S2196

A Novel Treatment Approach to Treatment-Resistant, Recurrent *Clostridioides difficile*

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Introduction: There have been increasing rates of recurrence of *Clostridioides difficile* colitis infection following standard antibiotic treatment in recent years. In antibiotic-refractory patients, fecal microbial transplant (FMT) has become the standard of care. Yet, there remains limited data on real-world practices as well as guidance on optimal timing of the procedure. Regimes outlining the duration of antibiotic course and timing of fecal microbial transplant may guide therapy in patients suffering from persistent C. *difficile* infection.

Case Description/Methods: A 36-year-old male with a previous medical history of persistent C. *difficile* presented to clinic for evaluation of diarrheal symptoms intermittently for the last 2 years, undergoing 12 unsuccessful treatment trials at a nearby clinic. At the current presentation, his serology was again positive for C. *difficile*; he was initiated on a 14-day course of fidaxomicin along with yogurt and probiotic supplementation. Subsequent serological PCR testing for C. *difficile* remained positive, consistent with CT abdomen and pelvis findings suspicious for enteritis. His recurrent resistance to standard therapy protocols inspired an unconventional treatment approach: another 14-day course of fidaxomicin, followed by fidaxomicin and cholestyramine for another 2 weeks, concluded by FMT. Two weeks following this regimen, serology was negative for C. *difficile*. Follow-up revealed no evidence of recurrence.

Discussion: The rationale behind the proposed approach can be attributed to bacterial and spore growth being the 2 major components contributing to C. *difficile* proliferation within the gut. Sufficiently low bacterial and spore loads allow for successful fecal microbial transplants, as the transplanted, healthy colonic gut flora will exist in high enough titers to prevail over the relatively lowered C. *difficile* bacterial titers. Fecal transplant then restores the normal gut microbiome composition, rendering C. *difficile* growth incapable of producing clinically significant disease. The aim of this case report is to equip clinicians with meaningful evidence to improve cure rates in treatment-resistant, recurrent C. *difficile* patients with an exemplary protocol ensuring success due to low bacterial and spore levels prior to fecal transplant.

S2197

A Case of Recurrent Urinary Tract Infections Secondary to Vaginovesicular and Vaginorectal Fistula

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Introduction: Enterovesical fistulas are a rare disease with an annular incidence of 0.5 per 100,000. The most common clinical presentations of enterovesicular fistulas are urinary tract infection. We present a rare case of a chemotherapy-induced vagionvesicular and vagionrectal fistula.

Case Description/Methods: Our patient is a 78-year-old female with a history of squamous cell anal cancer status post chemotherapy, cervical cancer status post total abdominal hysterectomy and recurrent E. coli urinary tract infections who presented with 3 weeks of painless, bright red blood per rectum without associated abdominal pain, nausea or vomiting. The patient's last colonoscopy was 6 years prior which had revealed a hyperplastic polyp. In the ED, she was found to have a hemoglobin of 7.2 with an MCV of 92.8. An abdominal CT scan revealed an ill-defining hyperattenuating material with single focus of gas between urinary bladder and rectum with concern for a possible colovesicular fistula. A CT Cystogram was unable to be obtained as the patient denied a foley placement. A CT abdomen/pelvis with oral and rectal contrast revealed nodular hyperdense material anterior to the rectum and along the posterior margin of the presumed urinary bladder confirming a colovesicular fistula. The patient was transferred to a tertiary care center for colorectal surgery (Figure).

Discussion: A radiation-induced fistula is a chronic and serious condition with a significant impact on quality of life. To our knowledge, this is the first case that reveals both a vaginovesicular and vaginorectal fistula secondary to chemotherapy treatment of squamous cell anal cancer.

[2197] **Figure 1.** Sagittal image of the right paramedian aspect of the pelvis shows 2 prominent locules of air within the vaginal vault and the decompressed urinary bladder. There are subtle curvilinear tracts of air extending from these locules.

S2198

### A Rare Case of Metastatic Primary Rectal Melanoma in a Geriatric Patient

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Introduction: Primary rectal melanoma (PRM) is a very rare and aggressive malignancy. It constitutes about 0.5-4% of all anorectal malignancies and less than 1% of all melanomas (1). It is more common in women and usually present in the fifth or sixth decade of life (1). The most common presenting symptom is rectal bleeding. Prognosis is poor with a median survival of 24 months and 5-year survival of 10%.

Case Description/Methods: A 72-year-old male, presented with bleeding per rectum, anal mass, and diarrhea for 11 months associated with anal pruritus. Significant examination findings include a soft, painful, friable mass protruding through the anus. The skin exam was negative for any abnormal skin pigmentation. Laboratory data was only remarkable for hemoglobin of 9.8gm/dl. CT abdomen and pelvis showed

numerous hepatic lesions, with the largest measuring 2.4cm, a large soft tissue at the anorectal junction with bilateral inguinal lymphadenopathy. Colonoscopy showed a friable mass at the anus, measuring about 3cm (Figure). Biopsy showed pigment-containing atypical pleomorphic cells positive for S100 and Sox 10 confirming the diagnosis of malignant rectal melanoma (Figure). The patient opted for hospice care.

Discussion: PRM is defined as melanoma arising from melanocytes in the rectal mucosa, more than 4 cm from the anal verge. Lymphatic metastasis to the inguinal or inferior mesenteric lymph nodes is common. Biopsy through colonoscopy or proctoscopy is the gold standard to establish the diagnosis. CT and Magnetic resonance imaging aid characterization, extent of the tumor and tumor staging. Useful markers commonly used include S100 protein, HMB 45, melanin A, and Sox 10. Multiple studies support that an abdominoperineal resection is the treatment of choice. This is based on the hypothesis that the disease spreads proximally via the submucosa to the mesenteric lymph nodes. Surgical resection with free margins is the goal of surgical treatment. New therapies are being studied, including immunotherapy, which can improve the dismal prognosis of this rare disease. The rarity of this disease and the limited number of patients presenting with the early disease have prevented definitive trials examining the optimal treatment for anal melanoma.
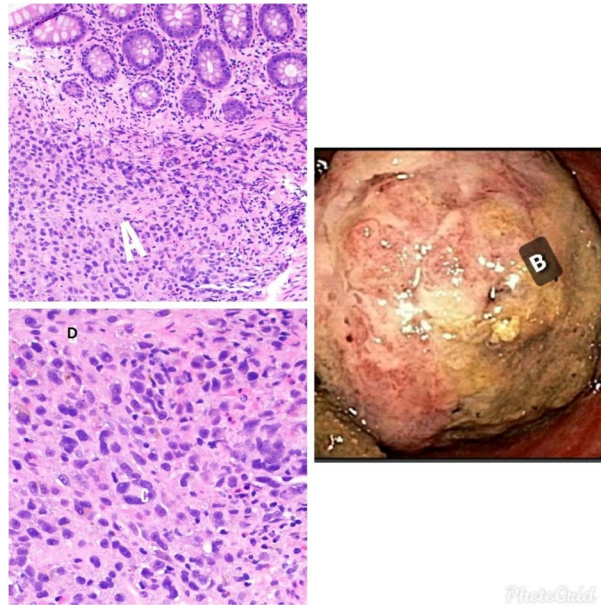
[2198] **Figure 1.** A: Submucosal melanoma. B: Rectal mass seen with colonoscope retroflexion. C: Atypical melanocyte with prominent macronuclei. D: Cytoplasmic pigment.

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1. Kohli S, Narang S, Singhal A, Kumar V, Kaur O, Chandoke R. Malignant melanoma of the rectum. J Clin Imaging Sci. 2014;4:4.

S2199

A Rare Case of Intestinal Spirochetosis in an Asymptomatic Immunocompetent Patient

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Introduction: Human Intestinal spirochetosis is defined as presence of spirochetes attached to the surface of the intestinal mucosa. Intestinal spirochetes comprise of a heterogeneous group of bacteria. In humans, Brachyspira aalborgi and Brachyspira pilosicoli predominate. Intestinal spirochetosis is primarily reported in developing countries and rare in places with high living standards. Immunocompromised patients and homosexuals are at higher risk for colonization and invasive human intestinal spirochetosis. Patients can be asymptomatic or present with diarrhea, abdominal pain, hematochezia and lower GI bleeding. We present a rare case of asymptomatic human intestinal spirochetosis with no risk factors.

Case Description/Methods: A 66-year-old White heterosexual male with past medical history of nicotine use disorder, alcohol dependence, and hypertension was referred to the gastroenterology clinic for persistently elevated liver enzymes and abnormal abdominal imaging results. He denied having any gastrointestinal or systemic symptoms except occasional diarrhea and was sexually active with only one female partner for last 40 years. CT scan of the abdomen & pelvis showed hepatic steatosis, sigmoid diverticulosis with sigmoid wall thickening and a fistulous communication between the sigmoid colon and bladder dome. An active open fistula between bowel and bladder was considered. Further evaluation with colonoscopy showed a total of 2 large polyps and multiple sigmoid diverticula but no evidence of fistula. Histopathology of biopsies showed hyperplastic, adenomatous polyps and spirochetes. Warthin-Starry stain was positive for Barchyspira spirochetes from all the tissue specimens. Patient was referred to an infectious disease specialist. HIV and Rapid Plasma Regain (RPR) were negative. The decision was made to monitor the clinical condition and avoid antibiotics for time being, given the absence of symptoms and concurrent alcohol use. A surgical evaluation was planned to look into a possible colo-vesical fistula, but patient was lost to follow-up (Figure).

Discussion: Intestinal spirochetosis is known to cause havoc in veterinary medicine, especially in the swine population (Our patient lived in a trailer park and worked with goats, chickens, dogs, and cats). Intestinal spirochetosis in humans and its clinical significance in an asymptomatic immunocompetent patient is poorly understood. Antibiotics are not recommended unless the patient is symptomatic. If recommended metronidazole is the choice of treatment.
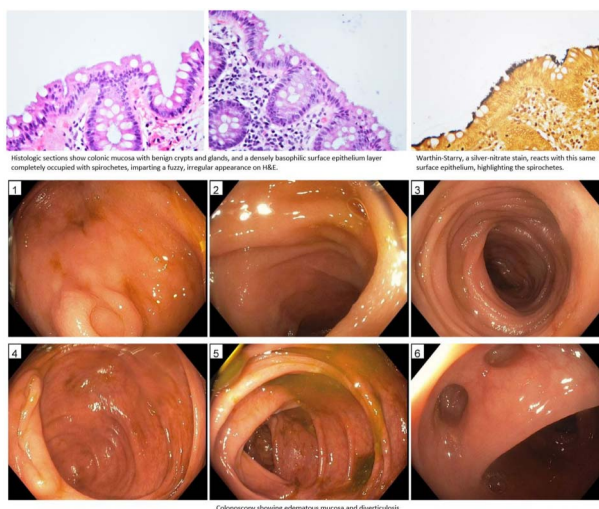
[2199] **Figure 1.** Intestinal Spirochetosis.

S2200

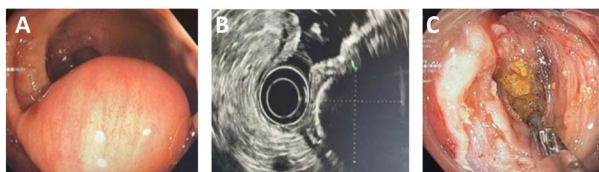**A Rare Case of Extraluminal Rectal Fecaloma**

Jelena Surla, MD[1], Fouzia Oza, MD[1], Ayla Benge, DO[1], Mladen Jecmenica, MD[2], Kristina Tanovic, MD[1], Barry Pernikoff, MD[3], Vikas Khurana, MD[1], Aman Ali, MD[1].
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Introduction: Fecaloma is usually an intraluminal stony mass of inspissated feces covered with layers of calcified shell. It can cause obstructive or compressive symptoms and sometimes even luminal rupture. It is usually managed conservatively and surgical removal is rarely needed. Most common sites for fecaloma are sigmoid colon and rectum. It is commonly associated with inflammatory bowel disease, Hirschsprung's disease, Chagas disease, psychiatric and bedridden patients, neoplasm or idiopathic chronic constipation. We present a unique case of extraluminal fecalith presenting as subepithelial rectal mass.
Case Description/Methods: A 60-year-old male with history of colon polyps underwent surveillance colonoscopy which showed a 3-4 cm firm rectal subepithelial mass that resembled a large lipoma or GIST (Figure A) Patient denied any symptoms including constipation or abdominal pain and had no family history of colon cancer. On endoscopic ultrasound (EUS) with radial and linear probe a subepithelial mass like lesion with calcified wall (Figure B) was noted. Multiple cold snare polypectomies were performed to de-roof the lesion as well as a deep "bite on bite/well biopsy technique" in order to get through the wall when feculent material and purulent debris was noted within the cavity (Figure C). Mucosal and muscular layer biopsies showed only vegetable fiber and fecal debris focally calcified consistent with fecalith. A CD 117 immunostain was negative excluding a GIST tumor. Historically this patient had an episode of complicated diverticulitis with phlegmon and microperforation in his 40s that was treated conservatively. Few months after that episode he had sigmoid colon resection with anastomosis in order to prevent future episodes.
Discussion: Although there are rare reported cases of extraluminal cecal fecalomas, to our knowledge this is the first reported case of extraluminal rectal fecaloma. We suspect that our patient developed fecal leakage through the suture line after sigmoid resection with anastomosis nearly 20 years ago. Over time, the leakage likely became a well-organized fecaloma with calcification. In summary, fecaloma is a differential diagnosis to consider when encountering a large subepithelial mass in the rectum.

[2200] **Figure 1.** Extraluminal Rectal Fecaloma. A. Colonoscopic imaging showing large subepithelial mass. B. Endoscopic ultrasound image showing subepithelial mass with calcified wall. C. Colonoscopic image showing feco-purulent material inside the mass.
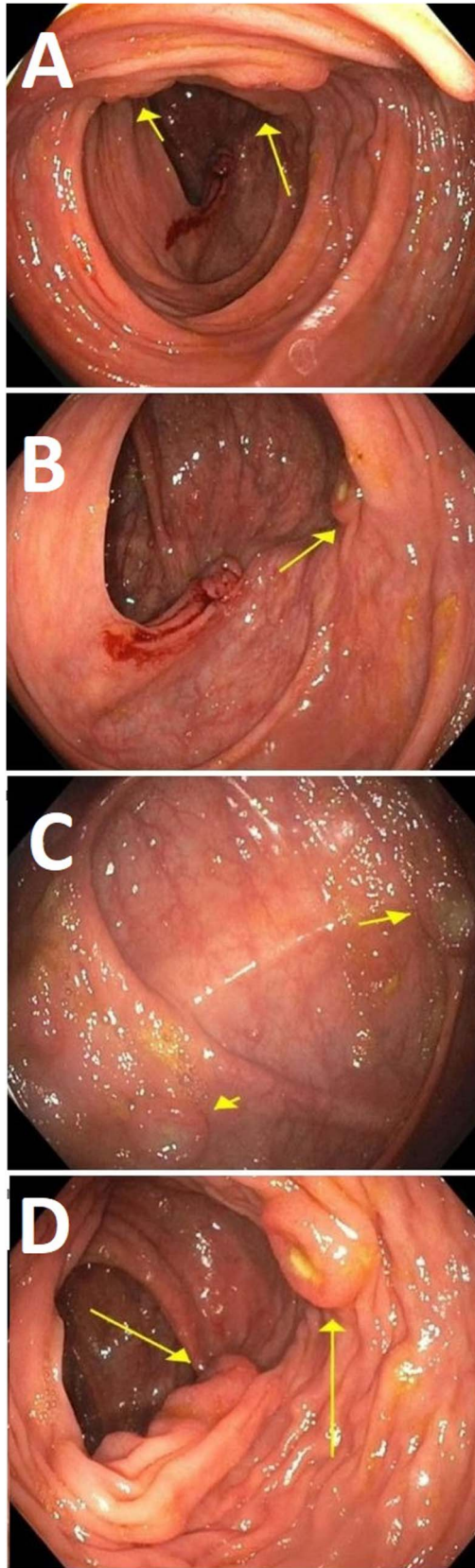

S2201

A Rare Case of Neuroendocrine Tumors Appearing in the Ascending and Transverse Colon

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Introduction: Neuroendocrine tumors in the colon occur infrequently. When they do occur, they are most frequently found in the rectum. However, increasing incidence of neuroendocrine tumors in other portions of the colon suggests a need to re-evaluate current guideline related treatment.
Case Description/Methods: A pleasant 77-year-old male with a PMH of COPD, CAD, HLD, recent diagnoses of LLL lung mass with hilar LAD, and significant metastatic disease in the liver, adrenal gland, and omentum, presented to the hospital for worsening fatigue. Patient's first colonoscopy was at age 50, with subsequent colonoscopies at 5-year intervals. No adverse findings were found in previous evaluations. Denied changes in bowel habits and polyps. Patient had undergone colonoscopy which had shown numerous 'volcano-shaped' masses with central ulceration. The lesions were found to be hard when biopsies were performed using cold forceps. The majority of these lesions were seen in the ascending and transverse colon. He had a single sessile polyp in the rectum, which appeared morphologically different than the proximal colon lesions. Per request of oncology team, a colonoscopy and IR-guided liver biopsy were performed. Colonoscopy and liver mass biopsy demonstrate a high-grade neuroendocrine carcinoma with metastasis resulting in cecal, ascending colon, and transverse polyps. Rectal polyp was found to have fragments of tubular adenoma and did not have high-grade dysplasia. Fragments of colonic mucosa share foci that are morphologically identical to the mass in the liver biopsy. Immunohistochemical analysis on tissue from pertinent portions of colon identified cell populations positive for pancytokeratin AE1/AE3 (punctuate dot pattern), CD56, synaptophysin, chromogranin, SATB2 and TTF-1. CDX2 was found negative. Ki67 proliferative index for sample colon tissue was found to be greater than 90-95% (Figure).
Discussion: This case illustrates morphological appearances of neuroendocrine tumors of the colon. Interestingly, patient did not have a rectal neuroendocrine tumor, the most common location for neuroendocrine tumor within the colon. This case also characterizes both the endoscopic and histological appearance of neuroendocrine tumors. It is important for gastroenterologists to be aware of luminal neuroendocrine tumors given their increasing incidence.

[2201] **Figure 1.** A: Transverse Colon. B: Hepatic Flexure. C: Cecum. D: Ascending Colon.

S2202

A Rare Case of Colonic Intussusception After Self Expandable Metal Stent Placement

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Introduction: Endoscopically placed colonic stenting is a palliative measure that can be used for unresectable etastatic colon cancer. It is a relatively safe procedure with a low mortality rate of about 1%. Intussusception is a rare complication of colonic stenting that occurs when the bowel telescopes about itself, possibly leading to obstruction or ischemia. Here we present a patient with intussusception 6 days after placement of a self-expandable rectosigmoid metal stent. We demonstrate successful reduction of rectosigmoid intussusception through a colonoscopy with air insufflation.

Case Description/Methods: A 35-year-old female presented with 3 days of constant and progressively-worsening rectal pain, bloody rectal discharge, and thin stool. Her past medical history was significant for metastatic colon cancer treated with sigmoid colectomy and chemotherapy 2 years prior, with recurrence of disease requiring palliative self-expandable rectosigmoid metal stent placement 6 days prior to arrival. Vital signs were normal. She did not appear in acute distress and was hemodynamically stable. Pertinent examination findings included lower abdominal tenderness, normal bowel sounds, and normal rectal tone. Labs revealed WBC 12.4, Hgb 13.2, Plt 443, AST 14, ALT 8, ALP 77, total bilirubin 0.7, and a lactate of 0.9. CT scan of the abdomen and pelvis revealed intussusception at the proximal sigmoid colon without evidence of bowel obstruction. Colonoscopy revealed ball-shaped mucosa with a dusky appearance at the proximal end of the stent, consistent with intussusception and ischemic colitis. The intussusception was successfully reduced with air insufflation through colonoscopy. The patient tolerated the procedure well and was started on a diet the next day with an improvement in her rectal pain and resolution of rectal discharge (Figure).

Discussion: Endoscopic colonic stenting remains a valuable palliative treatment for metastatic colon cancer. Survival rates of metastatic colon cancer do not significantly differ between palliative colonic stenting and colonic resection. However, there are fewer complications with colonic stenting than colectomy, making palliative stenting a preferred option. Intussusception is a rare complication of colonic stenting that is often treated surgically in adults. Here we demonstrate successful reduction of intussusception through colonoscopic air insufflation. We hope to bring awareness of this complication and consideration to air insufflation as first-line therapy.
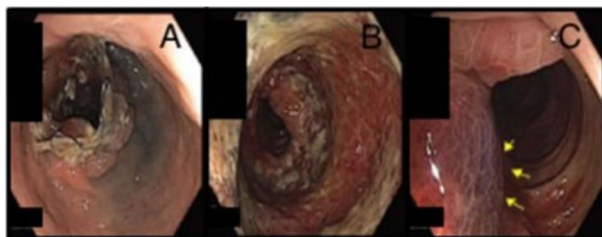
[2202] **Figure 1.** A. A view of the distal aspect of the rectosigmoid stent revealing adequate translocation of tumor mass without evidence of obstruction. B. A view of the proximal aspect of the rectosigmoid stent revealing a dusky appearance, with thickening of the bowel. C. A view of the proximal aspect of the stent with the ball-shaped mass in a dusky appearance consistent with intussusception, as seen by arrows.
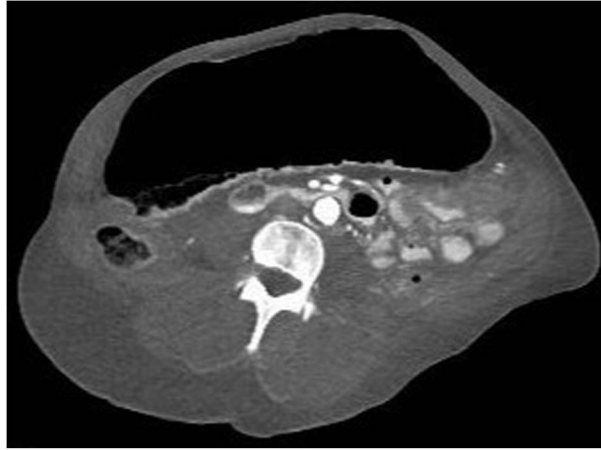
S2203

A Rare Case of Amyloid-Induced Colonic Pseudo-Obstruction

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Introduction: Colonic pseudo-obstruction is a rare complication of AL Amyloidosis that is described as a diffuse colonic dilation without underlying mechanical cause. In AL Amyloidosis, extracellular protein deposits disrupt tissue structure and function. Manifestations of colonic involvement of AL Amyloidosis include chronic diarrhea, weight loss, abdominal pain, and pseudo-obstruction. Here we present a patient with worsening abdominal pain and distention, found to have colonic pseudo-obstruction likely from AL Amyloidosis. Her symptoms improved with colonic decompression and with the utility of prokinetic agents.

Case Description/Methods: A 79-year-old female presented with 3 days of progressively worsening abdominal pain and distention, with associated constipation. Her past medical history was significant for anemia, AL-Amyloidosis diagnosed 4 months prior to arrival, and PEG placement 3 weeks prior to arrival due to worsening dysphagia secondary to macroglossia. Vital signs were normal. She did not appear in acute distress and was hemodynamically stable. Pertinent examination findings included abdominal distention, decreased bowel sounds, and diffuse abdominal tenderness. Pertinent labs included WBC 5.6 k/uL, albumin 2.1 g/dL, AST 39 U/L, ALT 43 U/L, ALP 196 U/L, and total bilirubin 0.3 mg/dL. Clostridium difficile, giardia lamblia, salmonella, and stool occult blood were negative. CT abdomen and pelvis revealed gaseous distention of the transverse colon and diffuse colonic wall thickening, as displayed in figure 1. Colonoscopy revealed diffuse dilation of the transverse colon, with components of inflammation including friability and loss of vascularity. Decompression was successfully performed through the colonoscope. The patient tolerated the procedure well and had marked improvement of abdominal distention and pain. Her percutaneous tube feeds were reinitiated and tolerated well. (Figure)

Discussion: Colonic pseudo-obstruction is a rare complication of AL Amyloidosis that is caused by deposits of protein in extracellular tissue. AL Amyloidosis is a multisystem disease that rarely presents with colonic manifestations. However, colonic manifestations may be the sole presentation of AL Amyloidosis. Colonic pseudo-obstruction remains a clinical challenge and can lead to bacterial overgrowth and malnutrition. Here we demonstrate successful air decompression of a colonic pseudo-obstruction due to AL Amyloidosis. We hope to increase awareness of AL Amyloidosis as an etiology colonic pseudo-obstruction.

[2203] **Figure 1.** CT Abdomen Pelvis reveals diffuse gaseous distention of the transverse colon with bowel wall thickening.

S2204

**A Rare Case of Medullary Carcinoma of the Colon With Lymphatic Metastasis**

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Introduction: Medullary carcinoma of the colon (MAC) is a rare cancer encompassing only .03% of all colorectal carcinomas. We present a rare case of MAC occurring in an older adult with a strong tobacco use history.

Case Description/Methods: A 76-year-old female with PMHx of tobacco use disorder, COPD, and known pulmonary nodules presented to the ED for surveillance of her pulmonary nodules. A review of systems was positive for chronic shortness of breath and cough. A CT scan of the chest revealed enlarging lung nodules and mediastinal adenopathy. A PET scan revealed a hypermetabolic 2.5 x 2.5 cm soft mass in the distal ascending colon and hypermetabolic lymph nodes in the right upper quadrant (**Figure**). Colonoscopy revealed an infiltrative 2 cm mass at the hepatic flexure, and pathology revealed an invasive, poorly differentiated adenocarcinoma with normal expression of MSH2 and MSH6 and absence of MLH1 and PMS2. These findings were consistent with medullary carcinoma of the colon. Endoscopic ultrasound with biopsy of peripancreatic and porta-hepatis lymph nodes favored metastatic medullary carcinoma. The patient underwent a right hemicolectomy and follows closely outpatient.

Discussion: MAC is a rare cancer associated with a high level of microsatellite instability and deficient mismatch repair proteins. It is a non-gland forming cancer composed of large polygonal eosinophilic cells growing in solid sheets and infiltrated with small lymphocytes. The majority of reported cases revealed a lack of MLH-1 and PMS2, just as our patient did. They instead express markers that are not commonly associated with colorectal cancers, such as calretinin, CK7, SATB2, and CDH17. MACs were previously difficult to differentiate from poorly differentiated adenocarcinomas due to their unique tumor marker expression and histopathology. The current standard for diagnosis of MAC therefore requires distinct microscopic morphology and molecular staining patterns. There are no current treatment guidelines due to the rarity of MACs, although MACs do have a favorable prognosis when compared to other adenocarcinomas and surgical resection and FOLFOX chemotherapy have been used successfully in some studies. Although MACs have been sporadically reported in case reports, further studies are required to determine guidelines for both diagnosis and treatment of this rare disease.
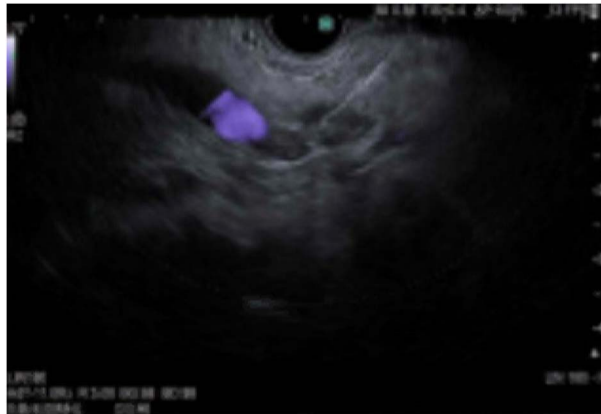
[2204] **Figure 1.** Endoscopic Visualization with Final Needle Aspiration of Abnormal Lymph Node.

S2205   WITHDRAWN

S2206


A Rare Case of Appendiceal Schwann Cell Hamartoma

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Introduction: Mucosal Schwann cell hamartoma (MSCH) is a rare, benign, neurogenic tumor characterized by a disorganized proliferation of S100-positive Schwann cells in the lamina propria, predominantly in the rectosigmoid colon. Most often, it is an incidental finding in a routine colonoscopy. Here we present an infrequently encountered case of appendiceal orifice MSCH.

Case Description/Methods: A 53-year-old male with a past medical history of hypertension, obstructive sleep apnea, obesity, depression, and knee osteoarthritis presented for surveillance colonoscopy. Three years ago, the patient had 2 sessile polyps removed, and interval colonoscopy at 3 years was recommended due to poor preparation. Repeat colonoscopy showed a solitary 4 mm polyp at the appendiceal orifice (Figure Panel 1). Biopsy of the polyp showed spindle cell proliferation of Schwann cell phenotype located in the lamina propria without nuclear atypia, pleomorphism, or mitoses (Figure Panel 2). Immunohistochemical stains were positive for S100 (Fig. 3) and negative for Desmin, SMM-HC, CD117, and CD34 (Figure Panels 4A-C).

Discussion: Benign nerve cell tumors are commonly described in the skin and soft tissue, and involvement of the gastrointestinal tract has been increasingly identified in the last decade. It is a rare disease of the colonic mucosa, often diagnosed during screening colonoscopy. They have been described as polyps less than one cm, predominantly discovered in descending colon and middle-aged females. Very few cases of appendiceal MSCH and gallbladder MSCH have been reported. Gibson and Hornick coined the term MSCH in 2009 to distinguish it from true "neuromas" and "neurofibromas." It is essential to accurately diagnose and distinguish it from other neuronal polyps - GIST, colorectal neurofibroma, mucosal neuromas, GI ganglioneuromas, mucosal perineurioma, inflammatory fibroid polyps, as some of these are associated with familial syndromes with worse outcomes and different management than MSCH. More studies are required to evaluate recurrences and long-term prognosis for MSCH. No association between MSCH and inherited syndromes or malignancies has been established. However, it should be considered an important differential diagnosis of incidental GI polyps and encourage clinicians to test for specific markers to rule out other causes and prevent aggressive or unnecessary treatments, thus reducing the burden on the health care resources.
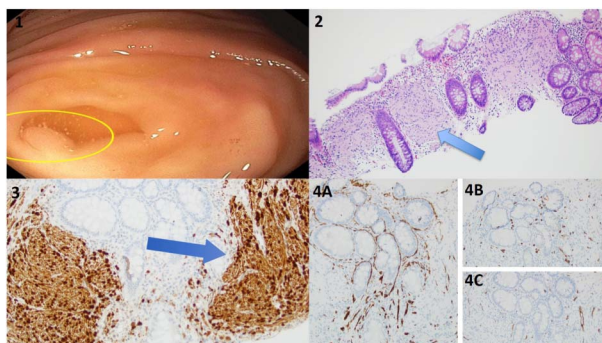
[2206] **Figure 1.** 1: Polyp at appendiceal orifice. 2: Spindle cell proliferation separating the crypts. 3: Spindle cell staining positive for S100. 4: Spindle cells are non-reactive to A. Smooth muscle myosin , B. CD117, C. CD34.

S2207

A Rare Case of Colonic Granular Cell Tumor

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Introduction: Granular cell tumors (GCTs) are rare submucosal tumors of Schwann cell origin. These tumors are typically benign but have malignant potential in up to 2 percent of cases. GCTs are most commonly found in the oropharynx, skin, subcutaneous tissue, and breasts. If found in the gastrointestinal tract, they are most likely to be found in the middle to lower third of the esophagus. Due to the rarity of colonic GCTs, our understanding of these tumors is limited to case reports.

Case Description/Methods: A 53-year-old woman with a past medical history of uterine fibroids complicated by iron deficiency anemia status-post hysterectomy, GERD, and IBS presented for her first screening colonoscopy. The patient previously suffered from blood loss anemia secondary to her leiomyomas, which corrected after a hysterectomy in 2017. She visited her primary care physician in June 2021 without any acute complaints. Labs at the time were notable for normal hemoglobin and no evidence of iron deficiency. Given her age, she was recommended for a screening colonoscopy. At the time of colonoscopy, the patient was found to have a submucosal non-obstructing large mass in the ascending colon. The mass was non-circumferential and measured one cm in length and 1.5 cm in diameter. A closed forceps was used to probe the lesion and pillow sign was negative. The lesion was biopsied with a cold forceps for histology with a plan for further resection. Histologic examination of the resected tissue revealed a GCT with positive S-100 staining (Figure).

Discussion: Colonic GCTs usually appear as small, isolated nodules or polyps located in the gastrointestinal tract with overlying mucosa and a yellowish hue. In patients with colonic GCT, the most common location typically involves the ascending colon, cecum, appendix, and rectum. Oftentimes patients are asymptomatic and GCTs are incidentally found on screening colonoscopy, as was the case in our patient. Patients with larger colonic GCTs may experience symptoms such as hematochezia and abdominal pain. Endoscopic ultrasonography is crucial in determining the invasion depth and nature of GCTs. Typically, colonic GCTs are characterized by homogeneous or mild heterogeneous hypoechoic nodules with a growth pattern within the mucosa or submucosa. A definitive diagnosis of GCT is based on histopathology, with the most typical findings including positive staining for S-100 protein. Endoscopic mucosal resection is considered the best strategy for tumors < 2 cm in diameter.
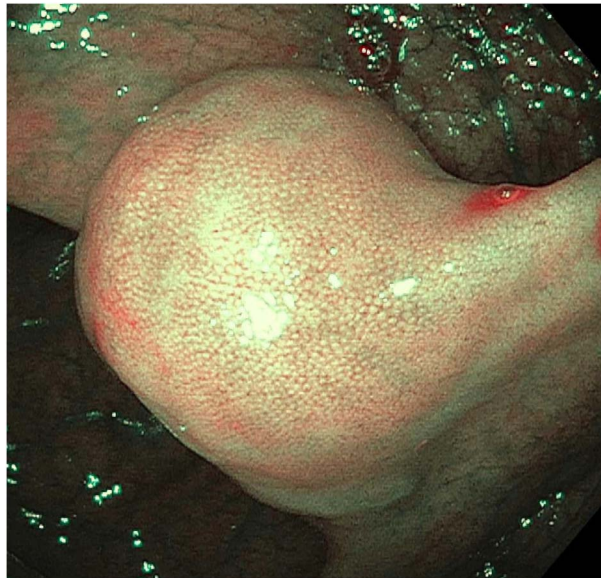
[2207] **Figure 1.** Gross examination revealed a 1.0 x 1.5 cm mass with negative pillow sign.

S2208

A Rare Case of Colonic Adenocarcinoma Presenting With Right Upper Extremity Weakness

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Introduction: Colorectal Cancer (CRC) is the 3rd most diagnosed cancer worldwide with a high incidence in the USA. Most common sites of involvement with metastatic colorectal cancer (mCRC) are liver and lungs. Brain metastasis (BM) and osseous metastasis (OM) are rarely seen, let alone as the initial presentation of CRC. BM confers poor prognosis among patients with CRC. Diagnosing BM remains critical, as early surgical intervention improves outcome. This is an unusual case of mCRC presenting with neurological deficits as a feature of atypical metastatic sites - brain and bone, with concurrent lung metastasis.
Case Description/Methods: A 62-year-old healthy female presented with 3 days of right upper extremity weakness. She denied any other neurological or GI complaints. Her mentation was intact but motor deficit of 2/5 in the right upper extremity was present. Labs were consistent with microcytic anemia (Hg 7.6 g/dL, MCV 71.5 fL), and elevated CEA level (36 ng/mL); transaminases were normal. CT head showed left frontal and right temporoparietal masses with vasogenic edema and mass effect upon left lateral ventricle. MRI brain was deferred due to claustrophobia. CTA chest revealed multiple nodules in bilateral lung fields and NM bone scan showed increased tracer uptake in bilateral ribs concerning for metastatic disease in lungs and bones, respectively. Concurrently, irregular wall thickening of the rectosigmoid colon suspicious for neoplasm was noted on CT abdomen. Dexamethasone was initiated and patient underwent right craniotomy with tumor resection. Pathology was positive for APC, tp53 and kras mutations, consistent with metastatic adenocarcinoma of colorectal origin. Patient was ultimately discharged home with hospice care and colonoscopy was deemed futile.
Discussion: Most common sites of mCRC are liver (50%) and lungs (36%), whereas metastasis to brain and bone is very rare and is often a late presentation. Increased risk of BM and OM is associated with known lung metastasis and KRAS mutation in a patient with primary CRC. The average time between detection of OM and diagnosing CRC is reported to be 21 months. We did not find any case describing simultaneous metastasis to lung, brain and bones from primary CRC at the time of diagnosis especially in the absence of hepatic lesions. Lastly, neurological deficit, as seen in our patient, is an uncommon presentation for CRC. Increased awareness of BM and OM in mCRC is crucial for early diagnosis and intervention.

S2209

A Rare Case of BRAF/MEK Inhibitor-Induced Colitis

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Introduction: Checkpoint inhibitors (e.g., PD-1, PD-L1, and CTLA-4) are first line treatments for metastatic melanoma but are increasingly recognized to cause GI toxicities, which may limit their use. We present a case of drug-induced colitis associated with the BRAF/MEK inhibitors encorafenib/binimetinib. These second line agents target mutated proteins in the MAP kinase signaling pathway and may be recommended for those who do not tolerate checkpoint inhibitors; however, they may also be a potential cause of colitis.
Case Description/Methods: A 59-year-old female with BRAF V600E-mutated metastatic melanoma was initially treated with ipilimumab (CTLA-4 inhibitor) and nivolumab (PD-L1 inhibitor). She developed CTC grade I diarrhea controlled with loperamide, but then also developed pathological fractures. Given disease progression and GI toxicity, therapy was stopped after 1 cycle. One month later, the patient experienced spontaneous colonic perforation attributed to her prior checkpoint inhibitors, necessitating left hemicolectomy and diverting ostomy. She was subsequently treated with encorafenib (BRAF inhibitor) and binimetinib (MEK inhibitor), but after 9 months developed dark stool, dyspnea, fatigue, and a hemoglobin of 5.6 g/dL from 10.2 g/dL one month prior. She had no diarrhea or other GI symptoms. Inpatient upper endoscopy revealed candida esophagitis. A colonoscopy found friable and ulcerated mucosa in the cecum and ascending colon. Pathology was notable for chronic inflammation of the lamina propria with eosinophilic infiltrates consistent with drug-induced colitis. The patient was treated with pRBC transfusions and fluconazole. Given her stable bony metastases and improved liver metastases, her BRAF and MEK inhibitors were withheld. At outpatient follow-up 4 months later, the anemia had resolved.
Discussion: Checkpoint inhibitors are well known causes of diarrhea and colitis. Patients with these complications and BRAF-mutated malignancies may be recommended to use BRAF and MEK inhibitors instead. However, the development and treatment of colitis related to these therapies are far less understood. Herein we present a patient who developed symptomatic anemia with no other potential source besides BRAF/MEK inhibitor induced colitis which improved after cessation of therapy. Given the risk of severe adverse events, it is important for clinicians to recognize that BRAF and MEK inhibitors may also cause clinically significant colitis.

S2210

A Rare Retroperitoneal Mass Simulating a Complicated Diverticulitis

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Introduction: Extra-gastrointestinal stromal tumors (EGISTs) are a group of rare neoplasm that arises from cells outside the gastrointestinal (GI) tract but with similar pathologic characteristics as of gastrointestinal stromal tumors (GISTs). They account for only 5% of all GISTs involving the retroperitoneum, mesentery or omentum. EGISTs typically presents as large intra-abdominal masses with unspecific symptoms and are known to have a more aggressive behavior than its GI counterpart.

Case Description/Methods: A 50-year-old male inmate with no medical history presents to the ED after having unquantified episodes of non-bloody, non-watery diarrhea and vomiting of gastric content for 5 days prior to admission. The patient also reports subjective fever and constant left quadrant abdominal pain. Upon physical exam, he was found with signs of dehydration, a distended abdomen with hyperactive bowel sounds, and a non-mobile large mass on the left lower quadrant with tenderness to light palpation. Laboratories were remarkable for neutrophilic leukocytosis, thrombocytosis, and elevated inflammatory markers. Abdomino-pelvic CT revealed a large left heterogeneously enhancing retroperitoneal mass with central necrosis measuring 18.6 cm AP x 18.4 cm transverse x 25.3 cm CC causing mass effect over the left kidney with loss of intervening fat planes, flattening of the left adrenal gland and displacement of the stomach, small and large bowel with almost complete collapse of the distal transverse and descending colon. Core-needle biopsy revealed high-risk GIST with positive immunohistochemistry for C-KIT, CD34, CD56, actin, and desmin with a very high mitotic index (45 mitosis/25 HPF). Surgery was deferred due to large size of mass and closure to adjacent structures. Neoadjuvant therapy with Imatinib was started but patient was lost to follow up upon discharge.

Discussion: This case describes a rare presentation of EGIST emerging from the retroperitoneum with a positive immunohistochemistry for desmin and manifesting as a complicated diverticulitis. Although there is limited data about its origin, EGISTs and GISTs are recognized to be molecularly identical. Furthermore, because EGISTs are found outside the GI system, symptoms only appear when the tumor has progressed to an advanced stage giving it a worse prognosis. As a result, having EGIST as a differential diagnosis for abdominal mass is crucial. More research is needed to better understand the behavior, prognosis, and treatment options of these tumors.

S2211

A Rare Case of Refractory Immune Checkpoint Inhibitor Colitis Complicated by Concurrent *Clostridioides difficile* Infection

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Introduction: Immune checkpoint inhibitor (ICI) colitis is a well-documented complication of novel antineoplastics. Herein we present a rare case of steroid and infliximab (IFX) refractory ICI colitis complicated by concurrent *Clostridioides difficile* infection (CDI).

Case Description/Methods: A 59-year-old female with a past medical history of metastatic stage IV non-small cell lung cancer treated with pembrolizumab initially presented with a complaint of 10 non-bloody diarrhea episodes per day. A PCR was positive for CDI and the patient was prescribed PO Vancomycin. Despite 5 days of treatment, symptoms continued to worsen, and the patient was admitted for fevers and PO intolerance. CT A/P showed acute proctocolitis involving the large bowel from the rectum to the cecum. Colonoscopy showed severe pan colonic inflammation, ulcerations in the terminal ileum, and active colitis on biopsy. ICI colitis was suspected and the patient was started on high-dose steroids followed by IFX for grade 3 ICI colitis with significant improvement in stool frequency, abdominal pain, and a decrease in CRP. One month after discharge, the patient had recurrent symptoms with a PCR positive for CDI and was readmitted after again failing to improve on vancomycin. She was started on fidaxomicin and high-dose steroids. Flexible sigmoidoscopy again revealed active colitis, no obvious pseudomembranes, and biopsy suggestive of possible ICI colitis. Vedolizumab was started for recurrent ICI colitis with a resolution of diarrhea (Figure).

Discussion: Treatment of ICI colitis ranges from symptomatic management (grade 1) to hospitalization, IV fluid resuscitation, and systemic steroids (grades 3-4). Steroid refractory cases have been shown to respond to IFX in up to 80% of patients. As in our patient, vedolizumab has been shown to be effective in cases of steroid and IFX refractory ICI colitis. ICI colitis with superimposed CDI has been reported a handful of times. Antineoplastic agent use has been established as a risk factor for CDI through possible alterations in the normal gut flora. Fecal microbiota transplantation (FMT) has been described as a successful treatment option for ICI colitis with superimposed CDI resistant to antibiotics, steroids, IFX, and vedolizumab. Further studies should be conducted on whether FMT is an effective treatment option for ICI colitis with superimposed infection. As the use of ICIs continues to increase, clinicians should be aware of the therapeutic options available for the treatment of this rare entity.
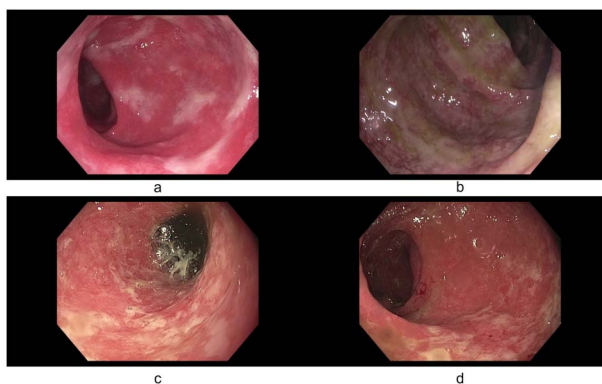
[2211] **Figure 1.** a: Colonoscopy image 1. b: Colonoscopy image 2. c: Flexible sigmoidoscopy 1. d: Flexible sigmoidoscopy image 2.

S2212

A Rare Systemic Illness Presenting With Fever and Abdomen Pain

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Introduction: Erdheim-Chester disease (ECD) is a rare non-Langerhans cell histiocytic disease. ECD can practically involve any organ system in the body with common organs involved being skeletal system, cardiovascular system and the central nervous system. Rarely, other organs like breast, liver, spleen, kidney, testis and thyroid glands were reported to be involved.

Case Description/Methods: A 51-year-old female presented to our emergency with fever and left upper quadrant pain abdomen of 10 days. Historically, she was symptomatic for last 3 years with complaints of intermittent fever, knee joints pain, polyuria, nocturia and polydipsia. Contrast enhanced computer tomography (CECT) chest and abdomen showed bilateral pleural and pericardial effusion, thrombosis in splenic vein and right portal vein, splenic infarct, bilateral urothelial thickening with perinephric fat stranding, soft tissue thickening around the aorta and asymmetrical bulky adrenals. PET-CT revealed Flouro-deoxyglucose (FDG) avid ill-defined lesion in the pericardium which was extending into the inter-atrial and atrioventricular septum and FDG avid asymmetrical mural thickening of aorta extending from ascending thoracic aorta up to the infrarenal abdominal aorta. There was presence of bulky tail of pancreas, bulky left adrenal, lytic lesions involving left femoral head, right sacrum and mandible, FDG avid lesions involving meninges, sella and cranial venous sinuses. Tc-99m bone scan showed increased tracer uptake in maxilla, mandible, bilateral forearm bones, bilateral femurs and bilateral tibia. PET guided biopsy from the lytic bone lesion in the right sacrum showed presence of cluster of atypical histiocytes with occasional multinucleated Touton type giant cells. The cells also showed granular cytoplasmic positivity for BRAFV600E, confirming the diagnosis of Erdheim Chester disease (ECD). She was initiated on oral vemurafenib, BRAF inhibitor, at a dose of 240mg twice a day.

Discussion: ECD presenting with splenic infarct has not been described previously. A thorough evaluation and targeted biopsy confirmed the diagnosis. *BRAF*V600E is the most common mutation noted in these patients, seen in nearly 60% of the patients and the patients with *BRAF* mutations respond well to vemurafenib, a kinase domain inhibitor of mutant *BRAF*. Here in, we report a patient of ECD who presented with multisite venous thrombosis and splenic infarct, a rare manifestation of ECD, who was treated successfully with vemurafenib.

S2213

A Uncommon Presentation of Invasive Colonic Amebiasis

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Introduction: Intestinal parasitic infections are more common in developing countries. There is an increased risk for morbidity and mortality in individuals with certain risk factors, such as HIV, due to related enteropathy, favoring parasitic intestinal colonization. When symptomatic, most cases of amebic colitis present with abdominal pain, diarrhoea and/or hematochezia. We present a case of an asymptomatic female immigrant with HIV, who was found to have invasive cecal amebiasis on screening colonoscopy.

Case Description/Methods: A 52-year-old woman presented to GI clinic for screening colonoscopy. She has a PMH of HIV, diabetes, hypertension, hypothyroidism and asthma. She was asymptomatic and denied GI symptoms, travel, smoking or illicit drug/alcohol use. She migrated from Dominican Republic many years ago, and denied any episodes of diarrhoea or abdominal pain. Her vitals were HR 115, BP 108/74, RR 16, T 97 F, SpO2 98%, and she had a normal physical exam. Labs: CD4 859, HIV RNA < 30; WBC 9, 0.2% eosin, CRP 12. She proceeded to have colonoscopy which revealed a hyperplastic polyp and shallow, serpiginous cecal mucosal ulcerations, negative for malignancy. At follow up, she again denied GI symptoms and had a benign abdominal exam. An IBD panel and GI PCR panel were tested to assess for possible infective/inflammatory causes. GI panel was positive for E. Histolytica, and coupled with the characteristic cecal ulcerations, a diagnosis of invasive intestinal amebiasis was made, for which she was treated with antibiotics (Figure).

Discussion: Amebic colitis in HIV patients usually affects men who have sex with men due to fecal-oral transmission from anal/oral sex. It often presents with abdominal pain, diarrhoea, or in severe cases, peritonitis from colonic perforation. Some risk factors for complicated/invasive infections are alcoholism, malnutrition, and malignancy. What makes our case unique is the presence of invasive amebic colitis in an asymptomatic female patient with HIV, and no history of anal sex, malignancy, or alcoholism. Her only risk factors were migration from a developing country and HIV infection, albeit well controlled, reflected by favourable CD4 count and viral load. It was fortunate that she was eligible for screening colonoscopy as it yielded findings of an invasive infective colitis, requiring treatment, and possibly prevented a more catastrophic presentation as a consequence of colonic perforation. This brings into question the possible role for routine amebic screening in high-risk populations.

[2213] **Figure 1.** Continuous area of shallow, serpiginous ulcerated mucosa in the cecum, with stigmata of recent bleeding.

S2214

A Rare Case of Secondary Extramedullary Plasmacytoma With Ileocecal Involvement

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Introduction: Extramedullary plasmacytomas (EMPs) are a rare type of plasma cell dyscrasia characterized by the neoplastic proliferation of plasma cells in soft tissue.EMPs share characteristics with multiple myeloma (MM) and can present as primary tumors or secondary to other plasma cell neoplasms.Herein we present an extremely rare case of a patient with established MM who was found to have an asymptomatic ileocecal mass with biopsy findings consistent with secondary EMP.

Case Description/Methods: A 62-year-old female with a past medical history of MM and Ulcerative Colitis (UC) presented to the gastroenterology clinic for evaluation of her UC before consideration of an experimental therapy trial for her refractory MM.On presentation, she denied changes in her bowel habits or blood in her stool. Lab results 2 weeks prior to presentation were significant for leukopenia at 2.9k/uL, normocytic anemia with hemoglobin at 8.5gm/dL, Calcium 8.2 mg/dl, and total protein of 5.7g/dl. Colonoscopy showed nodular, ulcerated mucosa at the hepatic flexure as well as a large polypoid non-bleeding, non-obstructing, non-circumferential mass at the ileocecal valve. Histopathology of the mass returned positive for CD138 Kappa and negative for lambda AE1/AE3, CAM 5.2, GATA3, ER, consistent with a diagnosis of plasma cell myeloma. The patient continued on salvage chemotherapy but passed shortly thereafter (Figure).

Discussion: Plasma cell neoplasms (PCNs) involving extra-osseous tissues are known as extramedullary plasmacytomas (EMPs).EMPs are further classified into primary EMPs, which are localized proliferation of clonal plasma cells in the absence of a systemic plasma cell dyscrasia, and secondary EMPs, where there is already a known primary PCN present. To the best of our knowledge, secondary EMP involving the small intestine and cecum is rare and only reported in a handful of case reports.Due to the indolent course of EMPs, nonspecific gastrointestinal manifestations may go undiagnosed in a subset of patients with MM. The prognosis of secondary EMP involving the gastrointestinal tract remains unclear, however, the limited data we have indicates a poor prognosis.On the other hand, novel treatments of MM continue to improve survival rates in patients with MM. As mortality in these patients decreases, the incidence of secondary EMPs is expected to proportionately rise as well. As such, more data is needed to understand how to monitor and treat this patient population for extramedullary involvement in order to generate good outcomes.
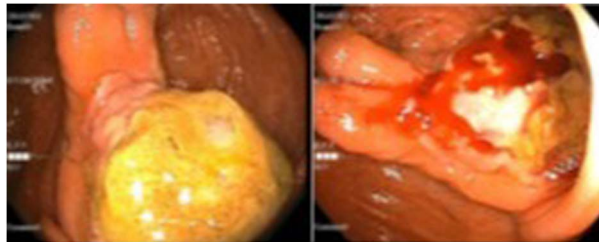
[2214] **Figure 1.** Large polypoid non-bleeding, non-obstructing, non-circumferential mass at the ileocecal valve before and after biopsy.

S2215

A Unique Approach to the Management of a Colovaginal Fistula With Closure Using Esophageal Stent, Guidewire and Padlock Clip

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Introduction: The risk of colonic perforation from a colonoscopy was found to be 0.03-0.8%. The risk of a fistula occurring after colonic anastomosis can be up to 10%. Currently, management has included fully covered self-expanding metal stents, endoscopic clipping with suturing, and endoscopic vacuum therapy.

Case Description/Methods: We present a 61-year-old female patient, with a past medical history of hypertension, hyperlipidemia, gout, end-stage renal disease on peritoneal dialysis and awaiting kidney transplant who underwent a screening colonoscopy and had an iatrogenic perforation of the rectosigmoid area at 20cm from the anal verge from a presumed perforated diverticulum. Management consisted of an Exploratory Laparotomy with sigmoid colectomy and primary anastomosis. Four months later, the patient presented with passing stool through her vagina, consistent with a colo-vaginal fistula. She was admitted, and she underwent colonoscopy where an EGD scope was advanced about 12-15cm to the anastomosis site; however, it was difficult to identify the site of the fistula. A 50-50% mixture of cyanoacrylate and lipid oral solution were injected submucosally. Then, a 23mmx12cm fully covered esophageal stent was deployed with subsequent single stentfix OTSC clip from OVESCO was applied. Few days after the procedure, the patient was diagnosed with pneumoperitoneum without significant peritonitis, and this was managed conservatively. A month later, she underwent flexible sigmoidoscopy with removal of stentfix clip and the stent. There was a large ulceration from the stent dilation at the anastomosis site. Due to the size of the ulcer, no intervention was performed. Her pelvic pain resolved and she stopped passing stool through her vagina, but she continued to pass air through her vagina. Subsequent barium X-ray revealed a persistent colo-vaginal fistula, and flexible sigmoidoscopy was attempted 3 weeks later to help close the colo-vaginal fistula. The scope was advanced into the vagina and with the help of a catheter, a 021G guidewire was passed from the vagina through the fistula into colonic anastomosis. A Padlock clip was attached to the tip of the endoscope and inserted into the rectum. The fistula was centered with the help of the guidewire into the Padlock clip and the clip was released successfully. The guidewire was then pulled out from the vagina.

Discussion: This case demonstrates a unique approach for patients with colo-vaginal fistulas for whom traditional techniques are unsuccessful.

S2216

A Rare Case of Symptomatic Colonic Lymphangioma

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Introduction: Lymphangiomas are benign lymphatic lesions, most frequently identified in the head and neck. Colonic lymphangiomas occur but are rare and represent less than 1% of all lymphatic malformations. These lesions are often asymptomatic and discovered incidentally during routine colonoscopy. We present a case of a symptomatic colonic lymphangioma manifesting as a large mass requiring surgical resection.

Case Description/Methods: A 42-year-old male presented with the complaint of lower abdominal pain. Associated symptoms included nausea with no vomiting, and he denied family history of gastrointestinal malignancies. At presentation, vital signs were stable and abdominal exam was benign. Laboratory studies were unremarkable, but a Computed Tomography (CT) abdomen/pelvis with contrast revealed a 6.6 x 7 x 6.6 cm colonic mass near the hepatic flexure. Follow up colonoscopy demonstrated a large, subepithelial-appearing mass in the ascending colon protruding more than 90% into the lumen. Retroflexed view revealed 2 x 2 cm ulceration on the proximal aspect of the lesion. Serum tumor markers including CEA, CA 19-9, and CA 125 were all within normal limits and additional CT imaging revealed no metastatic lesions. Biopsies resulted back demonstrating superficial portions of colonic mucosa with mild focal inflammation. However, surgical evaluation was advised given the mass size and the patient thus underwent an elective laparoscopic right hemicolectomy. Tissue samples were sent for evaluation and revealed lymphangiomatosis/lymphatic malformation/cystic lymphangioma centered in the colonic submucosa with extension into the subserosal tissue. No cellular atypia or malignancy was identified, and 24 lymph nodes were benign. These pathology findings were confirmed by expert review at a tertiary center, where it was noted that this case also lacked features of congenital lymphangiectasia. During post-operative follow-up, the patient was reported to be progressing well (Figure).

Discussion: Lymphangiomas have an incidence of less than 0.20% and intra-abdominal lymphangiomas represent only a fraction of cases. Although most colonic lymphangiomas are asymptomatic and identified incidentally, they can lead to an array of symptoms and severe complications such as obstruction, intussusception, and perforation requiring surgical intervention if large. Although colonic lymphangiomas are rare, it is important to be aware of their rising incidence to help facilitate accurate and timely diagnosis to prevent complications.
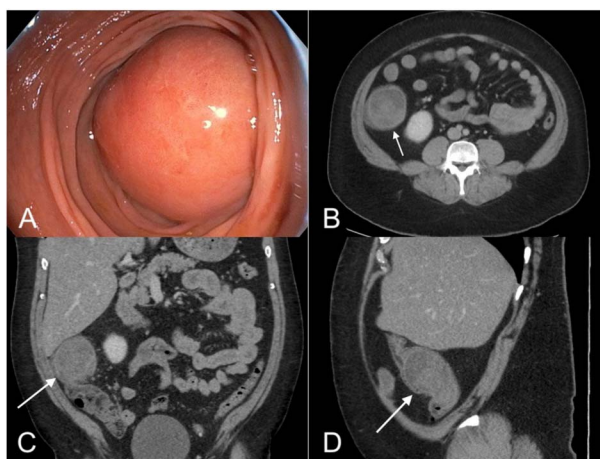
[2216] **Figure 1.** A. Colonoscopy. Submucosal mass in the ascending colon involving more than 90% of the circumference. Figure B. CT axial image. Mass in the ascending colon/hepatic flexure. **Figure** C. CT coronal image. Mass in the ascending colon/hepatic flexure. **Figure** D. CT sagittal image. Mass in the ascending colon/hepatic flexure.

S2217

A Rare Case of Synchronous Double Volvulus of the Sigmoid Colon and Cecum

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Introduction: Colonic volvulus is one of the leading causes of large bowel obstruction. Synchronous cecal and sigmoid volvulus is a rare presentation. Cecal volvulus and sigmoid volvulus have traditionally been thought of as separate clinical presentations with distinct clinical features, radiological findings, and treatment modalities. We focus on the classical radiological findings, uncharacteristic presentations, and definitive treatment to prevent recurrence, morbidity, and mortality.

Case Description/Methods: A 67-year-old female with a past medical history of severe chronic constipation secondary to stercoral colitis presents to the emergency department complaining of abdominal pain for 5 days. Pain is diffuse, and associated with nausea and vomiting. The last colonoscopy performed 4 years ago, was normal. The patient was in immense pain and was not able to provide further information. On presentation, the patient was afebrile, BP 127/52, HR 73, RR 16 breaths/min. The abdomen was distended, and peritoneal sounds were auscultated in all quadrants but were worse in lower quadrants bilaterally. X-ray of the abdomen showed pneumoperitoneum and dilated bowel related to stercoral colitis. Subsequent CT abdomen showed small volume ascites, hollow perforated viscus, markedly distended

cecum with peri-cecal inflammatory changes, and significant wall thickening with inflammation in the sigmoid colon secondary to concurrent cecal and sigmoid volvulus. The patient immediately underwent exploratory laparotomy, ileocecectomy with primary anastomosis, sigmoidectomy with primary anastomosis, and abdominal washout (Figure).

Discussion: When evaluating acute abdomen, we propose consideration of synchronous large bowel volvulus is a rare and easily missed etiology of large bowel obstruction due to challenging radiological presentation. Even with detailed cross-sectional imaging like CT scan, it is possible to miss coexisting cecal volvulus due to massively enlarged sigmoid volvulus causing mass effect. The preferred treatment is total or subtotal colectomy with or without anastomosis on a case-to-case basis. This approach provides the advantage of avoiding the risk of recurrence and histopathological analysis to rule out underlying malignancy. Commonly, only one type of large bowel volvulus is found radiologically, it is advisable to pay attention to the possibility of coexisting cecal volvulus and a definitive diagnosis being made intraoperatively.
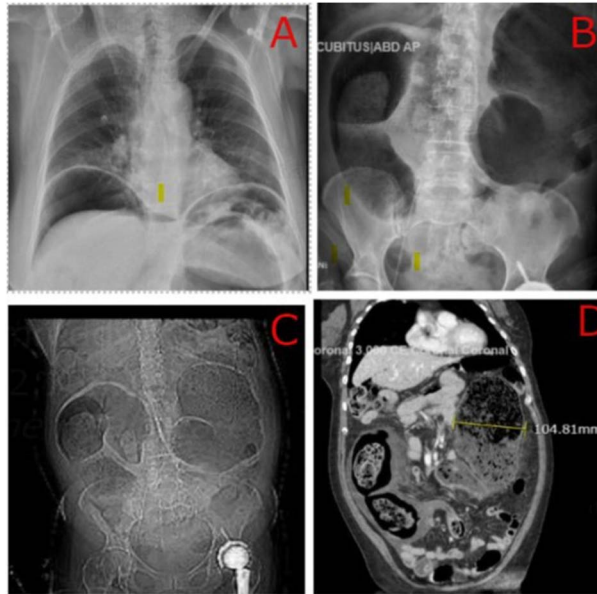
[2217] **Figure 1.** A. Chest X-ray showing gas under diaphragm; B. Volvulus with dilated caecum and Sigmoid colon on Abdominal X-ray; C. Scout film of the CT scan abdomen; D. Twisted Caecum with dilated sigmoid colon on axial film.

S2218

A Rare Case of Rectovesical Fistula Originating From Urothelial Carcinoma of the Bladder

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Introduction: Rectovesical fistula an abnormal connection between the bladder and rectum. It is a complication that may be caused by laparoscopic surgery, diverticular disease, Crohn's disease, malignant tumor invasion and states of chronic inflammation. Fistulas occurring as a complication of bladder carcinoma are a rare finding.

Case Description/Methods: A 68 year-old-male with a history of diabetes mellitus, coronary artery disease, human immunodeficiency virus, sick sinus syndrome, prostate cancer with transurethral resection and radiation, invasive urothelial cancer, stress incontinence with artificial urinary sphincter, suprapubic catheter, urinary tract infections (UTIs), and bilateral nephrostomy tubes came to the emergency department for watery non bloody diarrhea occuring 10 times daily for 1 month, weight loss and loss of appetite. Patient was anuric. On presentation, vitals were stable. Early laboratory indicated leukocytosis, acidosis, and hyperkalemia (Table). Urinalysis showed leukocyturia, bacteriuria, hematuria and 3+ leukocyte esterase. Urine culture was positive for *Enterococcus faecium* vancomycin-resistant enterococcus (VRE). Blood cultures revealed *Enterococcus faecium* VRE and *Escherichia coli.* Computed tomography (CT) of abdomen and pelvis without PO or IV contrast was negative. Infectious workup of stool including *Clostridium difficile* were negative. A decrease in hemoglobin prompted colonoscopy which showed a 40mm rectovesical fistula with a foley seen through the fistula and urine in the rectal vault (Images A/B/C). He had urinary diversion with bilateral nephrostomy placement along with diverting colostomy. He received palliative radiation for hematuria secondary to bladder cancer with plans for immunotherapy outpatient (Figure).

Discussion: Fistulas occurring from the bladder to the gastrointestinal (GI) tract are rare with 5% of enterovesical fistula from bladder carcinoma, frequently from urothelial carcinoma. Symptoms include recurrent UTIs, faecaluria, pneumaturia and dysuria. Less commonly, chronic watery diarrhea, melena and hematemesis. CT scan with PO or rectal contrast is the diagnostic test of choice. Endoscopic examination and cystoscopy can be useful in cases where CT scan is nondiagnostic. Treatment is individualized to each patient. Common treatments include surgical diversion of urinary and GI tracts as well as surgery. Moreover, excrement from the GI tract in the form of watery diarrhea can be a misleading symptom of rectovesical fistula in high risk patients.
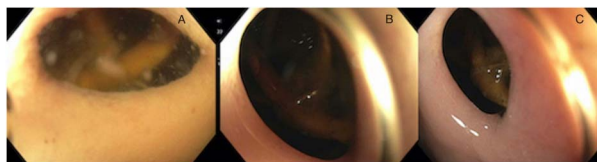
[2218] **Figure 1.** Images A/B/C: Colonoscopy images of a fistula extending from the bladder to the rectum with foley in the bladder. Image A: Urine is seen in rectum.

Table 1. Laboratory Values

Blood Chemistry	Values	Reference Range
Sodium	139	136 - 145 mmol/L
Potassium	5.7	3.5 - 5.3 mmol/L
Chloride	119	98 - 110 mmol/L
CO2	15	20.0 - 31.0 mmol/L
BUN	23	6.0 - 24.0 mg/dL
Creatinine	1.6	0.6 - 1.2 mg/dL
White blood cell (WBC)	16.40	4.40 - 11.0 10*3/uL
Hemoglobin	8.6	13.5 - 17.5 g/dL
Hematocrit	27.2	38.8 - 50.0%
Platelets	282	150 - 450 10*3/uL

S2219

A Rare Subtype of Colorectal Cancer Presenting as a Contained Perforation

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Introduction: Colonic perforation comprises 3-10% of the initial presentation of Colorectal Cancer (CRC). Signet Ring Cell Carcinoma and Mucinous Adenocarcinoma are 2 distinct subtypes which occur with a very low incidence of 10-20% and 0.9-4%, respectively. Both are usually diagnosed at an advanced stage and have an overall worse prognosis than other types of CRC. Here we present a rare case of colonic mucinous adenocarcinoma with signet ring cell features manifesting as a contained perforated intra-abdominal mass necessitating surgery.

Case Description/Methods: A 60-year-old male presented with fatigue, shortness of breath and anemia with hemoglobin of 4.8 g/dL. A computed tomography (CT) scan of the abdomen and pelvis was obtained which showed an intraperitoneal mass with a central necrotic component and air, suggesting communication to the small bowel. Due to the initial concern of a possible contained perforation, colonoscopy was deferred despite the patient never having one previously. Ultimately, the patient underwent a diagnostic laparoscopy which showed a large intra-abdominal mass with a mucinous surface involving multiple parts of the small bowel and sigmoid colon. This mass was removed along with a small bowel and sigmoid colon resection. Pathology was notable for moderately differentiated mucinous adenocarcinoma of the sigmoid colon with focal signet ring features with negative margins and no evidence of lymphovascular invasion. He was eventually discharged with instructions to follow up with Oncology for further treatment. (Figure)

Discussion: Mucinous adenocarcinoma is characterized by the presence of abundant extracellular mucin which accounts for at least 50% of the tumor volume. Signet ring cells have copious amounts of mucin in the cytoplasm and nuclei located at the cell periphery. These lesions are usually located in the right colon and share similar characteristics on CT imaging including segments of concentric bowel wall thickening and ulcerations. Studies have shown that even a minor signet-ring cell component in CRC was associated with higher patient mortality. This becomes evident as these tumors diffusely infiltrate the submucosa with full thickness involvement of the bowel wall and have a high propensity for pelvic, peritoneal and ovarian metastasis. Treatment centers on surgical resection with adjuvant chemotherapy showing some benefit. Our case highlights an atypical presentation of a rare subtype of CRC for which gastroenterologists should maintain a high index of suspicion.
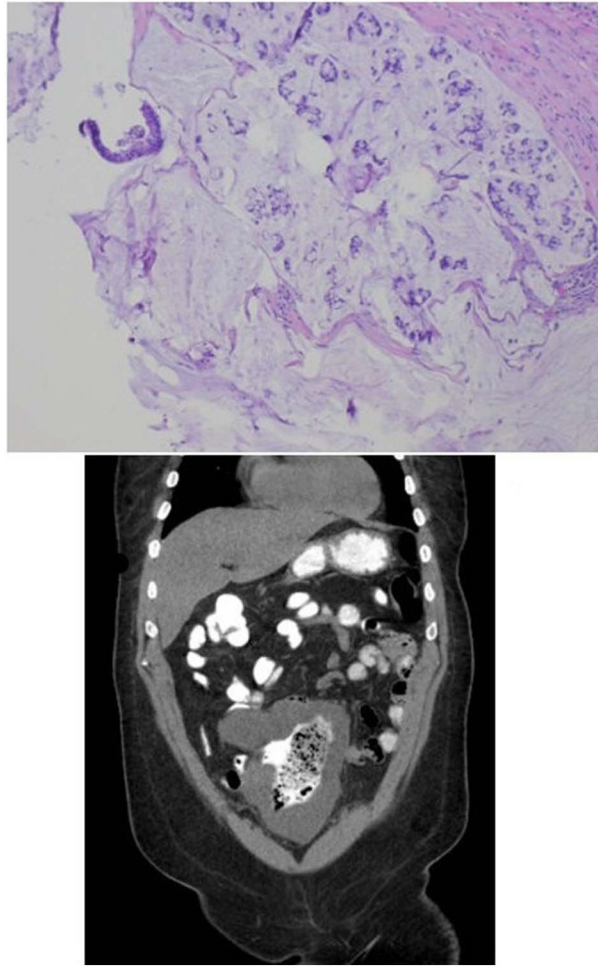
[2219] **Figure 1.** (Top) Signet Ring Cells in background of mucus (from sigmoid colon) (Bottom) Computed Tomography (CT) scan showing an intra-abdominal mass with a contained perforation.

S2220

A Solitary Extramedullary Plasmacytoma Found in the Sigmoid Colon

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Introduction: Plasmacytomas are rare tumors made of a single line of plasma cells that can appear anywhere in the body, but the majority arise in the bone marrow. Extramedullary plasmacytomas (EMPs) represent less than 5% of cases, and only 5% of EMPs occur in the gastrointestinal (GI) tract. GI EMPs occur most commonly in the small intestine, followed by the stomach; colonic EMPs are rare. We present a case of a solitary extramedullary plasmacytoma found in the sigmoid colon on routine colonoscopy.

Case Description/Methods: A 75-year-old female with a history of hypertension and diabetes presented for evaluation of sour taste in her mouth and epigastric pain, and also for average-risk colorectal cancer screening. Esophagogastroduodenoscopy showed Los Angeles Classification grade A esophagitis and patchy gastric erythema with Helicobacter pylori infection confirmed from random gastric biopsies. Colonoscopy showed an erythematous nodule in the sigmoid colon, and polypectomy was performed (**Figure**). Pathology showed plasma cell population with immunostaining that was overwhelmingly positive for IgG and kappa consistent with extraosseous plasmacytoma. A repeat colonoscopy was performed in 4 months which confirmed complete removal of the plasmacytoma. The patient was referred to a hematologist with evaluation pending.

Discussion: Colonic EMPs are rare. Patients can either be asymptomatic or present with abdominal pain, melena, and hematochezia. Once confirmed on pathology, patients should undergo extensive work-up including a complete blood count, comprehensive metabolic panel, and positron emission tomography to assess for more extensive involvement. Radiation therapy is warranted if complete surgical resection is not achieved, and these patients must be monitored closely for signs and symptoms of multiple myeloma. It is crucial for gastroenterologists to understand the significance of this rare finding to facilitate a comprehensive evaluation.

[2220] **Figure 1.** An erythematous nodule in the sigmoid colon.

S2221

A Rare Case of Triple Synchronous Colon and Metachronous Breast Cancer in an Elderly Male

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Introduction: Although rare, Multiple Primary Malignancies (MPM) are being commonly found due to rise in elderly cancer survivor population, increased awareness and management. MPMs can be classified into synchronous (detected < 6 months) or metachronous (detected >6 months) after diagnosis of primary cancer.

Case Description/Methods: A 77-year-old AA male patient with a history of gout, seizures, anemia, hypertension and hyperlipidemia initially presented with a Hb of 5.8, 8 months prior to index presentation which was treated with blood transfusion but was lost to follow up for a colonoscopy. At index presentation, his Hb was 5.5. A CT AP showed a 4 cm mass in the ascending colon, hepatosplenomegaly and a 1 cm right adrenal mass. Colonoscopy showed 4.5 cm sigmoid colon invasive moderately differentiated adenocarcinoma, a 1.5 cm hepatic flexure adenocarcinoma and a 5 cm moderately differentiated adeno-carcinoma in ascending colon. CEA was noted to be 19.6. No evidence of metastasis was noted. He underwent total abdominal colectomy with 0/13 pericolonic lymphnodes without evidence of metastasis with a T3N0M0 stage. MLH-1, MSH-2, MSH-6, PMS-2 negative. A follow up CT AP for the adrenal mass and subsequent work up was suggested but he was lost to follow up. Three years later, he was found to have a 3 x 2.5 cm grade 2 invasive ductal carcinoma in the left breast with ulceration which was CDX2 and TTF1/Napsin negative, GATA-3 positive suggestive of a primary breast neoplasm. He was HER-2 negative, ER+, PR+, Ki-67 - 60.78% strong with lymphovascular and perineural invasion with a pT4 stage. A CT chest showed multiple metastatic lesions not amenable for biopsy by interventional radiology or by EBUS. He underwent left palliative mastectomy, palliative radiotherapy to spinal metastasis and palliative chemotherapy for breast cancer. CEA was 5.6 (Figure).

Discussion: This patient is unique in that 3 large synchronous colon cancers and a large metachronous primary breast neoplasm were found in a male patient. To the best of our knowledge, this is a first reported case of a triple synchronous colon and a breast cancer in a male which is not metastatic but a metachronous cancer. Previous case reports were noted in females. Also, unique to this patient is the presence of ductal invasive carcinoma as opposed to lobular breast cancer reported previously. The association between breast and colon cancers should not be dismissed merely as metastasis and males should undergo a thorough physical exam during follow up.
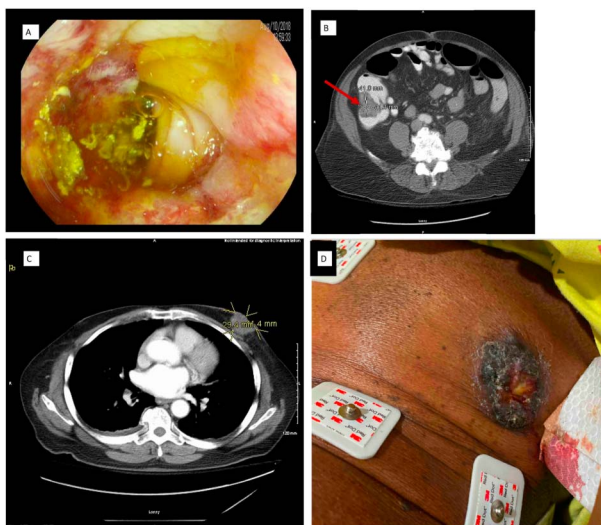
[2221] **Figure 1.** A - Sigmoid colon adenocarcinoma B - Apple core mass in the ascending colon C - Left breast mass without lymphadenopathy D - Ulcerated left breast mass involving areola.

S2222

A Rare Case of Primary Leiomyosarcoma of the Colon versus Metastasis

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Introduction: Leiomyosarcoma (LMS) is an aggressive soft tissue tumor that is rarely found in the gastrointestinal (GI) tract. Commonly misdiagnosed as a gastrointestinal stromal tumor (GIST), LMS incidence is now more accurately identified and rarer than previously thought due to advances in immunohistochemical (IHC) staining over the last 20 years. LMS can be distinguished from GIST by its distinctive IHC staining positive for smooth muscle actin (SMA) and desmin and negative for markers CD117, CD34, DOG1. We present the case of a patient who was found to have a colonic polyp with increased mitotic activity and ultimately diagnosed with metastatic LMS.

Case Description/Methods: A 72-year-old woman with history of uterine fibroids post hysterectomy underwent a routine screening colonoscopy. She was found to have a diminutive polyp in the hepatic flexure identified as a smooth muscle neoplasm with increased mitotic activity. A follow up colonoscopy 6 months later also revealed a polyp with smooth muscle neoplasm with high mitotic activity (2-3 per one high-power field). IHC staining on both polyps showed positive SMA and negative GIST markers (**Figure**). Proliferation index (Ki-67) was 20%. The differential diagnosis was rare primary leiomyosarcoma of colon versus metastasis. Abdominal and pelvis imaging with CT and MRI was nonrevealing. Three months after the follow up colonoscopy, the patient had ongoing neck pain and was found to have a lung mass and bone metastasis identified as LMS. She received multiple chemotherapy agents and then anastrozole after tumor hormone staining was estrogen receptor positive.

Discussion: We present an interesting case of metastatic leiomyosarcoma involving colon, lung, and bone with unknown primary. Because LMS spreads hematogenously, it is difficult to identify the primary LMS lesion. Her history of uterine leiomyoma is another potential source. Initial expert consultation indicated primary smooth muscle neoplasm of colon with 40% chance of progression. It became clear due to the discovery of additional foci of metastasis that the colonic lesions were also metastasis. We share this case to highlight a constellation of overlapping characteristics of mesenchymal tumors in the GI tract. The distinction among LMS and GIST with proper IHC staining is extremely important since treatment is vastly different. If the diagnosis is not immediately clear, like in our case, expert pathology evaluation, a multidisciplinary approach, and close endoscopic follow up are of the upmost importance.
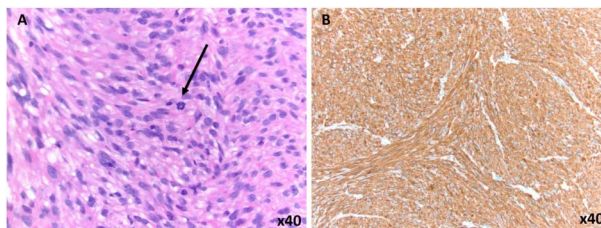
[2222] **Figure 1.** High magnification pathology slides. (A) Mitotic figure identified by arrow. (B) IHC staining confirms the smooth muscle nature of this neoplasm as tumor cell are positive for SMA.

S2223

A Rare Case of Sporadic Metastatic Rectal Small Cell Carcinoma With Primary Biliary Cholangitis

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Introduction: Small cell carcinoma (SmCC) of the gastrointestinal (GI) tract is a rare and highly aggressive malignancy with an estimated prevalence of 0.1% to 1% of all GI tumors. The only known risk factor is a positive family history with no other known associations between SmCC and other conditions in the literature. We present a rare case of a metastasized sporadic mixed neuroendocrine-small cell rectal carcinoma in a patient with primary biliary cholangitis (PBC).

Case Description/Methods: A 49-year-old woman with biopsy-proven PBC on ursodiol therapy was admitted due to 3 months of worsening rectal pain and bleeding. Liver chemistries revealed AST 146 IU/L, ALT 122 IU/L, ALP 1,106 IU/L, and total bilirubin 4.7 mg/dL. A CT scan showed multiple liver and pulmonary nodules concerning for metastatic disease in addition to an ill-defined mass in the rectum. MRCP confirmed the innumerable liver lesions with normal caliber biliary ducts. Colonoscopy showed a large, ulcerated rectal mass without obstruction but narrowing of the rectal vault (**Figure**), biopsy was strongly positive for synaptophysin, chromogranin, INSM, CD56, Villin and SATB2 suggestive of poorly differentiated neuroendocrine carcinoma, small cell type, with intact staining for MLH1, MSH2, MSH6 and PMS2 showing no evidence of mismatch repair. Patient was discharged in stable condition and started chemotherapy for metastatic SmCC with carboplatin/etoposide (Atezolizumab not approved by insurance). Unfortunately, patient expired due to complications of chemotherapy.

Discussion: Our case reports a clinical and morphological presentation of a rare sporadic small cell carcinoma with mixed neuroendocrine features in a patient with PBC. Only a handful of cases exist in literature describing small cell neuroendocrine tumors, and all appear to have very poor prognosis, typically occurring in older patients. Hindgut neuroendocrine tumors are typically asymptomatic until they obstruct or metastasize and are often found incidentally on colonoscopy. An age-appropriate colonoscopy in our case could have led to better outcomes, hence emphasizing its importance. It was interesting to note the history of PBC in our patient, but an association between PBC and SmCC has not been well studied and more research is needed to establish a relation.
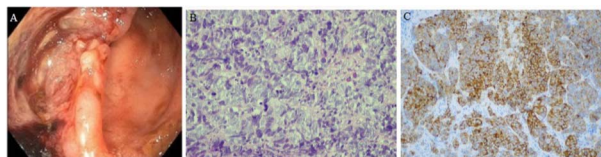
[2223] **Figure 1.** A) large, ulcerated rectal mass without obstruction, B) H&E stain, C) biopsy stained for synaptophysin.

S2224

A Rare Cause of Diarrhea: Intestinal Spirochetosis in an HIV-Positive Patient

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Introduction: Intestinal spirochetosis (IS) is a rare infection defined by the histologic presence of spirochetal organisms colonizing the colonic epithelial cells. The most common implicated organisms are Brachyspira aalborgi or Brachyspira pilosicoli.(1) Histopathology characteristically shows a thickened brush border due to the adhesion of spirochetes to the colonic mucosa and eosinophilia. Prevalence in the general population is 2%. There is a higher prevalence in men who have sex with men and those with a positive HIV status. (2,3)

Case Description/Methods: We report the case of a 56-year-old man with HIV who presented with 3 to 4 episodes of diarrhea daily for 4 months without associated mucous or blood. He denied abdominal pain, nausea, vomiting, weight loss, or recent antibiotic use. Screening colonoscopy 2 years ago was unremarkable. He has regular follow-up in infectious disease clinic and is on antiretroviral therapy with a normal CD4 count. Colonoscopy was performed and revealed normal colonic mucosa without evidence of inflammation or ulceration. Biopsies were taken throughout the colon to evaluate for microscopic colitis. Histopathology (H&E and Warthin-Starry stains) demonstrated colonic epithelium with spirochetal organisms and a false brush border confirming a diagnosis of IS (**Figure**). We treated him with a 10-day course of metronidazole with resolution of diarrhea.

Discussion: Intestinal spirochetosis is an unusual cause of diarrhea. Most cases of IS are asymptomatic and incidentally discovered; however abdominal pain, bloating, and overt bleeding can also occur. Invasion beyond the surface epithelium is associated with symptomatic IS. Antimicrobials such as metronidazole typically lead to symptomatic remission. This case highlights the importance of considering IS in the differential in HIV-positive patients with nonspecific gastrointestinal symptoms after more common etiologies have been ruled out. Additionally, colonoscopy with biopsy remains invaluable for diagnosis.
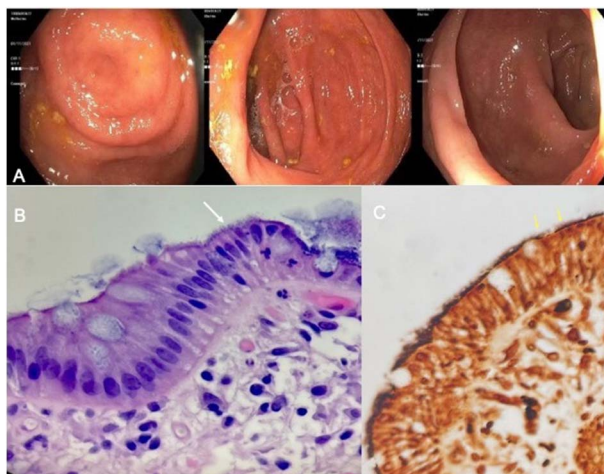
[2224] **Figure 1.** Panel A shows colonoscopy images demonstrating normal endoscopic appearance of colonic mucosa. Colon biopsy stained with hematoxylin and eosin (H&E) and Warthin-Starry stains (panels B and C), respectively, show spirochetes adhered to the mucosa that resemble the thick brush border characteristic of IS.

S2225

A Rare Finding of Primary Cecal Melanoma as a Cause of Lower GI Bleed

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Introduction: Primary melanomas of the GI tract are relatively uncommon. Cases in the Gi tract have been confirmed in the esophagus, small bowel and anorectum from prior published reports. The occurrence of primary malignant melanoma or secondary primary melanoma in the colon is very rare. In this case, we report secondary primary melanoma presenting as lower GI bleed.

Case Description/Methods: A 78-year-old male with history of melanoma of the scalp removed 10 years ago presented for anemia. GI was consulted for lower GI bleed. He underwent endoscopy and colonoscopy for evaluation of lower gastrointestinal bleed. Colonoscopy revealed a large circumferential ulcerative mass occupying the entirety of the cecum past the ileocecal valve. The biopsy showed sheets of malignant cells with prominent nuclear pleomorphism on a background of abundant necrosis. The pathology report was consistent with metastatic malignant melanoma based on morphology and immunophenotype. He underwent extensive workup to identify the primary lesion. PET-CT showed abnormal focal uptake only within the right colon and no other primary lesion identified. MRI brain with contrast did not show any abnormal enhancing lesions. The patient further underwent complete dermatological evaluation along with examining the previous melanoma area of the scalp. The conclusion was that the colonic mass is likely secondary primary melanoma (Figure).

Discussion: Presentation of melanomas within the alimentary tract are usually metastatic in origin. The occurrence of melanoma in the colon is atypical, because melanocytes are embryologically absent in the large colon. In a 2018 report there were less than 35 cases of right colon melanoma reported up to that date. Primary melanoma survivors have an increased risk of second primary melanoma. A population-based study conducted from 1973-2006 that included 89,515 patients showed overall subsequent primary cancer increased to 28%. One quarter of these were subsequent melanoma. They also had an elevated risk of breast, prostate and Non-Hodgkins lymphoma. There were no reports of second primary colonic melanoma. Currently, there is no current guideline for screening for second primary colonic neoplasm. Treatment and diagnosis require a multidisciplinary treatment approach including chemotherapy, radiation, surgery and immunotherapy. This case demonstrates that even though it is rare, health care providers have to be cognizant about a possible second primary colonic melanoma in the setting of prior history of melanoma.

[2225] **Figure 1.** A: Colonoscopy image showing large circumferential ulcerative mass occupying the entirety of the cecum B: Colonoscopy imaging showing circumferential mass with blood clots identified at the cecum C: Abnormal Uptake in the right colon.

S2226

A Rare Case of Submucosal Granular Cell Tumor Presenting as a Single Colon Polyp

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Introduction: Granular cell tumor (GCT) is a soft tissue neoplasm that is known to originate from Schwann cells. It may occur anywhere in the body however only 5-11% arise within the gastrointestinal tract with the majority occurring within the esophagus. Rarely, GCT may arise in the colon mimicking a benign colon polyp. We present an unusual case of a patient diagnosed with a colonic submucosal GCT.

Case Description/Methods: A 61-year-old male with past history of gastroesophageal reflux disease presented with mild intermittent diffuse aching abdominal pain for the last 10 years. The patient reported a single episode of hematochezia at the time of symptom onset. Physical exam, laboratory studies, and imaging were largely unremarkable. Colonoscopy revealed an 8 mm firm submucosal nodule in the ascending colon (Figure A). The lesion was completely resected using hot snare polypectomy. Histopathologic exam of the specimen revealed large polyclonal cells with abundant granular, eosinophilic cytoplasm and wavy nuclei (Figure B, C). Immunohistochemical analysis confirmed the diagnosis of GCT by positive staining of S-100 (Figure D) and CD68. The patient was scheduled for surveillance colonoscopy.

Discussion: GCT is most commonly seen in middle-aged women in the head, neck, skin, and subcutaneous tissues. 65% of gastrointestinal GCTs arise within the esophagus followed by the duodenum, anus, and stomach. Although the majority of GCTs are benign there is a 1-2% risk of malignancy. Malignant GCTs have a poor prognosis with a reported 3-year mortality of 60% with high rates of recurrence and metastasis. Colonic GCT is extremely rare with only 130 cases reported so far and its management has not been widely studied. Depending on tumor size and extent, complete resection with polypectomy vs endoscopic mucosal resection is the safest and recommended treatment for submucosal GCTs with follow-up colonoscopy. As the majority of colonic GCTs have a benign appearance on endoscopic examination, it's important to follow up with histopathological analysis to differentiate it from other colonic lesions. Gastroenterologists should consider GCT in the differential diagnosis of submucosal colonic tumors.
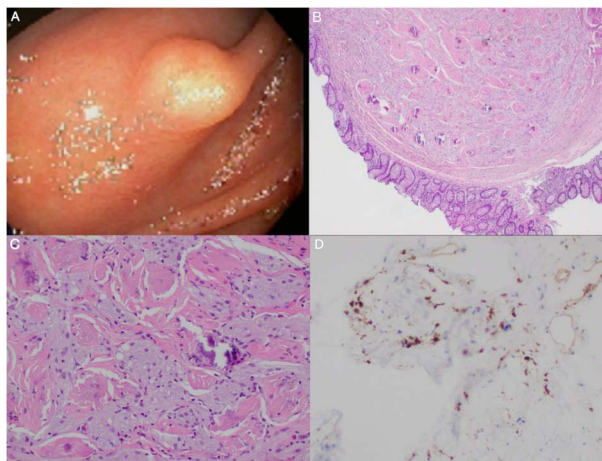
[2226] **Figure 1.** (A) Colonoscopy image of granular cell tumor in the ascending colon appearing as an 8 mm submucosal nodule. (B) H&E stain showing submucosal tumor covered with normal mucosa (magnification 40x). (C) H&E stain showing large polyclonal cells with abundant granular, eosinophilic cytoplasm and wavy nuclei (magnification 200x). (D) Immunohistochemical analysis showing positive staining of S-100 (magnification 200x).

S2227

A Rare Case of Primary Diffuse Large B Cell Lymphoma of the Colon

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Introduction: Primary colorectal lymphomas are rare and account for 0.3% of all large intestinal malignancies, with Diffuse Large B-Cell Lymphoma (DLBCL) representing the most common subtype. We present a case of primary colonic DLBCL that was diagnosed after surgical resection of the sigmoid colon.

Case Description/Methods: An 86-year-old White female with a past medical history of diverticulosis and atrial fibrillation presented to the emergency department complaining of abdominal cramping and rectal bleeding. Physical examination was significant for mild abdominal tenderness and vital signs revealed blood pressure of 151/83 mmHg. Laboratory investigations were significant for white blood cell count of 10.56 x 10^3 cells/uL and potassium 2.8 mmol/L. Abdominal and pelvic computed tomography with contrast revealed sigmoid colonic diverticulosis with interposition of colon between liver and right hemidiaphragm. The patient underwent colonoscopy that showed a stricture of benign intrinsic appearance in the sigmoid colon measuring 10 cm in diameter and 3 cm in length. Histological analysis of tissue biopsies taken at that time were only significant for mild to moderate colitis. After colonoscopy, she was taken for laparoscopic low anterior resection of the sigmoid colonic mass that was later converted to an open approach due to the size of the mass. After the incision was extended, the sigmoid colon was further mobilized and the uninvolved portions of the proximal rectum and descending colon were transected. After the sigmoid colon was removed and sent to pathology, the proximal rectum and descending colon were anastomosed with no air leaks identified. Pathology report of the surgical specimen later showed malignant lymphoma with transmural invasion and involvement of numerous adjacent pericolonic nodes with negative tumor margins. Immunostains revealed the tumor to be positive for BCL-2, BCL-6, CD10, and CD20 but negative for CD3 and BCL-1. High proliferative activity was discerned for KI-67 staining in 90% of tumor cells; all evidence supporting the diagnosis of DLBCL. After an uneventful postoperative period and clinical improvement, the patient was discharged to home for close follow-up.

Discussion: Primary colonic lymphomas are rare and usually present with nonspecific symptoms. Although in the case discussed, the patient did not present with any obvious predisposing conditions for DLBCL, further data is necessary to determine other possible associations and develop a standardized treatment regimen.

S2228

A Segmental Colitis Associated With Diverticulosis versus Inflammatory Bowel Disease: A Diagnostic Dilemma Despite Total Proctocolectomy

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Introduction: Patients with diverticular disease can develop segmental colitis associated with diverticulosis (SCAD). It can range from mild inflammatory changes to chronic active inflammation that mimics inflammatory bowel disease (IBD). SCAD usually presents a more benign outcome, with a low rate of complications. Here, we present a complex case in which a diagnosis was still unclear till the final stage of the management.

Case Description/Methods: A 60-year-old female was admitted for hypovolemic shock. She was resuscitated, and the GI was consulted for the management of IBD. She was recently diagnosed with ulcerative colitis about 2 months ago. She has abdominal pain in the right lower side, and examination revealed mild abdominal tenderness. She was already on prednisone 60 mg daily for 2 weeks and infliximab maintenance dose (completed 2 doses) and mesalamine from the last admission. She has had 3 colonoscopies in the past. The first colonoscopy 6 months ago showed a normal rectum, unable to traverse the sigmoid colon due to stricture and diverticulosis. The biopsy showed a normal rectum and a very focal area of cryptitis. The last colonoscopy 2 months ago showed a severely inflamed ulcerated mucosa in the sigmoid colon (**Figure, left**). Colon biopsy showed mild acute cryptitis and distorted and branched crypts. No crypt abscesses or granulomas were seen. On this admission, CT enterography showed pancolitis. Serology for Crohn's disease (CD) was negative, including ASCA IgA and ASCA IgG. The strong differential diagnosis was SCAD vs.IBD. The decision was to continue with the medical treatment (i.e., completion of steroid course, infliximab, and follow the response) and was discharged. The patient again presented with a shock one month after this admission. Unfortunately, she had colonic perforation and had total proctocolectomy with ileostomy creation. Pathology of surgical specimens revealed mild chronic active colitis and severe diverticular disease with associated transmural inflammation (**Figure, right**). Ileum excision showed no significant pathologic changes unlikely to be CD. The patient was doing well till the last follow-up.

Discussion: This is a unique case where the diagnosis of SCAD vs. IBD was unclear regardless of the availability of serology, endoscopic, surgery, and histopathological examinations. In this complex case, we suggest a multidisciplinary team approach to improve patient-centered care.
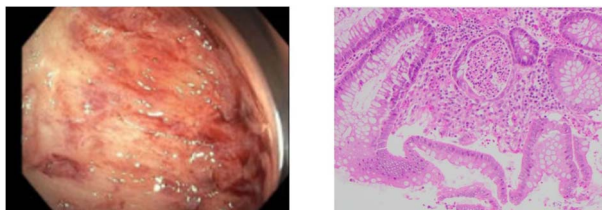
[2228] **Figure 1.** Left: colonoscopy showing inflamed ulcerated mucosa in the sigmoid colon. Right: Pathology shows mild chronic active colitis and severe diverticular disease.

S2229

Acquired Dextrocardia?: A Striking Consequence of Sigmoid Volvulus

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Introduction: Dextrocardia is a rare variation of cardiac embryology. Mechanical malposition of the heart in the right chest by adjacent structures is often confused with dextrocardia. This case emphasizes the distinction by illustrating a right-sided heart due to a sigmoid colon volvulus. The case reminds us of the presentation, management, and an uncommon complication of sigmoid volvulus.

Case Description/Methods: A 97-year-old man with chronic obstructive pulmonary disease (COPD) on home oxygen, atrial fibrillation, and chronic constipation presented to an outside hospital after 4 days of exertional shortness of breath. He was hypoxic with SpO$_2$ of 84% without use of home oxygen, which improved with nasal cannula. His admission exam noted diminished breath sounds bilaterally but no wheezing. Chest radiography showed no acute abnormalities, but chronic left hemi-diaphragmatic elevation with stable mediastinal shift, seen on recent studies (Figure A). He was treated empirically for COPD exacerbation. That evening, however, he developed acute abdominal pain and vomiting. A CT scan of the abdomen was performed and re-demonstrated left hemi-diaphragmatic elevation with several colonic loops extending into the chest, resulting in rightward deviation of the heart. However, there was also a new abrupt caliber change just proximal to the descending colon and sigmoid junction where apparent twisting of the mesocolon was noted, concerning for volvulus, a condition that the patient had in fact experienced previously (Figure B). The patient was urgently transferred to our hospital for surgical evaluation. Upon arrival, the gastroenterology service was consulted, and the patient underwent endoscopic decompression of a sigmoid volvulus (Figure C). After decompression, he was kept on a strict bowel regimen and discharged. Definitive surgical management was deferred given the patient's age and comorbidities.

Discussion: A sigmoid volvulus can present with abdominal bloating, pain, vomiting, and constipation. Bowel obstruction secondary to sigmoid volvulus is a gastrointestinal emergency. For patients who achieve successful endoscopic decompression, surgical resection of the sigmoid is often recommended. Though uncommon, the patient in this case also had shortness of breath, possibly related to distended bowel causing diaphragmatic elevation and compression of the ipsilateral lung. This level of bowel distension resulted in a noteworthy rightward deviation of the mediastinal contents, including the heart.
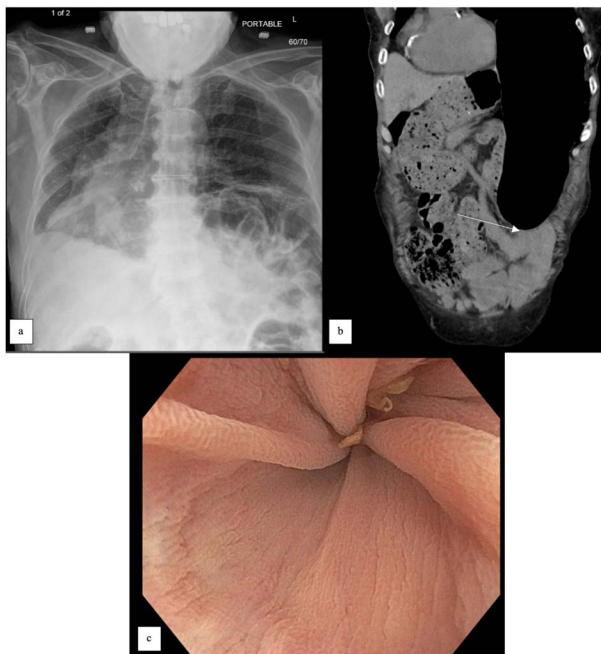
[2229] **Figure 1.** (a) Chest plain x-ray film demonstrating rightward deviation of the heart. (b) Coronal CT scan demonstrating the extent of distended bowel above a sigmoid volvulus, see arrow. (c) Endoscopic appearance of the patient's sigmoid volvulus prior to decompression.

S2230

A Unique Case of Rectal Adenocarcinoma Presenting as Headache

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Introduction: Colorectal cancers occur when cells lining the colon and rectum become hyperproliferative and grow out of control. Symptoms of colorectal cancer often do not appear until cancer has advanced, therefore it is important to have timely colon cancer screening. Brain metastases from colorectal carcinoma are a rare entity and we present one such case.

Case Description/Methods: The patient is a 27-year-old gentleman with a past medical history significant for irritable bowel syndrome who presented to the emergency room, with complaints of unilateral frontal headache and bloody bowel movements. The patient started experiencing right-sided frontal headache 2 weeks before the presentation which was associated with blurry vision and nausea. The patient also endorsed having multiple episodes of bloody bowel movements associated with rectal pain and tenesmus. The patient also endorsed losing 50 pounds in the last 2 months, which was unintentional, and associated with appetite loss and generalized weakness. On physical examination, the patient had alert, oriented times 3, and had no focal neurological deficits. A CT scan of the head was done which revealed 3x2x3 cms sized oval-shaped isointense mass with cerebral edema and 1 cm midline shift. A CT scan of the abdomen and pelvis was also done which showed the presence of a heterogeneous appearing soft tissue density lesion in the right anterolateral wall of the rectum measuring 2.7x3.9x7.1 cms. The neurosurgery team was consulted and the patient was started on steroids and seizure prophylaxis medication. The patient underwent a craniotomy for intracranial neoplasm excision. The excised mass was sent for pathology which resulted as metastatic adenocarcinoma of colorectal origin. The patient tolerated the procedure well and was referred to oncology and gastroenterology for further management. The patient is scheduled to get a colonoscopy and is about to be initiated on chemotherapy as well (Figure).

Discussion: Colorectal cancer is one of the leading causes of death due to cancer in the United States. In general colorectal cancer, metastasize to the liver and lungs, and metastases to the brain are rare. Aggressive surgical resection in selected patients shows improved survival rates and better prognosis. As clinicians, we must be aware of unique presentations of colorectal carcinoma and the importance of colorectal cancer screening. Raising awareness about colorectal carcinoma amongst the general population is of utmost importance.
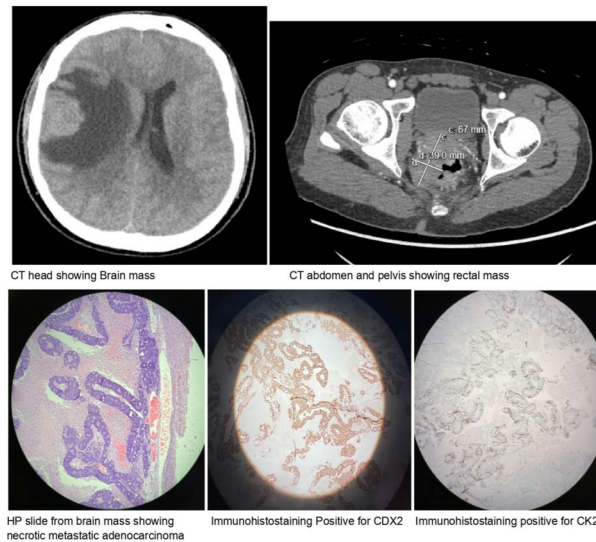
[2230] **Figure 1.** Ct scan images and Histopathology slides.

An Interesting Case of Pneumatosis Cystoides Intestinalis Diagnosed After Polypectomy: Case Report and Review of the Literature

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Introduction: Pneumatosis cystoides intestinalis (PCI) is characterized by the presence of gaseous cysts containing nitrogen, hydrogen, and carbon dioxide. This rare condition can be idiopathic (15% of cases), or secondary to another medical condition (85% of cases). The most common symptoms attributed to PCI have been diarrhea, bloody stools, abdominal pain, constipation, weight loss and tenesmus. The most common histologic findings associated with PCI includes gas cysts, multinucleated giant cells, macrophages, and pericystic inflammatory changes. Primary PCI typically creates a cystic pattern within the intraluminal wall and secondary causes creates a linear pattern. It is important to recognize this disease entity given the endoscopic appearance similar to other lesions such as sessile serrated adenomas.

Case Description/Methods: A 42 year old African male underwent colonoscopy for new constipation and a first degree relative history of colorectal cancer at age 45. The colonoscopy performed revealed a 12mm sessile polypoid lesion on the ileocecal valve (Figure A), with a normal terminal ileum, which underwent endoscopic resection using snare polypectomy. Five additional polypoid lesions seen in the ascending colon ranging from 5-12mm in size (Figure B) were removed with snare polypectomy. Pathology of these lesions showed empty appearing submucosal cystic structures with peripheral foreign body, and giant cell reaction (Figure C) diagnostic for localized PCI.

Discussion: PCI is not well understood and can be multifactorial from a mechanical defect, gas produced from bacteria, or gas from a pulmonary source. Some patients may have symptoms of abdominal pain, obstruction or bleeding but most individuals are asymptomatic and rely on endoscopy or imaging for diagnosis. Although many cases are asymptomatic, complications include obstructions from gaseous cysts, and rarely, rupture of these cysts can cause pneumoperitoneum. This patient's constipation could be related to his underlying diagnosis of PCI. In the management of these patients, oxygen therapy is considered the first approach. It is thought that cysts release gases within them and refill with oxygen that is then metabolized resulting in cyst resolution. Second line therapy is surgical treatment and is required in the setting of pneumoperitoneum. In patients with nonspecific abdominal symptoms, an endoscopy could be warranted to assess for primary PCI which if left untreated can cause complications.
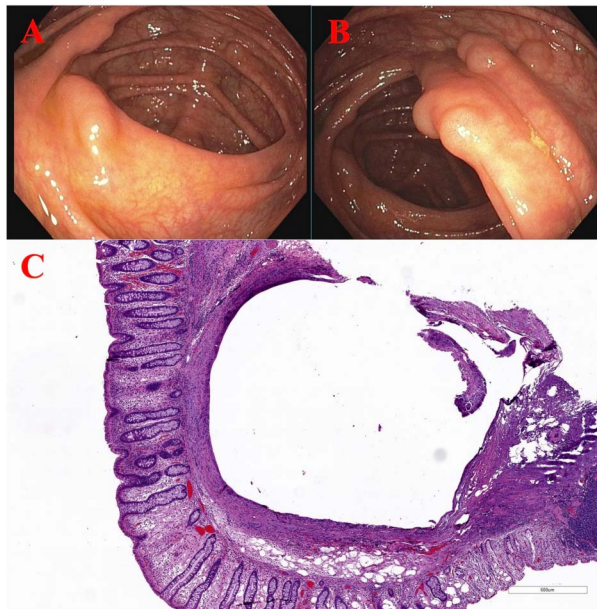
[2231] **Figure 1.** Image A: 12mm sessile polypoid lesion on the ileocecal valve Image B: Five polypoid lesions ranging from 5-12mm in the ascending colon Image C: Microscopic image showing empty appearing submucosal cystic structures with peripheral foreign body and giant cell reaction.

S2232

An Unusual Case of Acute Colonic Pseudo-Obstruction in an Immunocompetent Adult With Refractory *Cryptosporidium* Infection

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Introduction: Acute colonic pseudo-obstruction (ACPO) is characterized by acute colonic dilatation in the absence of mechanical obstruction and carries a 15% risk of perforation. Infectious agents such as VZV, Herpes virus, and CMV have been documented to cause ACPO. Cryptosporidium is a protozoan parasite that causes self-limited diarrhea in the immunocompetent and prolonged severe diarrhea in the immunocompromised.

Case Description/Methods: A 58-year-old male with bipolar disorder and BMI 34 presented with sepsis, rhabdomyolysis and AKI. His wife reported that he had ongoing watery diarrhea for 6 weeks. CT showed colonic distention. Stool culture was positive for cryptosporidium antigen. HIV, C. difficile, stool ova and parasites, Campylobacter and Shiga toxin tests were negative. Common variable immuno-deficiency was ruled out. Diarrhea persisted despite 2 courses of Nitazoxanide. Repeat stool culture was positive for cryptosporidium. Infectious Diseases (ID) suggested a prolonged course of Nitazoxanide. The patient was transferred to inpatient rehab, where diarrhea continued, and he had persistent hypokalemia despite scheduled potassium replacement. On rehab day 9, XR showed a transverse colon diameter of 13 cm, and patient was transferred to the ICU. CRP and calprotectin were within normal ranges. Other causes of ACPO were ruled out. Sigmoidoscopic decompression was done, with biopsies showing focal hyperplastic changes. NGT was placed and aggressive bowel regimen was started. A trial of neostigmine for the colonic pseudo-obstruction resulted in bradycardia. Repeat colonic decompression was performed which showed diffuse colonic dilation with large amount of stool. Patient initially declined any surgical procedures, and remained in PCU for TPN, scheduled IV potassium replacement and close monitoring of distended abdomen. After 1 month of attempted restimulation, patient agreed for total abdominal colectomy with end ileostomy for the chronic dilated colon, refractory to medical management. He continued to have high output from his ostomy. He succumbed to cardiopulmonary arrest on day 54 (**Figure**).

Discussion: This is an unusual case of Cryptosporidium causing chronic refractory diarrhea and ACPO in an immunocompetent adult. Though other infectious agents have shown to cause enteric autonomic dysfunction leading to ACPO, Cryptosporidium-induced dysmotility has not yet been documented. Management of such cases remains challenging with inter-disciplinary efforts between GI, Surgery, ID and Critical Care.
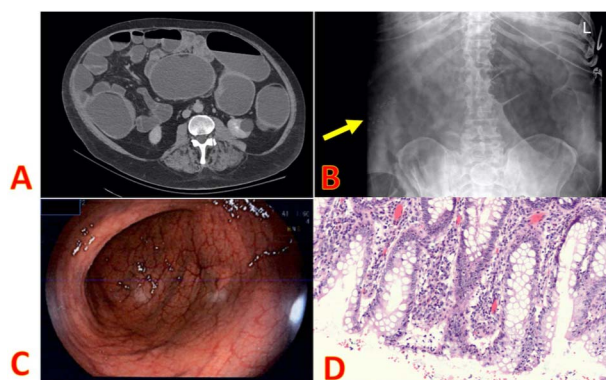
[2232] **Figure 1.** A: CT Abdomen and Pelvis on admission, that showed diffuse dilation of colon and rectum with gas and liquified stool, measuring up to 11 cm in diameter; B: XR abdomen showing Sitz markers in the right abdomen, that did not change position in 5 days (yellow arrow); C: Colonoscopy showing diffuse colonic dilation. This was noted up to the level of the transverse colon; D: Colectomy specimen showing colonic mucosa with congestion and focal hemorrhage.

S2233

Anorectal Melanoma

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Introduction: Mucosal melanoma is rare and accounts for approximately 1% of all melanomas. Mucosal melanomas occur primarily in the head and neck (55%), anorectal, and vulvovaginal regions (18%). Anorectal mucosal melanoma accounts for 0.05% of all colorectal malignancies and 1% of all anal canal cancers.

Case Description/Methods: A 61 year old-male patient with no significant past medical history presented to the hospital with anal pain for one month with subsequent rectal bleeding. On examination, his heart rate and blood pressure were within normal limits. His digital rectal exam was remarkable for a palpable anorectal mass. His blood tests showed no anemia. Colonoscopy revealed a large non-obstructing cauliflower mass occupying the anorectum with overlying friable mucosa that easily bleeds on touch (Figure A, B). Histopathology showed undifferentiated spindle and round cell malignancy consistent with nodular type of malignant melanoma. Immunohistochemical staining revealed strong positivity for S100, Melan A, and HMB45 markers confirming the diagnosis of malignant melanoma. Magnetic resonance imaging (MRI) of the abdomen and pelvis redemonstrated a large anorectal endoluminal mass lesion with multiple enlarged presacral and bilateral internal iliac lymph nodes. Positron emission tomography-computed tomography scan (PET-CT) showed a fluorodeoxyglucose (FDG)-avid anorectal wall thickening and internal iliac lymph nodes. After a multidisciplinary team discussion, the patient underwent abdominoperineal resection with bilateral iliac lymph nodes dissection (Figure C).

Discussion: Malignant melanoma of the anorectum is a rare mucosal neoplasm that typically presents in the fifth or sixth decade. Mucosal melanoma occurs in the anorectum due to abundance of the melanocytes in the mucosa of the anal canal. It usually presents with nonspecific complaints such as anal pain or rectal bleeding that can be misdiagnosed as hemorrhoids or rectal polyps and lead to delayed diagnosis. Surgical resection is the mainstay of treatment, while the benefit of radiotherapy and chemotherapy remains uncertain. This tumor is an aggressive tumor that carries a poor prognosis; and even with surgical intervention, the reported 5-year overall survival rate is 6%–15%.
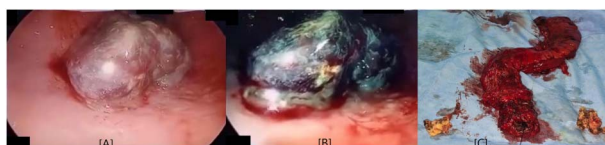
[2233] **Figure 1.** Endoscopic image of the anorectal mass lesion on retroflection (A) and with the i-Scan (B). (C) Abdominoperineal resection with bilateral iliac lymph nodes dissection.

S2234

An Unusual Case of Diverticulitis With Reactive Lymphadenopathy, Complete Obstruction, and Fistula

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Introduction: We present a case of diverticulitis complicated by a recto-sigmoid mass presumed to be malignancy due to alarming symptoms and lymphadenopathy, treated with surgical resection.
Case Description/Methods: 59-year-old female presents to the emergency department complaining of bright red blood per rectum associated with left-sided abdominal pain, 100-lb weight loss in 3 years, and reduced appetite. Patient was afebrile, HR 103 beats/min, RR 18 breaths/min, BP was 167/94 mmHg, with generalized abdominal tenderness on physical exam. CT scan shows chronic sigmoid diverticulitis with colocolic fistula and mild adjacent fat stranding. Colonoscopy was attempted but not completed due to the large infiltrative mass in the rectum extending to distal sigmoid colon, 3-5 inches in length, suspected to be a malignancy. Pathology showed hyperplastic changes. MRI showed T4N4 Tumor in the sigmoid colon 8 cm from the anal verge, with lymphadenopathy in the mesorectal fat. CT scan was negative for metastatic disease. CEA was 0.7. Patient underwent a repeat sigmoidoscopy for tissue biopsy, which again showed hyperplastic changes. Patient underwent surgical resection of the mass. Resected lymph nodes and rectosigmoid mass were sent to pathology which returned negative for malignancy. Lymph nodes were remarkable for acute diverticulosis with abscess formation, marked fibrosis, perforation of pericolic fibrous adhesions, and vascular congestion with recent hemorrhage (Figure).
Discussion: Our patient had many unusual complications such as fistulas, lymphadenopathy, and obstruction, which makes this case unique. Therefore, we emphasize the importance of keeping diverticular disease in the differential even afterward, until confirmed by pathology. Colonoscopy is generally avoided in acute diverticulitis in order to avoid perforations and is performed weeks after the resolution of diverticulitis (Hulknick et al). In this novel case, diagnostic colonoscopy was attempted multiple times, but unsuccessful due to the mass causing an obstruction, which prohibited safe navigation of the scope proximal to the rectosigmoid mass. As a result, our patient had to undergo laparotomy and tissue biopsy which eventually confirmed the diagnosis. Such patients in whom the rectum, Hartmann's procedure is the procedure of choice (Schein et al.). Patients require further follow-up since 33% of procedures are never reversed (Belmont et.al), and patient that undergoes a surgical reversal of a procedure face poses significant morbidity and fatality.
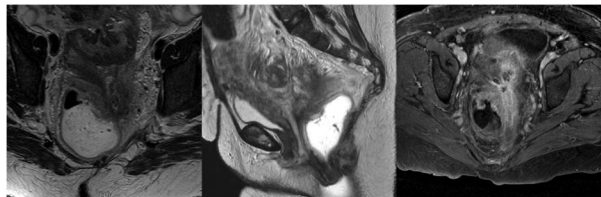
[2234] **Figure 1.** (Left) Coronal view and Saggital view (middle) of large rectosigmoid mass spanning sigmoid colon through the rectum inseparable from adjacent structures. Secondary Fistula (right) between the colon and bladder.

S2235

An Interesting Case of Anemia Related to Colonic Metastasis of Renal Cell Carcinoma Post Radical Nephrectomy

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Introduction: Renal cell carcinoma (RCC) arises from renal tubular epithelial cells. Individuals with a family history of renal cancer have a twofold greater risk, indicating genetic factors. The triad of flank discomfort, hematuria, and flank mass is rare (10%) and indicates severe illness. 25% of patients had distant metastases or severe local-regional illness at the time of presentation. Lung, bones, liver, and brain are the most common sites of metastasis. Metastasis in the colon is rare, with very few documented cases. We present a case of post nephrectomy renal cell carcinoma with metastatic lesions in the intestine, peritoneum, and abdominal wall.
Case Description/Methods: A 62-year-old male presented with anemia with Hemoglobin of 8 gm/dl. He had a past medical history of renal cell carcinoma of the left kidney, status post radical nephrectomy, done 2 years ago. Histopathologic analysis of the excised tumor revealed grade 2 clear-cell RCC with negative surgical margins, T1aNxMx, stage I. Following that, he received radiation therapy. At admission, his vitals were stable and systemic examination was normal. Stool occult blood was positive. Tubular adenoma and ulcerated lesion were found in ascending colon and splenic flexure on colonoscopy. Computed Tomography (CT) scan of the abdomen showed the presence of tumor metastasis in the abdominal wall and peritoneum. Histopathology showed a poorly differentiated carcinoma consistent with metastatic renal cell carcinoma, positive for PAX 8-, CK 20, CDX 2, and CK7. He was treated with ileosigmoid colonic bypass and excision of peritoneal, sigmoid, and abdominal wall tumors. He later completed his chemotherapy and immunotherapy (Figure).
Discussion: Colonic metastasis in RCC is very uncommon. It can occur in the sigmoid, splenic flexure, transverse colon, and hepatic flexure. CEA and CK7 levels, and increased CK10 levels, have been identified in tumors. High amounts of vimentin are detected in instances with RCC metastases. Thumb-printing on an abdominal radiograph and segmental wall thickening on a CT scan are 2 signs of malignancy-related inflammation and edema, neither of which were seen in this patient. Recent advances in treating renal cell carcinoma have increased patient survival rates, leading to atypical presentations. This case report stresses the importance of endoscopic vigilance in patients diagnosed with renal cell carcinoma.
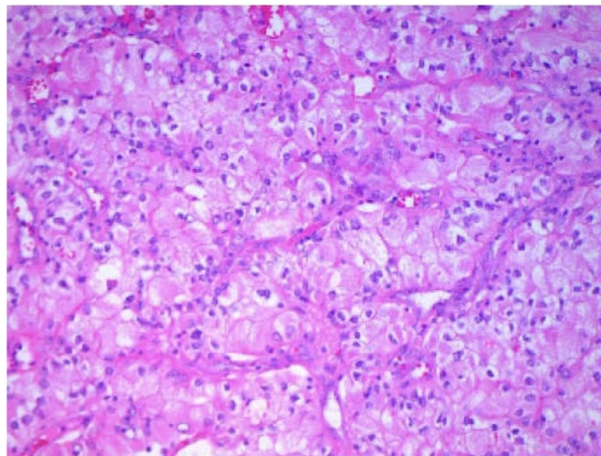
[2235] **Figure 1.** Histopathology findings show metastatic renal cell carcinoma involving bowel serosa.

S2236

An Extremely Rare Presentation of Large Cell Neuroendocrine Carcinoma of the Transverse Colon

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Introduction: Large cell neuroendocrine carcinoma (LCNEC) is a rare and deadly cancer with a poor prognosis. The majority of cases affect the lungs and gastrointestinal tract, but it can affect any part of the body. Colon and rectal neuroendocrine carcinomas are rare, accounting for less than 1% of all colon and rectal cancers. We present the unusual case of an 85-year-old woman with large cell neuroendocrine carcinoma of the transverse colon.

Case Description/Methods: An 85-year-old woman with a significant PMH of CKD and anemia of chronic disease presented to the hospital with abnormal labwork. The patient reported vague abdominal symptoms but denied having any hematochezia, melena, or hematemesis. She reported a prior colonoscopy in 2015 without any definitive pathology. Her physical exam was benign. Labs revealed significant iron deficiency anemia but she refused a transfusion of blood product. CT scan showed approximately 5 cm of thickening involving the transverse colon with an adjacently mildly enlarged mesenteric lymph node and a hypodense lesion seen in the inferior right hepatic lobe suspicious for metastasis. During colonoscopy the mass was biopsied but there were further complications by a localized perforated rectum during retroflexion. She required a diverting loop ileostomy and was ultimately discharged home with no significant complaints. Pathology revealed large cell neuroendocrine carcinoma with extramural venous invasion and infiltration of the mucosa propria into pericolic tissue. Tumor markers showed a high mitotic rate and immunochemistry stains were noted to be positive for Ki-67, PAN CK, CDX2, synaptophysin, and chromogranin. Furthermore, the pathology also indicated 9 of the 13 lymph nodes were positive for metastatic carcinoma. Patient was later followed by oncology but due to the patient's age and medical comorbidities, chemotherapy was not pursued (Figure).

Discussion: An Extremely Rare Presentation of Large Cell Neuroendocrine Carcinoma of the Transverse Colon Neuroendocrine tumors are rare neoplasms that present with a variety of clinical presentations. A large neuroendocrine tumor is a subtype of neuroendocrine tumors that are aggressive in nature, often present with metastasis, and a poor prognosis. Colonic NETS are exceptionally rare accounting for only 0.2% of all colorectal cancers. Prognosis is relatively poor with a median survival of 10.4 months. Our case highlights a rare case presentation of a large neuroendocrine tumor.

A) 200 x - Neuroendocrine marker is positive
B.) Ki-67 100x - Ki-67 proliferative rate is high (>70%)
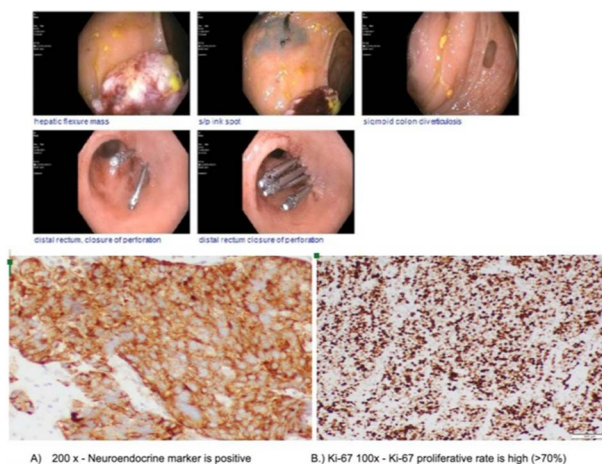
[2236] **Figure 1.** Gross imaging and histopathology showing evidence of large neuroendocrine tumor.

S2237

An Atypical Case of Squamous Cell Carcinoma of the Rectum Masquerading as a Rectal Carcinoid Tumor

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Introduction: Squamous cell carcinoma (SCC) of the GI tract is rare. When encountered, it usually involves the esophagus or the anal canal. Infrequently, it can be associated with a fistula of the GI tract, lined by squamous mucosa. SCC of the rectum is very unusual and not much is known about its pathogenesis, prognosis, and optimal treatment.

Case Description/Methods: A 67-year-old man, with PMH of HIV, CKD stage 3, and HLD, initially presented with intermittent hematochezia for a few months, along with mucus per rectum and lower abdominal pain. He denied constipation, weight loss, and other GI symptoms. He underwent colonoscopy in 8/2021, which demonstrated left colon diverticulosis, a 6 mm tubular adenoma in the sigmoid, and a 10 mm rectal submucosal nodule at 10 cm proximal to the anus. It was biopsied and came back as hyperplastic changes. He was referred for rectal EUS for further evaluation of the rectal nodule. He underwent flexible sigmoidoscopy and lower EUS-FNB in 11/2021 with finding of a 33.3x24.8 mm rectal submucosal lesion arising from the muscularis propria. Pathology initially demonstrated high grade squamous intraepithelial lesion (HGSIL) and the diagnosis of malignancy was not confirmed. However, the pathology was sent to a reputable cancer center for a second opinion and confirmed a diagnosis of SCC (**Figure**). He continued to have intermittent rectal bleeding and mucus in the stools, prompting him to visit the ER for further evaluation. A CT scan demonstrated no acute findings, and he was discharged. A repeat CT scan would demonstrate a 3.3x2.9x2.4 cm soft tissue mass arising from the low rectum at the 3-7 o'clock position, highly concerning for neoplasm. He obtained a second opinion from a colorectal surgeon who performed a third transanal procedure. The biopsy results of the rectal mass demonstrated rectal cancer again, per patient. He has been started on neoadjuvant chemotherapy and radiation therapy.

Discussion: SCC is among the rarest forms of rectal cancer. 90% are adenocarcinomas, while the remaining 10% is comprised of carcinoid tumors, lymphomas, and GISTs. While SCC can occur throughout the GI tract, it usually affects the esophagus or the anal canal. This lesion presented as a suspected rectal carcinoid tumor, located far from the anal verge. Pure SCC of the rectum remains an extremely rare histological diagnosis and clinical occurrence. Further research is needed about its pathogenesis, prognosis, and optimal treatment.
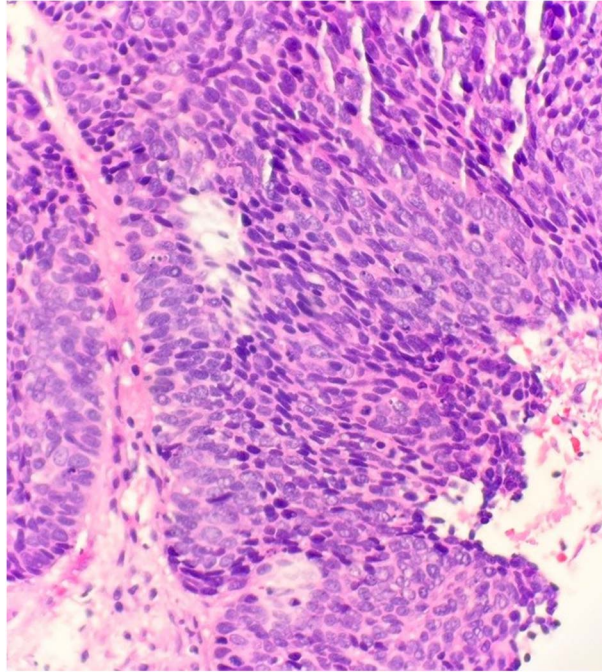
[2237] **Figure 1.** Squamous cell carcinoma with basaloid features.

S2238

An Uncommon Cause for Common Symptoms of Abdominal Pain and Diarrhea: A Case Report of Human Intestinal Spirochetosis in an Immune-Competent Patient

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Introduction: Abdominal pain, diarrhea, and weight loss are common but non-specific symptoms that can lead to extensive evaluation for the etiology, e.g., malignancy, infection, or IBS. While the incidence of neuroendocrine tumors (NETs) is increasing, those of the GI tract are rare, and even rarer is human intestinal spirochetosis (HIS). Here, we present an unusual case of an immune-competent patient incorrectly diagnosed with a NET and found to have HIS.

Case Description/Methods: A 54-year-old female with IBS-D and GERD on PPI was referred for one year of abdominal pain, diarrhea, and weight loss. A year ago, she had a cholecystectomy and made dietary changes without resolution. Prior labs collected showed elevated gastrin and somatostatin but normal VIP and urine 5-HIIA, concerning for NET. Prior double balloon enteroscopy did not locate any bowel lesions. CT A/P showed 1cm focus of high attenuation/enhancement in the ileum (**Figure A**). Chromogranin A levels were elevated. PET Dotatate scan performed 2 weeks later did not show any abnormal lesions (**Figure B**) despite persistent symptoms. Surgical oncology recommended repeat gastrin levels off PPI, and she was given colestipol for diarrhea with minor relief. Repeat gastrin levels were normal, and EGD/colonoscopy performed 2 months later was endoscopically unremarkable with no lesions seen after 30 cm intubation of the TI. However, random colon biopsies showed a focal fuzzy basophilic layer of organisms at luminal surface, highlighted by Warthin-Starry stain, suggestive of intestinal spirochetosis. She was prescribed a 2-week course of metronidazole with eventual full relief of diarrhea. She was referred to ID for further management.

Discussion: Human intestinal spirochetosis is likely underestimated due to its rarity, especially in heterosexual and immune-competent patients, and suboptimal diagnostic methods. Thus, a subset of IBS patients with diarrhea can often be misdiagnosed for years, especially if they are not immunocompromised. Long-term PPI use is also very prevalent, and one long-standing concern is PPI-induced gastrin elevation secondary to hypoacidity, which confounded our results. Ultimately, diagnosis is confirmed by histopathology and resolution of symptoms with metronidazole. Our case highlights the unusual diagnosis in an immune-competent patient with a puzzling work up.
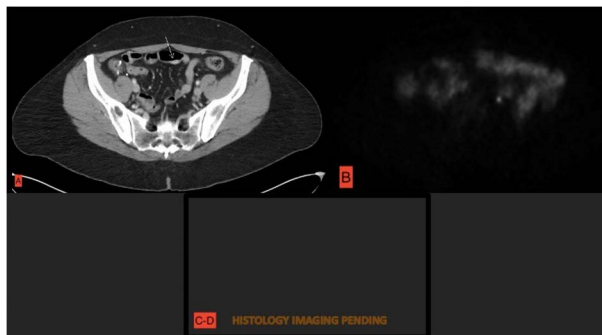
[2238] **Figure 1.** Image A: CT A/P (coronal) showing 1 cm focus of high attenuation/enhancement along the dependent aspect of an ileal bowel loop (white arrow), which may represent hyperdense enteric contents versus an enhancing lesion, but is suboptimally evaluated secondary to lack of precontrast images. Image B: No abnormal Dotatate-avid lesions.

S2239

An Uncommon Case of Neglected *Yersinia enterocolitica* Presenting as Anemia in Northeast America

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Introduction: Yersinia is a facultative anaerobic gram-negative coccobacillus. Most infections are caused by eating and the contamination of food and water by infected animals. It causes fever, abdominal pain, which may mimic appendicitis, and bloody diarrhea, mostly in children due to cross-contamination of their feeds. Necrotizing enterocolitis can occur in infants. It is not commonly seen on the East Coast of the United States for an older adult with no iron overload conditions.

Case Description/Methods: Our patient is an 88-year-old male with an extensive history of coronary artery disease presented with sudden onset of emesis, abdominal pain, and bloody stools. He had no chills or fever. At presentation, he was obese, pale, lethargic, oriented, and in no distress. His temperature was 98.5 F, Heart Rate was 84 beats per minute, blood pressure was 94/54mmHg, and SpO2 was 99% on room air. He had mottled skin on the legs with pitting edema. The abdominal examination was normal except for a mild tenderness in the left lower quadrant. The rest of the systemic review was normal. Computed Tomography (CT) abdomen showed mild wall thickening in the left colon, suggesting colitis. He received intravenous (IV) saline boluses and was then started on IV fluids, Zosyn, Unasyn, and Protonix. He needed pressor support and Intensive Care Unit admission for a brief time. Gastro duodenoscopy and flexible sigmoidoscopy showed 2 clean-based Antral ulcers with no bleeding and a circumferential inflammation of the right colon with ulcerated and friable mucosa. Gastrointestinal Pathogen Panel by PCR was positive for Yersinia enterocolitica, and he was started on IV Doxycycline. This led to his improvement, and he was eventually discharged in a stable condition (Figure).

Discussion: The centers for Disease Control and Prevention (CDC) monitors the frequency of Y. enterocolitica infections. In 2020 the incidence of yersiniosis was less than 0.30 per 100,000. Infections are usually self-limited, but they can cause sepsis with up to a 50% fatality rate in people with iron overload conditions like thalassemia, hemochromatosis, and blood transfusions. It causes pseudoappendicitis, mesenteric lymphadenitis, and endocarditis in susceptible adults. Reactive arthritis affecting the wrists, knees, and ankles is seen in people with HLA-B27. Erythema nodosum can occur. Bacterial shedding can continue for up to 3 months after recovery. Hence, its detection is vital to contain the spread.
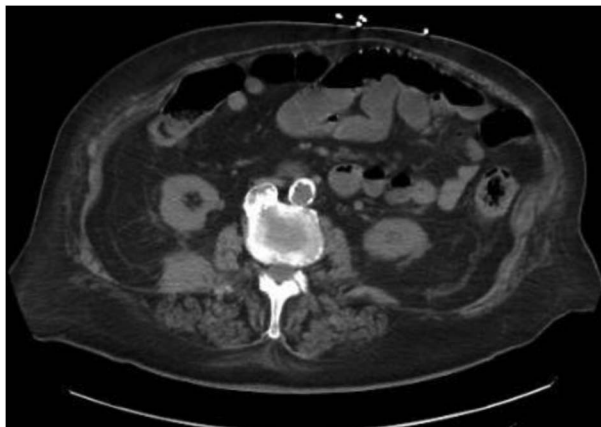
[2239] **Figure 1.** CT Abdomen showing mild wall thickening seen in the colon suggesting colitis.

S2240

Uncommon Presentation of Acute Diverticulitis Complicated by Colovesical Fistula

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Introduction: Acute Diverticulitis primarily occurs in elderly men, with incidence increasing with increasing age. However, the incidence of diverticulitis in men aged 18 to 44 years is increasing. The most common presenting symptoms of acute diverticulitis are Abdominal Pain, Fever, Chills, Constipation, Diarrhea, and Nausea. Complications include abscess, obstruction, perforation, and fistula formation. Here we present an unusual case of a young male, who presented to our hospital with symptoms of UTI and was subsequently found to have a colovesical fistula secondary to acute diverticulitis. Treating physicians should be aware of the rare presentation of acute diverticulitis and should have a high index of suspicion when treating similar cases.

Case Description/Methods: A 31-year-old Hispanic Male with a history of colonic diverticulosis and one episode of diverticulitis 4 years ago was presented to the hospital with the chief complaint of dysuria, increased urinary frequency, and urgency. His Vitals and Laboratory findings on presentation are shown in the table below. The physical exam did not show abdominal tenderness. He was clinically diagnosed with UTI and was started on appropriate antibiotics. He continued to have fever spikes and also developed passage of brown particles along with the passage of air in his urine. During his hospital stay, he did not have any abdominal pain, nausea, vomiting, diarrhea, or constipation. Based on the above history, an abdominal CT with contrast was obtained that showed acute diverticulitis of the sigmoid colon with colovesical fistula. The patient underwent robotic sigmoidectomy with excision of the fistula with improvement in his symptoms (Figure, Table).

Discussion: A diverticulum is a sac-like protrusion of the colonic wall, developing at well-defined points of weakness where the vasa recta penetrate the circular muscle of the colon. Approximately 4% of patients with diverticulosis develop acute diverticulitis and very few of them develop complications. Fistula formation is more common in men, as the uterus and the broad ligaments are thought to protect the bladder from the inflamed sigmoid colon. Colovesical fistulas should be suspected in any patient who presents with pneumaturia or fecaluria or a male with UTI symptoms and a history of diverticulosis. Diverticular fistulas do not close spontaneously and require surgical management that involves identification and division of the fistula, resection of the involved portion of the colon, and bladder repair if necessary.

COLON

S130 Outstanding Research Award in the Colon Category (Trainee)

Distal Cap-Assisted Endoscopic Mucosal Resection Is a Safe and Effective Technique for Resection of Non-Lifting or Adherent Colorectal Polyps: An International, Multicenter, Retrospective Study

Scott R. Douglas, MD[1], Douglas K. Rex, MD, MACG[2], Alessandro Repici, MD[3], Melissa Kelly, BSN, RN, CGRN[4], Wes Heinle, MPH[5], Matthew T. Moyer, MD, MS[1].
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Introduction: Distal Cap-Assisted Endoscopic Mucosal Resection (EMR-DC) is a developing technique for management of non-lifting or fibrotic polyps, a commonly encountered problem amongst endoscopists at referral centers. Biopsy sampling, submucosal tattoo, and prior unsuccessful attempts at polyp resection have all been shown to induce submucosal fibrosis, making subsequent complete endoscopic mucosal resection more difficult and increases the risk of recurrence. Multiple interventions have been proposed for management of these polyps, however each have limitations.EMR-DC is performed utilizing a clear distal attachment cap fitted 3-4mm from the tip of the colonoscope. Following submucosal injection, adherent areas are approximated into the open snare. Tissue is suctioned through the snare into the cap and the snare is closed on the adherent lesion. Tissue transection is accomplished with electrocautery and the process is repeated in a piecemeal fashion until resection is complete (Figure). Here we demonstrate EMR-DC as a safe, effective, and efficient means of managing noncancerous colon lesions with submucosal fibrosis.
Methods: We conducted a multicenter, international, retrospective study of 61 EMR-DC cases done for the indication of a non-lifting lesion occurring after previous biopsy, tattoo, or attempted resection. Procedures were performed by three expert endoscopists.
Results: EMR-DC was preceded by attempted polypectomy or EMR in 88.5%, submucosal tattoo injection in 1.6%, prior biopsy in 4.9% and both biopsy and tattoo in 4.9% of cases (Table). Complete macroscopic resection was achieved in 100% of EMR-DC. Lesion size ranged from 15mm to 95mm (average: 49mm). Procedure time averaged 49.5 minutes. The adenoma recurrence rate for these complex and adherent lesions at six month surveillance was only 9.8%. Two serious post-procedural adverse events occurred (3.3%). These included one instance of post-procedural bleeding requiring repeat colonoscopy, and one episode of post-polypectomy syndrome requiring hospitalization.
Conclusion: This large, multicenter series demonstrates EMR-DC to be a safe and efficacious approach to a difficult and common clinical problem; adherent and non-lifting polyps. EMR-DC may offer several advantages over more expensive or invasive endoscopic techniques used for this indication.
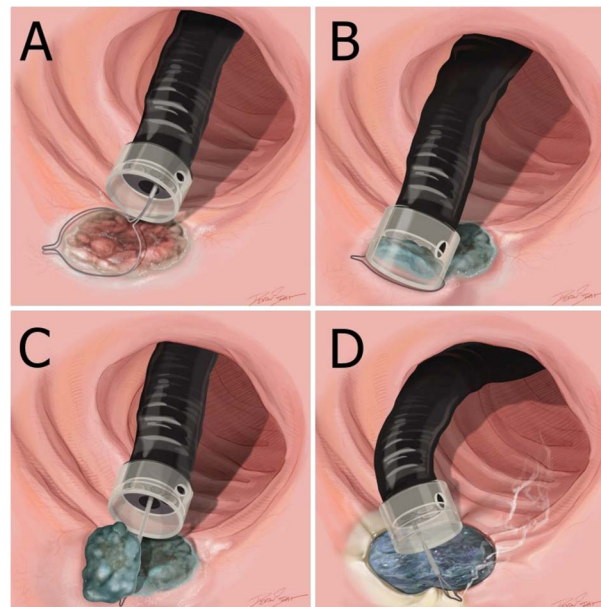
[0130] **Figure 1.** Distal Cap-Assisted EMR Technique: A) Lesion assessment using white light and snare to assess size of lesion. Submucosal injection is performed with commercially available lifting agent (not pictured). B) The snare is positioned to capture non-lifting tissue. Mucosa is suctioned through the snare and into the distal attachment cap. This will cause an endoscopic "blue out". The snare is then blindly closed. C) Suction is released for assessment of captured tissue, prior to application of electrocautery for tissue transection. D) Completed EMR-DC resection base, with application of prophylactic snare tip soft coagulation

Table 1. Patient Characteristics and Procedural Outcomes

	N=61	(%)
Age (mean)	66.8	
American Society of Anesthesiologists Classification		
I	6	9.8
II	33	54.1
III	21	34.4
IV	1	1.6
Anticoagulation use		
Aspirin	22	36.1
Antiplatelet	3	4.9
DOAC or warfarin	6	9.8
History of previous abdominal surgery	32	52.5
Previous manipulation		

Table 1. (*continued*)

	N=61	(%)
Biopsy	3	4.9
Tattoo	1	1.6
Biopsy and Tattoo	3	4.9
Attempted Polypectomy	54	88.5
Average number of attempted polypectomies	1.31	
Pathology		
Hyperplastic	1	1.6
Sessile Serrated Lesion	2	3.3
Sessile Serrated Lesion with high grade dysplasia	1	1.6
Tubular Adenoma	29	47.5
Tubular Adenoma with high grade dysplasia	5	8.2
Tubulovillous Adenoma	15	24.6
Tubulovillous Adenoma with high grade dysplasia	5	8.2
Villous adenoma with high grade dysplasia	1	1.6
Polyp Size (mm), [range], (SD)	49.5 [15-95] (8.4)	
Location		
Ileocecal valve	7	11.5
Cecum	6	9.8
Ascending colon	14	23.0
Hepatic flexure	4	6.6
Transverse colon	6	9.8
Splenic flexure	2	3.3
Descending colon	3	4.9
Sigmoid colon	8	13.1
Rectum	11	18.0
Paris Classification		
Is	8	13.1
IIa	27	44.3
IIb	3	4.9
IIc	5	8.2
IIa+Is	10	16.4
IIb+Is	1	1.6
IIc+Is	3	4.9
IIa+IIc	3	4.9
IIa+IIb	1	1.6
Laterally Spreading Tumor specification		
Granular	51	83.6
Non-granular	10	16.4
Performing Endoscopist		
DKR	22	36.1
MTM	19	31.1
AR	20	32.8
Snare Type		
Cold	12	19.7
Hot	42	68.9
Hot and Cold	7	11.5
Adjuvant Techniques		
APC	21	34.4
Hot biopsy forceps/avulsion	17	27.9
Snare tip soft coagulation (includes prophylactic ablation to margins)	17	27.9
Cold forceps avulsion	6	9.8
Procedure time (minutes)		
Mean	49.5	
Median	48	
Range	15-95	
Complete Macroscopic Resection	61	100.0
Mean time to follow up colonoscopy (months)	6.6	

Table 1. (*continued*)

	N=61	(%)
Recurrence at follow up colonoscopy	6	9.8
Intra-procedural Adverse Events		
Minor	2	3.3
Serious	0	0
Post-procedural Adverse Events		
Minor	2	3.3
Serious	2	3.3

S131

Clinical Application of Circulating Tumor DNA in Gastrointestinal Cancer Patients

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Introduction: Circulating tumor DNA (ctDNA) derived from apoptotic tumor cells is rapidly emerging as a non-invasive biomarker to detect the presence of tumor at a molecular level and guide therapy. In this study, we present our experience with this novel marker in gastrointestinal malignancy (GIM) patients.
Methods: We included all patients with GIM for whom ctDNA was ordered from January 2020 to July 2021 at our center. Patient demographics, tumor type, pathology, stage, and radiographic findings were collected. Descriptive statistics were employed to report findings.
Results: We identified 62 GIM patients for whom ctDNA was ordered. Results for 6 patients were not reported due to insufficient tumor tissue. Of the 56 patients for whom ctDNA results were available, 46 (82%) had colorectal adenocarcinoma (CRC) and the rest had other GI malignancies. Of the overall cohort of 56 evaluable patients, 21 (37.5%) had metastatic disease. Imaging findings paralleled ctDNA levels and correlated with tumor burden in 30 patients (53.5%). In 13 patients (23.2%), undetectable CT DNA levels influenced decisions regarding systemic therapy in addition to acting as a surrogate for treatment response. We discontinued maintenance therapy in 5 metastatic CRC patients with negative ctDNA and imaging. These patients have been off treatment for > 12 months without evidence of recurrence. We also truncated or skipped adjuvant treatment in 6 Stage III CRC patients with negative ctDNA and imaging who had significant post-operative complications or were otherwise considered high risk for severe toxicity. In one CRC patient, ctDNA was found to be undetectable post neoadjuvant therapy which corroborated with pathological complete response on surgical pathology report. 5 patients (9.09 %) had false-negative results and 1 patient had falsely elevated levels. In 6 other patients, we could not draw significant conclusions due to the availability of only a single value.
Conclusion: Our experience suggests that ctDNA is not only a sensitive tool to assess tumor burden, but can also help guide therapy in locally advanced and metastatic CRC patients. However, further prospective studies are needed to improve the accuracy of test results and integrate ctDNA in day-to-day clinical practice.

S132   Outstanding Research Award in the Colon Category

An Interim Analysis of a Phase 3, Open-Label Study Indicates Efficacy and Safety of RBX2660 in Patients With Recurrent *Clostridioides difficile* Infection

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[1]Mayo Clinic, Rochester, MN; [2]Washington University School of Medicine, St. Louis, MO; [3]Arkansas Gastroenterology, North Little Rock, AR; [4]PACT Gastroenterology Center and Yale University School of Medicine, New Haven, CT; [5]University of Kansas School of Medicine, Wichita, KS; [6]Ferring Pharmaceuticals, Parsippany, NJ; [7]Rebiotix Inc., a Ferring Company, Roseville, MN.

Introduction: Eligibility criteria in clinical trials are often narrowly defined and exclude broader patient populations representative of real-world clinical practice. Here, we report an updated interim analysis of PUNCH CD3-OLS, an ongoing, open-label phase 3 study evaluating the efficacy and safety of RBX2660, an investigational, microbiota-based live biotherapeutic for the reduction of recurrent *Clostridioides difficile* infection (rCDI) in participants with common comorbidities.
Methods: Participants enrolled in PUNCH CD3-OLS were ≥18 years old with medically documented rCDI, including first recurrence patients as determined by the treating physician and assessed with current standard-of-care diagnostic methods. Participants with comorbid conditions unrelated to gastrointestinal (GI) disorders, GI comorbidities (eg, irritable bowel syndrome (IBS), Crohn's disease, and ulcerative colitis), and immunocompromising conditions were included. After standard-of-care antibiotics, participants received a single dose of RBX2660, rectally administered. Treatment success was defined as remaining recurrence-free for 8 weeks after treatment. Participants were monitored for recurrence and treatment-emergent adverse events (TEAEs) for at least 6 months after treatment. Demographic and safety data are presented for the safety population; efficacy data are presented for the modified-intent-to-treat population (mITT).
Results: At the time of this analysis, 483 participants had received RBX2660 treatment. The median participant age was 63 years (45.1% ≥65 years), 69.8% were female, 13.3% (64/483) and 1% (5/483) had IBS and IBD (unspecified), and 37% (37/483) and 3.7% (18/483) had Crohn's disease and ulcerative colitis, respectively. Treatment success at Week 8 was achieved by 74.6% (300/402) of participants whose outcomes could be analyzed, consistent with the 2021 interim analysis (75%; 45/60). Among the RBX2660 responders (n=300) who completed 6 months of follow-up (n=262), 84% (220/262) remained CDI recurrence-free. TEAEs were reported by 69% (302/483) of RBX2660-treated participants; the majority of events were mild to moderate in severity. Most TEAEs were gastrointestinal in nature, with diarrhea and abdominal pain most reported.
Conclusion: RBX2660 consistently reduced CDI recurrence at 8 weeks with a sustained clinical response through 6 months in a cohort of patients with broad eligibility criteria. RBX2660 was well-tolerated; TEAEs were mild to moderate severity.

S133

An Open-Label Study (ECOSPOR IV) to Evaluate the Safety, Efficacy and Durability of SER-109, an Investigational Oral Microbiome Therapeutic, in Adults With Recurrent *Clostridioides difficile* Infection (rCDI)

Sahil Khanna, MBBS, MS, FACG[1], Paul Feuerstadt, MD, FACG[2], Edward Huang, MD, MPH[3], Caterina Oneto, MD[4], Darrell S. Pardi, MD, MS, FACG[1], Elaine E. Wang, MD[5], Ananya De, PhD[5], Kelly Brady, MD[5], Asli Memisoglu, PhD[5], David Lombardi, PhD[5], Brooke Hasson, PhD[5], Barbara McGovern, MD[5], Lisa Von Moltke, MD[5].
[1]Mayo Clinic, Rochester, MN; [2]PACT Gastroenterology Center and Yale University School of Medicine, New Haven, CT; [3]Sutter Health Research Enterprise, Mountain View, CA; [4]Vanguard Gastroenterology, New York, NY; [5]Seres Therapeutics, Cambridge, MA.

Introduction: Antibiotics are often insufficient to treat patients with rCDI due to persistence of spores and microbiome disruption. Recurrence occurs in 20-36% of patients with 1st recurrence and ≥40% in those with ≥2 recurrences. We reported that SER-109, an investigational, oral microbiome therapeutic comprised of purified Firmicutes spores, was superior to placebo in reducing risk of rCDI at 8 weeks (12% vs 40%, respectively) in patients with ≥2 CDI recurrences (Feuerstadt, P. *N Engl J Med* 2022). Here, we report the results of ECOSPOR IV, an open-label trial of SER-109.
Methods: Subjects with rCDI were enrolled in 72 US/Canadian sites in 2 cohorts: a) rollover subjects with rCDI in ECOSPOR III, diagnosed by toxin EIA) and b) subjects with ≥1 CDI recurrence (diagnosed by PCR or toxin EIA), inclusive of the current episode). After standard-of-care antibiotics, subjects received SER-109 (4 capsules daily x 3 days). Efficacy, including the proportion of subjects with rCDI (toxin+ diarrhea requiring treatment), and safety were evaluated through Week 8; durability of response was assessed through Week 24.
Results: Of 351 subjects screened, 263 were enrolled (Cohort 1: N=29; Cohort 2: N=234; 68% female; mean age 64 years). Comorbidities included cardiac disorders (31%), neoplasms (21%), Type 2 diabetes (11%), COPD (10%), chronic kidney disease (9%), and hepatobiliary disorders (9%). Overall, 137 subjects (52.1%) experienced treatment-emergent adverse events (TEAEs) through Week 8. The majority were mild to moderate in intensity and gastrointestinal (Table). There were 6 deaths (2.3%) and 20 subjects (7.6%) with serious TEAEs, none of which were deemed treatment-related. Overall, rCDI occurred in 23 subjects (8.7%) at Week 8 (4/29 in Cohort 1 [13.8%] and 19/234 in Cohort 2 [8.1%]) and rCDI rates remained low through 24 weeks (13.7% [36/263]). CDI recurrence rates at Week 8 in subjects with first recurrence were similarly low (6.5% [5/77]) as those with ≥2 recurrences (9.7% [18/186]; Figure).

Conclusion: SER-109, a potential first-in-class investigational microbiome therapeutic, was observed to be safe and well-tolerated in this population of older patients with multiple comorbidities. The rate of rCDI was low and durable, regardless of the number of prior episodes, supporting the potential benefit of microbiome repair following antibiotics for rCDI. Earlier intervention with SER-109 in first recurrence may reduce morbidity associated with rCDI.

Table 1. Summary of Treatment-Emergent Adverse Events Within 8 Weeks After Treatment, Safety Population

| | Cohort 1 | | | | |
| | Randomized Treatment Arm in ECOSPOR III | | | | |
	SER-109 (N=4) n (%)	Placebo (N=25) n (%)	Total (N=29) n (%)	Cohort 2 (N=234) n (%)	Total (N=263) n (%)
Any TEAE	4 (100.0)	15 (60.0)	19 (65.5)	118 (50.4)	137 (52.1)
Most Frequently Reported TEAEs by Preferred Term (≥5% in any cohort)					
Diarrhoea	1 (25.0)	9 (36.0)	10 (34.5)	49 (20.9)	59 (22.4)
Flatulence	0	4 (16.0)	4 (13.8)	16 (6.8)	20 (7.6)
Nausea	0	3 (12.0)	3 (10.3)	17 (7.3)	20 (7.6)
Abdominal pain	1 (25.0)	2 (8.0)	3 (10.3)	15 (6.4)	18 (6.8)
Fatigue	0	3 (12.0)	3 (10.3)	9 (3.8)	12 (4.6)
Urinary tract infection	0	0	0	12 (5.1)	12 (4.6)
Abdominal distension	1 (25.0)	3 (12.0)	4 (13.8)	7 (3.0)	11 (4.2)
Related/Possibly Related TEAE	1 (25.0)	4 (16.0)	5 (17.2)	27 (11.5)	32 (12.2)
Severe TEAEs	0	1 (4.0)	1 (3.4)	18 (7.7)	19 (7.2)
Serious TEAEs	0	0	0	20 (8.5)	20 (7.6)
Serious TEAEs Related/Possibly Related to Study Drug	0	0	0	0	0
Treatment-emergent AESIs	0	0	0	10 (4.3)	10 (3.8)
TEAEs Leading to Death[1]	0	0	0	6 (2.6)	6 (2.3)

Abbreviations: AESI = adverse event of special interest; TEAE = treatment-emergent adverse event Notes: Data presented are by subject. All TEAEs were collected and summarized from time of enrollment up to Week 8; Note: N is number of subjects in the Safety Population who are in the study at the beginning of the specified time interval. 1 TEAEs leading to death by preferred term included: congestive cardiomyopathy (1 subject), coronavirus infection and intestinal peforation (1 subect), death due to natural causes (1 subject), clostridium difficile infection (1 subject), necrotising fasciitis (1 subject), and pancreatic carcinoma (1 subject). Note: the start date of the fatal SAE of pancreatic carcinoma began prior to Week 8 with fatal outcome occurred after Week 12. No deaths were deemed by the investigator to be related to study drug.
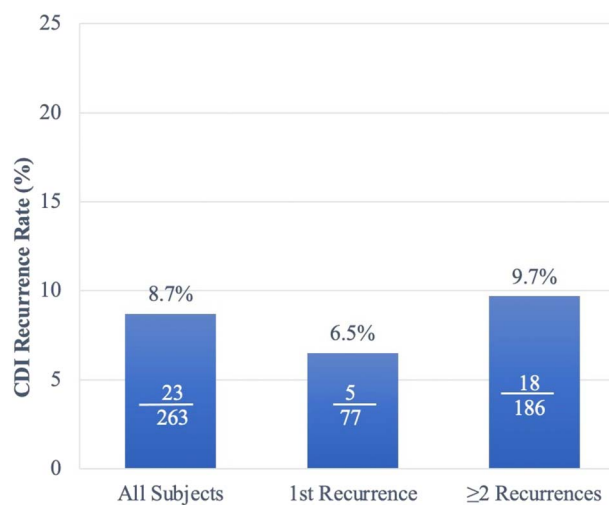
[0133] **Figure 1.** CDI Recurrence Rate at Week 8 in the Overall Population by Number of CDI Recurrences at Study Entry Note: Subjects who are lost to follow-up, terminated the study prematurely, or died without a recorded recurrence before the end of the time interval are assumed to have had a recurrence. Numbers presented within each bar represent the number of subjects with CDI recurrence over the total number of subjects within each grouping.

S134   ACG Auxiliary Award (Trainee)

Artificial Intelligence and High-Resolution Anoscopy: Automatic Identification of Anal Squamous Cell Carcinoma Precursors Using a Convolutional Neural Network

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Introduction: High-resolution anoscopy (HRA) is the gold standard for detecting anal squamous cell cancer (ASCC) precursors. Although it is superior to other diagnostic methods, particularly cytology, the visual identification of areas suspected of having high-grade squamous intraepithelial lesions (HSIL) remains challenging. Deep learning models, namely convolutional neural networks (CNNs), excel in image analysis and have shown great potential for assessing pleomorphic endoscopic images. Our group aimed to develop a CNN-based system for automatically detecting and differentiating HSIL versus LSIL (low-grade squamous intraepithelial lesion) in HRA images.

Methods: A convolutional neural network was developed based on 78 HRA exams from 71 patients from a Proctology high-volumecenter (GH Paris Saint-Joseph, Paris, France). A total of 5,026 images were included, 1,517 images containing HSIL and 3,509 LSIL. A training dataset comprising 90% of the total pool of images was defined to develop the network. The performance of the CNN was evaluated using an independent testing dataset comprising the remaining 10%. The sensitivity, specificity, accuracy, positive and negative predictive values, and area under the curve (AUC) were calculated.

Results: The algorithm was optimized for the automatic detection of HSIL and its differentiation from LSIL. Our model had an overall accuracy of 92.3%. The CNN had a sensitivity, specificity, and positive and negative predictive values of 91.4%, 92.7%, 86.9%, and 95.9%, respectively. The area under the curve was 0.97 (Figure).

Conclusion: Our group developed the first worldwide AI model for HRA. The CNN model accurately detected and differentiatedprecursors of squamous anal cancer. Further development and implementation of these tools in clinical practice may significantly modify the management of these patients and the current state of the art in HRA.
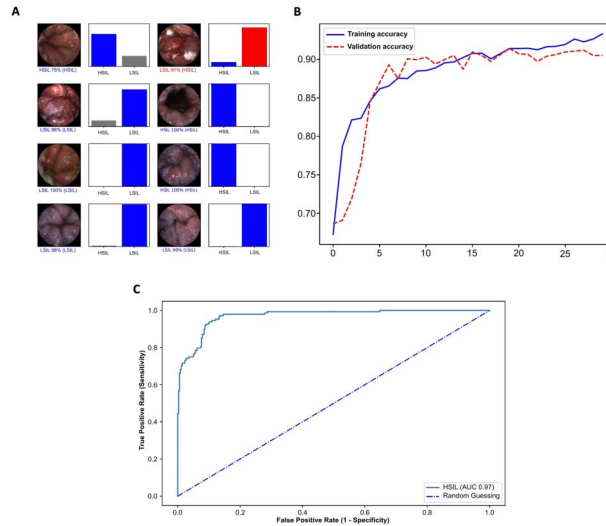
[0134] **Figure 1.** A) Output obtained after running the convolutional neural network. The percentage represents the estimated probability calculated by the algorithm. A blue bar represents a correct prediction by the convolutional neural network. Red bars represent misclassifications by the network. HSIL – high-grade squamous intraepithelial lesion; LSIL - low-grade squamous intraepithelial lesion. B) Evolution of the accuracy of the convolutional neural network during training and validation phases, as the training and validation datasets were repeatedly inputted in the neural network. C) ROC analysis of the network's performance in the detection of HSIL versus LSIL. HSIL – high-grade squamous intraepithelial lesion; LSIL - low-grade squamous intraepithelial lesion; ROC – receiver operator characteristics

S135

Bile Acid Sequestrants in Microscopic Colitis: Clinical Outcomes and Utility of Bile Acid Testing

June Tome, MD[1], Kanika Sehgal, MBBS[2], Amrit K. Kamboj, MD[1], William Harmsen, BS[1], Sahil Khanna, MBBS, MS, FACG[1], Darrell S. Pardi, MD, MS, FACG[1].
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Introduction: Bile acid sequestrants (BAS) may be an effective non-corticosteroid treatment in patients with microscopic colitis (MC), but data are lacking. We evaluated the effectiveness of BAS therapy in MC and assessed the utility of bile acid testing to predict response.

Methods: Adults diagnosed with MC and treated with BAS at Mayo Clinic Rochester (1/1/2010 - 12/31/2020) were identified. Response was assessed at 12 +/- 4 weeks after initiation of BAS therapy and defined as: complete (resolution of diarrhea), partial ($\geq$50% improvement in number of bowel movements), nonresponse (< 50% improvement), and intolerance (discontinuation due to side-effects). Bile acid malabsorption was defined by elevated serum 7α-hydroxy-4-cholesten-3-one or by fecal testing using previously validated cutoffs (total bile acids (BA) >2,337 μmol/48 hours, primary BA >10%, or primary BA >4% with total BA >1,000 μmol/48 hours). Univariate and multivariable logistic regression was used to identify predictors of response to BAS.

Results: A total of 282 patients were identified [median age 59 (20-87) years; 88.3% women] with a median duration of follow-up of 4.5 (0.4-9.1) years (Table). Prior to BAS therapy, 278 (98.6%) were treated with another medication (loperamide, budesonide, bismuth subsalicylate, or mesalamine) for MC. Patients were treated with the following BAS: 183 (64.9%) cholestyramine, 61 (21.6%) colesevelam, and 38 (13.5%) colestipol. Clinical outcomes with BAS were: 139 (49.3%) complete response, 46 (16.3%) partial response, 70 (24.8%) no response, and 27 (9.6%) intolerance. In patients with complete or partial response to BAS, 65/185 (35.1%) were on a concomitant medication for MC. The dose of BAS did not vary between response and non-response groups (p=0.51). A total of 90/282 (31.9%) had bile acid testing and 51/90 (56.7%) had a positive test. Age at MC diagnosis, smoking history, baseline diarrhea severity, history of cholecystectomy, use of prior MC medications, and abnormalities on bile acid testing did not predict response to BAS. After BAS discontinuation, 77/185 (41.6%) responders had recurrence at a median of 21 (1-172) weeks.

Conclusion: In one of the largest cohorts evaluating BAS treatment in MC, we demonstrate that nearly two-thirds had a partial or complete response to these agents. Additional research is needed to determine the role of bile acid malabsoprtion in MC, as well as the subset of patients that are most likely to benefit from BAS therapy.

Table 1. Baseline Characteristics in Microscopic Colitis Patients With and Without Bile Acid Testing

Characteristics	Median (range) or n (%)			
	All Patients (n = 282)	Bile Acid Testing Performed (n = 90)	No Bile Acid Testing Performed (n = 192)	p-value
Age	59 (20-87)	57 (23-87)	60 (20-87)	0.35
Sex, female	249 (88.3%)	82 (91.1%)	167 (87.0%)	0.31
Race, white	276 (97.9%)	89 (98.9%)	187 (97.4%)	0.53
Subtype, lymphocytic colitis	139 (49.3%)	52 (57.8%)	87 (45.3%)	0.06
Bowel movements, number	6 (3-20)	6 (3-20)	5 (3-15)	0.45
Body mass index (kg/m^2)	25.4 (16.2-47.0)	24.5 (16.2-47.0)	25.7 (16.7-46.4)	0.21
Smoking history	95 (33.7%)	37 (41.1%)	58 (30.2%)	0.17
Cholecystectomy	69 (24.5%)	28 (31.1%)	41 (21.4%)	0.08
Celiac disease	20 (7.1 %)	5 (5.6%)	15 (7.8%)	0.39
Previous medications*	278 (98.6%)	88 (97.8%)	190 (98.9%)	0.44

*Medications for microscopic colitis prior to bile acid sequestrant treatment.

S136 Presidential Poster Award

Real World Validation of an Artificial Intelligence Characterization Support System for Prediction of Polyp Histology in Colonoscopy: Interim Analysis of a Prospective Multicenter Study

Weiquan James Li, MBBS, MMed[1], Clement Wu, MBBS, MRCP[2], Christopher Jen Lock. Khor, MBBS[2], Raymond FH. Liang, MBBS, MRCP[3], Jonathan Wei Jie Lee, MBBS, MRCP[4], Jimmy So, MBChB, FRCSEd, FRCSG, FAMS, MPH[4], Weida Chew, MBBS, MRCP[3].
[1]Changi General Hospital, Singapore, Singapore; [2]Singapore General Hospital, Singapore, Singapore; [3]Tan Tock Seng Hospital, Singapore, Singapore; [4]National University Hospital, Singapore, Singapore.

Introduction: Colonoscopy is the gold standard for screening of colorectal cancer. Diminutive and hyperplastic polyps do not increase a patient's risk for colorectal cancer. Prediction of hyperplastic polyp histology is crucial for the resect and discard strategy, which saves cost and decreases procedure time in colonoscopy. This study aims to validate the performance of computer-aided diagnosis (CADx) in distinguishing between hyperplastic and neoplastic polyps during colonoscopy in a real-world setting.
Methods: We conducted a prospective multicentre study comparing CADx (Fujifilm Corp., Tokyo) with endoscopist optical prediction of polyp histology. We first recorded the optical diagnosis according to the NICE classification by the endoscopist. Following this, the CADx tool was switched on and its prediction recorded. Imaged polyps were resected for histological analysis, which formed the gold standard. Primary outcome was diagnostic accuracy (defined by sensitivity for diagnosis of hyperplastic polyps and concordance rate). Bowel preparation, polyp size and difficulty in location were recorded for subgroup analysis.
Results: 414 patients were assessed for eligibility across 4 large tertiary institutions in Singapore between February 2021 and June 2022. 625 polyps (303 hyperplastic, 322 neoplastic) were detected in 257 patients. Concordance rates for CADx and endoscopist predictions were 74.1% [95% confidence interval (CI) 70.5%-77.5%] and 73.1% (95% CI 69.5%-76.6%%), respectively (p=NS). Sensitivity for diagnosis of hyperplastic polyps was 84.2% (95% CI 79.6%-88.1%) and 77.6% (95% CI 72.4%-82.1%) for CADx and endoscopists, respectively (p=NS). CADx also showed superior performance in predicting hyperplastic histology in diminutive polyps compared to endoscopist optical prediction using the NICE classification (sensitivity 81.7%; 95% CI 76.2%-86.4%, versus 76.3%; 95% CI 70.4%-81.5%, respectively). Diagnostic accuracy was similar when analysed according to bowel preparation and difficulty in polyp location during colonoscopy (defined as polyp location behind fold, around bend, or unable to position at 6 o'clock).
Conclusion: CADx showed a trend towards increased diagnostic accuracy in prediction of hyperplastic polyp histology during colonoscopy compared to endoscopist prediction in this interim analysis. The superior performance in sensitivity for disgnosis of hyperplastic polyps was also seen in diminutive polyps, but not with poor bowel preparation and difficult polyp location.

S137 Presidential Poster Award

Outcomes of Patients Receiving Bezlotoxumab for the Prevention of Recurrent *Clostridioides difficile* Infection – A Multicenter Study

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Introduction: *Clostridioides difficile* infection (CDI) is the most common healthcare-associated infection in the United States (US). Treatment guidelines have evolved resulting in better outcomes however recurrent disease remains a major issue associated with significant morbidity despite best practices. Bezlotoxumab (BEZ) is a fully humanized monoclonal antibody approved by FDA in 2017 for prevention of recurrent CDI (rCDI). Limited real-world data are available regarding BEZ usage outside of clinical trials. In this multicenter study, we aim to report our experience with BEZ at a large healthcare system in northeast US.
Methods: We retrospectively reviewed all consecutive adult patients who received BEZ from 1/2017 until 12/2021 at Yale-New Haven Health System and had at least 90 days of follow up. Data collected for each patient included demographics, medical co-morbidities, adverse events to BEZ and rates of rCDI following BEZ.
Results: A total of 114 patients were included with a mean age of 67.3 years (range 25-97); 74 (64.9%) were female. There has been a recent increased utilization of BEZ with more than half of our sample (n=73, 64%) being since the beginning of COVID-19 pandemic and 38.6% in 2021 alone. Most patients were treated with vancomycin (88.6%) while 11 (9.7%) received fidaxomicin. Median time from most recent CDI episode to BEZ infusion was 22.5 days. Notably, 17.5% were not on active CDI treatment when they received BEZ. 30 (26.3%) received BEZ after initial CDI, 52 (45.6%) had one prior recurrent episode while 32 (28.1%) had 2 or more previous recurrences. Among those who received BEZ, 10 patients (8.8%) experienced 90-day rCDI, of these 9 (90%) had history of at least 1 episode of rCDI. There were no statistically significant differences in baseline characteristics between r-CDI and non-rCDI groups (Table). Furthermore, no statistical difference in rCDI between those who were on CDI treatment at the time of BEZ and those who completed it before BEZ [9/94 (9.6%) vs 1/20 (5.0%); p=0.511].
Conclusion: Our real-life data confirms that Bezlotoxumab appears to be safe and effective in preventing rCDI in this population whether given during CDI treatment or after. BEZ represents an important treatment option in this highly morbid population. Further studies are needed to determine the benefit of early administration of BEZ after index CDI in those at risk and to consider utilization shifts following the 2021 ACG updated guideline recommendations advising it's usage.

Table 1. Baseline variables comparing recurrent CDI patients and nonrecurrent patients after a single dose of Bezlotoxumab

Variable	All patients (N=114)	90-Day Recurrent CDI		p-value
		Yes (n=10)	No (n=104)	
Age (years), mean ± SD	67.3 ± 14.3	67.2 ± 13.2	67.3 ± 14.4	0.936
Age (years), median [range]	68.5 [25 – 97]	67.5 [42 – 86]	69 [25 – 97]	
Female, n (%)	74 (64.9)	7 (70.0)	67 (64.4)	0.724
Race, n (%)				0.048
White	96 (84.2)	7 (70)	89 (85.6)	
African American	9 (7.9)	3 (30.0)	6 (5.8)	
Asian	1 (0.9)	0 (0.0)	1 (1.0)	
Unknown	8 (7.0)	0 (0.0)	8 (7.7)	
Risk factors for recurrent CDI				
Age ≥ 65 years, n (%)	67 (58.8)	6 (60.0)	61 (58.65)	0.934
Co-morbidities / Immunosuppression, n (%)				
Active malignancy on chemotherapy	28 (24.6)	3 (30.0)	25 (24.0)	0.676
Organ transplant	27 (23.7)	3 (30.0)	24 (23.1)	0.623
On high dose steroids	4 (3.5)	1 (10.0)	3 (2.9)	0.243
Biologics/Immunomodulators	6 (5.3)	1 (10.0)	5 (4.8)	0.482
Hemodialysis	9 (7.9)	2 (20.0)	7 (6.7)	0.137
History of heart failure, n (%)	36 (31.6)	4 (40.0)	32 (30.8)	0.549
Charlson co-morbidity index, mean ± SD	4.9 ± 2.5	4.1 ± 2.0	4.9 ± 2.6	0.271
Charlson co-morbidity index ≥3, n (%)	91 (79.8)	8 (80.0)	83 (79.8)	0.988
Treatment of most recent CDI episode, n (%)				0.738
Vancomycin fixed dose	35 (31.0)	3 (30.0)	32 (31.1)	
Vancomycin taper	60 (53.1)	6 (60.0)	54 (52.4)	
Fidaxomicin	11 (9.73)	0 (0.0)	11 (10.7)	
Vancomycin taper + Nitazoxanide	4 (3.5)	1 (10.0)	3 (2.9)	

Table 1. (continued)

Variable	All patients (N=114)	90-Day Recurrent CDI		p-value
		Yes (n=10)	No (n=104)	
Vancomycin + Fidaxomicin	2 (1.8)	0 (0.0)	2 (1.9)	
Vancomycin chronic suppressive therapy	1 (.09)	0 (0.0)	1 (1.1)	
Received BEZ while on CDI treatment, n (%)				0.511
Yes	94 (82.5)	9 (90.0)	85 (81.7)	
No	20 (17.5)	1 (10.0)	19 (18.3)	
Days from most recent CDI to BEZ, median [range]	22.5 [4 – 426]	20 [7 – 69]	22 [4 – 426]	0.904
Days from starting SoC to BEZ median [range]	21 [3 – 211]	16 [7 – 67]	21.5 [3 – 211]	0.740
CDI history				
Primary CDI	30 (26.3)	1 (10.0)	29 (27.9)	0.220
No. of CDI recurrences ever				
1	52 (45.6)	6 (60.0)	46 (44.2)	0.339
≥2	32 (28.1)	3 (30.0)	29 (27.9)	0.887
Time to recurrence (days), median [range]	–	35 [4 – 76]		–
Adverse events to BEZ		· 1 Patient experienced mild allergic reaction (tongue swelling, itching and headache), required monitoring in the ED for less than 24 hours. · 1 Patient admitted with CHF exacerbation within 30 days of BEZ (although felt to be due to non-compliance with diuretics).		
90-day recurrent CDI following BEZ	10 (8.8)			–
Year of BEZ administration				
2017	7 (6.1)			–
2018	11 (6.6)			–
2019	26 (22.8)			–
2020	26 (22.8)			–
2021	44 (38.6)			–

Abbreviations: BEZ: Bezlotoxumab, SoC: Standard of care, CDI: Clostridioides difficile infection, SD: Standard deviation.

S138   Presidential Poster Award

Incidence and Outcomes of *C. difficile* Infection Following Colon Ischemia

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Introduction: Colon Ischemia (CI) is the most common ischemic injury to the gastrointestinal tract. *Clostridioides difficile* infection (CDI) is the most common healthcare-associated infection. There is limited knowledge of the risk of CDI after CI. Our hypothesis is that CI patients who develop CDI have worse outcomes compared with CI patients who don't develop CDI. (Figure)

Methods: We conducted a multicenter retrospective cohort study of patients admitted with biopsy-proven CI to Yale-New Haven Health Hospital, Montefiore Medical Center, Weiler Medical Center, and SUNY-Upstate Medical Center from 2005 to 2019. For each patient, we recorded numerous factors including the ACG severity scoring system. Patients who had CDI within 3 months following CI (CI+CDI) were compared to patients who did not develop CDI (CI-CDI). Primary outcome was to measure frequency of occurrence CDI in the CI population, secondary outcomes included comparing 30-day and 90-day colectomy, recurrent CI, readmission, and mortality from the time of diagnosis of CI, and segmental involvement of CI+CDI to CI-CDI. Multivariate logistic regression was performed after adjusting for the age, gender, race, Charlson Comorbidity Index (CCI) and the severity of CI.

Results: 906 patients met inclusion criteria with Bx proven CI. 3.2% developed CDI between 2005 and 2019 Figure. There were no differences between CI+CDI (n=29) and CI-CDI groups (n=877) with regards to gender, BMI, medical co-morbidities, or severity. CI+CDI patients had more isolated right-colon involvement (38.8% vs 16.5%, p=0.013), 30-day readmission (51.7% vs 9.3%, p< 0.001), 90-day readmission (65.5% vs 18.1%, p< 0.001), 30-day reoccurrence of CI (17.2% vs 1.6%, p< 0.001), 90-day reoccurrence of CI (24.1% vs 3.6%, p< 0.001) and 90-day mortality (17.8% vs 7.5%, p=0.047) than CI-CDI. When adjusting for age, gender, race, CCI and severity, patients with CI+CDI were at higher risk for 30-day readmission [OR 10.62 (95% CI: 4.2-26.3), p< 0.001], 90-day readmission [OR 10.45 (95% CI: 4.0-26.8), p< 0.001], 30- day reoccurrence CI [OR 7.3 (95% CI: 1.9 -27.3), p=0.003] and 90-day reoccurrence CI [OR 5.7 (95% CI: 1.8-17.2), p=0.003] compared with CI-CDI group (Table).

Conclusion: CI patients who developed CDI had higher rates of CI recurrence, more frequent readmission, and were more likely to have isolated right colon involvement than CI-CDI. When a patient with a recent history of CI is diagnosed with CDI, they might benefit from more aggressive therapy to try to improve these outcomes.
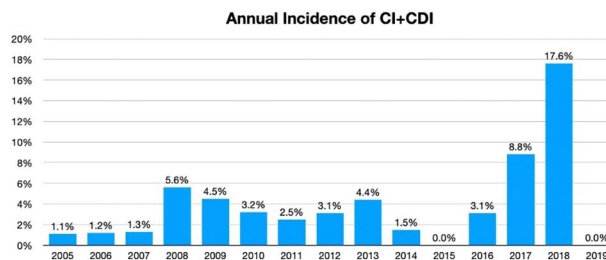
[0138] **Figure 1.** Annual incidence of CI+CDI. Abbreviations: BMI, Body mass index; CI, colon Ischemia; ICU, Intensive Care Unit

Table 1. Baseline demographics, clinical characteristics, and outcomes of pts in Post CI+CDI and Post CI-CDI groups

Parameter	CI+CDI n=29	CI-CDI n=877	p value	Parameter	CI+CDI n=29	CI-CDI n=877	p value
	Demographics				Bowel involvement CI		
Age (median, (IQR))	78 (71-83)	70 (61-79)	**0.009**	Small bowel involvement, n (%)	0 (0.00)	40 (7.60)	0.212
BMI (median, (IQR))	28.4 (22.34-31.15)	27.23 (23.58-31.56)	0.926	Pancolitis, n (%)	1 (4.00)	38 (5.18)	0.792
Females, n (%)	24 (82.76)	625 (71.27)	0.177	Any right colon involvement, n (%)	8 (44.44)	157 (25.49)	0.071
	Medical Comorbidities						
Diabetes Mellitus, n (%)	10 (34.48)	263 (29.99)	0.604	Right colon only, n (%)	7 (38.89)	103 (16.59)	**0.013**
Hypertension, n (%)	21 (72.41)	658 (75.03)	0.749		CI severity		
Coronary Artery Disease, n (%)	8 (27.59)	261 (29.86)	0.792	Mild/Moderate CI, n (%)	10 (34.48)	441 (50.69)	0.086
Atrial Fibrillation, n (%)	8 (28.57)	129 (15.60)	0.066	Severe CI, n (%)	19 (65.52)	429 (49.31)	
Peripheral Vascular Disease, n (%)	4 (13.79)	73 (8.37)	0.304	Charlson co-morbidity Index, median (IQR)	5 (4-8)	5 (3-7)	0.057
Cerebral Vascular Disease, n (%)	5 (17.24)	92 (10.50)	0.248	ICU requirement, n (%)	6 (20.69)	213 (24.77)	0.616
Constipation, n (%)	8 (28.57)	224 (25.66)	0.729		Treatment		
Pulmonary diseases, n (%)	5 (17.24)	185 (21.14)	0.612	Treatment with Antibiotics, n (%)	22 (75.86)	589 (68.73)	0.414
	Outcomes						
Length of stay (mean, (SD))	3 (1-10)	3 (1-7)	0.751	Adjusted Odds Ratio* (CI+CDI vs CI-CDI)	95% Confidence Interval	p value	
30-day readmission, n (%)	15 (51.7)	82 (9.3)	**< 0.001**	10.62	[4.28 - 26.37]	**< 0.001**	
90-day readmission, n (%)	19 (65.5)	159 (18.13)	**< 0.001**	10.45	[4.06 - 26.88]	**< 0.001**	
30-day recurrence of CI, n (%)	5 (17.24)	14 (1.6)	**< 0.001**	7.30	[1.94 - 27.37]	**0.003**	
90-day recurrence of CI, n (%)	7 (24.14)	32 (3.65)	**< 0.001**	5.70	[1.88 - 17.29]	**0.002**	
30-day colectomy, n (%)	4 (14.81)	108 (12.36)	0.703	1.78	[0.46 - 6.91]	0.408	
90-day colectomy, n (%)	4 (14.81)	101 (11.57)	0.605	2.24	[0.57 - 8.85]	0.251	
30-day mortality, n (%)	3 (10.71)	47 (5.39)	0.226	1.09	[0.13 - 9.07]	0.933	
90-day mortality, n (%)	5 (17.86)	66 (7.59)	**0.047**	2.15	[0.56 - 8.31]	0.267	

*Multivariate logistic regression for the outcomes of CI+CDI compared to CI-CDI (reference group). Analysis adjusted for age, gender, race, Charlson co-morbidity index and CI severity.
Abbreviations: BMI, Body mass index; CI, colon Ischemia; ICU, Intensive Care Unit.

S139   Presidential Poster Award

Low Volume Preparation Regimen for Colon Capsule Endoscopy – Clinical Study

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Introduction: Colon Capsule Endoscopy (CCE) procedure requires a preparation regimen (PR) to provide a clean visualization of the colon and promote capsule propulsion throughout the colon. Unfortunately, PR remains a significant barrier for patients, who must consume high volume preparation materials. The aim of this study was to demonstrate non-inferiority of a low-volume PR compared to a high-volume PR.

Methods: Two new PRs were selected for this study (Table). Healthy participants (age 50+) were assigned to receive either Plenvu/SuPrep/prucalopride (Group A, n=101) or SuPrep/Pico-Salax/prucalopride (Group B, n=99), prior to CCE. The endpoints for this study were overall adequate cleansing, capsule excretion rate in 10 hours, completion and adverse events (AEs). For the historical control (HC) group, a subset of 142 subjects (age 50+) from a previously published diagnostic study which included high volume PR was utilized (1). The new PR groups and HC group were reviewed by the same experienced CCE reader. Sample size estimation and analysis assumed 15% margin for P< 0.025 one-sided non-inferiority Farrington-Manning test.

Results: Group A demonstrated superior results as compared to the HC with regards to colon cleansing and completion (P< 0.0001) and was non-inferior with regards to capsule excretion in 10 hours (P< 0.0001) (Figure). Non-inferiority was not established for AEs (P=0.045) as Group A demonstrated a higher rate of AEs, which were mostly mild vomiting. Group B demonstrated non-inferior results as compared to the HC with regards to capsule excretion in 10 hours (P=0.0002), cleansing (P=0.028) and AE (P=0.027). Non-inferiority for completion was not established (P=0.07).

Conclusion: A new low volume PR (Group A) achieved superior completion when compared to HC; however, the AE results were not inferior. AEs were mostly mild vomiting and the increase may be due to regulation changes in the past decade which led to more events being classified as AEs. Plenvu/SuPrep/prucalopride may be an alternative low volume PR for CCE procedure.

*Overall Adequate Cleansing according to the Leighton and Rex cleansing scale
**Completion = Overall Adequate Cleansing & Excretion in 10 Hours
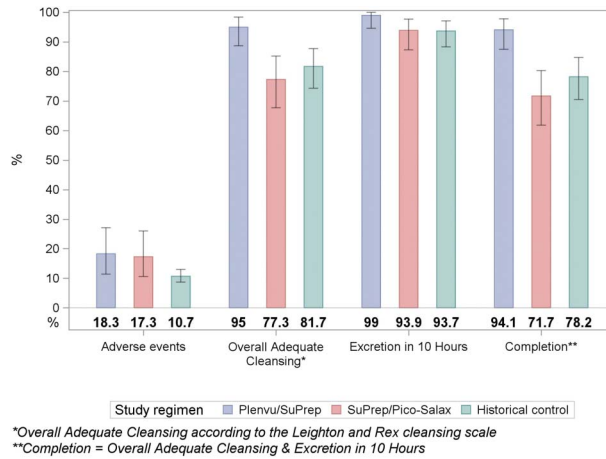
[0139] **Figure 1.** Study endpoints rate by regimens

Table 1. Description of the preparation regimens

Low Volume Preparation Regimen				High Volume Preparation Regimen			
Time			**Group A**	**Group B**	**Time**		**Historical Control (HC) Group**
Day -2	All day	Water	At least 10 glasses	At least 10 glasses	Day -2	All day	Water	At least 10 glasses
	Evening	Senna Tablets	40 mg (2 × 20 mg)	40 mg (2 × 20 mg)		Bedtime	Senna Tablets	4 Tablets (12 mg)
Day -1	All day		Clear liquid diet		Day -1	All day		Clear liquid diet
	20:30 - 22:00	Evening prep Water	0.5 L Plenvu 1 L water	0.5 L SuPrep 1 L water		19:00 - 21:00	Evening prep	2 liters of PEG (SF-ELS) solution
Day 0	07:00 - 07:30 07:30 - 08:30 08:30 09:15 (up to 09:45)	Morning prep Water Tablet PillCam	0.5 L Plenvu 1 L water Resolor**, 2 mg PillCam	0.5 L SuPrep 1 L water Resolor**, 2 mg PillCam	Day 0	07:00 - 08:30 09:15	Morning prep PillCam	2 liters of PEG (SF-ELS) solution PillCam
	10:00 - 10:30 *	Boost 1 (G2SB)	0.5 L SuPrep	0.15 L Pico-Salax		10:00 - 10:30*	Boost 1 (G2SB)	0.5 L SuPrep
	10:30 - 11:30	Water	1 L water	1 L water		10:30 - 11:30	Water	1 L Water
	12:00 - 12:15	Boost 2 (2 hours after Boost 1)	0.25 L SuPrep	0.075 L Pico-Salax		13:00 - 13:15	Boost 2 (3 hours after Boost 1)	0.25 L SuPrep
	12:15 - 12:45	Water	0.5 L water	0.5 L water		13:15 - 13:45	Water	1 L Water
	14:00 - 14:15	Boost 3 (2 hours after Boost 2)	0.25 L SuPrep	0.075 L Pico-Salax		15:00 - 15:15	Suppository (2 hours after Boost 2)	10 mg bisacodyl
	14:15 - 14:45 15:00 16:00	Water Light meal (1 hour after Boost 3) Suppository (1 hour after the meal)	0.5 L water 10 mg bisacodyl	0.5 L water 10 mg bisacodyl		17:00	Light meal (2 hours after Suppository)	
	Maximum Solution Volume		2L	1.3L		Maximum Solution Volume		4.75L

*Time of capsule passage into small bowel (G2SB(is estimated. 10mg Reglan is administrated in case the capsule fails to enter SB within 1h from ingestion (alert 0).
**Resolor is the specific brand of prucalopride that was used.

REFERENCE
1. Rex et al. Accuracy of capsule colonoscopy in detecting colorectal polyps in a screening population. Gastroenterology 2015; 148: 948-957.

S140   Presidential Poster Award

Examining Colorectal Cancer (CRC) Stage at Initial Diagnosis Before and During the COVID-19 Pandemic in the United States

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Introduction: Colorectal Cancer (CRC) is on the rise, prompting the need for earlier screening in the United States (U.S.) population. The American Cancer Society now recommends screening for CRC in patients with average risk at the age of 45. Further complicating this picture, the COVID-19 pandemic has disrupted the routine screening process for CRC, which we hypothesize has impacted the stage at which CRC is detected. We sought to determine the extent to which the COVID-19 pandemic has affected colorectal cancer diagnosis trends at a large urban community hospital.
Methods: We performed a retrospective analysis of patients, comparing two time periods: pre-pandemic (1/1/2019-1/31/2020) and during COVID pandemic (2/1/2020-9/29/21). Data was extracted from the electronic medical record (EMR) to compile a database of patients diagnosed with CRC during these time periods. Patients included in this study had a new diagnosis of colorectal cancer and either followed with colorectal specialists at the hospital or had undergone tissue biopsy analysis by the Department of Pathology. The primary outcome was determining the stage at which CRC was detected and the modality utilized for CRC screening in that patient. Additional variables collected were as follows: age, pathological findings (grade, presence of tumor mutations, or microsatellite instability), gender, race, and insurance.
Results: Data was collected from a total of 380 patients, which included 190 patients diagnosed with CRC within the timeframe defined as pre-pandemic and 190 diagnosed with CRC within the timeframe defined as during the pandemic. CRC diagnosis was analyzed in terms of TNM stage at time of diagnosis (Stages 0 through IV). Stage III and IV were grouped together and categorized as a late-stage diagnosis, whereas Stages 0, I, and II were grouped together and categorized as an early-stage diagnosis. Late-stage diagnosis was found in 34.7% (66/190) of patients in the pre-pandemic group. In comparison, late-stage diagnosis was found in 46.3% (88/190) of patients in the during pandemic group.
Conclusion: Our results suggest that the COVID-19 pandemic did produce delays in care and work-up for CRC. We believe this is why CRC stage at the time of initial diagnosis was later for patients diagnosed during the pandemic than for patients diagnosed prior to the pandemic. In the future, we hope to evaluate if the impact of COVID-19 is reflected in tumor grade and genetic mutations at the time of diagnosis, and determine race and gender disparities.

S141   Presidential Poster Award

Long-Term Risk of Colorectal Cancer in Patients With Prediabetes : A Systematic Review and Meta-Analysis

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Introduction: Prediabetes is often underdiagnosed and underreported due to its asymptomatic state in over 80% of individuals. Considering its role in promoting cancer incidence and limited evidence linking prediabetes and colorectal cancer (CRC), we conducted a meta-analysis to evaluate the incidence of colorectal cancer in people with prediabetes. (Figure)

Methods: A comprehensive search through PubMed/Medline, Embase, Scopus, and Google Scholar was performed until June 1, 2022, to screen for studies reporting colorectal cancer incidence/risk in prediabetics. Binary random-effects models were used to perform meta-analysis and subgroup analyses. Sensitivity analysis was done using leave-one-out method.

Results: Seven prospective and one retrospective study comprising 15 cohorts and a pooled number of 854876 cases and 2190511 controls were included in the analysis (2 Japan, 2 Korea, 1 Sweden, 1 UK, 1 China, and 1 USA). After combining all the studies the forest plots for adjusted analysis shows a significant increase in odds of having CRC with prediabetes - (OR 1.16; 1.08–1.25, p< 0.01) (fig 1b) and unadjusted analysis also shows a significant increase in odds of having CRC with prediabetes (OR 1.62; 1.35–1.95, p< 0.01) (fig 1a). Sensitivity analysis using the Leave-one-out method did confirm equivalent results (fig 1c). Heterogeneity analysis for adjusted OR had moderate heterogeneity with an overall I^2 of 56.06% with a p value < 0.01 and for unadjusted OR had considerable heterogeneity with an overall I^2 of 85.72% with a p value less than 0.01. Subgroup analysis based on type of study, the odds of developing colorectal cancer was higher in prospective studies (OR 1.175; 1.065-1.298)(p 0.001) than retrospective studies(OR 1.162; 1.033- 1.306)(p 0.012) .The odds of developing cancer was not significantly higher in ages >60(OR 1.446; 0.887-2.356)(p 0.139) compared to less than 60 years. The strongest association b/w Prediabetes and CRC was found on a median 5-10 years(aOR 1.257; 1.029-1.534)(p 0.025) follow-up compared to < 5 years and 10 years and higher.

Conclusion: This study showed nearly 16% higher long-term risk of colorectal cancer in patients with prediabetes. Lifestyle modifications like weight loss, proper diet, and exercise are essential to control prediabetes. This study further warrants a specific prediabetes screening for patients already at high risk of colorectal cancer with other risk factors. These strides would help subsequently lower the disease burden, and associated morbidity/mortality.
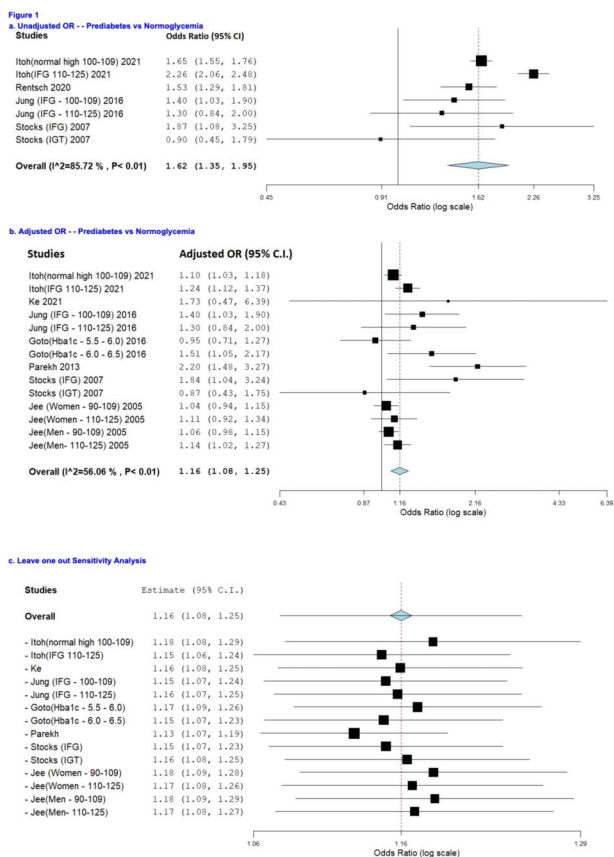
[0141] **Figure 1.** Forest Plot: Long-term Risk of Colorectal Cancer in Patients with Prediabetes vs Normoglycemia

S142   Presidential Poster Award

Impact of Socioeconomic Status on Colorectal Cancer Survival in the United States: A Population-Based Study 2010–2018

Abdul Rahman Al Armashi, MD[1], Dina Elantably, MD[2], Faris Hammad, MD[3], Anas Al Zubaidi, MD[4], Apoorva Krishna Chandar, MD[1], Kanchi Patell, MD[3], Francisco Somoza-Cano, MD[3], Keyvan Ravakhah, MD[3], Akram Alkrekshi, MD[2].

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Introduction: Colorectal cancer is the second leading cause of cancer-related deaths in the United States and worldwide. Disparities in cancer survival result from several variables, including socioeconomic, behavioral, and biological factors. The impact of socioeconomic status (SES) on colorectal cancer patient outcomes in the United States (US) needs identification.

Methods: We performed a database query into the Surveillance, Epidemiology, and End Results (SEER) Program 18 registry. Between 2010 and 2018, we included individuals diagnosed with colorectal cancer. The following SES data were gathered: race, insurance status, and marital status. We calculated the Cox proportional hazard model, logistic regression, and chi-square test using SPSS software, version 28.0 (IBM).

Results: We included 188,003 patients diagnosed with colorectal carcinoma between 2010 and 2018. In multivariable adjusted analyses, the mortality of patients who were uninsured or receiving Medicaid was statistically significantly higher than patients who were insured (Hazard ratio [HR] = 1.797, 95% confidence interval [CI]: 1.724-1.873, and HR= 1.597 , 95% CI: 1.562-1.633, respectively). When compared to

divorced, single, and widowed cohorts had a statistically significantly higher risk of death (HR = 1.123, 95% CI:1.090-1.157 and HR= 1.054, 95% CI: 1.022-1.087, respectively), while married cohorts had a better HR with a significant reduction of risk of death by 23.7%. On comparing race, mortality was statistically significantly lower in white than in black with HR= 0.876, 95% CI: 0.856-0.897. (Table)

Conclusion: Insurance, marital, and racial SES variables contribute to the disparities in colorectal cancer survival in the US. Married and insured had the most favorable survival outcome, while uninsured and single had the lowest survival. Racial disparities were also evident as the risk of mortality was reduced by 12.4% in the white population compared to black. Socioeconomic attributes may affect cancer survival and at least partly explain the disparity between the black and white populations in the US.

Table 1. Cox proportional hazard model associating SES variables and colorectal cancer survival

Covariates	HR (95% CI)	p-value
Insurance		
Insured	Reference	
Any Medicaid	1.597 (1.562-1.633)	< 0.001
Insured/No specifics	1.206 (1.181-1.231)	< 0.001
Uninsured	1.797 (1.724-1.873)	< 0.001
Gender		
Female	Reference	
Male	1.202 (1.182-1.222)	< 0.001
Marital status		
Divorced	Reference	
Married (including common law)	0.763 (0.743-0.784)	< 0.001
Separated	1.006 (0.934-1.084)	0.875
Single (never married)	1.123 (1.090-1.157)	< 0.001
Unmarried or Domestic Partner	0.919 (0.771-1.096)	0.349
Widowed	1.054 (1.022-1.087)	< 0.001
Race		
Black	Reference	
White	0.876 (0.856-0.897)	< 0.001

S143

Improving Suboptimal Bowel Prep in a Hydraulically Sealed Endoluminal Compartment Using a Novel On-Demand Overtube Device: An in vivo Animal Study

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Introduction: Inadequate bowel preparation during colonoscopy results in increased cost and risk to the patient due to need for additional examinations, reduced diagnostic yield, and increased the risk of subsequent colorectal cancer. A recently developed novel overtube (OT) device (IzoScope™, IzoMed Inc., Irvine, CA) can safely and efficiently seal a compartment of the colon and administer targeted fluid lavage (e.g., right colonic enema). The aim of this study was to describe the use of this device to address segmental suboptimal bowel preparation and improve visibility during colonoscopy.

Case Description/Methods: We performed a proof-of-concept study using a single domestic pig. The right colon was intubated using a standard adult colonoscope, and poor bowel preparation was seen with opaque liquid and stool precluding the visualization of the mucosa, consistent with a Boston Bowel Preparation Scale (BBPS) subscore of 0 (Figure 1A). The OT device was then deployed. The device consists of a soft, flexible sheet that can be quickly wrapped around the colonoscope, essentially creating an on-demand OT without need for preloading or scope withdrawal. The device deploys a balloon on the end of the OT, behind the tip of the endoscope, to create an anchor for the OT in the colon (Figure 1B, arrow). A second balloon on a catheter extends beyond the endoscope and can be used to seal the end of the compartment (Figure 1B, arrowhead). The balloons were used to create a sealed, compartment in the right colon that maintained an access for the OT after withdrawal of the endoscope. Fluid was then instilled through the OT (Figure 1B, star) to effectively perform a right colonic enema. One liter of normal saline was lavaged into the right colon and drained via gravity. The distal balloon catheter was then withdrawn to provide additional cleansing through a "squeegee"-like effect (Figure 1C). The colonoscope was then reinserted and mucosa was inspected. Bowel preparation had markedly improved, consistent with a BBPS subscore of 3 (Figure 1D).

Discussion: Using a novel OT device presented here, we were able to improve segmental bowel preparation, particularly at the right colon which is not typically accessible to conventional enema. The device can be used as an on-demand OT during colonoscopy to optimize mucosal visualization in suboptimal bowel preparation as shown in this study. This technology may potentially reduce the need to cancel or reschedule procedures when suboptimal preparation is encountered.
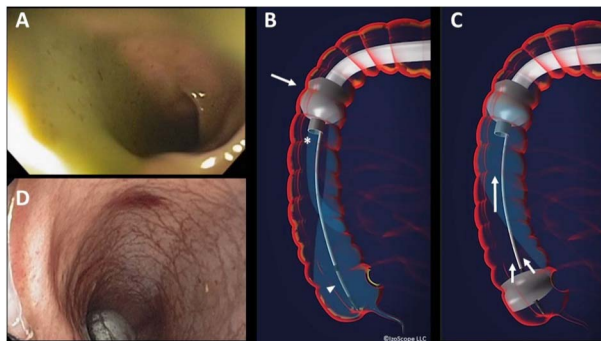
[0143] **Figure 1.** 1A: Poor right sided bowel preparation encountered during colonoscopy, 1B: Overtube device schematic showing balloon inflation and instillation of fluid into the right colon, 1C: additional cleansing effect obtained by withdrawing of the inflated distal balloon, 1D: post-right colonic irrigation bowel preparation

S144

Extent of Resection of the Primary Lesion With Draining Lymph Nodes Determines Long-Term Cancer-Specific Survival in Non-Mucinous Appendiceal Adenocarcinomas - A 15-Year National SEER Database Study

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Introduction: Adenocarcinomas of the appendix are rare cancers for which no national comprehensive cancer network (NCCN) guidelines exist and for patients who undergo resection with curative intent, there is a paucity of data on prognostic factors affecting long-term cancer-specific survival.

Methods: A retrospective study from National Cancer Institute's -Surveillance Epidemiology and End Results on patients who underwent curative resection over a 15-year period (2004-2019) for primary appendiceal adenocarcinoma. Of a total of 16,699 patients, 14,945 were excluded (exclusion criteria were non-adenocarcinoma histological types, patients with regional or distant metastasis as per SEER stage). Effects of factors [Age, race, tumor biology (mucinous versus non-mucinous tumors), extent of resection of primary lesion &lymph nodes] on cancer-specific long-term survival were studied. Survival analysis was performed using the Kaplan-Meir method & statistical significance set at p< 0.05. Survival outcomes were reported as mean survival (months).

Results: Of 1754 patients, 827 (47.1%) were females and 927 (52.1%) were males. The mean age in years (±SD) was 62.43± 14.3. The racial distribution was as follows-blacks 237(13.5%), whites 1398 (79.7%), and others 119 (6.8%). 771 (44.6%) underwent local resection (appendectomy or segmental resection of colon without lymph node resection) & 983 (55.4%) hemicolectomy with lymph node resection. Favorable survival prognosticators (Table) were age < 50, white race, and well-differentiated histology. Patients with mucinous tumors experienced better survival (Figure 1a). Patients who underwent right hemicolectomy with lymph node resection experienced better survival compared with those who had an appendectomy or segmental colonic resection, for non-mucinous tumors (Figure 1c), rather than mucinous tumors (Figure 1b).

Conclusion: We report novel demographic, tumor-related, and operative prognostic factors impacting long-term cancer-specific survival in patients who undergo resection for appendiceal adenocarcinoma. These tumors are likely to be encountered by gastroenterologists in clinical practice, either preoperatively or post-operatively as part of a multi-disciplinary team. Our data, if validated by large trials would be invaluable in advocating an aggressive approach for eligible patients with a hemicolectomy and lymph node resection rather than appendectomy alone, especially in non-mucinous adenocarcinomas of the appendix.
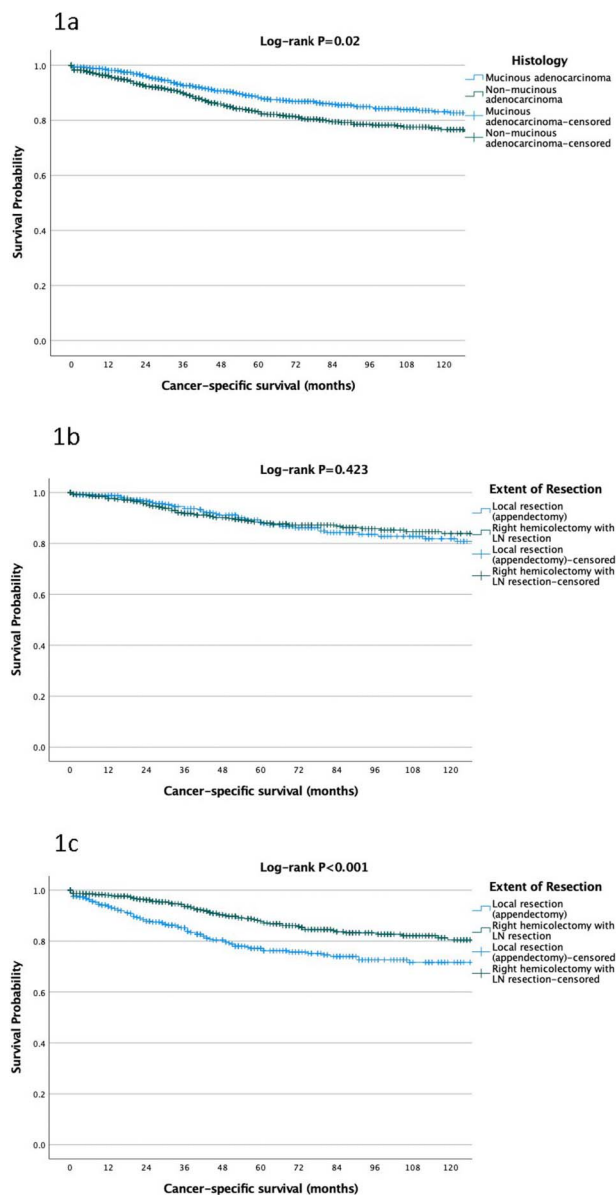
[0144] **Figure 1.** a. Kaplan Meir survival curves of cancer-specific survival comparing mucinous versus non-mucinous adenocarcinomas of the appendix Figure 1b. Kaplan Meir survival curves of cancer-specific survival (mucinous adenocarcinomas of the appendix) comparing appendectomy or segmental resection versus right hemicolectomy with lymph node resection. Figure 1c. Kaplan Meir survival curves of cancer-specific survival (non-mucinous adenocarcinomas of the appendix) comparing appendectomy or segmental resection versus right hemicolectomy with lymph node resectionwrap>

Table 1. Demographic, tumor-related and operative factors impacting survival in adenocarcinoma of the appendix

Factor studied	Mean cancer-specific survival (months)		P value
Age (< 50 years *vs.* = or > 50 years)	169	157	0.01
Gender (Female *vs.* Male)	161	157	0.22
Race (white *vs.* black and other)	161	145	0.04
Median household income (Below *vs.* Above, $60,000)	152	162	0.054
Tumor biology (mucinous *vs.* non mucinous)	185	145	0.002
Differentiation (well vs. moderate or poorly differentiated)	185	155	0.01
Lymph node sampling or resection status (Yes *vs.* No)	166	143	< 0.001
Overall extent of resection (appendectomy or segmental resection *vs.* hemicolectomy with lymph node resection)	152	165	< 0.001
Mucinous subgroup: extent of resection (appendectomy or segmental resection *vs.* hemicolectomy with lymph node resection)	161	167	NS 0.423
Non-mucinous subgroup: extent of resection (appendectomy or segmental resection *vs.* hemicolectomy with lymph node resection)	144	162	< 0.001

S145

Epidemiology of Anal Cancer in the Unites States: A Population-Based Study

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Introduction: Anal cancer (AC) represents 2.7% of all gastrointestinal tract malignancies according to the American Cancer Society. Most AC are squamous cell cancer that arise from the transitional or squamous mucosa lining of the anal canal. The data in the literature regarding the epidemiology of AC are limited, therefore we aim to describe the epidemiology of AC using a large US population database.
Methods: A multi-institutional database (Explorys Inc., Cleveland, OH, USA) was surveyed. A cohort of patients with a primary malignant neoplasm of anal cancer between 1999–2022 was identified. The prevalence rate was calculated and age-, race-, and sex-based distributions were described.
Results: Of the 70,330,250 individuals in the database, 10,800 individuals with AC were identified with a prevalence rate of 15.4 per 100,000. Patients with AC were also more likely to be elderly, Caucasian, females, smokers, have a history of alcohol abuse, obesity, and diabetes (Table). They were also more likely to have HIV and family history of malignant neoplasm of gastrointestinal tract.
Conclusion: This is one of the largest US population studies to date evaluating the epidemiology of AC. The prevalence rate of AC was 15.4 per 100,000. Patients with AC were more likely to be elderly, Caucasian, females, obese, diabetic, and have HIV.

Table 1. Baseline characteristics of Anal cancer patients. Univariate analysis used to calculate

	Anal Cancer n=10,800 (%)	No Anal Cancer n=70,330,250 (%)	OR (CI)	p-value
Age				
Age >65	6,810 (63%)	21,231,370 (30%)	3.95 (3.79-4.10)	< 0.0001
Sex				
Female	6,160 (57%)	38,434,840 (55%)	1.10 (1.06-1.15)	< 0.0001
Risk Factors				
HIV	580 (5%)	180,490 (0.3%)	22.06 (20.28-23.99)	< 0.0001
T2DM	2,550 (24%)	5,644,550 (8%)	3.54 (3.39-3.70)	< 0.0001
Obesity	2,030 (19%)	5,434,470 (8%)	2.76 (2.63-2.90)	< 0.0001
Tobacco	2,600 (24%)	6,485,500 (9%)	3.12 (2.99-3.26)	< 0.0001
Alcohol abuse	460 (4%)	1,089,430 (2%)	2.83 (2.58-3.10)	< 0.0001
Family hx of malignant neoplasm of GI tract	770 (7%)	594,590 (1%)	9.00 (8.37-9.69)	< 0.0001

OR. OR; odds ratio, CI; confidence interval, T2DM; type 2 diabetes mellitus, HIV; human immunodeficiency virus. GI; gastrointestinal.

S146

Evaluation of Engraftment and Diversity Following Open-Label Administration of CP101, an Investigational Oral Microbiome Therapeutic for the Prevention of Recurrent *C. difficile* Infection, in the PRISM-EXT Trial

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Introduction: Disruption of the microbiome is key to the pathogenesis of recurrent *Clostridioides difficile* infection (CDI). CP101 is an investigational orally administered microbiome therapeutic designed to restore microbiome diversity and potentially enable early intervention in the management of recurrent CDI. The safety and efficacy profile of CP101 for the prevention of recurrent CDI has been evaluated in a Phase 2 placebo-controlled trial (PRISM3) and an open-label trial (PRISM-EXT). However, pharmacology data for investigational microbiome therapies, including engraftment of microbes and changes in microbial diversity remains limited.
Methods: PRISM-EXT enrolled participants with ≥1 CDI recurrences at 51 sites. The qualifying CDI episode was diagnosed by guideline-recommended testing (PCR or toxin EIA) and clinical symptoms. Following standard-of-care (SOC) antibiotics, participants received a one-time oral administration of CP101 without bowel preparation. The primary efficacy endpoint was the proportion of participants without CDI recurrence through Week 8. Exploratory microbiome endpoints were measured at baseline following SOC antibiotics, Week 8 and 24 using 16S rRNA gene amplicon sequencing. Engraftment of CP101-associated taxa was determined by identification of CP101-associated operational taxonomic units (OTUs) in participants' post-treatment samples which were absent at baseline, as well as by global similarity between participants' microbiome and CP101. Alpha diversity was measured using ecological richness, i.e., the number of unique OTUs per sample. (Figure)

Results: Among the 132 PRISM-EXT participants, the proportion without CDI recurrence following administration of SOC antibiotics and CP101 was 80.3% through Week 8 and 78.8% through Week 24. No treatment-related serious adverse events were reported. Microbiome analysis showed that diversity significantly increased from baseline through Week 8 (p< 0.0001) and Week 24 (p< 0.0001, Fig 1A). Participant microbiomes became more similar to CP101 after treatment compared to baseline. Higher engraftment of CP101-associated taxa and improvement in diversity were both associated with prevention of CDI recurrence at Week 8 (Fig 1B).

Conclusion: The majority of PRISM-EXT participants treated with CP101 had no CDI recurrence through Week 8 and 24. Microbiome analysis suggests that treatment with CP101 led to engraftment and an increase in gut microbiome diversity, both important factors that were associated with the prevention of recurrence.
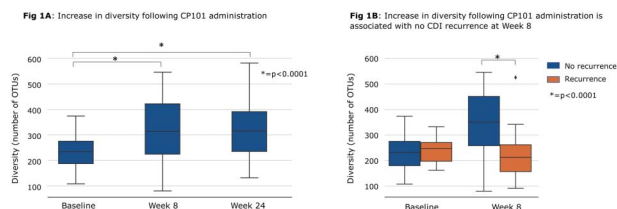
[0146] **Figure 1.** Increase in diversity following CP101 administration is associated with no CDI recurrence at Week 8

S147

Age and Gender Influence the Phenotype of Pelvic Floor Dyssynergia

Ella LePage, MD[1], Aryn Kormanis, DO[1], Hiral Patel, MD[1], Elizabeth Jensen, MPH, PhD[2], Richard Weinberg, MD[2], Nyree Thorne, MD[2].
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Introduction: Pelvic floor dyssynergia (PFD) is a common cause of chronic constipation. There are four phenotypes of PFD, categorized based on the presence or absence of an adequate expulsion force and an appropriate or inappropriate external anal sphincter contraction (1). We assessed the differences in the clinical characteristics and demographics of the four phenotypes in patients with chronic constipation.

Methods: We conducted a retrospective cohort study on adult patients with constipation who underwent anorectal manometry and balloon expulsion test from January 1, 2017 to June 30, 2019. All studies were interpreted by a single gastroenterologist with expertise in anorectal disorders. Demographics and characteristics for each type of dyssynergia were analyzed using chi-square for proportions and odds ratio to account for differences. Differences found were then analyzed by t-tests or ANOVA.

Results: Of the 421 patients diagnosed with constipation in our cohort, 323 were diagnosed with PFD. The cohort included 385 females and 63 males. The mean age was 53 years ± 0.8 years. There were significant differences in gender and age among the PFD phenotypes. Type 1 dyssynergia was the most common phenotype (n=118), followed by type 3 (n=98), type 4 (n=83), and type 2 (n=24). Females diagnosed with type 1 dyssynergia were significantly older (58.5 ± 1.5 years, p= < 0.001) than those with other phenotypes (Figure 1A). Type 1 dyssynergia was found to be significantly more common in males than females (p< 0.001) (Figure 1B). Demographic characteristics including ethnicity, BMI, and laxative use showed no significant difference between PFD phenotypes.

Conclusion: Our cohort of 421 patients composes the largest study of the distribution of PFD phenotypes. Currently, there is no literature to explain how gender and age influence the phenotypes of PFD. We speculate that anatomic differences between males and females cause different dyssynergia types to be more prevalent in each gender and that the effects of aging cause type 1 dyssynergia to be more common in older women. Future prospective studies are needed to evaluate for the increased prevalence of type 1 dyssynergia in men and older women.
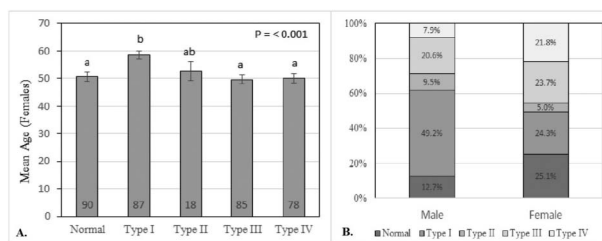
[0147] **Figure 1.** 1A: Mean age of females in each type of dyssynergia. 1B: Distribution of types of dyssynergia by gender

REFERENCE

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S148

Collaborative Efforts Between Interventional Radiology and Gastroenterology to Target Hemorrhoid Disease

Sandeep Bagla, MD[1], Alex Pavidapha, MD[1], Rachel Piechowiak, MD[1], Abin Sajan, MD[2], Mustafa Kasimcan, MD[1], Atul Marathe, MD[3], Kenneth Josovitz, MD[3].
[1]Hemorrhoid Centers, Falls Church, VA; [2]Columbia University Irving Medical Center, New York, NY; [3]Gastro Health, Woodbridge, NY.

Introduction: Symptomatic hemorrhoids are the third most common outpatient gastrointestinal diagnosis with considerable disease burden and economic cost. Multiple non-surgical options including Rubber Band Ligation (RBL), Doppler-guided ligation and Infrared Coagulation (IRC) are available, but recurrence rates can be as high as 30%. Most patients do not require invasive surgery, which may have significant associated morbidity and cost. Patients are often seen across multiple specialties including Gastroenterology, General and Colorectal Surgery, leading to high variability in treatment recommendations and therapeutic offerings. The purpose of this study is to highlight a novel, successful multi-disciplinary algorithm involving Interventional Radiology (IR) and Gastroenterology (GI) to treat patients with symptomatic hemorrhoids for non-surgical patients.

Methods: Patients were seen in disease-specific Hemorrhoid Clinic and evaluated for hemorrhoid burden by GI and IR physicians. Following a comprehensive evaluation, patients were counseled regarding traditional minimally invasive treatments and selected patients were also referred for hemorrhoidal artery embolization (HAE) which has emerged as an effective non-surgical treatment for hemorrhoids. Candidates included those who failed prior treatment, on anticoagulation, poor candidates (Inflammatory Bowel Disease), and patient preference. Selected patients underwent outpatient HAE in a collaborative IR Clinic with follow-up performed by GI and IR physicians. Long-term follow-up and patient management were maintained with the GI practice, including screening colonoscopy, based on standard guidelines.

Results: A total of 191 patients were evaluated in GI clinic for symptomatic hemorrhoids. Baseline hemorrhoid symptom score (HSS) was 12.0 and French Bleeding Score (FBS) was 5.2. Of the 191 patients, 144 patients qualified for HAE as per the algorithm and have undergone HAE with 100% technical success. 126 patients have completed 1-month follow-up with significant reductions in HSS and FBS. No significant adverse events were reported.

Conclusion: Increased collaborative efforts between GI and IR can supplement care and prevent gaps in treatment for symptomatic hemorrhoids, while maintaining an effective relationship with the patient for long term screening and care.

S149

Patient-Derived Enteroids and Colonoids for Measuring Enteroendocrine Function in Response to Luminal Contents: A Proof-of-Concept Study in Parkinson's Disease

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Introduction: *In vitro* studies of the gut-brain axis will require precise models of enteroendocrine function that replicate both patient-specific phenotype and intestinal milieu. Here we establish one such model for measuring the effects of stool and short-chain fatty acids (SCFA) on L-cell activity in Parkinson's disease (PD). We have adapted a patient-derived organoid system which replicates intestinal epithelial function, immune responsiveness, and barrier integrity to respond directly to luminal contents including stool. Given the emerging importance of the enteroendocrine system in mediating microbiota-derived gut-brain signals in PD and other neurologic diseases, our system provides a needed platform for querying L-cells from a single stem-cell niche.

Methods: Ileal and sigmoid colon biopsies were taken from PD patients and matched healthy volunteers between the ages of 40 and 80 years. 3D spherical organoids were generated from crypts isolated by EDTA, embedded in an extracellular matrix protein scaffold, and treated with growth factors to expand Lgr5$^+$ stem cells through serial passages. Organoid polarity was inverted such that the apical surface faced outward. Enteroids and colonoids were then cocultured with stool supernatant or SCFA mixtures that resembled PD or control intestinal milieu. Glucagon-like peptide 1 (GLP-1) secreted by L-cells into the spheres was measured by ELISA after lysis and normalized to DNA content.

Results: 3D epithelial organoids were successfully generated from ileal and colonic crypts from 7 PD and 7 control patients. L-cell presence was verified by immunohistochemistry for GLP-1 and chromogranin A. Spherical organoids were successfully inverted before coculture. GLP-1 secretion by control organoids was diminished in the presence of PD stool or SCFA relative to control milieu, and secretion by PD organoids was further diminished in either coculture condition.

Conclusion: This proof-of-concept study establishes patient-derived organoids as a platform technology for measuring enteroendocrine responses to luminal contents, including stool and SCFA. Here, we use this technique to demonstrate that PD and healthy L-cells respond differently to SCFA in the stool. However, our novel system may be adapted to study a vast array of patient-specific enteroendocrine responses to stool microbiota, metabolites, and drugs.

S150

Examination of Upregulated miRNAs and Associated Pathways in Colorectal Cancer: A Systematic Review

Ahamed Khalyfa, DO[1], Navkiran Randhawa, DO[1], Abdelnaby Khalyfa, PhD[2].
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Introduction: Colorectal cancer (CRC) is one of the leading causes of cancer-related deaths worldwide. Many biological molecules play a significant role in the pathogenesis of CRC including miRNAs, small RNA molecules that regulate the translation and stability of specific target mRNAs. Given the involvement of miRNAs on all fronts of CRC including pathogenesis, diagnosis, prognosis and potential therapy, it is imperative to fully understand their role within this deadly disease. With this study, we examined unique miRNAs which were upregulated in patients with CRC.

Methods: We searched PubMed and the Cochrane Database of Systematic Reviews (CDSR) through Wiley from 2016 to 2022 for keywords "miRNA"," micro-RNA", "colon cancer", "colorectal cancer", "CRC". From this data, we performed computational analysis using MicroInspector, miRanda, PicTar, RNA22, DIANA, softwares and identified unique upregulated miRNAs. We further examined the list of the biological pathways identified from predicted target genes of upregulated miRNAs and selected the top 4 pathways of clinical significance. We then filtered common miRNAs between these selected pathways and identified unique miRNAs between the top 4 pathways.

Results: Through our computational analysis, we identified 35 upregulated miRNAs from studies of patients with CRC. We then identified a list of the biological pathways identified from upregulated miRNAs target genes. We also highlighted the relevant pathways which are associated with cancer including: TGF-B signaling pathway (p -value 9.34 E-12), fatty acid metabolism (p-value 8.36E-06), FoxO signaling pathway (p-value 3.31E-05), and Hippo signaling pathway (p-value 0.000263). We further investigated the highlighted pathways and found unique miRNAs associated with these pathways. Namely, hsa-mir-135b-3p and hsa-mir-191-3p were identified, suggesting that these miRNAs may play an important role in those pathways. (Table)

Conclusion: MicroRNAs play an important role in CRC initiation, progression, and development through manipulation of cell stemness, angiogenesis, apoptosis, and the epithelial–mesenchymal transition (EMT) of tumor cells. With this study we identified unique clinically relevant metabolic pathways of CRC affected by upregulated miRNAs. We also identified the unique miRNAs hsa-mir-135b-3p and hsa-mir-191-3p. Further work is necessary to identify specific roles of these miRNA candidates as biological markers or therapeutic targets for patients with CRC.

Table 1. List of the biological pathways identified from predicted target genes of upregulated miRNAs

Pathway	p-value	#genes	#miRNAs
TGF-beta signaling pathway	9.34E-12	54	25
Fatty acid metabolism	8.36E-06	24	19
FoxO signaling pathway	3.31E-05	76	22
Prion diseases	9.36E-05	11	10
Proteoglycans in cancer	0.0001269	104	27
Arrhythmogenic right ventricular cardiomyopathy (ARVC)	0.000263	37	22
Endocytosis	0.000263	103	26
Hippo signaling pathway	0.000263	83	26
N-Glycan biosynthesis	0.0011974	24	18
Axon guidance	0.0014637	68	24

S151

Examination of Downregulated miRNAs and Associated Pathways in Colorectal Cancer: A Systematic Review

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Introduction: Colorectal cancer (CRC) is one of the leading causes of cancer-related deaths worldwide. Many biological molecules play a significant role in the pathogenesis of CRC including miRNAs, small RNA molecules that regulate the translation and stability of specific target mRNAs. Given the involvement of miRNAs on all fronts of CRC including pathogenesis, diagnosis, prognosis and potential therapy, it is imperative to fully understand their role within this deadly disease. With this study, we examined unique miRNAs which were upregulated in patients with CRC.

Methods: We searched PubMed and the Cochrane Database of Systematic Reviews (CDSR) through Wiley from 2016 to 2022 for keywords "miRNA"," micro-RNA", "colon cancer", "colorectal cancer", "CRC". From this data, we performed computational analysis using MicroInspector, miRanda, PicTar, RNA22, DIANA, softwares and identified unique upregulated miRNAs. We further examined the list of the biological pathways identified from predicted target genes of downregulated miRNAs and selected the top 4 pathways of clinical significance. We then filtered common miRNAs between these selected pathways and identified unique miRNAs between the top 4 pathways.

Results: Through our computational analysis, we identified 59 upregulated miRNAs from studies of patients with CRC. We then identified a list of the biological pathways identified from downregulated miRNAs target genes. We also highlighted the relevant pathways which are associated with cancer including: MAPK signaling pathway (p -value 2.79 E-08), ErbB signaling (p-value 6.69E-08), PI3K-Akt (p-value 2.87E-06). We further investigated the highlighted pathways and found unique miRNAs associated with these pathways. Namely, hsa-mir-296-3p and hsa-mir-198-3p were identified, suggesting that these miRNAs may play an important role in those pathways. (Table)

Conclusion: MicroRNAs play an important role in CRC initiation, progression, and development through manipulation of cell stemness, angiogenesis, apoptosis, and the epithelial–mesenchymal transition (EMT) of tumor cells. With this study we identified unique clinically relevant metabolic pathways of CRC affected by downregulated miRNAs. We also identified the unique miRNAs hsa-mir-296b-3p and hsa-mir-198-3p. Further work is necessary to identify specific roles of these miRNA candidates as biological markers or therapeutic targets for patients with CRC.

Table 1. List of the biological pathways identified from predicted target genes of downregulated miRNAs

Pathway	p-value	#genes	#miRNAs
ECM-receptor interaction	4.97E-32	58	23
Proteoglycans in cancer	6.89E-12	124	26
Focal adhesion	5.81E-09	137	27
MAPK signaling pathway	2.79E-08	158	26
ErbB signaling pathway	6.69E-08	60	25
Renal cell carcinoma	4.80E-07	49	25
Axon guidance	1.08E-06	83	27
Regulation of actin cytoskeleton	2.17E-06	129	27
PI3K-Akt signaling pathway	2.87E-06	197	28
Rap1 signaling pathway	3.71E-06	127	26

S152

Gastrointestinal Tract Injuries Associated With Sevelamer: A Systematic Review

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Introduction: Sevelamer is a phosphate binder that is used to treat hyperphosphatemia in patients with chronic kidney disease. Sevelamer is known to cause multiple gastrointestinal side effects including nausea, vomiting, constipation, and abdominal pain. However, sevelamer crystals were observed in rare cases in the gastrointestinal tract (GIT) with associated serious injuries including inflammation, ulceration, ischemia, and perforation. In this study, we conducted a systematic review to investigate the association of sevelamer with GIT injuries.

Methods: We conducted a systematic search in MEDLINE, EMBASE, Scopus, and Cochrane Central Register of Controlled Trials to identify eligible reports of sevelamer-associated gastrointestinal tract injuries. The bibliographies of identified articles, Goggle scholars, and websites of relevant professional associations were also searched for relevant studies. Two independent reviewers identified eligible studies and data were extracted in Excel. Only studies that had sevelamer crystals seen in the histopathological exams were included. (Table)

Results: We included 58 studies describing a total of 77 patients with a mean age of 58.8 years. Diabetes was present in 27% of cases and at least one risk factor to have slow GIT motility was identified in 63.3% of patients. Both sevelamer carbonate and sevelamer hydrochloride were reported to be associated with GIT injury. Gastrointestinal bleeding (44.2 %) and abdominal pain (37.7 %) were the most common presenting symptoms. The large intestines were the most common area of involvement (74 %), especially in the rectosigmoid area (36.4 %). Ulceration (52 %) and inflammation (48.1 %) were the most common histopathological findings. Stopping sevelamer was the most common pharmacological intervention. 20.8% of patients required surgical intervention, while 6.5% had an endoscopic intervention. Full recovery was reported in 45.5% while 6.5% of patients died.

Conclusion: While sevelamer crystals can be found incidentally in the mucosa of the GIT, there is growing evidence that sevelamer use can be associated with GIT injury. Slow GIT motility can be an important risk factor to develop sevelamer-associated GIT injury. If a GIT injury was found during endoscopy and sevelamer crystals were identified on histopathological exam, discontinuing sevelamer and using an alternative phosphate binder should be considered. Further studies are needed to identify risk factors and the best approaches for primary and secondary prevention.

Table 1. Characteristics of included studies GIT: gastrointestinal tract, GIB: Gastrointestinal bleeding

Demographics	Age (years)	58.88 ± 10.9
	Males	34 (44.2 %)
	females	35 (44.5 %)
Comorbidities	Diabetes	27 (35.5 %)
	Constipation	4 (5.2 %)
	Previous abdominal surgery	15 (19.5 %)
	Blood thinners	16 (20.8 %)
	Possible Slow GIT motility	49 (63.3%)
Sevelamer treatment	Sevelamer carbonate	16 (20.8 %)
	Sevelamer hydrochloride	12 (15.6 %)
	Both	1 (1.3%)
	Average dose	4,176.29 mg
	Median dose	3,200.00 mg
	Duration	5 days – 7 years
Symptoms	GIB	34 (44.2 %)
	Abdominal pain	29 (37.7 %)
	Diarrhea	12 (15.6 %)
	Nausea/vomiting	10 (13%)
	Esophageal dysphagia	1 (1.3%)
Location of GIT injury	Esophagus	8 (10.4 %)
	Stomach	8 (10.4 %)
	Small Intestines	3 (3.9 %)
	Ileocecal valve	3 (3.9 %)
	Large intestines	57 (74 %)
	Cecum and/or ascending colon	8 (10.4 %)
	Transverse Colon	7 (9.1 %)
	Descending colon	1 (1.3%)
	Rectosigmoid	28 (36.4 %)
	Diffuse colonic or unspecified	15 (19.5 %)
	Appendix	2 (2.6 %)

Table 1. (*continued*)

Histopathological abnormalities*	Ulceration	40 (52 %)
	Inflammation	37 (48.1 %)
	Perforation	14 (18.2 %)
	Necrosis	11 (14.3 %)
	Ischemia	6 (7.8 %)
	Stricture	3 (3.9 %)
	Inflammatory polyp	3 (3.9 %)
Pharmacological interventions	Stopped Sevelamer	35 (45.5 %)
	Decreased sevelamer dose	1 (1.3 %)
	Continued Sevelamer	1 (1.3 %)
Procedural interventions	Surgical intervention	16 (20.8)
	Endoscopic treatment	5 (6.5 %)
	Endovascular intervention	1 (1.3 %)
Outcomes	Recovered	35 (45.5 %)
	Death	5 (6.5 %)
	Not reported	37 (48.1 %)

*Includes both microscopic and macroscopic findings.

S153

Optimization of Inpatient Documentation to Improve Bowel Regimen Prescribing Rates and Impact on Opiate-Induced Constipation

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Introduction: Opioid analgesics are commonly used in the inpatient setting to alleviate moderate- to severe-pain. These medications can cause constipation by inhibiting gastric emptying and slowing peristalsis in the gastrointestinal tract and are not subject to tolerance with prolonged use. 40-60% of patients can develop opioid-induced constipation which may present immediately or develop gradually after usage. Due to this adverse effect, it has been suggested that a bowel regimen should be prescribed when initiating an opiate medication. One study revealed that only 14.5% of pediatric patients who were prescribed opioids were on a prophylactic bowel regimen. With this in mind, a quality improvement project was conducted to determine whether utilizing a bowel regimen checklist on Internal Medicine resident inpatient history and physicals improved prescribing frequency of bowel regimens in patients on opiate medications.
Methods: A prospective study was conducted at a tertiary care center in Pittsburgh, PA. After implementation of the checklist in the inpatient history and physical template, admissions to residency teaching teams during a 5 week period between February and March 2021 were collected.
Results: A total of 90 admission were analyzed. Of those individuals, 19 patients had an opioid analgesic as a home medication. In our population, it was discovered that 73.7% (14/19) of our patients on opiates as an outpatient had a bowel regimen. After implementing the inpatient bowel regimen checklist, a total of 83.3% (20/24) of our patients had a bowel regimen including those on opiates at home. Interestingly, 1 patient developed ileus despite being prescribed a bowel regimen.
Conclusion: Continuous assessment of bowel function should be incorporated into clinical notes to prompt early management of opioid induced bowel dysfunction. In conclusion, utilizing this checklist can help remind providers of the need to prescribe bowel regimens in patients taking opiates to help decrease secondary constipation. Ultimately, increasing usage of bowel regimens in these patients can improve patient experiences and prevent discomfort caused by constipation.

S154

SMAD4-Mediated Interaction of Epithelial and Dendritic Cells

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Introduction: SMAD4 is a tumor suppressor known to be altered in patients with Colitis-Associated Carcinoma (CAC), a subtype of colorectal cancer. Previous studies have confirmed that loss of SMAD4 in mice with colitis led to upregulation of pro-inflammatory pathways and increased chemokine and cytokine levels. CCL20 was one such upregulated chemokine and it binds to the CCR6 receptor, the sole receptor it activates. Notably, B cells, T cells, and dendritic cells contain the CCR6 receptor, and there is evidence that CCL20 may particularly recruit dendritic cells to the gut epithelium to regulate the inflammatory environment. This led us to hypothesize that dendritic cell recruitment to the epithelium will increase in mice with a loss of SMAD4 and an elevated CCR6/CCL20 axis
Methods: First, cells were extracted from the bone marrow of mice and were differentiated into dendritic cells using GM-CSF and either IL-4 or ß-Mercaptoethanol. We found that either method induced abundant expression of dendritic cell markers as determined by RT-qPCR analysis. A co-culture experiment was performed assessing dendritic cell migration to SMAD4+ and SMAD4- epithelia from CCR6+ and CCR6- mice. RT-qPCR was performed to characterize the dendritic cells that migrated during the co-culture. We also performed immunohistochemical (IHC) staining of dendritic cells in colon tissue from CCR6+ and CCR6- mice with a loss of SMAD4.
Results: Results from IHC suggest that loss of CCR6 appears to have little effect on dendritic cell recruitment within the colon. Preliminary results from the co-culture experiment indicate that dendritic cells are able to migrate to the epithelium regardless of SMAD4 status. Results from the RT-qPCR performed on dendritic cells from the co-culture show that dendritic cells migrating to SMAD4- epithelia have higher levels of a marker of dendritic cell activation when compared to those migrating to SMAD4+ epithelia.
Conclusion: This early finding suggests that although dendritic cells are recruited to either SMAD4+ or SMAD4- epithelia, the dendritic cells may function differently in a SMAD4- epithelium. Additional studies will be performed to confirm this. Ultimately, exploring how Smad4 interacts with dendritic cells through this study will enhance our understanding of immune signaling in CAC pathogenesis and highlights the need for additional research in immune cell activity in the setting of colon inflammation.

S155

Recurrent *Clostridioides difficile* Infection in Patients Treated With Bezlotoxumab: Systematic Review and Meta-Analysis

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Introduction: Clostridioides difficile infection (CDI) remains a global health concern. Bezlotoxumab (BEZ) is a monoclonal antibody against C. difficile toxin B. Two randomized controlled trials (RCTs), MODIFY I & II, confirmed BEZ efficacy in preventing recurrent CDI (rCDI). Observational studies have since been conducted, and it is essential to explore the consistency of BEZ effectiveness utilizing these real-world data.
Methods: We performed a systematic review and meta-analysis aiming to pool the frequency of rCDI in patients receiving BEZ and explore BEZ efficacy in preventing rCDI compared to standard of care (SOC). We searched PubMed, EMBASE, Cochrane Library, and Google Scholar from inception through January 2022 for relevant RCTs or observational studies assessing BEZ in preventing rCDI. Single-arm studies describing experience with BEZ in preventing rCDI were also included for proportion-meta-analysis. A proportion meta-analysis with a random-effects model was used to pool rCDI prevalence with its corresponding 95% confidence interval (CI). In a meta-analysis of efficacy, we pooled Odds ratios (OR) to compare BEZ vs. SOC in preventing rCDI. Heterogeneity was assessed using the Higgins I^2 statistic (I^2 values >50% implied the presence of significant heterogeneity). MetaXl software was utilized for statistical analysis.
Results: Nine studies comprising two RCTs and 2056 patients, of which 1203 received BEZ, were included in the analysis. Of the constituent studies, five (1698 patients) compared BEZ vs. SOC. Pooled frequency of rCDI in patients receiving BEZ was 17% (95% CI = 0.14-0.19, I^2=0%) (Figure). Subgroup analysis excluding RCTs resulted in 422 patients receiving BEZ with rCDI pooled frequency of 16% (95% CI = 0.13-0.20, I^2=0%). We also pooled rCDI in the SOC group from studies that reported direct comparison with BEZ (5 studies=853 patients in the SOC group). Pooled rCDI rate was higher in the SOC group of 27% (17% (95% CI = 0.24-0.30, $I^2$0%). In the meta-analysis of efficacy, there was a significant reduction in rCDI in the BEZ treated group compared to SOC (OR= 0.53, 95% CI = 0.42-0.68, $I^2$0%). No heterogeneity was shown in all analyses, as depicted by an I^2 of 0.

Conclusion: Our meta-analysis comprising real-world data revealed lower rCDI in patients receiving BEZ and supported its efficacy in preventing rCDI compared to SOC. The results were consistent and homogenous. These results are keeping with the new ACG and IDSA guidelines that endorse a role for BEZ in the prevention of rCDI.
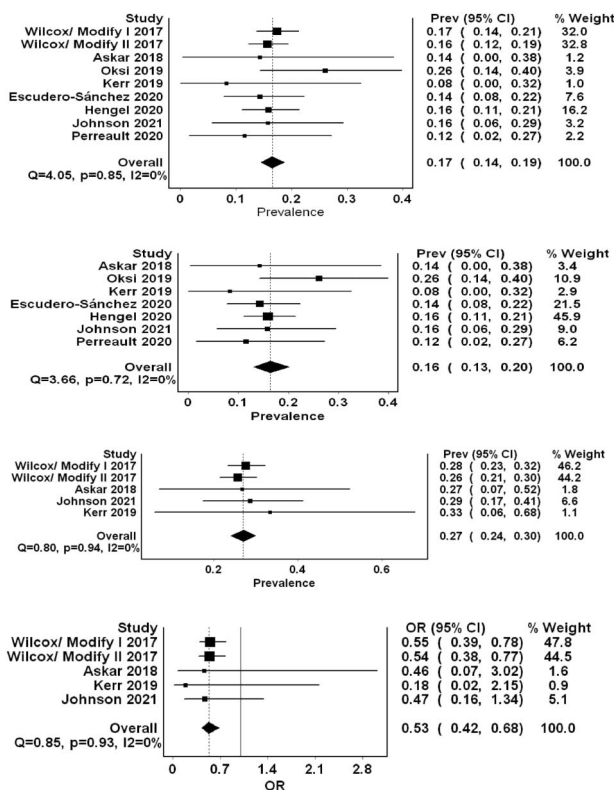
[0155] **Figure 1.** Forest plots summarizing the (A) overall pooled frequency of recurrent Clostridioides Difficile infections (rCDI) in patients treated with bezlotoxumab (Bez), (B) rCDI pooled frequency in patients treated with Bez utilizing real-world data only, (C) rCDI pooled frequency in standard of care (SOC) group, and (D) pooled odds ratio of rCDI in Bez treated patients compared to SOC

S156

Trends and Disparities in Outcomes of Hospitalizations With *Clostridioides difficile,* Infection: A Decade-Long Analysis of the Nationwide Inpatient Sample

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Introduction: *Clostridioides difficile* infection (CDI) is the most frequently reported nosocomial infection. There is a paucity of research on the impact of sociodemographic indices on CDI hospitalization outcomes. This study aimed to describe epidemiologic trends and effects of sociodemographic disparities on outcomes among CDI hospitalizations over a decade.
Methods: We queried Nationwide Inpatient Sample (NIS) databases from 2010 to 2019, identified hospitalizations with CDI, and excluded those of patients less than 18 years. We obtained the incidence and admission rate of CDI per 100,000 adult hospitalizations for each year. We analyzed trends in mortality rate, mean length of hospital stay (LOS), and mean total hospital charge (THC). We highlighted disparities in outcomes stratified by sex, race, and mean household income (MHOI) quartile. We used multivariable regression analysis to obtain trends in incidence and admission rates, mortality, LOS, and THC adjusted for age categories, sex, and race. We used Joinpoint regression analysis to obtain trends in adjusted rates. The threshold for statistical significance was set at 0.05. (Figure)
Results: Of the 305 million hospitalizations included in our study, over 3.3 million were complicated by CDI, with 1.01 million principal admissions for CDI. There was an average annual percentage change (AAPC) of -2% reduction in adjusted CDI incidence and AAPC for CDI admissions was -3.2%. Joinpoint regression analysis showed an increased adjusted CDI admission rate from 2010 to 2012 (annual percentage change [APC] = 4.15%), with a subsequent decrease from 2012 to 2016 (APC = -2.17%), and 2016 to 2019 (APC = -9.87%). Among primary admissions for CDI, mortality rate decreased from 3.2% in 2010 to 1.4% in 2019. The AAPC for adjusted mortality rate was -10.2%. Mean LOS reduced from 6.6 to 5.3 days while mean THC increased from US$40,593 to US$42,934 between 2010 and 2019. Females had a 21% decrease in adjusted odds of mortality compared to males (all p-trends < 0.001). Mortality rates showed a steady decline among Whites over the study period. Mean LOS trends were similar across racial subgroups. Mortality rates, mean LOS and mean THC followed similar trends in hospitalizations among low and high MHOI quartiles.
Conclusion: Outcomes of CDI hospitalizations improved over the studied decade but were consistently better in females than males, with better improvements among Whites than Blacks or Hispanics. Further studies are needed to elucidate the reasons for these findings.

Mortality rate trends

■ Hospitalizations with CDI   ■ Admissions with principal admitting diagnosis of CDI
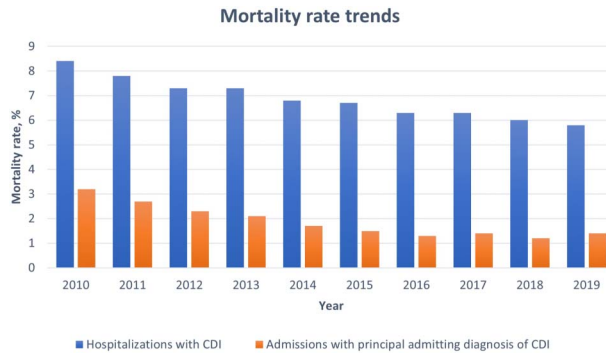
[0156] **Figure 1.** Trends in mortality rates among hospitalizations with CDI and admissions with principal admitting diagnosis of CDI

S157

24-Month Sustained Clinical Response and Safety of RBX2660 in Participants With Recurrent *Clostridioides difficile* Infection: Subgroup Analysis

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Introduction: *Clostridioides difficile* is an opportunistic pathogen that causes an estimated 500,000 infections per year in the United States. Microbiota-based treatments have shown promise in reducing recurrent *Clostridioides difficile* infection (rCDI), but long-term efficacy and safety data have been reported infrequently. Here, we present a subgroup analysis on the long-term efficacy and safety of RBX2660, a microbiota-based live biotherapeutic, in participants with rCDI in PUNCH CD Open-Label (NCT02589847), a prospective, multicenter, open-label phase 2 trial.
Methods: PUNCH CD Open-Label participants enrolled between October 1, 2015, and March 6, 2017, were ≥18 years old with either ≥2 episodes of rCDI treated by standard-of-care antibiotic therapy after a primary CDI episode, or ≥2 episodes of severe CDI requiring hospitalization. All participants had a positive stool test for *C. difficile* or toxins within 60 days prior to enrollment and were on antibiotics to treat CDI at the time of enrollment. Participants received up to 2 doses of RBX2660 rectally administered 7 ± 2 days apart. Treatment success was defined as the absence of CDI diarrhea without the need for CDI retreatment for 8 weeks after completing study treatment. In this post hoc subgroup analysis, we report the 6-, 12-, and 24-month outcomes of 8-week responders by age, sex, race, and number of prior CDI episodes.
Results: Among the 142 participants treated with RBX2660 (evaluable population), 92% were white, 62% were female, 59% were ≥65 years of age, and 49% had >3 prior episodes of CDI. Sustained treatment response through 6-, 12-, and 24-months after treatment, respectively, was achieved by 98.0%, 97.9%, and 93.5% of participants < 65 years of age and by 96.8%, 93.1%, and 88.0% of participants ≥65 years of age (Figure). Similar sustained response rates were demonstrated in participants categorized by sex, race, and number of prior CDI episodes. As shown in Table, treatment-emergent adverse events (TEAEs) were reported by a similar percentage of participants across demographic subgroups between 6-12 months (range: 31% to 43%) and 12-24 months (range: 23% to 37%) after treatment with RBX2660, with most being gastrointestinal and mild to moderate in severity.
Conclusion: Across demographic subgroups, the majority of RBX2660 responders showed a sustained clinical response, remaining free of CDI recurrence up to 24 months after treatment. Long-term safety data reinforce that RBX2660 is well-tolerated.

■ 6 Months   ■ 12 Months   ■ 24 Months

CDI, *Clostridioides difficile* infection.
Numbers above the bars are the percentage of participants with sustained response. Numbers below the bars are the total number of assessed participants with follow-up through specified timepoints.
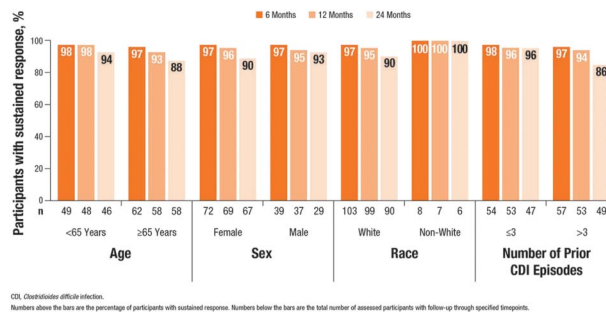
[0157] **Figure 1.** Sustained Clinical Response Across Demographic Subgroups Through 24 Months After RBX2660 Treatment

Table 1. Summary of Adverse Events Across Demographic Subgroups Through 24 Months After RBX2660 Treatment

	Adverse Events/Participants (%)							
	Age		Sex		Race		Number of Prior CDI Episodes	
	< 65 Years	≥ 65 Years	Female	Male	White	Non-White	≤3	>3
Onset Interval	N = 62	N = 87	N = 95	N = 54	N = 136	N = 13	N = 74	N = 75
6-12 months	46/23 (37)	95/36 (41)	81/37 (39)	60/22 (41)	130/55 (40)	11/4 (31)	48/27 (36)	93/32 (43)
12-24 months	59/15 (24)	88/30 (34)	77/27 (28)	70/18 (33)	127/41 (30)	20/4 (31)	60/17 (23)	87/28 (37)
Severity								
Mild	119/19 (30.6)	236/12 (13.8)	288/21 (22.1)	147/10 (18.5)	395/30 (22.1)	40/1 (7.7)	217/17 (23.0)	218/14 (18.7)
Moderate	87/22 (35.5)	155/27 (31.0)	134/41 (43.2)	108/8 (14.8)	215/43 (31.6)	27/6 (46.2)	113/21 (28.4)	129/28 (37.3)
Severe	36/9 (14.5)	92/34 (39.1)	50/19 (20.0)	78/24 (44.4)	110/40 (29.4)	18/3 (23.1)	59/19 (25.7)	69/24 (32.0)

S158

Frailty Is a Predictor for Worse Outcomes in Patients Hospitalized With *Clostridioides difficile* Infection

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Introduction: Frailty is recognized as a having major health implications for affected patients and is applicable in the peri-operative risk assessment. Hospital Frailty Risk Score (HFRS) is a validated score that solely utilizes International Classification of Diseases codes (ICD-10) in the identification of patients who are at higher risk. In this study, we investigated the utility of HFRS in identifying patients admitted with *Clostridioides difficile* infection (CDI) who are at risk for worse clinical outcomes and higher healthcare resource utilization.
Methods: Using the 2017 National Inpatient Sample, we identified all adult patients who were discharged with a primary diagnosis of CDI. We then classified patients into 2 groups: those who had HFRS of ≤5 (NonFrailCDI) and those with a score of >5 (FrailCDI). Primary outcomes included all-cause in hospital mortality rates and healthcare utilization while secondary outcomes included hospital complications. Discharge-level weights were applied to provide national estimates.
Results: We identified 93,810 hospitalizations with a primary discharge diagnosis of CDI, of which 54,300 (57.88%) were FrailCDI while 39,510 (42.12%) were NonFrailCDI. Using a multivariate analysis after adjusting for demographics and Charlson co-morbidity index, FrailCDI patients were at higher risk for inpatient mortality [OR: 4.49, 95% CI (2.84 − 7.11); p< 0.001], cardiac [OR: 1.13, 95% CI (1.02 − 1.25); p=0.013], pulmonary [OR: 1.92, 95% CI (1.65 − 2.22); p< 0.001], infectious [OR: 6.80, 95% CI (6.01 − 7.69); p< 0.001], and renal [OR: 8.76, 95% CI (8.08 − 9.48); p< 0.001] complications. Furthermore, FrailCDI patients had higher odds of requiring intensive care [OR: 13.70, 95% CI (6.28 − 29.90); p< 0.001] and had longer length of stay [Difference: 1.70 days, 95% CI (1.55 − 1.86); p< 0.001] along with higher total charges [Difference: 11,843.56$, 95% CI (10,366.32 − 13,320.8); p< 0.001] when compared to NonFrailCDI. (Table).
Conclusion: Frailty status as defined by HFRS is an independent factor for worse outcomes and higher healthcare utilization in adult patients admitted for CDI even after adjusting for age and Charlson co-morbidity index. By considering this index in patients with CDI, we might consider more aggressive therapy to improve outcomes. Further research is needed to identify which therapeutics are most optimal in the frail population.

Table 1. Baseline characteristics and outcomes

Variable	NonFrailCDI n=39,510	FrailCDI n= 54,300	p-value
Female, %	63.95	64.31	0.611
Age (years), mean ± SD	60.07 ± 18.63	70.53 ± 15.43	< 0.001
Age >=65 years, %	44.50	69.48	< 0.001
Charlson co-morbidity index	1.56 ± 1.92	2.77 ± 2.25	< 0.001
Hospital Frailty Risk Score, mean ± SD	2.59 ± 1.51	8.95 ± 3.27	< 0.001
In-hospital all-cause mortality, %	0.33	2.10	< 0.001
Length of Stay (Days), mean ± SD	4.24 ± 3.42	6.28 ± 6.48	< 0.001
Total Charges ($), mean ± SD	30,908.25 ± 34,174.49	44,180.51 ± 57,287.25	< 0.001
Cardiac complications, %	11.29	22.97	< 0.001
Pulmonary complications, %	3.34	8.29	< 0.001
GI complications, %	4.61	4.86	0.414
ID complications, %	4.63	26.73	< 0.001
Renal complications, %	44.55	87.27	< 0.001
Required Intensive Care Unit, %	0.10	1.30	< 0.001

*Analysis adjusted for age, gender, race, hospital location and teaching status, insurance, median household income and Charlosn co-morbidity index.
**Adjusted co-efficient representing the average difference in this outcome between FrailCDI and NonFrailCDI.

S159

Efficacy and Safety of RBX2660 in Reducing Recurrent *Clostridioides difficile* Infection in Patients With Underlying Gastrointestinal Comorbidities

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Introduction: Several underlying gastrointestinal (GI) comorbidities are known risk factors for recurrent *Clostridioides difficile* infection (rCDI), yet patients with these GI comorbidities are often excluded from prospective clinical trials. Here, we report the efficacy and safety of RBX2660, a microbiota-based live biotherapeutic, in adult participants categorized by GI comorbidity subgroups (eg, past or present history of gastroesophageal reflux disease [GERD], irritable bowel syndrome [IBS], diverticulitis, inflammatory bowel disease [IBD], and unspecified colitis) from an interim analysis of PUNCH CD3-OLS, an ongoing open-label phase 3 study.
Methods: An ad hoc analysis of the modified intent-to-treat (mITT) population was conducted to identify subgroups according to GI comorbidities based on medical histories. Treatment success was defined as remaining free of CDI recurrence for 8 weeks after treatment. Participants were monitored for recurrence and treatment-emergent adverse events (TEAEs) for at least 6 months after treatment. Efficacy data are presented for the mITT population and safety data are presented for the safety population.
Results: At the time of this analysis, 402 of 469 screened participants in the mITT population were treated with RBX2660 and had adjudicated results, of which 300 of 402 (74.6%) had treatment success at Week 8. Across GI comorbidity subgroups, RBX2660 consistently reduced rCDI, and treatment success rates at Week 8 were comparable for participants with and without GI comorbidities (Figure 1A). 6-month adjudicated results were available for 262 of 300 participants with treatment success at Week 8, of whom 220 (84.0%) remained CDI recurrence-free through 6 months. Sustained clinical response through 6 months was also maintained in RBX2660-responders with and without GI comorbidities (Figure 1B). Overall AEs and TEAEs were similar between participants with and without GI comorbidities. TEAEs were experienced by 53.2% (100/188), 64.1% (41/64), 47.5% (47/99), 46.3% (25/54) and 52.9% (9/17) of participants with GERD, IBS, diverticulitis, IBD, and unspecified colitis, respectively. Most TEAEs were mild to moderate in severity and GI in nature (predominantly diarrhea and abdominal pain). Potentially life-threatening TEAEs and TEAEs leading to discontinuation were infrequently reported.
Conclusion: These results suggest consistent efficacy and safety for RBX2660 in reducing rCDI in a patient population with underlying GI comorbidities.

A[a]

	GERD		IBS		Diverticulitis[c]		IBD		Unspecified colitis	
	Present	Absent	Present	Absent	Present	Absent	Present	Absent	Present	Absent
%	75%	74%	68%	76%	70%	76%	84%	73%	69%	75%
(n/N)	(116/154)	(184/248)	(38/56)	(262/346)	(55/79)	(245/323)	(37/44)	(263/358)	(9/13)	(291/389)

B[b]

	GERD		IBS		Diverticulitis[c]		IBD		Unspecified colitis	
	Present	Absent	Present	Absent	Present	Absent	Present	Absent	Present	Absent
%	88%	82%	75%	85%	83%	84%	82%	84%	88%	84%
(n/N)	(86/98)	(134/164)	(24/32)	(196/230)	(39/47)	(181/215)	(27/33)	(193/229)	(7/8)	(213/254)

n/N, number of subjects with event/number of subjects; GERD, gastroesophageal reflux disease; GI, gastrointestinal; IBS, irritable bowel syndrome; IBD, inflammatory bowel disease; mITT, modified intent-to-treat; Present, GI comorbidity present; Absent, GI comorbidity absent; Participants could have more than one comorbidity. Type of IBS was not differentiated in this community; Unspecified colitis included indeterminate colitis, pancolitis, undefined colitis.
[a]Only patients with adjudicated treatment outcomes are included; [b]Only patients who were treatment-responders at Week 8 and with adjudicated treatment outcomes were included; [c]Diverticulitis was exclusionary if antibiotics were required at the time of screening or if the patient had surgical intervention within 6 months of enrollment or planned within 8 weeks of enrollment.

[0159] **Figure 1.** (A) Treatment success at Week 8 in patients with and without GI comorbidities (mITT population; N=402); (B) Sustained treatment response through 6 months (mITT population; N=262)

Efficacy and Safety of RBX2660 in Patients With Recurrent *Clostridioides difficile* Infection Grouped by Age and Underlying Comorbidities

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Introduction: Age and certain underlying comorbidities are among the risk factors for recurrent *Clostridioides difficile* infection (rCDI). Here, we report the efficacy and safety of RBX2660, a microbiota-based live biotherapeutic, in patients with rCDI grouped by age and baseline Charlson Comorbidity Index (CCI) severity scores. This is a subgroup post-hoc analysis of the PUNCH CD3 trial (NCT03244644), a prospective, multicenter, randomized, double-blind, placebo-controlled phase 3 trial.
Methods: Participants enrolled in PUNCH CD3 were ≥18 years old with documented rCDI and completed standard-of-care antibiotic therapy prior to treatment with RBX2660 or placebo. Treatment success was defined as remaining free of CDI recurrence 8 weeks after treatment. In this subgroup post hoc analysis, we assessed outcomes of participants grouped by age (< 65 years, 65 to < 75 years, and ≥75 years) and CCI severity scores at screening (0 to 2 [mild], 3 to 4 [moderate], and ≥5 [severe]). The treatment-emergent adverse events (TEAEs) were summarized for the double-blind treatment period within 8 weeks and censored if a patient received open-label RBX2660 after CDI recurrence.
Results: Of 262 total participants in the modified intent-to-treat population, 143 (55%) were < 65 years old, 68 (26%) were between 65 and < 75 years old, and 51 (19%) were ≥75 years old. A greater percentage of RBX2660-treated participants remained recurrence free through 8 weeks following treatment compared to placebo-treated participants in the following subgroups: < 65 years old with moderate and severe CCI severity scores; ≥65 years to < 75 years with mild, moderate, and severe CCI severity scores; and ≥75 years old with severe CCI severity scores (Figure 1A). In the total safety population (N=267), the overall incidence of TEAEs was 52% following RBX2660 treatment compared to 44% following placebo treatment, with mild events (mostly gastrointestinal) accounting for most of the difference. Similar percentages of participants categorized by age and CCI severity scores reported TEAEs (Figure 1B). Serious and life-threatening TEAEs did not cluster with any particular age or CCI subgroup and none were related to RBX2660 or its administration.
Conclusion: RBX2660 is efficacious and safe in adults with rCDI regardless of age and baseline comorbidities.
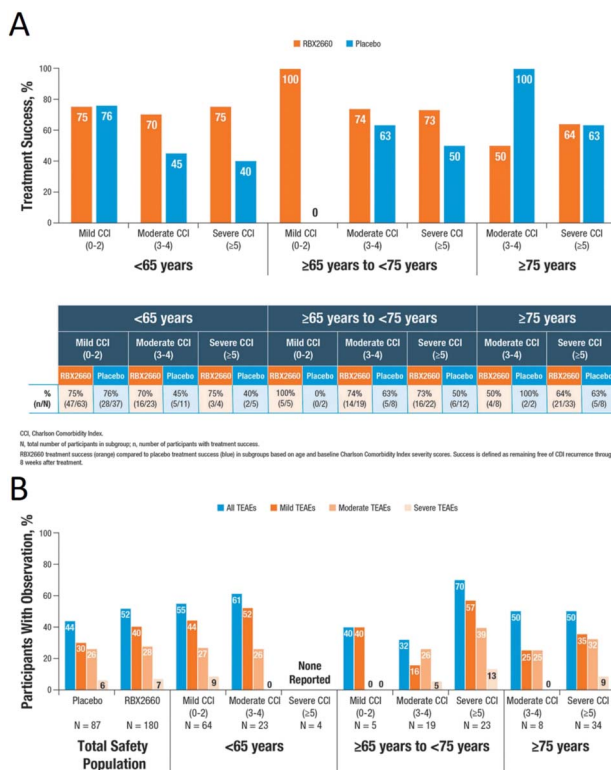
[0160] **Figure 1.** (A) Summary of treatment success and (B) adverse events in participants with recurrent Clostridioides difficile infection across age and Charlson Comorbidity Index severity score subgroups

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S161

Cold Snare Endoscopic Mucosal Resection for Colon Polyps: A Systematic Review and Meta-Analysis

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Introduction: Cold snare endoscopic mucosal resection (CS-EMR) has become increasingly popular for the removal of colon polyps $\geq$ 10 mm. CS-EMR can potentially avert some of the risks associated with the use of electrocautery during polyp resection without compromising clinical efficacy. Therefore, we conducted a systematic review and meta-analysis to evaluate the efficacy and safety of CS-EMR in removing colon polyps.

Methods: We conducted a comprehensive literature search of MEDLINE, EMBASE, Cochrane, ClinicalTrials.gov, and Scopus databases for studies published in the English language addressing outcomes of CS-EMR for colon polyps from database inceptions through April 2022. The weighted pooled estimates with the 95% confidence interval (CI) were calculated. Cochran Q test and I^2 statistics were used to evaluate heterogeneity.

Results: We identified 3599 articles on the initial search, and 32 full-text studies were assessed for eligibility. Fifteen studies met inclusion criteria. There were three randomized controlled trials, six prospective, and six retrospective studies. Six studies were from the United States, two each from Australia, China, and Japan, one from the United Kingdom, and one from Greece. A total of 2382 polyps were removed from 1756 patients. 45% were females. Polyps ranged from 6-80 mm in size, and 72.4% were proximal to the splenic flexure. In addition, 50.4% of the polyps were NICE I or serrated lesions and 48.5% were NICE II, and 0.1% were NICE III. Polyp recurrence rate after CS-EMR was 9.4 % (95% CI: 3.3-15.6%, I^2= 95.8%), piecemeal resection rate 59.4% (95% CI: 46.3-72.4%, I2= 99.9%), and complete histological resection rate (defined by post polypectomy biopsies) was 93.1% (95% CI: 88.7-97.6%, I^2=90.8%). For adverse events, delayed post-polypectomy bleeding rate was 0.8% (95% CI: 0.3-1.3%, I^2 = 21.4%), perforation and the post-polypectomy syndrome rate was 0.3% (95% CI: 0-0.5%, I^2 = 0%) (Figure). Given significant heterogeneity in recurrence rate, subgroup analyses were performed. Recurrence rate in serrated lesions (n=484) was 3.8% (95% CI: 0.2-7.4%, I^2= 76.7%), in polyps < 20 mm (n= 137) 0.8% (95% CI: -0.7-2.3%, I^2= 0%), and in polyps $\geq$ 20 mm (n=617) 15.7% (95% CI: 2.6-28.7%, I^2= 95.2%).

Conclusion: CS-EMR has an excellent safety profile and acceptable recurrence rate for resection of colon polyps, especially for polyps < 20 mm and serrated lesions. However, large prospective studies to validate safety and efficacy are needed.
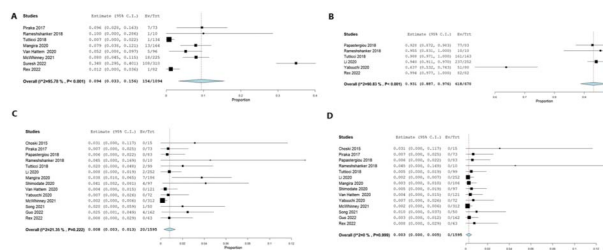
[0161] **Figure 1.** Forest plots of A) recurrence rate, B) complete histological resection, C) delayed post polypectomy bleeding, and D) perforation of cold snare endoscopic mucosal resection in colon polyps

S162

Clinical Significance of Colonic Wall Thickening on Computed Tomography Scan in Inpatients: Retrospective Study From a Community Hospital

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Introduction: Colon wall thickening (CWT) is one of the common reasons for GI consults both in inpatient and outpatient settings, owing to the widespread use of computed tomography (CT) scans for assessment of gastrointestinal complaints. Often these patients undergo colonoscopy due to concerns of delaying a potential cancer diagnosis. As of now there are neither guidelines on how to manage these patients nor clear consensus on which factors predict a cancer in a patient with CWT. We aim to evaluate this.

Methods: We identified 116 patients who had CWT on CT scan of the abdomen with intravenous and oral contrast that was performed for various GI complaints, and subsequently underwent colonoscopy for further evaluation between January 2021-2022. Patients with definitive CT evidence of malignancy like colonic mass, metastases were excluded from the study. However, patients in who CT was inconclusive for underlying mass, i.e., possible mass/underlying mass cannot be excluded, are included. Variables listed in Table were assessed by univariate and multivariate analysis as appropriate.

Results: Patients with normal colonoscopy or those with diverticulosis, hemorrhoids, adenoma without malignancy irrespective of size and number were grouped as non-significant pathology, and those with malignancy, IBD, ischemic colitis were grouped as significant pathology. Out of 116 patients, 54 (46%) had inpatient colonoscopies; 41 (35%) patients had findings that could potentially explain BWT; 21 (18%) had newly diagnosed cancer, 14 (12%) with IBD of which 3 were newly diagnosed and 6 (5%) patients had ischemic colitis. Of the 21 newly diagnosed colon cancer patients, 5 never had a colonoscopy. The mean duration of last colonoscopy was 8±3 years. Figure depicts the colonoscopy findings in each segment of the colon corresponding to BWT. On multivariate logistic regression weight loss ($p < 0.008$, OR: 22, 95% CI: 2.2-220) IBD history ($p < 0.001$) and years passed since last colonoscopy ($p < 0.03$, OR: 1.3, CI:1.03-1.6) were statistically significant.

Conclusion: In our study, bowel wall thickening in majority (65%) of the patients is nonspecific without malignancy or IBD on colonoscopy. Based on our analysis, we conclude that patients with weight loss (OR: 22), rectal bleeding (OR: 28), Hemoglobin< 11g/dL (OR: 19), and more than 5 years since last colonoscopy (OR: 1.3) are more likely to have significant pathology when colonoscopy is performed for colon wall thickening on CT scan. Rest of the patients may be safely monitored.
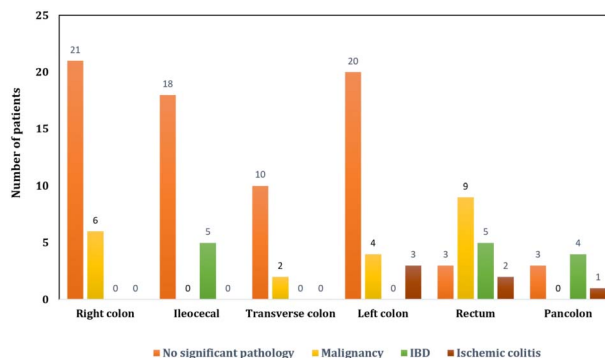
[0162] **Figure 1.** Colonoscopy findings corresponding to segment of bowel wall thickening

Table 1. Predictors of significant pathology on colonoscopy in patients with colon wall thickening on CT scan

Variable	Significant colonoscopy 35% (n=41)	Non-significant colonoscopy 65% (n=75)	OR 95% CI	P value
		Univariate analysis		
Age$	69 (34-78)	55 (44-64)	1.02 (0.9-1.1)	0.6
Sex (females)	63 (26)	45 (34)	2(0.9-4.6)	0.06
Race				**0.001**
Caucasian	20 (8)	41 (31)		
African American*	56 (23)	31 (23)	3.9 (0.9-17) *	**0.006**
Hispanic	12 (5)	21 (16)		
Asian	12 (5)	7 (5)		
Hemoglobin < 11 g/dL	78 (32)	16 (12)	19 (7-49)	**0.0001**
Weight loss	71 (29)	7 (5)	34 (11-105)	**0.0001**
Family h/o colon cancer	15 (6)	24 (18)	0.5 (0.2-15)	0.2
H/o IBD	19 (8)	1 (1)	27 (3.4-219)	**0.002**
Reason for CT scan				**0.002**
Abdominal pain	27 (11)	44 (33)		
Diarrhea	7 (3)	11 (8)		
Rectal bleeding*	47 (19)	2 (2)	28 (6-142) *	**0.0001**
Nausea, vomiting	7 (3)	11 (8)		
Combination of symptoms	12 (5)	32 (24)		
No prior colonoscopy	36 (15)	52 (39)		
Years since last colonoscopy¶	8±3	5±2	1.2 (1.1-1.4)	**0.001**
CT scan inconclusive for mass	41 (17)	16 (12)	4 (1.5-9)	**0.003**
		Multivariate Analysis		
Weight loss			22 (2.3-220)	**0.008**
H/o IBD			205 (7.8-5380)	**0.001**
Years since last colonoscopy			1.3 (1.03-1.6)	**0.03**

$Median and interquartile range.
¶Mean and Standard deviation.

S163

Association Between Coronavirus Disease 2019 and First Occurrence of Acute Diverticulitis in Unvaccinated Individuals

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Introduction: Although Coronavirus Disease 2019 (COVID-19) primarily presents with fever and respiratory symptoms, gastrointestinal manifestations are increasingly recognized as part of the disease spectrum. Through potentially overlapping pathophysiology, co-occurrence of COVID-19 and first-time acute diverticulitis has been reported. Our study seeks to further characterize the association between COVID-19 and first-time acute diverticulitis in unvaccinated individuals.
Methods: Unvaccinated patients diagnosed with COVID-19 who subsequently developed acute diverticulitis within 30 days (n=41, age 62.7 ±15.5 years, 46% male) were identified between 2020-2022. COVID-19 and acute diverticulitis was diagnosed by PCR and computer tomography respectively. Patients with prior history of acute diverticulitis were excluded. Patient characteristics and comorbid conditions were collected. Characterization of COVID-19 course (treatment setting, medical/ventilatory therapy) and acute diverticulitis (treatment setting, complications, therapy) was performed.
Results: Of 41 patients, 56% (23/41) were hospitalization for COVID-19 (13.6 ±10.7 days), with 10 requiring non-invasive ventilation and 4 requiring invasive ventilation. Mean duration between COVID-19 diagnosis and acute diverticulitis was 14.3 ±9.6 days. Complications of acute diverticulitis occurred in 65.9% (27/41) of patients, with 73.2% (30/41) requiring hospitalization and 24.4% (10/41) requiring emergent surgery. The most common complication was intestinal perforation (43.9%, 18/41), followed by abscess formation (36.6%, 15/41), peritonitis (19.5%, 8/41), and fistula formation (4.9%, 2/41). Patients hospitalized for COVID-19 were more likely to develop intestinal perforation (47.8% vs. 38.9%) and peritonitis (30.4% vs. 5.6%) vs. non-hospitalized patients, likely reflecting more severe COVID-19 disease course (Table).
Conclusion: COVID-19 is thought to cause intestinal injury though a combination of inflammation-mediated endothelial damage, interstitial edema, and microvascular injury. Our study indicates that patients diagnosed with first-time acute diverticulitis within 30-days of COVID-19 infection have an elevated complication rate, most commonly intestinal perforation and abscess formation. The incidence of perforation was further elevated in hospitalized patients, with marked elevation in peritonitis incidence. Given the increased all-cause complication rate, future large-scale studies are indicated to evaluate the potential benefit of early intervention.

Table 1.

Diverticular complication	Complication incidence in all patients (n= 41)	Complication incidence subclassified by COVID-19 hospitalization status	
		Hospitalized for COVID-19 (n= 23)	Not hospitalized for COVID-19 (n= 18)
Incidence of one or more complications	65.9% (27/41)	65.2% (15/23)	66.7% (12/18)
Abscess formation	36.6% (15/41)	34.8% (8/23)	38.9% (7/18)
Perforation	43.9% (18/41)	47.8% (11/23)	38.9% (7/18)
Peritonitis	19.5% (8/41)	30.4% (7/23)	5.6% (1/18)
Fistula formation	4.9% (2/41)	4.3% (1/23)	5.6% (1/18)

S164

Naloxegol Provides Clinically Meaningful Healthcare-Related Quality of Life (HR-QoL) Improvement (PAC-QOL) in Patients With Opioid-Induced Constipation (OIC): A Pooled Analysis of Two Global Phase 3 Studies of Naloxegol

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Introduction: OIC negatively impacts patients' HR-QOL. Naloxegol (Movantik®), a peripherally acting mu-opioid receptor antagonist (PAMORA) proved effective in treating OIC symptoms in adults with chronic non-cancer pain in two pivotal phase 3 trials (KODIAC 4/5; NCT01309841/NCT01323790). This pooled analysis evaluated HR-QOL improvement utilizing the Patient Assessment of Constipation Quality of Life questionnaire (PAC-QOL) in these two randomized, placebo-controlled trials.
Methods: PAC-QOL scores were collected during KODIAC 4/5 as supportive efficacy measures. Scoring ranged from 0 (absence of symptoms) to 4 (very severe) for each domain (Physical Discomfort, Psychosocial Discomfort, Worries/Concerns, and Satisfaction). Minimal clinically important difference (MCID) thresholds of 0.5 based on literature and naloxegol real world studies, and 0.8 based on anchor method assessment were evaluated in the pooled KODIAC 4/5 data and used to identify responders and non-responders.
Results: 1337 patients (naloxegol (25mg, 12.5mg) or placebo (PBO)) were assessed in this analysis. The overall baseline values for PAC-QOL Total, Physical discomfort, Psychosocial Discomfort, Worries/Concerns, and Satisfaction scores were 2.0, 2.1, 1.3, 2.0, and 3.3, respectively. For MCID >0.5, a higher proportion of PAC-QOL responders were observed for naloxegol (25 mg: 66.07%; 12.5mg: 68.47%) vs PBO (58.95%) at Wk 12. Odds ratios (OR) were 1.4 (p=0.047) for 25mg and 1.5 (p=0.017) for 12.5mg vs. PBO, indicating significance with 40-50% higher likelihoods of clinically meaningful HR-QOL improvement than PBO. For MCID >0.8, higher proportions of PAC-QOL responders were also observed for naloxegol (25mg: 52.68%; 12.5mg: 56.25%) vs. PBO (45.73%). ORs were 1.4 (p=0.068) for 25mg and 1.5 (p=0.010) for 12.5mg vs. PBO. ORs were generally consistent between MCID >0.8 and 0.5 (Table). Significantly greater proportions of responders achieved Satisfaction for 25mg and 12.5mg vs. PBO (p< 0.05) for both MCID thresholds. Other subdomains also showed statistically significant and numerical improvements with naloxegol (25mg, 12.5 mg) vs. PBO. (Figures 1a-d).
Conclusion: In two phase 3 pivotal clinical trials, patients with OIC achieved clinically relevant HR-QOL improvements and reported significant satisfaction with naloxegol at both MCID thresholds.
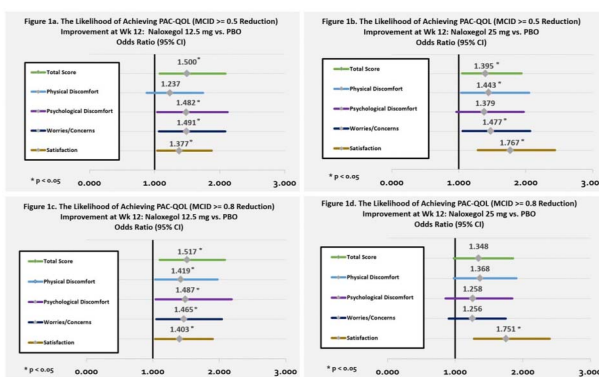
[0164] **Figure 1.** a-d. Likelihood of Achieving PAC-QOL MCID at Week 12: Naloxegol vs. Placebo (KODIAC 4/5; ITT Population)

Table 1. PAC-QOL Total Score: Proportion of Responders Achieving MCID at Week 12 (KODIAC 4/5; ITT Population)

Placebo (N=363)[a] n (%)	Naloxegol 12.5 mg (N=352)[a] n (%)	Naloxegol 25 mg (N=336)[a] n (%)	Naloxegol 12.5 mg vs. Placebo OR (95% CI) p-value	Naloxegol 25 mg vs. Placebo OR (95% CI) p-value
Proportion of PAC-QOL Responders Achieving MCID ≥ 0.5				
214 (58.95%)	241 (68.47%)	222 (66.07%)	1.500 (1.077, 2.089) 0.0165	1.395 (1.004, 1.938) 0.0471
Proportion of PAC-QOL Responders Achieving MCID ≥ 0.8				
166 (45.73%)	198 (56.25%)	177 (52.68%)	1.517 (1.103, 2.087) 0.0104	1.348 (0.978, 1.858) 0.0682

[a]Number of analyzable subjects with complete PAC-QOL data for 12-wks.
PAC-QOL, Patient Assessment of Constipation Quality of Life questionnaire; MCID, minimal clinically important difference; OR, odds ratio; CI, confidence interval.

S165

Impact of Patient Subgroups on the Efficacy and Safety of Methylnaltrexone for Opioid-Induced Constipation in Patients With Advanced Illness

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Introduction: Methylnaltrexone (MNTX) is a peripherally acting μ-opioid receptor antagonist indicated for opioid-induced constipation (OIC) in patients with advanced illness who are receiving palliative care and in patients with chronic noncancer pain. We investigated if baseline patient characteristics impact the safety and efficacy of MNTX in those with advanced illness and OIC.
Methods: This analysis pooled data from 2 randomized, double-blind, placebo (PBO)-controlled studies (study 302–NCT00402038; study 4000–NCT00672477) in patients with advanced illness, including cancer. Study 302: Patients were randomized to receive subcutaneous (SC) MNTX 0.15 mg/kg or PBO every other day (QOD) for 2 weeks, with possible dose escalation to 0.30 mg/kg at week 2. Study 4000: Patients received weight-based SC MNTX 8 mg or 12 mg QOD or PBO for 2 weeks. The proportion of patients achieving a rescue-free laxation within 4 or 24 hours after the first dose of study drug was assessed in patient subgroups stratified by baseline age (< 65 vs ≥ 65), Eastern Cooperative Oncology Group (ECOG) status (≤ 2 vs > 2), cancer status, laxative type (osmotic agents, stimulants, stool softeners), and opioid requirement (oral morphine equivalent dose < 80 mg/d, 80 − < 150 mg/d, and ≥ 150 mg/d). Treatment-emergent AEs (TEAEs), gastrointestinal (GI) TEAEs, and abdominal pain were evaluated.
Results: Overall, 363 patients were included in this analysis (MNTX = 178; PBO = 185). Mean age was 67.8 years in the MNTX group and 66.7 years in the PBO group; 46.8% were men across all groups. A significantly greater proportion of patients receiving MNTX achieved rescue-free laxation within 4 hours (n = 111/178, 62.4% vs n = 31/185, 16.8%, P < .0001) and 24 hours (n = 135/178, 75.8% vs n = 81/185, 43.8%, P < .0001) of the first dose vs PBO. These trends were consistent across all subgroups (Table). Most patients experienced ≥ 1 TEAE in the overall population (MNTX 82.1%; PBO 76.2%); results were similar when stratified by baseline cancer, ECOG, opioid, or laxative group (Table). More than half of TEAEs were GI in nature; abdominal pain was more common in patients receiving MNTX across subgroups.
Conclusion: MNTX treatment was superior to PBO in achieving RFL within 4 and 24 hours after the first dose, irrespective of patients' cancer status, baseline ECOG status, or baseline opioid or laxative use. MNTX remained consistently safe across different baseline clinical and demographic characteristics.

Table 1. Rescue-free laxation response and treatment-emergent events by demographic and clinical characteristics subgroup

| | Rescue-free laxation | | | | TEAEs | | | | | |
| | Within 4 hours of the first dose | | Within 24 hours of the first dose | | Patients with ≥ 1TEAE | | Patients with gastrointestinal TEAE | | Patients with abdominal pain | |
	MNTX	PBO	MNTX	PBO	MNTX	PBO	MNTX	PBO	MNTX	PBO
Age, n (%)										
< 65 years	53 (63.9)	13 (14.6)	66 (79.5)	36 (40.4)	70 (84.3)	65 (73.0)	48 (57.8)	37 (41.6)	21 (25.3)	8 (9.0)
≥ 65 years	58 (61.1)	18 (18.8)	69 (72.6)	45 (46.9)	77 (80.2)	76 (79.2)	43 (44.8)	47 (49.0)	18 (18.8)	11 (11.5)
Cancer status, n (%)										
Cancer	74 (63.8)	17 (14.9)	88 (75.9)	53 (46.5)	102 (87.9)	91 (79.8)	67 (57.8)	57 (50.0)	28 (24.1)	11 (9.6)
Noncancer	37 (59.7)	14 (19.7)	47 (75.8)	28 (39.4)	44 (69.8)	50 (70.4)	24 (38.1)	27 (38.0)	11 (17.5)	8 (11.3)
Functional status, n (%)										
ECOG ≤ 2	52 (66.7)	18 (22.5)	60 (76.9)	42 (52.5)	67 (85.9)	58 (72.5)	43 (55.1)	37 (46.3)	23 (29.5)	8 (10.0)
ECOG > 2	59 (59.0)	13 (12.4)	75 (75.0)	39 (37.1)	80 (79.2)	83 (79.0)	48 (47.5)	47 (44.8)	16 (15.8)	11 (10.5)
Baseline opioid dose in OME, n (%)										
< 80 mg/d	24 (57.1)	7 (12.3)	29 (69.0)	24 (42.1)	30 (71.4)	42 (73.7)	16 (38.1)	26 (45.6)	7 (16.7)	5 (8.8)
80 to < 150 mg/d	24 (61.5)	8 (19.0)	29 (74.4)	22 (52.4)	37 (94.9)	31 (73.8)	22 (56.4)	17 (40.5)	8 (20.5)	6 (14.3)
≥ 150 mg/d	63 (64.9)	16 (18.6)	77 (79.4)	35 (40.7)	80 (81.6)	68 (79.1)	53 (54.1)	41 (47.7)	24 (24.5)	8 (9.3)
Baseline laxative regimen, n (%)										
Stimulants	86 (63.2)	21 (14.1)	104 (76.5)	64 (43.0)	118 (82.5)	118 (79.2)	73 (53.3)	68 (45.6)	29 (21.2)	17 (11.4)
Osmotic agents	56 (65.9)	17 (20.7)	64 (75.3)	38 (46.3)	75 (88.2)	63 (76.8)	53 (62.4)	38 (46.3)	25 (29.4)	12 (14.6)

Table 1. (*continued*)

| | Rescue-free laxation | | | | TEAEs | | | | | |
| | Within 4 hours of the first dose | | Within 24 hours of the first dose | | Patients with ≥ 1TEAE | | Patients with gastrointestinal TEAE | | Patients with abdominal pain | |
	MNTX	PBO	MNTX	PBO	MNTX	PBO	MNTX	PBO	MNTX	PBO
Stool softeners	58 (63.0)	15 (15.3)	69 (75.0)	46 (46.9)	72 (78.3)	78 (79.6)	42 (45.7)	46 (46.9)	18 (19.6)	12 (12.2)

ECOG = Eastern Cooperative Oncology Group; OME = oral morphine equivalent dose; MNTX = methylnaltrexone; PBO = placebo; TEAE = treatment-emergent adverse event.

S166

Osteonecrosis of the Jaw Associated With Bevacizumab in Treatment: A Case Series Using the FDA Adverse Event Reporting System (FAERS) Database

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Introduction: Osteonecrosis of the jaw (ONJ) is a rare but serious adverse drug reaction (ADR) historically associated with denosumab and bisphosphonate therapy. Studies have demonstrated an association between ONJ and bevacizumab, a VEGF inhibitor now used for some gastrointestinal malignancies. This study reviewed cases of bevacizumab associated ONJ reported to the FDA Adverse Event Reporting System (FAERS) database

Methods: The FAERS database was searched for all reported cases of ONJ from 2010 to 2021. Cases lacking patient age or gender were excluded from review. Only adults (age 18 and older) and reports from Healthcare Professions were included for analysis. Duplicate cases were removed. A dataset was created for bevacizumab associated ONJ and demographics were summarized. A subgroup analysis was performed for subjects receiving bevacizumab without prior or concomitant denosumab or bisphosphonate therapy.

Results: 19,670 cases of ONJ were reported to the FAERS database from 2010 to 2021 with approximately half (9,556) containing complete patient demographic data. 146 cases (1.5%) of bevacizumab associated with ONJ were identified. 65.8% (96) of the patients were female and the average age was 60.9 years +/- 9.3 years. There were 34 cases without prior or concomitant bisphosphonate or denosumab therapy. Male gender was associated with 65% (22 of 34) of these cases and average age was 61 years +/- 12.0. Table/Figure depicts clinical indications for each of these 34 cases. Gastrointestinal malignancies (i.e., colon cancer and esophageal cancer) were present in 6/34 (17.6%) cases without prior denosumab/bisphosphonate therapy, 5 patients with breast cancer (14.7%) and 5 cases of prostate cancer (14.7%).

Conclusion: 146 cases of bevacizumab associated with ONJ have been reported to the FAERS database and 23% of these cases did not involve medications known to cause ONJ. Clinicians should be aware that ONJ is a potential adverse effect of bevacizumab treatment.
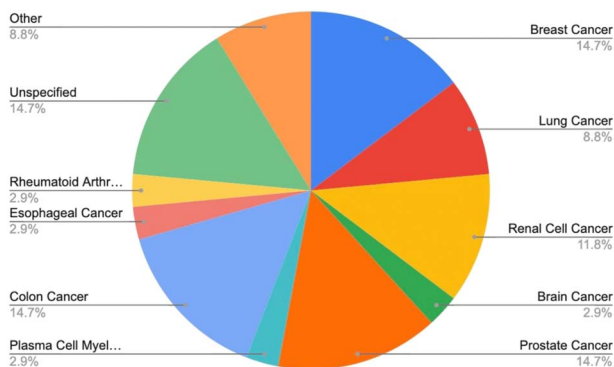
[0166] **Figure 1.** This Figure represents the distribution of the clinical indications of bevacizumab-associated with ONJ as reported to the FAERS database from 2010 to 2021

Table 1. This Table represents the distribution of the clinical indications of bevacizumab associated with ONJ as reported to the FAERS database from 2010 to 2021 along with the respective number of cases

Indication for use	Number of cases
Colon cancer	5
Breast cancer	5
Prostate cancer	5
Unspecified	5
Renal cell cancer	4
Lung cancer	3
Other	3
Esophageal cancer	1
Brain cancer	1
Rheumatoid Arthritis	1
Plasma cell myeloma	1

S167

Comparison of High-Resolution Anorectal Manometry and Magnetic Resonance Defecography in Patients With Obstructive Defecation: Are Both Tests Necessary?

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Introduction: Investigation of evacuation disorders is often pursued in patients with symptoms of obstructive defecation. High-resolution anorectal manometry (HR-ARM) is a simple, safe and widely available test to diagnose pelvic floor dysfunction. A more costly and less accessible test is magnetic resonance defecography (MRD). This study aims to qualify the added value of MRD in diagnosing pelvic floor disorders.
Methods: HR-ARM and MRD performed in patients with a diagnosis of constipation between 1/1/2020 and 5/15/22 at Mayo Clinic were identified using Epic SlicerDicer. Univariate and multivariate analyses were used to compare findings on MRD in patients with and without abnormal HR-ARM.
Results: Seventy-six consecutive patients (81.8% female, 94.8% white, age 19-82) who underwent both HR-ARM and MRD were included. The majority had evidence of dyssynergia on HR-ARM (n=49, 64.5%). Patients with dyssynergia on HR-ARM were significantly more likely to have prolonged balloon expulsion at both >60 and >30 seconds (p< 0.00001) and incomplete gel expulsion on MRD (p=0.00008) (Table). However, they were not more likely to have a clinically significant rectocele measuring ≥2cm (p=0.5093) or evidence of rectal prolapse (p=0.071). An increased number of vaginal deliveries was correlated with a higher likelihood of having a rectocele ≥2cm (r=0.24, p< 0.05).
Conclusion: Anatomic findings on MRD were similar between patients with and without evidence of dyssynergia identified by HR-ARM. In this retrospective review, undergoing MRD in addition to HR-ARM does not appear to provide additional diagnostic information to guide therapeutic recommendations. Large prospective studies to evaluate the added value of MRD are needed.

Table 1. Findings on MRD and balloon expulsion test in patients with and without dyssynergia on HR-ARM

	Dyssynergia on HR-ARM n= 49 (64.5%)	No dyssynergia on HR-ARM n = 27 (35.5%)	P value
Balloon Expulsion >60 sec	30 (61.2%)	0 (0.0%)	p< 0.00001
Balloon Expulsion >30 sec	32 (65.3%)	2 (7.4%)	p< 0.00001
< 50% gel expulsion on MR	26 (53.1%)	2 (7.4%)	p=0.00008
Rectocele on MR	26 (53.1%)	22 (81.5%)	p=0.0139
≥2 cm Rectocele on MR	21 (42.9%)	16 (59.3%)	p=0.5093
>3 cm Rectocele on MR	10 (20.4%)	9 (33.3%)	p=0.2113
>4 cm Rectocele on MR	3 (6.1%)	3 (11.1%)	p=0.4413
Rectal Prolapse	5 (10%)	7 (31.8%)	p=0.071

S168

Charlson Comorbid Index of 5 or More in Patients With *Clostridium difficile* Infection Predicts Poor Outcomes

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Introduction: Clostridium difficile infection (CDI) related severity as defined by Infectious Diseases Society of America (IDSA) is based on laboratory or clinical parameters at the time of presentation. CDI related sepsis could lead to worsening of otherwise stable underlying comorbid conditions and hence may escalate mortality risk. Charlson Comorbidity Index (CCI), which assesses patient's underlying co-morbid illness, may help in prognosis estimation and prediction of clinical outcomes. In our study, we intend to analyze the CCI as a tool to predict poor outcomes across all CDI severities.
Methods: We conducted a 10 years, retrospective observation study on patients with CDI from April 2008 to November 2018. Demographic, clinical and laboratory was abstracted from our Electronic Health Record. Based on IDSA severity all patients were divided into non-severe, severe and fulminant disease. The primary outcome was defined as death during the same hospital admission as CDI. The CCI index was calculated based on chart review. IDSA severity and Charlson's comorbidity index were included as independent variables in conducting multivariate analysis. The cut-off point for Charlson's comorbidity index was calculated based on Youden's index. Estimated marginal odds were derived using the binary logistic regression model to make predictions about the included parameters. (Figure) (Table)
Results: There were 1470 hospitalized patients with CDI and majority of patients had non-severe presentation (44%, 647), followed by severe (35%, 527) and fulminant disease (21%, 296). The overall mortality rate was 14.9% (219). The CCI cut-off of 5 was best at predicting the mortality in patients with CDI with a sensitivity of 70% and specificity of 53%. The impact of CCI >5 on the CDI related morality could be seen across all CDI severity groups, specifically in the group with non-severe presentation. In patient with non-severe CDI, the patients with CCI > 5 had 3.67 times higher odds of mortality as comparted to patient with CCI < 5 (OR = 3.67, p= < 0.001). In patients with severe and fulminant infection, the odds of mortality were 2.22 and 2.31, respectively (P < 0.05 for both comparisons).
Conclusion: CCI > 5 affects the mortality in patients with CDI across all severity. Exacerbation of co-morbid condition due to CDI is likely explanation. Inclusion of CCI in CDI severity, in addition to IDSA criteria, may assist in improving overall prognosis of patients.

Table 1. Association of Charlson comorbid index with clinical outcome for patients with clostridium infection

Clostridium difficle Severity based on IDSA classification	Study patient N=1470	Non severe N=647	Severe N=527	Fulminant N=296	p-valuse
Charlson score					
Mean (SD)	4.58 (3.18)	3.86 (3.29)	5.08 (3.01)	5.28 (2.91)	< 0.001
Median [IQR]	4.00 [2.00;7.00]	3.00 [1.00;6.00]	5.00 [3.00;7.00]	5.00 [3.00;7.00]	< 0.001
Outcome					< 0.001
No Mortality	1251 (85.1%)	617 (95.4%)	483 (91.7%)	151 (51.0%)	
Mortality	219 (14.9%)	30 (4.64%)	44 (8.35%)	145 (49.0%)	
Predicted mortality by severity					
Charlson Comorbidity Index (CCI)					0.001
CCI below 5 (% mortality)		2.33	5.22	36.44	
CCI above 5 (% mortality)		8.08	10.85	57.06	
Odds ratio comparing odds of Mortality with CCI above 5 to CCI below 5 (p-value)		3.67 (0.001)	2.22 (0.005)	2.31 (0.005)	
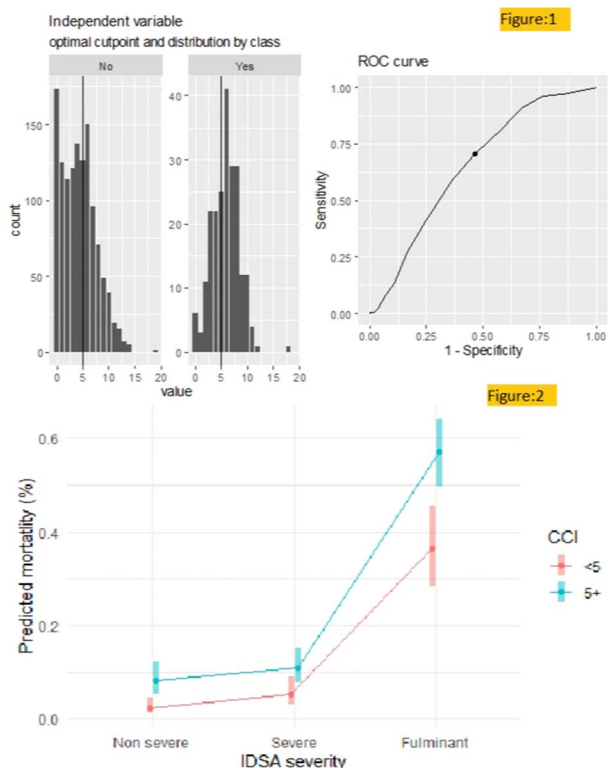
Figure:1

Figure:2

[0168] **Figure 1.** IDSA Severity and Predicted Mortality

S169

Extra-Intestinal *Clostridioides difficile* Infection: A Multi-Center Retrospective Review

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Introduction: *Clostridioides difficile* infection (CDI) is the most common healthcare-associated infection in the United States. The overwhelming majority of CDI cases are localized within the colon. In rare cases, however, CDI may involve locations outside the colon. There are a small number of studies reporting extra-intestinal CDI (EiCDI) and most emanate from Europe. The most recent United States study was published in 2014 from a rural healthcare setting. In this study we report on our experience with EiCDI within an urban environment at Yale-New Have Health System (YNHHS).
Methods: We performed a retrospective descriptive analysis reviewing all patients with EiCDI at a large multi-center health system from 1/2013 until 9/2021. We electronically screened all cultures done at YNHHS regardless of the source and retrieved those that isolated *C difficile* from an extraintestinal source (EiCDI). Data collected for each patient included demographics, medical co-morbidities, source of culture, treatment and outcomes.
Results: A total of 20,594 samples from 13,139 patients were positive for CDI from any source. Among these, only 20 patients (0.15%) with EiCDI were identified. The mean age was 57.2 years and 55% were male. 50% of the samples were from abdominopelvic source while 25% were from either the blood or wound cultures. Fourteen patients (70%) were hospitalized within 12-weeks prior to their positive cultures and 80% were exposed to antibiotics within the prior 3 months. All patients had their infections treated with antibiotics, 16 (80%) underwent surgical intervention or drainage for source control. Eleven (55%) required admission to intensive care unit (ICU). Only 5 patients had concomitant CDI involving the colon or intestine. 20% of patients with EiCDI died within 30 days of diagnosis and 35% expired within 90 days. Readmissions were common with 25% and 30% at 30- and 90- days from discharge, respectively. (Table)
Conclusion: EiCDI is a rare event mostly seen as part of a polymicrobial infection and not frequently associated with intestinal CDI. This low frequency is likely a result of the anaerobic nature of this bacterium. Most patients with EiCDI required surgical intervention or drainage for source control and about half required high level of care including mechanical ventilation and/or ICU admission. EiCDI is associated with high rates of morbidity and mortality. Large prospective studies are needed to better understand optimal diagnosis and treatment this uncommon entity.

Table 1. Baseline Characteristics and Outcomes

Demographics (N=20)	
Age, mean ± SD (years)	57.2 ± 16
Male, n (%)	11 (55%)
Race, n (%)	
Caucasian	15 (75%)
African American	3 (15%)
Asian	1 (5%)
Other	1 (5%)
Sample Source	
Abdomen/Pelvis	10 (50%)
Blood	5 (25%)
Wound	5 (25%)
Charlson comorbidity index, median [IQR]	4 [1.50, 7.25]

Table 1. (continued)

Demographics (N=20)	
Hospitalization in the last 12 weeks	14 (70%)
Associated *C difficile* colitis	5 (25%)
Antibiotic exposure in the last 3 months	16 (80%)
PPI exposure in the last 3 months	11 (55%)
Treatment and Outcomes	
Antimicrobial usage	20 (100%)
Surgery or interventional radiology drainage	16 (80%)
ICU admission	11 (55%)
Mechanical ventilation	8 (40%)
Length of stay (days), median [IQR]	16 [11.25, 29.5]
Mortality	
30-day mortality	4 (20%)
90-day mortality	7 (35%)
Readmission	
30-day readmission	5 (25%)
90-day readmission	6 (30%)
Disposition	
Home	9 (45%)
Rehab facility	2 (10%)
Skilled nursing facility	3 (15%)
Hospice	3 (15%)
Died	3 (15%)

S170

Efficacy and Safety of Prucalopride in Patients With Renal Dysfunction: A Post Hoc Analysis of Phase 3 and 4 Clinical Trials in Chronic Idiopathic Constipation

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Introduction: Prucalopride is a selective serotonin type 4 receptor agonist indicated to treat chronic idiopathic constipation (CIC) in adults. A *post hoc* analysis of key phase 3 and 4 clinical trials evaluated the effect of renal function on the efficacy and safety of prucalopride.

Methods: Data from six phase 3 and 4 randomized, double-blind, placebo-controlled trials of prucalopride (2 mg once daily) over 12 weeks were pooled. Patients were stratified by estimated glomerular filtration rate (eGFR; normal renal function, $\geq$ 90 mL/min/1.73 m^2; mild impairment, 60 to < 90 mL/min/1.73 m^2; moderate impairment, 30 to < 60 mL/min/1.73 m^2). The proportion of patients with a mean frequency of $\geq$ 3 complete spontaneous bowel movements (CSBMs) per week was analyzed for each eGFR group. Secondary efficacy outcomes included CSBM frequency, stool characteristics, time to first CSBM, rescue medication use, Patient Assessment of Constipation Symptoms (PAC-SYM) and Patient Assessment of Constipation Quality of Life (PAC-QOL) questionnaire scores, global severity of constipation score and global efficacy of treatment score. Safety data were evaluated descriptively.

Results: Of 2474 patients (mean age: 47.4 years; 75.9% female), 1444 (58.4%) had normal renal function, 869 (35.1%) had mild impairment and 161 (6.5%) had moderate impairment (Table). A greater proportion of patients treated with prucalopride achieved a mean frequency of $\geq$ 3 CSBMs per week over 12 weeks versus placebo (normal function, 29.8% vs 13.7%, p < 0.001; mild impairment, 26.2% vs 12.8%, p < 0.001; moderate impairment, 17.7% vs 12.2%, p = 0.325; Figure A). Greater improvements in all secondary efficacy outcomes were observed with prucalopride versus placebo across renal function groups, except for CSBM frequency, rescue medication use, and PAC-SYM and PAC-QOL questionnaire scores in patients with moderate impairment (data not shown). The proportions of patients with any treatment-related treatment-emergent adverse events (TEAEs) were higher with prucalopride than placebo across renal function groups (Figure B).

Conclusion: A greater proportion of patients treated with prucalopride versus placebo achieved a mean frequency of $\geq$ 3 CSBMs per week among those with normal and mildly impaired renal function. No significant differences were observed between prucalopride and placebo groups among patients with moderately impaired renal function. There was no clear relationship between the incidence of TEAEs and renal function.
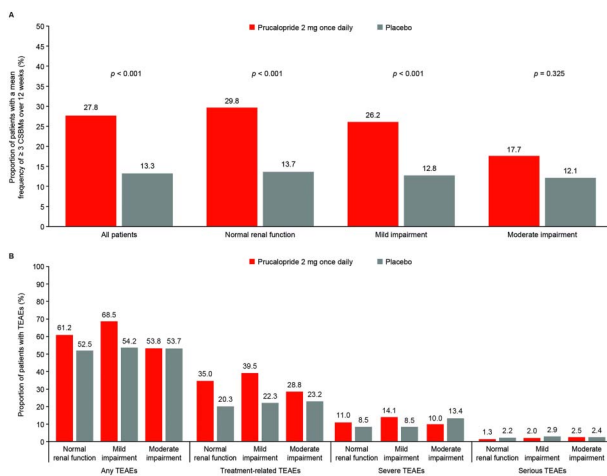
[0170] **Figure 1.** Proportion of patients with (A) a mean frequency of ≥ 3 CSBMs per week over 12 weeks, and (B) any TEAEs, stratified by renal function. Normal renal function, eGFR ≥ 90 mL/min/1.73m^2; mild impairment, eGFR 60 to < 90 mL/min/1.73m^2; moderate impairment, eGFR 30 to < 60 mL/min/1.73m^2. CSBM, complete spontaneous bowel movement; eGFR, estimated glomerular filtration rate; TEAE, treatment-emergent adverse eventwrap>

Table 1. Patient demographics and baseline characteristics stratified by renal function

	Prucalopride 2 mg once daily (n = 1233)			Placebo (n = 1241)		
	Normal renal function (eGFR, ≥ 90 mL/min/1.73 m²) (n = 722)	Mild impairment (eGFR, 60 to < 90 mL/min/1.73 m²) (n = 432)	Moderate impairment (eGFR, 30 to < 60 mL/min/1.73 m²) (n = 79)	Normal renal function (eGFR, ≥ 90 mL/min/1.73 m²) (n = 722)	Mild impairment (eGFR, 60 to < 90 mL/min/1.73 m²) (n = 437)	Moderate impairment (eGFR, 30 to < 60 mL/min/1.73 m²) (n = 82)
Age, mean (SD)	42.4 (13.2)	52.4 (15.7)	66.6 (15.2)	42.6 (12.8)	51.7 (15.4)	66.8 (12.6)
Sex, n (%)						
Female	544 (75.3)	336 (77.8)	56 (70.9)	539 (74.7)	345 (78.9)	58 (70.7)
Male	178 (24.7)	96 (22.2)	23 (29.1)	183 (25.3)	92 (21.1)	24 (29.3)
SBMs per week,[a] n (%)						
0	214 (29.6)	134 (31.0)	35 (44.3)	185 (25.6)	151 (34.6)	23 (28.0)
> 0 to ≤ 1	244 (33.8)	132 (30.6)	21 (26.6)	238 (33.0)	128 (29.3)	26 (31.7)
> 1 to ≤ 3	257 (35.6)	154 (35.6)	22 (27.8)	290 (40.2)	148 (33.9)	31 (37.8)
> 3	7 (< 1.0)	12 (2.8)	1 (1.3)	9 (1.2)	10 (2.3)	2 (2.4)
Hard stools, n (%)	66 (9.1)	48 (11.1)	8 (10.1)	68 (9.4)	42 (9.6)	8 (9.8)
Previous use of laxatives, n (%)						
Yes	500 (69.3)	312 (72.2)	59 (74.7)	493 (69.3)	308 (70.5)	62 (75.6)
No	222 (30.7)	120 (27.8)	20 (25.3)	229 (31.7)	129 (29.5)	20 (24.4)
Duration of constipation, years						
Mean (SD)	15.3 (13.4)	17.2 (15.6)	21.8 (19.5)	15.5 (13.6)	17.1 (14.6)	22.1 (18.6)
n (%)						
< 1	17 (2.4)	15 (3.5)	1 (1.3)	29 (4.0)	13 (3.0)	0 (0.0)
1 to < 5	175 (24.2)	85 (19.7)	12 (15.2)	158 (21.9)	75 (17.2)	19 (23.2)
5 to < 10	92 (12.7)	54 (12.5)	11 (13.9)	97 (13.4)	75 (17.2)	6 (7.3)
10 to < 15	109 (15.1)	77 (17.8)	16 (20.3)	104 (14.4)	56 (12.8)	10 (12.2)
15 to < 20	59 (8.2)	38 (8.8)	3 (3.8)	62 (8.6)	31 (7.1)	4 (4.9)
<20≥ 20	244 (33.8)	154 (35.6)	35 (44.3)	247 (34.2)	177 (40.5)	42 (51.2)
Missing	26 (3.6)	9 (2.1)	1 (1.3)	25 (3.5)	10 (2.3)	1 (1.2)
Overall therapeutic effect of laxatives or bulk-forming agents, n (%)						
Adequate	109 (15.1)	73 (16.9)	15 (19.0)	107 (14.8)	78 (17.8)	6 (7.3)
Inadequate	514 (71.2)	326 (75.5)	61 (77.2)	517 (71.6)	314 (71.9)	70 (85.4)
Not applicable	24 (3.3)	10 (2.3)	0 (0.0)	22 (3.0)	14 (3.2)	1 (1.2)
Missing	75 (10.4)	23 (5.3)	3 (3.8)	76 (10.5)	31 (7.1)	5 (6.1)

[a]SBMs per week were measured during the 6-month period before trial initiation. eGFR, estimated glomerular filtration rate; SBM, spontaneous bowel movement; SD, standard deviation.

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The Association Between Stool Shedding of SARS-Cov-2, Microbiome Diversity and Intestinal Inflammation

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Introduction: The transmission of the etiologic virus of COVID-19 (severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]) is thought to occur mainly via respiratory droplets even though limited evidence has shown the virus can be found in feces and involve the gastrointestinal (GI) tract. The aim of this study was to assess if patients with COVID-19 present with fecal shedding of SARS-CoV-2, intestinal inflammation or changes in their microbiota.

Methods: This was a prospective cohort study that included outpatients that presented with symptoms of COVID-19 and were tested using a nasopharyngeal PCR test (NPT). Two cohorts were selected: one with a (+) NPT and a control group with a (-) NPT. Stool and a clinical data were collected at baseline and then, days 14, 28 and 42. SARS-CoV-2 viral loads were measured in stool using PCR and stool microbiome was analyzed using 16S rRNA gene sequencing (V3/V4 region). Fecal calprotectin levels were also measured on each sample and used as a surrogate marker of intestinal inflammation.

Results: 101 patients were recruited (410 total samples). Of those, 55 had a (+) COVID-19 NPT. Most patients with a (+) COVID-19 NPT PCR had a detectable fecal viral load (71%). Among these patients, 23 (55%) had detectable viral stool loads only at baseline, 12 through day 14, 6 through day 28 and 1 through day 42. One patient had a (-) NPT but detectable SARS-CoV-2 in the baseline stool sample. Subjects with (+) NPT presented more commonly with myalgias (p=0.02), dysgeusia (p=0.019) and anosmia (p=0.03) when compared to those with (-) NPT but there were no differences in any other symptoms including GI manifestations. Within the group with a (+) NPT, those patient with detectable SARS-CoV-2 in the stool were younger but no differences were seen in demographic, symptoms, or fecal calprotectin levels (Table). There was no correlation between fecal SARS-CoV-2 loads and fecal calprotectin levels (rho: 0.007 [p=0.95]). Patients with a (+) NPT PCR had higher evenness when compared to those that tested (-) for a NPT PCR. However, no differences were seen in other alpha or beta diversity (Figures 1A and 1B, respectively).

Conclusion: Even though intestinal viral shedding of SARS-CoV-2 in patients with COVID-19 is common, these patients do not present with evidence of inflammation of the GI tract, a significantly disrupted gut microbiome or a higher incidence of GI symptoms when compared to patients with respiratory symptoms and no COVID-19.
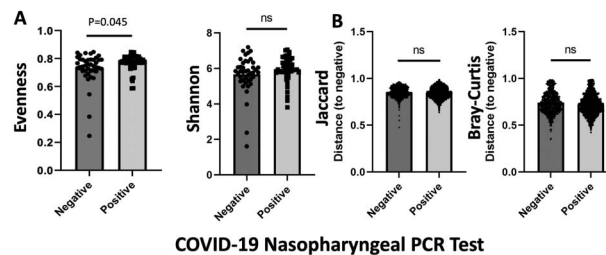
[0171] **Figure 1.** Differences in fecal microbiome alpha(A) and beta (B) diversity between patients that test positive or negative for COVID-19. (1) Nasopharyngeal test(*) Statistically significant

Table 1. Differences in characteristics among COVID-19 patients with and without detectable fecal SARS-CoV-2 viral loads

	(+) NS test[1] (n=54)	(-) NPT1 (n=45)	P value
Age [Mean in years (SD)]	37 (10)	40 (13)	0.30
Female gender [n (%)]	41 (75.9)	38 (82.6)	0.41
Race [n (%)]			0.22
Caucasian	31 (56.4)	29 (63.0)	
Black	18 (32.7)	16 (34.8)	
Asian	1 (1.8)	1 (2.2)	
Unknown	5 (9.1)	None	
Hispanic ethnicity [n (%)]	3 (5.6)	1 (2.2)	0.39
Detectable stool SARS-Cov-2 [n (%)]	39 (70.9)	1 (2.2)	< 0.0001*
Body Mass Index [Mean in Kg/m2 (SD)]	31.5 (8.4)	28.0 (6.8)	0.1
Oxygen saturation [Mean in % (SD)]	98.1 (1.5)	97.8 (1.9)	0.49
Respiratory rate [Mean in RPM (SD)]	18 (2.7)	19 (2.5)	0.22
Fecal calprotectin [Median in μg/mg(IQR)]	30 (30-83)	30 (30-34)	0.92
Symptoms at presentation			
Fevers [n (%)]	14 (25.5)	11 (23.9)	0.86
Fatigue [n (%)]	34 (61.8)	22 (47.8)	0.16
Cough [n (%)]	32 (58.2)	22 (47.8)	0.30
Anorexia [n (%)]	1 (1.8)	1 (2.2)	0.9
Pharyngalgia [n (%)]	25 (45.5)	21 (45.7)	0.98
Myalgias [n (%)]	33 (60.0)	17 (37.0)	0.02*
Anosmia [n (%)]	12 (21.8)	3 (6.5)	0.03*
Dysgeusia [n (%)]	13 (23.6)	3 (6.5)	0.019*
Any gastrointestinal Symptoms [n (%)]	32 (58.2)	23 (50.0)	0.41
Diarrhea [n (%)]	15 (27.3)	11 (23.9)	0.7
Abdominal pain [n (%)]	2 (3.6)	6 (13.0)	0.08
Nausea [n (%)]	15 (27.3)	17 (37.0)	0.3
Blood in the stool [n (%)]	None	1 (4.4)	0.12
[1]Nasopharyngeal test *Statistically significant			

S172

Risk Factors of *Clostridium difficile* Infection in *Helicobacter pylori* Diagnosed Patients: A Multicenter Study

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Introduction: *Clostridium difficile* infection (CDI) is one of the most common gastrointestinal illnesses. However, there are conflicting studies regarding the association of CDI with Helicobacter Pylori (*H pylori*) treatment regimens. Our aim is to investigate the risk of CDI in those treated for *H. pylori* as well as characterize other risk factors for developing CDI.

Methods: A retrospective study was performed in the adult population diagnosed with *H. pylori* within the Beaumont Hospital system in Michigan, from 2010 to 2021. Inclusion criteria included age > 18 years and diagnosis of *H. pylori* with one of three proven methods: endoscopic biopsy with pathology, stool antigen test or urea breath test. Treatment was defined as being prescribed any one of the established multi-regimen therapies used to treat *H. pylori*. Diagnosis of CDI was queried in two groups: within 6 months and 12 months of *H pylori* diagnosis, while both required a positive stool toxin or PCR for diagnosis. Analysis was performed using SAS 9.4 (SAS Institute, Cary, NC). (Table, Figure)

Results: Among 11,457 patients, 56 (0.48%) had a subsequent CDI, with 5 (0.21%) and 35 (0.38%) among treated and untreated groups respectively. A total of 2341 (20.43%) patients were treated for *H. pylori* infection, and the most common regimen was clarithromycin based triple therapy in 1944 (17%). In a case control analysis for CDI within 6 months of *H. pylori* diagnosis, matched for 10-year age interval, sex and 3-unit BMI intervals with those without CDI, 23 (41.1%) vs 17 (30.4%) had been prescribed an antibiotic known to be associated with CDI, 5 (8.9%) vs 4 (7.1%) had been prescribed a histamine receptor 2 (H2) blocker, and 30 (53.6%) vs 29 (51.8%) had been prescribed a proton pump inhibitor (PPI). The odds of previous hospitalization among those who developed CDI are 300% greater than those who did not develop CDI (p value 0.04).

Conclusion: We found that there was no association of future CDI with treatment of *H. pylori* infection. This result was similar to the study done by Kumar et. al. in a large veteran population, which did consist of a higher percentage of male patients, and our study consists of more female patients. In addition, our study reaffirms the notion that previous hospitalization is a risk factor for developing CDI. There were a few limitations including the inability to confirm if patients received treatment from an external electronic medical record or if they completed the prescribed treatment regimens.
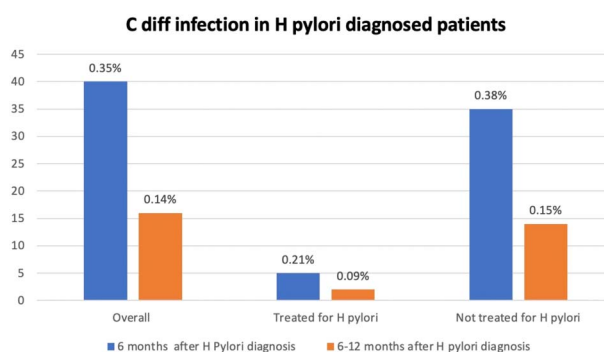
[0172] **Figure 1.** CDI in H. pylori diagnosed patients

Table 1. Comparison of characteristics of H. pylori diagnosed populations within 12 months of CDI and without CDI

	Total CDI (56)	No CDI (1401)
Mean Age, in years	57.6	47.8
Sex		
Female	38 (67.9%)	6823 (59.8%)
Male	18 (32.1%)	4578 (40.2%)
Race		
Caucasian	28 (50%)	5934 (52%)
African American	16 (28.6%)	1788 (15.7%)
Others	10 (17.9%)	2786 (24.4%)
Treatment Regimen within 180 days		
Clarithromycin based triple therapy	5 (8.9%)	1939 (17.0%)
Clarithromycin based concomitant therapy	3 (5.4%)	211 (1.9%)
Bismuth quadruple therapy	0	246 (2.2%)
Levofloxacin based triple therapy	0	130 (1.1%)
Levofloxacin based quadruple therapy	0	2
Rifabutin based therapy	0	13 (0.1%)

S173

Diagnostic Yield of Random Colon Biopsy in Chronic Diarrhea Patients With Normal Colonoscopy: A Systematic Review and Meta-Analysis

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Introduction: Chronic diarrhea is a frequently encountered indication for outpatient colonoscopy. Majority of the colonoscopic exams in stable chronic diarrhea patients do not reveal endoscopic abnormalities. Although normal appearing, routine random colon biopsies are taken for further diagnostic assessment. No previous meta-analysis exists assessing the diagnostic yield of histopathological analysis in chronic diarrhea patients with a normal colonoscopy exam. In this study, we aim to perform a systematic review and meta-analysis to study the diagnostic value of random colon biopsies in these patients.

Methods: Multiple databases, including Medline, Scopus, and Embase, were searched from inception to May 2022 using specific terms for studies evaluating the diagnostic yield of random biopsies in chronic diarrhea patients with normal colonoscopy exams. Outcomes of interest were the diagnostic yield of microscopic colitis, inflammatory bowel disease, significant histopathologic disease, and normal biopsy. Standard meta-analysis methods were employed using the random-effects model, and heterogeneity was assessed using the I[2] statistics.

Results: Initial database search yielded 1459 articles, of which 22 studies were finally included. Total of 3935 patients (48.9% females) with mean age of 42.32 years were included in the final analysis. The pooled rate of normal colon biopsy was 49.8% (95% CI 34.3-65,2, I2=98%) and normal ileal biopsy was 88.5% (51.3-98.3, 93%). The pooled rate of specific diagnosis based on random colonic biopsy were as follows:

microscopic colitis 15.1% (95% CI 10.8-20.7, I^2=91%), lymphocytic colitis 9.3% (6.6-13, I^2= 83%) collagenous colitis 3.7% (2.4-5.7, I^2= 79%), nonspecific colitis 19.7% (11-32.8, I^2= 97%), inflammatory bowel disease 1.7% (0.8-3.5, I^2= 54%), infective colitis 2% (1.1-3.7, I^2=17%), and eosinophilic colitis 2.3% (1.1-4.5, I^2= 69%) as shown in Table. The pooled rate of total significant histopathological change was 32.9% (23.8-43.5, I^2= 96%).

Conclusion: Based on meta-analysis of 22 studies, normal colon biopsy was observed in 49.8% and normal ileum biopsy was observed in 88.5%. Pooled rate of microscopic colitis was 15.1% and total significant histopathological change was noted in 32.9%. Our study adds important data to the current clinical care of patients with chronic diarrhea who undergo colonoscopy exam with random biopsies.

Table 1. Summary of pooled rates

Outcome: Diagnostic value of random colonic biopsy in the evaluation of chronic unexplained diarrhea with normal colonic appearance.	Pooled rate	95% confidence interval, (I2% heterogeneity)	Number of studies
Normal colon biopsy	49.8%	34.3-65.2, (98%)	18 studies
Normal ileum biopsy	88.5%	51.3-98.3, (93%)	3 studies
Microscopic colitis	15.1%	10.8-20.7, (91%)	19 studies
Lymphocytic colitis	9.3%	6.6-13, (83%)	15 studies
Collagenous colitis	3.7%	2.4-5.7, (79%)	13 studies
Nonspecific colitis	19.7%	11-32.8, (97%)	14 studies
Inflammatory bowel disease	1.7%	0.8-3.5, (54%)	12 studies
Infective colitis	2%	1.1-3.7, (17%)	8 studies
Eosinophilic colitis	2.3%	1.1-4.5, (69%)	11 studies
Total significant histopathological change	32.9%	23.8-43.5, (96%)	22 studies

S174

Prevalence and Characteristics of Therapy-Associated Polyposis: A Systematic Review

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Introduction: Therapy-associated Polyposis (TAP) is a poorly understood condition in which colorectal polyps develop in individuals with childhood and young adulthood cancers (CYAC) who were treated with chemotherapy and/or radiation, in the absence of a genetic predisposition to polyposis syndromes. We aimed to determine characteristics of these individuals and the polyposis to better understand TAP.

Methods: This systematic review was in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Statement (PRISMA). PubMed and Embase were searched from when TAP was first reported (January 2014) to April 2022. Inclusion criteria: citations of cases with CYAC (diagnosed at <39 years) treated with chemotherapy and/or radiation with >10 lifetime polyps and negative genetic testing for hereditary polyposis syndromes. Data were collated into (Table). For individuals' characteristics we represented continuous measurements as medians (IQRs) and compared them using the Mann-Whitney-Wilcoxon test. For categorical data we used Pearson's Chi-square test.

Results: 3766 publications were screened, 6 met inclusion criteria for 44 individuals total (Figure). Cases were divided into 2 groups: those aged < 18 years at diagnosis of their primary cancer versus young adults (18-39 years). The most common primary cancer was Hodgkin's lymphoma in both groups; most cases were treated with both chemotherapy and radiation. Individuals with CYAC diagnosed as young adults developed more polyps than with CYAC as children (40.0 vs. 21.5, p=0.001), with no difference between polyp types. Most were adenomas. Children with CYAC were diagnosed with TAP earlier than young adults (43.0 vs. 50.5 years, p= 0.005). However, young adults had a shorter interval between primary cancer diagnosis and polyposis (26.0 vs 29.3 years, p=0.03). Importantly, 30% of cases with TAP developed colorectal cancer (CRC), with no significant difference in the proportion developing CRC between the groups.

Conclusion: Individuals diagnosed with cancer as children developed TAP earlier than young adults, but those treated as young adults developed more polyps. There is a high incidence of CRC in TAP. Current guidelines recommend that individuals who undergo abdominal, pelvic, spinal, or total body irradiation begin CRC screening 5 years after radiation or at age 30 (whichever is later). Further investigation is necessary to determine the prevalence of TAP after CYAC and the role of early CRC screening for patients treated for CYAC.
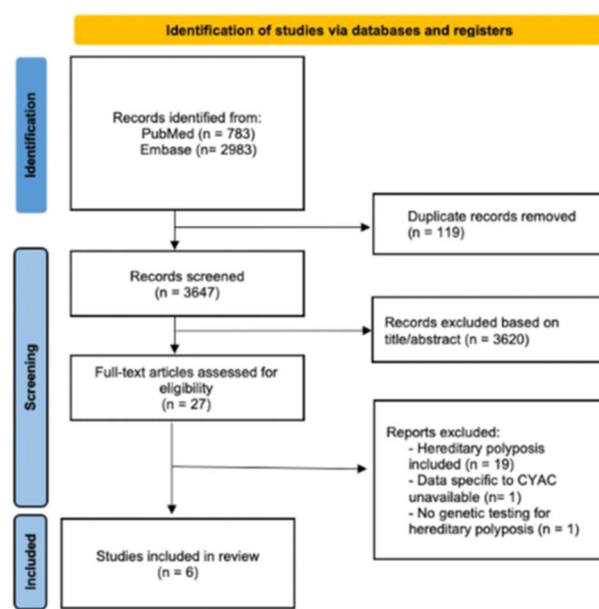
[0174] **Figure 1.** Flow diagram of search results and citation screening for Therapy-associated Polyposis citations

Table 1. Baseline characteristics of individuals with Therapy-associated Polyposis based on age at diagnosis of primary cancer

	Total N=44	Age at Cancer Diagnosis: < 18 Years Old N=24	Age at Cancer Diagnosis: 18 Years and Over N=20	p-value
Age at Cancer Diagnosis (median, years)	16.0 (10.0-22.5)	11.5 (4.3-15.0)	23.0 (21.0-30.0)	< 0.001
Sex (n)				0.28
Female	17 (39%)	11 (46%)	6 (30%)	
Male	27 (61%)	13 (54%)	14 (70%)	
Type of Cancer (n)				0.12
Acute myeloid leukemia	1 (2%)	1 (4%)	0 (0%)	
Hodgkin's lymphoma	33 (76%)	15 (63%)	18 (90%)	
Medulloblastoma	1 (2%)	1 (4%)	0 (0%)	
Nephroblastoma	2 (5%)	2 (8%)	0 (0%)	
Non-Hodgkin's lymphoma	1 (2%)	0 (0%)	1 (5%)	
Teratoma of R testis	1 (2%)	0 (0%)	1 (5%)	
Radiation Above Diaphragm (n)	32 (73%)	17 (71%)	15 (75%)	0.92
Radiation Below Diaphragm (n)	29 (66%)	16 (67%)	14 (70%)	0.95
Alkylating Agents (n)	29 (66%)	17 (71%)	12 (60%)	0.56
Age at First Polyps (years)	46.5 (34.5-52.5)	43.0 (29.0-50.0)	50.5 (43.5-55.0)	0.005
Time from Cancer Diagnosis to First Polyp (median, years)	26.7 (22.5-33.0)	29.3 (24.6-35.5)	26.0 (19.5-28.0)	0.03
Number of Polyps (n)				
Total	30.5 (18.5-50.0)	21.5 (16.0-31.5)	40.0 (32.5-59.0)	0.001
Adenoma	9.5 (2.0-21.0)	9.5 (2.0-21.0)	10.5 (1.5-20.5)	0.93
Sessile Serrated	2.0 (0.0-18.0)	1.5 (0.0-5.5)	2.0 (0.0-32.5)	0.38
Hyperplastic	2.0 (0.0-5.0)	1.5 (0.0-3.0)	4.0 (0.0-9.5)	0.10
Colorectal Cancer (n)	13 (30%)	5 (21%)	8 (40%)	0.17
Other Neoplasms (n)	23 (52%)	11 (46%)	12 (60%)	0.35

S175

Colitis on CT Imaging: Do the Radiographic Findings Correspond With Direct Visualization on Colonoscopy?

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Introduction: Patients present to the emergency department with complaints of abdominal pain at a higher frequency than any other ailment, according to the US Department of Health and Human Services. Healthcare providers will attempt to identify the root cause of patient's chief complaint, starting with physical exam, laboratory tests, and imaging studies. Performing a CT scan of the abdomen is a recommended choice. The scan may reveal inflammation, narrowing or thickening which allows the radiologist to suggest a diagnosis of colitis. However, there are limitations to the utility of imaging when diagnosing colitis. This study aims to identify if radiographic diagnosis of colitis corresponds to actual diagnosis of colitis when colonoscopy is done.

Methods: This study examined the results of CT imaging and colonoscopy of 50 patients who presented to the emergency department at a large, level-1 trauma center with chief complaint including abdominal pain and hematochezia. 30 women with an average age of 55 and 20 men with an average age of 59 were identified. Their CT abdomen suggested colitis per the radiologist's interpretation. Upon that diagnosis, they had colonoscopy for definitive diagnosis. At the completion of their workup, data was analyzed.

Results: Of the 50 patients examined, 47 patients with CT findings of colitis underwent colonoscopy. 22 (47%) had colitis on colonoscopy, 23 (49%) had no colitis on colonoscopy, 2 (4%) had colonic mass. Of the 22 patients with colitis on colonoscopy, 4 (8.5%) had Crohn's disease, 2(4%) had Ulcerative colitis, 1 (2%) with radiation colitis, 11(23.4%) had ischemic colitis, 3 (6%) had infectious colitis, 1 (2%) had stercoral colitis. Pathology confirmed adenocarcinoma in the 2(4%) that had colonic mass. Of the 23 (48.9%%) with no colitis on colonoscopy, no pathology was identified in 8 (17%), 7 (15%) had benign polyps, 2 had diverticulitis (4%), 2 (4%) had stricture/anastomosis, 1 (2%) had colonic ulcer and 3(6%) had hemorrhoids. 86% of inflammatory colitis were confirmed by pathology, 81.8% of ischemic colitis was confirmed by pathology, infectious colitis and adenocarcinoma was confirmed 100% by pathology. (Figure)

Conclusion: Our study results illustrate a 49% false-positive rate of CT demonstrating colitis where colonoscopy findings were negative for colitis thus leading to overdiagnosis of colitis. Colonic mass/adenocarcinoma was missed on CT. This illustrates that colonoscopy remains the gold standard for diagnosis of colitis and tumors of gastrointestinal tract.

- Sample size-50
- Excluded 3 patients because of poor bowel prep. No colitis was found either on colonoscopy or pathology report in excluded patients.

% of patients with specific Colonoscopy finding:		% of patients with confirmed pathological diagnosis for their colonoscopy finding
Inflammatory colitis (n=7)	23.4%	86%
• Crohn's disease (n=4)	8.5%	
• Ulcerative colitis (n=2)	4%	
• Radiation colitis-(n=1)	2%	
Ischemic colitis (n=11)	23.4%	81.8%
Infectious colitis (n=3)	6%	100%
Colon adenocarcinoma (n=2)	4%	100%
stercoral colitis (n=1)	2%	N/A
Benign finding (n=23)	49%	90%
• No pathology identified (n=8)	17%	
• Diverticulitis (n=2)	4%	
• Polyps (n=7)	15%	
• stricture/anastomosis (n=2)	4%	
• colonic ulcer (n=1)	2%	
• Hemorrhoids (n=3)	6%	

- Also noted, there is no significant difference noted in colonoscopy in identifying pathological finding (eg:colitis and cancer) vs benign (eg: diverticulitis, benign polyps and hemorrhoids) finding (92% vs 90%; p>0.05). But CT imaging was unable to differentiate between the benign findings and pathological findings.

[0175] Figure 1.

S176

Cold Snare Polypectomy in Pedunculated Colorectal Polyps: A Systematic Review and Meta-Analysis

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Introduction: Colonoscopy remains an vital tool for colorectal cancer screening and allows for early detection and removal of adenomatous polyps. While several studies have reported on cold snare polypectomy (CSP) and hot snare polypectomy (HSP) in sessile and flat elevated polyps; limited data exists on outcomes in pedunculated polyps. We conducted a systematic review and meta-analysis to evaluate the efficacy and safety of CSP for pedunculated polyps.

Methods: Multiple databases were searched till June 2022 to identify studies involving the removal of pedunculated polyps with CSP and HSP. (Table) A random effects model was used to calculate outcomes and 95% confidence intervals (CI). Heterogeneity was assessed using I2 test. Our primary goal was to assess pooled rates of immediate and delayed bleeding with CSP. Secondary outcomes included pooled rates of en-bloc & piecemeal resection as well as prophylactic and post resection clipping. Meta-regression was performed to assess if bleeding was affected by polyp location and use of antithrombotics.

Results: Six studies including 1025 patients (1,111 polyps with a mean size 4 – 8.5 mm) were analyzed. 116 and 995 polyps were removed with HSP and CSP, respectively. The overall pooled rate of immediate bleeding following CSP was 49.8% (CI 46.8-52.91; I2 98%), which was significantly higher than HSP, RR 7.89 (CI 4.36-14.29; I20%), p< 0.00001 (Figure 1A). The overall pooled rate of delayed bleeding following CSP was 0% (CI 0.00-0.00; I2 0%), which was significantly lower than HSP, RR 0.05 (CI 0.01-0.43; I20%), p=0.006 (Figure 1B). Pooled rate of en-bloc and piecemeal resection with CSP were 99.7% and 0.3%, respectively. Pooled rate of prophylactic clipping and post procedure clipping (to control immediate bleeding) after CSP was 55.3% and 47.2%, respectively. We found no statistical difference in these outcomes when compared to HSP, RR 0.19 (CI 0.01-6.35; I2 85%), p=0.35 and RR 1.73 (CI 0.12-25.5; I2 98%), p=0.69. Meta-regression showed that concurrent use of antithrombotic and/or antiplatelet agents did not have any effect on immediate bleeding following CSP. Right colon polyp location (proximal to the hepatic flexure) significantly correlated with frequency of immediate bleeding.

Conclusion: Our analysis shows that CSP is safe and effective for resection of pedunculated colorectal polyps, especially those less than 10 mm in size. While CSP may increase the risk of immediate bleeding, HSP has a higher risk of delayed bleeding.
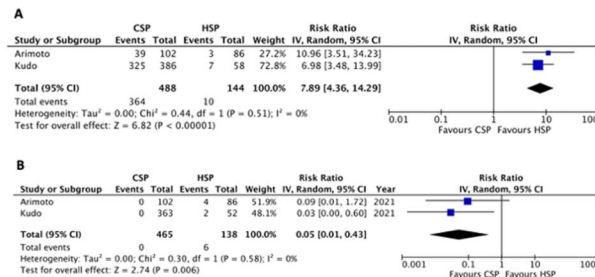
[0176] Figure 1. Forest plots demonstrating the relative risk of immediate (1A) and delayed (1B) bleeding following polypectomy

Table 1. Characteristics of included studies

Author, year	Study Design	Study Country	Total Polyps
Arimoto, 2022	Prospective, single center	Japan	114
Fatima, 2022	Prospective, single center	United States	239
Kaltenbach, 2019	Retrospective, multicenter	United States	94

Table 1. (*continued*)

Author, year	Study Design	Study Country	Total Polyps
Arimoto, 2021	Retrospective, single center	Japan	188
Kudo 2021	Retrospective, single center	Japan	444
Arimoto, 2020	Retrospective, single center	Japan	90
Kaltenbach, 2019	Retrospective, multicenter	United States	94

S177

Reduction in Urinary Tract Infections in Patients Treated With Fecal Microbiota Transplantation for Recurrent *C. difficile* Infection: A Case Control Study

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Introduction: Antibiotics used for recurrent urinary tract infections (UTIs) predispose patients to develop recurrent C. *difficile* infection (rCDI) by disruption of the gut microbiome. Also, antibiotics facilitate emergence of multidrug resistant organisms (MDRO) in the gut, serving as reservoir for pathogens that cause UTIs. We hypothesize that fecal microbiota transplantation (FMT) for rCDI could decolonize the gut and alleviate UTIs.
Methods: Patients with 3 or more UTIs the year prior to FMT for CDI were cases and controls were patients with 3 or more rCDI episodes and 3 or more UTIs the year prior managed with antibiotics (vancomycin or fidaxomicin). Patients with urinary symptoms and culture samples with a single bacterial colony count $>10^5$ colony-forming units/mL were considered positive.. For positive samples, data were collected regarding the organism cultured and antimicrobial resistance patterns.
Results: A total of 25 cases and controls were included and had similar age and gender (67 years (range 24-92) vs 75 (range 38-87) and 84% female in both). The median number of CDI episodes for cases was 3 (range 3-6) and for controls was 3 (range 3-7). For cases, there was a statistically significant decrease in the frequency of UTIs from a median of 4 (range 3-9) episodes in the year before FMT to median of 1 (range 0-7) (p< 0.001, Wilcoxon sign rank test). Amongst controls, no difference was noted with median UTIs: 4 (range 3-8) in the year prior to 3 rd CDI and 3 (0-11) in the subsequent year (p=0.27, Wilcoxon sign rank test). Amongst cases, 107 positive urine samples were identified in the year before FMT and 45 positive samples in the year after FMT. *Escherichia coli* was the most common organism cultured from pre and post FMT urine samples followed by *Klebsiella* sp. There was a numerical decrease in the antimicrobial resistance and MDRO *E coli* frequency (pre FMT 40% vs post FMT 22.2%, p= 0.18). For Klebsiella, there was a decrease in antimicrobial resistance and MDRO frequency (35.4% vs 15.3%, p=0.18) Amongst controls, 105 positive urine samples were identified in the year before FMT and 95 positive samples in the year after FMT. There was no difference in the proportion of MDRO *E. coli* (49.1% vs 57.1%. p=0.46) or Klebsiella (42.8% vs 39.2%, p=0.82) in the year before and after 3rd CDI.
Conclusion: FMT decreases the frequency of UTIs and the proportion of MDROs, likely by decolonizing the gut. FMT might be considered as a potential treatment in high-risk patients with recurrent UTIs.

S178

A Systematic Review of the Gut Microbiota Profile in Patients With Heart Failure

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Introduction: The "gut-heart axis" could explain the role of the human gut microbiota in the pathogenesis of heart failure (HF) by activation of host inflammation induced by a state of gut dysbiosis. This systematic review characterized the gut microbiota profile in HF patients compared to healthy subjects.
Methods: Peer-reviewed human studies published in Ovid MEDLINE, Ovid EMBASE, SCOPUS, and the Cochrane Library up to April 18, 2022, were searched. Studies comparing the gut microbiota profile in adult HF patients and healthy controls (HCs) were eligible for inclusion. The alpha diversity (microbial richness and diversity), beta diversity (dissimilarity in microbiota composition between two groups), and the relative abundance of gut microbiota taxa were compared in adult HF patients and HCs. The Newcastle-Ottawa Scale (NOS) was used to assess the quality of included studies.
Results: A total of nine studies, including 317 HF patients and 510 HCs, were included in this systematic review. Decreased gut microbiota richness and similar microbial diversity and significantly different gut microbiota composition were observed between HF patients and HCs. HF patients had a greater abundance of *Actinobacteria, Proteobacteria,* and *Synergistetes* phyla; *Enterococcus, Escherichia, Klebsiella, Lactobacillus, Ruminococcus, Streptococcus,* and *Veilonella* genera; and *Ruminococcus gnavus, Streptococcus sp.,* and *Veilonella sp.* Species compared to HCs. Decreased abundance of *Firmicutes* phylum; *Blautia, Eubacterium, Faecalibacterium, Lachnospiraceae FCS020,* and *Sutterella* genera; and *Dorea longicatena, Eubacterium rectale, Faecalibacterium prausnitzii, Oscillibacter sp.,* and *Sutterella wadsworthensis* species were noted in HF patients.
Conclusion: The gut microbiota diversity, richness, and composition in HF patients are significantly different from HCs. Overall, short-chain fatty acids-producing gut microbiota was depleted in HF patients.

S179

Naloxegol Provides Clinically Meaningful Symptom Improvement (PAC-SYM) in Patients With Opioid-Induced Constipation (OIC): A Pooled Analysis of Two Global Phase 3 Studies of Naloxegol

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Introduction: OIC affects 40-80% of patients taking chronic opioid therapy. Naloxegol (Movantik®), a peripherally acting mu-opioid receptor antagonist (PAMORA) is effective in treating OIC symptoms in adults with chronic non-cancer pain as shown in two pivotal phase 3 trials (KODIAC 4/5; NCT01309841/NCT01323790). This pooled analysis evaluated symptom improvement utilizing the Patient Assessment of Constipation Symptoms questionnaire (PAC-SYM) in these two randomized, placebo-controlled trials.
Methods: PAC-SYM scores were collected during KODIAC 4/5 as supportive efficacy measures. Scores range from 0 (absence of symptoms) to 4 (very severe) for each domain (abdominal, rectal, and stool symptoms). Minimal clinically important difference (MCID) thresholds of 0.5 based on literature and naloxegol real world studies, and 0.8 based on anchor method assessment were used to identify responders and non-responders.
Results: 1337 patients (naloxegol (25mg, 12.5mg) or placebo (PBO)) were assessed in this analysis. The overall mean baseline values for PAC-SYM total, abdominal, rectal, and stool symptoms scores were 1.8, 1.7, 1.3, and 2.3, respectively, and were similar across groups. For MCID ≥0.5, there was a significantly higher proportion of PAC-SYM responders with naloxegol (25 mg: 69.49%; 12.5 mg: 65.63%) vs PBO (57.66%) at week 12. Odds ratios (OR) were 1.776 (p=0.0010) for 25mg and 1.501 (p=0.0143) for 12.5mg vs PBO. For MCID ≥0.8, higher proportions of PAC-SYM responders were also observed for naloxegol (25mg: 53.47%; 12.5mg: 45.74%) vs PBO (42.34%) at week 12. ORs were 1.709 (p=0.002) for 25mg and 1.217 (p=0.2368) for 12.5mg vs PBO ORs were generally consistent between MCID >0.8 and 0.5 (Table). At 12 weeks for both MCID thresholds, patients receiving naloxegol 25mg were >70% more likely to achieve clinically meaningful symptom improvement than with PBO.Subdomain analyses revealed dose-dependent responses; significantly greater responses in rectal and stool symptoms were achieved for 25mg vs. PBO (p< 0.05) at both MCID cut-offs (Figure 1a-d).
Conclusion: OIC patients achieved clinically meaningful, constipation-related symptom improvement with naloxegol. These changes were dose dependent, with significant gains noted for 25mg at both MCID thresholds. Rectal and stool symptoms appear to drive these improvements consistent with the known effects of PAMORAs.
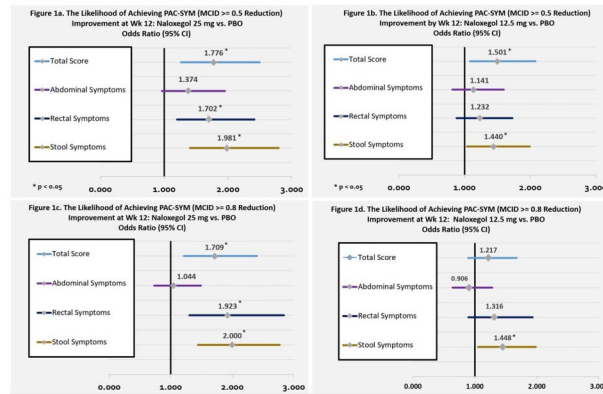
[0179] **Figure 1.** a-d. Likelihood of Achieving PAC-SYM MCID at Week 12: Naloxegol vs. Placebo (KODIAC 4/5; ITT Population)

Table 1. PAC-SYM Total Score: Proportion of Responders Achieving MCID at Week 12 (KODIAC 4/5; ITT Population)

Placebo (N=359)[a] n(%)	Naloxegol 12.5 mg (N=352)[a] n(%)	Naloxegol 25 mg (N=331)[a] n(%)	Naloxegol 12 mg vs. Placebo OR (95% CI) p-value	Naloxegol 25 mg vs. Placebo OR (95% CI) p-value
Proportion of PAC-SYM Responders Achieving MCID ≥ 0.5				
207 (57.66%)	231 (65.63%)	230 (69.49%)	1.501 (1.085, 2.078) 0.0143	1.776 (1.263, 2.497) 0.0010
Proportion of PAC-SYM Responders Achieving MCID ≥ 0.8				
152 (42.34%)	161 (45.74%)	177 (53.47%)	1.217 (0.879, 1.687) 0.2368	1.709 (1.216, 2.401) 0.0020

[a]Number of analyzable subjects with complete PAC-SYM data for 12-wks.
PAC-SYM, Patient Assessment of Constipation Symptoms questionnaire; MCID, minimal clinically important difference; OR, odds ratio; CI, confidence interval.

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Rectal Bleeding as a Symptom of Advanced Colorectal Cancer Is Associated With Left-Sided Colorectal Cancer and Improved Survival

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Introduction: Rectal bleeding (RB) is a symptom of colorectal cancer (CRC) that often prompts endoscopic investigation. The outcomes of RB in the setting of CRC have not been well described. We investigated the outcomes of patients diagnosed with stage IV CRC after presenting with RB.
Methods: We retrospectively analyzed patients ages 18 years and older diagnosed with Stage IV CRC from 2011 to 2017 in our academic, safety-net hospital. Patients were excluded if they were not diagnosed via diagnostic colonoscopy. Patients were stratified based on RB at presentation. Location of tumors were categorized as right-sided colorectal cancer (RCRC) and left-sided colorectal cancer (LCRC). RCRC included those located from the cecum to the proximal two-thirds of the transverse colon. LCRC included those located from the distal one-third of the transverse colon to the rectum.
Results: Sixty-nine patients met the inclusion criteria. General characteristics are shown in Table. Those without RB had significantly higher Charlson Comorbidity Index (CCI) scores (p < 0.05). The average time from presentation to endoscopy in those with RB compared to those without RB were 0.9 ± 1.5 months and 1.2 ± 3.3 months, respectively (p = 0.53). All thirty-five patients with RB had LCRC. For those without RB, eighteen had RCRC and sixteen had LCRC. There were no differences in times to surgery (p = 0.09), systemic therapy (p = 0.27), or any treatment (p = 0.14). Median survival in those with RB was 1377 days and those without RB was 358 days. Using the Cox proportional hazards model with CCI, gender, and race as covariates for multivariate analysis, the average length of survival remained significantly higher in patients with RB (p < 0.01, HR 0.43, 95% CI 0.23-0.80) (Figure).
Conclusion: RCRC and LCRC have been documented to have different morphological and molecular characteristics, with RCRC often being described as more aggressive than LCRC. In our study, all patients who presented with RB had LCRC and more than half of the patients without RB had RCRC. The absence of RB was associated with increased mortality after controlling for age, comorbidities, gender, and race. Furthermore, there were no differences in time to either endoscopy or treatment. In conclusion, RB in CRC may be more indicative of left-sided disease which may be associated with a less aggressive disease course. However, more research is required to fully understand the association between RB and clinical outcomes.

Number at Risk

Rectal Bleeding	35	19	11	4	4	1
No Rectal Bleeding	34	10	3	3	2	0
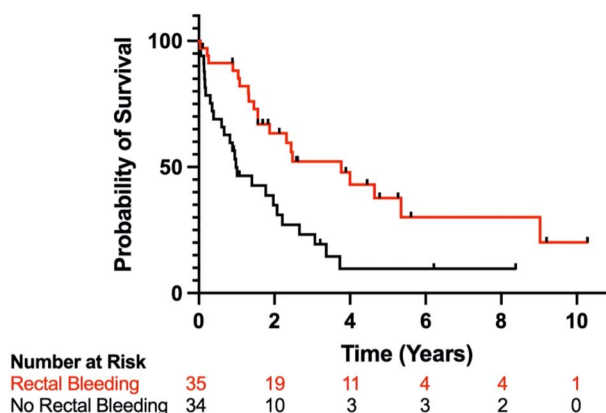
[0180] **Figure 1.** Survival curve using the Cox proportional hazards model with CCI, race, and gender as covariates for multivariate analysis. Red line: Rectal Bleeding. Black line: No Rectal Bleeding. $p < 0.01$, HR: 0.43, 95% CI: 0.23 - 0.80

Table 1. General characteristics, time from presentation to endoscopy, median survival, and times to treatment in patients with stage IV colorectal cancer

		Rectal Bleeding	No Rectal Bleeding	Significance
Number of Patients		35	34	
Age at Diagnosis		57.9 + 13.0	62.2 ± 13.8	n.s.
Sex	Male	20 (57.1%)	17 (50.0%)	n.s.
	Female	15 (42.9%)	17 (50.0%)	
Race	White	15 (42.9%)	12 (35.3%)	n.s.
	Black	19 (54.3%)	20 (58.8%)	
	Other	1 (2.9%)	2 (5.9%)	
Charlson Comorbidity Index		5.6 ± 2.3	6.9 ± 2.0	< 0.05
Time from presentation to endoscopy (months)		0.9 ± 1.5	1.2 ± 3.3	n.s.
Median Survival (days)		1377	358	< 0.01
Time to first treatment (months)		2.7 ± 4.8	1.3 ± 1.8	n.s.
Time to surgery (months)		4.2 ± 3.2	2.2 ± 3.0	n.s.
Time to systemic treatment (months)		3.0 ± 4.7	1.8 ± 1.8	n.s.

S181

Neurogenic Bowel Dysfunction: A Healthcare Disparity

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Introduction: Peristeen is a manual transanal bowel irrigation system designed for patients (pts) with neurogenic bowel dysfunction (NBD) suffering from chronic constipation and fecal incontinence. This control pump with water irrigation has been shown to improve symptom-related qualify of life (QOL) and time spent on defecation. Despite its benefits, the insurance coverage for Peristeen depends on the pts specific insurance plan. Currently there is no Medicare benefit for the Peristeen, all claims are denied as non-covered with no Medicare benefit and separate billing for individual components is not allowed. We aimed to evaluate the insurance coverage for Peristeen amongst our neurogenic bowel pts referred to a tertiary care practice.
Methods: A retrospective, single-center, analysis (December 2019-March 2022) of 45 pts enrolled in Peristeen was performed. Variables within the prescription form include primary and secondary insurance coverage and diagnosis code. All diagnostic ICD 10 codes were Neurogenic Bowel, K59.2. One nurse completed all forms. The percentage of pts approved and denied by insurance type was reported in graphical form by creation of a two-by-six contingency table in SPSS after recording of data.
Results: Peristeen approval was significantly lower in pts insured with Medicare alone and with combined Medicare coverage compared to Private/Medicaid coverage. Approval percentages included 57% (Private 16/45), 0% (Medicare 0/45), 0% (No insurance 0/45), 11% (Medicaid 3/45), 29% (Medicare/Private 8/45), 3% (Medicare/Medicaid 1/45). Denial percentages included 12% (Private), 12% (Medicare 2/45), 6% (No insurance 1/45), 0% (Medicaid 0/45), 53% (Medicare/Private 9/45), 17% (Medicare/Medicaid 3/45). (Figure)
Conclusion: Few insurances provide coverage for Peristeen, despite the advantages it provides to a segment of society with a significant health burden from severe constipation and fecal incontinence. This study further bolsters the results needed for improvement in insurance coverage for a vulnerable population with healthcare disparities. Pts insured with Medicare and/or combined Medicare/Private insurance coverage have lower approval rates compared to pts with Medicaid and/or Private insurance alone. Future studies are needed to fully address the coverage and reimbursement for Peristeen, as lack of access to a successful bowel management program can result in poor clinical outcomes for pts with NBD.
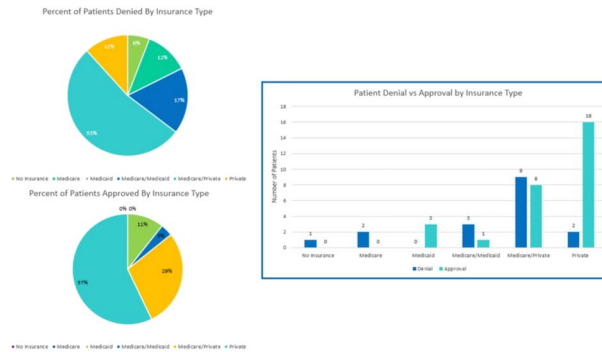
[0181] **Figure 1.** Percentage of approval or denial of Peristeen transanal irrigation system by insurance type

S182

Estimating the Prevalence and Characteristics of Colorectal Neoplastic Lesions in Young Patients Undergoing Colonoscopy

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Introduction: Incidence of colorectal neoplasia (CRN) in patients < 50 years of age has been increasing. Although current guidelines recommend starting screening at age 45, data on the prevalence and characteristics of CRN in this cohort is sparse. We aim to determine the overall prevalence and characteristics of CRN lesions in patients < 50.

Methods: All patients < 50 years who underwent colonoscopy for any indication between Jan 2012 and Dec 2018 were included. Data on demographics, comorbidities, risk factors and indications was obtained. Procedural data on number of polyps and polyp characteristics was collected. Patients with inadequate preparation, personal history of (h/o) colon polyps or cancer and inflammatory bowel disease were excluded. Logistic regression analysis was used to determine predictors of adenoma detection.

Results: 4587 patients had diagnostic colonoscopy during the study period. Mean age was 38.1 years, with 61.2% females, 84% white. Abdominal pain (36%), family h/o CRC (29.5%), diarrhea (29.3%), hematochezia (25.7%) and constipation (21.2%) were the most common indications. Information on clinical characteristics based on age groups are shown in Table. 26.2% (n=1201) had at least one polyp; 14.8%, 31.9% and 39.4% were < 39, 40-44 and 45-49 years of age respectively. Overall adenoma prevalence was 15.8%; 7.81%, 19.9% and 24.9% were < 39, 40-44 and 45-49 respectively. ≥ 3 adenomas were observed in 6.9%; prevalence increased with age (Figure 1a). Majority of the polyps were tubular adenomas (45.6%), followed by sessile serrated adenomas (17.2%); tubulovillous adenomas were the least common (2.7%). High-grade dysplasia and carcinoma were observed in 0.4% and 0.8% (Figure 1b). On multivariate analysis of 1602 patients (801 with polyps and 801 age-sex matched controls), female sex (OR 0.79) and age < 39 (OR 0.63) were associated with lower odds, while family h/o polyps (OR 1.76) and BMI (1.04) were associated with higher odds of adenoma detection (Table).

Conclusion: There was an increasing trend in the prevalence of polyps, adenomas, advanced adenomas and CRC with increasing age; our rates were similar to other published studies. Prevalence rates for all the above doubled between age groups < 39 and 40-44, but with a smaller proportion of increase between 40-44 and 45-49. Large population studies are needed to confirm this observation. Male gender, increasing age, obesity and family h/o colon polyps were independent predictors of adenoma detection in our cohort.

Table 1. Demographics, Clinical Characteristics and Logistic Regression

Demographics	Age < 39	Age 40-44	Age 45-49	All Age Groups	p-value
Total number of patients	2152	1036	1399	4587	
Patients with ≥ 1 polyp, n	319	331	551	1201	
Clinical Characteristics, Comorbidities and Risk Factors					
Mean BMI (+/-SD)	32 (10.1)	32.4 (9.5)	32.7 (9.4)	32.4 (9.6)	0.3128
Diabetes, n (%)	16 (5)	29 (8.8)	42 (7.6)	87 (7.3)	0.1591
Hypertension, n (%)	37 (11.6)	55 (16.7)	146 (26.6)	238 (19.9)	< .0001
Tobacco use, n (%)	112 (35.2)	107 (32.4)	180 (32.9)	399 (33.4)	0.7137
NSAID use, n (%)	76 (23.9)	73 (22.3)	128 (23.3)	277 (23.2)	0.8904
Statin use, n (%)	7 (2.2)	20 (6.1)	67 (12.2)	94 (7.9)	< .0001
Multivariate Analysis					
Predictor	Reference	OR	95% CI (UL, LL)		p-value
Age 40-44 ≤ 39	45-49 45-49	0.49 0.63	0.75, 1.18 0.5, 0.79		0.59 < **0.001**
Gender	Male	0.79	0.65, 0.95		0.011
BMI	Per each unit ↑	1.04	1.03, 1.05		< **0.001**
Diabetes	No	0.81	0.56, 1.19		0.29
Hematochezia	No	0.96	0.77, 1.19		0.71
Anemia	No	1.22	0.87, 1.71		0.25
Family h/o colon polyps	No	1.76	1.03, 1.05		< **0.01**
Family h/o colon cancer	No	1.18	0.94, 1.48		0.15
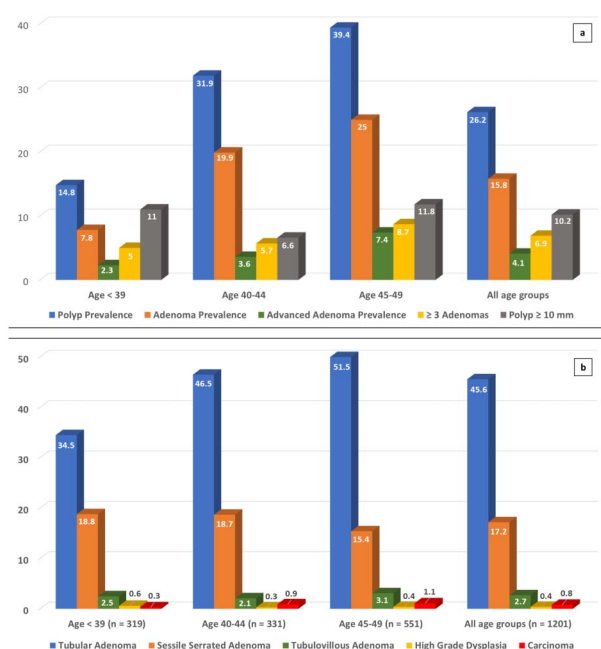
[0182] **Figure 1.** Prevalence rates of polyps, adenomas and advanced adenomas (1a) and different types of adenomas, high grade dysplasia and carcinoma (1b)

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Characteristics of Appendicitis After Immune Checkpoint Inhibitors Among Cancer Patients

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Introduction: Immune checkpoint inhibitor (ICI) therapy has revolutionized cancer care and the management of advanced malignancies. Despite the efficacy of ICI therapy, this class of medications is often associated with immune-related adverse events (irAEs). Recent case reports have raised concern that acute appendicitis may be a possible irAE. Conventional appendicitis usually occurs in a younger population (age 5-45 years) and is characterized by acute right lower quadrant abdominal pain with a perforation rate of 20-30%. In this study, we aim to describe the disease course of appendicitis after ICI exposure and its associated complications.

Methods: We retrospectively studied adult patients who had an ICD code of appendicitis between their 1st dose of ICI and up to 2 years after during 01/2020-04/2021 and imaging evidence of appendicitis. Patients were excluded if the appendicitis diagnosis was prior to ICI exposure.

Results: Forty-four out of the 13,991 ICI patients had the ICD diagnostic code for appendicitis during the study period, among whom 10 patients met the inclusion criteria. The median age at the time of appendicitis diagnosis was 59 years (IQR=55-60). Seven patients (70%) were male. The most common malignancies were melanoma (n=4, 40%) and genitourinary cancers (n=3, 30%). Nine patients (90%) had stage IV cancer. Most patients received treatment with anti-PD-1/L1 monotherapy (60%). The median time from ICI initiation to appendicitis onset was 188 days (IQR=46-386). The median doses of ICI received was 4 (IQR=2-15). The most common presenting symptoms were abdominal pain (70%) and fever (40%). Abscess was present on imaging in two patients (20%) and a perforation was found in one patient (10%). No patients had symptoms or evidence of concurrent colitis. All ten patients had received antibiotic treatment. Five patients (50%) required surgical or IR intervention. Nine patients (90%) had resolution of appendicitis symptoms after treatment. Three patients (30%) had their ICI terminated after the episode of appendicitis. (Table, Figure)

Conclusion: Appendicitis after ICI therapy is extremely rare. Compared to conventional appendicitis it occurs at an older age but with similar clinical presentations and comparable complication rates. Management strategies are comparable to conventional appendicitis, with appendectomy being the mainstay of treatment. Appropriateness of continuing ICI therapy after episode of appendicitis has yet to be delineated and is often determined by clinical judgement.
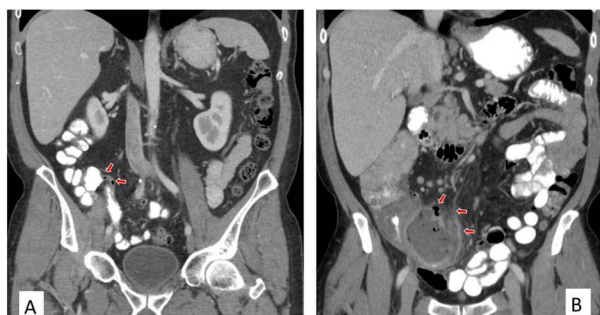
[0183] **Figure 1.** Radiological features of appendicitis and complications. (A) Contrast-enhanced CT image showing a normal-appearing appendix (arrows, coronal view). (B) Contrast-enhanced CT image showing an appendix perforated by a large, rim-enhancing, partially walled-off collection containing multiple small pockets of air adjacent to the cecum, suggesting an abscess with associated mesentery fat stranding (arrows, coronal view)

Table 1. Appendicitis-related characteristics of the study patients (n=10)

Characteristic	No. of patients (%)
Median no. of ICI doses (IQR)	4 (2-15)
Clinical symptoms	
Abdominal pain	7 (70)
Diarrhea	0
Fever	4 (40)
Nausea/vomiting	3 (30)
Loss of appetite	3 (30)
CT findings	
Appendiceal inflammation	10 (100)
Abscess/fluid collection	2 (20)
Perforation	1 (10)
Complications of appendicitis	
Abscess	2 (20)
Perforation	1 (10)
Treatment of appendicitis	
No treatment	0
Antibiotics	5 (50)
Antibiotics plus surgery/IR procedure	5 (50)
ICI therapy termination due to appendicitis	2 (20)
Cancer treatment after ICI therapy termination	
No further cancer treatment	0
Switched to other non-ICI treatment	1 (10)
Outcomes	
Hospitalization	10 (100)
Median length of hospitalization, days (IQR)	9 (2-11)
Response of appendicitis after any treatment	9 (90)
Median follow-up duration, months (IQR)	28.5 (14.0-35.5)
All-cause mortality	3 (30)

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National Patterns and Trends in Colorectal Cancer: A 15-Year Analysis

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Introduction: Colorectal cancer (CRC) is the third most common cancer diagnosed in both men and women in the United States and it accounts for the second most common cause of cancer deaths in men and women combined. Over the past two decades, the incidence of CRC has decreased due to an increase in patients undergoing screening for CRC. Few studies have been performed to investigate the occurrence and mortality rates of CRC over time. The objective of this study was to identify time trends for CRC in a large national population cohort admitted to U.S. hospitals from the years 2005-2019.
Methods: The National Inpatient Sample (NIS) database for the years 2005-2019 was queried to identify adult (age >18 years) patients admitted with the principal procedural codes for esophageal cancer. Data were obtained from all US states that contributed to the National Inpatient Sample. We estimated trends in the total number of patients yearly, prevalence, mortality, and mortality rate for patients admitted for colorectal cancer. Weighted analysis utilizing Stata 17 MP was performed.
Results: A total of 2,602,474 patients had colorectal cancer, of which 126,735 died. From 2005 to 2019, the prevalence of colorectal cancer has increased from 0.46% in 2005 to 0.50% in 2019 (p< 0.01), mortality rate has decreased from 6.2% to 4.0% (p< 0.01), hospital length of stay decreased from 7.98 in 2005 to 6.5 days in 2019 (p< 0.01), total hospital charges increased from $39309 in 2005 to $84,790 in 2019 (p< 0.01), mean age decreased from 69.1 to 67.3 (p< 0.01) (Table). The average mortality rate over this timeframe was 4.8%.
Conclusion: Colorectal cancer remains one of the most common malignancies in the US and worldwide. Over the past two decades, there have been active measures to increase awareness and surveillance for CRC given its highly-preventable nature. The study shows that the efforts to increase screening have significantly improved mortality in CRC and further highlights the importance of further development in detection and treatment options in the future.

Table 1. Prevalence and mortality rate of Colorectal Cancer

Year	Total	Prevalence	Mortality (n)	(Mortality rate)	P value (Mortality rate)
2005	182,481	0.46%	11,316	6.2%	p<0.0001
2006	180,528	0.46%	10,454	5.8%	p<0.0001
2007	185,356	0.47%	9,790	5.3%	p<0.0001
2008	184,049	0.46%	10,138	5.5%	p<0.0001
2009	177,130	0.45%	9,242	5.2%	p<0.0001
2010	170,752	0.44%	8,801	5.2%	p<0.0001
2011	178,143	0.46%	8,851	4.9%	p<0.0001
2012	164,795	0.45%	8,035	4.9%	p<0.0001
2013	161,225	0.45%	7,725	4.7%	p<0.0001

Table 1. (*continued*)

Year	Total	Prevalence	Mortality (n)	(Mortality rate)	P value (Mortality rate)
2014	162,540	0.46%	7,800	4.8%	p<0.0001
2015	164,420	0.47%	3,658	4.7%	p<0.0001
2016	170,325	0.48%	7,660	4.4%	p<0.0001
2017	171,450	0.48%	7,655	4.4%	p<0.0001
2018	173,910	0.49%	7,945	4.5%	p<0.0001
2019	175,370	0.50%	7,665	4.0%	p<0.0001

S185

Characteristics and Outcomes of Cancer Patients With Pre-existing Microscopic Colitis After Exposure to Immune Checkpoint Inhibitors

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Introduction: Immune checkpoint inhibitors (ICIs) are frequently associated with adverse events, often affecting the gastrointestinal tract. We conducted this study to determine the characteristics and outcomes of cancer patients with pre-existing microscopic colitis (MC) who underwent ICI treatment.
Methods: In this retrospective study, we identified 10 patients with pre-existing MC who received ICIs at our center 01/2010-06/2020. Clinical characteristics and disease outcomes were recorded.
Results: Of the 124 screened patients with MC before ICI exposure, 10 had sufficient data to be included in the study. Melanoma (40%) and lung cancer (30%) were the most prevalent cancer types, with 70% of stage IV cancer. Most patients (90%) received anti–programmed death ligand 1 monotherapy. Six patients (60%) had collagenous colitis, and 4 (40%) had lymphocytic colitis. The median time from MC diagnosis to ICI initiation was 4 years, with 1 patient on budesonide within 2 months of ICI initiation. Eight patients (80%) developed colitis exacerbations after ICI subsequently requiring selective immunosuppression. One patient received a compassionate-use fecal transplantation. The median time from ICI initiation to colitis exacerbation was 14 days, with 40% and 50% of patients experiencing grade 3 diarrhea and grade 2 colitis, respectively, and leading to hospitalization in 3 patients. Six patients received steroids and vedolizumab with no colitis recurrence. Of the 8 patients who had colitis exacerbations, 6 resumed ICI therapy afterwards; with 5 receiving concomitant vedolizumab for secondary prophylaxis. (Table)
Conclusion: Our findings suggest that ICI exposure in patients with pre-existing MC increases the risk of exacerbation of underlying colitis necessitating and responding to potent immunosuppression therapy.

Table 1. Colitis characteristics after ICI (N=10)

Characteristic	Value
MC status after ICI initiation, no. (%)	
Persistent symptoms	2 (20)
Exacerbation of colitis	8 (80)
Median time from ICI initiation to colitis exacerbation, days (IQR) (N=8)	14 (8-128)
Highest grade of diarrhea after ICI initiation, no. (%)	
1	4 (40)
2	2 (20)
3	4 (40)
Highest grade of colitis after ICI initiation, no. (%)	
0	2 (20)
1	3 (30)
2	5 (50)
Median duration of initial colitis exacerbation symptoms, months (IQR) (N = 8)	4 (2-6)
Hospitalization, no. (%)	3 (30)
Median duration of hospitalization, days (IQR) (N = 3)	5 (4.5-7)
ICU admission for colitis, no. (%)	0 (0)
Positive lactoferrin, no. (%) (N = 9)	6 (67)
Median peak fecal calprotectin, mcg/gm (IQR) (N = 8)	368 (119-591)
Treatment of colitis exacerbation, no. (%) (N = 8)	
Mesalamine	1 (12.5)
Systemic corticosteroids	8 (100)
Vedolizumab/ustekinumab (in addition to systemic corticosteroids)	8 (100)
Fecal microbiota transplantation	1 (12.5)
Endoscopic presentation after ICI initiation, no. (%) (N = 7)	
Mucosal ulceration	1 (14)
Nonulcerative inflammation	1 (14)
Normal	5 (72)
Presence of histologic inflammation	6 (86)
Subsequent recurrent colitis – no. (%)	2 (25)
Mortality due to MC, no. (%)	0 (0)

Abbreviations: GI, denotes gastrointestinal; ICU, intensive care unit; IQR, interquartile range; MC microscopic colitis.

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Variation in Colectomy Rates in Ulcerative Colitis

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Introduction: Data regarding inter-regional colectomy rates in patients with ulcerative colitis (UC) remains largely unknown. Herein, we sought to systematically review the global variation in the rates of colectomy in patients with UC.

Methods: A comprehensive search analysis was performed using the electronic databases MEDLINE/PubMed, EMBASE, and Cochrane through May 2020, to identify all full-text, randomized controlled trials (RCTs) and cohort studies pertaining to colectomy rates in adult patients with UC. We followed PRISMA and AMSTAR 2 guidance for conducting our systematic review. Outcomes included continent based demographic data and variation in colectomy rates. All articles were screened for bias using the Newcastle-Ottawa Scale. To identify the region-specific proportion of patients undergoing colectomy, data were plotted and median overall proportions were generated.

Results: Our literature search identified 1249 articles, of which 77 studies met inclusion criteria and were eligible for review. The median overall proportion of persons with UC whom underwent a colectomy in studies was 17% (range: 1.6%-71%). Median age at UC diagnosis was scarcely reported and could not be adequately assessed. While the median proportion of persons with UC whom underwent colectomy was 38%, 31%, and 14% in Oceania, North America, and Europe respectively; Africa, Asia, and South America saw median colectomy rates as low as 10%, 8%, and 3%, respectively (Table).

Conclusion: Considerable inter-regional differences were observed regarding colectomy rates in patients with UC. As such, the development of homogenous evidence-based guidelines accounting for the geographic differences in managing patients with UC is needed. Additionally, as a paucity of data on colectomy exists outside the North American and European continents, future studies—particularly in less studied locales—are warranted.

Table 1. Continent based Ulcerative Colitis (UC) colectomy rates

Region	N studies	N sample size (median, range)	Proportion males (median, range)	N colectomy (median, range)	Proportion colectomy (median, range)
North America	20	429 (26-443,043)	51% (39%-66%)	176 (9-19,208)	31% (4%-58%)
Europe	41	474 (30-76,129)	53% (0%-88%)	37 (10-9118)	14% (2%-71%)
Asia	10	175.5 (62-1013)	54% (49%-59%)	20 (3-61)	8% (16%-47%)
Oceania	3	71 (15-225)	61% (55%-67%)	22 (9-86)	38% (31%-60%)
Africa	2	125 (115-135)	45% (44%-47%)	12 (4-20)	10% (3%-17%)
South America	1	267	33%	9	3%

S187

Percutaneous Endoscopic Colostomy: A Systematic Review of More Than Two Decades Experience

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Introduction: Percutaneous endoscopic colostomy (PEC) is a minimally invasive procedure used to treat recurrent colonic pseudo-obstruction, sigmoid volvulus, chronic intracTable constipation, and neurogenic bowel. Traditional management of these conditions involving surgical colostomy or bowel resection in many cases has been replaced by percutaneous approaches under imaging or endoscopic guidance due to high rates of technical success and low morbidity rates. We conducted a systematic literature review to summarize the use, indications, and complications of PEC in adult patients.

Methods: A systematic literature review was conducted using PubMed, Medline, Google Scholar, and Embase to identify patients who had undergone PEC for any indication. The search terms used were "percutaneous endoscopic colostomy", "percutaneous endoscopic cecostomy", "percutaneous cecostomy", and "percutaneous colostomy". Exclusion criteria were colostomy tubes that were not placed endoscopically.

Results: A total of 11 observational studies (3 prospective, 8 retrospective), 18 case reports, and 7 case series between 1998 and 2022 were identified. A total of 318 patients who underwent PEC were identified. The mean age was 66.4 ± 23.5 and 64% were male. The most common indication was sigmoid volvulus (n= 131) followed by pseudo-obstruction (n=43), chronic intrac table constipation (n=83), neurogenic bowel (n=45), and others (n=9). The procedure was technically successful in 311 patients (97.7%). The total complication rate was 37.6%, 83.5% (n=66) of which were minor complications such as pain, bleeding, infection, leakage, and 16.4% (n=13) of which were major complications such as peritonitis, pneumoperitoneum, and sepsis. PEC-related mortality was 1.3% (n=4). The most common locations for tube placement were the left colon (59%) followed by right colon (13%), the rest of the cases the location was not reported. The number of tubes removed was 57, 8 due to symptom resolution, 3 for planned colostomy, and 1 for pain. (Figure)

Conclusion: PEC is an underutilized procedure that offers a viable treatment alternative for select patients who are deemed high risk for surgical intervention and in whom conservative therapy is unsuccessful. It can lead to durable relief of symptoms with good technical success and low risk of major complications. Further prospective studies are needed to establish the optimal placement technique, long-term efficacy, and safety.

INDICATIONS
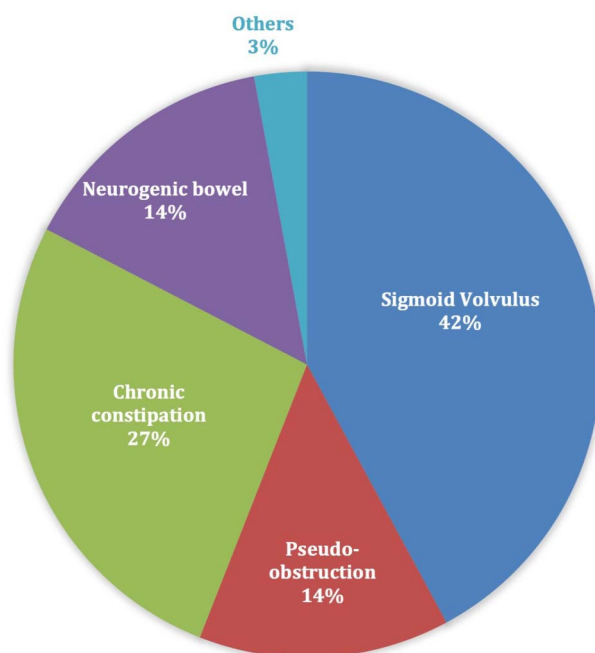
[0187] **Figure 1.** Percutaneous Endoscopic Colostomy tube indications

S188

Idiopathic Myointimal Hyperplasia of Mesenteric Veins: A Systematic Review and Individual Patient Regression Analysis

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Introduction: Idiopathic myointimal hyperplasia of the mesenteric veins (IMHMV) is an uncommon cause of colonic ischemia for which surgical treatment is recommended. We describe the clinical, radiologic and endoscopic findings in IMHMV patients to provide clinicians with a framework for the identification of this rare disease.
Methods: We performed a systematic review of seven databases for cases of IMHMV and identified additional cases from Yale New Haven Hospital records. To identify features specifically associated with colonic ischemia due to IMHMV, we performed multivariate logistic regression analysis incorporating data from a large, well-characterized multicenter cohort of biopsy-proven ischemic colitis (n=923).
Results: A total of 123 patients with IMHMV were identified from 58 publications and 3 unpublished cases at Yale New Haven Hospital (80% male, mean age 53, 56% Caucasian). Symptoms at presentation were most commonly abdominal pain (87%) and diarrhea (67%). The most affected areas were the sigmoid colon (89%) and rectum (66%). Median time from symptom onset to diagnosis was 4 months. Complications, including obstruction and perforation due to diagnostic delay occurred in 33% of patients. The most common radiologic feature was thickening of the affected segment of colon (97%). Anatomic vascular abnormalities including non-opacification of the inferior mesenteric vein were observed in 38% of patients. 97% of patients ultimately underwent curative segmental colectomy. Mean follow-up time was 23.6 months. Compared to biopsy-proven non-IMHMV colonic ischemia, IMHMV was significantly associated with younger age (p=0.010), male sex (p=0.002), rectal involvement on imaging (p=0.027) and on endoscopic evaluation (p=0.004), mucosal ulcerations on endoscopy (p=0.049) and absence of rectal bleeding on presentation (p< 0.001) (Table).
Conclusion: IMHMV is a rare, underreported cause of colonic ischemia that predominantly involves the left colon. Using the largest IMHMV cohort to date and comparing to a multicenter cohort of patients with ischemic colitis, we identify clinical, endoscopic, and radiologic characteristics of this entity. Our findings suggest younger age, rectal involvement, and absence of rectal bleeding as clinical features to help identify select patients presenting with colonic ischemia as having higher likelihood of IMHMV and therefore consideration of upfront surgical management.

Table 1. Clinical, endoscopic, and radiologic findings associated with IMHMV associated colonic ischemia

Variable	# patients	IMHMV	# patients	Non-IMHMV	P value
Demographics					
Age	85	55.5 (17.0)	922	69.5 (13.2)	< 0.001
Male sex	85	78.8% (67)	918	28.7% (265)	< 0.001
Clinical Presentation					
Abdominal pain	85	84.7% (72)	918	82.6% (758)	0.764
Rectal bleeding	85	57.6% (49)	913	76.2% (696)	< 0.001
Pain without bleeding	85	35.3% (30)	911	22.7% (207)	0.011
Bleeding without pain	85	8.2% (7)	911	18.2% (166)	0.017
Non-bloody diarrhea	85	24.7% (21)	911	11.0% (100)	< 0.001
Clinical Comorbidities					
Hypertension	61	21.3% (13)	921	75.1% (692)	< 0.001
Diabetes mellitus	61	13.1% (8)	921	30.0% (276)	0.005
Stroke	61	4.9% (3)	920	10.8% (99)	0.193

Table 1. (*continued*)

Variable	# patients	IMHMV	# patients	Non-IMHMV	P value
Hypercoagulability	61	6.6% (4)	768	1.0% (8)	**0.008**
Multivariate logistic regression					
Variable	aOR		95% CI		P value
Age, per year	0.941		0.919 – 0.964		**0.010**
Sex (Male)	10.10		4.71 – 21.67		**0.002**
Rectal bleeding on presentation	0.006		0.001 – 0.025		**< 0.001**
Non-bloody diarrhea on presentation	1.46		0.60 – 3.55		0.673
Diabetes mellitus	0.569		0.249 – 1.350		0.494
Rectal involvement on imaging	6.71		2.84 – 15.85		**0.027**
Right-sided involvement on endoscopy	0.620		0.213 – 1.806		0.655
Rectal involvement on endoscopy	12.61		5.22 – 30.51		**0.004**
Mucosal ulcerations on endoscopy	4.06		1.99 – 8.25		**0.049**

Baseline characteristics and regression analysis of IMHMV and non-IMHMV patients included in the final multivariate model. Number of patients included in the analysis are indicated. Continuous variables presented as mean and standard deviation. Categorical variables are presented as proportion and number of individuals. aOR = adjusted odds ratio. 95% CI = 95% confidence interval.

S189

Efficacy and Safety of RBX2660 in Patients After First Recurrence of *Clostridioides difficile* Infection – Results From a Phase 3, Randomized, Placebo-Controlled Study

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Introduction: Antibiotics used to treat *Clostridioides difficile* infection (CDI) can predispose patients to recurrent CDI (rCDI). Gut microbiome restoration by fecal microbiota transplantation is recommended by multiple guidelines after ≥2 rCDI, with no guideline recommended options to restore the microbiome earlier in the course of CDI. A prespecified analysis of a prospective, multicenter, randomized, double-blind, placebo-controlled phase 3 trial, PUNCH CD3 (NCT03244644), showed consistent efficacy of microbiota-based live biotherapeutic RBX2660 in participants with ≤3 (treatment success: placebo, 67%; RBX2660, 72%) and >3 (placebo, 54%; RBX2660, 70%) episodes of CDI prior to enrollment. In the present post-hoc analysis, we report the efficacy and safety of RBX2660 in a subgroup of patients with only 1 rCDI episode prior to enrollment.

Methods: Patients enrolled in PUNCH CD3 were ≥18 years old with ≥1 rCDI episode as determined by the treating physician and assessed with current standard-of-care (SOC) diagnostic methods. After completing SOC antibiotic therapy for the enrolling CDI episode, patients received a single blinded dose of RBX2660 or placebo. Treatment success was defined as remaining free of CDI recurrence for 8 weeks after treatment. Patients were monitored for recurrence through 6 months. Treatment-emergent adverse events (TEAEs) were summarized for the double-blind treatment period within 8 weeks.

Results: In the modified intent-to-treat population, 86 of 276 patients (32.2%) were enrolled after 1 rCDI. Patients were mostly white (93%) and female (66.3%) with a mean age of 58 years. At week 8, 79.2% (42/53) of RBX2660-treated patients and 60.6% (20/33) of placebo-treated patients achieved treatment success. Of responders, 90.5% (38/42) treated with RBX2660 and 85% (17/20) treated with placebo remained recurrence-free at 6 months. TEAEs were reported by 54.7% (29/53) of RBX2660-treated patients and 33.3% (11/33) of placebo-treated patients; mild events, mostly gastrointestinal, accounted for the difference. Serious adverse events were reported by 5.7% (3/53) of RBX2660-treated and 6.1% (2/33) of placebo-treated patients. No potentially life-threatening TEAEs or TEAEs leading to discontinuation or death were reported.

Conclusion: After 1 rCDI episode, RBX2660-treated patients had numerically higher treatment success at week 8 and sustained response at 6 months compared to placebo. These results support the efficacy and safety of RBX2660 in reducing rCDI.

S190

Complete Colonoscopy vs Flexible Sigmoidoscopy to Diagnose Microscopic Colitis

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Introduction: Microscopic colitis (MC) is a diagnosis made via biopsy, typically requiring a colonoscopy. Current European guidelines recommend performing a colonoscopy as rectal biopsies alone could miss the diagnosis. The purpose of the study is to retrospectively analyze the data on patients diagnosed with MC and determine if complete colonoscopy with right and transverse colon biopsies is needed to make a diagnosis or if flexible sigmoidoscopy with rectal and left sided biopsies would suffice

Methods: We performed a retrospective review of data from 1/1/1999 to 1/12/2019 on patients with a pathologic diagnosis of MC at Gundersen Health System. This study was conducted after the approval by the Gundersen Health System institutional review board. We included 342 patients with a histological diagnosis of either collagenous, lymphocytic, or MC. No patients were excluded. We compared the frequencies of left sided versus random colonoscopy biopsy diagnosis of microscopic colitis using Kappa coefficient as a measure of interrater reliability for agreement. A *p*-value was calculated to evaluate for significant difference. (Table)

Results: Out of 342 patients, 129 patients had positive pathologic diagnosis from left sided biopsy sites alone while 184 patients had positive biopsy results from random biopsy sites. This frequency indicates 53.8% of the diagnoses for MC could be missed by performing left sided biopsies alone. The Kappa coefficient of -0.7896 indicates no agreement between obtaining a pathologic diagnosis from left sided biopsy compared to random with a ($p < .0001$). None of these patients were using budesonide at the time of biopsy.

Conclusion: This study highlights agreement with current European guidelines for the recommendation of doing a complete colonoscopy for the diagnosis of MC. Prior studies including Tanaka M, et al. and Offner FA, et al. have shown consistent results with 30 patients but our study included a larger patient population. Having a Kappa coefficient of -0.7896 indicates moderate disagreement between positive biopsy diagnosis from left and random biopsy sites. While this study may not change current guidelines, it adds validity to them and highlights the importance of performing a colonoscopy and not just flexible sigmoidoscopy to diagnose microscopic colitis.

Table 1. Patient Characteristics

Patient Characteristics	Frequency
Collagenous Colitis	113
Lymphocytic Colitis	218
Microscopic Colitis	11
Tubular Adenomas	7

S191

Efficacy and Safety of Adipose-Derived Stem Cell Therapy for the Treatment of Complex Perianal Fistula Not Associated With Crohn's Disease: A Systematic Review and Meta-Analysis

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Introduction: Given the high recurrence rate and the risk of fecal incontinence with surgical options, Injection of adipose tissue-derived stem cells (ASC) has been arising as a novel method for treating complex perianal fistulas (CPAF). Therefore, we conducted a meta-analysis to evaluate the efficacy and safety of ASC in the management of CPAF not associated with Crohn's disease.

Methods: We systematically searched Medline and Embase databases through April 20, 2022, for all studies that assessed the efficacy and safety of ASC for the treatment of CPAF not associated with Crohn's disease. We excluded patients with rectovaginal fistulas and perianal fistulas associated with Crohn's disease. Our primary outcome was the complete closure. The secondary outcomes included overall nonserious adverse events (NSAE), serious adverse events (SAE), and perianal abscess rate. All meta-analyses were conducted using a random-effect model. The publication bias was assessed by Egger's test.

Results: Ten studies (eight clinical trials and two observational studies) with 271 patients were included in the pooled analysis. Eight studies used autologous stem cells, one used allogeneic stem cells, and one did not report the source of stem cells. The mean age of the patients was 43.7 years. The follow-up period ranged from 3 months to 2 years. The pooled complete closure rate was 59.7% (95% confidence interval (CI): 0.46-0.73, Figure 1A). On subgroup analysis based on country of origin, six studies with 213 patients were conducted in European countries, and four studies with 58 patients were conducted in non-European countries. The complete closure rate was higher in European countries than non-European countries, 64.1% vs. 52.6%. Eight studies reported overall NSAEs with the pooled NSAE rate of 22.5% (95% CI: 0.11-0.34, Figure 1B). Seven studies reported SAEs with the pooled SAE rate of 1.7% (95% CI: 0.001-0.034, Figure 1C). Seven studies reported the perianal abscess rate with a pooled perianal abscess rate of 7.1% (95% CI: 0.016-0.125, Figure 1D). No evidence of publication bias was found (Egger's test: P=0.36).

Conclusion: Our meta-analysis demonstrated that ASC is a promising therapeutic option for CPAF not associated with Crohn's disease with a clinically adequate efficacy and low rate of adverse events. However, more studies with larger sample sizes are needed to provide a definitive assessment of the effectiveness of ASCs for CPAF not associated with Crohn's disease.

[0191] **Figure 1.**

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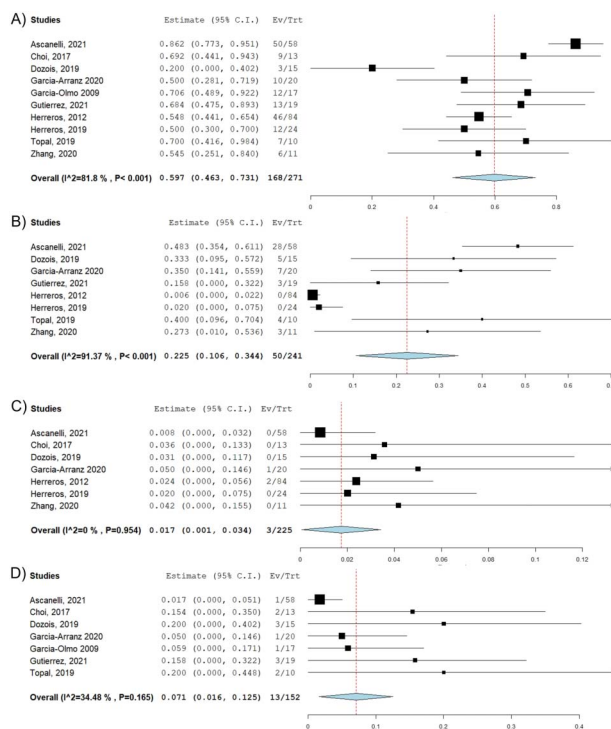
Efficacy and Safety of Biologic Medications in Refractory Microscopic Colitis

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Introduction: The current treatment for microscopic colitis (MC) involves use of antidiarrheals, budesonide, and avoidance of exacerbating medications. However, there is currently no treatment guideline for use of biologic medications as advanced therapy in patients who continue to have severe symptoms despite first line treatment options. In this study, we analyzed the clinical use, safety profile, and efficacy of biologic medications in refractory microscopic colitis.

Methods: Patients at a large academic center in Boston, MA with an ICD-10 diagnosis of collagenous colitis or lymphocytic colitis were included in this study. These patients were further narrowed to include patients who had been on infliximab, adalimumab, vedolizumab, or ustekinamab. Each patient chart was individually reviewed by two authors (RA, LB), with conflicting charts reviewed by a gastroenterologist (JDF). Data regarding date of diagnosis, histologic phenotype, demographics, concomitant GI illness, medications prior to biologic use, biologics trialed, length of treatment, adverse events, and clinical outcomes were analyzed descriptively.

Results: 1947 patients were identified with a diagnosis of MC. 98 (5%) of those patients had been exposed to biologics, and only 12 (< 1%) total patients were started on a biologic medication primarily for MC (as opposed to other concomitant conditions). The average length of diagnosis prior to biologic was 1.7 +/- 1.6 years (Table). The average length of biologic treatment was 3.7 +/- 3.3 years with eight patients continuing medication currently. Four patients achieved clinical remission, and four switched biologic class or medication due to medication non-effectiveness. There were two adverse reactions: ustekinumab associated with an anaphylaxis type allergic reaction two years after initiating therapy and infliximab associated with a pelvic abscess 6.7 years after initiating therapy. At both six weeks and at six months, four of the nine patients (44.4%) with data were in clinical remission. On follow up colonoscopy, zero patients had histologic resolution of their microscopic colitis.

Conclusion: In patients with MC, only a very small percentage were initiated on biologic therapy for directed therapy. Of these, there were patients who achieved clinical remission, suggesting a clinical benefit to some patients in this population. MC has a low incidence and few patients are prescribed biologics; therefore, more research is needed to establish guidelines for use of biologics in treatment.

Table 1. Patient Demographics, Comorbodities, Prior Medications, and Disease Characteristics

Patient Characteristics	Data (n = 12)
Race	
White	12/12 (100%)
Gender	
Male	4/12 (33.3%)
Female	8/12 (66.7%)
Diagnosis	
Collagenous Colitis	6/12 (50%)
Lymphocytic Colitis	5/12 (41%)
Microscopic Colitis NOS	1/12 (9%)
Concomitant GI Illness	6/12 (25%)
IBD	3/12 (25%)
Celiac Sprue	3/12 (25%)
Age at Diagnosis (years)	57 ± 12
Charlson Comorbidity Index	2.3 ± 1.4
Medications Prior to Biologic	
Steroids	11/12 (91.7%)
Prednisone	3/11 (27.2%)
Budesonide	8/11 (72.3%)
Anti-Diarrheals	12/12 (100%)
5-ASA	5/12 (41.7%)
Length of Disease Prior to Biologic (years)	1.7 +/- 1.6
Length of Biologic Treatment (years)	3.7 +/- 3.3

S193

Use of Data From All Exams versus Screening Only to Calculate Serrated Polyp Detection Rates: Data From the New Hampshire Colonoscopy Registry

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Introduction: Since serrated polyps are associated with a large percentage of colorectal cancer (CRC), adequate detection is crucial. Even among endoscopists with adequate adenoma detection rates, higher clinically significant serrated polyp (CSSP) detection rates are associated with lower post colonoscopy CRC risk (Anderson et al GIE 2022). A limitation is that some endoscopists may have a lower exam volume. One solution is to use all exams as opposed to the current calculation using only screening colonoscopies. We used data from the New Hampshire Colonoscopy Registry (NHCR) to compare CSSDR calculated with data from screening versus all exams.

Methods: Our sample consisted of NHCR patients with at least one follow up event 3 months after index exam, a colonoscopy or CRC diagnosis in the New Hampshire State Cancer Registry which collects data from NH, VT, MA and ME. The exposure variable was CSSDR, calculated as the total number of colonoscopies with at least one CSSP divided by the total number of colonoscopies for each endoscopist. Screening CSSDR (CSSDR-S) used data from screening exams and CSSDR-A used all exams. CSSDRs were examined as continuous as well by categories, < 3, 3-< 9 and 9+. We examined risk for PCCRC defined as any CRC diagnosed 3 months after an index exam. Exclusion criteria were any CRC diagnosed at index or within 3 months, incomplete exams, IBD, and genetic syndromes. Cox regression was used to model the Hazard of PCCRC on CSSDR controlling for age, sex, index exam year, index findings, bowel prep quality and having more than 1 surveillance exam.

Results: Our sample included 27,343 exams performed by 148 endoscopists with 150 CRCs diagnosed after the index exam. CSSDR-S and CSSDR-A had a high correlation (Spearman's rho=0.92; p< 0.0001) but the mean CSSDR-A was higher (9.20) than CSSDR-S (7.22) Both CSSDRs were associated with a reduction of PCCRC as a continuous variable as well as stratified (Table). The median percentage of screening exams across endoscopists was 50% (IQR=16). The median difference between CSSDR-S and CSSDR-A was 1.2 (IQR=1.5).

Conclusion: Our novel data support the calculation using all exams for CSSDR by demonstrating a reduction in PCCRC risk in exams performed by endoscopists with higher CSSDR-A, similar to that for CSSDR -S. In addition, the 2 rates correlated closely. Although our data suggested a wide range of proportions of screening exams, the difference between the CSSDRs were minimal suggesting that adjusting for case mix may not be required.

Table 1. Cox regression was used to model the Hazard of PCCRC on CSSDR controlling for age, sex, index exam year, index findings, bowel prep quality, and having more than 1 surveillance exam

		CSSDR -S < 3 (REF)	CSSDR -S 3-< 9	CSSDR -S 9+	P value	Continuous CSSDR -S	P value
CSSDR -S	HR	1.0	0.66	0.57	0.035	0.94	0.018
	95 % CI	REF	0.46-0.94	0.33-0.98		0.90-0.99	
	Absolute Risk	0.9%	0.5%	0.3%	0.001	—	—
	N	5914	14239	7190	—	—	—
		CSSDR-A < 3 (REF)	CSSDR-A 3-< 9	CSSDR-A 9+	P value	Continuous CSSDR-A	
CSSDR -A	HR	1.0	0.38	0.31	0.001	0.94	0.002
	95% CI	REF	0.25-0.58	0.18-0.52		0.90-0.98	
Risk	Absolute 1.4%	0.6%	0.3%	0.001	—	
	N	2044	15394	9905	—	—	—

S194

Real World Experience of Bezlotoxumab for the Prevention of Recurrent *Clostridioides difficile* Infection: A Mayo Clinic Experience

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Introduction: Two large placebo-controlled phase III trials demonstrated that bezlotoxumab when combined with antibiotics had lower recurrent *Clostridioides difficile* infection (CDI) rates compared to placebo. Patients with one or more of these: age ≥65 years, an immunocompromised state, severe CDI or a prior history of CDI in the last 6 months benefit the most. Those with 3 or more risk factors have the greatest recurrence reduction. We report differences in recurrence rates in patients with recurrent CDI receiving bezlotoxumab stratified by these prespecified risk factors.
**Methods:** We conducted a retrospective study of all patients treated with bezlotoxumab from 2017-2021 at Mayo Clinic. Patient demographics, CDI diagnostics, number of CDI episodes, antibiotics received and the number of prespecified risk factors were analyzed. Recurrence was defined as a subsequent CDI episode within 56 days of the previous episode. A Kaplan Meier survival curve and Cox model was constructed to generate hazard ratio (HR) and confidence intervals (CI).
Results: A total of 47 patients treated with bezlotoxumab, of which 59.6% (28/47) were female, with median age 62 years (range 23-94) were included. Patients had a median of 3 prior CDI episodes (range 1-10) (Table). Of these, 34 patients (72.3%) had CDI resolution and the other 13 patients recurred (27.6%). Recurrence rates with different number of risk factors is displayed in Table. Kaplan Meier survival curve analysis showed that after treatment with bezlotoxumab, there was a significantly higher probability of recurrence in groups of patients with 1, 2 or 3 risk factors (log-rank test, p=0.018) (Figure). With an increase in the total number of risk factors, there is also an increase in the risk of recurrence (HR 3.97, 95% CI 1.37-11.50) (p=0.010).
Conclusion: The benefit of bezlotoxumab treatment is lower in CDI patients with a greater number of risk factors. More studies are needed to evaluate the clinical efficacy of bezlotoxumab in patients with a higher number of prespecified risk factors.
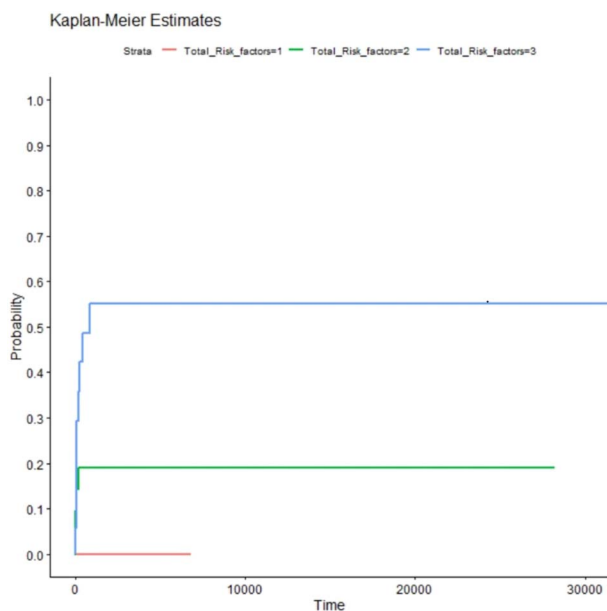
[0194] **Figure 1.** Kaplan-Meier curve depicting probability of recurrence of Clostridioides difficile infection with 1, 2 or 3 risk factors after treatment with bezlotoxumab

Table 1. Median prior episodes of Clostridioides difficile and recurrence rates associated with 1, 2 or 3 risk factors in patients treated with bezlotoxumab

No. of Risk Factors	Median Prior Episodes (range)	Recurrence Rate (%)
1	3.5 (1-8)	0/8 (0%)
2	3 (1-10)	4/22 (18.2%)
3	4 (1-7)	9/17 (53%)

S195

Is There a "Golden Window" for Endoscopic Reduction of Acute Sigmoid Volvulus: A Multicenter Retrospective Study

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[1]*Monmouth Medical Center, Eatontown, NJ;* [2]*University of Jordan, Amman, 'Amman, Jordan;* [3]*East Tennessee State University, Johnson City, TN;* [4]*Henry Ford Hospital, Detroit, MI;* [5]*Brown University/Kent Hospital, Providence, RI;* [6]*Monmouth Medical Center, Long Branch, NJ;* [7]*Monmouth Medical Center/RWJBH, Long Branch, NJ;* [8]*Presbyterian Medical Center, Albuquerque, NM*

Introduction: Colonic volvulus accounts for around 2% of all bowel obstructions in the United States. the involvement of the sigmoid colon consists of the overwhelming majority of colonic volvulus cases, possibly 60.9–80%. [1]. Per the American Society of Gastrointestinal endoscopy guidelines (ASGE), Non-operative detorsion with flexible sigmoidoscopy is considered first-line therapy in the management of sigmoid volvulus in patients without signs of peritonitis, perforation, or with recurrent or unsuccessful nonoperative decompression [2][3][4]. Despite this recommendation, the ideal timing for endoscopic intervention remains unclear.
Methods: We conducted a retrospective study in adult patients admitted for acute sigmoid volvulus in 4 academic centers from January/2010-January/2020. 47 Patients were identified using ICD-9 and ICD-10 codes. Inclusion criteria included adult patients who were initially managed with endoscopic detorsion. The time interval between diagnosis and endoscopic intervention was collected. Primary outcomes included the need for subsequent urgent surgical intervention within 30 days of the endoscopic intervention. Secondary outcomes were hospital length of stay and mortality.
Results: A total of 47 patients met the inclusion criteria. 33 patients were males (70.2%). The mean age of the sample was 71.0 (±16.5) years. Successful non-surgical reduction was achieved in 43 patients (91.5%). Endoscopic intervention was aborted in 4 patients for concerns of bowel ischemia or nonviable mucosa. 31 (66%) patients required urgent surgical intervention within 30 days of the endoscopic reduction, with an average interval period of 7 (±8.5) days. Surgical interventions included Hartmann's procedure, sigmoid colectomy with primary colorectal anastomosis, and total abdominal colectomy. Early endoscopic reduction resulted in fewer subsequent urgent and emergent surgical interventions (p-value = 0.013). Using the ROC curve, a cut-off point of 8.5 hours was determined to be predic table of favorable outcomes with a sensitivity and specificity of 74.2%, and 75%, respectively. (Figure) Early endoscopic intervention was associated with shorter hospitalization (p-value = 0.001).

Conclusion: Endoscopic decompressive intervention within 8.5 hours of diagnosis of acute sigmoid volvulus decreased early volvulus recurrence, bowel ischemia and subsequent need for urgent surgical interventions. This in return decreased hospital length of stay and allowed for planned prophylactic surgical resection.

ROC Curve - Presentation-to-intervention time vs Need for second surgical intervention
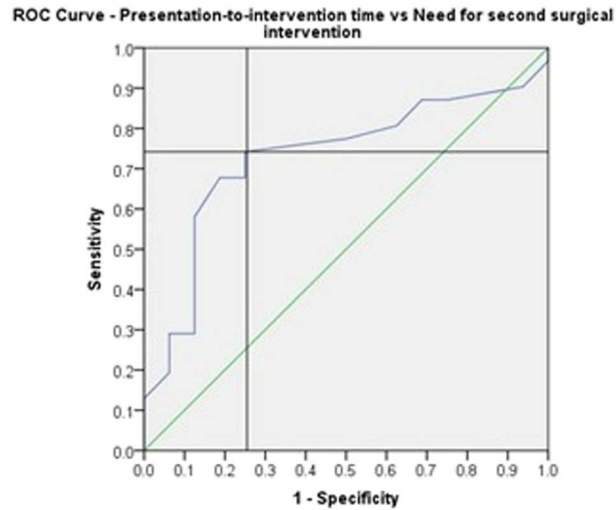
[0195] **Figure 1.**

S196

***Clostridioides difficile* Infection (CDI) Increased in Individuals Diagnosed With Prior Colorectal Adenomas**

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Introduction: *Clostridioides difficile* infection (CDI) is increased in patients with colorectal cancer, but no one has investigated if *CDI* is also higher in individuals with prior history of colorectal adenomas seen on colonoscopy.
Methods: We conducted a hospital-based cohort study composed of patients with diarrhea admitted to University of Michigan from 3/2016 to 12/2017 who were tested for *C. difficile*. Two hundred ninety-six diagnosed with *C. difficile* and 571 with non-C. difficile diarrhea were enrolled into the larger study. We abstracted prior colonoscopy reports and pathology reports from the medical records. Patients who had undergone colonoscopy were included in this analysis. Six hundred forty-seven underwent colonoscopy and 111 were diagnosed with colorectal adenomas prior to enrollment in the study. Logistic regression models were used to derive odds ratios (ORs) and 95% confidence intervals (95% CI) to evaluate comparisons between cases diagnosed with *C. difficile* and non-*C. difficile* diarrhea controls. We analyzed the association between history of colorectal adenoma diagnosis and *CDI*. (Figure, Table)
Results: We found an increased risk of *CDI* in individuals with a prior colorectal adenoma (HR 1.64; 95% confidence interval (CI) 1.06-2.54) after adjusting for age, sex, obesity, complicated and uncomplicated diabetes and inflammatory bowel disease. Notably we also found a significant decreasing association between time since polypectomy and *CDI* with greater risk associated with greater time since colonoscopy.
Conclusion: This study showed a higher incidence of *CDI* in individuals with a prior history of adenoma.Risk decreases over time since last polypectomy, which lends support to the hypothesis that there is a link between adenomas and subsequent *CDI* risk. Futures studies are needed to confirm this finding and elucidate mechanisms as this relationship could help target prophylactic measures in these individuals to avoid future infection.

Predictors of CDI
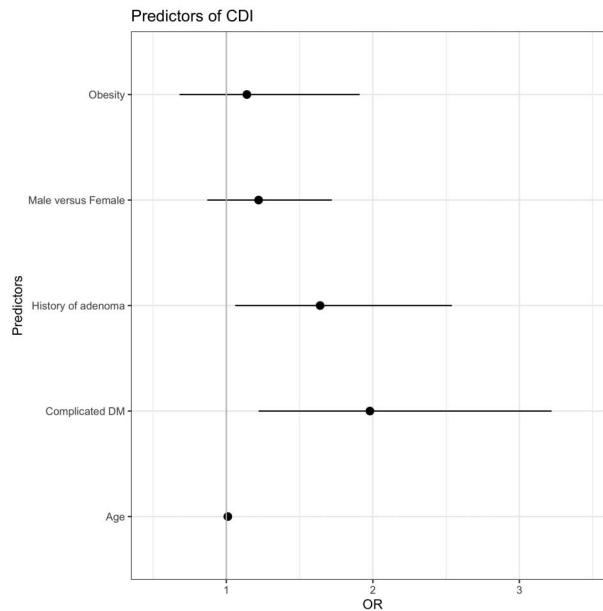
[0196] **Figure 1.** Risk factors of CDI estimated with multivariate logistic regression. Model was adjusted for Complicated DM, Obesity, gender, history of adenoma, and age

Table 1. Baseline characteristics of subjects by Clostridioides difficile infection (CDI) diagnosis 1. Clostridioides difficile infection (CDI), Diabetes mellitus (DM) 2. Pearson's Chi-squared test; Fisher's exact test. 3. Interquartile range (IQR). 4. n (%)

Characteristic	Non-CDI[1] Diarrhea (N=422)	CDI[1] Diarrhea (N=225)	p-value[2]
Age	53 (39, 64)[3]	55 (45, 69)[3]	0.6
Non-Hispanic Caucasian	337 (80%)[4]	178 (79%)[4]	0.8
History of adenoma	58 (14%)[4]	53 (24%)[4]	0.002
Gender			0.11
Female	249 (59%)[4]	118 (52%)[4]	
Male	73 (41%)[4]	107 (48%)[4]	
Obesity	43 (10%)[4]	34 (15%)[4]	0.07
IBD	155 (37%)[4]	57 (25%)[4]	0.003
Complicated DM[1]	42 (10.0%)[4]	48 (21%)[4]	< 0.001

S197

Real Word Experience of Bezlotoxumab for the Prevention of *Recurrent Clostridioides difficile* Infection: A Systematic Review and Meta-analysis

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Introduction: Two large, placebo-controlled phase III trials, MODIFY I and MODIFY II, demonstrated that patients with *Clostridioides difficile* infection (CDI) treated with bezlotoxumab (BEZ) had a lower rate of recurrent infection than placebo. The clinical efficacy of BEZ has been evaluated in real-world studies. We aimed to carry out a systematic review and meta-analysis of the efficacy of BEZ in real-world clinical setting.
Methods: A thorough search of literature was run on February 2022, in Cochrane Central Register of Controlled Trials, Embase, Medline, Scopus and Web of Science Core Collection. We included studies that reported CDI resolution rates with BEZ. The random-effects model described by DerSimonian and Laird was used to calculate weighted pooled resolution rates (WPR) with corresponding 95% confidence intervals (CI). Data were weighted based on the sample size in each trial to calculate WPR. We assessed heterogeneity within groups with the inconsistency index (I^2) statistic. The primary outcome of our pooled analysis was CDI clinical resolution rates with BEZ i.e. resolution of CDI with no recurrence in the follow up period.
Results: Thirteen studies (11 retrospective cohorts, 2 unspecified) including 1008 CDI patients were included. Recurrence with BEZ was compared with standard-of-care (SOC) antibiotics (metronidazole, vancomycin or fidaxomicin) in 6 studies and with fecal microbiota transplantation (FMT) in 1 study, the other 6 had no comparator arm. A total of 771 patients received BEZ, 237 received SOC and 14 received FMT. Patients were followed for recurrence for a median of 90 days from initial episode (range 84-168 days). Of the 771 on BEZ, 550 had CDI resolution with WPR of 82% (95% CI 79-85%). No significant heterogeneity was noted, with I^2=0% (Figure). A resolution rate of 50% (7/14) was seen in the FMT group. Subgroup analysis comparing BEZ with SOC revealed a WPR of 84% (95% CI 79-89%) with BEZ vs 67% (95% CI 61-73%) with SOC (p=0.0001).
Conclusion: Use of BEZ in real-world clinical settings seems to have a high resolution rate of CDI in patients with recurrence.
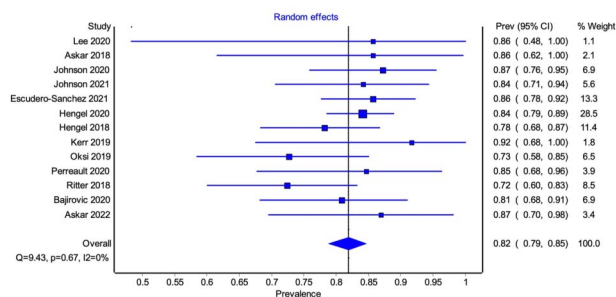
[0197] **Figure 1.** Forest plot depicting weighted resolution rate observed with bezlotoxumab

S198

Predicting Post-Operative *C. difficile* Infection (CDI) With Automated Machine Learning (AutoML) Algorithms Using the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) Database

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Introduction: Clostridium difficile infection (CDI) is one of the most common hospital-acquired infections leading to prolonged hospitalization and significant morbidity. Only a few prior studies have developed predictive risk models for CDI and all but one have utilized logistic regression (LR) models to identify risk factors. Automated machine learning (AutoML) programs consistently outperform standard LR models in non-medical contexts. This study aims to investigate the utility of AutoML methods in developing a model for post-operative CDI prediction.
Methods: We used an AutoML system developed by Amazon, Autogluon v0.3.1, to evaluate the prediction accuracy of post-surgical CDI using the 2016-2018 ACS NSQIP database. A total of A total of 3,049,617 patients and 79 pre-operative features were included in the model. Post-operative CDI was defined as CDI within 30 days of surgery. Models were trained for 4 hours to optimize performance on the Brier score, with lower being better. Validation of all performance metrics was done using the 2019 NSQIP database.
Results: 0.36% of the patients (n = 11,001) developed post-operative CDI. Brier scores were calculated for each model with the top performing model being an ensembled neural net model having a Brier score of 0.0027 on the test set. The corresponding AUROC and AUC-PR was 0.840 and 0.015 respectively (Figure).
Conclusion: The models generated via AutoML to predict post-operative CDI had discriminatory characteristics greater than or equal to those models reported in the literature. Future post-operative CDI models may benefit from automated machine learning techniques.
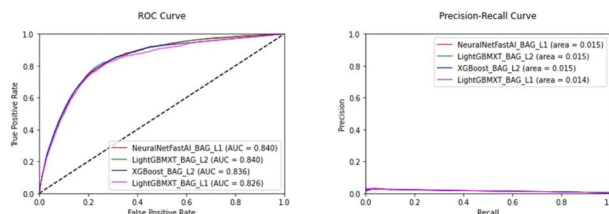
[0198] **Figure 1.** The top performing model had a Brier score of 0.0027, an AUROC of 0.840, an AUC-PR of 0.015

S199

Excess Dietary Intake May Increase the Risk of Early Colon Cancer Pathogenesis

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Introduction: Although non-modifiable factors such as age, sex, and race have been associated with increased risk of developing colon cancer, there are limited studies investigating modifiable factors. Some studies have shown fiber and calcium to be protective, while processed meats and alcohol to be risk factors. The data, however, remains controversial. The aims of this study are to 1) re-evaluate the epidemiology of colon cancer and 2) explore the nutritional status of those with early colon cancer diagnosis.

Methods: The National Health and Nutrition Examination Survey (NHANES) is a survey designed to assess the health and nutritional status of adults and children across the United States (US). Nutritional information was collected via a 24-hour diet recall, and those with reliable recall were included in the study. We combined demographic and nutritional datasets from NHANES during 2007-2016 and identified patients who self-reported a diagnosis of colon cancer. The sample size was appropriately weighted and stratified into 2 cohorts: age < 45 years vs age ≥ 45 years. SPSS was used for analysis.

Results: There were 5,767,593 self-reported cases of colon cancer in the US from 2007-2016 with reliable nutritional recall. Demographic data stratified by cohort is outlined in Table along with caloric and dietary intake. The average age of colon cancer diagnosis was 56.5 ± 15.3 years of which 19.4% were diagnosed early (age < 45). Univariate analysis showed those with early diagnosis had higher calorie ($p < 0.001$), fiber ($p < 0.001$), calcium ($p < 0.001$), caffeine ($p < 0.001$), and alcohol consumption ($p < 0.001$) than those diagnosed over 45. After controlling for BMI, race, sex, education, and income using logistic regression, we found that patients with higher caloric intake (≥ 2000 kcal) were more likely to be diagnosed with early onset colon cancer (OR: 3.81, 95% CI: 3.79-3.82).

Conclusion: There were on average 576,759 reported cases of colon cancer per year in the US of which approximately 1/5th were diagnosed before 45. Females, non-Hispanic whites, and higher education/income were associated with early colon cancer diagnosis possibly due to earlier screening. Contrary to other studies, higher fiber and calcium intake did not appear to be protective. However, those with early diagnosis did have higher alcohol intake. Our data suggests those with high caloric intake, a modifiable risk factor, increases the odds of developing early cancer by over threefold, perhaps due to chronic underlying inflammation.

Table 1. Demographic and Dietary Breakdown in Patients Diagnosed with Colon Cancer

		Colon Cancer Diagnosis ≥ 45 years	Colon Cancer Diagnosis < 45 years	Average	P-value
Sex	Male (%)	83.8%	16.2%	-	P< 0.001
	Female (%)	78.2%	21.8%	-	
Race	Non-Hispanic White (%)	78.3%	21.7%	-	P< 0.001
	Non-Hispanic Black (%)	89.5%	10.5%	-	
	Hispanic (%)	95.9%	4.1%	-	
	Other (%)	100%	0%	-	
Education Level	Less than 9th Grade (%)	80.6%	19.4%	-	P< 0.001
	9-12th Grade (%)	87.0%	13.0%	-	
	High School Graduate (%)	89.8%	10.2%	-	
	AA Degree or Some College (%)	79.1%	20.9%	-	
	College Graduate (%)	72.4%	27.6%	-	
Ratio of Family Income to Poverty Level (FIP)	FIP ≥ 1 (%)	78.3%	21.7%	-	P< 0.001
	FIP < 1 (%)	88.2%	11.8%	-	
BMI (kg/m2)		29.9	31.4	30.2	P< 0.001
BMI	BMI ≥ 25	79.7%	20.3%	-	P< 0.001
	BMI < 25	83.6%	16.4%	-	
Total Caloric Intake (kcal)		1679.1 ± 654.1	2177.6 ± 1092.3	1775.6 ± 784.0	P< 0.001
Total Caloric Intake	Kcal ≥ 2000	68.4%	31.6%	-	P< 0.001
	Kcal < 2000	86.3%	13.7%	-	
Total Sugar (gm)		94.2 ± 69.7	122.9 ± 150.8	99.8 ± 91.9	P< 0.001
Total Fat (gm)		62.5 ± 28.8	90.7 ± 64.9	68.0 ± 40.1	P< 0.001
Dietary Fiber (gm)		14.3 ± 8.0	16.7 ± 10.5	14.7 ± 8.6	P< 0.001
Calcium (mg)		825.1 ± 537.5	980.1 ± 560.8	855.1 ± 545.6	P< 0.001
Caffeine (mg)		193.0 ± 177.4	284.0 ± 262.3	210.6 ± 200.0	P< 0.001
Alcohol (gm)		4.7 ± 14.3	9.0 ± 35.9	5.5 ± 20.4	P< 0.001

S200

Diarrhea as an Independent Risk Factor for COVID-19 Severity and Inpatient Mortality

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Introduction: Multiple meta-analyses have shown that over 15% patients with COVID-19 have at least one gastrointestinal complaint, most commonly diarrhea. The effects on the gastrointestinal system are thought to be mediated by the high expression of angiotensin-converting enzyme 2 (ACE2) and cellular serine proteases (TMPRSS2) in enterocytes, which cause altered intestinal permeability. The purpose of this study was to determine the incidence of diarrhea as it relates to COVID-19 infection and to determine if having concomitant diarrhea had a significant impact on disease course.

Methods: A retrospective chart review of 164,730 patients in a hospital system who were older than 18 years of age and had a positive SARS-CoV-2 test from March 2020 to February 2022 was completed. Diarrhea was determined using ICD code or patient's symptoms. Patients with confounding variables such as IBD, IBS, Celiac, Clostridium difficile, and pancreatic insufficiency were excluded. Demographic

clinical characteristics and outcomes, including inpatient admission and mortality, were compared in patients with and without diarrhea. The Mann-Whitney test and Fisher's exact or Chi-square test was used for continuous and categorical variables respectively and multivariate logistic regression was used to evaluate for significant differences in disease outcome between the two groups. (Table)

Results: Of the 164,730 patients included, 14,648 (8.89%) had diarrhea at the time of SARS-CoV-2. 6,748/33,464 (20.16%) of inpatient admissions were associated with diarrhea. On multivariate analysis, diarrhea was an independent risk factor for inpatient hospitalization (OR 2.39, CI 95% 2.28-2.51, P< 0.001) and inpatient mortality (OR 1.15, CI 96% 1.06-1.26, P= 0.001) after controlling for age, gender, race, comorbidities that could impact patient outcome, use of immunomodulators and outpatient antibiotics.

Conclusion: These findings show that, even with controlling for comorbidities with COVID-19, diarrhea was an independent factor for predicting inpatient mortality and inpatient admission in general. Patients who had diarrhea and COVID-19 were sicker, having more comorbid conditions than those without diarrhea in our cohort. Attention should be given to not only respiratory complaints of COVID-19, but also gastrointestinal complaints, as they are an indicator of poor prognosis and mortality.

Table 1. Demographics Table

Demographics	Total Patients	With Diarrhea	Without Diarrhea	P-value
Total patients, n (%)	164,730	14,648 (8.89%)	150,082 (91.11%)	-
Age, Mean ± SD	49.09 ± 19.09	54.189 ± 18.50	48.59 ± 19.03	< 0.0001
Female	89,391 (54.28%)	8,059 (55.02%)	81,332 (54.20%)	< 0.058
Race/Ethnicity				< 0.001
White	93,407 (56.70%)	8,153 (55.66%)	85,254 (56.80)	
Asian	2,456 (1.49%)	152 (1.04%)	2,304 (1.54%)	
Pacific Islander	9,158 (5.56%)	859 (5.86%)	8,299 (5.53%)	
Hispanic	45,353 (27.53%)	4,656 (31.79%)	40,697 (27.12%)	
Native American	3,086 (1.76%)	438 (2.99%)	2,648 (1.76%)	
Unknown/other	11,270 (6.84%)	390 (2.66%)	10,880(7.25%)	
Use of Immunomodulators	6,552 (3.98%)	1,566 (10.69%)	4,986 (3.32%)	< 0.001
Use of Outpatient Antibiotics	19,414 (11.79%)	3,518 (24.02%)	15,896 (10.59%)	< 0.001
COPD (Chronic Obstructive Pulmonary Disease)	7,718 (4.69%)	1,304 (8.90%)	6,414 (4.27%)	< 0.001
Hypertension	35,462 (21.53%)	6,096 (41.62%)	29,366 (19.57%)	< 0.001
Cancer	4,185 (2.54%)	622 (4.25%)	3,563 (2.37%)	< 0.001
Chronic Kidney Disease	10,069 (6.11%)	1,991 (13.59%)	8,078 (5.38%)	< 0.001
Coronary Artery Disease	12,213 (7.41%)	2,127 (14.52%)	10,086 (6.72%)	< 0.001
Obesity	12,102 (7.35%)	2,394 (16.34%)	9,708 (6.47%)	< 0.001

S201

Octogenarians Admitted with Acute Diverticulitis Do Not Have Increased Mortality or Worse Outcomes: A Nationwide Analysis

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Introduction: Diverticulosis is present in around 65% of people at the age of 80. 10-25% of patients with diverticulosis will develop acute diverticulitis (AD). There is lack of data regarding outcomes in patients above the age of 80.

Methods: Retrospective cohort study of the 2018 National Inpatient Sample (NIS) using ICD10-CM/PCS codes to identify patients discharged after being admitted for AD. Patients were divided in those 80 years of age or older and those 79 years of age and younger. Primary outcomes were mortality, need for colonoscopy, total colectomy (TC), partial colectomy (PC), percutaneous drainage (PD). Secondary outcomes were length of stay (LOS), costs and charges. Multivariate regression analysis adjusted for patient and hospital characteristics was performed for the primary and secondary outcomes.

Results: A total of 214,594 discharges for AD were identified. 11.3% (n=24,169) were 80 years of age or older. Octogenarian patients were more likely to be female (74.3% vs. 55.6%, P< 0.01), Caucasian (83.2 vs. 74.3%, P< 0.01), to have uncomplicated AD (73.2% vs. 54.4%, P< 0.01), to have a Charlson Comorbidity Index score ≥3 (CCI) (30.9% vs. 10.1%, P< 0.01), to have Medicare as primary payer (95.9% vs. 37.5%, P< 0.01), to have malnutrition (8.7% vs. 3.5%, P< 0.01) and require parenteral nutrition(1.7% vs. 1.3%, P=.02). They are less likely to have obesity (7.0% vs. 21.6%, P< 0.01), alcohol use disorder (0.4% vs. 2.5%, P< 0.01), cannabis use disorder (0.1% vs. 1.7%, P< 0.01). Elderly patients had lower rates of TC (6.8%% vs. 17.2%, P< 0.01), PC (4.3% vs. 10.1%, P< 0.01). They had higher mean LOS (5.1 vs. 4.4 days p< 0.01). On multivariate analysis octogenarians did not have increased odds of mortality (aOR 0.80, 95% CI [0.45-1.39]) or PD (aOR 0.90, 95% CI [0.39-2.09]). Octogenarians had lower significant odds of colonoscopy (aOR 0.72, 95% CI [0.87-1.77]), TC (aOR 0.38, 95% CI [0.33-0.43]), PC (aOR 0.48, 95% CI [0.41-0.56]). There was no difference in total costs ($-191, 95% CI [-690-307]) and charges ($-1,156, 95% CI [-3,402-1,089]). (Table)

Conclusion: In this study 11.3% of patients admitted with AD were 80 years of age or older. Octogenarians do not have higher risk of mortality, surgical intervention or healthcare expenditure, likely related to a less complicated disease presentation in this set of patients.

Table 1. Univariate and multivariate analysis for primary and secondary outcomes

	Colonoscopy / flexible sigmoidoscopy	Total Colectomy	Partial colectomy	Percutaneous drainage of abscess
	Crude Odds Ratio (95% Confidence interval)			
Age ≥ 80	0.92 (0.82-1.05)	0.74 (0.70-0.78)	0.40 (0.35-0.46)	0.77 (0.40-1.48)
	Adjusted Odds Ratio; (95% Confidence interval)			
Age ≥ 80	0.72 (0.62-0.83)	0.38 (0.33-0.43)	0.48 (0.41-0.56)	0.90 (0.39- 2.09)
	Mortality	Length of stay (Days)	Total Costs (US$)	Total Charges (US$)
	Crude Odds Ratio (95% Confidence interval)			
Age ≥ 80	5.36 (3.89-7.38)	0.69 (0.56-0.82)	-153 (-653-347)	626 (-1,703-2,956)
	Adjusted Odds Ratio; (95% Confidence interval)			
Age ≥ 80	0.80 (0.45-1.39)	0.12 (-0.02-0.26)	-191 (-690-307)	-1,156 (-3,402-1,089)

S202

Are Biopsies Sufficient for Diagnosis? Comparison of ESD and Forceps Biopsy Findings for Colon and Rectal Lesions

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Introduction: Endoscopic submucosal dissection (ESD) is a minimally invasive technique used for removal of superficial dysplastic or early cancerous colon and rectal lesions. For larger lesions (>20mm) that are not amenable to endoscopic mucosal resection, superficial biopsies are typically taken prior to referral for ESD. The aim of this study was to evaluate the degree of concordance between superficial forceps biopsies and ESD pathology.
Methods: A retrospective medical record review was performed including consecutive patients who underwent ESD of colon and rectal lesions at a tertiary care center between 10/2018 and 11/2021. Pathology results from outside hospital and same institution pre-ESD superficial forceps biopsies were compared to ESD pathology results. The primary outcome was the number of patients found to have higher disease severity on ESD pathology compared with superficial forceps biopsies.
Results: Of the 84 patients who underwent ESD of colon or rectal lesions, 72 had pre-ESD superficial forceps biopsies which were taken at an outside hospital (n=48) or at the same institution (n=36). The average length of time between outside hospital superficial forceps biopsies and ESD was 91 days compared to 75 days for those performed at the same institution. Delays between superficial forceps biopsies and ESD may be related to the COVID-19 pandemic prolonging time between procedures. Pathology findings after ESD differed from superficial forceps biopsies in 31/72 patients (43%) with 21 patients receiving upgraded disease severity and 6 patients receiving a new cancer diagnosis based on ESD pathology. Patients who received a new cancer diagnosis had more days between superficial forceps biopsies and ESD compared with the whole cohort (86 vs 75, respectively).
Conclusion: While superficial forceps biopsies of colon and rectal lesions were typically concordant with ESD pathology, 29% of patients in this cohort received upgraded disease severity based on ESD pathology. This shows that while superficial forceps biopsies can aid in diagnosis, *en bloc* resection via ESD remains critical for accurate diagnosis of large colon and rectal lesions. These results also show that ESD is not only diagnostic but therapeutic given 75% of the patients in this cohort achieved R0 resection.

S203

Health Care Professional's Bowel Management Practices for Neurogenic Bowel Dysfunction: Development of a Web-Based Survey

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Introduction: Neurogenic Bowel Dysfunction (NBD), is an "impairment of the gastrointestinal and anorectal function from a lesion in the nervous system".[1] As a result of the inability to evacuate the bowel, persons with NBD may experience severe constipation and fecal incontinence which may lead to an increased risk of needing emergency care.[2] Despite clinically documented success with transanal irrigation (TAI) devices in NBD, TAI prescribing evidence is missing. Therefore, a survey was developed by a multi-disciplinary group of Health Care Providers (HCP)with NBD expertise. Aims of the study include understanding bowel management strategies by HCP for persons with NBD.
Methods: Four HCPs with NBD expertise participated in four virtual platform meetings to develop the survey. NBD experts developed pertinent questions for the study. Survey participant eligibility includes residency in the United States, HCPs working with persons with NBD. Participation is voluntary, anonymous, no compensation/incentive provided.
Results: The authors developed a 3-part, 17-questions, cross-sectional, anonymized, online, survey, asking HCPs bowel management practices based on clinical expertise and published clinical management guidelines for NBD. Section 1 (1 question): introduction and consent; Section 2 (8 questions): HCPs experience, type of NBD population. Section 3 (8 questions): bowel management practices for NBD. Survey launch date, June, 2022 with data analysis in September, 2022. (Figure)
Conclusion: Published evidence of prescribing practices for TAI is lacking. The development of the HCP survey will give insight on HCPs management and recommendations for persons with NBD. The survey will aid in determining how to improve NBD management based on the existing clinical practice guidelines to enhance health, wellbeing, and quality of life of people with NBD.
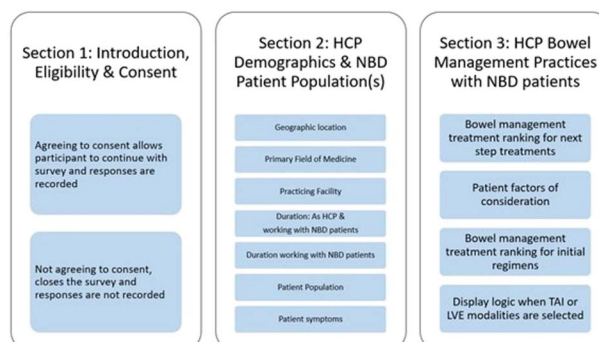
[0203] **Figure 1.** Breakdown of sections included within the Health Care Professional survey

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S204

A Quality Improvement Project on the Use of a Standard Order Set for Bowel Preparation for Inpatient Colonoscopies

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Introduction: Bowel preparation is an essential prerequisite for colonoscopies as insufficient dosing can directly affect the procedure and results. Currently, there is no sufficient data on what method should be utilized for bowel preparation in inpatient settings. This quality improvement (QI) project aimed to examine the implementation of a standardized order set for the preparation of colonoscopy procedures.
Methods: We studied the effect of inpatient bowel preparation in patients aged 18 or older. Data were collected before and after the implementation of the standard order set. Bowel preparation: Before the standard order was set in our institution, bowel preparation required multiple orders and asking the GI department for specific recommendations, which may lead to inaccuracies or delays in preparation. We implemented a standard order to simplify and streamline the ordering of bowel preparation. This included one gallon of a laxative solution GoLytely. Measures: Gastroenterologists assessed prep quality as good or poor during the colonoscopy. Chi2 tests were run to compare the two groups' bowel prep quality.
Results: Sixty-nine patients were examined before and 79 after the standard bowel prep implementation. The sample consisted of 149 patients (50% were over 65, 50% were under 65, 69% were females, and 31% were males). There was no difference in prep quality. Before standard bowel prep, 36/69 (52.2%) patients had adequate cleansing, versus 45/79 (56.9%) post standard bowel prep. This difference was not significant (p=0.559). (Table)
Conclusion: Poor bowel preparations burden patients and gastroenterologists, especially when colonoscopies have to be repeated. This QI project aimed to improve bowel preparation in our inpatient population by creating a standardized bowel preparation order. We did not find this standard ordering improved bowel cleansing, with about half showing poor bowel prep. Inadequate bowel preparation may be

driven by other factors, such as the poor implementation of bowel preparation once ordered. There may also be patient-specific factors that affect good clean-out. Future efforts are on the way to determine which other factors could affect bowel prep in our inpatients.

Table 1. t-Test: Two-Sample Assuming Unequal Variances

	Prep quality before orderset	Prep quality after orderset
Mean	1.347826087	1.243589744
Variance	1.200767263	1.095737596
Observations	69	78
Hypothesized Mean Difference	0	
Degrees of freedom	141	
t Stat	0.587768736	
P(T< =t) one-tail	0.278813846	
t Critical one-tail	1.655732287	
P(T< =t) two-tail	0.557627693	
t Critical two-tail	1.976931489	

S205

Frequency and Predictors of Emergency Department Visits Following Colonoscopy: An Assessment of Procedure Safety

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Introduction: Colonoscopy is the most commonly performed colorectal cancer screening test in the US, and is associated with known adverse events (AE), including gastrointestinal bleeding (GIB), bowel perforation, abdominal pain, and others. Despite this, post-colonoscopy AEs are rarely monitored by current colonoscopy quality programs. This study investigated the frequency of ED visits in the two weeks following an outpatient colonoscopy at a multi-site academic center.

Methods: We conducted a retrospective cohort study including all adults aged $\geq$ 40 who underwent an outpatient colonoscopy at a single academic center between 2016-2019. Data from 2020 were excluded given unpredicTable effects of the COVID-19 pandemic on healthcare utilization. Patients were identified using procedural codes and administrative claims records were used to identify persons who had a subsequent ED visit up to 14 days after their procedure date. For those with ED visits, patient charts were reviewed to abstract data including details of ED presentation. Descriptive statistics were used to characterize the sample.

Results: There were 187 patients who had an ED visit within two weeks of their colonoscopy, among 34,222 total colonoscopies during the same 4 year time period (0.44%). 46.1% of the ED visits reviewed were either definitely or possibly related to post-colonoscopy AEs. The mean age of the population sample was 61 years. The most common presenting symptoms to the ED post-colonoscopy included abdominal pain (47%), GI bleeding (27.7%), and nausea/vomiting (20.6%). The most common ED diagnosis included GI bleed (26.2%), dehydration (6.4%), and obstruction (3.6%). Nearly half of patients presenting to the ED were admitted (47.2%). In terms of clinical details of the colonoscopies of those who presented to the ED, polypectomy was performed in 67.4% of patients and polypectomy of a large ($\geq$10mm) polyp was performed in 22.7% of patients. Hot snare/biopsy was used in 36.9% of patients and periprocedural use of anti-thrombotics occurred in 36.9% of patients. (Table)

Conclusion: ED visits occurred in roughly 4 out of 1000 patients within two weeks of a colonoscopy at our center, and nearly half of these patients were admitted. A high proportion of ED visits were for GI symptoms. Furthermore, over 1/3rd of patients with ED visits following a colonoscopy had polyps removed with electrosurgical techniques. These data suggest that regular monitoring of post-colonoscopy ED visits may be valuable for quality improvement purposes.

Table 1. Characteristics of patients with ED visits and colonoscopy characteristics of those with post-colonoscopy ED visits

Characteristics	n (%) or mean +/- SD
Age	61.0 +/- 9.7
Sex	
Female	70 (49.6)
Male	71 (50.4)
ASA class	
I	12 (8.5)
II	65 (46.1)
III	59 (41.8)
IV	1 (0.7)
Days between colonoscopy and ED	6.1 +/- 4.0
Reason for ED visit (symptoms)	
Abdominal pain	47 (33.3)
GI bleeding	39 (27.7)
Nausea/vomiting	29 (20.6)
Fever	11 (7.8)
Syncope	13 (9.2)
Other	55 (39.0)
ED diagnosis	
GI bleed	37 (26.2)
Perforation	3 (2.1)
Obstruction	5 (3.6)
Dehydration	9 (6.4)
Post-polypectomy syndrome	2 (1.4)
Other	85 (60.3)

Table 1. (*continued*)

Characteristics	n (%) or mean +/- SD
Related to colonoscopy	
Yes	55 (39.0)
Possible	10 (7.1)
No	76 (53.9)
Interventions	
X-ray	16 (11.3)
CT	42 (29.8)
Admission	67 (47.2)
Anesthesia	
Moderate sedation	28 (19.9)
Propofol	112 (79.4)
General anesthesia	1 (0.7)
Polypectomy performed	95 (67.4)
Polyp 10+ mm	32 (22.7)
3+ polyps	51 (36.2)
Polyp location	
Proximal	77 (54.6)
Distal	67 (47.5)
Anti-thrombotics	
Total	52 (36.9)
Aspirin	37 (26.2)
NSAIDs	7 (5.0)
Clopidogrel	2 (1.4)
Coumadin/DOAC	8 (5.7)
Hot snare/biopsy	52 (36.9)

S206

Clinical Characteristics of Young Patients With Colonic Adenomas

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Introduction: The incidence of colonic adenomas and colorectal cancer has been rising among young patients. Studies addressing the prevalence, risk factors, patient characteristics and appropriate surveillance intervals in young patients with adenomas are limited. In this study, we aim at describing the characteristics of young patients (< 50 years of age) with adenomatous polyps and characterizing those polyps.
Methods: This was a retrospective chart review of the Department of Gastroenterology database to identify patients < 50 years of age who had polyp(s) on colonoscopy done between 2008 and 2021. Patient demographics, colonoscopy indication, and number, size, location, and pathology of polyps were documented. Timing and findings of follow-up colonoscopies were recorded. Patients with personal history of inflammatory bowel disease, personal or family history of colorectal cancer were excluded.
Results: 877 patients were included in the study; mean age 42.4 ± 6.3 years, 62% males, mean BMI 27.7 ± 5.0. Colonoscopy indications were abdominal pain (26%), rectal bleeding (22%), change in bowel habits (17%), and evaluation of abnormal imaging/lab values. Of 877 patients, 610 (70%) had at least one adenoma: 571 (65%) tubular adenomas, 29 (3%) tubulovillous adenomas, 1 villous adenoma and 19 (2%) had sessile serrated adenomas. 267 (31%) patients had only hyperplastic polyps. Of patients with adenomas, 63 had a polyp > 10mm with mean polyp size 11 ± 9mm. 41% of patients had adenomas in the sigmoid, 34% in ascending, 27% in transverse, 24% in descending colon, and 22% in the rectum. Almost half (49%) of patients with adenomas were younger than 45 years and had similar demographic characteristics as patients between 45 and 50 years of age, but they had a larger mean polyp size (Table). Of the 610 patients with adenoma, 156 (26%) had a follow-up colonoscopy after a mean time of 2.9 ± 2.3 years, with 74 (47%) patients developing recurrent adenomas. 38 (6%) patients had a second follow-up after 2.1 ± 1.6 years and 15/38 had adenomas.
Conclusion: Patients < 50 years of age with colonic adenomas were mostly males and overweight. Recurrence of adenomas was prevalent over the follow up of 3 years. For patients with GI complaints, colonoscopy should be considered in individuals with high-risk baseline characteristics. High rates of recurrent adenomas and larger polyp size in patients < 45 years of age may warrant more frequent surveillance than is done for patients > 45 years of age.

Table 1. Comparison of Demographics and Polyp Characteristics between Patients Younger than 45 Years of Age and Patients 45 to 50 Years of Age with Adenomatous Polyps

	Patients Younger than 45 Years of Age (N=299)	Patients between 45 and 50 Years of Age (N=311)	p-value
Mean Age at Colonoscopy	38.27 (n=299)	47.45 (n=311)	< **0.001**
Males	58.6% (n=299)	63.0% (n=311)	0.256
BMI	26.77 (n=174)	28.20 (n=186)	0.886
Vitamin D Level	20.82 (n=161)	23.28 (n=186)	0.403
Smoking	50.0% (n=270)	51.6% (n=279)	0.705
Mean Size of Polyps	1.21 (n=109)	1.01 (n=97)	< **0.001**
High Risk Patients*	24.7% (n=299)	30.2% (n=311)	0.130
Follow Up Rate	24.7% (n=299)	26.1% (n=311)	0.713

BMI: Body Mass Index. N: Total number of patients. n: Total number of patients used to calculate a mean or a percentage.
*High Risk patients are defined as having three or more adenomatous polyps and/or a villous component on pathology and/or a polyp size >1cm.

S207

There Is No Difference in Frequency or Outcome of Colon Ischemia Based Upon the Season of Presentation

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Introduction: Colon Ischemia (CI) is the most common ischemic injury to the gastrointestinal tract. Studies from Asia have shown a seasonal variation of CI with an increased incidence in the summer months. Our study hypothesizes that in a United States population focusing within a northeastern group of hospitals, where there is a significant variation in the seasonal climate, there is a seasonal variation in the incidence and outcome for CI.

Methods: We conducted a multicenter retrospective cohort study of pts admitted with biopsy-proven CI admitted to Yale-New Haven Hospital, Montefiore Medical Center, Weiler Medical Center, and SUNY-Upstate Medical Center from 2005 through 2017. For each patient, demographics, medical co-morbidities, treatments, and outcomes were recorded. Using a meteorological definition of seasons, we subdivided the population into the onset of CI during the spring (SP-CI; March to May), summer (SU-CI; June to Aug), fall (FA-CI; Sept to Nov), and winter (WI-CI; Dec to Feb). We then compared the seasonal cohorts. Our primary outcome was incidence of CI based upon the season. The secondary outcomes included combination of 30-day colectomy and mortality (i.e., poor outcome), segmental involvement, intensive care unit (ICU) requirements, length of the hospital stay (LOS), 30-day readmission and recurrence.

Results: A total of 685 pts met inclusion criteria. There were no differences in incidence based upon season: CI-SP (27%), CI-SU (24.5%), CI-FA (22%) and CI-WI (26.4%). There were also no differences with regards to age, gender or BMI. No differences were observed in the presentation, medical comorbidities, Charlson Comorbidity Index or treatment patterns among the four groups. When considering outcomes, 30-day colectomy was observed 10.3%, 8.2%, 9.2% and 11.1% in the CI-SP, CI-SU, CI-FA and CI-WI group, respectively (p=0.84). There were also no significant differences when considering 30-day mortality or poor-outcome. LOS, ICU requirements, segmental involvement, 30-day readmission and 30- day recurrence were not significantly different between the four groups (Table).

Conclusion: Our study showed no difference in the distribution of biopsy-proven cases of CI based upon seasonal change. This is in contrast to Asian based studies. It is possible that the severity of the cases considered in our study are different than the Asian studies and that mild cases might have a seasonal variation that are less likely to undergo a colonoscopy to confirm the diagnosis.

Table 1. Baseline characteristics and outcomes

Outcomes	Spring (SP-CI) 27.0% (185)	Summer (SU-CI) 24.5% (168)	Fall (FA-CI) 22.0% (151)	Winter (WI-CI) 26.4% (181)	_p_ value
Demographics					
Age (years), median (IQR)	70 (63 - 80)	69 (61 - 79)	72 (64 - 80)	70 (60 - 80)	0.988
Female	135 (72.9%)	125 (74.4%)	114 (75.5%)	133 (73.4)	0.957
BMI, median (IQR)	27.68 (23.83-32.14)	26.78 (22.86-30.67)	28.22 (24.80-31.7)	27.06 (23.39-32.11)	0.935
Presentation					
Tachycardia	17.8% (33)	17.8% (30)	20.5% (31)	20.4% (37)	0.857
Hypotension	6.4% (12)	8.3% (14)	5.3% (8)	9.4% (17)	0.485
Peritoneal signs	7.6% (14)	6.6% (11)	7.2% (11)	11.6% (21)	0.316
Medical comorbidities					
Chronic pulmonary disease	19.4% (36)	24.4% (41)	22.5% (34)	21.5% (39)	0.727
Colon cancer	2.1% (4)	1.1% (2)	1.3% (2)	2.2% (4)	0.837
Coronary artery disease	30.8% (57)	26.3% (44)	32% (48)	27.2% (49)	0.616
Diabetes mellitus	30.2% (56)	32.7% (55)	34.4% (52)	29.2% (53)	0.738
Hypertension	73.5% (136)	78.5% (132)	81.4% (123)	76.8% (139)	0.364
Hemodialysis	10.1% (9)	10.3% (10)	5.8% (5)	12.6% (11)	0.510
Hypercoagulable state	0.5% (1)	0.6% (1)	0.7% (1)	1.1% (2)	0.915
Malignancy (any)	14% (26)	18.4% (31)	14% (21)	17.7% (32)	0.557
Malignancy with metastasis	3.8% (1)	6.4% (2)	9.5% (2)	9.3% (3)	0.837
Peripheral vascular disease	10.3% (19)	5.3% (9)	6.6% (10)	7.2% (13)	0.324
Stroke	8.1% (15)	8.3% (14)	11.9% (18)	13.8% (25)	0.226
Calculated Charlson Score, mean (SD)	5 (2.7)	5 (2.8)	5.2 (2.8)	5.1 (3.0)	0.979
Bowel Segment Involvement					
Small bowel involvement	6.8% (8)	7.2% (7)	4% (4)	7.3% (8)	0.732
Pancolitis	5.6% (10)	2.5% (4)	4.8% (7)	8.3% (15)	0.122
Any right colon involvement	24.8% (40)	27.3% (41)	21.8% (29)	28.6% (45)	0.564
Right colon only	13.5% (23)	16.6% (26)	10.6% (15)	14.7% (25)	0.500
CI Severity					
Mild CI	0.5% (1)	0% (0)	0% (0)	1.12% (2)	0.390
Moderate CI	46.9% (86)	49.1% (82)	56.3% (84)	49.1% (88)	
Severe CI	52.4% (96)	50.9% (85)	43.6% (65)	49.7% (89)	
Presence of necrosis on colonoscopy	9.8% (16)	10.4% (16)	8.2% (11)	5.4% (9)	0.372
ICU requirement	22.5% (41)	24.2% (39)	18.2% (27)	25.9% (46)	0.400
Outcomes					
30-day colectomy	10.3% (19)	8.3% (14)	9.2% (14)	11.1% (20)	0.842
30- day mortality	5.4% (10)	3.5% (6)	4% (6)	6.6% (12)	0.546
Combined poor outcome (30- day colectomy and/or 30-day mortality)	13.5% (25)	9.5% (16)	11.3% (17)	15% (27)	0.437
Length of stay (mean, (SD))	6.2 (16.9)	10.3 (56.6)	8.4 (31.2)	10.1(55.2)	0.137
C Difficile as a complication	3.4% (6)	2.5% (4)	2.8% (4)	3.1% (5)	0.97

Table 1. (*continued*)

Outcomes	Spring (SP-CI) 27.0% (185)	Summer (SU-CI) 24.5% (168)	Fall (FA-CI) 22.0% (151)	Winter (WI-CI) 26.4% (181)	*p* value
30-day Readmission	13.5% (25)	10.7% (18)	7.3% (11)	9.9% (18)	0.328
30-day Recurrence	3.7% (7)	1.7% (3)	0% (0)	2.2% (4)	0.112

Abbreviations: BMI, Body mass index; CI, colon Ischemia; ICU, Intensive Care Unit.

S208

Increased Primary Tumor Sutterella Bacterial RNAseq Signatures Are Associated With Increased M2 Macrophage Abundance and Worse Overall Survival in Rectal Adenocarcinoma

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Introduction: Although gut microbiome dysbiosis has been implicated in colorectal cancer, the role of intratumor microbiome in carcinogenesis has not been studied extensively. We aimed to identify intratumor bacterial genera that are significantly correlated with M2 tumor-associated macrophage (TAM) abundance in rectal adenocarcinoma and analyze associations of those bacterial genera with overall survival.
Methods: RNA sequencing (RNA-seq) data for 1206 bacterial genera was procured as described by Poore et al. and used to calculate average log2 counts per million for each bacterial genus. Intratumor M2 TAM abundance was first estimated by quanTIseq, an RNAseq deconvolution algorithm, and verified by CIBERSORT, another RNA-seq-based in silico approach for characterizing cell subsets in tumor samples. Pearson correlation analysis of intratumor abundance of each bacterial genus and M2 TAM was conducted. Bonferroni correction was used for multiple comparisons correction. Next, for bacterial genera correlated with M2 TAM abundance, we analyzed their associations with overall survival in rectal adenocarcinoma using clinical data from The Cancer Genome Atlas Rectal Adenocarcinoma database. Only patients with primary tumor sites in the rectum (n=158) were included for analysis. Relative hazard ratios (HRs) for overall survival were estimated with cox proportional hazards models using the lifelines python package, with p-value threshold set at < 0.05 for independent t-tests.
Results: Among 1206 bacterial genera with RNA-seq data, Sutterella was the only bacterial genus significantly positively correlated with M2 TAM abundance estimated via the quantiSeq method after Bonferroni correction (Pearson correlation coefficient=0.38; p=6.7E-7) (Figure 1A). This significant correlation was replicated in correlation analysis using M2 TAM abundance estimated via the CIBERSORT method (Pearson correlation coefficient=0.17; p=0.03) (Figure 1B). In 151 patients with primary rectal adenocarcinoma, intratumor Sutterella abundance was significantly associated with worse overall survival (HR 1.45; p=0.02) after adjusting for age, sex, and tumor stage (Table).
Conclusion: This is the first study to identify associations of intratumor microbiome with TAMs in rectal adenocarcinoma. We found Sutterella abundance to be associated with M2 TAM abundance and poor overall survival, highlighting the need for further investigation of mechanistic pathways linking intratumor microbiome and carcinogenesis.
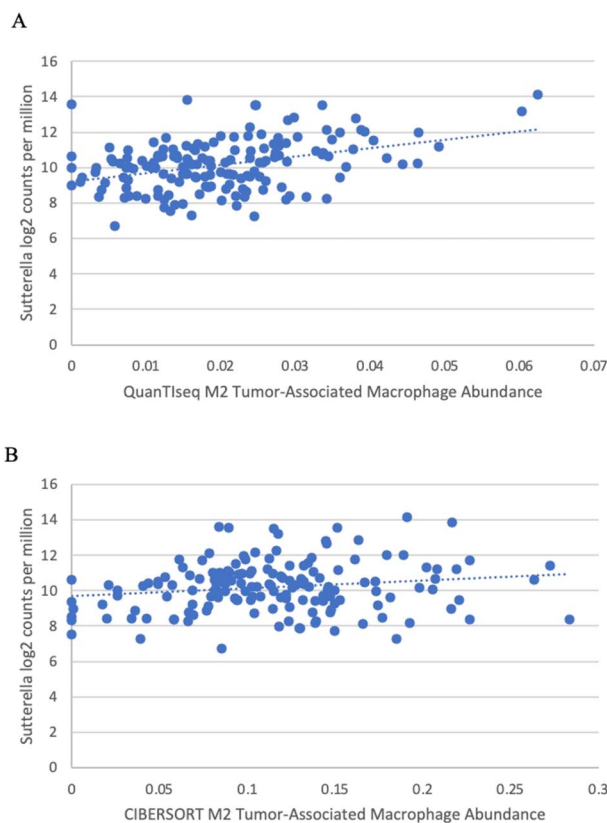
[0208] **Figure 1.** (1A) Sutterella is positively correlated with M2 TAM abundance estimated via the quantiSeq method (Pearson correlation coefficient=0.38; p=6.7E-7) (1B)Sutterella is positively correlated with M2 TAM abundance estimated via the cibersort method (Pearson correlation coefficient=0.17; p=0.03)

Table 1. Associations of intratumor Sutterella abundance, sex, and tumor stage with overall survival in patients with rectal adenocarcinoma using Cox proportional hazards models (n = 151)

Parameter		Hazard Ratio (HR)	ln (HR)	95% Confidence Interval ln (HR)	P-value
Sutterella abundance	Per unit increase in Sutterella log2 counts per million	1.45	0.37	0.071 – 0.673	0.015

Table 1. (*continued*)

Parameter		Hazard Ratio (HR)	ln (HR)	95% Confidence Interval ln (HR)	P-value
Age	Per year increase in age	1.11	0.10	0.047 – 0.153	0.0002
Sex	Female	1			
	Male	1.09	0.083	-0.722 – 0.889	0.84
Tumor stage	I-II	1			
	III-IV	0.80	-0.223	-1.361 – 0.915	0.701

S209

Appendiceal Adenocarcinomas Are Associated With Better Prognosis Than Cecal Adenocarcinomas: A Population-Based Comparative Survival Study

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Introduction: The incidence of appendiceal cancer in the U.S. has increased over the past two decades despite stable rates of appendectomies. Although the appendix is embryologically derived from the cecum, appendiceal adenocarcinomas have distinct molecular profiles from those of cecal adenocarcinomas. However, treatment protocols are the same and differences in survival outcomes between these malignancies have not been compared extensively. To this end, we conducted a comparative survival analysis of appendiceal and cecal adenocarcinomas.

Methods: Using the Surveillance, Epidemiology, and End Results (SEER) database, we identified individuals ≥30 years of age with appendiceal or cecal adenocarcinomas from 1975 to 2016. Demographic and clinical data, including sex, age at diagnosis, year of diagnosis, race, ethnicity, marital status, tumor histology, tumor stage, tumor grade, chemotherapy, surgery, and survival in months, was extracted using SEER*Stat software. Relative hazard ratios for death in the five-year period following diagnosis were calculated using multivariate Cox regression analysis, adjusted for other covariates. Survival was compared by Mantel-Haenszel Log-Rank test, and survival curves were generated using the Kaplan-Meier method. The p-value level of significance was set at < 0.05 for a two-tailed test. Data was analyzed using SAS 9.4 software and R.

Results: We identified 16,738 appendiceal and 87,047 cecal adenocarcinomas. Male sex, age >60, earlier year of diagnosis, black race, and non-Hispanic ethnicity were independently associated with higher mortality rates (Table). Those who were divorced, separated, never married, or widowed had worse survivorship compared to married individuals. Non-mucinous histology and advanced stage and grade were associated with worse prognosis, while surgery and chemotherapy were associated with improved survival. Multivariate Cox regression analysis demonstrated significantly lower mortality in appendiceal adenocarcinomas (HR 0.61; p< 0.0001). The five-year cancer-specific and overall survival curves for appendiceal and cecal cancers are shown in Figure.

Conclusion: In this first large comparative survival study of appendiceal and colon cancers, appendiceal adenocarcinomas were associated with improved survival compared to that of cecal adenocarcinomas. Further investigation of prognostic factors and molecular mechanisms of appendiceal cancers is needed to establish standardized treatment guidelines.

CECAL AND APPENDICEAL ADENOCARCINOMAS – CANCER-SPECIFIC AND OVERALL SURVIVAL EXPERIENCE BY SITE

Strata: Appendix, Cecum
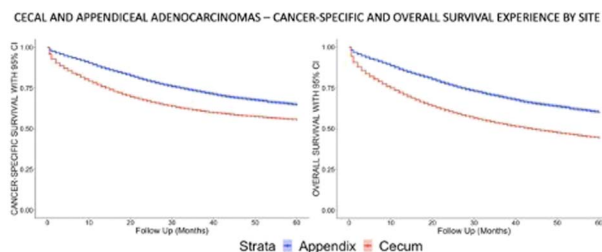
[0209] **Figure 1.** Cecal and appendiceal adenocarcinomas - cancer-specific and overall survival experience by site

Table 1. Demographic and clinical factors associated with five-year mortality following diagnosis of appendiceal or cecal adenocarcinoma using multivariate Cox regression analysis

Parameter		P-value	Hazard Ratio	95% Confidence Interval
Sex	Male		1	
	Female	< 0.0001	0.89	0.87-0.91
Age	>60		1	
	≤60	< 0.0001	0.78	0.76-0.80
Year of Diagnosis	2005-2016		1	
	1991-2005	< 0.0001	1.56	1.49-1.63
	1975-1990	< 0.0001	1.25	1.22-1.29
Race	White		1	
	Asian/Pacific Islander	0.0003	0.91	0.87-0.96
	Black	< 0.0001	1.13	1.10-1.17
Ethnicity	Non-Hispanic		1	
	Hispanic	0.003	0.94	0.90-0.98
Marital status	Married		1	
	Divorced	< 0.0001	1.14	1.10-1.19
	Separated	0.02	1.11	1.02-1.21
	Never married	< 0.0001	1.15	1.12-1.19
	Widowed	< 0.0001	1.21	1.18-1.24
Histology	Non-mucinous		1	
	Mucinous	< 0.0001	0.89	0.86-0.91
Stage	Local		1	
	Regional	< 0.0001	3.60	3.43-3.77
	Distant	< 0.0001	17.61	16.79-18.47
Grade	I: Well differentiated		1	
	II: Moderately differentiated	< 0.0001	1.32	1.26-1.37
	III: Poorly differentiated	< 0.0001	1.99	1.90-2.08
	IV: Undifferentiated; anaplastic	< 0.0001	2.11	1.96-2.28
Surgery	Surgical excision		1	
	Biopsy only	< 0.0001	3.55	3.38-3.74
	No surgery or biopsy	< 0.0001	5.39	4.87-5.97

Table 1. (*continued*)

Parameter		P-value	Hazard Ratio	95% Confidence Interval
Chemotherapy	Chemotherapy No chemotherapy	< 0.0001	1 1.06	1.03-1.08
Site	Cecum Appendix	< 0.0001	1 0.64	0.61-0.67

S210

Agreement and Reproducibility in the Rediagnosis of Sessile Polyps

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Introduction: Most serrated polyps (SPs) fall into two categories: hyperplastic polyps (HPs) and sessile serrated polyps (SSPs), the former lacking precancerous potential while the latter is precancerous. These subtypes can be difficult to diagnose histologically. Inaccuracy in SP diagnosis can lead to incorrect colonoscopy surveillance recommendations that can increase the risk of colorectal cancer. In this study, we present GI pathologists with previously diagnosed SPs and aim to quantify the frequency of diagnostic change of SPs and diagnostic agreement.

Methods: Polyp pathology data was utilized from a colonoscopy quality database from colonoscopies performed from 2012-2020. 167 serrated polyps (either HP or SSP) were selected for analysis balanced on previous histology, size and location, excluding those found in patients with known polyposis syndromes. Polyp specimens underwent re-diagnosis from a five member GI pathology team, their experience ranging from fellow to experienced attending. Each pathologist reviewed pathological specimens independently without knowledge of the original diagnosis and made their diagnosis of SSPs following WHO definition. Effort was made to keep diagnostic conditions like real-world practice. Statistical analysis was performed in SPSS. Kappa analysis was performed for inter-observer agreement. Kappa values were grouped as poor (< 0.2), fair (0.21-0.40), moderate (0.41-0.60), good (0.61-0.80), and perfect (>0.80). Means were compared using independent samples t-test. A p value less than 0.05 was considered significant. (Table)

Results: On average, the five GI pathologists re-diagnosed 163 SPs matching the previous diagnosis about 74.1% of all polyps. The mean kappa value for variability in SSP diagnoses between original diagnosis and each GI pathologist was 0.497. Kappa value for polyps less than 1 cm was 0.313 versus 0.692 for polyps greater than 1 cm (p=0.006). The mean kappa value between all pathologists in their re-diagnosis was 0.669. There was no significant difference in kappa when stratified by proximal versus distal colon.

Conclusion: Re-diagnosis of SSPs resulted in only moderate level agreement between GI pathologists and the previous diagnosis. Interestingly, inter-observer agreement among pathologists was at a good level, and there was increased agreement for larger polyps, but not for location. While moderate to good level of agreement is above what is reported in literature, our study highlights the need for improved diagnostic reproducibility of SSPs.

Table 1. Bolded values being statistically significant with p-value < 0.05

	Number of polyps matching previous diagnosis/ Number of polyps re-diagnosed	Kappa	Kappa for polyps less than 1 cm	Kappa for polyps greater than 1 cm	Kappa for polyps in proximal colon	Kappa for polyps in distal colon
Pathologist A vs original diagnosis	84/102 (82.4%)	0.661	**0.471**	**0.835**	**0.768**	**0.555**
Pathologist B vs original diagnosis	57/78 (73.1%)	0.466	**0.166**	**0.589**	**0.386**	**0.625**
Pathologist C vs original diagnosis	122/163 (74.8%)	0.518	**0.287**	**0.725**	**0.563**	**0.450**
Pathologist D vs original diagnosis	125/162 (77.2%)	0.539	**0.326**	**0.579**	**0.600**	**0.449**
Pathologist E vs original diagnosis	12/19 (63.2%)	0.300	-0.176	0.229	0.500	0.167
Mean			0.3125	0.682	0.579	0.520
Pathologist A vs B		0.744	**0.602**	**0.885**	**0.615**	**0.903**
Pathologist A vs C		0.696	**0.604**	**0.850**	**0.694**	**0.695**
Pathologist A vs D		0.785	**0.723**	**0.842**	**0.850**	**0.724**
Pathologist A vs E		0.635	**0.556**	**0.514**	0.556	**0.690**
Pathologist B vs C		0.604	**0.572**	**0.514**	**0.661**	**0.489**
Pathologist B vs D		0.651	**0.517**	**0.771**	**0.664**	**0.623**
Pathologist B vs E	-	-	-	-	-	-
Pathologist C vs D		0.651	**0.592**	**0.663**	**0.715**	**0.592**
Pathologist C vs E		0.543	**0.556**	0.341	0.556	**0.535**
Pathologist D vs E		0.700	**0.737**	**0.538**	0.500	**0.833**
Mean		0.685	0.606	0.697	0.700	0.676

S211

Risk Factors of Patients With Microscopic Colitis and Celiac Disease

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Introduction: Microscopic colitis (MC) is defined as non-bloody diarrhea with macroscopically normal colonic mucosa and microscopically abnormal mucosa in the form of collagenous colitis or lymphocytic colitis. MC affects 10-20% of the population, with true estimates higher as not every patient with chronic non-bloody diarrhea undergoes colonic biopsies. MC is known to be associated with celiac disease (CD), an autoimmune disease of the small intestine. We aimed to further characterize the risk profile and epidemiologic association between CD and MC.

Methods: We employed a multi-institutional database (Explorys Inc., Cleveland, OH); an aggregate of electronic health record data from 26 major US health systems. We formed cohorts of patients with CD and MC using Systemized Nomenclature of Medicine – Clinical Terms (SNOMED – CT). Microscopic colitis was defined as SNOMED terms "microscopic colitis" or "collagenous colitis." Univariate and multivariate analyses were performed on the data, and associations were reported as adjusted odds ratios (aORs) with 95% confidence intervals (CIs) using IBM SPSS Statistics version 28.

Results: Of 47,900,300 adult patients in the database, 143,290 (0.30%) carried a celiac disease diagnosis. Among CD patients, 70 (0.05%) carried a microscopic colitis diagnosis compared to 143,220 (99.95%) of the non-CD patients (p < 0.0001). After multivariate analysis, celiac disease was associated with an increased odds of microscopic colitis (aOR = 10.5; 95% CI 8.59-12.94; p = < 0.0001) (Table).

Conclusion: This large population-based cohort study demonstrated significantly higher odds of MC among patients with celiac disease compared to patients without the disease with higher odds in females, older individuals, smokers, use of NSAIDs and PPIs. Our findings are in line with those from previous observational studies showing the same. Larger prospective studies would be beneficial in identifying the role of gluten exposure in development of microscopic colitis in patients with celiac disease.

Table 1. Multivariable analysis showing risk factors in patients with celiac disease, with and without microscopic colitis

Celiac Disease	With Microscopic Colitis (n [%])	Without Microscopic Colitis (n [%])	Multivariate Analysis (aOR [95% CI])
Total; n= 143290	70	143,220	10.5 (8.59-12.94)
Risk factor			
Female	60 (85.7)	106,640 (74.4)	2.79 (2.47-3.14)
Senior (age >65)	40 (57.1)	18,230 (27.5)	3.15 (2.83-3.50)
Tobacco use	20 (28.6)	19,480 (13.6)	2.44 (2.17-2.74)
NSAID use	60 (85.7)	99,350 (69.3)	2.58 (2.22-3.01)
PPI use	40 (57.1)	54,790 (38.2)	2.96 (2.63-3.32)

S212

Incidence Rates of Adenoamtous Polyps, Clinically Significant Serrated Polyps and Advanced Neoplasia in Adults Age 18-45 in a Community Hospital in the Upper Midwest Over a 15-Year Period: A Retrospective Review

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Introduction: Increasing incidence of early onset colorectal cancer over time has been well described. Temporal trends regarding precursor lesions in young adults are less clearly defined. The aim of this study was to investigate trends in the rates of adenomatous colon polyps, clinically significant serrated polyps and advanced neoplasia in young adults over a 15 year period.

Methods: We performed a retrospective review of all colonoscopy examinations performed in two community hospitals and an ambulatory surgery center in northern Minnesota between January 1, 2006 and December 31, 2020 in adults age 18-45. Exclusion criteria were incomplete colonoscopy exams or exams with inadequate bowel preparation. A total of 2655 colonoscopy exams were included in our review. We measured the incidence rates of adenomas, clinically significant serrated polyps (sessile serrated polyps, traditional serrated adenomas, proximal hyperplastic polyps > 4 mm and hyperplastic polyps > 9 mm) and rates of advanced neoplasia (adenoma > 9 mm, villous histology, high grade dysplasia, colon cancer) for each year in the study period. The relationship between time (as measured by year) and incidence of adenomatous polyps, clinically significant serrated polyps, advanced neoplasia and non-malignant advanced neoplasia was investigated using Spearman Rank Order Correlation (rho). Preliminary analyses were performed to ensure no violation of the assumptions.

Results: There were a total of 291 cases with at least one adenoma detected (11.0% incidence rate), 63 cases with at least one clinically significant serrated polyp (2.4% incidence rate), 60 cases with advanced neoplasia (2.3% incidence) and 8 cases of colorectal cancer (0.3% incidence rate). The incidence rate of adenomatous polyps increased over the course of the study period ($rho = .88$, $n = 15$, $= p < .001$). The incidence of clinically significant serrated polyps increased over the study period, however this finding was not statistically significant. The incidence of advanced neoplasia increased over the course of the study period and trended towards significance ($rho = .50$, $n = 15$, $p = .056$). (Figure)

Conclusion: Incidence rates of adenomatous colon polyps in young adults increased over the study period while rates of advanced neoplasia appeared to increase over the study period. More complete understanding of temporal trends in different precursor colon lesions in young adults may help guide endoscopists caring for young adults with lower GI symptoms.
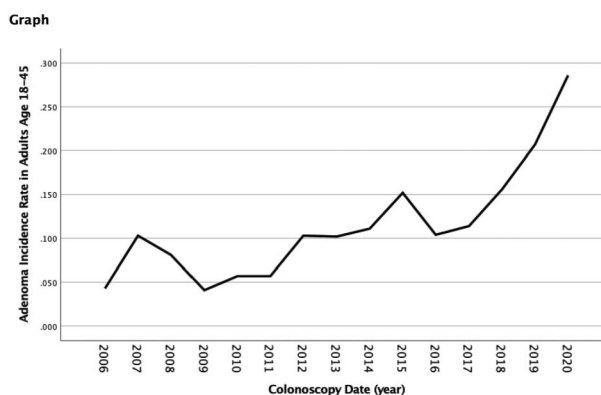
[0212] **Figure 1.** Incidence of adenomatous colon polyps in young adults over time

S213

Intratumoral Human Cytomegalovirus Abundance in Colon Adenocarcinoma Is Associated With Poor Survival Outcomes and Increased Intratumoral Regulatory T-cell Infiltrate in Elderly Patients

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Introduction: Although higher rates of human cytomegalovirus (CMV) are known to be associated with colorectal cancer, the impact of CMV on patient survival and its impact on the immune milieu in the tumor microenvironment have not been studied extensively. As such, we assess the associations of intratumoral CMV RNA signatures in colon adenocarcinoma with overall and age-specific survival and intratumoral immune cell abundance.

Methods: Microbial RNA sequencing (RNA-seq) data was procured as described previously by Poore et al. and used to calculate average log counts per million (CPM) of CMV. Abundance of intratumoral immune cell types was estimated via the quanTIseq method described previously by Finotello et al. The Cancer Genome Atlas Colon Adenocarcinoma clinical dataset was downloaded from cBioPortal.org. Only patients with primary tumor sites in the colon were included for further analysis. Survival data was processed using GraphPad Prism software to generate Kaplan-Meier curves. Relative hazard ratios (HRs) for overall and age-specific survival were estimated with cox proportional hazards models using the lifelines python package. Spearman correlation analysis was calculated with Bonferroni correction for multiple comparisons.

Results: Our study included 432 patients with primary colon adenocarcinoma and CMV RNA-seq data. Comparison of the rate of overall survival for patients in the top and bottom quintiles of CMV log CPM showed higher CMV abundance was associated with significantly decreased survival (p=0.04) (Figure). When stratified by age, individuals aged ≥65 with higher CMV abundance had increased overall mortality risk (HR 1.21; p< 0.001) while no significant association was observed between CMV abundance and survival in those aged ≤55 (Table). Spearman correlation analysis showed intratumoral CMV signatures were significantly positively correlated with CD8+ T cell (correlation coefficient=0.20; p=0.001) and regulatory T cell (correlation coefficient=0.17; p=0.005) abundance in individuals aged ≥65 but not in those aged ≤55.

Conclusion: To our knowledge, this is the largest study investigating associations of intratumoral CMV signatures with patient survival in colon adenocarcinoma and the first to characterize an age-specific correlation between intratumoral CMV and immune cell abundance. Further research elucidating the molecular mechanisms by which CMV modulates the tumor microenvironment is warranted.
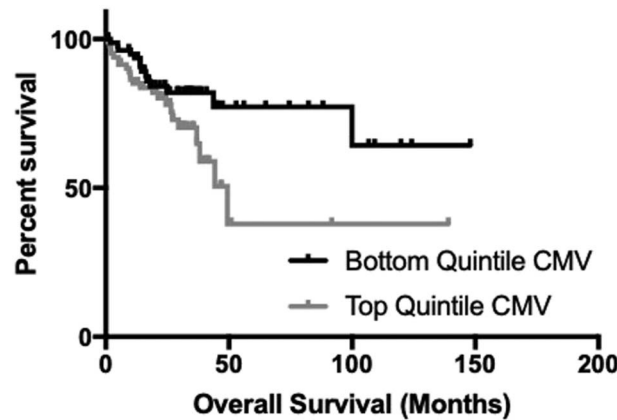
[0213] **Figure 1.** Kaplan-Meier Overall Survival Curve comparing top quintile (n = 86, black) vs bottom quintile (n=86, gray) of CMV recoveries in Colon Adenocarcinoma

Table 1. Associations of intratumoral cytomegalovirus abundance, sex, and tumor stage with mortality risk in patients with colon adenocarcinoma stratified by age using Cox proportional hazards model

| Age ≥65			
Parameter		Hazard Ratio (HR)	P-value
CMV abundance	Per unit increase in CMV log CPM	1.21	< 0.001
Sex	Female	1	
	Male	1.04	0.94
Tumor stage	I-II	1	
	III-IV	3.87	0.009
Age ≤55			
CMV abundance	Per unit increase in CMV log CPM	0.94	0.77
Sex	Female	1	
	Male	0.94	0.91
Tumor stage	I-II	1	
	III-IV	3.44	0.23

S214

Clinicopathological Characteristics and Management of High-Grade Immune-Related Colitis

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Introduction: The incidence of immune-related adverse events (irAEs) is increasing due to the rapid expansion of immune-checkpoints inhibitors (ICIs) use. Recent studies showed that immune-related colitis (IRC) is the most common high-grade irAE. However, limited data are available regarding the clinical course and outcomes of severe and life-threatening (CTCAE grade ≥3) IRC. Therefore, we conducted a retrospective cohort study exploring the characteristics, treatment course, and outcomes of high-grade IRC.

Methods: At our tertiary care hospital, we established the ITOX service; one of the first inpatient services in the country devoted to mitigating irAEs. We then incorporated a novel platform into the electronic medical record (Epic) to triage patients admitted with irAEs to the ITOX service. We reviewed the charts of patients admitted to the ITOX service with high-grade IRC within the last year and collected clinical, endoscopic, and histopathological data. (Figure, Table)

Results: A total of 59 patients admitted to the hospital with CTCAE grade≥3 colitis since the ITOX service inception. A 59% of the cohort received ICI monotherapy; 14% received a combined ICI therapy, and 27% received a combination of ICIs and non-ICIs. Thirteen patients (22%) had multiple irAEs and 78% had IRC only at the time of presentation. Imaging studies showed wall thickening, mucosal hyperemia, and air-fluid level. Endoscopy findings range from normal to severe inflammation with deep mucosal ulcerations. The biopsy results showed regenerative changes, increased epithelial cell apoptosis, and intraepithelial lymphocytosis. Most patients 90% had a sustained response to steroids and deemed steroid-sensitive; 1mg/kg/day (74%), >1mg/kg/day (7%), and < 1mg/kg/day (9%). Only 10% of the patients had steroids-refractory IRC and needed other immunosuppressants. The presence of deep ulcerations and erosions associated with steroids-refractory IRC. Most patients (93%) were discharged on steroids. The average length of hospital stay was 15 days, with a readmission rate of 71% within a year with relapsed IRC. One-third (33%) of the patients resumed ICIs after the resolution of high-grade IRC as maintenance therapy or a rechallenge due to disease progression.

Conclusion: High-grade IRC is associated with high-risk endoscopic and histopathological features and high rates of hospital readmission. These features could represent markers of disease severity and can be utilized to guide the use of high-dose steroids and other immunosuppressants.
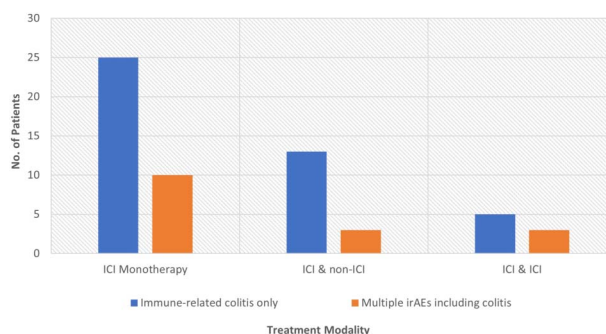
[0214] **Figure 1.** Treatment regimen & number of irAEs

Table 1.

Number of irAEs	
One irAE (Colitis)	46 (78%)
Multiple irAEs	13 (22%)
ICI Monotherapy	7
ICI & non-ICI	3
ICI & ICI	3
Type of irAEs	
Hepatitis	6
Thyroiditis	3
Dermatitis	1
Myositis	1
Hypophysitis	1
Optic Neuritis	1
CTACE Grade of IRC	
Grade 3 (severe)	54 (91.5%)
Grade 4 (life-threatening)	4 (7%)
Grade 5 (fatal)	1 (1.5%)
Hospital Course	
Length of hospital stay (mean):	15 days
Patients admitted to ICU:	2 (3%)
Length of ICU stay (mean):	8 days
Management of irAEs	
Methylprednisolone	48 (89%)
Prednisone	5 (9%)
Dexamethasone	1 (2%)
Response to treatment:	
<1 mg steroids/ kg/ day	9%
=1 mg steroids / kg/ day	74%
>1 mg steroids / kg/ day	7%
Steroids-refractory irAEs:	10%
Infliximab	
Readmission rate:	71%

Education, Knowledge of Family Cancer History, and Colorectal Cancer Screening Among U.S. Adults

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Introduction: It is well known that a family history of colorectal cancer (CRC) is associated with an increased risk of the disease. However, it is uncertain if knowledge of family cancer history influences CRC screening uptake independent of formal educational attainment.
Aim: To evaluate the role of knowledge of family cancer history and educational attainment on CRC screening among adults in the United States.
Methods: We used the 2018 Health information National Trends Survey (HINTS) 5 cycle 2. We identified 2,276 respondents (weighted population size = 132, 125, 477) who gave information regarding their highest formal educational attainment, knowledge of their family cancer history and whether they have been screened for CRC. We used survey weights in all analyses to obtain national estimates and used logistic regression analyses to calculate odds ratios (OR) and 95% confidence intervals (CI). Our fully adjusted model included age, sex, race, BMI, smoking, marital status, and health insurance.
Results: A total of 644 (33.8%) respondents had high school education or less, 715 (40.4%) had some college / vocation school education while 917 (25.8%) were college graduates. Overall, 1,494 (64.1%) respondents reported that they knew their family cancer history well. Respondents with college degrees were more likely to know their family cancer history (74.2%) versus 64.8% among those with some college / vocational training versus 55.5% among those with high school education or less (P value for trend < 0.001). By education status, college graduates were more likely to have been screened for CRC (72.9%;

OR=2.27; 95% CI: 1.40-3.68) as compared to 62%; OR= 1.13; 95% CI: 0.71-1.81) among those with some college or vocational training when compared to 59.7% among those with high school education or less (P value for trend = 0.017) regardless of knowledge of family cancer history. Overall, 1,494 (64.1%) respondents reported that they knew their family cancer history well and were more likely to have been screened for CRC (66.9% versus 58.9%; OR = 1.48; 95% CI: 1.04-2.10). However, formal education had more influence on CRC screening than knowledge of family cancer history (Table).

Conclusion: Formal educational attainment significantly influences CRC screening uptake. However, acquisition of the knowledge of family cancer history should be encouraged among the population.

Table 1. Colorectal cancer screening uptake by educational status and knowledge of family cancer history

Educational status	Lacks knowledge of family cancer history		Knows family cancer history	
	% screened for CRC	Multivariate OR (95% CI)	% screened for CRC	Multivariate OR (95% CI)
High school or less	53.9%	Reference	64.4%	Reference
Some college / vocational training	58%	1.21 (0.53-2.78)	64.1%	1.01 (0.58-1.76)
College graduate	72.1%	**3.21 (1.31-7.85)**	73.2%	**1.74 (1.00-3.02)**

S216

Incidence and Outcomes of Advance Adenoma Detection in Patients Referred for Endoscopic Resection of Large Colon Polyps

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Houston Methodist Hospital, Houston, TX

Introduction: Endoscopic resection of large colon polyps has emerged as the preferred treatment option for large colon polyps detected during colonoscopy. There is insufficient data regarding the incidence of advanced adenoma detection during therapeutic colonoscopy for polyp resection. This study aims to report our experience with large colon polyp resections

Methods: A retrospective chart review was performed to identify patients referred for endoscopic resection of large colon polyps between September 2018 and April 2022. Referral procedure reports were reviewed for documentation of adenomas detected, procedure difficulty for difficult colon polyp resection. Data was collected including demographics, family history of colon cancer, incidence, and type of advanced adenoma detection during therapeutic colonoscopy. Descriptive statistics and multivariate logistic regressional analysis was performed to report outcomes. (Table)

Results: A total of 432 patients were referred for endoscopic resection of large colon polyp. However, only 372 patients were deemed to have a large colon polyp requiring endoscopic mucosal resection. The procedure was technically successful in 354 patients (95.1%). 14 patients had morphologic appearance suggestive of invasive cancer (3.4%), 2 patients were found to have cancer missed on index procedure (.53%) and 2 patients has large polyps involving diverticulum (0.53%).154 patients were found to have at least one missed advanced adenoma (40.8 %) . Of these 154 patients, a total 107 patients had tubular adenoma or tubular villous adenoma (69.4%) and 67 patients had sessile serrated lesions (43.5%). On multivariate analysis, family history of colon cancer was found to be statistically significant factor for missed advanced adenoma(p< .04). 1/14 patients (3.8%) had technically difficult colonoscopy to access polyp documented. A total of 92 patients (25.9%) had a tattoo placed into the polyp, with difficulty< to resect polyp encountered in 14 cases. A follow up colonoscopy was performed in 242 cases, with residual polyp tissue identified in 16 cases (6.6%) which were easily resected

Conclusion: Our study shows that advanced adenomas are frequently missed in patients referred for endoscopic mucosal resection, and a family history of colon cancer was found to be a predictor for missed advanced adenomas. Education for referring physicians is needed to document appropriately the difficulty of colonoscopy and avoid tattoo into polyp tissue.

Table 1. Demographic information

Patients	total number
Male	231(65.3%)
Female	123(34.7%)
Age	62+/-9.1 yrs
Family history of colon cancer	151 (37%)

S217

Use of Endoscopic Vacuum Therapy to Repair Colonic Anastomotic Leaks: A Meta-Analysis

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Introduction: Endoscopic vacuum therapy (EVT) has recently emerged as a treatment modality for patients who experience anastomotic leak after surgery with an incidence of 6-30%. Treatment of anastomotic leaks using EVT in the upper gastrointestinal tract has been well documented. However, endoscopic vacuum therapy for colorectal leaks remains a somewhat less studied entity. EVT is based on applying sponges to the area of the leak and negative pressure is applied to draw off fluid from the leak and help promote granulation tissue formation and healing. In our study we aim to use prospective studies to assess the success and rates of adverse events using EVT for colo-rectal anastomotic leaks.

Methods: Pubmed, Embase and Cochrane were searched from inception to April 2022 for studies reporting success and adverse event rates for EVT used for colo-rectal anastomotic leaks. We included only prospective studies in our analysis. Using I2 we assessed heterogeneity and calculated 95% confidence intervals using fixed or random effect models.

Results: Seven studies involving 368 patients were included in our analysis. Indication for surgery was malignancy in all cases. The total clinical success rate was 90.5% (CI: 87.6-93.5. I2 = 0%). The adverse event rate among all studies was 7% (95% CI: 4.4-9.5%, I2 = 0%). Six patients required further surgical intervention and 2 required CT guided drain placement. No mortality with the procedure protocol was reported. (Figure)

Conclusion: EVT is an emerging treatment option for anastomotic leak. Our study demonstrates the safety and efficacy of EVT as an option for patients who experience colorectal anastomotic leak, however large prospective studies are warranted for further evaluation in this area.
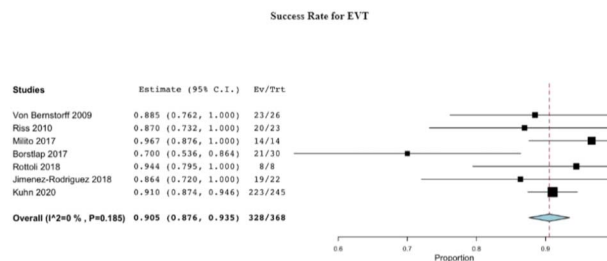
[0217] **Figure 1.** Success rate of EVT for anastomotic leaks

S218

Prevalence and Outcomes of Immune Checkpoint Inhibitor (ICI) Associated Colitis: A Population-Based Cohort Study

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Introduction: Immune checkpoint inhibitors (ICIs) can trigger an overactivation of the immune system, resulting in an autoimmune-like process in various organ systems. Involvement of the gastrointestinal (GI) tract has been frequently reported in literature. The primary aim of this study was to evaluate the prevalence and disease outcomes of ICI colitis.
Methods: A retrospective cohort study was conducted using TriNetX, a multi-institutional database of more than 70 million patients from 49 healthcare organizations in the USA. ICI colitis cohort included patients on Nivolumab, Ipilimumab, Pembrolizumab, Atezolizumb, Durvalumab, Avelumab or Cemiplimab who developed colitis within 1 year of initiation of ICI. Patients with inflammatory bowel disease (IBD), GI infections and intestinal ischemia were excluded from the study. Disease outcomes that were evaluated included hospitalization, oral/IV steroid use, biologic use and mortality within 3 months of ICI colitis. Disease outcomes between patients on CTLA-4 inhibitor and PD-1 inhibitor; and CTLA-4 inhibitor and PD-L1 inhibitor were compared after 1:1 propensity matching for age, gender, race and ethnicity and reported as adjusted Odds Ratios (aOR) with 95% confidence intervals (CIs).
Results: Out of 57,067 patients on ICIs, 4128 (7.23%) patients developed ICI colitis (mean age 64 ± 12, male 56%, Caucasian 77%). The prevalence of ICI colitis was 5.9% in Pembrolizumab, 15.5% in Ipilimumab, 5.5% in Nivolumab, 3% in Durvalumab, 5.8% in Atezolizumab, 3% in Cemiplimab and 2.8% in Avelumab. 34% required hospitalization, 44% required oral steroids, 6.6% required IV steroids, 6% required a biologic agent and 0.2% required colectomy (Figure). 90-day mortality was observed in 15% of patients. Patients with ICI colitis from CTLA-4 inhibitors were more likely to require oral steroids [aOR 1.62, 95% CI 1.33-1.98], IV steroids [1.54, 1.15-2.07] and infliximab [OR 2.18, 1.62-2.91] compared to those on PD-1 inhibitors. Patients with ICI colitis from CTLA-4 inhibitors were also more likely to require oral steroids [aOR 3.33, 95% CI 2.36-4.69], IV steroids [2.45, 1.49-4.02] and infliximab [OR 7.35, 3.73-14.50] compared to those on PD-L1 inhibitors (Table).
Conclusion: Approximately 50% of patients with ICI colitis require either PO or IV steroids. Patients on CTLA-4 inhibitors are more likely to have a worse disease course compared to patients on PD-1 or PD-L1 inhibitors.
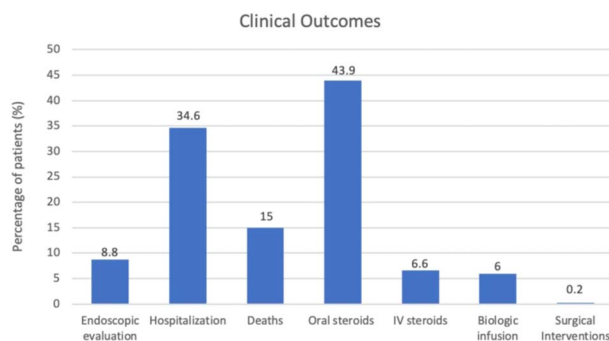
[0218] **Figure 1.** Clinical outcomes of the patients with ICI colitis Oral steroids: Prednisone or Budesonide; IV steroids: Methylprednisolone; Biologic: Infliximab or Vedolizumab; Surgical intervention: total or subtotal colectomy

Table 1. Comparison of the clinical outcomes between patients that developed Cytotoxic T-lymphocyte-associated protein 4 (CTLA-4) inhibitor colitis vs Programmed death-ligand 1 (PD-L1) inhibitor associated colitis and CTLA-4 inhibitor colitis vs Programmed cell death protein 1 (PD-1) inhibitor colitis

Clinical Outcomes	CTLA-4 vs PD-L1 (OR, CI)	CTLA-4 vs PD-1 (OR, CI)
Oral steroids	3.333 (2.368-4.693)	1.626 (1.334-1.982)
IV steroids	2.450 (1.491-4.025)	1.546 (1.154-2.071)
Infliximab	7.355 (3.73, 14.502)	2.175 (1.625-2.912)
Hospitalization	1.256 (0.73-1.621)	1.096 (0.916-1.31)
ICU care	1.00 (0.626, 1.596)	0.972 (0.697-1.354)

CTLA-4 inhibitor: Ipilimumab; PD-1 inhibitor: pembrolizumab, and nivolumab; PD-L1 inhibitor: avelumab, atezolizumab and durvalumab.

S219

The Outcomes of *Clostridioides difficile* Infection in Patients With and Without History of Bariatric Surgery

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Introduction: Obesity is a known risk factor for Clostridioides difficile infection (CDI). Bariatric surgery is widely used to manage obesity in a certain patient population, but bariatric surgery significantly reduces stomach acid production, and gastric acid suppression has been deemed to be another risk factor for CDI. However, there is little data on the outcomes of CDI in patients who had bariatric surgery. Thus, we aim to assess the outcomes of CDI in patients with a history of bariatric surgery.
Methods: Patients hospitalized with CDI from the National Inpatient Sample (NIS) database 2014 were selected. Diagnoses were identified by using ICD-9 CM codes. Patient demographics and outcomes of CDI were compared between the groups with and without a history of bariatric surgery. The outcomes of interest were inpatient mortality, length of stay, total hospital charge, hypotension/shock, acute renal failure, ileus, megacolon, and colectomy. Chi-squared tests and independent t-tests were used to compare proportions and means, respectively. Multivariate logistic regression analysis was performed to determine if bariatric surgery is an independent predictor of the outcomes, adjusting for age, sex, race, Charlson Comorbidity Index, and obesity.
Results: There were no statistically significant differences in length of stay, total hospital charge, and inpatient mortality between the groups. After adjusting for age, sex, race, Charlson Comorbidity Index, and obesity, there were no statistically significant differences in outcomes of interest, including hypotension/shock, acute renal failure, ileus, megacolon, and colectomy.
Conclusion: Our study indicates that a history of bariatric surgery has no significant impact on the outcomes of CDI among hospitalized patients despite potential physiologic changes with bariatric surgery.

S220

High Intratumoral Hepatovirus Abundance in Colon Adenocarcinoma Is Associated With Worse Overall Survival and Increased Intratumoral CD8+ T-Cell Infiltration

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Introduction: Hepatovirus infection is positively associated with colon adenocarcinoma (COAD) risk, but its role in COAD tumorigenesis remains unclear. We aimed to investigate whether intratumoral hepatovirus abundance in COAD is independently associated with both overall survival and intratumoral immune cell infiltrate.

Methods: We included patients with primary COAD and hepatovirus RNA sequencing (RNA-seq) data from The Cancer Genome Atlas (TCGA) COAD database. RNA-seq data procured as described previously by Poore et al. (*Nature*, 2020) was used to estimate intratumoral hepatovirus abundance by calculating the average log2 of transcripts per million for each patient. Demographic and clinical data, including age, sex, and tumor stage, were downloaded from TCGA-COAD using cBioPortal.org. Relative hazard ratios (HRs) for overall survival were estimated with Cox proportional hazards model using the lifelines python package. A significance threshold of $p \leq 0.05$ was used for independent t-tests. Intratumoral immune cell abundance was estimated via the quanTIseq, a devolution algorithm described previously by Finotello et al. (*Genome Medicine*, 2019). Spearman correlation analysis was then used to assess the association between intratumoral hepatovirus and immune cell abundance.

Results: In 432 patients with primary COAD, intratumoral hepatovirus abundance was significantly associated with shorter overall survival (HR 1.25; $p = 0.05$) in Cox proportional hazards model adjusted for age, sex, and tumor stage (Table). Next, we sought to analyze associations of hepatovirus abundance with 10 immune cell types. Spearman correlation analysis showed intratumoral hepatovirus abundance was significantly positively correlated with intratumoral CD8+ T cell infiltration (correlation coefficient=0.11; $p = 0.02$) but not with B cells, M1 macrophages, M2 macrophages, myeloid dendritic cells, monocytes, neutrophils, natural killer cells, CD4+ T cells, or regulatory T cells.

Conclusion: To our knowledge, this is the first study to identify an association between intratumoral hepatovirus abundance and overall survival in COAD. We also found a significant correlation between intratumoral hepatovirus and CD8+ T cell abundance, highlighting the potential role of hepatovirus in immune and inflammatory pathways regulating COAD carcinogenesis.

Table 1. Associations of intratumoral hepatovirus abundance, age, sex, and tumor stage with overall survival in patients with colon adenocarcinoma using Cox proportional hazards model

Parameter		Hazard Ratio	P-value
Hepatovirus abundance	Per unit increase in hepatovirus log2 transcripts per million	1.25	0.05
Age	Per year increase in age	1.02	0.03
Sex	Female	1	
	Male	1.02	0.93
Tumor stage	I-II	1	
	III-IV	1.02	0.03

S221

Incidence of Follow-Up Colonoscopy After Acute Diverticulitis: A Single-Center Experience

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Introduction: Acute diverticulitis (AD) is the third most common inpatient gastrointestinal (GI) diagnosis in the United States. Guidelines recommend a follow-up colonoscopy in complicated diverticulitis and after first episode of uncomplicated AD to rule out underlying adenoma and colorectal cancer. We conducted a retrospective study to assess our institution's adherence to guidelines by determining the incidence of follow-up colonoscopies in patients with AD.

Methods: We conducted a retrospective chart review of all adult patients presenting to Allegheny Health Network with AD. Demographic details, imaging, treatment, discharge, and follow-up data were collected. Chi-square test or Fisher's exact test were used for categorical variables. P-value < 0.05 was considered statistically significant.

Results: We included 489 patients with age 64.06±14.82 years, comprising 222/489 (45.03%) males in our study. Left-sided diverticulitis was most common 459/489 (93.9%), followed by right sided 20/489 (4.1%) and bilateral 6/489 (1.2%). 272/485 (56.1%) had complicated diverticulitis. Only 53/272 (19.5%) patients with complicated AD and 63/213 (29.6%) patients with uncomplicated AD received colonoscopy referrals at discharge. Among inpatient teams, teaching teams had higher referral rates for follow up colonoscopy (18/38, 47.4%) as compared to private (52/253, 20.6%) and surgery (34/166, 20.5%) teams (p-value:0.001). Follow-up colonoscopy was done in 82/213 (38.5%) and 109/272 (51.1%) in uncomplicated and complicated diverticulitis respectively. Colonoscopy was performed in 50/213 (23.5%) and 73/272 (26.8%) in uncomplicated and complicated diverticulitis groups respectively for screening of colorectal cancer after the episode of diverticulitis. Further analysis showed that odds of GI follow-up were 3.6 times greater for patients with a PCP follow-up than without a PCP follow-up (95% CI:1.93-6.59). Patients were 1.7 times more likely to have a colonoscopy follow-up if they had a PCP follow-up (95% CI:1.18-2.50).

Conclusion: Our study shows low adherence to guidelines for follow-up colonoscopy after the episode of acute diverticulitis especially among private hospitalists and surgical teams. Patients should get PCP to follow up on discharge to improve adherence to follow-up GI visits and colonoscopy. This allows for the opportunity to further educate medicine providers, which can improve early diagnostic rates of adenoma and colorectal carcinoma in this population.

S222

Patients With Eosinophilic Colitis Have Comparable Rates of Colorectal Cancer Compared to Patients With Ulcerative Colitis

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Introduction: Eosinophilic colitis (EoC) is a rare entity characterized by the presence of high eosinophilic infiltrate into the colonic wall in symptomatic patients, in the absence of known other causes of colonic eosinophilia. Recently proposed guidelines suggest 100 eosinophils per high-power-field in the ascending colon, 85 in the descending, and 65 in the sigmoid colon as diagnostic thresholds. Whereas ulcerative colitis (UC), is known to be associated with an increased risk of colorectal cancer (CRC), little is known of the association between EoC and CRC. We aimed to compare EoC patients to UC patients to assess their odds of developing CRC.

Methods: Using the multi-institutional, health research network database TriNetX (Cambridge, MA), de-identified, aggregated clinical data were obtained on patients with a diagnosis of either EoC or UC. Patients with other identifiable causes of eosinophilia were excluded from the EoC cohort, including inflammatory bowel disease, food allergies, helminth infections, and other eosinophilic gastrointestinal disorders. A 1:1 propensity score matching method was used to stratify EoC and UC patients. Matched variables were age at diagnosis, sex, race, obesity, tobacco abuse, alcohol abuse, and family history of digestive tract malignancy. Odds ratios(OR) and confidence intervals (CI) were calculated for development of CRC and subsequent colonoscopies for each cohort.

Results: A total of 1,310 and 195,477 EoC and UC patients were identified, respectively (Table). The higher proportion of EoC patients were female compared to UC patients (65.4% vs 54.4%), and were African American (11.9% vs 9.2%). More EoC patients reported tobacco usage (4.6% vs 2.5%) and were obese (11.8% vs 7.0%) compared to UC patients. A 1:1 matching ratio stratified 1,310 patients into each cohort. After adjusting for the aforementioned covariates, EoC patients had an OR of 1.304 (95% CI 0.828-2.054, *p*-value 0.2503) of developing CRC compared to UC patients (Figure). EoC patients demonstrated an OR of 0.754 (95% CI 0.583-0.976, *p*-value 0.0313) of undergoing subsequent surveillance colonoscopies after initial diagnosis of disease compared to UC patients.

Conclusion: Patients with a diagnosis of EoC have a similar risk of developing colorectal cancer compared to UC patients. Despite this, EoC patients are less likely to undergo subsequent surveillance colonoscopy compared to UC patients. Hopefully, our data can be used for future prospective studies investigating the natural course of EoC.
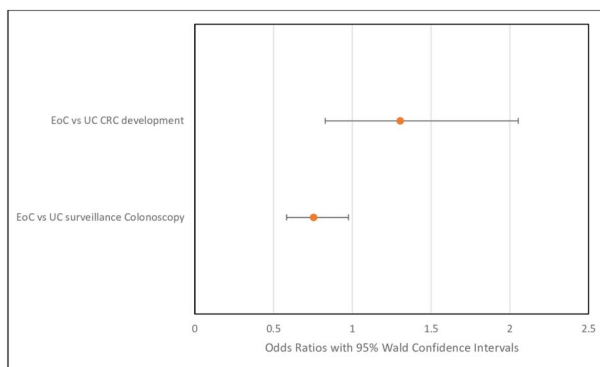
[0222] **Figure 1.** Forest plot showing odds ratios and confidence intervals of development of colorectal cancer (CRC) and subsequent surveillance colonoscopies in EoC patients compared to UC patients

Table 1. Baseline patient characteristics of EoC (eosinophilic colitis) and UC (ulcerative colitis) patients before and after 1:1 propensity score matching

Baseline Patient Characteristics

	Before Matching			After Matching		
	EoC(n=1,310)	UC(n=195,477)	*p*-value	EoC(n=1,310)	UC=n1,310)	*p*-value
Age at Diagnosis	54 +/- 17.2	51 +/- 17.6	< 0.0001	54 +/- 17.2	54 +/- 17.4	0.9451
Sex						
Female	857(65.4%)	106,402(54.4%)	< 0.0001	857(65.4%)	865(66.1%)	0.7419
Male	453(34.6%)	89,075(45.6%)	< 0.0001	453(34.6%)	445(33.9%)	0.7418
Race						
African American	157(11.9%)	17,934(9.2%)	0.0005	157(11.9%)	134(10.2%)	0.1527
Asian	32(2.4%)	3,583(1.8%)	0.1014	32(2.4%)	39(2.9%)	0.3997
Caucasian	980(74.8%)	145,147(74.3%)	0.6468	980(74.8%)	1,007(76.9%)	0.2178
Other/Unknown	141(10.9%)	28,813(14.7%)	< 0.0001	141(10.9%)	130(10.0%)	0.6152
Other Covariates						
Alcohol abuse	18(1.4%)	3,241(1.7%)	< 0.0001	18(1.4%)	151(11.5%)	0.8078
Family history of GI cancer	38(2.9%)	4,033(2.1%)	< 0.0001	38(2.9%)	49(3.7%)	0.2818
Obesity	155(11.8%)	13,688(7.0%)	0.4222	155(11.8%)	12(0.9%)	0.2706
Tobacco use	60(4.6%)	4,807(2.5%).	0.0338	60(4.6%)	31(2.4%)	0.3931

S223

Factors Related to Fecal Microbiota Transplant Failure in the Treatment of Recurrent *C. difficile* - A Single Center Retrospective Cohort Study

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Introduction: Fecal Microbiota transplantation (FMT) is recommended for treatment of recurrent *Clostridioides difficile* infection (CDI) with reported success rates of 80-90%. There are limited data on factors contributing FMT failure, particularly in the outpatient setting. Our objective was to describe FMT failure rates within one year and to evaluate factors associated with FMT failure.
Methods: We conducted a retrospective cohort study of consecutive patients who had outpatient FMT at Baystate Medical Center, Springfield, MA from 12/14 through 9/18. We collected patient data including demographics, CDI related factors, comorbid conditions, medications and FMT route. FMT failure was defined as non-response or recurrence of diarrhea, associated with positive stool C. diff toxin or PCR. IRB approval was obtained. Unadjusted relative risk (RR) and 95% confidence intervals for factors associated with FMT failure were estimated using log-binomial regression. Due to low power, we present possible associations with p-values < 0.2.
Results: 92 patients were included with a mean age of 64y. CDI severity (per IDSA guidelines) was mild/moderate in 73% and severe or fulminant in 27%. 69% of patients had been previously hospitalized for CDI and the most common FMT indication was recurrent CDI in 76%. FMT failure occurred in 25 of 92 (27%) of which half occurred within 21 days. Factors associated with FMT failure were immunosuppression (RR=2.90); current or previous malignancy (RR=2.50); prior hospitalizations (RR=2.42); and receipt of non-CDI antibiotics within 6 months of FMT (RR=2.80). None of the following factors were associated with risk of FMT failure: age, indication, CDI severity, history of colectomy, diabetes, prior radiation, history of appendectomy, probiotics prior to FMT, H2 antagonists or PPIs, ICU admission, inflammatory bowel disease, or route of FMT delivery (oral, NGT, colonoscopy). (Table)
Conclusion: We have identified four factors associated with FMT failure for outpatients with recurrent CDI: immunosuppression, current or previous malignancy, prior CDI hospitalizations and non-CDI antibiotics within 6 months prior to FMT. Knowledge of the above factors may help inform treatment options for patients with recurrent or refractory CDI.

Table 1. Univariable analysis of associations between factors associated with FMT failure within one year

	Overall	FMT Failure No	FMT Failure Yes		Relative Risk
	N=92	N=67	N=25	p- value	(95% CI)
Age at transplant (yrs)	63.9	65.1	60.7	0.319	0.92 (0.77 to 1.10)
Male	n=20 (21.7%)				
Female	n=72 (78.3%)				
FMT Indication					

Table 1. (*continued*)

	Overall	FMT Failure No	FMT Failure Yes		Relative Risk
	N=92	N=67	N=25	p- value	(95% CI)
Recurrent CDI	70 (76.1%)	54 (77.1%)	16 (22.9%)	0.062	n/a
Severe CDI	3 (3.3%)	3 (100.0%)	0 (0.0%)		
Fulminant Colitis	2 (2.2%)	2 (100.0%)	0 (0.0%)		
Recurrent and Severe CDI	17 (18.5%)	8 (47.1%)	9 (52.9%)		
CDI Severity					
Mild/Moderate	67 (72.8%)	51 (76.1%)	16 (23.9%)	0.415	Referent
Severe	15 (16.3%)	10 (66.7%)	5 (33.3%)		1.40 (0.61 to 3.21)
Fulminant Colitis	10 (10.9%)	6 (60.0%)	4 (40.0%)		1.67 (0.70 to 4.00)
Prior Hospitalization Due to C. Diff					
No	29 (31.5%)	25 (86.2%)	4 (13.8%)	0.076	Referent
Yes	63 (68.5%)	42 (66.7%)	21 (33.3%)		2.42 (0.91 to 6.40)
Immunosuppression					
No	57 (62.0%)	48 (84.2%)	9 (15.8%)	0.003	Referent
Yes	35 (38.0%)	19 (54.3%)	16 (45.7%)		2.90 (1.44 to 5.83)
Current or Previous Malignancy					
No	70 (76.1%)	56 (80.0%)	14 (20.0%)		Referent
Yes	22 (23.9%)	11 (50.0%)	11 (50.0%)	0.012	2.50 (1.33 to 4.68)
Antibiotics (6 mos. prior to cdiff; not treating c.diff.)					
No	32 (34.8%)	28 (87.5%)	4 (12.5%)	0.027	Referent
Yes	60 (65.2%)	39 (65.0%)	21 (35.0%)		2.80 (1.05 to 7.46)

S224

Colonic Gastrointestinal Angioectasias Are More Likely to Be Diagnosed in African Americans Who Live in Metropolitan Areas

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Introduction: Limited information exists on racial and ethnic disparities in patient diagnosed with colonic gastrointestinal angioectasias (CGIAE). We therefore evaluated incidence of CGIAEC using the National Inpatient Sample (NIS) over a three year period from 2016-2018. The primary aim of the study was to determine the incidence, demographics and comorbidities among difference racial groups and ethnicities.
Methods: Categorical data analyzed via chi square test with Rao-Scott correction. Numerical data was analyzed by a version of the Kruskal Wallis test that is modified for complex survey data. Population data Tables were used from Health Care Utilization Project (HCUP) to determine national population for different groups. This study was approved by the institutional review board for the VA Loma Linda Healthcare System.
Results: The incidence of CGIAE was highest in African-Americans (AA) and lowest among Hispanics (H) when compared to non-Hispanic Whites (nHW). Incidence of CGIAE in H was lower compared to either AA or nHW despite a similar age. Length of stay, age and Charlson score was not different among the different racial and ethnic groups. A significantly higher proportion of the patients in the lowest income category based on zipcode were noted to be AA. In addition, AAs were more likely to be hospitalized in the large urban hospitals within the higher density urban areas versus fringe or micropolitan locations when compared to nHW.
Conclusion: CGIAE is an important cause of lower gastrointestinal bleeding. It is important to understand the different racial and ethnic differences when CGIAE is diagnosed. The incidence of CGIAE may be more prevalent among AA and patients who are lower socioeconomic status and obtain care at large urban hospitals.

S225

Pattern of Distant Organ Metastasis and Effects on Survival in Rectal Adenocarcinoma: A Population-Based Study

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Introduction: Metastasis to distant organs is associated with a poorer prognosis in patients with rectal adenocarcinoma (RAC). Identification of risk factors for metastasis is crucial for early detection. We used the Surveillance, Epidemiology and End-Results (SEER) database to determine the frequency, risk factors, and prognosis of metastasis in RAC patients.
Methods: Data on sociodemographic and tumor characteristics of RAC patients from 2010 to 2018 were retrieved from the SEER database. Patients with a histologically confirmed diagnosis of RAC were included. Patients diagnosed at autopsy and those with incomplete survival data were excluded. Overall survival (OS) was defined as the time from diagnosis to death from any cause or end of follow-up. Cancer-specific survival (CSS) was defined as the time from diagnosis to death due to rectal adenocarcinoma or end of follow-up. Descriptive statistics, multivariate logistic regression, and Cox regression were applied using SPSS version 25. Kaplan Meier survival curves were constructed.
Results: We included 13,564 patients with RAC. Metastasis to any site, liver, lung, bone, and brain, was reported in 11.5%, 9.6%, 4.1%, 0.8%, and 0.1% of patients, respectively. Sociodemographic and tumor characteristics of patients with and without metastasis are reported in Table. On logistic regression, significant risk factors for metastasis were age< 50 years (adjusted odds ratio (aOR) 1.168), grade 4 (aOR 2.119), T4 (aOR 1.866), N2 (aOR 4.520), and patients without surgery (aOR 9.71). The median OS and CSS in metastatic RAC were 24 and 25 months, respectively. Median OS of one, two, and three metastatic sites were 27, 15, and 8 months, respectively ($P< 0.001$) (Figure). On Cox regression, variables significantly associated with decreased OS were age greater than 75 years (adjusted hazard ratio (aHR) 2.13), grade 4 (aHR 1.436), T4 (aHR 1.31), N2 (aHR 1.257), and tumors >200mm (aHR 1.229). Variables significantly associated with decreased CSS were age greater than 75 years (aHR 2.009), grade 4 (aHR 1.487), T4 (aHR 1.278), N2 (1.304), and tumors >200 mm (aHR 1.259).
Conclusion: Metastasis was reported in 11.5% of patients, most commonly in the liver (9.6%). The site-specific risk factors for metastasis reported in our study may facilitate the identification of high-risk groups that need careful surveillance.
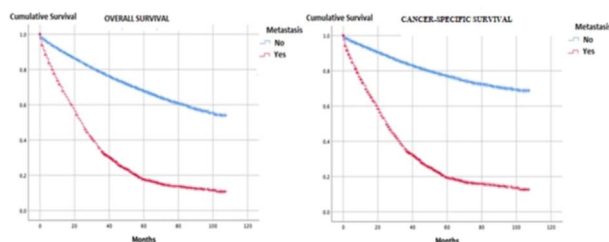
[0225] **Figure 1.** Kaplan Meier Survival Analysis for Rectal Adenocarcinoma with and without Metastasis

Table 1. Baseline characteristics of patients with rectal adenocarcinoma

Features	No metastasis, n (%)	Any metastasis, n (%)	P-value
Total	12,005	1,559	
Race			0.001
Caucasian	9439 (88.8)	1196 (11.2)	
African American	974 (85.2)	169 (14.8)	
Other	1592 (89.1)	194 (10.9)	
Sex			0.065
Male	7084 (88.1)	958 (11.9)	
Female	4921 (89.1)	601 (10.9)	
Age, years			< 0.001
Less than 50	2085 (86.0)	339 (14.0)	
50-75	7123 (88.3)	941 (11.7)	
More than 75	2797 (90.1)	279 (9.1)	
Tumor grade			< 0.001
1	963 (93.8)	64 (6.2)	
2	9488 (88.8)	1194 (11.2)	
3	1355 (83.6)	266 (16.4)	
4	199 (85.0)	35 (15.0)	
T Stage			< 0.001
1	2633 (91.4)	249 (8.6)	
2	2007 (96.4)	75 (3.6)	
3	6172 (87.8)	860 (12.2)	
4	1193 (76.1)	375 (23.9)	
N Stage			< 0.001
0	7041 (93.5)	490 (6.5)	
1	3679 (83.8)	711 (16.2)	
2	1285 (78.2)	358 (21.8)	
Surgery			< 0.001
Yes	10889 (92.6)	870 (7.4)	
No	1116 (61.8)	689 (38.2)	
Size >200mm	187.51	260.52	< 0.001
Annual income			0.076
Less than 50,000	1557 (86.9)	234 (13.1)	
50,000-75,000	6296 (88.8)	791 (11.2)	
>75,000	4152 (88.6)	534 (11.4)	

S226

The Outcomes of Diverticular Disease in Patients With Morbid Obesity: A Nationwide Population Study

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Introduction: Diverticular disease is a common finding in developed countries. The most common complications of diverticular disease are bleeding and diverticulitis, these may prompt hospitalization and therefore, increase the healthcare burden. It is proposed that physical activity or BMI may be associated with the prevalence or complications of diverticular disease. Obesity has come to attention with the recent trends in the United States and worldwide. In this study, we aimed to compare diverticular disease in patients with and without morbid obesity.
Methods: This was a retrospective cohort study with data from the Nationwide Inpatient Sample (NIS) database for 2016, 2017, 2018, and 2019. The study population consisted of hospitalizations with a principal diagnosis of diverticular disease, identified by the International Classification of Disease-10 (ICD-10) code K57. Patients were divided into 2 subgroups based on a secondary diagnosis of morbid obesity, identified by ICD-10 code E6601. The primary outcome was comparing inpatient mortality. Secondary outcomes included the rate and adjusted odds of several complications of admission. We used the Chi-square test to compare characteristics between the two groups and logistic regression to compare the complications of admissions. P-value had 0.05 as the threshold for statistical significance.
Results: A total of 1,173,634 patients were included, and 75,559 had a diagnosis of morbid obesity. Patients with morbid obesity were more female (65.3% versus 55.7%, P< 0.001). They also had lower mean age (56.8 versus 65.0 years, P< 0.001), higher proportion of Black (19.1 versus 11.4% P:0.000) and Hispanic race (11.5 versus 10.0%, P: 0.000), and higher proportion of low household income (31.8% versus 26.1%,

P:0.000). The odds of in-hospital mortality were lower in the group with morbid obesity (OR: 0.75, 95%CI: 0.57-0.97, P: 0.032), however, the odds of sepsis and mechanical ventilation were higher (OR:1.56, 95% CI: 1.38-1.76, P< 0.001 and OR:1.79, 95%CI: 1.54-2.08, P< 0.001 respectively).

Conclusion: Patients with morbid obesity who were admitted due to diverticular disease were younger, from lower quartiles of income and more from racial minorities. Morbid obesity was associated with higher odds of sepsis and mechanical ventilation; however, the mortality was lower. This may be explained by the younger age of the group.

S227

Messenger RNA SARS-CoV-2 Vaccines Affect the Gut Microbiome

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Introduction: Messenger RNA vaccines for preventing SARS-CoV-2 infection are widely used yet their effect on the gut microbiome is not known. Low *bifidobacteria* levels have been linked with severe SARS-CoV-2 infection, inflammatory bowel disease, *Clostridioides difficile* infection, obesity and aging. Preliminary case reports suggest fecal microbiota transplant could cure SARS-CoV-2 infection (1). A study by Bozkurt et al. showed that SARS-CoV-2 patients taking *bifidiobacteria*-containing probiotics had lower COVID-related hospitalization times (2).

Methods: 34 subjects had stool collection prior to vaccination and one month post vaccination to evaluate the relative abundance of *bifidobacteria* in the gut. DNA was extracted, library was prepped, and enrichment and sequencing were done using metagenomic next generation sequencing.

Results: Relative abundance of genus *bifidobacteria* significantly decreased to about half of original value after vaccination (P = 0.0065 via Wilcoxon signed rank test). Prior to vaccination, median (interquartile range) values of relative abundance for genus *bifidobacteria* were 1.13% (0.0016% to 2.52%) and after vaccination were 0.64% (0.0015% to 2.48%).

Conclusion: *Bifidobacteria*, included in the $1 billion industry of probiotics, has been shown to be critical in inflammatory diseases, severe COVID-19, obesity, and the aging process. Our results, although preliminary suggest that SARS COV-2 mRNA vaccine decreases levels of *bifidobacteria* (P = 0.0065). Future studies will be needed to characterize the time course of this decrease in *bifidobacteria* abundance, its impact on human health, and whether or not similar findings are seen with other vaccines (Figure).
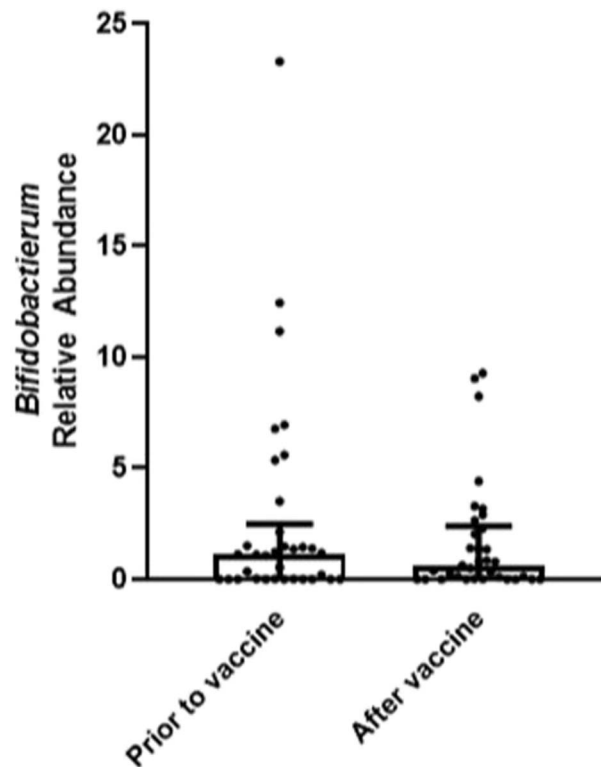
[0227] **Figure 1.** Bifidobacterium relative abundance decreases (P = 0.0065) in subjects (n=34) after vaccination compared to before vaccination in the same subjects. Bars plot median; error bars plot interquartile range

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S228

Multimodal Analysis of cfDNA Methylation Sequencing Improves Early Colon Cancer Detection

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Introduction: In recent years, alterations in cell free DNA (cfDNA) methylation patterns have gained wide acceptance as powerful biomarkers for early cancer detection. Here, we evaluate a Multimodal Epigenetic Sequencing Assay (MESA) for colon cancer detection that combines features derived from both cfDNA fragmentomics and cfDNA methylation to improve test performance. Our study indicates that MESA's combined approach fragmentomics to distinguish between colon cancer patients and healthy individuals.

Methods: Blood specimens drawn from 64 subjects diagnosed with colon cancer and 67 control subjects were processed by using the ECLIPSE platform. This platform consists of molecular techniques for cfDNA extraction, conversion, library generation and targeted next-generation DNA sequencing to generate high quality sequencing reads from genomic regions of interest. The ECLIPSE platform also allows for the evaluation of both cfDNA methylation patterns and fragmentation features by using a non-disruptive, enzymatic conversion step which minimizes degradation of cfDNA, unlike traditional bisulfite conversion methods. Custom bioinformatics pipelines and algorithms were used to process sequencing data, generate features and train models. Model performance was evaluated by using repeated 5-fold cross validation.

Results: The MESA combined feature models possessed a median AUC of 0.91. In contrast, models incorporating only cfDNA methylation features or only cfDNA fragmentation features possessed median AUCs of 0.89 and 0.83, respectively. We also observed > 5% increase in sensitivity at 90% specificity for the MESA combined feature models. Therefore, our MESA approach of combining cfDNA fragmentomics and DNA methylation proved to be superior to using only a single class of features when distinguishing between colon cancer patients and healthy individuals.

Conclusion: Our findings suggest that cfDNA fragmentation-derived features may carry useful information that is complementary and additive to the cfDNA methylation signal when distinguishing between patients with and without colon cancer. By utilizing improved molecular techniques and analysis methods, it is possible to evaluate both cfDNA methylation and cfDNA fragmentation features that reflect the underlying chromatin structure within a single assay. This multimodal approach is predicted to allow for the development of diagnostic tests with superior performance characteristics when compared to currently available testing methods.

S229

A Wolf in Sheep's Clothing: Isolated Colonic Histoplasmosis as a Rare and Devastating Disease in Patients Undergoing Immunomodulator Therapy - A Systematic Review

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Introduction: Gastrointestinal histoplasmosis is mainly considered a protean manifestation of disseminated histoplasmosis. It can mimic inflammatory bowel disease (IBD), cancer, or other bowel diseases, presenting diagnostic and therapeutic challenges. To our knowledge, this report represents the first systematic review on isolated colonic histoplasmosis in patients receiving immunomodulator therapy (IMT).

Methods: A systematic search of MEDLINE, Google Scholar, Embase, and Scopus was conducted for English-only studies, published between inception and June 15, 2022. Abstracts from major GI conferences and articles' reference lists were also screened. The search terms "Histoplasma capsulatum," and "histoplasmosis", were combined using the Boolean operators 'AND' and 'OR' with the terms "isolated colonic" and "colon", with all permutations. Two authors reviewed each study to determine eligibility. The search yielded a total of 264 relevant results. However, only 13 articles fulfilled the inclusion criteria.

Results: A total of 13 patients were identified with isolated colonic histoplasmosis in the setting of IMT. The mean age was 55.62 ± 10.66 years, and 62% of patients were women. Screening colonoscopy incidentally diagnosed histoplasmosis in 38% of patients. Common symptoms were diarrhea 31%, weight loss 23%, or abdominal pain 23%. IMT was mainly administered for liver transplant 31%, renal transplant 31%, and ulcerative colitis 15%. Colonoscopy mostly revealed colonic ulcers 69%, polypoid lesions 15%, or hemorrhage 15%. Of 38%, Histoplasma antigen was positive in 23% of patients. Colonic biopsy diagnosed 85% of patients. Unfortunately, 15% of patients also underwent GI surgery for diagnosis. Amphotericin B with itraconazole 54%, itraconazole alone 38%, and amphotericin B alone was administered in 8% of patients. All patients achieved complete recovery.

Conclusion: This systematic review shows that isolated colonic involvement can be the only clinical presentation of disseminated or primary histoplasmosis. Gastroenterologists should consider it in patients undergoing IMT who present with consistent symptoms. GI histoplasmosis should be ruled out before starting immunosuppressive therapy for colitis due to other causes. Colonoscopy with biopsy can play a pivotal diagnostic role in suspected patients (Figure). Prompt detection and antifungal treatment can result in uneventful recovery. However, delayed identification and improper treatment can lead to death in immunocompromised individuals.
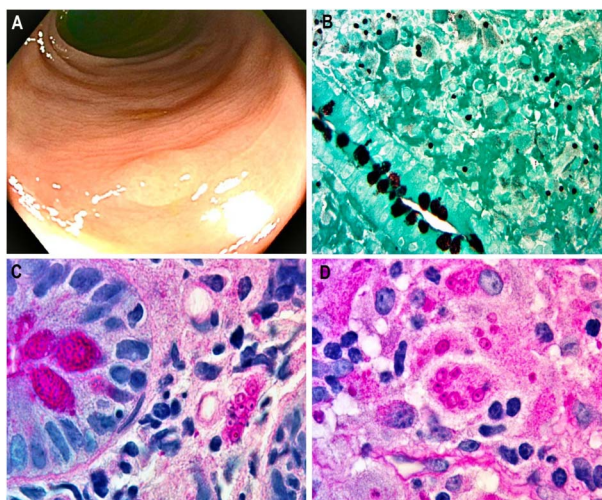
[0229] **Figure 1.** A 65-year-old Caucasian female who was receiving methotrexate for rheumatoid arthritis presented with watery diarrhea for 15 days. Colonoscopy was only remarkable for one sessile polyp in the descending colon (Panel A). Pathology of the polypectomy specimen revealed multiple tiny yeast-like organisms on GMS stain (Panel B). PAS staining confirmed Histoplasma capsulatum (Panels C and D). The patient was finally diagnosed with primary isolated colonic histoplasmosis and she recovered well with antifungal treatment

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S230

Baseline Characteristics of Patient Admitted With Microscopic Colitis

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Introduction: Microscopic colitis (MC) is a chronic inflammatory disease of the colon causing frequent watery diarrhea, abdominal pain, nocturnal diarrhea, urgency and fecal incontinence. Once known to be rare now MC is one of the most common causes of chronic watery diarrhea in adult population which leads to poor quality of life and increase health care cost burden. So, we decide to identify baseline characteristics and incidence of microscopic colitis in adult population.

Methods: Adult patients admitted with MC were analyzed from 2016 - 2019 using the National Inpatient Sample database. The primary outcome was to determine the baseline characteristics of patients admitted with MC. Secondary outcome was to determine the disease burden in hospitalized patient population. SAS 9.4 software was used for statistical analysis. (Figure)

Results: Total 35,685 patients were admitted with MC during our study period. MC cohort comprise of predominantly elders, with mean age of 71.2 ± 13.7 yrs. MC was found to be more prevalent in Caucasian (89.6%) females (77.4%) compared to male (22.6%). We also observed significant increasing trend in hospitalization secondary to MC through 2016 to 2019. Comorbidities like hypertension (62.8%), coronary artery disease (25.3%), smoking (44.7%), hypothyroidism (25.2%) and Depression (24.8%) are some of the higher prevalent ones associated with MC. Concurrent IBS (2.4%), Celiac Disease (2.6%), Rheumatoid Arthritis (9.3%), and C.diff infection (4.5%) were noted among MC patients. Majority of the hospitalization were noted to be emergent (86.7%) and primary insurance in majority of the hospitalized was found to be Medicare (74.5%). (Table)

Conclusion: Our study showed increasing prevalence of MC among the elderly, Caucasians and females throughout the study period. Study also showed increased association between depression and MC. Throughout the years MC has shown an increasing hospitalization trend which potentially increases healthcare cost burden. More detailed studies are warranted in this field to better understand pathophysiology, immune response, gut microbiome along with disease management to improve quality of life among MC patients and decrease the health care cost burden especially on Medicare.
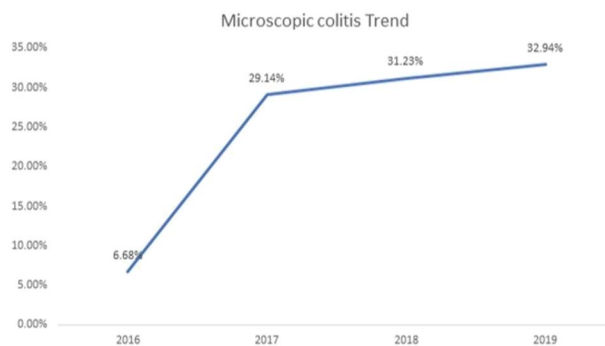
[0230] **Figure 1.** Trend of Microscopic Colitis

Table 1. Baseline characteristics and comorbidities of Microscopic colitis patients admitted between January 2016 and December 2020

Microscopic colitis	N = 35,685
Age, in years (Mean ± SD*)	71.2 ± 13.7
Age groups, %	
18 - 34 years	1.9%
35 – 49 years	5.9%
50 – 64 years	18.3%
65 - 79	43.3%
>79 years	30.4%
Gender, %	
Male	22.6%
Female	77.4%
Race, %	
Caucasians	89.6%
African Americans	2.5%
Others	7.9%
Comorbidities, %	
Hypertension	62.8%
Diabetes mellitus	18.7%
Congestive heart failure	18.4%
CAD*	25.3%
Peripheral vascular disease	9.3%
COPD*	25.1%
Renal failure	19.8%
Coagulopathy	6.1%
Obesity	9.9%
Drug abuse	2.1%
Alcohol abuse	4.1%
Smoking	44.7%
Cdiff * infection	4.5%
IBS*	2.4%
Celiac disease	2.6%
Rheumatoid arthritis/collagen vascular disease	9.3%
Hypothyroidism	25.2%
Depression	24.8%
Admission Type, %	
Emergent	86.7%
Elective	13.3%
Insurance type, %	
Medicare	74.5%
Medicaid	4.7%
Private	18.4%

Table 1. (*continued*)

Microscopic colitis	N = 35,685
Other	2.4%
Location/Teaching status of the hospital, %	
Rural	8.9%
Urban nonteaching	20.7%
Urban teaching	70.3%
*Abbreviations (SD - Standard deviation, CAD - Coronary artery disease, COPD - Chronic obstructive pulmonary disease, cdiff - clostridium difficile, IBS - Irritable Bowel Syndrome)	

S231

The Impact of Nonalcoholic Fatty Liver Disease on the Outcomes of Diverticulitis

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Introduction: The pathogenesis of nonalcoholic fatty liver disease (NAFLD) has not been clearly understood, but several studies suggest intestinal bacteria may play a role. Similarly, diverticulitis is associated with changes in the gut microbiome. However, there is a lack of studies on how NAFLD affects the outcomes of diverticulitis. Thus, this study aims to assess the outcomes of diverticulitis among patients with NAFLD.

Methods: Adult patients hospitalized with diverticulitis from the National Inpatient Sample (NIS), Healthcare Cost and Utilization Project, Agency for Healthcare Research and Quality 2014 were selected. Diagnoses were identified by using ICD-9 CM codes. Patient demographics and outcomes of diverticulitis were compared between the groups with and without NAFLD. The outcomes of interest were inpatient mortality, length of stay, total hospital charge, shock/hypotension, colectomy, abscess, obstruction, fistula, and perforation. Chi-squared tests and independent t-tests were used to compare proportions and means, respectively. Multivariate logistic regression analysis was performed to determine if NAFLD is an independent predictor for the outcomes, adjusting for age, sex, race, and the Charlson Comorbidity Index.

Results: Among 48,214 patients with diverticulitis, 1,184 patients had a history of NAFLD. Patients with NAFLD had shorter length of stay (4.2 days vs. 4.7 days, $p < 0.05$), lower hospital charge ($34,392 vs. $38,652, $p < 0.05$), and lower mortality (0.0% vs. 0.4%, $p < 0.05$). After adjusting for age, sex, race, and the Charlson Comorbidity Index, NAFLD was an independent protective factor for colectomy (OR 0.44, 95% CI: 0.34-0.57, $p < 0.05$) and intestinal abscess (OR 0.67, 95% CI: 0.55-0.81, $p < 0.05$). Adjusted odds ratios of other outcomes were not statistically significant.

Conclusion: Our study indicates that NAFLD is associated with better outcomes of diverticulitis, such as lower rates of colectomy and intestinal abscess among patients hospitalized with diverticulitis, in contrast with worse outcomes associated with NAFLD in many other conditions. The limitation of this study using the NIS database is the difficulty in comparing the severity of diverticulitis between the groups and exact treatment methods, which may have affected the results. Future studies to assess the potential protective effect of NAFLD on outcomes of diverticulitis and understand the pathophysiology of NAFLD and diverticulitis are warranted.

S232

Trends of LOS, Mortality and Healthcare Costs in Comparison With Colorectal Cancer, Breast Cancer and Lung Cancer

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Introduction: Febrile neutropenia is a life-threatening side effect with the mortality of 5 to 11% and can exceed up to 50% in high-risk patients. The objective is to evaluate its effect on mortality, length of stay, health care costs involved with colon cancer in comparison with lung and breast cancer due to its increasing clinical and economic burden. It also involves modifications in the chemotherapy regimen.

Methods: A retrospective study was conducted in adults >18 years using the Nationwide Inpatient Sample (NIS) database from 2016 to 2019 with the admitting diagnosis of Febrile Neutropenia in hospitalized patients with colorectal, breast and lung cancer using the ICD 9 and ICD 10 codes. Study was focused on its effect on mortality, length of stay, co-morbidities, insurance status and health care costs involved based on the cancer type. The outcome was analyzed using multivariate logistic regression analysis and statistical analysis was done using STATA.

Results: Among 7550 colorectal cancer patients, the mean hospital length of stay (LOS) was 6.2 days which is higher than breast cancer (4.5 days) and almost like lung cancer (6.2 days). The mean total health care costs were $16,272 for colorectal cancer whereas it is $11,609 and $17,503 for breast and lung cancer respectively. The in-patient mortality rate was 4% for colorectal and is 1.6% for breast and 6.5% for lung cancer. The odds ratio of in-patient mortality for lung cancer compared to colorectal cancer is 1.10 (with the p-value of 0.020 and confidence interval of 1.01 to 1.20), breast cancer in comparison to colorectal cancer is 0.67 (with p-value of < 0.001 and confidence interval of 0.59 to 0.75) and lung cancer in comparison to breast cancer is 0.99 (with p-value 0.84 and confidence interval of 0.90 to 1.08). The charlson Co-morbidity index was >3 in 75% in colorectal cancer whereas it is >3 in 58% and 85% in breast and lung cancer population. (Table)

Conclusion: Increase in mean length of stay was observed in colorectal cancer compared to breast cancer and increased health care costs for colorectal cancer was also observed despite its lower incidence than breast and lung cancer. The co-morbidity risk and in-patient mortality rate for colorectal cancer is higher than breast cancer.

Table 1. Comparison between Colorectal, Breast and Lung Cancer Studies

Metric	Colorectal cancer	Breast cancer	Lung cancer
Total Population	7550	19915	15465
Mean Age	61.8±12.2	57.7±12.5	66.3±11.2
Female (%)	56.7	100	49.0
Race			
White (%)	75	72	82
Non-White (%)	25	28	18
Charlson Co-morbidity (%)			
0-2	24.8	42.2	14.4
3 or >3	75.2	57.8	85.6
Chronic co-morbidities			
Anemia	7.4	3.4	2.7
Congestive Heart failure	4.8	4.0	10.9
Arrythmia	15.8	11.4	26.4
Peripheral Vascular disease	4.6	3.0	9.0
Chronic Lung disease	12.3	13.6	50.5
Obesity	7.2	11.2	6.6

Table 1. (*continued*)

Metric	Colorectal cancer	Breast cancer	Lung cancer
Hypothyroidism	11.2	15.5	12.4
Chronic Kidney disease	8.9	5.1	12.5
HTN	47.6	43.8	60.5
Diabetes Mellitus	15.5	16.6	21.1
In-Patient Mortality rate	4.0	1.6	6.5
Mean Length of stay (days)	6.2±5.9	4.5±4.4	6.2±5.7
Mean total cost (dollars)	16272	11609	17503
In-patient Mortality	**Odds ratio**	**P Value**	**95% CI**
Breast ca comparison to colorectal ca	0.67	< 0.001	0.59-0.75
Lung ca comparison to colorectal ca	1.10	0.020	1.01-1.20
Lung Ca comparison to breast Ca	0.99	0.84	0.90-1.08

S233

Prevalence, Trends, and Mortality of *Clostridium difficile* Infection in Hospitalized Elderly Patients with HIV: A Nationwide Analysis From 2016-2019

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Introduction: Patients with HIV are expected to be at higher risk for CDI due to increasing antimicrobial use and disease-related alterations in gut microflora. We aim to study its prevalence, hospitalization trends, and outcomes in elderly patients with HIV.

Methods: The National Inpatient Sample (NIS) 2016-2019 database was queried for geriatric HIV patients (≥65 years) hospitalized with a primary diagnosis of CDI using ICD-10 codes. Baseline characteristics, comorbidities, hospitalization trends, and in-hospital mortality were compared in hospitalized patients with CDI between HIV and non-HIV cohorts. Trends in mortality were assessed using a linear by linear association test.

Results: Of a total of 48025 geriatric admissions among HIV patients, 995 (2.1%) were primarily related to CDI. Prevalence of CDI in hospitalized elderly patients was higher among HIV patients (2.1% vs 1.4%) compared to the Non-HIV cohort (p< 0.001) with reassuringly declining trends in CDI hospitalizations in HIV patients between 2016 and 2019(2.4 % to 1.5%, p-trend< 0.001-Figure A). Among elderly patients with HIV, Females vs. males (2.6% vs. 1.9%) and white race compared to other race groups (2.3% white vs 2.0% black vs 1.7% Hispanic) showed a higher rate of CDI (p< 0.001). Comorbid depression and renal failure were more frequent whereas smoking and obesity were less frequent in the CDI cohort vs. non-CDI cohort. Patients with CDI and HIV tend to belong to lower household income groups and are less likely to be smokers than those with HIV but without CDI. The overall mortality rate was significantly higher for elderly HIV patients with CDI than those without CDI (10.6% vs. 4.7%, p< 0.001) with decreasing trends of nearly 50% from 14.0 % in 2016 to 7.7 % in 2019 (p-trend=0.044-Figure B). Discharge to another facility (38.4% to 26.3%), the median length of stay (8 days vs 5 days), and cost burden ($70860 vs $53688) were all higher in the CDI cohort vs non-CDI cohort (p< 0.001).

Conclusion: Our study found declining trends in CDI in HIV patients hospitalized from 2016 to 2019, however, the overall rate still remained significantly higher compared to the non-HIV cohort. Similarly, the overall mortality rate was 2 times higher in the HIV-CDI cohort vs. non-CDI cohort with improving trends in survival between 2016 and 2019. Further studies are warranted to understand contemporary trends in hospitalizations for CDI, associated comorbidities, and their impact on patient outcomes and cost.
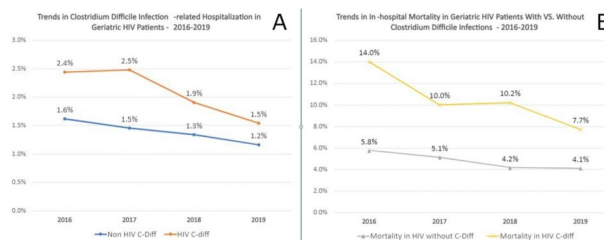
[0233] **Figure 1.** A. Trends in Clostridium Difficile Infection-related Hospitalization in Geriatric HIV Patients - 2016-2019 B. Trends in In-hospital Mortality in Geriatric HIV Patients With VS. Without Clostridium Difficile Infections- 2016-2019

S234

Trends in Ocular Manifestations Requiring Inpatient Admission in Inflammatory Bowel Disease: A Nationwide Analysis Over a Decade

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Introduction: Inflammatory Bowel Disease (IBD) can affect the gut and almost every other body system. Extra-intestinal manifestations (EIM) play a significant role in lifetime care and quality of life in IBD patients. Ocular Manifestations (OM) are a common form of EIM and often present in insidious but can have dire consequences, including permanent vision loss in these patients. We explore the trends of OM in IBD patients requiring inpatient admission over the past decade.

Methods: This study is a retrospective review of the healthcare cost and utilization project: national inpatient sample for 2008-2018 was conducted. Patient and institutional characteristics were extracted for the analysis. International classification of disease (ICD) codes are used to identify variables including optic neuritis, conjunctivitis, uveitis, IBD, and other comorbidities. Chi-square test and propensity matched-multivariate logistic regression were used to analyze the risk of OM, mortality, and effects on total hospital charges and length of stay.

Results: A total of 3,474,827 IBD patients were included in this study, out of which 24,280 had OM. Caucasians had the highest rate of OM at 74%, followed by African Americans at 15% (p< 0.05). Majority of the admissions were at large bed-size (70% vs 59% p< 0.05) non-teaching hospitals (74% vs 26% p< 0.05). The rate of OM has remained between 0.8-1% over the past decade (p< 0.05). As a disease overall, IBD increases the risk of OM [1.03 (1.02-1.04) p< 0.05]. By subtype, UC does not have a statistically significant impact on OM, while CD does increase the odds of developing OM [1.10 (1.05-1.15) p< 0.05]. The most common OM seen were cataracts, conjunctivitis, uveitis, and episcleritis. (Figures 1 and 2)

Conclusion: As IBD prevalence has increased over the years, OM continue to be a significant burden on this population. The rate of OM has remained approximately the same over the past decade, indicating that despite new and innovative treatments that may prevent flares and induce remission, OM require continuous active surveillance as they can lead to blindness. As a whole, inflammatory bowel disease

significantly increases the risk of OM. When divided by subtype, CD showed increased odds of developing OM, while UC showed no statistical association with OM. Coordination between specialists is essential to avoid or prevent OM in IBD.
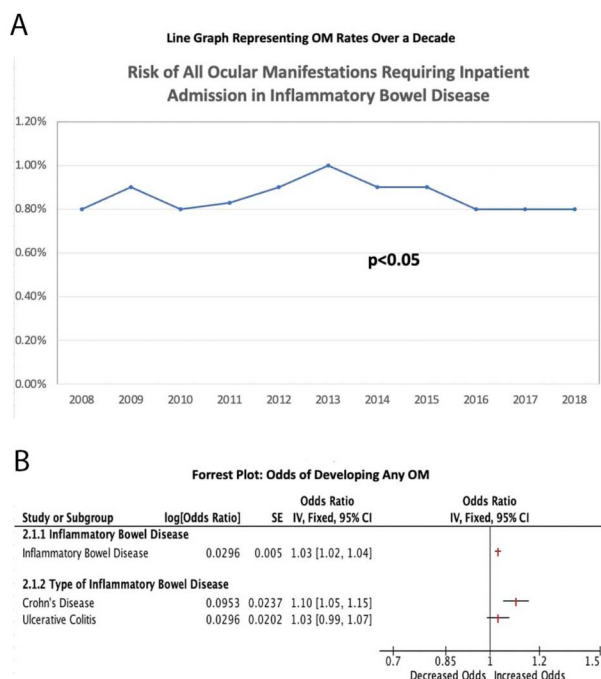
[0234] **Figure 1.** A) Line graph of the OM over a decade, B) Odds of developing any OM

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The Impact of Malnutrition on Patients Hospitalized With *Clostridioides difficile* Infection

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Introduction: *Clostridioides difficile* infection (CDI) is the most common healthcare-related diarrhea and is associated with substantial morbidity and mortality. Malnutrition is common amongst patients with CDI, and some studies have suggested that it may increase CDI risk due to secondary immunodeficiency. However, the direct impact of malnutrition on patients who develop CDI has yet to be determined. In this study, we evaluated in-hospital outcomes of malnourished patients admitted to the hospital with CDI.
Methods: A retrospective study was conducted using the Nationwide Inpatient Sample from 2016 to 2019. Adult hospitalizations that had an admitting diagnosis of CDI were identified and stratified based on the presence of malnutrition using the International Classification of Diseases (ICD-10) codes. The primary outcome was in-hospital mortality. Secondary outcomes were intensive care unit (ICU) admissions, acute kidney injury (AKI) requiring dialysis, the length of stay (LOS), and hospital charges. Multivariate regression analysis was used to adjust for confounding factors of outcomes. (Table)
Results: A total of 1,267,805 patients were admitted to the hospital with CDI during the study period. Of those, 15.17% had a documented diagnosis of malnutrition. Patients with malnutrition had higher mortality, ICU admissions, AKI requiring dialysis, mean LOS, and hospital charges than those without malnutrition. On multivariate analysis, malnutrition was an independent predictor of worse outcomes in patients with CDI. The adjusted odds ratio was 1.77 for mortality ($P < 0.001$), 1.69 for ICU admission ($P < 0.001$), and 1.65 for AKI requiring dialysis ($P < 0.001$). The adjusted mean for LOS and total hospital charges increased by 5.48 days and $64,150 for CDI patients with malnutrition compared to those without malnutrition.
Conclusion: Our results highlight the impact of malnutrition on patients admitted to the hospital with CDI. The increased in-hospital mortality and complications underline the importance of identifying malnourished patients as a higher-risk group and suggests that nutritional replenishment may be one strategy to decrease adverse outcomes in patients with or at increased risk of CDI.

Table 1. In-hospital outcomes in patients admitted to the hospital with CDI with and without malnutrition

Outcome	CDI without malnutrition	CDI with malnutrition (P value)	AOR (95% CI)
In-hospital mortality (%)	5.41%	10.04% (< 0.001)	1.77 (1.70 – 1.85)
ICU admission (%)	9.68%	16.19% (< 0.001)	1.69 (1.62 – 1.75)
Acute kidney injury (%)	1.19%	2.23% (< 0.001)	1.65 (1.51 – 1.80)
Mean length of stay (days)	9.05	14.89 (< 0.001)	5.48* (5.26 – 5.71)
Mean hospital charges (US$)	91,822	161,665 (< 0.001)	64,150* (60,109 – 68,190)

*Adjusted mean difference.
Abbreviations: CDI: spontaneous bacterial peritonitis, ICU: Intensive care unit, AKI: Acute kidney injury, CI: confidence interval, AOR: adjusted odds ratio.

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Demographic Associations and Potential Impact of Comorbid Conditions on Complications of Diverticular Disease

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Introduction: Diverticular disease causes significant morbidity and impaired quality of life. Although often asymptomatic, serious complications including hemorrhage with/without infarction and inflammation with possible abscess formation, perforation, or fistulation may arise. The role of comorbid conditions on development of diverticular complications however remains to be elucidated. We sought to evaluate comorbid disease associations on the incidence of complications in diverticular disease.

Methods: The Grady Healthcare inpatient database from 2010-2019 was queried and cases of diverticulosis identified. The incidence of diverticular disease related hemorrhage and diverticulitis was examined. Chi-squared and/or Fischer's exact tests where appropriate, were used to assess demographic and comorbid disease associations.

Results: A total 418 cases of diverticulosis were identified, 67.22% were female, mean age was 65.15years (SD12.31), age-categories were 18-44years (5.98%), 45-64years (43.54%), 65-84years (42.58%), and ≥85years (7.89%). Racial/ethnic composition was predominantly black/African-American (85.65%), followed by white/Caucasian (6.22%), and Hispanic (5.26%). The mean body mass index (BMI) of patients with diverticular disease was 31.75 (SD12.2). Hemorrhagic diverticular disease (HDD) occurred in 20.81% and diverticulitis in 5.50%. Patients with HDD had a mean age of 74.97years (SD12.90), and 63.22% were female. The mean BMI of patients with HDD was 33.03 (SD21.87), median=28.57 (IQR=25.22-35.46). Patients with complications of diverticulitis were younger with a mean age of 61.39years (SD12.60) and 69.57% were female. The mean BMI of patients with diverticulitis was 27.28 (SD9.19), median=24.36 (IQR=21.92-28.03). Overall, patients with HDD compared to patients without were more likely to have comorbid hypertension (62.07% vs 46.53%, P=0.01), however no significant association was found with diabetes mellitus (19.54% vs 17.82%, P=0.41). On the other hand, patients with diverticulitis compared to patients without were less likely to have comorbid diabetes mellitus (4.35% vs 18.99%, P=0.04), and also less likely to have comorbid hypertension (21.74% vs 51.39%, P=0.01).

Conclusion: HDD was directly associated with comorbid hypertension but not with diabetes mellitus, while diverticulitis was inversely associated with comorbid hypertension and diabetes mellitus. Further studies are needed in prospective cohorts to evaluate the impact of comorbidities on patient outcomes in diverticular disease.

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Safety and Efficacy of Powered Non-Thermal Endoscopic Resection Device for Removal of Colonic Polyps: A Systematic Review and Meta-Analysis

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Introduction: Endoscopic mucosal resection is a procedure commonly utilized for the resection of colonic polyps. However, polyp recurrence over a scarred submucosal base can make resection of residual lesions difficult using conventional techniques. EndoRotor is a non-thermal endoscopic mucosal resection device that has been recently evaluated in the resection of colonic polyps, non-dysplastic Barrett's esophagus, and pancreatic necrosis, but the studies are limited to small sample sizes. Therefore, we performed a systematic review and meta-analysis to evaluate the safety and efficacy of EndoRotor for the resection of colonic polyps.

Methods: A systematic review of the literature was performed using Medline, Embase, Web of Science, and the Cochrane library database until June 2022 to identify all studies that evaluated the safety of non-thermal endoscopic resection devices for the removal of colonic polyps. Our primary outcome of interest was the technical success rate, and secondary outcomes included rates of residual lesions and adverse events. All analyses were conducted using comprehensive meta-analysis software.

Results: Three studies, including 54 patients who underwent resection of 60 lesions, were included in the analysis. The pooled technical success rate was 93.9% (95% CI: 77.7-98.6%, I2=25.5%). Among patients with a repeat endoscopic evaluation, 20 patients had a residual lesion. The pooled residual lesion rate after the first session was 39.8% (95% CI: 15.3-70.8%, I2=74.5%). There were eight instances of intraoperative bleeding and four cases of post-procedural bleeding. The pooled rate of intraoperative bleeding was 13.2% (95% CI: 6.7-24.3%, I2=0%) and post-procedural bleeding was 8.5% (95% CI: 3.4-19.8%, I2=0%). There was only one event of major bleeding, and no perforations were reported.

Conclusion: Our study revealed that EndoRotor is successful in removing scarred colonic polyps, but the residual lesion rate is high and may require multiple sessions for complete removal. Larger prospective studies, especially randomized controlled trials, are needed to evaluate further the efficacy and safety of EndoRotor for removing colonic polyps.

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**Evaluating Important Features Limiting Adequate Inpatient Colonoscopy Preparation**

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Introduction: The success of colonoscopy for colorectal cancer (CRC) screening hinges on adequate bowel cleansing. Inpatient colonoscopies are routinely cancelled or rescheduled due to inadequate bowel cleansing at rates as high as 30-50%. Split-dose regimens are now standard of care, but there is institutional variability regarding the volume and formulation of laxative used. High-volume (4L) polyethylene glycol (PEG)-3350 electrolyte lavage solution (ELS) prior to colonoscopy is currently the conventional bowel prep. The aim of this study was to identify the number of inpatient colonoscopies that are cancelled at the Michael E. Debakey Veterans Affairs Medical Center (MEDVAMC) due to inadequate prep and identify possible solutions.

Methods: A retrospective cohort study was performed of inpatient colonoscopies scheduled during the period of 3/1/21 – 9/1/21 at the MEDVAMC in Houston, Texas. Data was collected through chart review through internal EHR. Type of bowel prep, volume of prep used, Boston bowel prep score (BBPS), and frequency of cases rescheduled due to inadequate prep were collected. Descriptive statistics were performed to identify baseline patient information and frequency of adequate prep (BPPS >/= 7). Vulnerabilities in the existing system were identified through a process map and fishbone diagram. (Figure)

Results: A total of 135 inpatient colonoscopies were performed from 98 unique patients. 94 (96%) of the patients were male, 51 (52%) were white, 42 (43%) were African American, and 17 (17%) were Hispanic. 126 (93%) of the colonoscopies used split-dose 4L PEG-3350 ELS. 69 (51%) of performed colonoscopies had adequate colonoscopy preps and 33 (24%) of colonoscopies were cancelled or rescheduled. The average BBPS was 7.0 ± 2.1. Noncompliance with full prep solutions was identified in 9 of rescheduled cases. Supplementation with additional bowel prep agents was used in 38 (28%) patients. (Table)

Conclusion: About 50% of scheduled inpatient colonoscopies performed at the VA hospital over 6 months was noted to be adequate bowel preparation. This is substantially lower than the performance targets for outpatient colonoscopies (e.g., >85%). Our process map and fishbone diagrams identified patient and staff-related factors as areas for improvement. Future interventions will focus on making bowel prep more tolerable for patients with high acuity illnesses (e.g., lower volume prep) and standardizing prep instructions and bedside analysis of pre-procedural stool color.
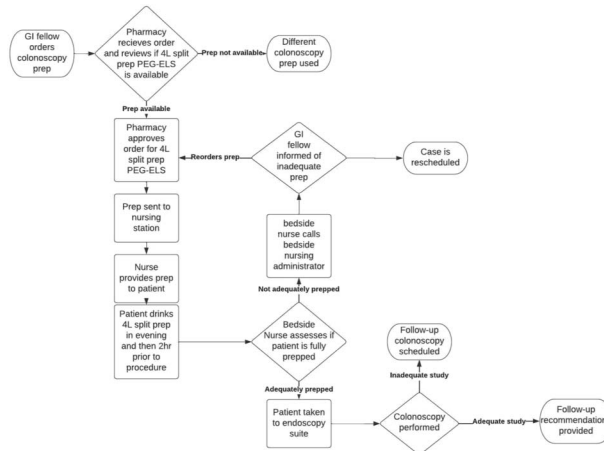
[0238] **Figure 1.** Process map of key inpatient colonoscopy preparation steps

Table 1. Important demographic and descriptive data of patient population

Factor	Total (N=98)
Gender	
Male	94
Female	4
Race	
White	51
African American	42
Pacific Islander	2
Unknown	3
Ethnicity	
Hispanic	17
Non-Hispanic	81
Age	67
Prep type	
PEG-3350 w/ ELS	126
PEG-3350 w/o ELS	
Requiring additional prep	
added Mg citrate	
Added additional PEG-3350 w/ ELS	
Average BBPS	

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The Association of Obstructive Sleep Apnea and *Clostridium difficile*: A Nationwide Inpatient Sample Analysis

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Introduction: Obstructive sleep apnea (OSA) is a sleep disorder involving repeated apneic episodes during sleep due to an obstruction of the airflow. OSA predisposes individuals to community-acquired pneumonia due to upper airway microaspiration. Furthermore, hypoxia due to intermittent pharyngeal collapses is shown to cause a pro-inflammatory state and reduced NK cell cytotoxicity and maturation, which can increase the risks of infections due to suppression of immune response. Increased incidence of infections in the OSA subgroup leads to increased use of antibiotics. Antibiotic exposure is the primary risk factor for developing Clostridium difficile (C. diff) infection. In synchrony with this notion, the primary purpose of this study was to determine the association between OSA and C. diff infection.
Methods: A retrospective analysis was conducted using the Healthcare Cost and Utilization Project-Nationwide Inpatient Sample (HCUP-NIS). Patients without C. diff were analyzed (control) and were randomly selected and matched to each patient who did have C. diff. Weighted logistic regression models were used to calculate the association between OSA and C. diff for different comorbidities.
Results: A total of 7,135,090 patients were included in our analysis. The prevalence of C. diff was significantly higher in patients with OSA (1.19% vs. 1.00%, p< 0.0001). In addition, multiple comorbidities were significantly elevated in the OSA group compared to those without OSA, including alcohol and obesity (p< 0.0001).
Conclusion: This study uses ICD-10-CM codes with a specific search code for OSA. Our large population database shows a significant association between OSA and C. diff. One of the hypotheses describing this increased association could be more antibiotic exposure in OSA subgroup leading to C. diff. Additional studies are needed to confirm or refute this association.

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Outcomes of Patients Hospitalized for Acute Diverticulitis With Comorbid Generalized Anxiety Disorder

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Introduction: The prevalence of diverticulosis is as high as 50% in adults greater than 60 years old. Prior research on diverticular disease showed that these patients have an increased frequency of anxiety. Generalized anxiety disorder (GAD) is a common form of anxiety. This study explored the impact of GAD on the outcomes of patients admitted with acute diverticulitis.
Methods: Adults hospitalized for diverticulitis were selected from the 2014 National Inpatient Sample database. ICD-9 codes were used to select diagnoses. Demographic data and outcomes of diverticulitis were compared between a subgroup with GAD and a subgroup without GAD. The outcomes of interest were sepsis, acute renal failure (AKI), myocardial infarction (MI), acute respiratory failure, obstruction, colectomy, hypotension/shock, gastrointestinal perforation and inpatient mortality. Chi-squared tests and independent t-tests were used to compare proportions and means respectively. A multivariate logistic regression analysis was used to establish if GAD is an independent predictor for the outcomes after adjusting for age, sex, race, and Charlson Comorbidity Index (CCI).
Results: Among 77,520 diverticulitis patients in the study, 8,434 had GAD. Patients with GAD were younger (62.7 vs. 63.2 years old, p< 0.05), more likely to be female (72.6% vs. 43.5%, p< 0.05), more likely to be caucasian (83.9% vs. 75.5%, p< 0.05), and had a longer hospital stay (4.86 vs. 4.53 days, p< 0.05). There were no significant differences in total hospital charge ($40,003 vs. $39,660, p=0.54) and CCI (2.89 vs. 2.85, p=0.15). After adjusting for age, sex, race, and CCI, GAD was found to be a risk factor for obstruction (adjusted odds ratio (aOR) 1.22, 95% confidence interval (CI) 1.05-1.43, p< 0.05) and intestinal abscess (aOR 1.19, 95% CI 1.10-1.29, p< 0.05). GAD was also found to be a protective factor for acute respiratory failure (aOR 0.76, 95% CI 0.62-0.93, p< 0.05) and hypotension/shock (aOR 0.83, 95% CI 0.76-0.91, p< 0.05). The p-values for the aORs of sepsis (p=0.19), inpatient mortality (p=0.11), MI (p=0.77), AKI (p=0.76), and colectomy (p=0.07) were not statistically significant. (Table)
Conclusion: In acute diverticulitis patients, GAD is a risk factor for intestinal obstruction and intestinal abscess, which may be due to GAD's impact on motility. GAD is also a protective factor against acute respiratory failure and hypotension/shock possibly due to its association with higher healthcare utilization which may lead patients to seek out care earlier.

Table 1. Multivariate logistic regression analysis of clinical outcomes among diverticulitis patients

Outcomes	*Adjusted Odds Ratio	95% Confidence Interval	p-Value
Acute renal failure	1.02	0.93-1.11	0.76
Acute respiratory failure	0.76	0.62-.93	< 0.05
Colectomy	0.75	0.55-1.02	0.07
Hypotension/shock	0.83	0.76-.91	< 0.05

Table 1. (continued)

Outcomes	*Adjusted Odds Ratio	95% Confidence Interval	p-Value
Inpatient mortality	1.34	0.93-1.92	0.11
Intestinal abscess	1.19	1.10-1.29	< 0.05
Intestinal obstruction	1.22	1.05-1.43	< 0.05
Myocardial infarction	1.05	0.78-1.40	0.77
Sepsis	1.07	0.97-1.19	0.19

*Adjusted for age, sex, race, and the Charlson comorbidity index.

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Colonoscopy Adenomatous Polyp Detection Rate in Patients With Inadequate Bowel Prep

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Introduction: Colorectal cancer (CRC) is the second leading cause of cancer-related deaths amongst men and women together in the United States. Screening colonoscopies have been proven to reduce CRC mortality. However, the efficacy of colonoscopies can be hindered by poor bowel preparation due to poor visualization and a higher likelihood of missing polyps and other colonic lesions including CRC. Per ASGE, adenoma detection rate (ADR) for combined male and female population is 25%. This retrospective study aims to identify the ADR for patients with inadequate bowel preparation noted during colonoscopies at our institution to emphasize the importance of quality bowel preparation.
Methods: During the years 2018-2020, a total of 250 inadequately prepared colonoscopies were examined at University of Louisville Hospital for our study. 28 colonoscopies were excluded due to being aborted prior to the procedure brown stool being present on exam. 14 colonoscopies did not have pathology reports and were also excluded. The study was a retrospective single-center cohort study reviewing risk factors in patients with inadequate bowel preparation noted during colonoscopy. A Boston Bowel Preparation Scale (BBPS) was used with score of < 6 (inadequate preparation) and ≥6 (adequate preparation).
Results: This study specifically examined the adenomatous detection rate for patients with poor colonoscopy preparation. Of these, 27 patients with screening colonoscopy indications had adenomatous or high-risk polyps with an ADR of 10.8%. This was well below the ASGE quality indicator for ADR for screening colonoscopies. 18 non-screening colonoscopies had an ADR of 7.2%. Additionally, there was a total of 91 the patients who came back for repeat colonoscopy within a 3-year time span after having poor bowel preparation or aborted procedure initially. 2 patients were missing pathology reports and excluded. 29 patients were found to have adenomatous or high-risk polyps for a total of 32.5% of patients with repeat colonoscopy who initially had poor bowel preparation or aborted procedure.
Conclusion: Having a BBPS score of 5 or less considerably decreased ADR compared to ASGE standards. It is critically important that patients who have poor bowel prep return for repeat colonoscopy due to high risk of missing adenomatous or high-risk polyps as shown by the follow-up data. ADR is far below the endoscopist expectation without adequate bowel preparation in both screening and non-screening colonoscopies.

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Observations in Therapy Interventions for Stage III and Stage IV Colon Cancer From 2010 to 2019

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Introduction: Colorectal cancer (CC) treatment options range from surgery, radiation therapy, systemic chemotherapy (CH), targeted immunotherapy (IM), or a combination of these. Surgical resection is the standard of care for cases with curative intent. CH is recommended in all cases of stage III cancer after surgery. Combination CH and IM have been FDA approved for use in recent years. With the advent of IM and the major breakthroughs in its curative ability, we intended to assess the shift in treatment of stage III and stage IV CC.
Methods: The 2022 National Cancer Database Public Benchmark reports from the American College of Surgeons from 1391 hospitals was utilized. IRB approval was not required as the database contains de-identified information. This study analyzed CC cases with first line course of treatment for AJCC stage III-IV. 15,897 patients in 2010 and 20,060 in 2019 with stage IV cancer were evaluated, respectively. For stage III CC, 20,036 and 21,954 were evaluated in 2010 and 2019, respectively. A two-sample proportion z-test for significance was used.
Results: Changes in trends were examined with stage III CC comparing the years 2010 and 2019 [Figure 1b]. Surgery in patients decreased (32.3% vs 29.9%, p< 0.001). Surgery in combination with CH did not change significantly (63.5% vs 64.4%, p= 0.006). CH only also did not change significantly (0.2% vs 0.3%, p= 0.039). IM combined with CH was limited (0% vs 0.1%). However, combination IM, surgery and CH increased use of IM (0.1% vs 1.9%, p< 0.001), and decreased treatment with surgery or CH alone. CH alone was used in 18.6% of cases in 2010 compared to 15.1% in 2019 for stage IV CC (p< 0.001) [Figure 1b]. Surgical treatment decreased over the years from 18.8% to 13% (p< 0.001). Surgery and CH combination also decreased (38.9% vs 19.3%, p< 0.001). In contrast, treatment with IM and CH increased (0.2% vs. 12.7%, p< 0.001). IM in combination with surgery and CH also increased significantly in stage IV CC (0.2% vs 14.4%, p< 0.001).
Conclusion: Treatment options between 2010 and 2019 were compared for stage III and stage IV CC. Stage IV CC treatment regimens have changed with increased use of IM and decreased sole use surgery and CH. However, stage III CC treatment regimens have largely been unchanged comparing 2010 to 2019. With the major successes of IM in treatment of early stage CC, there should be more work and studies to support its use in late stage.
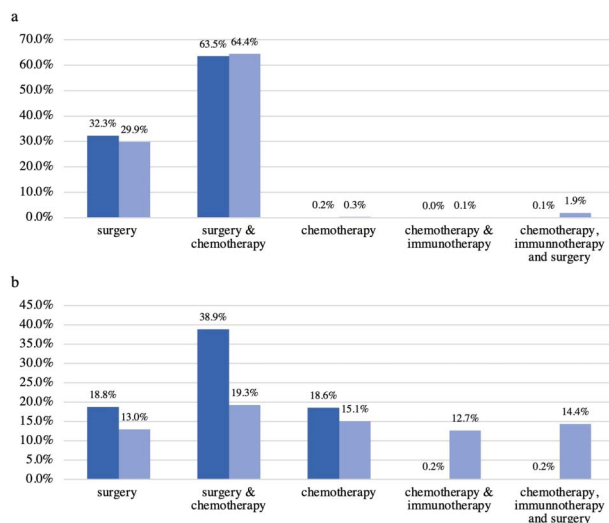
Figure 1. a. Stage III colorectal cancer treatment distribution for 2010 and 2019 Figure 1b. Stage IV colorectal cancer treatment distribution for 2010 and 2019

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Outcomes of *Clostridioides difficile* Infection in Hospitalized Patients With Generalized Anxiety Disorder

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Introduction: Clostridioides difficile infection (CDI) is a significant burden for healthcare facilities. Clinical presentation can range from mild diarrhea to colitis. Higher levels of anxiety have been reported in patients with recurrent CDI. Generalized anxiety disorder (GAD) is a common form of anxiety. Our study aims to understand the impact of comorbid GAD on the outcomes of hospitalized patients with CDI.
Methods: Hospitalized patients with CDI were selected from the 2014 National Inpatient Sample database based on ICD-9 codes. Patient demographics and outcomes of CDI were compared between groups with and without GAD. The outcomes included respiratory failure, renal failure (AKI), sepsis, megacolon, colonic perforation, hypotension/shock, intestinal abscess, hepatic failure, and inpatient mortality. The proportions and means were compared using chi-squared tests and independent t-tests respectively. After adjusting for age, race, sex, and Charlson Comorbidity Index (CCI), a multivariate logistic regression analysis was used to assess GAD as an independent predictor of the outcomes.
Results: For the year 2014, 72,379 hospitalized adults were diagnosed with CDI. Patients with CDI and comorbid GAD were younger (62.1 vs 65.4 years old, $p < 0.001$), more likely to be female (72.3% vs 56.3%, $p < 0.001$), more likely to be white (84% vs 72.6%, $p < 0.001$), had a lower CCI (3.91 vs 4.57, $p < 0.001$), had a shorter length of stay (9.55 days vs 10.70 days, $p < 0.001$), and had a smaller hospital charge ($77,039 vs $96,129, $p < 0.001$). GAD was noted to be an independent risk factor for inpatient mortality (adjusted odds ratio (aOR) 1.57, 95% confidence interval (CI): 1.40-1.76, $p < 0.001$), sepsis (aOR 1.26, 95% CI: 1.20-1.34, $p < 0.001$), hypotension/shock (aOR 1.12, 95% CI: 1.06-1.19, $p < 0.001$), respiratory failure (aOR 1.23, 95% CI: 1.14-1.33, $p < 0.001$), AKI (aOR 1.27, 95% CI: 1.20-1.33, $p < 0.001$), acute hepatic failure (aOR 1.47, 95% CI: 1.15-1.89, $p=0.003$), and colonic perforation (aOR 1.62, 95% CI: 1.08-2.43, $p=0.019$). GAD was not a risk factor for intestinal abscess (aOR 0.99, 95% CI: 0.70-1.40, $p=0.969$). The analysis for megacolon could not be performed due to small sample size.
Conclusion: Hospitalized CDI patients with a history of GAD are more likely to have increased mortality, sepsis, multi-organ failure and colon perforation. These findings are likely due to GAD's association with a pro-inflammatory state, inconsistent healthcare utilization, and altered gut microbiota.