

Ascites			
<b>Definition</b>	Accumulation of free fluid in the peritoneal cavity.		
<b>Types</b>	<b>Exudate</b>	<b>Due to local peritoneal conditions as:</b> 1. <u>Tuberculous peritonitis</u> : 2. <u>Malignant ascites</u> : a) Massive, hemorrhagic & rapidly accumulating. b) Malignant cells on aspiration. c) Abdominal mass (tumour) may be felt after tapping. 3. <u>Pseudomyxoma peritonii</u> : a) Rupture mucocele of the appendix. b) Rupture mucocele of the gall bladder. c) Pseudomucinous cystadenoma of the ovary.	
	<b>Transudate</b>	<b>Portal hypertension</b>	
		1. Cirrhosis. 2. Alcoholic hepatitis. 3. Fulminant hepatitis. 4. Subacute hepatitis. 5. Hepatic veno-occlusive disease.	6. Massive liver meta stasis. 7. Congestive heart failure. 8. Constrictive pericarditis. 9. Budd- Chiari syndrome
	<b>Haemorrhagic</b>	1. Traumatic (especially rupture spleen). 2. Malignancy.(most common in HCC in HCV patient) 3. Hemorrhagic blood diseases. 4. Ruptured ectopic pregnancy. 5. Acute pancreatitis.	
	<b>Chylous</b>	<b>Due to thoracic duct obstruction caused by lymph nodes, tumour or filariasis.</b> <b>Features:</b> a. <b>Colour: milky white.</b> b. <b>Rich in fat.</b> c. <b>Clears on addition of ether.</b> d. <b>Stains orange with Sudan III</b>	
<b>Purulent</b>			
<b>Pathogenesis of ascites in cirrhosis</b>	1. <b>Splanchnic vasodilatation</b> is the main factor mediated by nitric oxide, a vasodilator released when portal hypertension causes shunting of blood into the systemic circulation. 2. ↓ Systemic arterial pressure → activation of renin angiotensin system with secondary aldosteronism, ↑ sympathetic nervous activity. 3. Portal hypertension. 4. Hypoalbuminemia.		
<b>Characteristic of ascetic fluid</b>	<b>Aspect</b>	<ul style="list-style-type: none"> <li>• Straw- colored: parenchymal liver disease portal hypertension.</li> <li>• Cloudy: Bacterial peritonitis, pancreatitis.</li> <li>• Bloody: Trauma, tumor, invasive technique. Blood disease, internal Hag.</li> <li>• Green: Biliary tract diseases, ruptured bowel.</li> <li>• Milky: Tumor, T.B, Lymph obstruction.</li> </ul>	
	<b>Specific gravity</b>	<ul style="list-style-type: none"> <li>• Transudate: between 1005 – 1015.</li> <li>• Above 1015, in cases of exudates</li> </ul>	
	<b>Protein</b>	<ul style="list-style-type: none"> <li>• Transudate: 1-2 g/100 ml.</li> <li>• Higher values in: infection, Budd-Chiari syndrome, pancreatitis, T.B, malignant, myxedema, nephrogenous ascites.</li> <li>• Lower values in: portal hypertension, hepatic veins occlusion, heart failure.</li> </ul>	
	<b>Cellular contents</b>	<ul style="list-style-type: none"> <li>• Polymorphs and peritoneal mesothelium but polymorphs not exceed 100 <math>\mu\text{L}/\text{mm}^3</math>. If polymorphs more than 250 <math>\mu\text{L}/\text{mm}^3</math> indicates infection.</li> <li>• Red cells: not exceed 1000 <math>\mu\text{L}/\text{mm}^3</math>, if ↑ indicate hemorrhagic ascites.</li> </ul>	
	<b>Electrolyte concentrations</b>	Are those of other extracellular fluid.	
<b>Clinical picture</b>	<b>History</b>	abdominal distension, dyspepsia , respiratory distress.	
	<b>Inspection</b>	<ul style="list-style-type: none"> <li>☉ Diffuse abdominal enlargement with full flanks.</li> <li>☉ The umbilicus is shifted downwards &amp; everted ± hernia.</li> <li>☉ In chronic cases: wide subcostal angle - divarication of recti-</li> <li>☉ White abdominal striae (striae albicans).</li> <li>☉ Dilated veins on the anterior abdominal wall: may be due to portal hypertension or IVC obstruction.</li> </ul>	
	<b>Palpation</b>	<ul style="list-style-type: none"> <li>• Fluid transmitted thrill (in tense ascites).</li> <li>• Liver &amp; spleen may be felt by dipping method.</li> <li>• Abdominal swelling may be felt in malignancy &amp; TB.</li> </ul>	
	<b>Percussion</b>	<ul style="list-style-type: none"> <li>• Resonance over the umbilicus &amp; dull flanks (&gt; 2L.).</li> <li>• Shifting dullness from side to side (&gt; 1.5L.).</li> <li>• Knee elbow position (300-500cc).</li> </ul>	
	<b>Auscultation</b>	<b>Puddle sign:</b> in knee elbow position, put the diaphragm on the umbilicus & scratch from outside towards the umbilicus till change of tone → +ve = fluid. <b>Venous hum:</b> may be heard in cases of portal hypertension (Kenawi sign).	

<b>Clinical picture</b>	<b>Clinical picture of the 2ry effects of ascites:</b> 1. Right-sided pleural effusion. 2. Elevation of the diaphragm causing: a. Congested neck veins. b. Shift of the apex of the heart upwards & outwards. c. Dullness over the lung base (basal collapse). 3. Edema following ascites (in LCF)														
<b>Complications</b>	<b>Hydrothorax</b>	<ul style="list-style-type: none"> <li>• Pleural effusion usually ranges from 0.4% to 10%. 60% is right sided.</li> <li>• Bilateral effusion and left sided one is less frequently.</li> <li>• If left sided effusion develops alone, T.B is suspected.</li> <li>• <b>Causes of effusion:</b> <ol style="list-style-type: none"> <li>a) Hypoalbumina</li> <li>b) Plasma leakage from a hypertensive azygous venous system.</li> <li>c) Lymph leaking from thoracic duct.</li> <li>d) acquired diaphragmatic defects</li> <li>e) Co-existence of other disease as : Meig's syndrome, and congestive heart failure.</li> </ol> </li> </ul>													
	<b>Spontaneous bacterial peritonitis</b>	<ul style="list-style-type: none"> <li>• Presents with abdominal pain, rebound tenderness, absent bowel sounds &amp; fever in patient with cirrhosis &amp; ascites.</li> <li>• The source of infection can not usually identified.</li> <li>• Escherichia coli is the organism most frequently found.</li> <li>• The condition should be differentiated form other intra abdominal emergencies.</li> <li>• Treatment with cefotaxime should be started immediately &amp; recurrence is common</li> </ul>													
	<b>Hernia</b>	Due to ↑ intra abdominal pressure: inguinal, umbilical													
	<b>Varicose veins</b>	Due to compression of venous return of lower limbs and the testicle.													
	<b>Urinary symptom</b>	As urgency, ↑ urinary tract infection, difficulty up to retention of urine													
<b>Differential diagnosis</b>	1. Obesity: due to fat. 2. Distension: due to gas 3. Full urinary bladder	4. Pregnant uterus: due to massive amniotic fluid. 5. Ovarian cysts: huge 6. Large pancreatic cyst. 7. Huge organo megal: huge liver and spleen.													
<b>Malignant ascites</b>	<ul style="list-style-type: none"> <li>• Rapidly accumulated</li> <li>• Macroscopically bloody in 10% of cases only</li> <li>• High protein contents</li> </ul>	<ul style="list-style-type: none"> <li>• High lactate dehydrogenase and cholesterol</li> <li>• Cytological Ex: reveals 60-90% malignant cells</li> <li>• Polyclonal and monoclonal antibodies against tumor marker may be helpful.</li> </ul>													
<b>Investigations</b>	1. <b>Abdominal Ultrasound</b> is the best particularly in the obese and those with small volumes of fluid. 2. <b>Serum-Ascites Albumin Gradient</b> <ul style="list-style-type: none"> <li>• SAAG: serum albumin – ascitic fluid albumin (g/dL)</li> <li>• <b>High gradient</b> (<math>\geq 1.1</math> g/dL) indicates portal hypertension with <b>97% accuracy</b></li> <li>• <b>Low gradient</b> (<math>&lt; 1.1</math> g/dL) indicates absence of PHT with 97% accuracy</li> <li>• Replaced <b>exudative</b> (<math>&gt;2.5</math> g/dL total protein) and <b>transudative</b> ascites (poor <b>accuracy of 56%</b>)</li> </ul>														
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<b>Treatment</b>	<b>Bed rest</b>	Helps mobilization of fluid, giving good urinary exertion especially if there is low salt intake.													
	<b>Diet</b>	<ul style="list-style-type: none"> <li>• Nacl: less than 0.5gm/Day</li> <li>• Proteins: 100gm/day, expect if encephalopathy develops.</li> <li>• Low fat and high carbohydrate.</li> </ul>													
	<b>Drugs</b>	Diuretics <ul style="list-style-type: none"> <li>☉ Should be given, if weight loss less than 1kg/in four days inspite of good diet, salt-restriction rest</li> <li>☉ <b>Potassium losing (1<sup>st</sup> group)</b>: thiazides, furseimide, bumetamide, ethacrynic acid give Ka supplement.</li> <li>☉ <b>Potassium sparing (2<sup>nd</sup> group)</b>: spironolacton, amiloride and triamterene. They are weak diuretic and can be added to 1<sup>st</sup> group diuretic without adding potassium.</li> <li>☉ <b>To avoid complications of diuretics</b> → Treat the ascites slowly, Allowing at least 2 weeks to get good response.</li> </ul>													
	<b>Paracentesis</b>	<ul style="list-style-type: none"> <li>☉ It is aspiration of ascitic fluid from the peritoneal cavity.</li> <li>☉ Indications: <ol style="list-style-type: none"> <li>1. Sluggish response to diuretics</li> <li>2. Poor urinary output</li> <li>3. Need for more than 160mg of furosemide and 400mg of spironolactone.</li> <li>4. Tense ascites causing respiratory distress.</li> </ol> </li> </ul>													
	<b>Surgical</b>	1. Peritoneo-venous (leveen) shunt: is a long tube with a non return valve running subcutaneously from the peritoneum to the internal jugular vein in the neck, which allows ascetic fluid to pass directly into the systemic circulation. <ul style="list-style-type: none"> <li>• Contraindication → Protein <math>&gt; 4.5</math> g/l (occlusion), Loculated ascites, Coagulopathy, Advanced renal/cardiac disease, GI malignancy</li> <li>• <b>Complication</b> → Infection, Hematogenous spread of mets, DIC, Pulmonary edema, Pulmonary emboli</li> </ul> 2. Omentopexy 3. Porto caval method													

