



*Reviewed By*  
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# Pelvic Inflammatory Disease & Pelvic Abscess

## Objectives:

- Identify the prevalence of Pelvic Inflammatory Disease (PID)
- Explain the causes and pathogenesis of PID
- Describe the symptoms and signs of PID.
- Describe the management of PID and list the criteria for hospitalization and parental treatment
- List the complications of PID
- Discuss the tubo-ovarian abscess in terms of: Incidence, Etiology, Diagnosis, Management, Sequelae.



- **Explained Slides**
- **Department's Slides (Dr. Dana)**
- **Important**
- **Golden notes**
- **Extra**
- **Doctor's notes**
- **Previous Doctor's notes**
- **Reference**

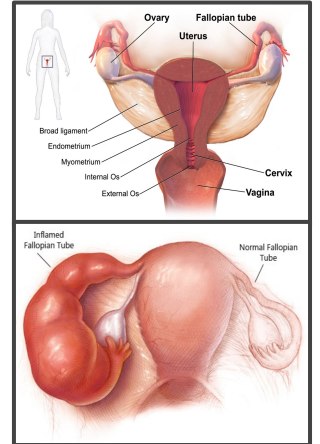
Kaplan Video

Editing File

# Pelvic Inflammatory Disease

## Definition:

- **Pelvic Inflammatory Disease (PID):** a spectrum of infection-induced inflammation of **upper genital tract** that includes **endometritis**, salpingitis, pelvic peritonitis, and/or tubo-ovarian abscess (TOA).
- **PID:** microorganisms colonizing the endocervix and ascending to the endometrium and fallopian tubes cause PID.
- Inflamed fallopian tube (salpingitis) → tube obstruction → TOA formation.
- Most often **by** ascending spread of microorganisms from the vagina through cervix & endocervix to the endometrium, tubes, and contiguous structures (*when barrier between the lower genital tract and upper genital tract is broken*).
- **Picture:** demonstrates normal genital tract on the right, and on the left a collection of inflammatory exudates.



## Prevalence:

- **CDC:** ≈ > 1 million women in USA experience an episode of PID every year.
- PID → ≈ 2.5 million office visits + 125,000 - 150,000 hospitalizations yearly.
- No specific international data is available for PID incidents worldwide.
- **Annual rate of PID in high-income countries:** 10 - 20 per 1000 women of reproductive age.

## Risk Factors:

- **Exposure to STD:** strong correlation.
- Age of 1<sup>st</sup> intercourse.
- Frequency of intercourse.
- Number of sexual partners.
- **Reinfection if untreated male partner (80%):** males can be carriers of many STDs but females present dramatically.
- Lactobacilli → acidic pH of vagina → protection against pathogens.
  - Antibiotics, vaginal douching → pH gets disturbed → organisms enter & infect the genital tract.
- Marital status.
- **Nulliparous:** never conceived before, 33%.
  
- **↑ risk:**
  - **IUD user (multifilament string):** organism colonizes string → acts as a mechanical helper for it.
    - IUD already present when infection is obtained → no need to remove it.
    - Highly suspected PID patient desires an IUD → must prohibit.
  - Surgical procedure.
  - Previous acute PID.
- **↓ risk:**
  - **Barrier method:** if partner is infected.
  - **OCP:** estrogen encourages lactobacilli proliferation.
  - **Pregnancy:** ↑ progesterone ↑ cervical mucus.

# Pelvic Inflammatory Disease



## Causes:

- **Sexually transmitted microorganisms:** N. gonorrhoeae - C. trachomatis.
  - Sexually active female of reproductive age (85% of infection).
  - Bacteria culture direct from tubal fluid.
  - STDs are the main cause of PID, but PID is not always caused by STDs.
  - Most common organisms causing STD & a serious complications: gonorrhea - chlamydia.
- After procedures that break mucus barrier (15% of infection).
  - **iatrogenic:** → before any procedure, make sure the patient isn't having any purulent discharge + instruments are sterile.
    - Endometrial biopsy.
    - D&C.
    - Hysterosalpingogram.



## Causative Organisms:

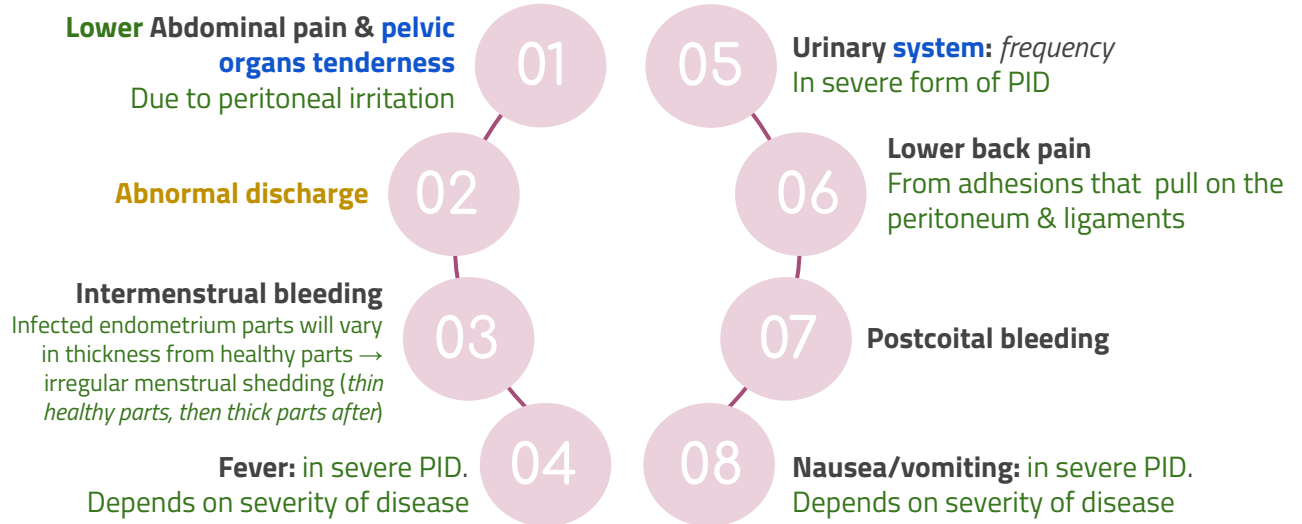
	Neisseria gonorrhoeae (N. gonorrhoeae)	C. Trachomatis
<b>Prevalence</b>	Most <b>common</b>	Second most <b>common</b>
<b>Bacteria</b>	Gram <b>negative</b> diplococcus	Intracellular organism
<b>Growth</b>	<b>Rapid:</b> 20 - 40 mins.	<b>Slow:</b> 48 - 72 hours ( <b>goes unnoticed</b> ).
<b>Onset</b>	<ul style="list-style-type: none"> <li>→ Rapid &amp; intense inflammatory response (acute infection).</li> <li>→ Severe symptoms.</li> </ul>	<ul style="list-style-type: none"> <li>→ Insidious</li> <li>→ <b>Asymptomatic</b>.</li> </ul>
<b>Sequelae</b>	<ul style="list-style-type: none"> <li>→ Infertility</li> <li>→ Ectopic pregnancy</li> <li>→ <i>Strongly associated with prior chlamydia infection</i></li> </ul>	<ul style="list-style-type: none"> <li>→ Mild form of salpingitis.</li> <li>→ Remains (<i>preference</i>) in tubes for months/years after initial colonization <b>silent &amp; asymptomatic</b> → <b>more severe tubal involvement</b> (<i>destroying cilia's transitional epithelium</i> → <i>damaged tubes = old infection</i>).</li> </ul>

- **Mycoplasma genitalium (genital mycoplasma spp.):**
  - Common
  - Present with mild clinical symptoms similar to chlamydial PID.
- **Endogenous aerobic & anaerobic:**
  - Common
  - Endogenous microorganisms found in the vagina.
  - Often isolated from upper genital tract of women with PID.
  - **BV microorganisms:** anaerobic bacteria (**such as:** prevotella – peptostreptococci - G. vaginalis).

- **Polymicrobial flora: vaginal normal flora**
  - Prevotella sp.
  - Peptostreptococcus sp.
  - Escherichia
  - Anaerobic gram-negative rods.
- **Respiratory pathogens:**
  - Colonize the lower genital tract and cause PID
  - Haemophilus influenzae.
  - Group A streptococci.
  - Pneumococci.

# Pelvic Inflammatory Disease

## Signs & Symptoms:



## Approach to patient with PID:

1. History.
2. Examination.
  - Vitals signs
  - Abdominal Examination
  - Pelvic exam and bimanual exam.
  - High vaginal swab
3. **Labs:** CBC - ESR - CRP.
4. Imaging.

## Diagnosis:

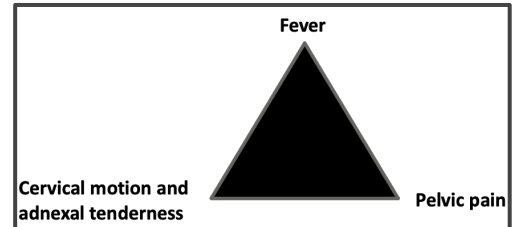
- Diagnosis is made clinically (symptoms & signs), there is no single test to confirm if the Pt has PID)
- Clinical diagnosis implying that patient has upper genital tract infection and inflammation.
  - **Inflammation may be at any point along a continuum:** endometritis - salpingitis - peritonitis.
- Wide variation in many symptoms and signs among women with PID → difficult acute PID diagnosis.
  - Subtle or mild symptoms that are not readily recognizable as PID.

# Pelvic Inflammatory Disease

## Diagnosis:

### Physical Examination:

- Temperature and vital signs.
- **Diagnosis of PID - triad of signs & symptoms** -: pelvic pain + cervical motion & adnexal/uterine tenderness + fever.
  - **Cervical motion tenderness**: peritoneal inflammation + moving cervix → adnexa traction on peritoneum → stretched perineum → irritated peritoneum → pain.
- Direct or rebound abdominal tenderness.
- **Genitourinary symptoms (including but not limited to)**: lower abdominal pain - excessive vaginal discharge - heavy & irregular vaginal bleeding - fever - chills - urinary symptoms.
- **Assess the abdomen for tenderness**: usually over lower abdomen, but if the infection ascends through the peritoneum, the tenderness will be generalized over the abdomen.
- Vaginal & endocervical secretion examination → assess BV presence (important workup<sup>1</sup> part).
- Microscopy of vaginal secretion → presence of leukocytes, clue cells, and trichomonads (take a swab).
- Cervical canal examination → presence of yellow/green mucopus and friability.
- Testing for *C. trachomatis* and *N. gonorrhoeae*.
- Bimanual pelvic examination → assess pelvic organ tenderness + pelvic mass (might suggest a TOA).
  - PID patients have positive cervical motion tenderness<sup>2</sup>, but it's not specific for PID & occurs in any peritoneal irritation (appendicitis - pelvic bleeding due to corpus luteum rupture).



### Lab Tests:

- **Complete blood count (CBC)**:
  - Hb → decide if there's bleeding or not.
  - WBC differential → infection type identification + look for leukocytosis.
- Erythrocyte sedimentation rate (ESR).
- C-reactive protein test (CRP).

### Imaging Studies:

- **Pelvic ultrasonography**:
  - Rule out symptomatic ovarian cysts.
  - Patients with pelvic mass noted on bimanual pelvic examination.
- **Computed tomography**:
  - Rule out appendicitis & endometriosis in case of abdominal tenderness.
  - See if there is any collection like ovarian abscess.

### Laparoscopic Visualization:

- **Most accurate method to confirm PID**, but **NOT** the initial approach as it's invasive.
- All patients with uncertain diagnosis (such as suspected abscess).
- **All patients not responding to treatment within 48-72h of antibiotics**: big TOA or hydrosalpinx are unlikely to respond to antibiotics & need to be drained.
- **Negative gram smear does not rule out PID**: many PID patients have negative cervical swab & culture, but you still have to treat for both organisms.
- Not a routine test to confirm PID.

1. In women with PID, an increased number of polymorphonuclear leukocytes may be detected in a wet mount of the vaginal secretions or the cervix may have a mucopurulent discharge.  
2. Suggests the presence of peritoneal inflammation.

# Pelvic Inflammatory Disease



## Management:

- **Therapeutic goal:** eliminate acute infection & symptoms + prevent long term sequelae.
- Start treatment as soon as you suspect PID.
- Always start with **empirical** treatment!
- **Therapeutic PID regimens must provide empirical, broad-spectrum coverage of likely pathogens:**
  - N. gonorrhoeae
  - C. trachomatis
  - M. genitalium
  - Gram-negative facultative bacteria
  - Anaerobes
  - Streptococci
- **Outpatient regimen:** cefoxitin and doxycycline (as effective as an inpatient parenteral regimen of the same antimicrobials).

Mild to Moderate PID	Severe PID & TOA
<ul style="list-style-type: none"> <li>→ Treat as <b>outpatient</b>.</li> <li>→ <b>Aim:</b> microbiological cure of <b>N. gonorrhoeae + C. trachomatis</b> (even if <i>negative endocervical screening for these organisms</i>).</li> <li>→ Coverage for polymicrobial flora associated with BV (<i>bacterial vaginosis</i>).</li> <li>→ <b>Antibiotic</b> therapy.</li> </ul>	<ul style="list-style-type: none"> <li>→ <b>Hospitalization</b> (inpatient).</li> <li>→ <b>Parenteral</b> therapy (criteria noted).</li> <li>→ Imaging: like US, specifically if they don't respond to treatment + to rule out tubo-ovarian abscess.</li> <li>→ <b>Surgical intervention:</b> if failed antibiotic therapy:               <ul style="list-style-type: none"> <li>→ TOA with abscesses diameter <math>\geq 10</math> cm.</li> <li>→ Failed antibiotic treatment within 48 - 72 hours (<i>persistent fever - <math>\uparrow</math> leukocytosis</i>) which may indicate an infection.</li> <li>→ <b>Drainage of TOA:</b> laparotomy (<i>sick / bleeding patient</i> → <i>faster</i> → <i>do it</i>) + laparoscopy + image-guided percutaneous routes.</li> </ul> </li> </ul>

### Clinical Criteria for Hospitalization<sup>1</sup> & Parenteral Treatment:

- First rule out other causes like appendicitis or ectopic pregnancy.
- Surgical emergencies (e.g. appendicitis) can't be excluded or not ruled out.
- Pregnancy & you can't rule out ectopic pregnancy at time of acute abdomen.
- **Does not respond clinically to oral antibiotic therapy (failed):** no improvement with short-term treatment.
- **Compliance questionable:** unable to follow/tolerate an outpatient oral regimen.
- **Severe illness (toxicity):** nausea - vomiting - high fever.
- **Tubo-ovarian abscess:** on ultrasonography or clinically suspected.

### Discharging a Hospitalized Patients Conditions:

- Fever  $< 99.5^\circ$  F for more than 24 hours.
- Decreasing WBC count.
- Absent rebound tenderness.
- Marked amelioration of abdominal tenderness in repeated examination.

1. Patients can be considered for discharge when their fever is less than 99.5° F for more than 24 hours, WBC count is decreasing, rebound tenderness is absent.

# Pelvic Inflammatory Disease



## Management:

### CDC Recommended Oral Regimen:

- 3 regimens, we choose based on most common organism we know in the center.
- **Most important coverage:** gram -ves & anaerobes.
- Doxycycline & metronidazole are a must and present in each regimen while other medications depend on the center.
- Just know the antibiotics that covers both gonorrhoea & Chlamydia
- **Most common:** 1<sup>st</sup> regimen in the table.

2015 CENTERS FOR DISEASE CONTROL (CDC) RECOMMENDED FIRST-LINE REGIMEN FOR OUTPATIENT TREATMENT OF PELVIC INFLAMMATORY DISEASE
<b>Recommended Regimen</b>
<b>Ceftriaxone</b> 250 mg intramuscularly in a single dose PLUS
<b>Doxycycline</b> 100 mg orally twice a day for 14 days WITH or WITHOUT
<b>Metronidazole</b> 500 mg orally twice a day for 14 days
<b>OR</b>
<b>Cefoxitin</b> 2 g intramuscularly in a single dose and probenecid, 1 g orally administered concurrently in a single dose PLUS
<b>Doxycycline</b> 100 mg orally twice a day for 14 days WITH or WITHOUT
<b>Metronidazole</b> 500 mg orally twice a day for 14 days
<b>OR</b>
<b>Other parenteral third-generation cephalosporin</b> (e.g., ceftizoxime or cefotaxime) PLUS
<b>Doxycycline</b> 100 mg orally twice a day for 14 days WITH or WITHOUT
<b>Metronidazole</b> 500 mg orally twice a day for 14 days
<small>From Pelvic Inflammatory Disease: Sexually Transmitted Diseases Treatment Guidelines, 2015. Available at <a href="http://www.cdc.gov/std/treatment/2015/pid.htm">http://www.cdc.gov/std/treatment/2015/pid.htm</a>. Accessed February 19, 2015.</small>

TABLE 22-6 CENTERS FOR DISEASE CONTROL (CDC) RECOMMENDED FIRST-LINE REGIMEN FOR PARENTERAL TREATMENT OF PELVIC INFLAMMATORY DISEASE
<b>Recommended Parenteral Regimen A</b>
<b>Cefotetan</b> 2 g IV every 12 hours OR
<b>Cefoxitin</b> 2 g IV every 6 hours PLUS
<b>Doxycycline</b> 100 mg orally or IV every 12 hours
<b>Recommended Parenteral Regimen B</b>
<b>Clindamycin</b> 900 mg IV every 8 hours PLUS
<b>Gentamicin</b> loading dose IV or IM (2 mg/kg of body weight), followed by a maintenance dose (1.5 mg/kg) every 8 hours. Single daily dosing (3 to 5 mg/kg) can be substituted.
<b>Alternative Parenteral Regimens</b>
<b>Ampicillin/sulbactam</b> 3 g IV every 6 hours PLUS
<b>Doxycycline</b> 100 mg orally or IV every 12 hours
<small>From Pelvic Inflammatory Disease: Sexually Transmitted Diseases Treatment Guidelines, 2015. Available at <a href="http://www.cdc.gov/std/treatment/2015/pid.htm">http://www.cdc.gov/std/treatment/2015/pid.htm</a>. Accessed February 19, 2015. IM, Intramuscularly; IV, intravenously.</small>



## Sexual Partner Management:

- Sexual partners of PID women must be evaluated & treated for urethral infection of chlamydia or gonorrhoea.
- Treat male partners & educate them for prevention reinfection.
- **Regimens for uncomplicated gonorrhoea & chlamydia infection:**
  - Ceftriaxone 125 mg IM.
  - Followed by one of the following:**
    - Doxycycline 100 mg twice daily pc (post cibum = after meals) for 7 days.
    - Azithromycin 1gm.
    - Ofloxacin 300 mg twice daily pc (post cibum = after meals) for 7 days.

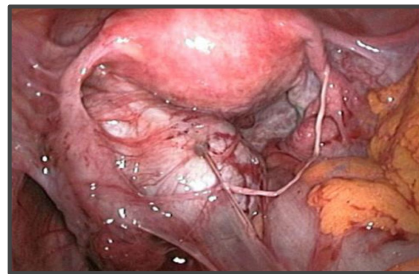
# Pelvic Inflammatory Disease

## Complications:

- **Chronic pelvic pain:** 25%, due to pelvic scars & adhesions.
- Infertility.
- **Ectopic pregnancy:** ↑ 15 - 50%.
- **Fitz-Hugh Curtis syndrome (FHCS) or Perihepatitis:** PID → TOA, if ruptured will extend → pelvic peritonitis + FHCS.
  - **FHCS:** TOP + peritonitis + perihepatitis.
  - Infection ascends to upper abdomen → likes to infect liver capsule → bad adhesions around liver → right upper quadrant pain + diaphragm inflammation → bad nausea & vomiting + generalized abdominal pain.
- **Life threatening!!!** acute rupture of TOA & peritonitis → urgent abdominal surgery.



Perihepatitis



Peritoneal adhesions

## Differential Diagnosis of: Acute Lower Abdominal Pain + Fever

### Appendicitis:

- Pain mainly be in the **right iliac fossa**.
- **GI symptoms:** diarrhea - rebound tenderness.
- **Low grade fever:** unless there is rupture.

### Ectopic Pregnancy:

- No fever.
- GI symptoms.
- Purulent discharge.

### Bleeding in pelvis due to ectopic/ovarian cyst/follicle rupture:

- Signs & symptoms of hypovolemia (tachycardia - hypotension).
- No fever.

### PID:

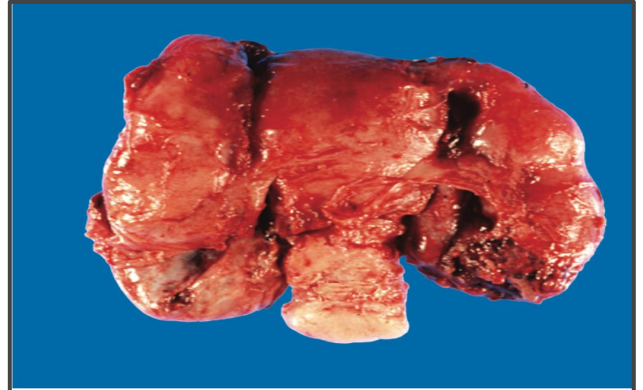
- Reproductive age.
- Married & sexually active.
- Vaginal discharge.
- History of STDs or PID, IUCD.
- Partner had neisseria or chlamydia.
- **On exam:**
  - Cervix doesn't look healthy: cervical motion tenderness.
  - No localization of the pain to the right side.
  - Healthy ovaries on ultrasound.
  - Negative pregnancy test.
- Sometimes the diagnosis of acute abdomen is not clear → confirm by laparoscopy.



# Tubo-Ovarian Abscess

## Introduction:

- **Tubo-ovarian abscess (TOA):** an end stage process of acute PID.
- **Tubo-ovarian abscess (TOA):** the accumulation of pus in the adnexa forming an inflammatory mass involving the oviducts, ovaries, uterus, or omentum.
- **Clinical presentation:**
  - Patient will look septic.
  - Severe lower abdominal-pelvic pain.
  - Severe back pain.
  - Rectal pain.
  - Pain with bowel movements.
  - Nausea and vomiting.
- **Examination:**
  - Patient appears gravely sick.
  - High fever.
  - Tachycardia.
  - She may be in septic shock with hypotension.
  - **Abdominal examination:** peritoneal signs (guarding - rigidity).
  - **Pelvic examination:** severe pain → rectal examination must be performed.
  - **Rectal examination:** bilateral adnexal masses may be palpated.
- **Diagnosis:** PID patient has a palpable pelvic mass during bimanual examination.
- **Pathophysiology:** an agglutination of pelvic organs (tube - ovary - bowel) → palpable complex.



**FIGURE 22-5** Gross appearance of bilateral tubo-ovarian abscesses. (From Kumar V, Fausto N, Abbas A: *Robbins and Cotran pathologic basis of disease*, ed 7, Philadelphia, 2005, Saunders.)

## Management:

- **Treatment:** antibiotic regimen administered on an inpatient basis.
- ≈ 75% respond to antimicrobial therapy alone.
- Failure of medical therapy → abscess drainage.
  - Drainage may require surgical exploration.
- **Percutaneous drainage guided by imaging studies (US or CT):** initial option if possible.
- **Trocar drainage (with or without placement of a drain):** successful in up to 90% of cases in which the patient has failed to respond to antimicrobial therapy after 72 hours.
- Inpatient IV clindamycin and gentamicin → fever defervescence within 72 hours.
- No response or abscess rupture exposing free pus into peritoneal cavity → exploratory laparotomy with possible TAH & BSO or percutaneous drainage through a colpotomy incision.
  - No laparotomy or drainage → significant mortality can occur. Exploratory laparotomy with possible TAH and BSO or percutaneous drainage through a colpotomy incision may be required.

# Kaplan

## > Pelvic Inflammatory Disease:

- PID is a nonspecific term for a spectrum of upper genital tract conditions ranging from acute bacterial infection to massive adhesions from old inflammatory scarring.
- The most common initial organisms are chlamydia and gonorrhea. With persistent infection, secondary bacterial invaders include anaerobes and gram- negative organisms.
- Risk Factors: The most common risk factor is female sexual activity in adolescence, with multiple partners. PID is increased in the month after insertion of an IUD, but this is probably exacerbation of preexisting subclinical infection.

## > Cervicitis:

- The initial infection starts with invasion of endocervical glands with chlamydia and gonorrhea. A mucopurulent cervical discharge or friable cervix may be noted. Cervical cultures will be positive, but symptoms are usually absent.
- WBC and ESR are normal
- Management: Single dose orally of cefixime and azithromycin.

## > Acute Salpingo-oophoritis:

- Usually after a menstrual period with breakdown of the cervical mucus barrier, the pathogenic organisms ascend through the uterus causing an endometritis; then the bacteria enter the oviduct where acute salpingo-oophoritis develops.
- Bilateral lower abdominal-pelvic pain. Onset may be gradual to sudden. Nausea and vomiting may be found.
- Mucopurulent cervical discharge, cervical-motion tenderness, and bilateral adnexal tenderness are present. Fever, tachycardia, abdominal tenderness, peritoneal signs, and guarding.
- Elevated WBC and ESR. Pelvic sonography is usually unremarkable. Laparoscopy will show erythematous, edematous, purulent oviducts. Cervical cultures will come back positive for chlamydia or gonorrhea.
- Management is often based on a presumptive diagnosis. Empiric broad spectrum coverage need to include *N. gonorrhoeae* or *C. trachomatis* as well as anaerobes (e.g., *B. fragilis*).

## > Chronic PID:

- Chronic bilateral lower abdominal-pelvic pain is present. Other symptoms may include history of infertility, dyspareunia, ectopic pregnancy, and abnormal vaginal bleeding. Nausea and vomiting are absent.
- On examination, bilateral adnexal tenderness and cervical-motion tenderness is present, but mucopurulent cervical discharge is absent. Fever and tachycardia are absent.
- Negative cervical cultures with normal WBC and ESR. Sonography may show bilateral cystic pelvic masses consistent with hydrosalpinges.
- Diagnosis is based on laparoscopic visualization of pelvic adhesions.
- Management: Outpatient mild analgesics for pain. Lysis of tubal adhesions may be helpful for infertility. Severe unremitting pelvic pain may require a pelvic clean-out (TAH, BSO). If the ovaries are removed, estrogen replacement therapy is indicated.

# 439 Summary

## Pelvic inflammatory disease (Upper genital tract infections)

<b>Pathophysiology</b>	<ul style="list-style-type: none"> <li>Occurs due to the disruption of the barrier (cervical canal).</li> <li>Possible sites of infection <ul style="list-style-type: none"> <li>Endometrium: endometritis</li> <li>Fallopian tubes: salpingitis</li> <li>Ovaries: oophoritis</li> </ul> </li> <li>Often due to ascending spread of microorganisms → cervicitis → <b>endometritis</b> → <b>salpingitis</b> → <b>oophoritis</b> → chronic PID (if not treated)</li> <li>Upper genital tract is normally sterile</li> </ul>
<b>Risk factors</b>	<ul style="list-style-type: none"> <li><b>Sexually active females of reproductive age</b></li> <li>Multiple sexual partners, unprotected sex (no condom) <ul style="list-style-type: none"> <li>Reinfection if untreated male partner (80%): males can be carriers of many STDs but females present dramatically</li> </ul> </li> <li>History of prior STIs or PID</li> <li>Iatrogenic: <ul style="list-style-type: none"> <li><b>Intrauterine devices</b> <ul style="list-style-type: none"> <li>They increase the risk of pelvic infection</li> </ul> </li> <li>Endometrial biopsy, D&amp;C, hysterosalpingogram</li> </ul> </li> </ul>
<b>Protective factors</b>	<ul style="list-style-type: none"> <li>Pregnancy: due to mucus plug</li> <li>Barrier method: if partner is infected</li> <li>OCP: estrogen encourages lactobacilli proliferation</li> </ul>
<b>Pathogens</b>	<ul style="list-style-type: none"> <li>Microbial etiology is unknown in most cases, often treated as <b>polymicrobial infection</b></li> <li>Causative organisms (<b>order based on frequency</b>): <ul style="list-style-type: none"> <li><b>Neisseria gonorrhoeae</b>: <ul style="list-style-type: none"> <li>Causes <b>acute infection</b>, may lead to tubal obstruction ending with infertility &amp; ectopic pregnancy</li> <li><b>Gram negative diplococci, mucopurulent discharge, STD</b></li> </ul> </li> <li><b>Chlamydia trachomatis</b> <ul style="list-style-type: none"> <li>Causes chronic infection, may lead to tubal blockage</li> <li><b>Obligate intracellular, STD</b></li> </ul> </li> <li>Mycoplasma genitalium</li> </ul> </li> </ul>
<b>Clinical features</b>	<p>Classic presentation: young, sexually active women who present with lower abdominal pain and adnexal/cervical motion tenderness.</p> <ul style="list-style-type: none"> <li>Clinical diagnosis of PID: <ul style="list-style-type: none"> <li>Fever &gt;38.3°C &amp; chills</li> </ul> </li> </ul>

<b>Diagnostics</b>	<ul style="list-style-type: none"> <li><b>Lower abdominal pain and tenderness</b> (mostly bilateral)</li> <li><b>Abnormal discharge</b> (cervical or vaginal)</li> <li>Uncommon: N/V, dysuria, and abnormal uterine bleeding, lower back pain</li> <li>Chronic disease (often due to chlamydia) <ul style="list-style-type: none"> <li>Constant pelvic pain</li> <li>Dyspareunia</li> <li>Palpable mass</li> <li>Very difficult to treat, may require surgery</li> </ul> </li> </ul> <p>Diagnosis is primarily based on <b>clinical findings (Hx &amp; PE)</b>. There is no single test to confirm if the Pt has PID.</p> <ul style="list-style-type: none"> <li>Important diagnostic criteria <ul style="list-style-type: none"> <li>Patient history: most often a <b>sexually active young woman</b></li> <li><b>Lower abdominal pain</b></li> <li>Vaginal examination <ul style="list-style-type: none"> <li><b>Cervical motion tenderness</b>: severe cervical pain elicited by pelvic examination</li> <li>Uterine and/or adnexal tenderness</li> <li>Purulent, bloody cervical and/or vaginal discharge</li> </ul> </li> </ul> </li> <li>Blood tests: elevated ESR, leukocytosis</li> <li>Pregnancy test: to rule out an (ectopic) pregnancy</li> <li>Cervical and urethral swab <ul style="list-style-type: none"> <li>Gonococcal and chlamydial DNA (PCR) and cultures</li> <li>Giemsa stains of discharge can show cytoplasmic inclusions in C. trachomatis infections, but not in N. gonorrhoeae infection.</li> </ul> </li> <li><b>Negative gram smear does NOT rule out PID</b></li> <li>Imaging is not routinely required for diagnosis of PID. <ul style="list-style-type: none"> <li><b>Laparoscopic visualization</b>: <ul style="list-style-type: none"> <li><b>Most accurate method to confirm PID</b></li> <li>Only used for patients with unconfirmed cases or not responding to treatment</li> </ul> </li> <li>Transvaginal ultrasound indication: in case of severe PID (high fever, n/v, severe pain), to exclude tubo-ovarian abscess and to hospitalize women with severe PID</li> </ul> </li> </ul>
<b>Management</b>	<p>Start treatment as soon as you <b>suspect PID</b></p> <ul style="list-style-type: none"> <li>Empirical antibiotic therapy: <b>broad spectrum antibiotics</b> <ul style="list-style-type: none"> <li>Outpatient regimen <ul style="list-style-type: none"> <li>Mild to moderate PID <ul style="list-style-type: none"> <li>One single dose of IM ceftriaxone and oral therapy with doxycycline <ul style="list-style-type: none"> <li>Add metronidazole if there is signs of vaginitis</li> </ul> </li> </ul> </li> </ul> </li> <li>Inpatient regimen (<b>parenteral antibiotics</b>)</li> </ul> </li> </ul>

- Indications
  - No response to or inability to take outpatient oral regimen
  - Non-compliance concerns
  - Severe PID with nausea, vomiting, and/or high fever
    - Tubo-ovarian abscess**
  - Pregnancy
- Possible combinations (should be administered for 14 days)
  - IV Cefoxitin or cefotetan plus IV/PO doxycycline
  - In the case of tubo-ovarian abscess or signs of vaginitis: Add oral metronidazole or clindamycin
- Surgical intervention is considered if antibiotics therapy failed**
- As it's a result of STD, treat male partners and educate to prevent reinfection

### Complications

#### Short term complications

- Fitz-Hugh-Curtis syndrome (perihepatitis)
  - Inflammation of the liver capsule caused by spread of infection
  - Characterized by right upper quadrant pain
  - Characterized by violin-string-like adhesions extending from the peritoneum to the liver
  - Managed the same as PID
- Tubo-ovarian abscess**
  - Salpingitis → obstruction of the tube → formation of TOA (Inflammatory mass in fallopian tubes or ovary)
  - May rupture and cause peritonitis: a life-threatening event that calls for urgent abdominal surgery
  - Diagnosed by **transvaginal US: bilateral pelvic masses**
  - Managed the same as PID**. If not improved or TOA with abscesses >= 10 cm in diameter:
    - Image-guided drainage of abscess
    - Laparotomy
    - Laparoscopy



#### Long term complications

- Scarring and adhesions
- Infertility**: PID is one of the most common causes of infertility
- Ectopic pregnancy** (especially chlamydia)
- Chronic pelvic pain

DDx of lower abdominal pain + fever

	Ectopic pregnancy	PID	Appendicitis
Clinical features	Lower abdominal pain (unilateral), guarding Vaginal bleeding Amenorrhea	Lower abdominal pain (bilateral) Fever Menorrhagia, metrorrhagia Dyspareunia	Initially: diffuse epigastric pain Later: localized right lower quadrant pain N/V Fever
Diagnostic rules	Positive pregnancy test US	Cervical discharge Cervical motion tenderness	McBurney's point tenderness Rebound tenderness US
Therapy	Methotrexate or surgical removal	Antibiotics	Appendectomy

# Quiz

## Question 1:

- You are counseling a lady about different methods of contraception. What is the characteristic feature of intrauterine contraceptive device?
- A. Candida
  - B. Trichomoniasis
  - C. Chlamydia
  - D. Syphilis

## Question 2:

- A 29-year old lady presented with abdominal pain, fever and chills. Her temperature is 38.6C and she has lower abdominal tenderness. On speculum examination showed mucopurulent discharge. Which one of the following is the most likely diagnosis?
- A. Bacterial vaginosis.
  - B. Gonorrhoea cervicitis.
  - C. Pelvic inflammatory disease.
  - D. Trichomonas vaginitis.

## Question 3:

- A 30-year-old lady P2 +0 with 2 previous C-section. She has regular menstrual cycles. She used the oral contraceptive pills for 2 years but is off the pill for one year. She came to you as a case of secondary infertility. What is the most likely diagnosis?
- A. Endometriosis.
  - B. Polycystic ovarian syndrome.
  - C. Prolonged use of oral contraceptive pills.
  - D. Tubal blockage due to adhesions.

## Question 4:

- A female in the 7th week of gestation presented with lower pelvic pain and bleeding. she noticed some passing tissue. What is your diagnosis?
- A. Inevitable abortion.
  - B. Missed abortion.
  - C. Incomplete abortion.
  - D. Complete abortion.

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၇	၃	၂	၂

# Quiz

## Question 1:

- A 29-year-old woman with frothy offensive vaginal discharge, with motile flagellated organism. What is the organism?
- A. Increase incidence of endometrial cancer
  - B. Inhibits ovulation.
  - C. Reduce pelvic inflammatory disease.
  - D. Risk of ectopic pregnancy if she gets pregnant.(by causing PID > fibrosis of fallopian tube > ectopic)

## Question 2:

- A newly married woman was admitted to the ward with fever, abdominal pain and foul-smelling vaginal discharge. Pelvic ultrasound showed bilateral pelvic masses. What is the most serious long-term complication in this case?
- A. Amenorrhea
  - B. Infertility
  - C. Preterm labor
  - D. Endometriosis

## Question 3:

- Which one of the following lower genital tract infections require treatment for the husband?
- A. Bacterial vaginosis
  - B. Monilial infection
  - C. Chlamydia infection
  - D. Group B streptococcus infection

## Question 4:

- A 29-year-old lady, presented with abdominal pain, fever an is 38.6C and lower abdominal tenderness. On speculum examination discharge. Which one of the following is the most likely diagnosis?
- A. Endometriosis
  - B. Gonorrhoea cervicitis
  - C. Ovarian torsion
  - D. Pelvic inflammatory disease

D	C	B	B
7	3	2	1

# Reference

CHAP 21



## Pelvic Pain Acute, Cyclic (Dysmenorrhea), and Chronic

ANDREA J. RAPKIN • JOSEPH C. GAMBONE

### CLINICAL KEYS FOR THIS CHAPTER

- Acute pelvic pain of sudden onset can be caused by both gynecologic and nongynecologic disorders. Adnexal accidents such as rupture or torsion of ovarian cysts, pelvic infections, tubal rupture of ectopic pregnancies, and aborting intrauterine pregnancies are the more common gynecologic causes. Gastrointestinal conditions, such as appendicitis and bowel obstruction, and genitourinary problems, such as cystitis and ureteral stones are the significant nongynecologic causes. Early diagnosis and expeditious treatment, often surgical, are important for safe and effective clinical management of acute pelvic pain.
- The most common type of cyclic pelvic pain is recurrent painful menstruation or dysmenorrhea. Dysmenorrhea may be primary, when caused by excessive production of prostaglandins (PGs), mainly  $PGF_{2\alpha}$ , or secondary when an underlying condition for the pain such as adenomyosis or endometriosis is diagnosed. Primary dysmenorrhea occurs in ovulatory cycles and in younger women (17 to 22 years). Other causes of secondary menstrual and perimenstrual recurrent pain include chronic pelvic infection, degenerating fibroids, and pelvic congestion. Secondary dysmenorrhea is not limited to pain only during menses and typically occurs in older women (>30 years of age).
- Treatment of primary dysmenorrhea involves provision of an explanation for the cause of the pain, and reassurance, along with nonsteroidal antiinflammatory drugs (NSAIDs), hormonal contraceptives to block ovulation, and other nonpharmaceutical interventions such as transcutaneous nerve stimulation and acupuncture. Treatment of secondary dysmenorrhea depends on the underlying cause of the pain, with NSAIDs the preferred initial choice.
- Chronic pelvic pain (CPP) is noncyclic pain that lasts for more than 6 months. Like other forms of pelvic pain, CPP has both gynecologic and nongynecologic causes. Chronic pain, including CPP, differs from acute pain in several important and measurable ways. With acute pain, the pain perception, suffering, and behavior are usually commensurate with the degree of sensory input. With chronic pain, such as CPP, the suffering and behavioral responses may be quite exaggerated, and may persist even after the pain stimulus has remitted.
- The appropriate evaluation and treatment of CPP is challenging. The most effective treatment occurs when a multidisciplinary team manages the patient with ongoing, as opposed to episodic care. Psychiatric referral for psychopharmacologic therapy may be needed. This aspect of therapy is crucial, because many of these patients may be severely depressed and they may be withdrawn interpersonally, sexually, and occupationally.

Pelvic pain is a frequent complaint in gynecology. It may be acute, cyclic, and associated with menstruation, or chronic, lasting for more than 6 months. **Acute pelvic pain** is sudden in onset and is usually associated with significant neuroautonomic reflexes such as nausea and vomiting, diaphoresis, and apprehension. There are several important gynecologic and nongynecologic causes of acute pain.

**Half of all menstruating women are affected by painful menstruation or dysmenorrhea** making it the most common type of pelvic pain. Ten percent of these women have severe symptoms necessitating time off from work or school. **Chronic pelvic pain (CPP) includes reproductive and nonreproductive organ-related pelvic pain** that is primarily acyclic and that lasts for 6 months or more.

### Acute Pelvic Pain

It is important for the gynecologist to be aware of both the gynecologic and nongynecologic causes of acute pelvic pain (Box 21-1). Delayed diagnosis and treatment of acute pelvic pain may increase the morbidity and even the mortality.

Adnexal accidents, including torsion or rupture of an ovarian or fallopian tube cyst (Figure 21-1), can cause severe lower abdominal pain. Normal ovaries and fallopian tubes rarely undergo torsion, but cystic

#### BOX 21-1

##### CAUSES OF ACUTE PELVIC PAIN

- Gynecologic**
- Adnexal accidents, e.g., ovarian cyst torsion, rupture, or hemorrhage
  - Acute infections, e.g., endometritis or pelvic inflammatory disease
  - Pregnancy complications, e.g., ectopic gestation or abortion
- Nongynecologic**
- Gastrointestinal, e.g., appendicitis, enteritis, or intestinal obstruction
  - Genitourinary, e.g., cystitis, ureteral stones, or urethral syndrome
  - Other, e.g., pelvic thrombophlebitis, vascular aneurysm, or porphyria

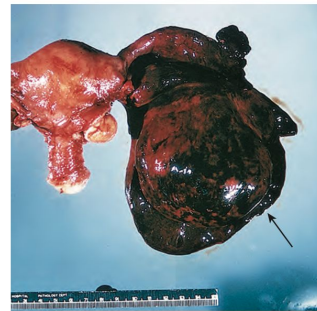


FIGURE 21-1 Torsion of an ovarian cyst and adnexal blood vessels. Note the large clot that has formed in the adnexal area (arrow) due to obstruction of venous outflow from a left ovarian cyst. (From Clement PB, Young RH: *Atlas of gynecologic surgical pathology*, Philadelphia, 2000, Saunders.)

or inflammatory enlargement predisposes to these adnexal accidents. The pain of adnexal torsion can be intermittent or constant, is often associated with nausea, and has been described as reverse renal colic because it originates in the pelvis and radiates to the loin. An enlarging pelvic mass is found on examination and ultrasound, with decreased or absent blood flow to the adnexa on Doppler-ultrasonic studies. The need for surgical intervention is common and urgent.

**Functional ovarian cysts** (e.g., corpus luteal or follicular cysts) may rupture causing leakage of fluid or blood that causes acute pain from peritoneal irritation. When there is significant associated bleeding, the pain may be followed by a hemoperitoneum and hypovolemia. Surgical intervention is mandatory in this setting, after adequate resuscitation with packed red cells and intravenous fluids.

**Reproductive organ infections such as endometritis or salpingo-oophoritis** (commonly referred to as pelvic inflammatory disease or PID) can present acutely. Rupture of a tubo-ovarian abscess is a surgical emergency that can progress to hypotension and oliguria after initially presenting with diffuse lower abdominal pain. Pelvic infection is covered in greater detail in Chapter 22.

**Several complications of early pregnancy, such as ectopic gestation** (see Chapter 24) and **threatened or incomplete abortion, can cause acute pelvic pain** and are generally associated with abnormal bleeding. Ectopic tubal pregnancies produce pain as the fallopian tube dilates and ruptures into the abdominal cavity, and can be life-threatening when not diagnosed expeditiously.

Nongynecologic causes of acute lower abdominal pain (see Box 21-1) are frequently in the differential diagnosis when a woman presents with pelvic pain. **Appendicitis** is a common gastrointestinal cause of acute lower abdominal pain that eventually localizes to the right lower quadrant of the abdomen (McBurney point). The unilateral intensity of the pain usually differentiates it from salpingo-oophoritis. Rupture of an infected appendix into the pelvic cavity can have a significant adverse effect on female fertility and may be a diagnostic challenge during pregnancy (see Chapter 16). **Diverticular abscess** is also not uncommon but usually occurs in postmenopausal women.

**Acute cystitis** (see Chapter 22) and **urethral stone formation** (lithiasis) and passage are both frequently painful. **Urethral syndrome** can present acutely and become chronic over time when not recognized and treated. Painful pelvic floor disorders are covered in more detail in Chapter 23.

an enigmatic disorder, it is one of the most common presenting complaints in a gynecologic practice. As a public health problem, it results in great cost to society in terms of hospital services, loss of productivity, and human misery.

#### BOX 21-4

##### CHARACTERISTICS OF SOME CAUSES OF SECONDARY DYSMENORRHEA

###### Endometriosis

Pain extends to premenstrual or postmenstrual phase or may be continuous; may also have deep dyspareunia, premenstrual spotting, a fixed retroverted uterus, and tender pelvic nodules (especially on the uterosacral ligaments); onset is usually in the 20s and 30s but may start in the teens.

###### Pelvic Inflammation

Initially pain may be menstrual, but often with each cycle it extends into the premenstrual phase; may have intermenstrual bleeding, dyspareunia, and pelvic tenderness.

###### Adenomyosis, Fibroid Tumors

Uterus is generally symmetrically enlarged and may be mildly tender; dysmenorrhea is associated with a dull pelvic dragging sensation; hypermenorrhea and dyspareunia may be present.

###### Ovarian Cysts (Especially Endometriosis and Luteal Cysts)

Should be clinically evident.

###### Pelvic Congestion

A dull, ill-defined pelvic ache, usually worse premenstrually, relieved by menses; not all investigators agree that this is a cause of chronic pelvic pain.

Obviously, not all lower abdominal and low back pains are of gynecologic origin. **Careful evaluation is needed to distinguish gynecologic pain from that of orthopedic, gastrointestinal, urologic, neurologic, and psychosomatic origin.** The relationship between pelvic pain and the underlying gynecologic pathology is often inexplicable, and frequently the pain is thought to be psychosomatic.

### Anatomy and Physiology

The innervations of the pelvic organs that convey information related to pain are shown in Table 21-1. Painful impulses that originate in the skin, muscles, bones, joints, and parietal peritoneum travel in somatic nerve fibers, whereas those originating in the internal organs travel in visceral nerves.

**Visceral pain is more diffusely spread than somatic pain because of a phenomenon called viscerosomatic convergence, and the lack of a well-defined projection area in the sensory cortex for its identification.** Viscerosomatic convergence occurs in all second-order neurons in the dorsal horn of the spinal cord that receive visceral input. No second-order neurons in the dorsal horn receive only visceral input. The viscerosomatic neurons have larger receptive fields than do the somatic second-order neurons. Visceral pain is therefore usually referred to the skin, which is supplied by the corresponding spinal cord segment (**referred pain**). For example, the initial pain of appendicitis is referred to the epigastric area because the affected structures are innervated by the thoracic cord segments T8, T9, and T10.

The structures of the female genital tract vary in their sensitivity to pain. The skin of the external

TABLE 21-1

##### NERVES CARRYING PAINFUL IMPULSES FROM THE PELVIC ORGANS

Organ	Spinal Segments	Nerves
Perineum, vulva, lower vagina	S2-4	Pudendal, inguinal, genitofemoral, posterofemoral cutaneous
Upper vagina, cervix, lower uterine segment, posterior urethra, bladder trigone, uterosacral and cardinal ligaments, rectosigmoid, lower ureters	S2-4	Pelvic parasympathetics
Uterine fundus, proximal fallopian tubes, broad ligament, upper bladder, cecum, appendix, terminal large bowel	T11-12, L1	Sympathetics via hypogastric plexus
Outer two-thirds of fallopian tubes, upper ureter	T9-10	Sympathetics via aortic and superior mesenteric plexus
Ovaries	T9-10	Sympathetics via renal and aortic plexus and celiac and mesenteric ganglia
Abdominal wall	T12-L1	Sympathetics via renal and aortic plexus and celiac and mesenteric ganglia
	T12-L1	Iliohypogastric
	T12-L1	Ilioinguinal
	L1-2	Genitofemoral

### Chronic Pelvic Pain

CPP refers to pelvic pain of more than 6 months' duration that has a significant effect on daily function and quality of life. CPP includes reproductive and nonreproductive organ-related pain. Although CPP is



# Reference

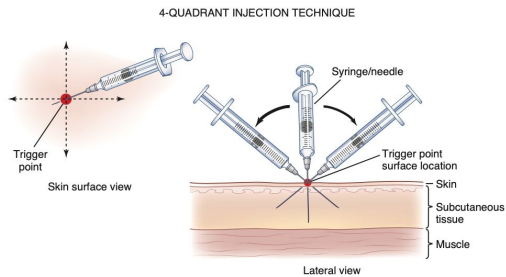


FIGURE 21-3 Trigger point injection technique for the abdominal wall for a patient with chronic pelvic pain. (From Auerbach PS: *Wilder-ness medicine*, ed 5, Philadelphia, 2007, Mosby.)

suspension for generalized pelvic pain. Lysis of adhesions is also usually nonproductive, with the possible exception of the situations where the site of adhesions, as visualized by the laparoscope, specifically coincides with the localization of pain. However, pelvic adhesions often recur following surgical lysis. Without proof of organic pathology or a reasonable functional explanation for the pelvic pain, a thorough psychosomatic evaluation should be carried out before any surgical procedure is considered.

### INJECTION THERAPIES

Acupuncture, nerve blocks, and trigger-point injections of local anesthetics may provide prolonged pain relief. Acupuncture has been used successfully for dysmenorrhea, and trigger-point injections and nerve blocks with local anesthetics have been used successfully for neuropathic and musculoskeletal pain. Acupuncture probably increases spinal cord endorphins. In women with CPB, trigger points are typically found

either in the lower abdominal wall, lower back, or the vagina. A significant percentage of patients with pelvic pain have abdominal wall trigger points or nerve entrapments that respond to weekly or biweekly injections of a local anesthetic (usually up to five injections is sufficient) combined with alterations of activity or modification of behaviors that affect the area of pain. Injection of local anesthetic into myofascial trigger points (Figure 21-3) may abolish pain by lowering the impulses from the area of referred pain, thereby diminishing the afferent impulses reaching the dorsal horn to a level below the threshold for pain transmission (but the exact mechanism is not known). Repeated local anesthetic nerve blocks of areas of nerve impingement/entrapment combined with instructions to patients about alteration in physical activity and/or physical therapy can be helpful. Along with nerve threshold altering medications, these interventions can down regulate neural hypersensitivity and permanently decrease or eliminate pain.

inflammation. The inflammation may be present at any point along a continuum that includes endometritis, salpingitis, and peritonitis. PID is commonly caused by the sexually transmitted microorganisms *N. gonorrhoeae* and *C. trachomatis*. Recent evidence suggests that *Mycoplasma genitalium* can cause PID and may present with mild clinical symptoms similar to chlamydial PID. Endogenous microorganisms found in the vagina, particularly the BV microorganisms, are often isolated from the upper genital tract of women with PID. The BV microorganisms include anaerobic bacteria such as *Prevotella* and peptostreptococci, as well as *G. vaginalis*. Less frequently, respiratory pathogens such as *Haemophilus influenzae*, group A streptococci, and pneumococci can colonize the lower genital tract and cause PID.

Traditionally, the diagnosis of PID has been based on a triad of symptoms and signs, including pelvic pain, cervical motion and adnexal tenderness, and the presence of fever. There is wide variation in many symptoms and signs among women with this condition, which makes the diagnosis of acute PID difficult. Many women with PID exhibit subtle or mild symptoms that are not readily recognizable as PID. The diagnosis should be considered in women with any genitourinary symptoms, including, but not limited to, lower abdominal pain, excessive vaginal discharge, heavy and irregular vaginal bleeding, fever, chills, and urinary symptoms.

Pelvic organ tenderness, either uterine tenderness alone or uterine tenderness with adnexal tenderness, is usually present in patients with PID. Cervical motion tenderness suggests the presence of peritoneal inflammation, which causes pain when the peritoneum is stretched by moving the cervix and causing traction of the adnexa on the pelvic peritoneum. Direct or rebound abdominal tenderness may be present.

Evaluation of both vaginal and endocervical secretions is an important part of the workup of a patient with PID. In women with PID, an increased number of polymorphonuclear leukocytes may be detected in a wet mount of the vaginal secretions or the cervix may have a mucopurulent discharge.

Therapeutic regimens for PID must provide empirical, broad-spectrum coverage of likely pathogens, including *N. gonorrhoeae*, *C. trachomatis*, *M. genitalium*, gram-negative facultative bacteria, anaerobes, and streptococci. Recommended first-line outpatient treatment regimens for PID, per the 2015 CDC guidelines, are listed in Table 22-5, and parenteral treatment is illustrated in Table 22-6.

An outpatient regimen of cefoxitin and doxycycline is as effective as an inpatient parenteral regimen of the same antimicrobials. Box 22-1 lists the clinical criteria for hospitalization with parenteral treatment. Hospitalized patients can be considered for discharge when their fever is less than 99.5° F for more than 24

TABLE 22-5  
2015 CENTERS FOR DISEASE CONTROL (CDC) RECOMMENDED FIRST-LINE REGIMEN FOR OUTPATIENT TREATMENT OF PELVIC INFLAMMATORY DISEASE

Recommended Regimen
Ceftriaxone 250 mg intramuscularly in a single dose PLUS Doxycycline 100 mg orally twice a day for 14 days WITH or WITHOUT Metronidazole 500 mg orally twice a day for 14 days OR Cefoxitin 2 g intramuscularly in a single dose and probenecid, 1 g orally administered concurrently in a single dose PLUS Doxycycline 100 mg orally twice a day for 14 days WITH or WITHOUT Metronidazole 500 mg orally twice a day for 14 days OR Other parenteral third-generation cephalosporin (e.g., ceftiofime or cefotaxime) PLUS Doxycycline 100 mg orally twice a day for 14 days WITH or WITHOUT Metronidazole 500 mg orally twice a day for 14 days

From Pelvic Inflammatory Disease: Sexually Transmitted Diseases Treatment Guidelines, 2015. Available at <http://www.cdc.gov/std/treatment/2015/pid.htm>. Accessed February 19, 2015.

hours, the white blood cell count is decreasing, rebound tenderness is absent, and repeat examination shows marked amelioration of abdominal tenderness.

Sexual partners of women with PID should be evaluated and treated for urethral infection caused by chlamydia or gonorrhea. One of these STIs is usually found in the male sexual partners of women with PID even if her diagnosis is not associated with chlamydia or gonorrhea.

### TUBO-OVARIAN ABSCESS

Tubo-ovarian abscess (TOA), an endstage process of acute PID, is diagnosed when a patient with PID has a pelvic mass that is palpable during bimanual examination. The condition usually reflects an agglutination of pelvic organs (tube, ovary, and bowel) forming a palpable complex. Occasionally, an ovarian abscess can result from the entrance of microorganisms through an ovulatory site. Tubo-ovarian abscess is treated with an antibiotic regimen administered on an inpatient basis. Table 22-6 illustrates the parenteral treatment of PID, as per the 2015 CDC guidelines. About 75% of women with a tubo-ovarian abscess respond to antimicrobial therapy alone. Failure of medical therapy suggests

### PELVIC INFLAMMATORY DISEASE

Microorganisms colonizing the endocervix and ascending to the endometrium and fallopian tubes cause PID. This is a clinical diagnosis implying that the patient has upper genital tract infection and

TABLE 22-4  
2015 CENTERS FOR DISEASE CONTROL (CDC) RECOMMENDED FIRST-LINE REGIMEN FOR UNCOMPLICATED GONOCOCCAL AND CHLAMYDIAL INFECTIONS OF THE CERVIX, URETHRA, AND RECTUM

Recommended Regimen
Ceftriaxone 250 mg in a single intramuscular dose PLUS Azithromycin 1 g orally in a single dose or doxycycline 100 mg orally twice daily for 7 days*
Alternative Regimens
If ceftriaxone is not available: cefixime 400 mg in a single oral dose PLUS Azithromycin 1 g orally in a single dose or doxycycline 100 mg orally twice daily for 7 days*
PLUS Test-of-cure in 1 week
If the patient has severe cephalosporin allergy: azithromycin 2 g in a single oral dose PLUS Test-of-cure in 1 week

From Centers for Disease Control and Prevention. Updated recommended treatment regimens for gonococcal infections and associated conditions—United States, April 2015. [www.cdc.gov](http://www.cdc.gov).

\*Because of the high prevalence of tetracycline resistance among Gonococcal Isolate Surveillance Project isolates, particularly those with elevated minimum inhibitory concentrations to cefixime, the use of azithromycin as the second antimicrobial is preferred as dual therapy.

TABLE 22-6  
CENTERS FOR DISEASE CONTROL (CDC) RECOMMENDED FIRST-LINE REGIMEN FOR PARENTERAL TREATMENT OF PELVIC INFLAMMATORY DISEASE

Recommended Parenteral Regimen A
Cefotetan 2 g IV every 12 hours OR Cefoxitin 2 g IV every 6 hours PLUS Doxycycline 100 mg orally or IV every 12 hours
Recommended Parenteral Regimen B
Clindamycin 900 mg IV every 8 hours PLUS Gentamicin loading dose IV or IM (2 mg/kg of body weight), followed by a maintenance dose (1.5 mg/kg) every 8 hours. Single daily dosing (3 to 5 mg/kg) can be substituted.
Alternative Parenteral Regimens
Ampicillin/sulbactam 3 g IV every 6 hours PLUS Doxycycline 100 mg orally or IV every 12 hours

From Pelvic Inflammatory Disease: Sexually Transmitted Diseases Treatment Guidelines, 2015. Available at <http://www.cdc.gov/std/treatment/2015/pid.htm>. Accessed February 19, 2015.

### BOX 22-1

#### PELVIC INFLAMMATORY DISEASE: CLINICAL CRITERIA FOR HOSPITALIZATION AND PARENTERAL TREATMENT

1. Surgical emergencies (e.g., appendicitis) not ruled out
2. Failed oral treatment (no improvement with short-term treatment)
3. Compliance questionable (i.e., patient unable to follow or tolerate outpatient regimen)
4. Severe illness (toxicity: nausea, vomiting, high fever)
5. Tubo-ovarian abscess demonstrated on ultrasonography or suspected clinically

the need for drainage of the abscess. Although drainage may require surgical exploration, percutaneous drainage, guided by imaging studies (ultrasonography or computed tomography) should be used as an initial option if possible. Trocar drainage, with or without placement of a drain, is successful in up to 90% of cases in which the patient has failed to respond to antimicrobial therapy after 72 hours. Figure 22-5 depicts a surgical specimen with bilateral TOAs.





## Med 441 Team:

### Leader:

Sarah Alhamlan

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# Good Luck!



## Med 438 Team:

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Ateen Almutairi - Lama ALzamil

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