

PID and Pelvic TB

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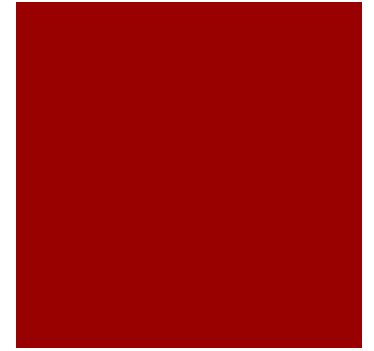
Obstetrics and Gynecology

Reproductive Endocrinology and Infertility

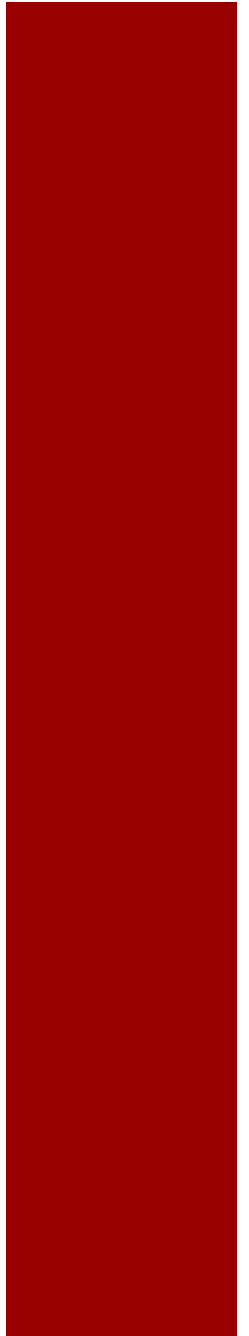
Laparoscopy and Hysteroscopy

Main reference

- Comprehensive Gynecology 7th edition, 2017 (Lobo RA, Gershenson DM, Lentz GM, Valea FA editors); chapter 23, Genital Tract Infections

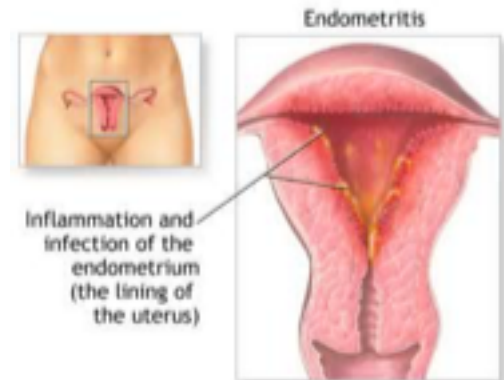


Pelvic Inflammatory Disease (PID)



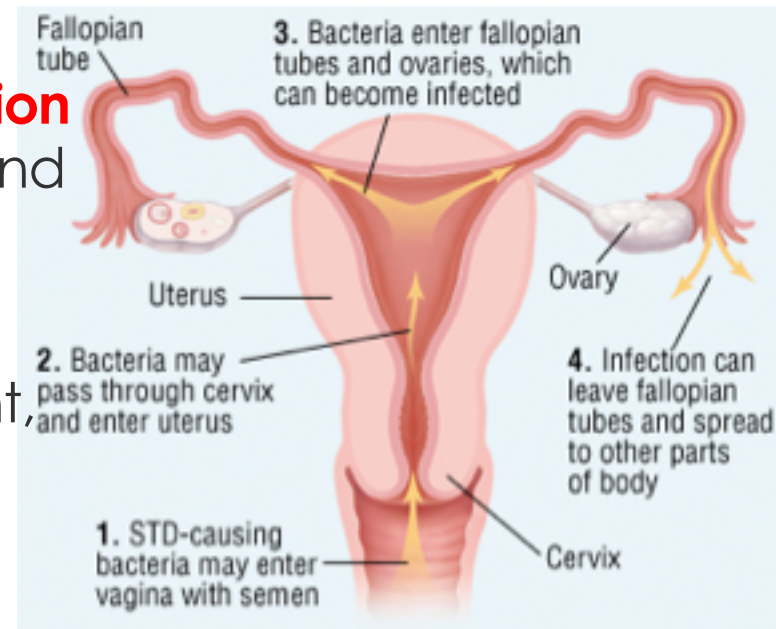
Pelvic Inflammatory Disease (PID)

- infection in the upper genital tract not associated with pregnancy or intraperitoneal pelvic operations.
- polymicrobial infection that is a mixture of aerobic and anaerobic bacteria, clinically appearing as a complex infection.
- It may include infection of any or all of the following anatomic locations:
 - endometrium (endometritis)
 - Oviducts/fallopian tubes (salpingitis)
 - ovary (oophoritis)
 - uterine wall (myometritis)
 - uterine serosa and broad ligaments (parametritis), and pelvic peritoneum



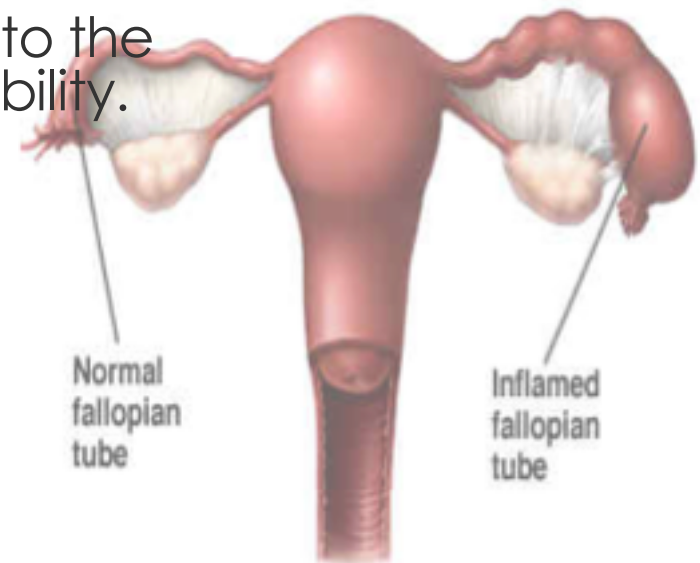
Pelvic Inflammatory Disease (PID)

- Oviducts are the most commonly affected
- Acute PID results from **ascending infection** from the bacterial flora of the vagina and cervix in more than **99% of cases**
- Acute PID is rare in the woman without menstrual periods, such as the pregnant, premenarcheal, or postmenopausal woman.



Pelvic Inflammatory Disease (PID)

- In less than 1% of cases, acute PID results from **transperitoneal spread** of infectious material from a perforated appendix or intraabdominal abscess.
- **Hematogenous and lymphatic** spread to the tubes or ovaries is another remote possibility.



Pelvic Inflammatory Disease (PID)

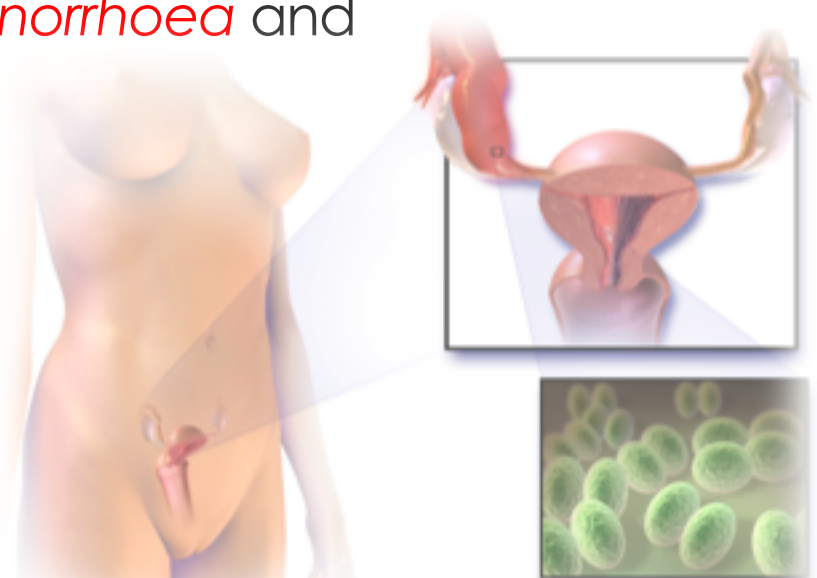
- PID is extremely rare in women who are amenorrheic or not sexually active.
- When PID is found in the **postmenopausal woman**, associated conditions are as follows:
 - genital malignancies
 - Diabetes
 - concurrent intestinal diseases, such as diverticulitis, appendicitis, or carcinoma



Pelvic Inflammatory Disease (PID): Etiology



- In many cases, no causative organism is found.
- two classic sexually transmitted organisms associated with PID: *Neisseria gonorrhoea* and *Chlamydia trachomatis*



Pelvic Inflammatory Disease (PID): Etiology



■ **N. gonorrhea**

- Once the gonococcus ascends to the fallopian tube, it selectively adheres to nonciliated mucus-secreting cells.
- However, most damage occurs to the ciliated cells, most likely because of an acute complement-mediated inflammatory response with the migration of polymorphonuclear leukocytes, vasodilation, and transudation of plasma into the tissues
- This robust inflammatory response causes cell death and tissue damage → **SCARRING/ tubal adhesions**

Pelvic Inflammatory Disease (PID): Etiology

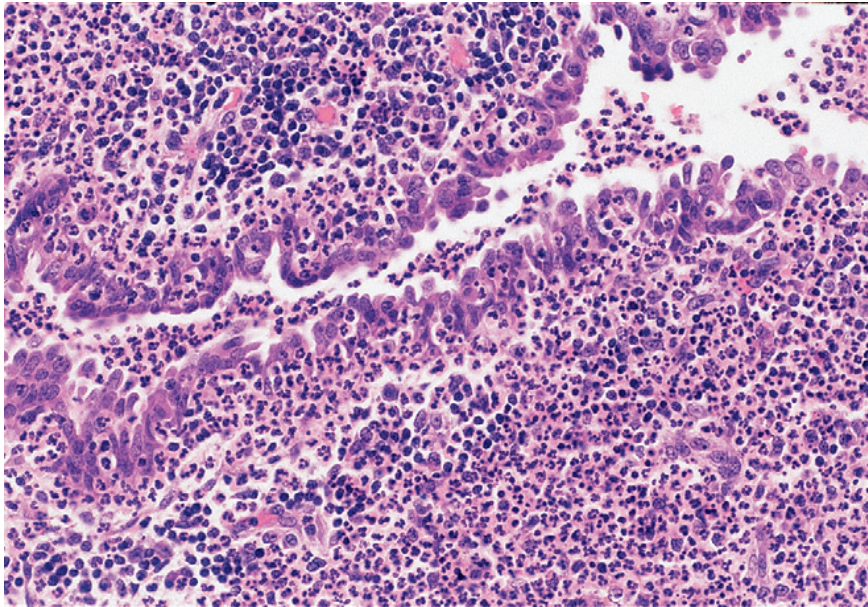


Figure 23-23 Acute salpingitis with a mixture of neutrophils, lymphocytes, and plasma cells in the fallopian tube destroying sor of the epithelial lining. (From Voet RL: Color Atlas of Obstetric and Gynecologic Pathology. St. Louis, Mosby, 1997, p 107.)

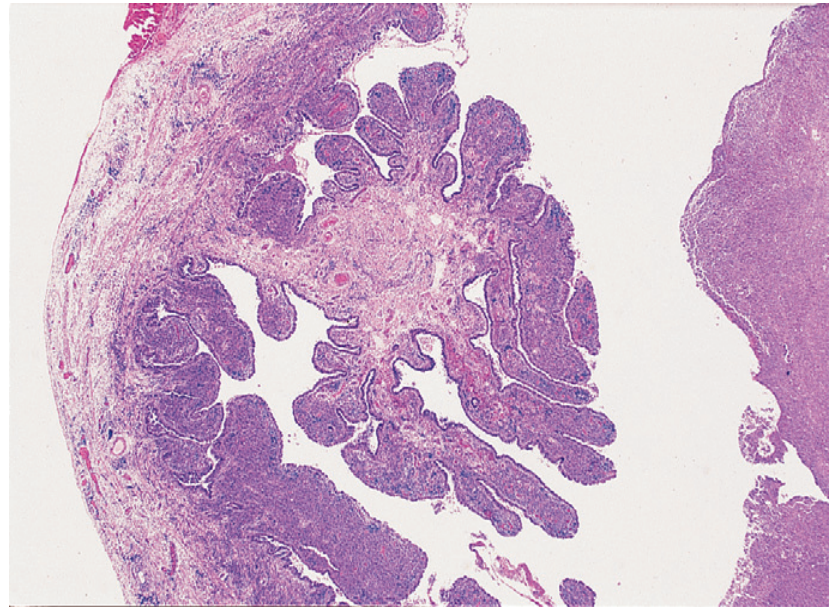


Figure 23-24 Acute salpingitis showing dilation of the fallopian tube and blunting of the papillary fronds. (From Voet RL: Color Atlas of Obstetric and Gynecologic Pathology. St. Louis, Mosby, 1997, p 102.)

Pelvic Inflammatory Disease (PID): Etiology



■ **Chlamydia trachomatis**

- *C. trachomatis* an intracellular, sexually transmitted bacterial pathogen.
- Chlamydia may remain in the fallopian tubes for months after initial colonization of the upper genital tract.
- Primary infection appears to be *self-limited*, with mild symptoms and little permanent damage.
- **repeat exposures** to Chlamydia, such as may occur in asymptomatic untreated *C. trachomatis* cervical infection, may lead to an **autoimmune response** that causes **severe tubal damage**, even if *C. trachomatis* is no longer present.

Pelvic Inflammatory Disease (PID): Etiology



- The most common **aerobic organisms** are nonhemolytic *Streptococcus*, *E. coli*, group B *Streptococcus*, and coagulase-negative *Staphylococcus*.
- **Anaerobic organisms** tend to predominate over aerobes, and the most common anaerobic organisms are *Bacteroides spp.*, *Peptostreptococcus*, and *Peptococcus*.
- Anaerobic organisms are almost ubiquitous in pelvic abscesses associated with acute PID.

Pelvic Inflammatory Disease (PID): Risk factors

- age at first intercourse
- marital status
- number of sexual partners



Pelvic Inflammatory Disease (PID): Signs and Symptoms

Box 23-8 CDC Guidelines for Diagnosis of Acute Pelvic Inflammatory Disease: Clinical Criteria for Initiating Therapy

Minimum Criteria

Empirical treatment of PID should be initiated in sexually active young women and others at risk for STIs if the following minimum criteria are present and no other causes(s) for the illness can be identified:

Lower abdominal tenderness *or*
Adnexal tenderness *or*
Cervical motion tenderness

Additional Criteria for Diagnosing PID

Oral temperature $> 38^{\circ}\text{C}$
Abnormal cervical or vaginal discharge (mucopurulent)
Presence of abundant WBCs on microscopy of vaginal secretions
Elevated erythrocyte sedimentation rate
Elevated C-reactive protein
Laboratory documentation of cervical infection with *N. gonorrhoeae* or *C. trachomatis*

Definitive Criteria for Diagnosing PID

Histopathologic evidence of endometritis on endometrial biopsy
Transvaginal sonography or MRI showing thickened fluid-filled tubes, with or without free pelvic fluid or tubo-ovarian complex
Laparoscopic abnormalities consistent with PID
Although initial treatment can be made before bacteriologic diagnosis of *C. trachomatis* or *N. gonorrhoeae* infection, such a diagnosis emphasizes the need to treat sex partners.

Pelvic Inflammatory Disease (PID): Signs and Symptoms

- Lower abdominal and pelvic tenderness during examination is the **hallmark** of acute PID.



Pelvic Inflammatory Disease (PID): Signs and Symptoms

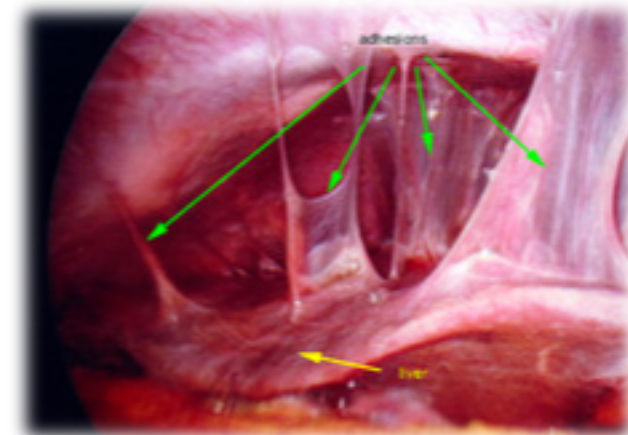
- The most frequent symptom of acute PID is new-onset **lower abdominal and pelvic pain**.
 - pain is diffuse, bilateral, and usually described as constant and dull.
 - It may be exacerbated by motion or sexual activity.
 - The duration of pain is usually less than 7 days.
- It is important to remember that up to **50%** of women with tubal damage **never** experience any symptoms consistent with PID.



Pelvic Inflammatory Disease (PID): **Fitz-Hugh–Curtis syndrome**

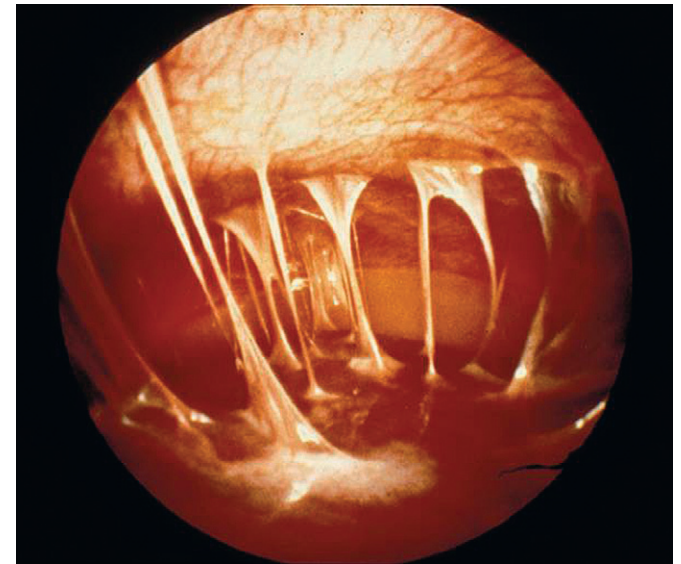


- **Five percent to 10%** of women with acute PID develop symptoms of perihepatic inflammation, the **Fitz-Hugh–Curtis syndrome**
- the liver capsule will appear inflamed, with **classic violin string adhesions** to the parietal peritoneum beneath the diaphragm.
- Persistent symptoms and signs include right upper quadrant pain, pleuritic pain, and tenderness in the right upper quadrant when the liver is palpated



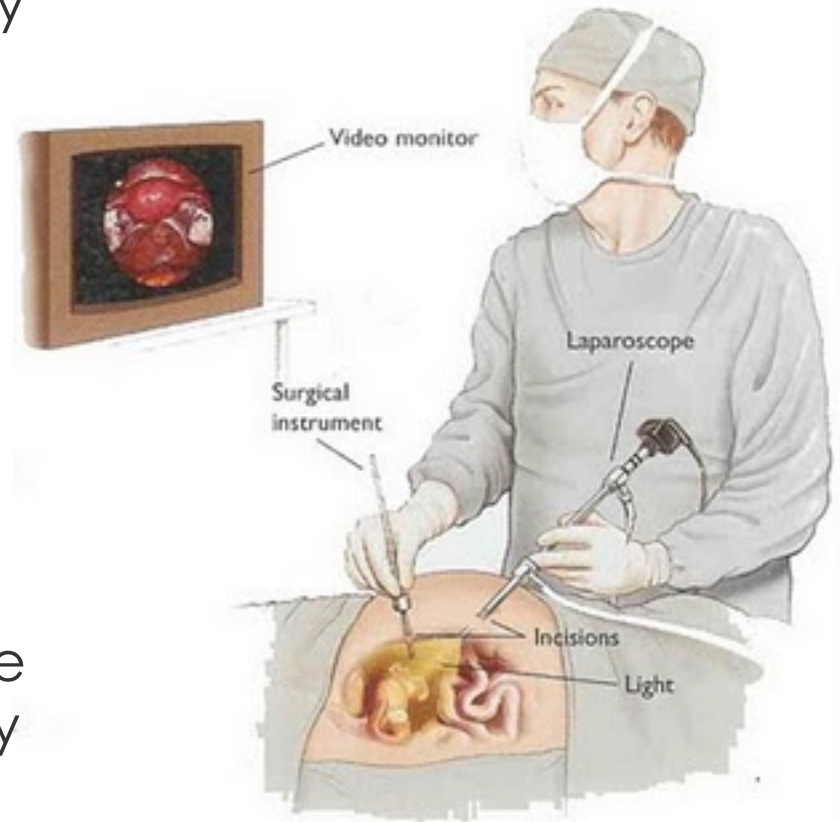
Pelvic Inflammatory Disease (PID): **Fitz-Hugh–Curtis syndrome**

- develops from **transperitoneal or vascular dissemination** of the gonococcal or Chlamydia organism to produce the perihepatic inflammation



Diagnosis of PID

- **Direct visualization** via laparoscopy is the most accurate method of diagnosing acute PID.
- The laparoscopy offers the additional advantage of concurrent operative procedures such as lysis of adhesions, potential drainage of an abscess, and irrigation of the pelvic cavity.
- Acute PID should be included in the differential diagnosis of any sexually active young woman with pelvic pain.



Diagnosis of PID

- Examine the endocervical mucus for inflammatory cells and perform the NAAT for *N. gonorrhoeae* and *C. trachomatis*.
- The presence of an increased number of vaginal white blood cells is the *most sensitive laboratory indicator of acute PID*.



Diagnosis of PID



- Endometrial biopsy (?)
- Transvaginal ultrasound – useful in documenting an adnexal mass
- MRI (?)

Diagnosis of PID

Box 23-8 CDC Guidelines for Diagnosis of Acute Pelvic Inflammatory Disease: Clinical Criteria for Initiating Therapy

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Treatment



- The **two most important goals** of the medical therapy of acute PID:
 1. resolution of symptoms
 2. preservation of tubal function.
- Antibiotic therapy should be started as soon as the diagnosis has been made.
- Early diagnosis and early treatment will help reduce the possibility of long-term sequelae of the disease.

Treatment



- Women who are **not treated in the first 72 hours** following the onset of symptoms are **three times as likely** to develop tubal infertility or ectopic pregnancy
- In the management of acute PID, **DO NOT FORGET the treatment and education of the male partner** for the prevention of the disease, including the use of proper contraceptives, which help reduce the rate of upper genital tract infection.

Treatment

- Because most cases of PID are polymicrobial, **broad-spectrum antibiotic coverage** is indicated.
- Empirical antibiotic protocols should cover a wide range of bacteria,
(includes: *N. gonorrhoeae*, *C. trachomatis*, anaerobic rods and cocci, gram-negative aerobic rods, and gram-positive aerobes)

Treatment: Outpatient

Box 23-9 CDC Recommendations for Ambulatory Management of Acute Pelvic Inflammatory Disease

Ceftriaxone, 250 mg IM, single dose

or

Cefoxitin, 2 g IM, single dose, and probenecid, 1 g PO administered concurrently in a single dose

or

Other parenteral third-generation cephalosporin (e.g., ceftizoxime, cefotaxime)

plus

Doxycycline, 100 mg PO bid for 14 days

with or without

Metronidazole, 500 mg PO bid for 14 days

Treatment: Outpatient



- It is important to reexamine women **within 48 to 72 hours** of initiating outpatient therapy to evaluate the response of the disease to oral antibiotics.
- If the disease is responding well, approximately **4 to 6 weeks** after therapy the woman should be reexamined to assess the resolution of clinical symptoms and establish a post-treatment baseline.

Treatment: Inpatient



Box 23-10 Indications for Hospitalizing Patients with Acute Pelvic Inflammatory Disease

Surgical emergencies (e.g., appendicitis) cannot be excluded.

The patient is pregnant.

The patient does not respond clinically to oral antimicrobial therapy.

The patient is unable to follow or tolerate an outpatient oral regimen.

The patient has severe illness, nausea and vomiting, or high fever.

The patient has a tubo-ovarian abscess.

Treatment: Inpatient

Box 23-11 Inpatient Management of Acute Pelvic Inflammatory Disease

Parenteral Regimen A

Cefotetan, 2 g IV every 12 hr

or

Cefoxitin, 2 g IV every 6 hr

plus

Doxycycline, 100 mg PO or IV every 12 hr

NOTE: Because of pain associated with infusion, doxycycline should be administered orally when possible, even when the patient is hospitalized. PO and IV administration of doxycycline provide similar bioavailability.

Parenteral Regimen B

Clindamycin, 900 mg IV every 8 hr

plus

Gentamicin, loading dose IV or IM (2 mg/kg of body weight) followed by a maintenance dose (1.5 mg/kg) every 8 hr. Single daily dosing may be substituted.

Alternative Parenteral Regimens

Limited data support the use of other parenteral regimens. The following regimen has been investigated in at least one clinical trial, and has broad-spectrum coverage:

Ampicillin-sulbactam, 3 g IV every 6 hr

plus

Doxycycline, 100 mg PO or IV every 12 hr

One trial has demonstrated high short-term clinical cure rates with azithromycin, either as monotherapy for 1 wk (500 mg IV × one or two doses followed by 250 mg PO, 5-6 days) or combined with a 12-day course of metronidazole.

Treatment: Inpatient regimens



- With IV protocols, the CDC recommends that IV antibiotics be continued for **at least 24 hours** after substantial improvement in the patient.
- When the woman has a **mass**, we add **ampicillin** to clindamycin and gentamicin.
- For patients without a mass, we switch to oral antibiotics when the symptoms have diminished and the woman has been afebrile for 24 hours.
- In both regimens, doxycycline is continued for a total of 14 days.

Treatment: Inpatient Regimen A



- Regimen A is a combination of doxycycline and IV cefoxitin.
- It is excellent for community-acquired infection.
- Doxycycline and cefoxitin provide excellent coverage for *N. gonorrhoeae*, *C. trachomatis*, and penicillinase-producing *N. gonorrhoeae*.
- Cefoxitin is an excellent antibiotic against *Peptococcus* and *Peptostreptococcus* spp. and *E. coli*.

Treatment: Inpatient Regimen B



- Regimen B is a combination of clindamycin and an aminoglycoside (gentamicin).
- provides excellent coverage for anaerobic infections and facultative gram- negative rods.
- it is preferred for patients with an abscess, IUD-related infection, and pelvic infection after a diagnostic or operative procedure.
- Parenteral antibiotic therapy may be discontinued when the woman has been afebrile for 24 hours, and oral therapy with doxycycline (100 mg twice daily) should continue to complete 14 days of therapy.

Surgical management

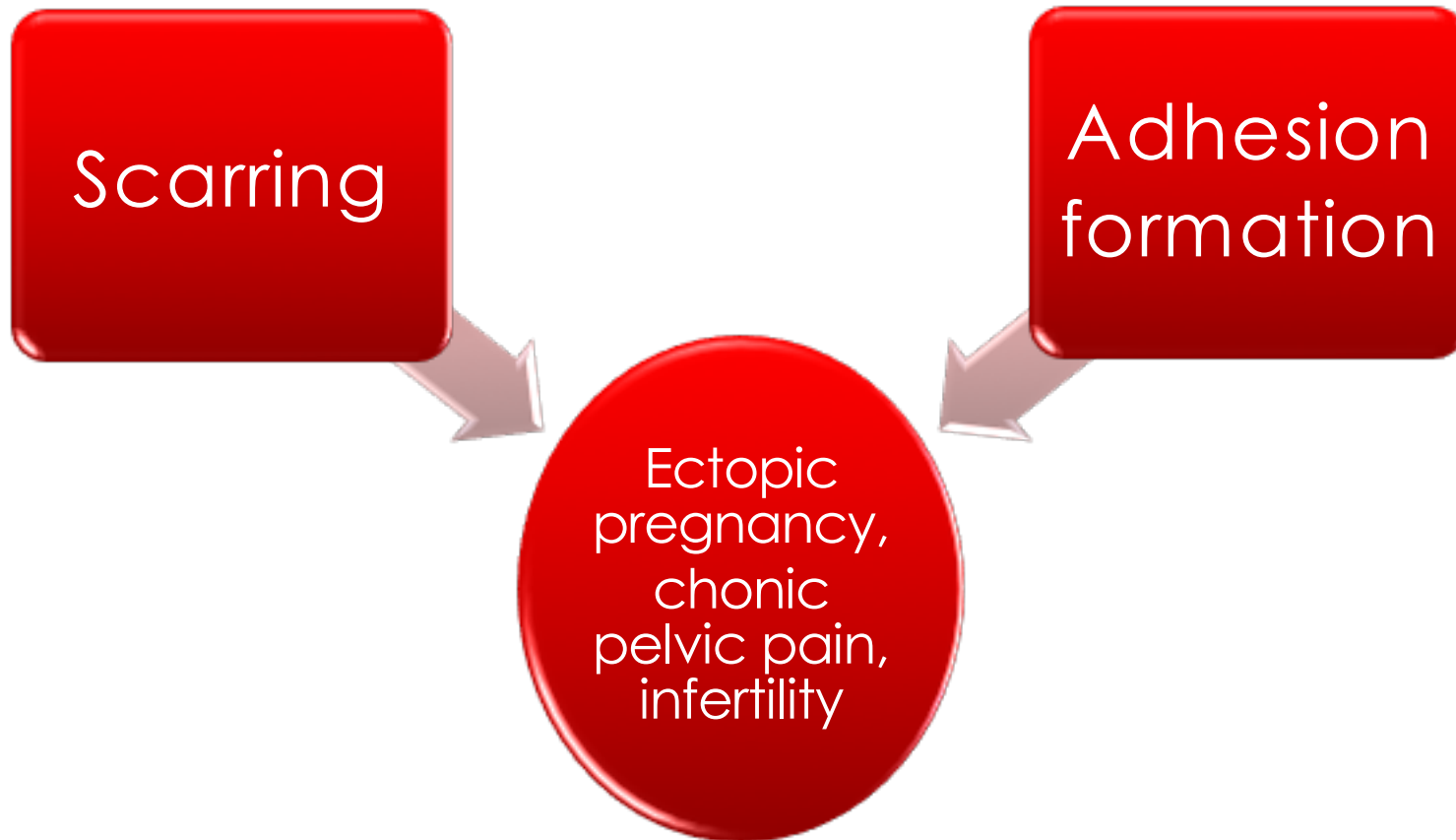
- Operations are restricted to the following:
 - life-threatening infections
 - ruptured tubo-ovarian abscesses
 - laparoscopic drainage of a pelvic abscess
 - persistent masses in some older women for whom future childbearing is not a consideration
 - removal of a persistent symptomatic mass.

Abscess vs Tubo-ovarian complex



- an abscess is a collection of pus within a newly created space.
- Tubo-ovarian complex is a collection of pus within an anatomic space created by the adherence of adjacent organs.
- *Since Clindamycin is stable in the abscess environment, a combination of clindamycin and an aminoglycoside is considered the **standard for treatment of a tubo-ovarian abscess.***

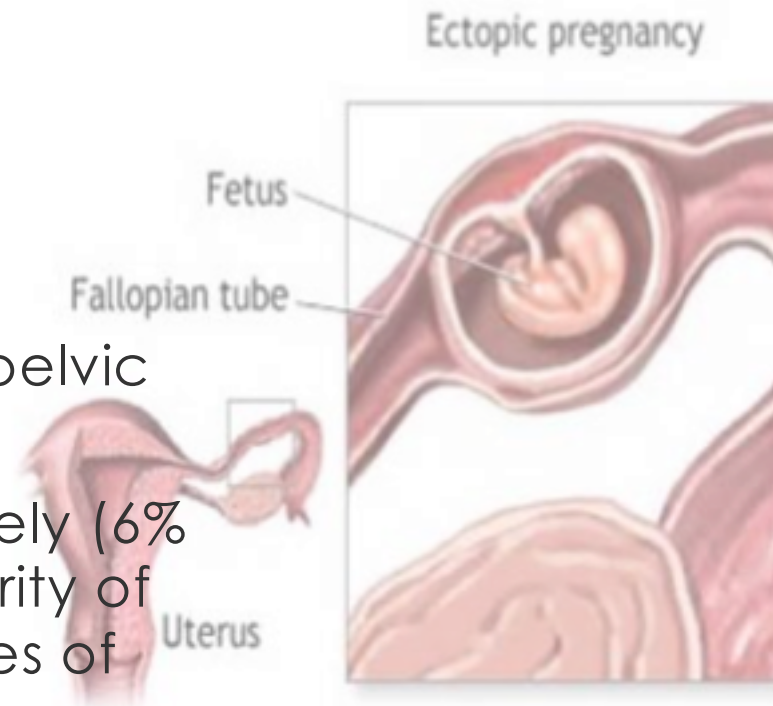
Sequelae



Pelvic Inflammatory Disease (PID): Sequelae

- Following acute PID:

- the rate of ectopic pregnancy increases 6- to 10-fold
- chance of developing chronic pelvic pain increases fourfold.
- incidence of infertility varies widely (6% to 60%), depending on the severity of the infection, number of episodes of infection, and age of the woman.



Sequelae: ectopic pregnancy and infertility



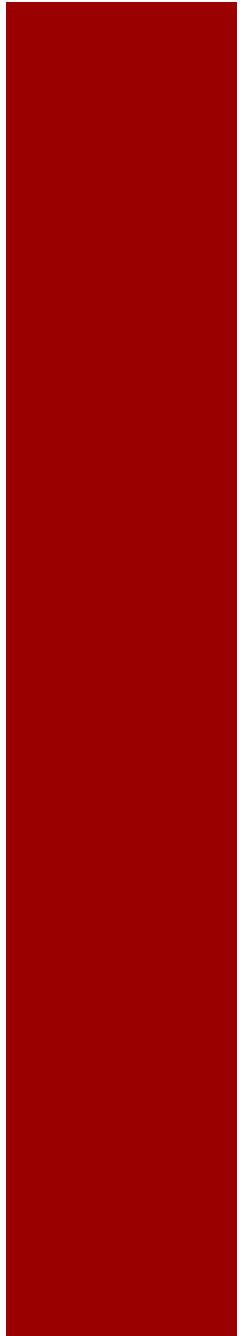
- Approximately 10% to 15% of pregnancies will be ectopic after laparoscopically mild to moderate PID, and almost 50% after severe PID.
- 4% and 13% of women are infertile or undergo an operative procedure secondary to acute PID.

Sequelae: chronic pelvic pain

- Chronic pelvic pain may be caused by a hydrosalpinx, a collection of sterile watery fluid in the fallopian tube.
- A hydrosalpinx is the end-stage development of a pyosalpinx.
- The pain may result from adhesions and the resultant fixation or tethering of organs intended to have freedom of movement during physical activity, coitus, and ovulation.



Pelvic Tuberculosis



Pelvic TB



- *Mycobacterium tuberculosis* or *Mycobacterium bovis*.
- Early in the course of pulmonary infection, the bacteria spread hematogenously and the infection becomes located in the oviducts, which are the primary and predominant site of pelvic tuberculosis.
- Subsequently, the bacilli usually spread to the endometrium and, less commonly, to the ovaries.

Pelvic TB



- clinical symptoms and signs of pelvic Tuberculosis are similar to the chronic sequelae of acute PID.
- The predominant presentations of this chronic infection are **infertility** and **abnormal uterine bleeding**.
- Mild to moderate chronic abdominal and pelvic pain occur in 35% of women with the disease.
- Advanced cases are often accompanied by ascites.
- Some women may be asymptomatic.

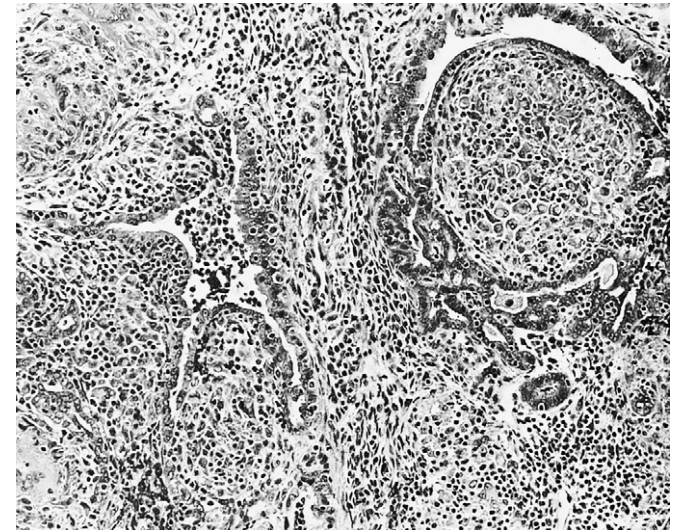
Pelvic TB: diagnosis



- Tuberculous salpingitis may be suspected when a woman is not responding to conventional antibiotic therapy for acute bacterial PID.
- Results of a tuberculin skin test will be positive.

Pelvic TB: diagnosis

- The diagnosis may be established by performing an endometrial biopsy late in the secretory phase of the cycle.
- **classic findings**: giant cells, granulomas, and caseous necrosis confirm the diagnosis.
- The distal ends of the **oviduct** remain everted, producing a **tobacco pouch appearance**.



Pelvic TB: diagnosis



- When the diagnosis has been established, the woman should have: *chest radiographic examination, IV pyelography, serial gastric washings, and urine cultures for tuberculosis.*
- Approximately 10% of women with pelvic tuberculosis have concomitant urinary tract tuberculosis.

Pelvic TB: Treatment



- The treatment of pelvic tuberculosis is mainly **medical**
- Initial therapy in a woman with newly diagnosed tuberculosis usually will include **five drugs** because of the emergence of multidrug-resistant organisms.
(Isoniazid, Rifampicin, Ethambutol, Pyrazinamide + Bedaquiline SIRTURO®)
- **Multidrug-resistant (MDR) tuberculosis** is defined as infection from a strain of *M. tuberculosis* that is resistant to two or more agents, including isoniazid
- The CDC has recommended starting a woman on a multi- drug regimen until the culture results yield specific sensitivity.
- Patients who have infection from MDR strains are usually kept on a five-drug regimen.

Pelvic TB: Surgical Treatment



- Operative therapy for pelvic tuberculosis is reserved for women with:
 - persistent pelvic masses
 - resistant organisms
 - Age >40 years
 - endometrial cultures remain positive

Summary

PID

- Definition
- Etiology
- Risk factors
- Signs/symptoms
- Diagnosis
- Treatment
- Sequelae

PELVIC TB

- Etiology
- Signs and symptoms
- Diagnosis
- treatment



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