

Pelvic Inflammatory Disease

Done by: Nora AlSahli , Njoud Alenezy , Laila Mathkour, Dana Alrasheed

Revised by: Allulu Alsulayhim, Shrooq Alsomali, Rotana Khateeb

References: 437 Lectures and Notes, 436 Teamworks slides

Color code: 437 Notes, 436 Notes | Important | Extra | Kaplan

Editing file:

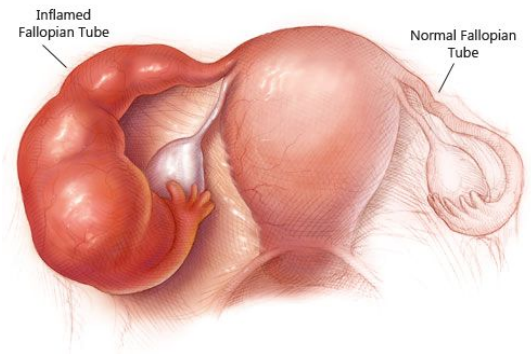
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Objectives:

1. Identify the prevalence of Pelvic Inflammatory Disease (PID).
2. Explain the etiology and pathogenesis of PID.
3. Describe the symptoms and signs of PID/ Diagnosis.
4. Describe the management of PID.
5. Discuss tubo-ovarian abscess.
6. List the complication of PID.

Pelvic Inflammatory Disease (PID)

PID is a spectrum of infection-induced inflammation of the **upper genital tract**; uterus, 2 ovaries and 2 fallopian tubes that includes **endometritis**, salpingitis pelvic peritonitis, and/or tubo-ovarian abscess (TOA). **PID= inflammation of pelvic organs.** **PID should be separated from lower genital tract infections (STDs)**



Pathogenesis of PID

Most often, Ascending spread of microorganisms from vagina & endocervix to endometrium, tubes, contiguous structures; **for eg. if the infection of the uterus it can spread to broad ligament or visceral peritoneum.**

The Prevalence of PID

- The CDC has estimated that more than 1 million women in the USA experience an episode of PID every year.
- The disease leads to approximately 2.5 million office visits and 125,000-150,000 hospitalizations yearly.
- No specific international data is available for PID incidents worldwide.
- The annual rate of PID in high-income countries has been reported to be as high as 10-20 per 1000 **women of reproductive age** **especially if they were sexually active.**
- **Not common in our community? Bc there is No sex before marriage so that is why the prevalence is higher in US.**

Etiology

- 85% of infections are in sexually active female of reproductive age.
- 15% of infection occur after procedures that break **cervical** mucous barrier.
- Bacteria culture direct from tubal fluid; **these organisms reach the fallopian tubes.**
 - **Neisseria gonorrhoeae is the most common cause of PID.**
 - **C. trachomatis. 2nd most common**
 - Mycoplasma genitalium
 - endogenous aerobic
 - Polymicrobial flora; **vaginal normal flora:**
 - Prevotella sp.
 - Peptostreptococcus sp.

- Escherichia
 - Anaerobic gram-negative rods.
 - It can also be caused by Normal flora of the genital tract and GIT system.
- Previously mentioned organisms (other than N.Gonorrhoeae and C. trachomatis) cause less serious infections in term of damage and long term complications.

	N. Gonorrhoeae	C. trachomatis
Bacteria	Gram –ve diplococcus	Intracellular organism
Severity		Produce mild form of salpingitis.
Growth	Rapid growth (20-40 minutes)	Slow growth (48-72 hours) therefore patients usually present later in life with complications.
Onset	Rapid and intense inflammatory response (it cause acute infection but it can be eliminated very easily)	Insidious onset
Result	2 Major sequelae: Infertility and ectopic pregnancy → strong association with prior chlamydia infection (both chlymdia and N.Gonorrhoeae can cause this)	<ul style="list-style-type: none"> ● Remain in tubes for months or years after initial colonization of upper genital tract. ● More severe tubes involvement. Chylmydia especially causes more damage to fallopian tube cilia therefore impairing ferility and causing ectopic pregnancy.

Risk factors of PID

- Strong correlation with exposure to STDs; lower genital tract infections
- Age of 1st intercourse; younger age at intercourse
- Frequency of intercourse.
- Number of sexual partners.
- Marital status: 33% in nulliparous.
- Sexually active women
- ◆ **Increase risk:**
 - IUD user (multifilament string).
 - Surgical procedure. if u don't do it under the specific percussion
 - Previous acute PID (recurrence).



- ❖ **Reinfection can occur if male partner is untreated (80%).** Treating the partner is a “must” if you suspect the women with PID or any STD bc if you don’t treat a partner she is at more risk of having reinfection.
- ❖ **Decrease risk:**
 - Barrier method. E.g. condoms or diaphragm; **Best form for protection.**
 - OCP; **causes changes in cervical mucus making it thicker which can protect from ascending vaginal infections.**

Signs & symptoms of PID

- **Lower** Abdominal pain ; **many ddx.**
- **Abnormal Discharge**
- Intermenstrual bleeding
- Postcoital bleeding
- Fever
- Urinary frequency
- Lower back pain
- Nausea/vomiting **depends on acuity and severity of disease**

Diagnosis

Physical examination	Tests
<ul style="list-style-type: none"> ● Temperature and vital signs ● Assess the abdomen for tenderness (lower, central, bilateral). ● Vaginal secretion examination to assess the presence of BV. ● Microscopy of the vaginal secretion should be examined for the presence of leukocytes, clue cells, and trichomonas → take a swab ● Cervical canal examination for the presence of yellow/green mucus and friability and for redness of cervix. ● Testing for C. trachomatis and N. gonorrhoeae. ● A bimanual pelvic examination to assess for pelvic organ tenderness and pelvic mass (might suggest a TOA <small>tubo-ovarian abscess</small>). <ul style="list-style-type: none"> ○ Adnexal tenderness ○ Cervical motion tenderness 	<ol style="list-style-type: none"> 1. Lab <ul style="list-style-type: none"> ● A complete blood count see if there is leucocytosis ● Erythrocyte sedimentation rate. ● C-reactive protein test. 2. Imaging studies <ul style="list-style-type: none"> ● Pelvic ultrasonography: to rule out symptomatic ovarian cysts or those with pelvic mass noted on bimanual pelvic examination (tubo-ovarian abscess). ● Computed tomography (to rule out appendicitis). 3. Laparoscopic visualization <ul style="list-style-type: none"> ● Most accurate method to confirm PID. ● we don’t do it to all patients, it is used for: All patients with uncertain diagnosis, no response to treatment. ● Negative gram smear does not rule out PID.

Management of PID

Therapeutic goal: eliminate acute infection & symptoms as well as prevent long term sequelae. **Start treatment as soon as you suspect PID**

Mild to moderate	Severe PID & TOA
<ul style="list-style-type: none"> • Treat as outpatient. • Aim at microbiologic cure for N. gonorrhoeae and C. trachomatis (even in the presence of negative endocervical screening for these organisms). • Coverage for polymicrobial flora associated with BV bacterial vaginosis. • Antibiotic therapy. 	<ul style="list-style-type: none"> • Hospitalization and inpatient parenteral therapy (criteria noted) • Imaging should be considered; like US. • Surgical intervention is recommended for those who failed to antibiotic therapy alone: <ul style="list-style-type: none"> ○ Size of the TOA with abscesses 10 cm or greater in diameter according to US ○ Patient who fail to respond to antibiotic treatment within 48- 72 hrs. (persistent fever, increasing leukocytosis) ○ Drainage of TOA via laparotomy, laparoscopy, or image-guided percutaneous routes.

once you suspect the women from the history is at high risk of the PID treat her without waiting for the lab results bc of long term sequels like INFERTILITY!

lab test negative? It is not rule out PID or infection keep this in your mind.

If you feel a mass or fullness in Adnexa that means it could be collection abscess or fluid or other DDx.

Criteria for hospitalization Patient presenting with severe abdominal pain → many ddx: 1- PID 2- Appendicitis 3- Ruptured ectopic 4- Ruptured ovarian cyst.

1. Surgical emergencies (e.g. appendicitis) cannot be excluded.
2. Patient is pregnant **and you can't rule out ectopic pregnancy at the time of acute abdomen**
3. Patient does not respond clinically to oral antibiotic therapy.
4. Patient is unable to follow/tolerate an outpatient oral regimen.
5. Patient has severe illness, nausea and vomiting or high fever.
6. Patient has a tubo-ovarian abscess.

CDC Recommended oral regimen

Doses are not required.

Know that there are 3 regimens and we choose based on the most common organism know in center.

Most important coverage: gram -ves and anaerobes

Doxycycline and metronidazole are a must and present in each regimen while other medications depend on the center.

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 cephalosporins (e.g., ceftizoxime 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

Treatment

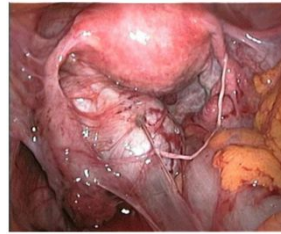
- Treat male partners & education for prevention reinfection
- **For Rx of male partners:** Regimens for uncomplicated gonorrhoeae & chlamydial infection:
 - Ceftriaxone 125 mg IM followed by:
 - Doxycycline (100) 1x2 pc x7 days or
 - Azithromycin 1gm or
 - Ofloxacin (300) 1x2 pc x7 days

Complications of PID

- Chronic pelvic pain 25%
- Infertility
- Ectopic pregnancy (increased 15%-50%) bc of damage to the cilia of the tube.
- PID may produce TOA and extend to produce pelvic peritonitis and Fitz-Hugh Curtis syndrome (perihepatitis)
 - Perihepatic inflammation & adhesion.
 - S/S: RUQ pain, pleuritic pain, tenderness at RUQ on palpation of the liver.
 - Mistaken dx; acute cholecystitis, pneumonia.



Perihepatitis



Peritoneal Adhesions

adhesions between liver and peritoneum

- Acute rupture of TOA and peritonitis is a life threatening event that calls for urgent abdominal surgery.

Kaplan corner

- 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.



- PID is an ascending infection that starts within the cervix and moves up to involve the oviducts and ovaries.
- **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.
- Often there are no symptoms except vaginal discharge. **The most common finding** is mucopurulent cervical discharge or a friable cervix. No pelvic tenderness is noted. The patient is afebrile.
- **Investigative findings** can be a lab diagnosis or a clinical diagnosis. See Diagnosis section for chlamydia. 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 may be variable, ranging from minimal to severe. Onset may be gradual to sudden, often after menses. Nausea and vomiting may be found if abdominal involvement is present.
- **On examination**, mucopurulent cervical discharge, cervical-motion tenderness, and bilateral adnexal tenderness are present. Fever, tachycardia, abdominal tenderness, peritoneal signs, and guarding may be found depending on the extent of infection progression.
- **Investigative findings** include 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.
- Differential diagnosis includes adnexal torsion, ectopic pregnancy, endometriosis, appendicitis, diverticulitis, Crohn disease, and ulcerative colitis.
- **Diagnosis.** This is made on **clinical grounds** using the following:
 - **Minimal criteria:**
 - Sexually active young woman
 - Pelvic or lower abdominal pain
 - Tenderness: cervical motion or uterine or adnexal
 - **Supportive criteria** (but not necessary for diagnosis):
 - Oral temperature $>38.3\text{ C}$ ($>101\text{ F}$)
 - Abnormal cervical or vaginal mucopurulent discharge
 - Presence of abundant WBC on vaginal fluid saline microscopy
 - Elevated erythrocyte sedimentation rate
 - Positive lab findings of cervical *N. gonorrhoeae* or *C. trachomatis*
 - **Most specific criteria for diagnosis:**
 - Endometrial biopsy showing endometritis
 - Vaginal sono or MRI imaging showing abnormal adnexa

- Laparoscopic abnormalities consistent with PID
- **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*).
 - **Outpatient treatment** is equivalent to inpatient in mild to moderate cases.
 - **Criteria:** absence of inpatient criteria
 - **Antibiotics:** ceftriaxone IM x 1 plus doxycycline po bid for 14 days with/without metronidazole po bid for 14 days
 - **Inpatient treatment** is essential with severe cases.
 - **Criteria:** cannot rule out; failed outpatient therapy; unable to tolerate oral medications; severe illness, high fever, nausea/vomiting; tubo-ovarian abscess or pregnancy
 - **Antibiotics:** (1) cefotetan IV 12 h plus doxycycline po or IV q 12 h or (2) clindamycin plus gentamicin IV q 8 h

TUBO-OVARIAN ABSCESS

- Tubo-ovarian abscess (TOA) is the accumulation of pus in the adnexa forming an inflammatory mass involving the oviducts, ovaries, uterus, or omentum. The typical clinical presentation is similar to severe acute PID with acute pain, fever, chills, and vaginal discharge; some patients present with chronic pain and are afebrile.
- The patient will look septic. Lower abdominal-pelvic pain is severe. Often there is severe back pain, rectal pain, and pain with bowel movements. Nausea and vomiting are present.
- On examination the patient appears gravely sick. She has high fever with tachycardia. She may be in septic shock with hypotension. Abdominal examination shows peritoneal signs, guarding, and rigidity. Pelvic examination may show such severe pain that a rectal examination must be performed. Bilateral adnexal masses may be palpated.
- **Differential diagnosis** includes septic abortion, diverticular or appendiceal abscess, and adnexal torsion.
- **Management.** Inpatient IV clindamycin and gentamicin should result in fever defervescence within 72 hours. If there is no response or there is rupture of the abscess exposing free pus into the peritoneal cavity, significant mortality can occur. Exploratory laparotomy with possible TAH and BSO or percutaneous drainage through a colpotomy incision may be required.

CHRONIC PID

- Chronic bilateral lower abdominal-pelvic pain is present, varying from minimal to severe. 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.
- **Investigative findings** include negative cervical cultures with normal WBC and ESR. Sonography may show bilateral cystic pelvic masses consistent with hydrosalpinges.
- **Diagnosis:** 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.

ENDOMETRIOSIS

- Endometriosis is a benign condition in which endometrial glands and stroma are seen outside the endometrial cavity. While it is associated with increased risks of epithelial ovarian carcinoma, it is not a premalignant condition. Although the etiology is not known, the most accepted theory of explanation is that of Sampson, which is **retrograde menstruation**.



- The **most common site** of endometriosis is the ovary; because this is functioning endometrium, it bleeds on a monthly basis and can create adnexal enlargements known as endometriomas, also known as a chocolate cyst.
- **The second most common site** of endometriosis is the cul-de-sac, and in this area the endometriotic nodules grow on the uterosacral ligaments, giving the characteristic uterosacral ligament nodularity and tenderness appreciated by rectovaginal examination. Menstruation into the cul-de-sac creates fibrosis and adhesions of bowel to the pelvic organs and a rigid cul-de-sac, which accounts for dyspareunia.
- On examination, pelvic tenderness is common. A fixed, retroverted uterus is often caused by cul-de-sac adhesions. Uterosacral ligament nodularity is characteristic. Enlarged adnexa may be found if an endometrioma is present.
- WBC and erythrocyte sedimentation rate (ESR) are normal. CA-125 may be elevated. Sonogram will show an endometrioma if present.
- **Diagnosis:** Diagnosis of endometriosis is made by laparoscopy. There is a suspicion of the disease based on history and physical exam; however, laparoscopic identification of endometriotic nodules or endometriomas is definitive.
- **Management** seeks to prevent shedding of the ectopic endometrial tissue, thus decreasing adhesion formation and pain.
- **Pregnancy** can be helpful to endometriosis because during this time there is no menstruation; also, the dominant hormone throughout pregnancy is progesterone, which causes atrophic changes in the endometrium. However, infertility may make this impossible.
- **Pseudopregnancy** achieves this goal through preventing progesterone withdrawal bleeding. Continuous oral medroxyprogesterone acetate (MPA [Provera]), subcutaneous medroxyprogesterone acetate (SQ-DMPA [Depo- Provera]), or combination oral contraceptive pills (OCPs) can mimic the atrophic changes of pregnancy.
- **Pseudomenopause** achieves this goal by making the ectopic endometrium atrophic. The treatment is based on inhibition of the hypothalamic–pituitary– ovarian axis to decrease the estrogen stimulation of the ectopic endometrium. Testosterone derivative (danazol) and gonadotropin-releasing hormone (GnRH) analog (leuprolide) can be used to achieve inhibition of the axis.
- The best inhibition of the hypothalamic–pituitary–ovarian axis is achieved by GnRH analogs. GnRH stimulates the pituitary in a pulsatile fashion, and GnRH analogs stimulate by continuous stimulation, which produces a condition known as down-regulation of the pituitary.
- Although regression of the endometriotic nodules can be achieved, the patient can become symptomatic with menopausal complaints. Patients on leuprolide therapy for >3–6 months can complain of menopausal symptoms such as hot flashes, sweats, vaginal dryness, and personality changes. Leuprolide is continued for 3–6 months and then a more acceptable medication for the inhibition of the axis can be used, e.g., birth control pill medication. An alternative to leuprolide is depot medroxyprogesterone acetate (DMPA), which also suppresses FSH and LH but does not result in vasomotor symptoms.
- **Surgical management** can be conservative or aggressive.
 - **Conservative.** If preservation of fertility is desired, the procedures can be performed in many cases through laparoscopic approach. Lysis of paratubal adhesions may allow adherent fimbria to function and achieve pregnancy. Ovarian cystectomies as well as oophorectomies can be treatment for endometriomas. Laser vaporization of visible lesions is also performed laparoscopically.
 - **Aggressive.** If fertility is not desired, particularly if severe pain is present because of diffuse adhesions, definitive surgical therapy may be carried out through a total abdominal hysterectomy (TAH) and bilateral salpingo-oophorectomy (BSO). Estrogen replacement therapy is then necessary.





1- You are counseling a lady about different methods of contraception. What is the characteristic feature of intrauterine contraceptive device?

- 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)

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.

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.

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.



OB/GYN

C- Incomplete abortion.

D- Complete abortion.

Answers: 1-D. 2-C. 3-D. 4-C.