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Pelvic inflammatory disease

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:
  a) Incidence
  b) Etiology
  c) Diagnosis
  d) Management
  e) Sequelae

References: 435 lecture and notes, Hacker and Moore's, team 433
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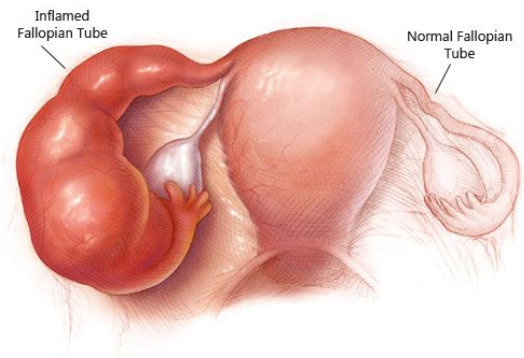
Pelvic Inflammatory Disease (PID)

Definition:

- PID is a spectrum of infection-induced inflammation[1] of the **upper** genital tract[2] that includes **endometritis / salpingitis** which may be complicated by pelvic **peritonitis** and/or **tubo-ovarian abscess (TOA)**.[3]
- If the inflamed fallopian tube is filled with inflammatory exudate we call it hydosplanix but if it infected we call it tubo-ovarian abscess.
- We can say it's breakage of the barrier between lower genital tract and upper genital tract that can happen following surgeries, STD (ascending infection.)
- Most commonly it will affect the lining of the uterine cavity as well as the fallopian tube
- More severe form it will spread to the myometrium, serosa and peritoneum.



Pathogenesis of PID:

- Ascending spread of microorganisms from **vagina & endocervix** to endometrium, tubes, contiguous structures.

The Prevalence of PID:

- Acute PID 1-2% of young sexually active women each year
- More than 10% of reproductive aged women report a history 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.
- PID develops in 15% to 30% of women with inadequately treated gonococcal or chlamydial cervicitis.
- The CDC has estimated that more than 1 million women in the USA experience an episode of PID every year.
- 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.

Etiology

- 85% of infections are in sexually active female of reproductive age.
    - Neisseria gonorrhoeae **is the most common cause of PID.**
    - C. trachomatis. 2nd common.
    - Most cases are mixed bacteria.
    - **Mycoplasma genitalium**[4]
    - Polymicrobial flora:

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[1] It range from acute bacterial infection to massive adhesions from old inflammatory scarring.
[2] Cervix, uterus, and tubes
[3] it Affects non-pregnant and occasionally pregnant women
[4] mild clinical symptoms similar to chlamydial PID.

    - Anaerobic bacteria such as Prevotella and pepto-streptococci, and G. vaginalis.
    - Anaerobic gram-negative rods (Escherichia)
- 15% of infection occur after procedures that break the cervical mucus barrier. E.g. D&C following evacuation of abortion and minor gynecological procedures may predispose to PID such cryotherapy and using of spiral contraceptive and so on

	N. Gonorrhoeae	C. trachomatis
Bacteria	• Gram –ve diplococcus	• Intracellular organism that can't be gram stained
Severity	More prevalent and intense. it is more acute, easier to treat, less risk of complication	• Produce **mild** form of salpingitis. It is insidious in onset, higher risk of complications
Growth	• Rapid growth (20-40 minutes).	• Slow growth (48-72 hours)
Onset	• Rapid and intense inflammatory response.	• Insidious onset. Usually subclinical
Results	• 2 Major sequelae: **Infertility and ectopic pregnancy**, > strong association with prior chlamydia infection .	• Remain in tubes for months or years after initial colonization of upper genital tract. • May cause more severe tubes involvement. So later on you will have infertility due to the ciliary damage of the tubes.

They can co-exist together and may cause infertility , adhesions +/- ectopics!.

Risk factors of PID:

All of these are risk factors for **lower** genital tract infection.

- Strong correlation with exposure to STDs .
- Younger Age of 1st intercourse.
- Frequency of intercourse.
- Number of sexual partners.
- Marital status
- 33% in nulliparous.
- **Increase risk:**
    - IUD user (multifilament string). Barrier method and COP are advised over IUD bc they reduce the risk of PID.
    - Surgical procedure. If they didn't follow aseptic technique
    - Previous acute PID (recurrence).
- Reinfection can occur if male partner is untreated (80%). **You need to treat the partner!**

Barrier methods and OCP decrease the risk

Differential diagnosis:

- acute appendicitis
- Endometriosis
- torsion/rupture adx mass
- ectopic preg
- lower genital tract infection

It's a disease of High index of suspicion and low threshold for treatment! Because if you miss the diagnosis you will have infertility adhesions and so on..

Diagnosis of PID

symptoms	Signs

• Some women are **asymptomatic**, others you see them at OP (outpatient) or ER
• **Lower abdominal pain** 90% pelvic pain and pelvic organ tenderness > OP
• Cervical discharge > OP. mucoid purulent discharge. 75% are associated with endocervical infection (mucopurulent cervicitis) & coexist with purulent vaginal discharge (leukorrhea).
• **Fever** / chills
• Nausea/vomiting (autonomic reflexes)
• Urinary frequency
• Intermenstrual bleeding and postcoital bleeding (it's a contact bleeding due to cervicitis) > OP
• Lower back pain
	• Assess the abdomen for tenderness.
	• Vaginal secretion examination to assess the presence of BV (bacterial vaginosis).
	• Microscopy of the vaginal secretion should be examined for the presence of **leukocytes**, **clue cells**, and **trichomonas**. you have to treat the husband if you find it
	• Cervical canal examination for the presence of **yellow/green mucus** and **friability**.
	• Testing for **C. trachomatis and N. gonorrhoeae.**
	• A bimanual pelvic examination to assess for pelvic organ tenderness and pelvic mass (might suggest a **tubo-ovarian abscess**).
	  ○ **Adnexal tenderness** or adnexal mass in case of abscess. Though its absence doesn't exclude the disease
	  ○ **Cervical motion tenderness** [5]

Lab tests:

To confirm the diagnosis!

- A complete blood count > Leukocytosis
- Erythrocyte sedimentation rate.
- C-reactive protein test .
  - All of these are non specific test. You must order specific culture media for gonorrhea and chlamydia.
- Negative gram smear does not rule out PID.
- Vaginal & cervical swab > 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.
- Culdocentesis[6]

[5] 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.

[6] **Culdocentesis** is a medical procedure involving the extraction of fluid from the pouch of Douglas (posterior to the vagina) through a needle.

Imaging studies:

- Pelvic ultrasonography: to rule out symptomatic ovarian cysts or those with pelvic mass noted on bimanual pelvic examination (**tubo-ovarian abscess**). rule out other DxD. can be transabdominal or **transvaginal**
- Computed tomography (to rule out appendicitis). Only if you are suspicious of the source of the pathology.
- MRI

Laparoscopic visualization:

- Most accurate method to confirm PID.
- All patients with uncertain diagnosis and no respond to treatment.
- Negative gram smear but still PID is not rolled out

Management of PID

Therapeutic Goals:
1- eliminate the acute infection
2- relieve the symptoms
3- prevent the long term sequelae of this infection.

1) Medical Rx.

Empirical broad spectrum abx cover wide range of bacteria.
Treatment starts as soon as culture & diagnosis is confirmed/suspected.

Severity of PID	Management
Mild/moderate OP	• 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 bacterial vaginosis. • Antibiotic therapy: Broad spectrum of antibiotic covering **both** gonorrhea and chlamydia. • Rx failure rate is 10-20%. Reevaluate 48-72 hrs of initial OP therapy
Severe/TOA Admission	• Hospitalization and impatient **parenteral** therapy (criteria noted) • Rx failure rate is 5-10% • Imaging should be considered

Criteria for hospitalization:

1. Surgical emergencies (e.g. appendicitis) cannot be excluded.
2. Patient is pregnant. Thinking of ectopic pregnancy.
3. Patient does not respond clinically to oral antibiotic therapy. Within 48-72h
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. More than 10cm in diameter it means it needs drainage it can be done under **US guided percutaneous** or **laparoscopic,** or in some cases **laparotomy** may be needed!

Any tube ovarian abscess admit and drain

Recommended oral regimen:

Depends on the hospital regulation

Cephalosporins + doxycycline +\- Metronidezole (for geam- and trichomans vaginalls).

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., 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

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

- Treat male partners at same time & 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

2) Surgical Rx.

Surgical intervention is recommended for those with evidence of current / previous abscess, acute exacerbation of PID with bilateral TOA.

- Size of TOA: **abscesses ≥10 cm** "Any tube ovarian abscess admit and drain despite its size"
- Patient who fail to respond to antibiotic treatment **within 48-72 hrs** (persistent fever, increasing leukocytosis)
- Drainage of TOA via laparotomy(nobody does it here anymore), laparoscopy, or image-guided percutaneous routes
  - Laparotomy: for surgical emergencies & definite Rx of failure medical treatment
  - Laparoscopy: consider in all pt with ddx of PID & without contraindication. Rule out surgical emergency

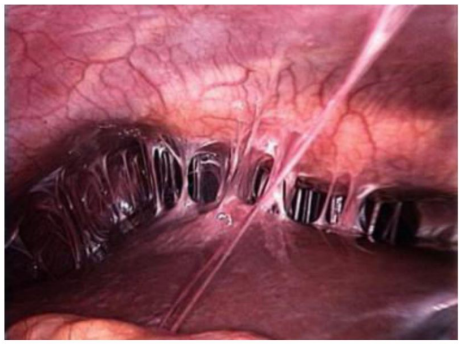
Complications of PID

1. Chronic pelvic pain 25% *
    - 4 times higher after acute salpingitis
    - Caused by **hydrosalpinx and adhesion** around ovaries
    - Should undergo laparoscopy to rule out other disease
2. Infertility *
    - ¼ of pt have acute salpingitis (20%)
    - Infertility rate increase directly with number of episodes of acute pelvic infection
3. Ectopic pregnancy *
    - Increase 6 - 10 fold .
    - 50% occur in fallopian tubes (previous salpingitis).
    - Mechanism ; interfere ovum transport > entrapment of ovum.
4. TOA 10%.
    - PID may produce TOA and extend to produce **pelvic peritoniti**s and Fitz-Hugh Curtis syndrome (**perihepatitis**) see below . *
    - Acute **rupture of TOA and peritonitis** is a life threatening event that calls for urgent abdominal surgery
    - Can rupture spontaneous into the rectum, sigmoid colon, bladder, peritoneal cavity. Almost never in vagina
5. Mortality
    - Acute PID 1%
    - Rupture TOA 5-10%**.**

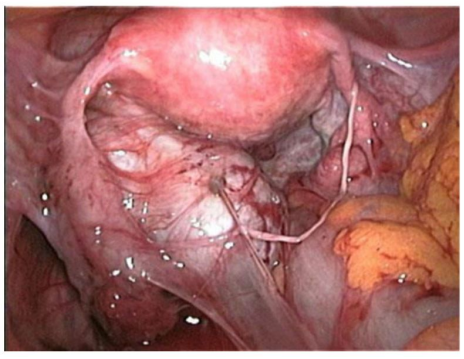
*doctor said it is imp

★FITZ - HUGH - CURTIS SYNDROME (1 - 10%):

- **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

Tubo-ovarian abscess (TOA)

Tubo-ovarian abscess (TOA), an end stage 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.

Treatment:

- Tubo-ovarian abscess is treated with an antibiotic regimen administered on an **inpatient** basis. About 75% of women with a tubo-ovarian abscess respond to antimicrobial therapy alone.
- Failure of medical therapy (after 72 hours) suggests the need for drainage of the abscess. Although drainage may require surgical exploration, percutaneous drainage guided by imaging studies 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 .

Notes from 433 :

➢ Hx of unilateral pelvic pain **->** suspect ectopic pregnancy.
➢ Hx of bilateral pelvic pain **->** suspect PID.
➢ chlamydia causes asymptomatic PID **->** infertility.
➢ clinical picture of chronic PID **->** chronic pelvic pain/no cervical discharge/associated with infertility.
➢ **How is the menstrual cycle associated with PID?**
At the end of the menstrual cycle the cervical mucus barrier is broken down, which facilitates bacteria ascending from the lower reproductive tract.
➢ **What are the routes of upper reproductive tract infection?**
Hematogenous/lymphatic/ascending.
➢ **What is the CDC criteria for diagnosing PID?**

1) Bilateral pelvic pain.
2) Mucopurulent cervical discharge.
3) Cervical motion tenderness.
4) Elevated WBCs.
5) Elevated ESR .

➢ **Causes of acute pelvic pain:**

1) Gynecologic
Adnexal accidents (e.g. rupture) Acute infections (e.g. PID) Pregnancy complications (ectopic)
2) Nongynecologic
Gastrointestinal (e.g. appendicitis) Genitourinary (e.g. cystitis, urethral stones)

★ **Q1: 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)

The answer is: D

★ **Q2: 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. Gonorrhea cervicitis.
C. Pelvic inflammatory disease.
D. Trichomonas vaginitis.

The answer is: C

★ **Q3: 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

The answer is: D

★ **Q4: 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.

The answer is: C