PELVIC INFLAMMATORY DISEASE

EPIDEMIOLOGY:

- PID comprises a spectrum of infectious of the female upper reproductive tract
- Initiated by ascending infection from the cervix and vagina
- Includes:
    - Salpingitis
    - Endometritis
    - Myometritis
    - Parametritis
    - Oophoritis
    - Tubo-ovarian abscess
    - Pelvic peritonitis
    - Perihepatitis (Fitz-Hugh-Curtis syndrome)
- PID is the most common serious infection in women 16-25 → coincides with high risk behaviours in this group:
    - Multiple sexual partners
    - Less consistent condom use
    - Increased coincident alcohol and drug use
    - Delay or reduction in seeking care
- Most common gynaecologic cause of ED visit
- Patients present with nonspecific complaints and findings
- Early diagnosis and aggressive treatment may provide rapid clinical and microbiologic improvement

PATHOPHYSIOLOGY:

ORGANISMS ASSOCIATED WITH PID:

- Reflect the predominant STD → Gonorrhoea, Chlamydia, but can be polymicrobial (anaerobic and aerobic vaginal flora) in 30-40% of cases (laparoscopic evidence)
    - When abscesses form, anerobes are increasingly isolated

Table 107-1 Organisms Associated with Pelvic Inflammatory Disease
Sexually Transmitted Organisms
Chlamydia trachomatis
Neisseria gonorrhoeae
Herpes simplex virus (types 1 and 2)
Trichomonas vaginalis
Other Organisms
Endogenous genital tract mycoplasma
Examples: *Mycoplasma genitalium, Ureaplasma urealyticum, M. hominis*
Anaerobic bacteria
Examples: *Bacteroides* species, *Peptostreptococcus*
Aerobic bacteria
Examples: *Gardnerella vaginalis*, *Haemophilus influenzae*, *Streptococcus agalactiae*, *Escherichia coli*, and other gram-negative rods

- About 10-20% of untreated gonococcal or chlamydial cervicitis
- Multiple RF are associated with development of PID

Table 107-2 Risk Factors Associated with Pelvic Inflammatory Disease
Multiple sexual partners
History of sexually transmitted disease or pelvic inflammatory disease
History of sexual abuse
Frequent vaginal douching
Intrauterine device insertion within previous month
Adolescence, younger adulthood

- IUD has been associated with increased risk
- Appropriately used barrier contraception decreases the acquisition of most STD
- BILATERAL TUBAL LIGATION DOES NOT PROVIDE PROTECTION AGAINST PID, BUT MAY DELAY TIME TO DIAGNOSIS
- Pregnancy protects against PID, probably by the mucous plug that protects the cervix → PID in the first trimester may cause pregnancy loss

COMPLICATIONS OF PID:

- PID is associated with a number of serious clinical sequelae:
    - Tubo-ovarian abscess reported in 1/3 women hospitalised for PID
    - Infection/inflammation can lead to scarring and adhesions within tubal lumen → hence ↑d rate of fatal ectopic pregnancy is 12-15% higher in women who have PID
    - Tubal factor infertility is 12-50% higher in women with PID → infertility increases with number and severity of past episodes
    - Chronic pelvic pain, menstrual disturbance or dyspareunia have all been reported

CLINICAL FEATURES OF PID:

- Diagnosis of acute PID primarily based on historical and clinical findings → IMPRECISE
- HISTORY:
  - Significant variation
  - Lower abdominal pain in 90% → bilateral, dull/crampy pain → exacerbated by movement or sex
  - Discharge in 75%
  - Vaginal and postcoital bleeding
  - Less commonly → irritative voiding symptoms, fever, malaise, N+V
- PHYSICAL EXAMINATION:
  - Usually notable for lower abdominal tenderness, cervical motion tenderness and uterine or adnexal tenderness
  - Guarding, rebound and associated peritonitis may occur
    - Adnexal tenderness is most sensitive finding (95%)
  - RUQ pain, particularly with jaundice may indicate perihepatic inflammation of Fitz-Hugh-Curtis syndrome → uncommon (one study sited 4%) and responds to antibiotics
- LAB EVALUATION:
  - No single test is highly sensitive or specific for PID
  - ALWAYS DO A PREGNANCY TEST → the most common alternative diagnosis in missed ectopic is PID!
  - Endocervical swab specimens should be sent for culture and gram stained for gonococci
  - PCR for Chlamydia, as this is the most common cause of PID
  - In a patient whom PID is suspected → ↑d WCC, CRP or ESR supports the diagnosis
  - Positive UA does NOT exclude the diagnosis
  - Patients should be counselled and tested for HIV and hepatitis
- PROCEDURES:
  - TRANSVAGINAL PELVIC US:
    - May demonstrate thickened (>5mm), fluid-filled fallopian tubes or free pelvic fluid in acute severe PID
    - Pelvic or TOA may be seen as complex adnexal masses with multiple internal echoes
    - Useful in excluding ectopic pregnancy, ovarian torsion, haemorrhagic ovarian cyst, possibly appendicitis or endometriosis
    - CT findings → obscuration of pelvic fascial planes as well as many other findings
  - LAPAROSCOPY:
    - Gold standard for diagnosis of PID
    - Visible hyperaemia of the tubal surface, tubal wall oedema and presence of exudate on the tubal surface
    - Material may be obtained for definitive culture and histologic studies without risk of vaginal contamination

        - Even despite its advantages, laparoscopy fails to define PID in up to 20% of cases
- DIAGNOSIS OF PID:
    - To expedite treatment and maximise adherence to the treatment regimen, the diagnosis of PID in ED/clinic is usually based on clinical criteria with or without laboratory evidence
    - Current guidelines suggest that empiric treatment should be commenced in those women at risk WHO EXHIBIT LOWER ABDOMINAL PAIN, ADNEXAL TENDERNESS AND CERVICAL MOTION TENDERNESS

Table 107-3 Treatment Guidelines for Pelvic Inflammatory Disease Based on Diagnostic Criteria
Group 1: Minimum criteria. Empiric treatment indicated if no other cause to explain findings.
Uterine or adnexal tenderness
Cervical motion tenderness
Group 2: Additional criteria improving diagnostic specificity
Oral temperature >101°F (38.3°C)
Abnormal cervical or vaginal mucopurulent secretions
Elevated erythrocyte sedimentation rate
Elevated C-reactive protein level
Laboratory evidence of cervical infection with *Neisseria gonorrhoeae* or *Chlamydia trachomatis* (i.e., culture or DNA probe techniques)
Group 3: Specific criteria for pelvic inflammatory disease based on procedures that may be appropriate for some patients
Laparoscopic confirmation
Transvaginal US (or MRI) showing thickened, fluid-filled tubes with or without free pelvic fluid or tubo-ovarian complex
Endometrial biopsy results showing endometritis

TREATMENT:

- Treatment is aimed at:
    - Relieving acute symptoms
    - Eradication current infection
    - Minimising risk of long-term sequelae
    - Public health obligations → notify partners and treat to prevent spread
- Treatment is critical to preserve fertility
- MAINTAIN A LOW THRESHOLD FOR AGGRESSIVE TREATMENT, WITH OVER-TREATMENT PREFERRED TO A MISSED DIAGNOSIS

Non-sexually acquired

Non–sexually acquired PID is usually caused by mixed vaginal flora, including anaerobes, facultative Gram-negative bacteria and *Mycoplasma hominis*. If relevant, management should include removal of retained products of conception. There is no evidence that the risk of PID is increased by the presence of an IUCD beyond the first 2 to 3 weeks after insertion. In theory, the presence of a foreign body could compromise treatment of an established infection. However, removal of an IUCD can risk pregnancy in women who are unable or unwilling to use alternative methods of contraception. Unless infection occurs within 3 weeks of insertion, removal of an IUCD should only be considered if the benefit outweighs the harm (eg if the infection is severe and response to treatment poor). A new IUCD may be inserted once the infection has resolved.

For **mild to moderate infection**, use:

amoxycillin+clavulanate 875+125 mg orally, 12-hourly for 14 days

PLUS

azithromycin 1 g orally, as a single dose

PLUS EITHER

1 **azithromycin 1 g orally, as a single dose 1 week later (azithromycin should be used in pregnancy or breastfeeding)**

OR

1 **doxycycline 100 mg orally, 12-hourly for 14 days.**

For patients with penicillin hypersensitivity (see Table 2.2), **substitute** for amoxycillin+clavulanate:

metronidazole 400 mg orally, 12-hourly for 14 days.

For **severe infection** related to pregnancy or surgery and unlikely to be sexually acquired, use:

amoxy/ampicillin 2 g IV, 6-hourly

PLUS

gentamicin 4 to 6 mg/kg (see Table 2.24) IV, for 1 dose, then determine dosing interval for a maximum of either 1 or 2 further doses based on renal function (see Table 2.25)

PLUS

metronidazole 500 mg IV, 12-hourly.

Sexually acquired

Early empirical treatment of sexually acquired PID is important because it may reduce the risk of tubal damage, which predisposes to infertility or ectopic pregnancy. Infection is usually initiated by *C. trachomatis* or *N. gonorrhoeae* and there is now good evidence that *M. genitalium* infection is involved in a significant minority of cases (approximately 10% to 20%). Unfortunately, diagnostic NAT for *M. genitalium* is not yet widely available, but should be requested if symptoms of PID persist after treatment. Endogenous flora are commonly involved in mixed infection with one or more sexually acquired pathogens.

Sexual partners should be examined, investigated and treated appropriately.

For **mild to moderate infection**, use:

ceftriaxone 500 mg in 2 mL of 1% lignocaine IM, or 500 mg IV, as a single dose (for gonorrhoea) [Note 1]

PLUS

metronidazole 400 mg orally, 12-hourly for 14 days

PLUS

azithromycin 1 g orally, as a single dose

PLUS EITHER

1 **azithromycin 1 g orally, as a single dose 1 week later (azithromycin should be used in pregnancy or breastfeeding)**

OR

1 **doxycycline 100 mg orally, 12-hourly for 14 days.**

For **severe infection**, use:

ceftriaxone 1 g IV, daily

PLUS

azithromycin 500 mg IV, daily

PLUS

metronidazole 500 mg IV, 12-hourly.

Continue IV therapy until there is substantial clinical improvement, then use oral amoxycillin+clavulanate plus doxycycline, or in patients who are hypersensitive to penicillin, oral metronidazole plus doxycycline (as for mild to moderate non-sexually acquired PID), to complete at least 2 weeks of treatment. If clinically improved after 48 hours, IV therapy can be ceased and a single dose of azithromycin 1 g orally can be given 1 week later, plus oral metronidazole to complete at least 2 weeks of treatment.

An alternative IV regimen, especially for patients with immediate hypersensitivity to penicillin (see Table 2.2), is:

gentamicin 4 to 6 mg/kg (see Table 2.24) (severe sepsis: 7 mg/kg) IV, for 1 dose, then determine dosing interval for a maximum of either 1 or 2 further doses based on renal function (see Table 2.25)

PLUS EITHER

1 **clindamycin 600 mg IV, 8-hourly**

OR

1 **lincomycin 600 mg IV, 8-hourly.**

- Treatment also includes adequate analgesia, antipyresis, control of emesis and fluid management in those with N+V and dehydration or in those who appear toxic
- Switch to PO antibiotics 24 hours after improving and re-evaluate within 72 hours of discharge, signs of improvement:
    - Defervescence
    - Decreased abdominal tenderness
    - Decreased uterine, adnexal and cervical motion tenderness

COMPLICATIONS:

- FITZ-HUGH-CURTIS SYNDROME:
  - Rare → perihepatitis marked by RUQ pain in woman with PID and no other demonstrable cause for URQ pain
  - Responds to antibiotics
- TUBO-OVARIAN ABSCESS:
  - Disproportionate unilateral adnexal tenderness or adnexal mass may indicate TOA
  - In woman with clinical toxicity and asymmetric pelvic findings → pelvic US should be performed
  - Most respond to antibiotics, but those that don't within 72 hours should be reassessed for consideration of laparoscopic treatment → pelvic lavage, abscess drainage and lysis of adhesions
  - Majority of TOA respond to antibiotics (60-80%)
  - An enlarging pelvic mass may indicated BLEEDING SECONDARY TO VESSEL EROSION or a ruptured abscess
  - Laparotomy reserved for emergencies such as ruptured abscess → intraoperative findings and patients' desire for future fertility guide management → may involve unilateral salpingo-oophorectomy or hysterectomy with bilateral salpingo-oophorectomy

DISPOSITION:

- Admission decisions in ED based on:
  - Severity of illness
  - Likelihood of adherence to outpatient medication regimen
  - Likelihood of major anaerobic infection (IUD, suspected abscess, recent uterine instrumentation)
  - Certainty of diagnosis
  - Coexisting illness and immunosuppression
  - Pregnancy → should be admitted because both mother and foetus are at risk for adverse outcomes
  - Age
- If discharged, follow up within 72 hours