

ADULT PELVIC INFLAMMATORY DISEASE

Background

1. Definition – polymicrobial infection in women of the upper genital tract.
 - Includes salpingitis, endometritis, parametritis, oophoritis, peritonitis and tubo-ovarian abscess.¹
2. General Information
 - Spectrum of disease may vary from subclinical, asymptomatic infection to severe, life-threatening illness.
 - Most common gynecological reason in US for admission to hospital²
 - Etiology: STI (sexually transmitted infection) organisms, especially *N. gonorrhoeae* and *C. trachomatis*, and vaginal flora microorganisms (e.g., anaerobes, *G. vaginalis*, *Haemophilus influenzae*, enteric Gram-negative rods, and *Streptococcus agalactiae*)³

Pathophysiology

1. Pathophysiology of Disease – Infections such as Neisseria gonorrhoea and Chlamydia trachomatis cause epithelial damage and allow opportunistic infections from other bacteria.³
 - PID believed to result from direct canalicular spread of these organisms from the endocervix to mucosa of endometrium and fallopian tube.⁵
 - Four factors may contribute:⁵
 - Uterine instrumentation (e.g., the insertion of an intrauterine device {IUD}). Limited to first 3 weeks post-insertion
 - Hormonal changes during menses, as well as menstruation itself, leads to cervical alterations decreased mechanical barrier preventing ascent.
 - Retrograde menstruation
 - Individual organisms may have potential virulence factors associated with pathogenesis of acute chlamydial and gonococcal PID.⁵
2. Incidence, Prevalence – estimated 600,000 to 1 million cases annually in U.S⁷
3. Risk Factors^{1, 2}
 - young age
 - recent new sexual partner
 - low socioeconomic status
 - lower educational attainment
 - previous episode of PID
 - early age sexual intercourse
 - presence of a sexually transmitted infection
 - high number of sexual partners
 - alcohol use
4. Morbidity/Mortality –
 - About 40% of affected women develop chronic pelvic pain
 - About 20% of affected women become infertile
 - 1% who conceive have an ectopic pregnancy
 - Repeated episodes: four-six fold increase in risk of permanent tubal damage.²

Diagnosics

1. History⁴
 - Abdominal/pelvic pain
 - Abnormal vaginal discharge
 - Intermenstrual bleeding
 - Postcoital bleeding
 - Urinary frequency
 - Lower back pain
 - Nausea/ vomiting
 - Fever
 - Dyspareunia
 - In some women, symptoms are mild or absent.¹
2. Physical Examination⁴
 - Abdominal examination may reveal diffuse tenderness greatest in lower quadrants.
 - Rebound tenderness, decreased bowel sounds. Marked right upper quadrant tenderness in about 10% of patients with perihepatitis.
 - May be asymptomatic
 - Bimanual pelvic examination: cervical motion and/or uterine tenderness
 - Presence of palpable adnexal mass likely to represent a tubo-ovarian abscess complicating PID.
 - Cervix: green or yellow mucopus and friability.
3. Diagnostic Testing – Invasive diagnostic tests, such as laparoscopy, may sometimes be needed.¹
4. Laboratory Evaluation⁴
 - Human chorionic gonadotropin: r/o ectopic pregnancy
 - Leukocytosis
 - Elevated acute phase reactants: ESR>15mm/hr, C-reactive protein
 - Endocervical cultures for *N. gonorrhoeae* and *C. trachomatis*
 - Gram stain of endocervical exudates: > 30 polymorphonuclear cells /hpf suggests GC of Chlamydia
 - Fallopian tube aspirate or peritoneal exudates culture if laparoscopy
5. Diagnostic Imaging¹
 - Transvaginal ultrasound: tubal wall thickness greater than 5 mm, fluid in the cul-de-sac, incomplete septae within fallopian tube, and cogwheel sign (cogwheel appearance on cross-section tubal view).
 - CT pelvis (if ultrasound indeterminate): may show subtle changes pelvic floor fascial planes, inflammatory changes of tubes or ovaries, thickened uterosacral ligaments, and abnormal fluid collection.
 - MRI: tubo-ovarian abscess, a pyosalpinx, a fluid-filled fallopian tube, or polycystic-like ovaries with free pelvic fluid.
6. Other Studies¹
 - Endometrial biopsy: endometritis can be diagnosed from histologic exam of specimens
 - Laparoscopy: allows direct visualization of ovaries, uterus, fallopian tubes, and other abdominal structures.

7. Diagnostic Criteria¹

- CDC Diagnostic Criteria:
- PID should be suspected and treatment initiated if:
 - Patient at risk of PID and
 - Patient has uterine, adnexal, or cervical motion tenderness with no other apparent causes.
- **Findings that support the diagnosis:**
 - Cervical or vaginal mucopurulent (green or yellow) discharge
 - Elevated erythrocyte sedimentation rate or C-reactive protein
 - Laboratory confirmation of gonorrheal or chlamydial infection
 - Oral temperature of 101°F (38.3°C) or greater
 - WBC's on vaginal secretion saline wet mount
- **Most specific criteria for the diagnosis:**
 - Endometritis on endometrial biopsy
 - Thickened, fluid-filled tubes apparent on trans-vaginal ultrasound or magnetic resonance imaging
 - Laparoscopic abnormalities consistent with PID (e.g. tubal erythema, adhesions, edema, purulent exudates or cul-de-sac fluid, abnormal fimbriae)

Differential Diagnosis

1. Key Differential Diagnosis:

- Gastrointestinal: appendicitis, cholecystitis, constipation, inflammatory bowel disease, gastroenteritis
- Renal: urethritis, nephrolithiasis, pyelonephritis, cystitis
- Obstetric/Gynecologic: ectopic pregnancy, dysmenorrhea, ruptured ovarian cyst, ovarian torsion, endometriosis, adenomyosis, tuboovarian abscess

Therapeutics

1. Acute Treatment³: In women with PID of mild to moderate severity, parenteral and oral therapies appear to have similar efficacy.
 - Criteria for hospitalization:
 - surgical emergencies (e.g. appendicitis) cannot be excluded
 - pregnant
 - does not respond clinically to oral antimicrobial therapy in 72 hours
 - unable to follow or tolerate an outpatient oral regimen
 - severe illness, nausea and vomiting, or high fever
 - tubo-ovarian abscess suspected
 - Recommended parenteral regimen A:
 - Cefotetan 2g iv q12h OR
 - Cefoxitin 2g iv q 6h PLUS
 - Doxycycline 100mg po or iv q 12h
 - Recommended parenteral regimen B:
 - Clindamycin 900 mg iv q8h PLUS
 - Gentamicin loading dose iv or im (2mg/kg of body weight), followed by a
 - Maintenance dose (1.5 mg/kg) q8h. Single daily dosing (3 to 5 mg/kg) can be substituted.

- Alternative parenteral regimens:
 - Ampicillin/sulbactam 3g iv q6h PLUS
 - Doxycycline 100mg po or iv q12h
- Outpatient oral treatment: (CDC does not recommend routine use of fluoroquinolones)
- Recommended regimen
 - Ceftriaxone 250 mg im in a single dose PLUS
 - Doxycycline 100 mg po bid for 14 days WITH or WITHOUT
 - Metronidazole 500 mg po bid for 14 days OR
 - Cefoxitin 2 g im in a single dose and Probenacid, 1 g po administered concurrently in a single dose PLUS
 - Doxycycline 100 mg po bid for 14 days WITH or WITHOUT
 - Metronidazole 500 mg po bid for 14 days OR
 - Other parenteral third-generation cephalosporin (e.g ceftizoxime or cefotaxime) PLUS
 - Doxycycline 100 mg po bid for 14 days WITH or WITHOUT
 - Metronidazole 500 mg po bid for 14 days
- 2. Further Management (24 hrs): Transition to oral therapy usually within 24-48 hours of clinical improvement.
 - If patient has tubo-ovarian abscess, at least 24 hours of direct in-patient observation recommended.³
- 3. Long-Term Care: In hospitalized patients receiving intravenous therapy, significant clinical improvement characterized by defervescence, decreased abdominal, adnexal, uterine and cervical motion tenderness within 3-5 days.
 - If no clinical improvement occurs, further diagnostic tests required, including possible surgical intervention.
 - After discharge from hospital, oral antibiotics continued for 10-14 days total.^{3,5}

Follow-Up

1. Return to Office: follow-up within 48-72 hours to ensure clinical improvement if outpatient oral regimen chosen.⁶
2. Admit to Hospital: no clinical improvement within 48-72 hours of outpatient therapy,
 - Hospitalization for parenteral therapy and further diagnostic evaluation for alternative diagnosis recommended.^{3,7}
 - Antimicrobial regimen should be reassessed and diagnostic laparoscopy for consideration of an alternative diagnosis recommended.
3. High rate of reinfection in women who have documented chlamydia or gonococcal infections
 - Repeat testing recommended 3-6 months after treatment regardless of whether their sex partners were treated.⁵

Prevention⁵

1. Primary prevention: avoiding acquisition of sexually transmitted infections.
2. Secondary prevention: preventing lower-genital-tract infection from ascending

3. Tertiary prevention: preventing upper-genital-tract infection from leading to tubal dysfunction/obstruction and functional or structural damage to other abdominal/pelvic organs.
4. Recommended Strategies for Communities:
 - Community health promotion and education
 - Appropriate clinical services
 - Partner notification
 - Training of health-care providers
 - Detecting asymptomatic STD's
5. Recommended Strategies for Individuals:
 - Maintain healthy sexual behavior
 - Use barrier methods
 - Adopt appropriate health-care-seeking behavior
 - Influence sex partners to be evaluated
6. Recommended Strategies for Health-care Providers:
 - Maintain up-to-date knowledge about the prevention and control of STD/PID
 - Provide appropriate preventive services
 - Provide appropriate medical management for illness
 - Provide risk-reduction counseling
 - Ensure evaluation of sex partners

References

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