

Pediatric Pelvic Inflammatory Disease

Definition

1. Pelvic Inflammatory Disease: infection of female upper genital tract; can involve any or all of the following
 - Uterus
 - Fallopian tubes
 - Ovaries
 - Pelvic peritoneum
 - Neighboring pelvic organs

General Information¹

1. Pelvic Inflammatory Disease (PID) is:
 - Disease of women.
 - Reportable condition.
 - Syndrome that can have acute, sub-acute and chronic presentations.
 - Major health concern due to associated morbidity and mortality.
2. Timely prevention, diagnosis and treatment play an important role in reducing PID-associated cost and morbidity.
3. PID can be asymptomatic (subclinical PID); therefore, easily missed by providers.
4. STDs highly prevalent in incarcerated men and women
 - Good chance to treat this population when they are in juvenile/adult detention centers to prevent PID.
5. Adolescents face many health challenges
 - Most costly are unintended pregnancy, STDs, violence.
6. STDs most common reported infectious disease in adolescents
 - Chlamydia and gonorrhea most common bacterial cause, both of which are associated with PID
7. Providers need to have low threshold to diagnose and treat

Demographics²

1. Adolescents in the US - persons aged 10-19
 - Pediatric PID involves persons in this age group.
2. Mean age of puberty for US females - between 12-13 years
3. Mean age of first intercourse: 16 years
 - Time lapse of 1 yr between first and second intercourse.
 - 1/3 of adolescents experiment with oral-genital sex and vaginal intercourse.

4. Each year, 750,000 women between 15-19 y/o become pregnant
 - According to 2002 National Survey of Family Growth, 40% of women age 15-19 received sexual or reproductive health services from a medical provider during previous year
5. Persons between the ages of 15-24 constitute nearly half of all new STI's (Sexually Transmitted Infection) annually, including HIV
6. Adolescents remain underserved, because services not always
 - Accessible
 - Acceptable
 - Appropriate
 - Effective
 - Confidential
 - Only 34% spend time alone with their healthcare provider; lower (18%) for Hispanic teens
 - More than 4 million adolescents uninsured
7. Adolescents can access healthcare through a Pediatrician, OB/GYN, Family Physician
 - 56% of Pediatricians report that they offer some reproductive health services
 - Only 1 in 5 make condoms available
8. Only 38% of adolescents have had recent preventative health visit that includes screening and anticipatory guidance.
 - Preventive visits are most common between 10-14 years and decline by 16-19 years (highest risk)
9. Only 26% of adolescent males reporting high risk sexual behavior received counseling
10. 51% of women between 16-20 y/o reported via survey that they were physically or sexually abused by an intimate partner
 - 18% pregnancy coercion
 - 12% birth control sabotage

Pathophysiology^{1,3}

1. PID is poly-microbial infection.
2. Infective organisms penetrate cervical mucosa and ascend to upper genital tract.
3. Mechanisms of infection include
 - Direct contact
 - Transport via sperm
 - Motility of organism
 - Instrumentation
 - Carriage via refluxed menstrual blood

4. Organisms involved
 - Gardenella vaginalis
 - Anaerobes
 - Neisseria Gonorrhoea
 - Viridans Streptococci
 - Diphtheroids
 - Chlamydia Trachomatis
 - Trichomonas Vaginalis
5. Women with HIV have higher rates of Mycoplasma hominis, Candida, Streptococcus, HPV
6. Chlamydia
 - 14.5% (median) female and 6.5% (median) male adolescents entering juvenile facilities test positive for Chlamydia
 - In 2010, Chlamydia in women 15-19 y/o increased 9% (3378.2/100,000); 6% increase (774.3/100,000) in men
7. Gonorrhoea
 - 4.15% (median) female and 0.6% (median) male adolescents entering juvenile facilities test positive for Gonorrhoea
 - Women between 15-19 y/o have highest rates of Gonorrhoea
 - In 2010, Gonorrhoea in women increased 0.9% (570.9/100,000); 2.1% increase in men (253.4/100,000)

Incidence and Prevalence⁴

1. Accurate estimates of PID difficult to obtain
2. Hospitalizations declined in 1980-1990's; remained constant from 2000-2007
3. Estimated number of office visits declined from 2000-2009
4. Racial disparities exist
 - PID three times more common in African Americans than Caucasians
5. Acute PID occurs in 1-2 % of sexually active women
 - 85% of these episodes occur spontaneously
 - 15% occur after procedures causing PID which include
 - EMB
 - D&C
 - IUD placement
 - HSG (hysterosalpingogram)
 - Hysteroscopy
 - NSVD
 - C-Section
6. PID extremely rare in those with amenorrhoea

7. Risks associated with PID include
 - Ectopic pregnancy
 - Increases 6-7 fold
 - Infertility
 - Increased by 6-60%; can be up to 54% following 3 episodes of PID-hospitalization
 - Repeat infection

Risk Factors^{1,5}

1. < 24 y/o (more common in this age group)
2. Individuals who do not have health insurance
 - Vast majority of adolescents covered through parents, employer, Medicaid or state children's health insurance program.
 - More than 4 million uninsured
 - Adolescents without insurance more likely to forego healthcare
3. H/o STDs
4. Early age at first intercourse
5. H/o Multiple sexual partners
6. Not using barrier contraception
7. Douching
8. Low socioeconomic status (more likely to show early/atypical patterns of sexual behavior)
 - In 2005, 16% of adolescents 10-17 years were living below threshold of poverty, with another 20% near poverty.
 - Racial disparities exist
 - 60% are non-Hispanic, black adolescents living with single parent; 35 percent are Hispanic adolescents.
 - 22% of adolescents live in immigrant families (2004)
9. Adolescence
 - In 2005, persons aged 10-19 comprised 14% of US population
 - STDs most commonly reported infectious disease in adolescents
 - Chlamydia and Gonorrhea most common bacterial cause
 - Increased risk because of:
 - Increased frequency of unprotected sexual intercourse
 - Biological susceptibility to infections
 - Pattern of sexual behavior shows multiple monogamous relationships of short duration
 - Multiple obstacles faced in order to access confidential health care services

10. Ethnicity
11. IUD use
12. Education
 - College graduation decreases incidence in African-Americans

Morbidity and Mortality

1. Infertility (up to 10-15%)¹
2. Hospitalization
3. Financial burden
4. Ectopic pregnancy with complications
5. Transmission to newborn during childbirth
6. Repeat infections
7. Mortality

Signs and Symptoms¹

1. Lower abdominal pain
 - Most common symptom of PID
2. Vaginal discharge that may have foul odor
3. Painful intercourse
4. Painful urination
5. Irregular menses
6. Constitutional symptoms (fever)

Physical Examination

1. Abdominal Findings
 - Lower abdominal tenderness
 - Rebound tenderness
 - Vaginal discharge
 - Cervical motion and adnexal tenderness
 - Ascites
 - RUQ tenderness indicative of Fitz-Hugh-Curtis (FHC) Syndrome
 - FHC rare complication of PID
 - PID-causing bacteria thins cervical mucus, allowing bacteria into the uterus
 - Causes inflammation that may involve liver capsule.
2. Pelvic Exam Findings
 - Vaginal discharge
 - WBC on thin prep

- Cervical motion tenderness (“Chandelier Sign”)
- Adnexal mass
- Adnexal tenderness

Diagnostic Tests³

1. Laparoscopy (81% sensitivity; up to 100% specificity)¹⁰ is criterion standard; diagnosis often made clinically without additional laboratory & imaging¹⁶
2. CBC
 - 66% sensitive
 - 80% elevated WBCs
 - Does not correlate with need for hospitalization or how severe the infection is
3. Vaginal Swab (WBC’s)
 - 87% sensitive; 38 % specific
 - Single most important lab; if no WBC on discharge, PID less likely
4. Urinalysis
5. Pregnancy Test
 - Must rule out ectopic pregnancy in women of reproductive age with pelvic pain
6. ESR
 - 72% sensitive; 53% specific
7. C-Reactive-Protein
 - 76% sensitive; 59% specific – not reliable test
8. Cervical Culture
9. DNA Probe
 - False positives can occur due to surface contamination in clinic¹⁴
 - False negatives can occur due to mutations in Neisseria Gonorrhoea species⁷
10. Ultrasound
 - Helpful in establishing ER diagnosis of TOA⁸
11. MRI
 - Up to 95% sensitivity⁴
 - Expensive
12. CT Scan
13. Endometrial Biopsy
 - 89% sensitive; 87% specific³

Diagnostic Criterion¹

1. Lower abdominal pain
2. Tenderness with motion of cervix, uterus, adnexa
3. Fever
4. Abnormal discharge

5. WBC on thin prep
6. Elevated ESR
7. CRP

Definitive Criterion¹

1. TOA
2. Endometrial biopsy
3. Laparoscopy

Differential Diagnosis

1. Acute appendicitis
2. Ectopic pregnancy
3. Tubo-ovarian pathology
4. Ovarian torsion
5. Proctitis (infectious)
 - May be due to increase in STD's and the practice of receptive anal sex
 - Most frequently reported pathogens include
 - Neisseria gonorrhoea
 - Chlamydia trachomatis
 - Treponema pallidum
 - Herpes simplex.
 - Diagnosis:
 - History and physical examination are crucial
 - Symptoms include
 - Rectal blood and mucous discharge
 - Anorectal pain and/or ulcers
 - Lymphadenopathy
 - Fever
 - Supported by endoscopy, histology, serology, culture and PCR¹⁰

Management¹

1. PID treatment regimens must provide empiric, broad spectrum coverage of likely pathogens; health-care providers should consider availability, cost, patient acceptance, and antimicrobial susceptibility
2. All regimens used to treat PID should be effective against N. gonorrhoea, C. trachomatis and anaerobes
3. Outpatient management has same efficacy as inpatient management; grounds for consideration of inpatient management are
 - Surgical emergencies (e.g., appendicitis) cannot be excluded;
 - Patient pregnant

- Patient does not respond clinically to oral antimicrobials
 - Patient unable to follow or tolerate an outpatient oral regimen
 - Patient has severe illness, nausea, vomiting, a high fever, or a tubo-ovarian abscess
4. Patients who do not respond to oral therapy within 72 hours should be reevaluated to confirm the diagnosis and should be administered parenteral therapy as either outpatient or inpatient

Parental Therapy¹

1. 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
2. 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 (3–5 mg/kg) can be substituted
3. Ampicillin/Sulbactam 3 g IV every 6 hours PLUS Doxycycline 100 mg orally or IV every 12 hours¹

Oral Treatment¹

1. Ceftriaxone 250 mg IM 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
2. Cefoxitin 2 g IM 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 days¹
3. 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

Follow-Up^{1, 12}

1. Parenteral therapy should be switched to oral therapy within 24 hours
2. Patient should show improvement within 72 hours.
 - Persistence of high grade fever or pain may be a sign of treatment failure or another pathological process
3. Treatment failure should prompt hospitalization, additional diagnostic testing, surgical intervention, and patient should be considered for diagnostic laparoscopy
4. Repeat testing of all women who have been diagnosed with gonorrhea or Chlamydia recommended 3-6 months after treatment regardless of whether or not their sex partners were treated
5. Test of cure can be performed at 2 weeks using DNA amplification techniques
6. HIV testing should be done on all women

Prevention¹

1. Sex education to prevent STDs
2. Safe sexual practices
 - Use of barrier contraceptives
3. Avoid douching
 - Changes vaginal flora
 - Pushes bacteria from vagina into upper reproductive organs
4. Appropriate measures during instrumentation
 - IUD Placement
 - D&C
 - Therapeutic abortion
5. Adequate diagnosis and treatment of both partners to prevent repeat infection
6. Expedited partner therapy is an effective way of providing treatment to partners

Guidelines^{13, 15}

1. Summary of Recommendations for Chlamydia

- ACOG recommends initial reproductive health visit between age 13-15
- The U.S. Preventive Services Task Force (USPSTF) recommends screening for chlamydial infection for all sexually active non-pregnant young women aged 24 and younger and for older non-pregnant women who are at increased risk (Grade A Recommendation)
- The USPSTF recommends screening for chlamydial infection for all pregnant women aged 24 and younger and for older pregnant women who are at increased risk (Grade B Recommendation)
- The USPSTF recommends against routinely providing screening for chlamydial infection for women aged 25 and older, whether or not they are pregnant, if they are not at increased risk (Grade C Recommendation)
- The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for chlamydial infection for men (Grade I Statement)

2. Summary of Recommendations for Gonorrhea

- The U.S. Preventive Services Task Force (USPSTF) recommends that clinicians screen all sexually active women, including those who are pregnant, for gonorrhea infection if they are at increased risk for infection (that is, if they are young or have other individual or population risk factors) (Grade B Recommendation)
- The USPSTF found insufficient evidence to recommend for or against routine screening for gonorrhea infection in men at increased risk for infection (Grade I Statement)

- The USPSTF recommends against routine screening for gonorrhea infection in men and women who are at low risk for infection (see Clinical Considerations for discussion of risk factors) (Grade D Recommendation)
- The USPSTF found insufficient evidence to recommend for or against routine screening for gonorrhea infection in pregnant women who are not at increased risk for infection (Grade I Statement)

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