



Ready-to-Use

STD Curriculum for Clinical Educators

Pelvic Inflammatory Disease (PID) Module

Target Audience - Faculty in clinical education programs, including those programs that train advanced practice nurses, physician assistants, and physicians

Contents - The following resources are provided in this module:

- **Faculty Notes** (Microsoft Word and Adobe Acrobat formats) - Includes notes that correspond to the slide presentation, a case study with discussion points, and test questions with answers
- **Slide Presentation** (Microsoft PowerPoint and Adobe Acrobat formats)
- **Student Handouts**
 - **Case Study** (Microsoft Word format)
 - **Test Questions** (Microsoft Word format)
 - **Slides Handout** (Adobe Acrobat format)
 - **Resources** (Microsoft Word format)

Suggested Time Allowance - The approximate time needed to present this module is 60-90 minutes.

These materials were developed by the Program and Training Branch, Division of STD Prevention, CDC. They are Based on the curriculum developed by the National Network of STD/HIV Prevention Training Centers (NNPTC) which includes recommendations from the 2010 CDC STD Treatment Guidelines

Information on the NNPTC can be Accessed at:
www.nnptc.org

The 2010 CDC STD Treatment Guidelines Can be accessed at:
www.cdc.gov/std/treatment/



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Pelvic Inflammatory Disease (PID)

[Slide 1]

Pelvic Inflammatory Disease (PID)

[Slide 2]

Learning Objectives

Upon completion of this content, the learner will be able to

- Describe the epidemiology of PID in the United States;
- Describe the pathogenesis of PID;
- Discuss the clinical manifestations of PID;
- Identify the clinical criteria used in the diagnosis of PID;
- List CDC-recommended treatment regimens for PID;
- Summarize appropriate prevention counseling messages for a patient with PID; and
- Describe public health measures to prevent PID.

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Lessons

- I. Epidemiology: Disease in the U.S.
- II. Pathogenesis
- III. Clinical manifestations
- IV. PID diagnosis
- V. Patient management
- VI. Prevention

[Slide 4]

Lesson I: Epidemiology: Disease in the U.S.

[Slide 5]

Pelvic Inflammatory Disease

Definition

- PID is a clinical syndrome associated with ascending spread of microorganisms from the vagina or cervix to the endometrium, fallopian tubes, ovaries, and contiguous structures.
- PID comprises a spectrum of inflammatory disorders, including any combination of endometritis (infection of the endometrium), salpingitis (infection of the fallopian tubes), tubo-ovarian abscess, or pelvic peritonitis (infection of the peritoneum).
- PID may be asymptomatic (“silent”) or overt with mild to severe symptoms.

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Incidence and Prevalence

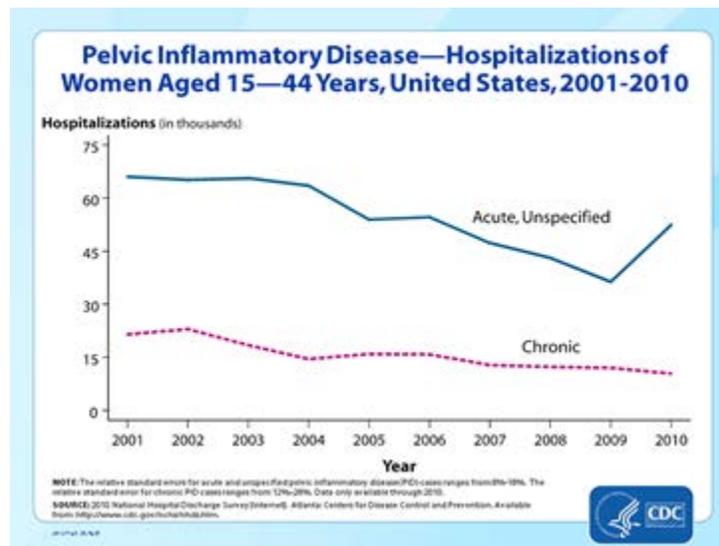
- Pelvic Inflammatory Disease is estimated to occur in over 750,000 U.S. women annually.
- Annual cost exceeds \$4.2 billion.
- No national surveillance or reporting requirements exist, and national estimates are limited by insensitive clinical diagnosis criteria.

- During 2001-2010, hospitalizations for acute PID overall have shown modest declines, although hospitalizations for acute PID increased by 44.3% (from 36.3 to 52.4 per 100,000) between 2009 and 2010. Hospitalizations for chronic PID have also shown modest declines, remaining relatively stable between 2007 and 2010
- The estimated number of initial visits to physicians' offices for PID from NDTI declined during 2003– 2012.

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Pelvic Inflammatory Disease—Hospitalizations of Women Aged 15–44 Years, United States, 2001–2010

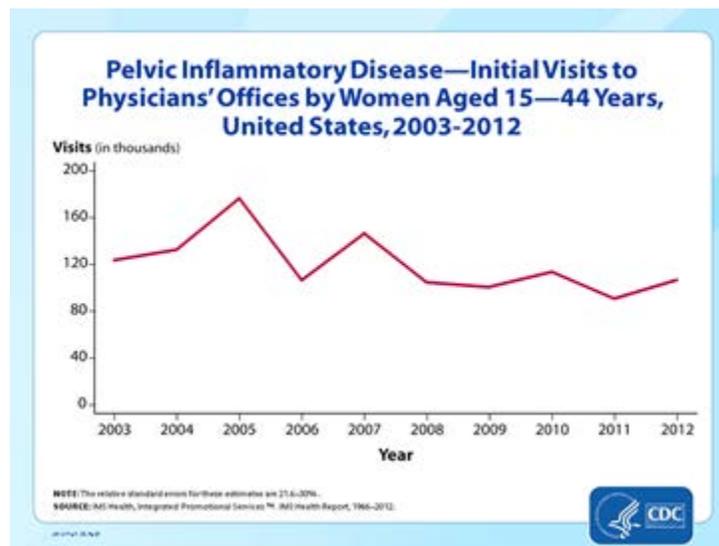
Graph



[Slide 8]

Pelvic Inflammatory Disease—Initial Visits to Physicians' Offices by Women Aged 15–44 Years, United States, 2002–2011

Graph



[Slide 9]

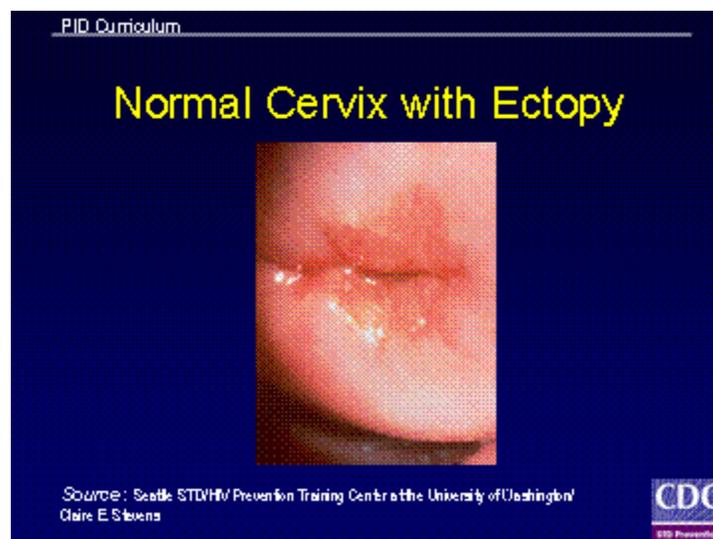
Risk Factors

- Adolescence is a risk factor because of increased age-related chlamydia and gonorrhea rates and the presence of cervical ectopy, which allows for increased adherence of infectious organisms. When gonorrhea and chlamydia are controlled for, there is no elevated risk for adolescents.
- History of PID: damaged fallopian tube mucosa may be more susceptible to recurrent infection.
- History of gonorrhea or chlamydia: increased likelihood of recurrent gonorrhea or chlamydia.
- Male partners with gonorrhea or chlamydia
- Multiple sex partners
- Current douching: contributes to vaginal flora changes, epithelial damage, and disruption of cervical mucous barrier.
- Insertion of IUD within the first 21 days of placement (this risk is greatly reduced if a woman is tested and, if necessary, treated for STDs before an IUD is inserted); after 21 days, risk returns to baseline.
- Bacterial vaginosis has been associated with PID.
- Oral contraceptive use: may increase the risk of cervical chlamydial infection because of cervical ectopy, but decreases the risk of clinically apparent symptomatic PID (mechanisms unclear). Oral contraceptives also cause thickening of cervical mucous which may be protective against lower genital tract organisms ascending into the upper genital tract.
- Demographics (socioeconomic status): may be related to access to care.

[Slide 10]

Normal Cervix with Ectopy

Image



[Slide 11]

Lesson II: Pathogenesis

[Slide 12]

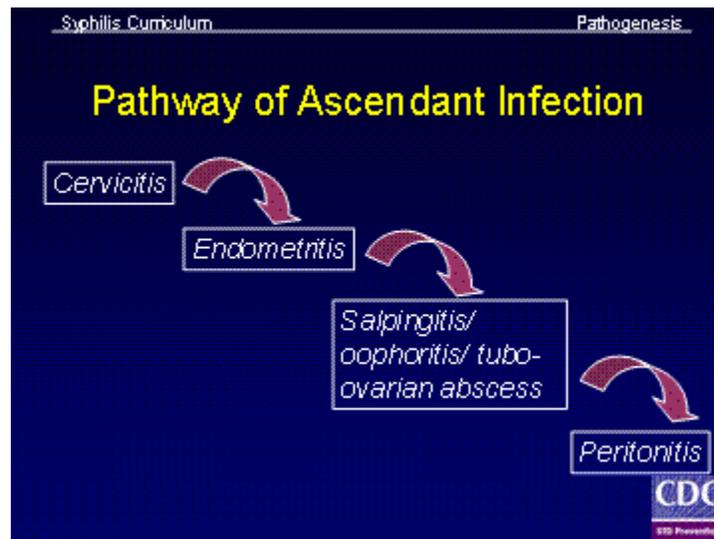
Microbial Etiology

- Most cases of PID are polymicrobial.
- Most common pathogens
 - *N. gonorrhoeae*: recovered from cervix in 30%–80% of women with PID
 - *C. trachomatis*: recovered from cervix in 20%–40% of women with PID; recovered from endometrium or tubes in a majority of women with cervical chlamydial infection. Especially associated with perihepatitis (Fitz-Hugh-Curtis syndrome—see Chlamydia module).
 - *N. gonorrhoeae* and *C. trachomatis* are present in combination in approximately 25%–75% of patients with PID; relative prevalence of these and other organisms depends on population studied.
- Other microbes include
 - Enteric Gram-negative rods (e.g., *E. coli*)
 - Anaerobes (*Bacteroides* spp., *Prevotella* spp., *Peptostreptococcus* spp.); especially those associated with bacterial vaginosis
 - *Mycoplasma genitalium*, ureaplasmas, have been isolated from the endometrium and fallopian tubes of women with PID.
 - Gram-positive organisms (*Streptococcus* spp.)

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Pathway of Ascending Infection

Graphic:



cervicitis→endometritis→salpingitis/oophoritis/tubo-ovarian abscess→peritonitis

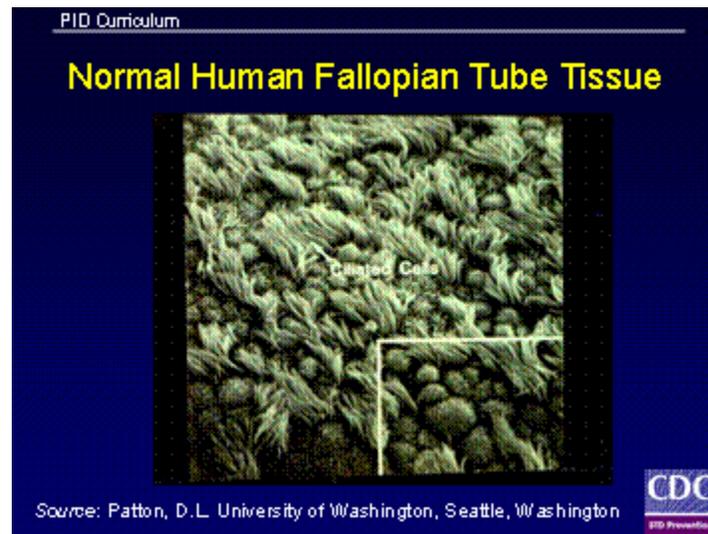
- Intermittent ascent of microorganisms into the endometrial cavity may be a physiological phenomenon. Fate of organisms depends on viability, number, pathogenicity, and local defense mechanisms.

- The response to ascending organisms is an inflammatory one that may lead to scarring of the tubes, subsequent tubal factor infertility, ectopic pregnancy, or chronic pelvic pain. This scarring may occur, even in women who do not report a history of PID symptoms.

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Normal Human Fallopian Tube Tissue

Image:

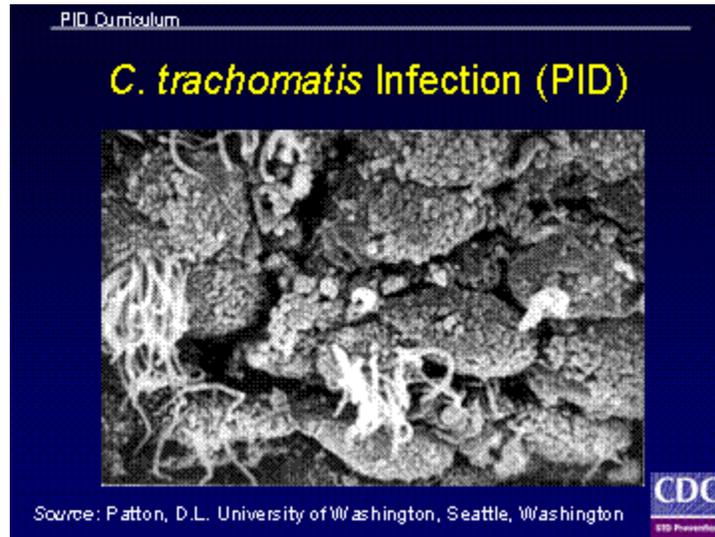


Millions of tiny hair-like cilia line the fimbria and interior of the fallopian tubes. The cilia beat in waves hundreds of times a second catching the egg at ovulation and moving it through the tube to the uterine cavity. Other cells in the tube's endothelium nourish the egg and lubricate its path during its stay inside the fallopian tube. This electron micrograph illustrates these structures.

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***C. trachomatis* Infection (PID)**

Image :



- Results of inflammation by *C. trachomatis* with loss of cilia

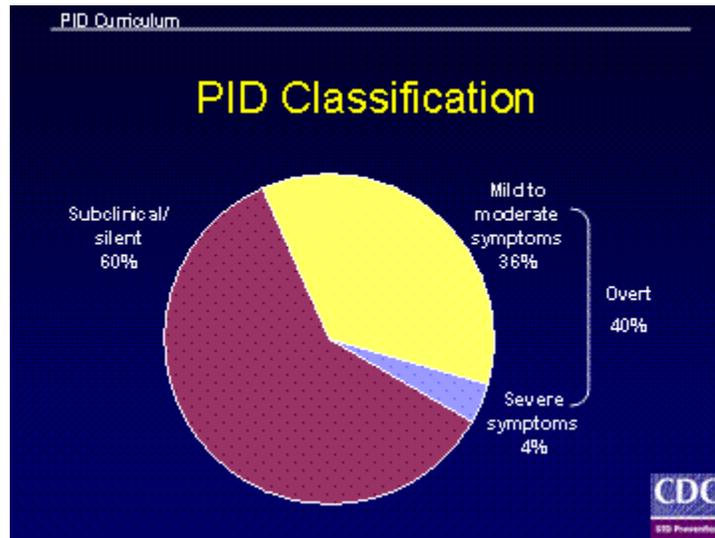
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Lesson III: Clinical Manifestations

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PID Classification

Graphic:



PID may be asymptomatic or subclinical (silent), or overt, with either moderate or severe symptoms.

- Subclinical, asymptomatic, or “silent” PID

- Occurs approximately 60% of the time; makes diagnosis and treatment problematic; women may not seek care, or variations in clinical presentation may lead to misdiagnosis.
- Atypical presentation may include dyspareunia, irregular bleeding, urinary, or gastrointestinal symptoms.
- Symptomatic or overt PID with moderate symptomatology
 - Occurs approximately 36% of the time; signs/symptoms include lower abdominal pain, cramping, dysuria, intermittent or post-coital bleeding, vaginal discharge, or fever.
 - Uterine tenderness or cervical motion pain or adnexal tenderness is present on a pelvic exam in most cases of moderate PID.
- Symptomatic or overt PID with severe symptomatology
 - Occurs approximately 4% of the time; patients appear very ill with fever, chills, purulent vaginal discharge, nausea, vomiting, and elevated white blood cell count (WBC).
 - Other laboratory indicators such as erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP), may also be elevated.

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Sequelae

- Approximately 25% of women with a single episode of symptomatic PID will experience sequelae, including ectopic pregnancy, infertility, or chronic pelvic pain.
- The risk of ectopic pregnancy is increased 6-fold to 10-fold after PID.
- Tubal infertility occurs in 8% of women after one episode of PID, in 20% of women after two episodes, and in 50% of women after three episodes.

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Lesson IV: PID Diagnosis

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Minimum Criteria in the Diagnosis of PID

- CDC recommends empiric treatment of PID in sexually-active young women, or other women at risk for STDs, with pelvic or lower abdominal pain, if these minimum criteria are met in the absence of any other explanation:
 - Uterine or adnexal tenderness (bilateral or unilateral)
 - Cervical motion tenderness
- Acute adnexal tenderness may be the most sensitive sign of upper genital tract infection. Under some circumstances, a clinician may choose to treat with even less specific findings. The general recommendation is to err on the side of over-treatment, given the high incidence of adverse outcomes with untreated PID.

Discussion question: Discuss sensitivity and specificity in clinical diagnosis:

Review of terminology – sensitivity and specificity

Sensitivity

- Likelihood a test will be positive when disease is present
- If 100 infected people are tested, and test results are positive for 85, the sensitivity is 85% (85/100).

Specificity

- Likelihood a test will be negative when disease is not present
- If 100 noninfected people are tested, and test results are negative for 99, the specificity is 99% (99/100).

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Additional Criteria to Increase Specificity of PID Diagnosis

These criteria also decrease sensitivity.

- Oral temperature >38.3°C (101° F)
- Abnormal cervical or vaginal mucopurulent discharge
- Presence of abundant numbers of white blood cells (WBCs) on saline microscopy of vaginal secretions (The absence of WBCs is even more helpful, and makes the diagnosis of PID less likely.)
- Elevated erythrocyte sedimentation rate
- Elevated C-reactive protein
- Cervical infection with gonorrhea or chlamydia

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Mucopurulent Cervical Discharge (positive swab test)

Image:

Most women with PID have either mucopurulent cervical discharge, or evidence of white blood cells (WBCs) on wet prep. If the cervical discharge appears normal, and no WBCs are found on the wet prep, the diagnosis of PID is unlikely.

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More Specific Criteria Used in Diagnosing PID

- Endometrial biopsy which shows histopathologic evidence of endometritis
- Transvaginal sonography or magnetic resonance imaging (MRI) may demonstrate tubo-ovarian abscess or thickened tubes with or without free pelvic fluid
- Laparoscopy showing abnormalities consistent with PID. Laparoscopy is indicated
 - For severe peritonitis, to exclude ruptured tubal abscess or ruptured appendix,
 - For patients with mild signs in whom the diagnosis is unclear,
 - For patients who fail to respond to antibiotic therapy, and
 - For drainage of an abscess.

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Lesson V: Patient Management

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General PID Management Considerations

- Regimens must provide empiric, broad-spectrum coverage of likely pathogens, including *N. gonorrhoeae*, *C. trachomatis*, anaerobes, Gram-negative facultative organisms, and streptococci. If bacterial vaginosis is present, anaerobic coverage is necessary.
- Treatment should be instituted as early as possible to prevent long-term sequelae.

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Criteria for Hospitalization of Women with PID

- Inability to exclude surgical emergencies (i.e., appendicitis, ectopic pregnancy)
- Pregnancy
- Nonresponse to oral therapy. Failure to respond clinically to outpatient antimicrobial therapy within 48–72 hours.
- Inability to follow or tolerate an outpatient oral regimen
- Severe illness, nausea, and vomiting, or high fever
- Tubo-ovarian abscess

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PID Treatment Regimens

- Current CDC recommendations for the treatment of PID include both parenteral and oral regimens
- Outpatient therapy can be considered for women with mild-to-moderately severe acute PID, because the clinical outcomes among women treated with oral therapy are similar to those treated with parenteral therapy. Patients on oral therapy ideally should be followed up within 72 hours, at which time they should show substantial clinical improvement. If no improvement occurs, the patient should be reevaluated to confirm the diagnosis, and should be switched to parenteral therapy either in an outpatient or inpatient setting. The addition of metronidazole should be considered, as anaerobic organisms are suspected in the etiology of the majority of cases. Metronidazole will also treat BV, which frequently is associated with PID.
- Oral Regimens
- CDC-recommended oral regimen A
 - Ceftriaxone 250 mg intramuscularly in a single dose plus
 - Doxycycline 100 mg orally two times a day for 14 days with or without
Metronidazole 500 mg orally two times a day for 14 days
- CDC-recommended oral regimen B
 - Cefoxitin 2 g intramuscularly in a single dose, and Probenecid 1 g orally administered concurrently in a single dose plus
 - Doxycycline 100 mg orally two times a day for 14 days with or without
Metronidazole 500 mg orally two times a day for 14 days
- CDC-recommended oral regimen C

- Other parenteral third-generation cephalosporin, plus
- Doxycycline 100 mg orally two times a day for 14 days with or without
Metronidazole 500 mg orally two times a day for 14 days

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Follow-Up

- Patient should be reexamined within 72 hours and should demonstrate substantial clinical improvement (e.g., defervescence; reduction in rebound or direct abdominal tenderness; reduction in uterine, adnexal, and cervical motion tenderness).
- Patients who do not improve within this period usually require hospitalization, additional diagnostic tests, and possible surgical intervention.
- Repeat testing of all women who have been diagnosed with chlamydia or gonorrhea is recommended three to six months after treatment, regardless of whether their sex partners were treated because there is a high rate of reinfection within 6 months of treatment in women with chlamydial or gonococcal infections.
- All women diagnosed with acute PID should be offered HIV testing.

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PID Parenteral Regimens

- CDC-recommended parenteral regimen A
 - Cefotetan 2 g intravenously every 12 hours, or
 - Cefoxitin 2 g intravenously every six hours, plus
 - Doxycycline 100 mg orally or intravenously every 12 hours
- CDC-recommended parenteral regimen B
 - Clindamycin 900 mg intravenously every eight hours, plus
 - Gentamicin loading dose intravenously or intramuscularly (2 mg/kg), followed by maintenance dose (1.5 mg/kg) every eight hours. Single daily gentamicin dosing (3–5 mg/kg) may be substituted.

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Alternative Parenteral Regimen

- Ampicillin/Sulbactam 3 g intravenously every six hours plus
Doxycycline 100 mg orally or intravenously every 12 hours
- It is important to continue either regimen A or B or alternative regimens for 24 hours after substantial clinical improvement occurs and also to complete a total of 14 days of therapy with Doxycycline 100 mg orally twice a day or Clindamycin 450 mg orally four times a day.

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Lesson VI: Prevention

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Screening

Screening recommendations

- Prevention of chlamydial or gonococcal infection by screening and treating at-risk women reduces the incidence of PID.
- CDC screening recommendations for chlamydia include annual screening for sexually-active women age 25 and under; screening of at-risk women over age 25; pregnant women in the first trimester or at the first prenatal visit, if after the first trimester; and any patient diagnosed with another STD. Retest pregnant women age 25 and under and those at increased risk for chlamydia should be retested during the third trimester as well.
- CDC screening recommendations for gonorrhea include sexually-active women age 25 and younger; previous gonorrhea infection; any patient diagnosed with another STD; new or multiple sex partners; inconsistent condom use; and engaged in commercial sex work or drug use.

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Partner Management

- Male sex partners of women with PID should be examined and treated if they had sexual contact with the patient during the 60 days preceding onset of the patient's symptoms. If a patient's last sexual intercourse was >60 days before onset of symptoms or diagnosis, the patient's most recent sex partner should be treated.
- Male partners of women who have PID caused by *C. trachomatis* or *N. gonorrhoeae* are often asymptomatic. Sex partners should be treated empirically with regimens effective against both of these infections, regardless of the apparent etiology of PID or pathogens isolated from the infected woman.
- The evaluation and treatment of partners is imperative because of the risk for reinfection and the strong likelihood of gonococcal or chlamydial infection in the sex partner.

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Reporting

Report cases to the local STD program in states where PID reporting is mandated. Laws and regulations in all states require that persons with gonorrhea or chlamydia be reported to public health authorities by clinicians, labs, or both. Check with your state or local health department for reporting requirements in your area.

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Patient Counseling and Education

Should cover the nature of the disease, transmission issues, and risk reduction

- Nature of the infection
 - PID may be silent or overt with moderate or severe symptoms.
 - A history of having had PID increases the risk for developing PID again.
 - The sequelae of PID are severe and include ectopic pregnancy, chronic pelvic pain, and infertility.
- Transmission issues
 - Gonorrhea and chlamydia are efficiently transmitted between males and females via vaginal intercourse.

- Patients should abstain from intercourse until therapy is completed and until they and their sex partners no longer have symptoms.
- Risk reduction
 - The clinician should:
 - Assess the patient's behavior-change potential.
 - Develop individualized risk-reduction plans with the patient for lasting results.
 - Discuss prevention strategies (abstinence, monogamy with an uninfected partner, condoms, limit number of sex partners, etc.).
 - Latex condoms, when used consistently and correctly, can reduce the risk of transmission of chlamydia and gonorrhea.
 - Discuss cessation of the practice of douching.

CASE STUDY

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Case Study

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History: Jane Wheels

Jane Wheels is a 24-year-old married female who presents to her nurse practitioner reporting lower abdominal pain, cramping, slight fever, and dysuria of four days duration.

- 24-year-old G1P1, LMP two weeks ago (regular without dysmenorrhea).
- She uses oral contraceptives (for two years).
- She reports a gradual onset of symptoms of lower bilateral abdominal discomfort, dysuria (no gross hematuria), abdominal cramping, and a slight low-grade fever in the evenings for four days. Discomfort has gradually worsened.
- Denies GI disturbances or constipation. Denies vaginal discharge. Took acetaminophen for fever (three doses).
- Jane states that she is happily married in a mutually monogamous relationship and plans another pregnancy in about six months. Husband does not use condoms. Reports that they engage in vaginal sexual intercourse approximately two times per week—no oral or rectal sex.
- Cooperative and good historian. Non-smoker, exercises regularly, no appetite changes, no travel outside the U.S., and no history of STDs. Reports occasional yeast infections. Douches regularly after menses and intercourse. Reports douching last this morning.

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Physical Exam

- Vital signs: blood pressure 104/72, pulse 84, temperature 38°C, weight 132 lbs.
- Neck, chest, breast, heart, and musculoskeletal exam within normal limits. No flank pain on percussion. No CVA tenderness.
- On abdominal exam the patient reports tenderness in the lower quadrants with light palpation. Several small inguinal nodes palpated bilaterally.
- Normal external genitalia without lesions or discharge.
- Speculum exam reveals minimal vaginal discharge with a small amount of visible cervical mucopus.
- Bimanual exam reveals uterine and adnexal tenderness, as well as pain with cervical motion. Uterus anterior, midline, smooth and not enlarged.

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Questions

1. What should be included in the differential diagnosis?

Correct responses include the following:

- Urinary tract infection (UTI) – Dysuria and lower abdominal tenderness can be consistent with a UTI.

- Vaginitis – Ms. Wheels’ history of douching this morning could account for the minimal vaginal discharge noted on exam, so vaginitis cannot be ruled out.
- Pelvic inflammatory disease (PID) – CDC’s minimal criteria for a presumptive diagnosis of PID (uterine or adnexal or cervical motion tenderness) have been met, and thus PID should be considered in this case.
- Pregnancy – Pregnancy or ectopic pregnancy should be ruled out in any woman of reproductive age with Ms. Wheels’ symptoms.

2. Which laboratory tests should be performed or ordered?

Correct responses include the following:

- Vaginal saline wet mount with pH – This would assist in diagnosing vaginitis, which may not be obvious given her douching history. Also, the presence of WBCs on saline microscopy increases the specificity of PID diagnosis, and the absence of WBCs on saline microscopy increases the likelihood that PID is not the correct diagnosis.
- Nucleic acid amplification test (NAAT) for gonorrhea – This would be appropriate given the presumptive diagnosis of PID.
- Urine analysis and culture – This would be appropriate given the history of dysuria and lower abdominal tenderness.
- Nucleic acid amplification test (NAAT) for chlamydia – A sensitive NAAT would be the first choice for diagnosing chlamydia.
- CBC with sedimentation rate and C-reactive protein – An elevated erythrocyte sedimentation rate and elevated C-reactive protein increases the specificity of PID diagnosis. However, these tests may not be indicated, may not be available, or may be too expensive.
- Pregnancy test – A sensitive pregnancy test to rule out ectopic pregnancy is necessary.

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Laboratory

Results of office diagnostics:

- Urine pregnancy test: negative
- Urine dip stick for nitrates: negative
- Vaginal saline wet mount: vaginal pH was 4.5. Microscopy showed WBCs >10 per HPF, no clue cells, no trichomonads, and the KOH wet mount was negative for budding yeast and hyphae.

3. What is the presumptive diagnosis?

This patient meets the minimum criteria for a presumptive diagnosis of PID. The presence of WBCs on the saline microscopy increases the specificity of that diagnosis. Minimum criteria, in the absence of a competing diagnosis, justify presumptive treatment.

4. How should this patient be managed?

As Ms. Wheels meets the minimum criteria for PID in the absence of a competing diagnosis, presumptive treatment is warranted. Given the clinical presentation of the patient, it is reasonable to consider oral/intramuscular outpatient treatment for PID and she should return for follow-up in 48–72 hours.

5. What is an appropriate CDC-recommended therapeutic regimen for Ms. Wheels?

Correct responses include the following:

- Ceftriaxone 250 mg Intramuscularly once, plus doxycycline 100 mg orally twice a day for 14 days, with or without metronidazole 500mg orally twice a day for 14 days
- Cefoxitin 2 g intramuscularly, plus probenecid 1 g orally, plus doxycycline 100 mg orally twice a day for 14 days, with or without metronidazole 500mg orally twice a day for 14 days
- Other parenteral third-generation cephalosporin (e.g. ceftizoxime or cefotaxime), plus doxycycline 100 mg twice a day for 14 days, with or without metronidazole 500 mg orally twice a day for 14 days

The chosen regimen should cover the polymicrobial nature of PID (gonorrhea, chlamydia, and anaerobes), as the etiologic agent is often unknown at the time of treatment initiation. The results of the cervical NAATs or cultures are not always predictive of the organisms implicated in upper genital tract disease. The organisms involved in bacterial vaginosis play a role in some cases of PID as well.

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Partner Management

Sex partner: Joseph (spouse)

First sexual exposure: 4 years ago

Last sexual exposure: 1 week ago

Frequency: 2 times per week (vaginal only)

6. How should Joseph be managed?

Joseph should be evaluated and treated for gonorrhea and chlamydia. Male sex partners of women with PID should be examined and treated if they had sexual contact with the patient during the 60 days preceding the onset of symptoms in the patient. If a patient's last sexual intercourse was >60 days before onset of symptoms or diagnosis, the patient's most recent partner should be treated. Partner evaluation and treatment are imperative because of the risk for reinfection and the strong likelihood of gonococcal or chlamydial infection in the sex partner.

Male partners of women who have PID caused by *C. trachomatis* and/or *N. gonorrhoeae* are often asymptomatic. Therefore, sex partners should be treated

empirically with regimens effective against both of these infections, regardless of the apparent etiology of PID or pathogens isolated from the infected woman.

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Follow-Up

On follow-up three days later, Jane had improved clinically. The nucleic acid amplification test (NAAT) for gonorrhea was positive. The NAAT for chlamydia was negative.

Joseph came in with Jane at follow-up. He was asymptomatic but did admit to a "one-night stand" while traveling. He was treated. They were offered HIV testing which they accepted.

7. Who is responsible for reporting this case to the local health department?

Laws and regulations in all states require that persons with gonorrhea or chlamydia be reported to public health authorities by clinicians, laboratories, or both. Check with your state or local health department for reporting requirements in your area.

8. What are appropriate prevention counseling recommendations for this patient?

Correct responses include the following:

- A history of PID increases the risk for developing a future episode of PID.
- Patients should abstain from intercourse until therapy is completed and until they and their sex partners no longer have symptoms.
- Latex condoms, when used correctly and consistently, can reduce the risk of transmission of chlamydia and gonorrhea.
- Sexually-active women 25 years of age and younger should be screened annually for chlamydia.
- Douching increases the risk of PID because it contributes to vaginal flora changes, epithelial damage, and disruption of the cervical mucous barrier.
- Discuss individual risk reduction strategies, including monogamy with an uninfected partner and correct and consistent use of condoms.

TEST QUESTIONS

1. In the United States the number of overall hospitalized cases of PID is decreasing. What is the most likely reason for this decrease?
 - a. Decrease in reporting of PID
 - b. Increase in prevention messages
 - c. **Increase in outpatient treatment of PID**
 - d. Decreased incidence of STDs
2. PID is associated with ascending spread of microorganisms to the upper genital tract. The fate of these organisms depends on all of the following factors **except**:
 - a. Pathogenicity of organisms
 - b. Host defense mechanisms
 - c. **Length of vagina**
 - d. Viability of organisms
3. All of the following are risk factors associated with PID **except**:
 - a. Adolescence
 - b. **Number of past pregnancies**
 - c. Douching
 - d. History of having an STD
4. Douching increases the risk of PID by all of the following mechanisms **except**:
 - a. Vaginal flora changes
 - b. **Cervical ectopy**
 - c. Epithelial damage
 - d. Disruption of cervical mucous barrier
5. The most common etiologic agent associated with PID is:
 - a. *N. gonorrhoeae*
 - b. *C. trachomatis*
 - c. Mycoplasma
 - d. **PID is usually polymicrobial**
6. The most common clinical presentation of PID is:
 - a. Severe pain
 - b. **No pain**
 - c. Profuse vaginal discharge
 - d. Fever, chills, and cramping
7. All of the following are potential sequelae of untreated PID **except**:
 - a. Ectopic pregnancy
 - b. Tubal infertility
 - c. Chronic pelvic pain

- d. **Decreased ovulation**
8. The majority of cases of PID are:
- Symptomatic with moderate symptomatology
 - Symptomatic with severe symptomatology
 - Caused by a single organism
 - Subclinical or asymptomatic**
9. What is the most sensitive sign of upper genital tract infection?
- Cervical motion tenderness
 - Abdominal pain
 - Fever
 - Adnexal tenderness**
10. Which of the following statements about PID is true?
- It is a preventable cause of tubal factor infertility.**
 - It is an infection of the lower reproductive tract.
 - Clinicians should “under diagnose” rather than “over diagnose” PID.
 - Diagnosis of PID always requires hospitalization.
11. CDC-recommended criteria for hospitalization of women with PID include all of the following except:
- Non-response to therapy
 - Adolescence**
 - Tubo-ovarian abscess
 - Pregnancy
12. CDC recommends empiric treatment for PID if which of these criteria are present?
- Bloody discharge and fever
 - Uterine or adnexal tenderness or cervical motion tenderness**
 - Fever and supra pubic pain
 - WBCs and clue cells on wet prep examination
13. The CDC recommendation for parenteral treatment of PID includes a cephalosporin plus which of the following?
- Clindamycin
 - Metronidazole
 - Doxycycline**
 - Ofloxacin
14. Which of the following is included in the CDC-recommended oral treatment regimens for PID?
- Azithromycin 500 mg once
 - Doxycycline 100 mg two times a day for 10 days
 - Doxycycline 100 mg two times a day for 14 days**

- d. Metronidazole 2 g once
15. After completion of parenteral therapy for PID, one should continue oral therapy to complete a total of _____ days of therapy?
- a. 7
 - b. **14**
 - c. 21
 - d. 28
16. PID prevention strategies include which of the following?
- a. Chlamydia screening of all sexually active women ages 25 and under on an annual basis
 - b. Screening and treating women with bacterial vaginosis prior to surgical abortion or hysterectomy
 - c. Encouraging abstinence, monogamy with an uninfected partner, condom use, and limiting number of sex partners
 - d. **A and C**
17. Patient education regarding PID should include which of the following messages?
- a. PID may be silent or have moderate to severe symptoms.
 - b. Consequences of PID may include ectopic pregnancy, infertility, and pelvic pain.
 - c. Having a history of PID increases the risk for a subsequent episode of PID.
 - d. **All of the above.**
18. Management of sex partners of women with PID includes which of the following strategies?
- a. **Partners should be examined and treated if they had sexual contact with the patient during the 60 days preceding onset of her symptoms.**
 - b. Only partners who are symptomatic and who are current partners should be treated.
 - c. Partners do not need to be treated if they were not the last reported sex partner of the patient.
 - d. All partners should be treated for chlamydia only.
19. Which of the following statements is true?
- a. PID reporting is mandated in all states.
 - b. Routine screening for *C. trachomatis* is not recommended.
 - c. **Latex condoms can reduce the risk of transmission of gonorrhea and chlamydia.**
 - d. The sequelae of PID may include chronic neurologic symptoms.

RESOURCES

Publications

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17. Weinstock H, Berman S, Cates W Jr. Sexually transmitted diseases among American youth: incidence and prevalence estimates, 2000. *Persp Sex Reprod Hlth* 2004; 36 (1): 6-10.

Websites and Other Resources

1. CDC, Division of STD Prevention: www.cdc.gov/std
2. National Network of STD/HIV Prevention Training Centers: www.nnptc.org
3. 2010 CDC STD Treatment Guidelines (including e-book for iPad, iPhone, iPod Touch): www.cdc.gov/std/treatment/2010/
4. STD information and referrals to STD clinics
CDC-INFO
1-800-CDC-INFO (800-232-4636)
TTY: 1-888-232-6348
In English, en Español
5. CDC National Prevention Information Network (NPIN): www.cdcpin.org
6. American Sexual Health Association (ASHA): www.ashastd.org