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Gonorrhea Curriculum

Gonorrhea

Neisseria gonorrhoeae

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Gonorrhea Curriculum

Learning Objectives

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

1. Describe the epidemiology of gonorrhea in the U.S.
2. Describe the pathogenesis of *Neisseria gonorrhoeae*.
3. Discuss the clinical manifestations of gonorrhea.
4. Identify common methods used in the diagnosis of gonorrhea.
5. List CDC-recommended treatment regimens for gonorrhea.
6. Summarize appropriate prevention counseling messages for patients with gonorrhea.
7. Describe public health measures for the prevention of gonorrhea.

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Gonorrhea Curriculum

Lessons

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

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

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Gonorrhea Curriculum Epidemiology

Incidence and Prevalence

- Significant public health problem in U.S.
- Number of reported cases underestimates incidence
- Incidence remains high in some groups defined by geography, age, race/ethnicity, or sexual risk behavior
- Increasing proportion of gonococcal infections caused by resistant organisms

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Gonorrhea — Rates: United States, 1941–2006 and the Healthy People 2010 target

Rate (per 100,000 population)

Year	Gonorrhea Rate (per 100,000 population)
1941	100
1945	250
1951	150
1955	120
1961	150
1965	200
1971	350
1975	450
1981	400
1985	350
1991	250
1995	150
2001	100
2006	100

Note: The Healthy People 2010 target for gonorrhea is 19.0 cases per 100,000 population.

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Gonorrhea Curriculum Epidemiology

Transmission

- Efficiently transmitted by:
 - Male to female via semen
 - Female to male urethra
 - Rectal intercourse
 - Fellatio (pharyngeal infection)
 - Perinatal transmission (mother to infant)
- Gonorrhea associated with increased transmission of and susceptibility to HIV infection

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Lesson II: Pathogenesis

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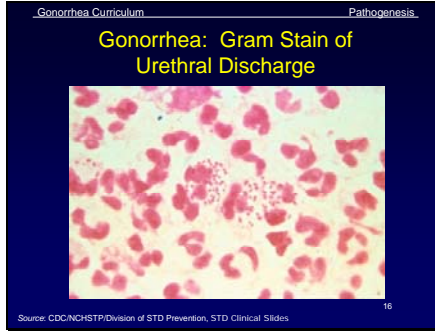
Gonorrhea Curriculum Pathogenesis

Microbiology/Pathology

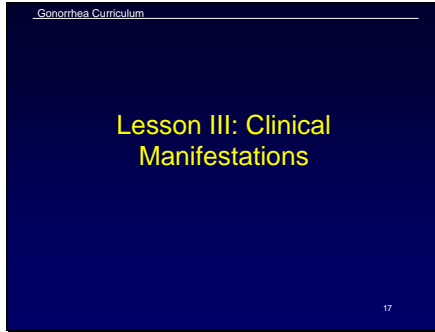
- Etiologic agent: *Neisseria gonorrhoeae*
- Gram-negative intracellular diplococcus
- Infects mucus-secreting epithelial cells
- Evades host response through alteration of surface structures

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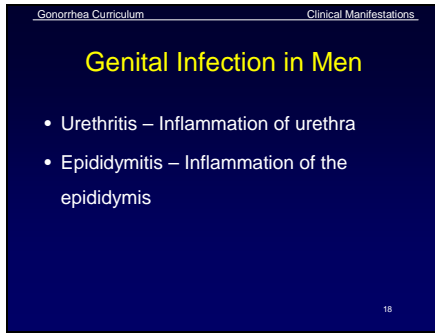
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Gonorrhea Curriculum Clinical Manifestations

Male Urethritis

- Symptoms
 - Typically purulent or mucopurulent urethral discharge
 - Often accompanied by dysuria
 - Discharge may be clear or cloudy
- Asymptomatic in 10% of cases
- Incubation period: usually 1-14 days for symptomatic disease, but may be longer

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Gonorrhea Curriculum Clinical Manifestations

Gonococcal Urethritis: Purulent Discharge



Source: Seattle STD/HIV Prevention Training Center at the University of Washington; Connie Celum and Walter Stamm

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Gonorrhea Curriculum Clinical Manifestations

Epididymitis

- Symptoms: unilateral testicular pain and swelling
- Infrequent, but most common local complication in males
- Usually associated with overt or subclinical urethritis

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Gonorrhea Curriculum Clinical Manifestations

Swollen or Tender Testicles (Epididymitis)



Source: Seattle STD/HIV Prevention Training Center at the University of Washington

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Gonorrhea Curriculum Clinical Manifestations

Genital Infection in Women

- Most infections are asymptomatic
- Cervicitis – inflammation of the cervix
- Urethritis – inflammation of the urethra

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Gonorrhea Curriculum Clinical Manifestations

Cervicitis

- Non-specific symptoms: abnormal vaginal discharge, intermenstrual bleeding, dysuria, lower abdominal pain, or dyspareunia
- Clinical findings: mucopurulent or purulent cervical discharge, easily induced cervical bleeding
- 50% of women with clinical cervicitis have no symptoms
- Incubation period unclear, but symptoms may occur within 10 days of infection

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Gonorrhea Curriculum Clinical Manifestations

Gonococcal Cervicitis



Source: CDC/NCHSTP/Division of STD Prevention, STD Clinical Slides 25

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Gonorrhea Curriculum Clinical Manifestations

Urethritis

- Symptoms: dysuria, however, most women are asymptomatic
- 40%-60% of women with cervical gonococcal infection may have urethral infection

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Gonorrhea Curriculum Clinical Manifestations

Complications in Women


- Accessory gland infection
 - Bartholin's glands
 - Skene's glands
- Pelvic Inflammatory Disease (PID)
 - May be asymptomatic
 - May present with lower abdominal pain, discharge, dyspareunia, irregular menstrual bleeding and fever
- Fitz-Hugh-Curtis Syndrome
 - Perihepatitis

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Gonorrhea Curriculum Clinical Manifestations

Bartholin's Abscess



Source: CDC/NCHSTP/Division of STD Prevention, STD Clinical Slides

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Gonorrhea Curriculum Clinical Manifestations

Syndromes in Men and Women

- **Anorectal infection**
 - Usually acquired by anal intercourse
 - Usually asymptomatic
 - Symptoms: anal irritation, painful defecation, constipation, scant rectal bleeding, painless mucopurulent discharge, tenesmus, and anal pruritus
 - Evaluate utilizing an anoscopic examination
 - Signs: mucosa may appear normal, or purulent discharge, erythema, or easily induced bleeding may be observed with anoscopic exam
- **Pharyngeal infection**
 - May be sole site of infection if oral-genital contact is the only exposure
 - Most often asymptomatic, but symptoms, if present, may include pharyngitis, tonsillitis, fever and cervical adenitis

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Gonorrhea Curriculum Clinical Manifestations

Syndromes in Men and Women (continued)


- **Conjunctivitis**
 - Usually autoinoculation in adults
 - Symptoms/signs: eye irritation with purulent conjunctival exudate
- **Disseminated gonococcal infection (DGI)**
 - Systemic gonococcal infection
 - Occurs infrequently. More common in women than in men
 - Associated with gonococcal strain that produce bacteremia without associated urogenital symptoms
 - Clinical manifestations: skin lesions, arthralgias, tenosynovitis, arthritis, hepatitis, myocarditis, endocarditis, meningitis

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Gonorrhea Curriculum Clinical Manifestations

Gonococcal Ophthalmia



Source: CDC/NCHSTP/Division of STD Prevention, STD Clinical Slides 31

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Gonorrhea Curriculum Clinical Manifestations

Disseminated Gonorrhea— Skin Lesion



Source: CDC/NCHSTP/Division of STD Prevention, STD Clinical Slides 32

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Gonorrhea Curriculum Clinical Manifestations

Gonorrhea Infection in Children

- Perinatal: infections of the conjunctiva, pharynx, respiratory tract
- Older children (>1 year): considered possible evidence of sexual abuse
- Vulvovaginitis, not cervicitis, in prepubescent girls
- Anorectum or pharynx more commonly infected in boys than urethra

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Lesson IV: Diagnosis

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Diagnosis

Diagnostic Methods

- Culture tests
 - Advantages: low cost, suitable for a variety of specimen sites, antimicrobial susceptibility can be performed
 - Anatomic sites to test: in response to complaints or clinical findings and exposure history in persons at significant risk of gonococcal infection.
 - In men: urethra in all men; pharynx and rectum depending on symptoms and exposure history
 - In women: cervix should be tested; pharynx and rectum depending on symptoms and exposure history; vagina may be tested if cervix is absent; Bartholin's or Skene's glands may be cultured if overt exudate is expressed

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Diagnosis

Diagnostic Methods (continued)

- Non-culture tests
 - Amplified tests (NAATs)
 - Polymerase chain reaction (PCR) (Roche Amplicor)
 - Transcription-mediated amplification (TMA) (Gen-Probe Aptima)
 - Strand displacement amplification (SDA) (Becton-Dickinson BD ProbeTec ET)
 - Non-amplified tests
 - DNA probe (Gen-Probe PACE 2, Digene Hybrid Capture II)
 - Gram stain

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Clinical Considerations

- In cases of suspected sexual abuse
 - Legal standard is **culture with multiple tests** to confirm the identity of *Neisseria gonorrhoeae*

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Lesson V: Patient Management

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Antimicrobial Susceptibility of *N. gonorrhoeae*

- Quinolone resistance is increasing
- Approximately 20% of isolates are resistance to penicillin or tetracycline or both
- Approximately 3% of isolates show decreased susceptibility to azithromycin
- Sporadic cases of decreased susceptibility to ceftriaxone, cefixime, and spectinomycin have been reported

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Treatment for Uncomplicated Infections of the Cervix, Urethra, and Rectum

Ceftriaxone	125mg	IM	Once	or
Cefixime	400mg	Orally	Once	or

* Contraindicated in pregnancy and children. Not recommended for infections acquired in California, Asia, or the Pacific, including Hawaii.

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Co-treatment for *Chlamydia trachomatis*

If chlamydial infection is not ruled out:

Azithromycin	1 g	Orally	Once	or
Doxycycline	100 mg	Orally	Twice a day for 7 days	

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Special Considerations: Pregnancy

- Treat with alternate cephalosporin
- If cephalosporin is not tolerated, treat with azithromycin 2 g orally or spectinomycin 2 g IM (if available)
- Pregnant women should NOT be treated with quinolones or tetracyclines

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Penicillin-Allergic

- Azithromycin 2 g orally
- Desensitization
- Spectinomycin 2 g in a single IM dose

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Follow-Up

- A test of cure is not recommended if a recommended regimen is administered
- If symptoms persist, perform culture for *N. gonorrhoeae*
 - Any gonococci isolated should be tested for antimicrobial susceptibility.
- Repeat testing in 3 months

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Lesson VI: Prevention

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Gonorrhea Curriculum Prevention

Screening

- **Pregnancy:**
 - A test for *N. gonorrhoeae* should be performed at the first prenatal visit for women at risk or those living in an area in which the prevalence of *N. gonorrhoeae* is high
 - Repeat test during the 3rd trimester for those at continued risk.
- **At-risk men who have sex with men:** CDC recommends screening of at-risk at least annually for urethral and rectal gonorrhea and chlamydia, and for pharyngeal gonorrhea.
- **U.S. Preventive Service Task Force** recommends screening all sexually active women, for gonorrhea infection if they are at increased risk of infection. Other populations can be screened based on local disease prevalence and patient's risk behaviors.

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Gonorrhea Curriculum Prevention

Partner Management

- Evaluate and treat all sex partners for *N. gonorrhoeae* and *C. trachomatis* infections if contact was within 60 days of symptoms or diagnosis.
- 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.
- Avoid sexual intercourse until therapy is completed and both partners no longer have symptoms.

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Reporting

- Laws and regulations in all states require that persons diagnosed with gonorrhea are reported to public health authorities by clinicians, labs, or both.

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Patient Counseling/Education

- Nature of disease
 - Usually symptomatic in males and asymptomatic in females
 - Untreated infections can result in PID, infertility, and ectopic pregnancy in women and epididymitis in men
- Transmission issues
 - Efficiently transmitted
- Risk reduction
 - Utilize prevention strategies

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Case Study

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Gonorrhea Curriculum Case Study



History: Robert Forbes

- 33-year-old male who presents to his doctor reporting a purulent urethral discharge and dysuria for 3 days
- Lives in Dallas with history of travel to Las Vegas 3 weeks ago
- New female sex partner (Laura) for 2 months. They have unprotected vaginal intercourse 4 times/week, the last time being 2 days ago. No oral or rectal sex.
- Also had a one-time sexual encounter with a woman he met in Las Vegas 3 weeks ago (Monica). They had oral and vaginal sex. No condoms used.
- No history of urethral discharge or STDs, no sore throat or rectal discomfort. Negative HIV test 1 year ago.

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Gonorrhea Curriculum Case Study

Physical Exam

- Vital signs: blood pressure 98/72, pulse 68, respiration 14, temperature 37.2° C
- Cooperative, good historian
- Chest, heart, musculoskeletal, and abdominal exams within normal limits
- No flank pain on percussion, normal rectal exam, no sores or rashes
- The genital exam reveals a reddened urethral meatus with a purulent discharge, without lesions or lymphadenopathy.

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Gonorrhea Curriculum Case Study

Questions

1. What should be included in the differential diagnosis?
2. Which laboratory tests are appropriate to order or perform?
3. What is the appropriate treatment regimen?

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Gonorrhea Curriculum Case Study

Laboratory

Results of laboratory tests:

- Urethral and pharyngeal culture: showed growth of a Gram-negative diplococcus that was oxidase-positive. Biochemical and FA conjugate testing confirmed this isolate to be *N. gonorrhoeae*.
- NAAT for chlamydia: negative
- RPR: nonreactive
- HIV antibody test: negative

- 4) What is the diagnosis based on all available information?
- 5) Who is responsible for reporting this case to the local health department?

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Gonorrhea Curriculum Case Study

Partner Management

Robert's sex partners within the past 3 months:

- Laura: Last exposure - Unprotected vaginal sex 2 days ago
- Monica: Last exposure - Unprotected oral (Monica performed fellatio) and vaginal sex 3 weeks ago while he was in Las Vegas
- Jerilyn: Last exposure - Unprotected vaginal sex 3 months ago

6) Laura was examined and her lab results came back negative for gonorrhea and chlamydia. How should Laura be managed?

7) What tests should Jerilyn and Monica have?

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Follow-Up

Robert returns 4 months later for an employer-sponsored flu shot. He took his medications as directed, is asymptomatic, and has had no sex partners since his office visit to you.

8) Does Robert need repeat testing for gonorrhea?

9) What are appropriate prevention counseling messages for Robert?

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