Gonorrhea infection

The right clinical information, right where it's needed
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summary</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Basics</strong></td>
<td>4</td>
</tr>
<tr>
<td>Definition</td>
<td>4</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>4</td>
</tr>
<tr>
<td>Etiology</td>
<td>4</td>
</tr>
<tr>
<td>Pathophysiology</td>
<td>5</td>
</tr>
<tr>
<td><strong>Prevention</strong></td>
<td>6</td>
</tr>
<tr>
<td>Primary prevention</td>
<td>6</td>
</tr>
<tr>
<td>Screening</td>
<td>6</td>
</tr>
<tr>
<td>Secondary prevention</td>
<td>7</td>
</tr>
<tr>
<td><strong>Diagnosis</strong></td>
<td>8</td>
</tr>
<tr>
<td>Case history</td>
<td>8</td>
</tr>
<tr>
<td>Step-by-step diagnostic approach</td>
<td>8</td>
</tr>
<tr>
<td>Risk factors</td>
<td>13</td>
</tr>
<tr>
<td>History &amp; examination factors</td>
<td>15</td>
</tr>
<tr>
<td>Diagnostic tests</td>
<td>18</td>
</tr>
<tr>
<td>Differential diagnosis</td>
<td>20</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>22</td>
</tr>
<tr>
<td>Step-by-step treatment approach</td>
<td>22</td>
</tr>
<tr>
<td>Treatment details overview</td>
<td>25</td>
</tr>
<tr>
<td>Treatment options</td>
<td>28</td>
</tr>
<tr>
<td>Emerging</td>
<td>44</td>
</tr>
<tr>
<td><strong>Follow up</strong></td>
<td>45</td>
</tr>
<tr>
<td>Recommendations</td>
<td>45</td>
</tr>
<tr>
<td>Complications</td>
<td>45</td>
</tr>
<tr>
<td>Prognosis</td>
<td>46</td>
</tr>
<tr>
<td><strong>Guidelines</strong></td>
<td>47</td>
</tr>
<tr>
<td>Diagnostic guidelines</td>
<td>47</td>
</tr>
<tr>
<td>Treatment guidelines</td>
<td>47</td>
</tr>
<tr>
<td><strong>Online resources</strong></td>
<td>49</td>
</tr>
<tr>
<td><strong>References</strong></td>
<td>50</td>
</tr>
<tr>
<td><strong>Images</strong></td>
<td>57</td>
</tr>
<tr>
<td><strong>Disclaimer</strong></td>
<td>65</td>
</tr>
</tbody>
</table>
A common STI caused by Neisseria gonorrhoeae, a gram-negative diplococcus bacterium that is closely related to other human Neisseria species.

Men typically present with a urethral discharge; women are often asymptomatic, but may have vaginal discharge.

Risk factors include multiple sexual partners in recent months, known partner with gonorrhea, drug use, prior STI, and men who have sex with men.

If left untreated, N gonorrhoeae can disseminate to areas of the body to cause skin and synovial infections; rarer complications include meningitis, endocarditis, and perihepatic abscesses.

High rates of antimicrobial resistance have been reported, and antibiotic treatment should be guided by local and national guidelines. The main treatment for uncomplicated gonorrhea is dual therapy with single-dose intramuscular ceftriaxone plus single-dose oral azithromycin.

The treatment of N gonorrhoeae is important in the prevention of infertility, chronic pelvic pain, and ectopic pregnancy in women.

If acquired congenitally from an infected mother, the neonate can present with ophthalmia neonatorum, which left untreated can cause blindness.
**Definition**

*Neisseria gonorrhoeae* is a gram-negative diplococcus bacterium that is closely related to other human Neisseria species.[1] Gonorrhea is any manifestation of infection by *N gonorrhoeae*. Aside from causing infection in the lower genital tract, it can also cause conjunctivitis and severe disseminated infections especially if acquired congenitally. The pathogen is almost exclusively sexually transmitted and can be found in the genital tract, pharynx, and rectum.

[Fig-1]

**Epidemiology**

Gonorrhea is the second most commonly reported communicable disease in the US, and the number of cases is increasing annually.[3] Between 2013 and 2017, there was a 67% increase in reported gonorrhea cases.[3] In 2017, the gonorrhea rate in the US was 171.9 cases per 100,000.[3] The lowest rate of gonorrhea in the US was recorded in 2009 (98.1 cases per 100,000); since then gonorrhea rates have had sustained increases.[3] The southern US continues to have the highest rates in the country. Rates continue to be highest among certain groups, such as men who have sex with men, and black people. Rates also continue to be higher in men than in women. The highest rates in women are seen in the 15 to 24 years age group. The highest rates in men are seen in the 20 to 29 years age group.

High rates of antimicrobial resistance to penicillin, tetracycline, and quinolones have been reported from the Gonococcal Isolate Surveillance Project (GISP), and there is concern about the potential of reduced susceptibility to extended-spectrum cephalosporins and macrolides.[4] Rare isolates have also been found with reduced susceptibility to cephalosporins and azithromycin, which has led to increased vigilance for antimicrobial resistance and updated treatment guidance.

**Etiology**

Sexual contact without a condom is a primary cause for acquisition of gonorrhea in sexually active adults and adolescents. This may include any penetrative sex (usually referring to a penis) that involves a mucosa-lined orifice (oropharynx, vagina, and anus).[5] [6] [7] [8] The transmission probability for a single unprotected heterosexual contact is estimated to be around 58% for male to female and 23% for female to male transmission.[9] [10]

Gonococcal infection among infants usually results from exposure to infected cervical exudates at birth. It presents as an acute illness 2 to 5 days after birth. The most severe manifestations are ophthalmia neonatorum and sepsis, which can include arthritis and meningitis. Less severe manifestations include rhinitis, vaginitis, urethritis, and reinfection at a site of fetal monitoring. Ophthalmia neonatorum, if left untreated, can lead to severe eye complications or disseminated infection.

Concomitant gonococcal infection increases the risk of sexually transmitted HIV as suggested by increased seminal HIV viral load in urethritis, and a doubling of relative risk has been suggested.[11] [12]

*Neisseria gonorrhoeae* does not survive long outside of a human and therefore sexual abuse must be strongly suspected in any child with gonorrhea.[13] [14]
Pathophysiology

*Neisseria gonorrhoeae* has an affinity for human mucosal epithelium that is mediated by outer membrane proteins.\(^{[15]}\) *N. gonorrhoeae* can elude the immune system by changing the outer membrane antigens through genomic plasticity related to DNA mutation or recombination with related species.\(^{[16]}\) Of special importance, chromosomal DNA changes and plasmid transfer have mediated resistance to many common antibiotics.\(^{[17]}\) Humans are the only known host.

Experimental inoculation of the male urethra has resulted in infection from an inoculum of 250 bacterial cells.\(^{[18]}\) The incubation period for symptomatic urethritis depends on the inoculum dose, but the median time has been reported as 3.4 days. The first symptom in men is dysuria before or concomitant with discharge.\(^{[19]}\) Although not well studied, detection of *N. gonorrhoeae* may be possible even after the first day of infection especially with sensitive nucleic acid amplification tests (NAATs). Asymptomatic infection occurs in <15% of male urethral infections and closer to 60% of female cervical infections.\(^{[20]}\) Duration of infection may be as long as 6 months if untreated, but this has not been well characterized. Repeated exposure to *N. gonorrhoeae* may result in reinfection.\(^{[21]}\) Unlike with HIV, circumcision has no impact on the transmission of gonorrhea.\(^{[22]}\)

Local genital structures such as the Mullerian glands and Cowper glands can rarely be infected. Ascending infection with *N. gonorrhoeae* along anatomically contiguous routes can lead to male complications of prostatitis, epididymitis, or orchitis (unilateral disease most common). In women, ascending infection can lead to pelvic inflammatory disease (endometritis, salpingitis, tubo-ovarian abscesses) and rarely peritoneal spread including perihepatic abscesses (Fitz-Hugh-Curtis syndrome). Unilateral or bilateral gonococcal conjunctivitis is possible in those exposed to infected secretions. In approximately 0.1% to 0.3% of cases more virulent strains of *N. gonorrhoeae* may be invasive and hematogenously spread to cause septic arthritis, meningitis, endocarditis, and osteomyelitis.\(^{[23]}\)
Primary prevention

Primary prevention measures include encouraging the delay of first sexual activity, promoting monogamy (or at least a reduction in the number of partners), and using condoms during any penetrative sex. Many behavioral modification methods, particularly high-intensity counseling on sexual risk reduction, have been shown to reduce risk behaviors that lead to sexually transmitted infections,[35] but the problem is how to deliver counseling interventions in a time-constrained environment. In general, the approach should be nonjudgmental and person-centered. Following a risk history, the discussion should focus on sexual risk behaviors to clarify misconceptions, review successes and failures of previous attempts to change behavior, and set concrete goals for the future.[36] It is important to note that spermicides and nonbarrier forms of contraception do not prevent gonorrhea or other STIs.

The US Preventive Services Task Force and Centers for Disease Control and Prevention recommend prophylactic ocular topical medication for all newborns to prevent gonococcal ophthalmia neonatorum.[23][37]

There are no vaccines available for gonorrhea. However, a retrospective case-control study involving adults ages 15 to 30 years in New Zealand found that outer membrane vesicle meningococcal B vaccine (MeNZB) has a protective effect against gonorrhea.[38] Further studies are required to verify these findings.

Screening

Women

The US Preventive Services Task Force (USPSTF) recommends that all sexually active women under the age of 25 years should be screened for gonorrhea, and the Centers for Disease Control and Prevention (CDC) recommends that this should be carried out annually.[60][61] Women who are 25 years or older should be screened if they have an increased risk for infection.[62] This includes women from a high-morbidity community (as defined by an increased prevalence) or those with individual risk factors (such as multiple recent sex partners, a history of an STI, a partner with an STI), and those connected to networks with the incarcerated, to the commercial sex trade, or to drug use. Low-risk asymptomatic women should not be screened. All pregnant women aged under 25 years and older pregnant women with risk factors for infection should be screened at the first prenatal visit.[61]

Men

The USPSTF cites insufficient evidence to support for or against routine screening in men at increased risk.[62] The CDC recommends that sexually active men having sex with men should have annual screening for gonorrhea at any site where exposure has occurred in the past year (urine, rectum, and throat), preferably by nucleic acid amplification test (NAAT).[23] Those at highest risk with multiple partners, anonymous partners, and associated drug use (such as methamphetamine or other club-related drugs) should be screened more frequently, up to every 3 to 6 months.[23] Low-risk asymptomatic men should not be screened.

Men or women with recent STI

The CDC recommends that people with gonorrhea be retested 3 months after treatment for recurrence of gonorrhea or, if this is not possible, whenever they next present for care after that in the first year.[23]

Pregnant women

The USPSTF and CDC recommend screening pregnant women who are at risk for gonorrhea (as listed in the section on screening in women).[23][62] The CDC also recommends retesting pregnant women during the third trimester if they remain at high risk for gonococcal infection.[23]
Secondary prevention

Treatment of gonorrhea is also a means of secondary prevention to interrupt transmission within the community. To this end gonorrhea is a reportable disease to the local public health authority. For the health provider, partner management is an important aspect of treating the patient to prevent reinfection. Partners should be sought from the last 60 days or the last partner before 60 days if no recent partners are reported.[23] If possible the partner should be engaged for counseling and testing or, at the very least, the patient should be told to refer his/her partners to medical care. Use of electronic partner notification is another option in some jurisdictions; however, uptake by index cases is low and evidence for proper evaluation of partners is lacking.[79]

Partners of patients with documented *Neisseria gonorrhoeae* infection should be evaluated and treated. To avoid reinfection, sex partners should abstain from sexual intercourse until they and their partner(s) are adequately treated.

Infection in mothers of gonorrhea-infected neonates should be confirmed, and they should be treated as well as their partners.
Case history

Case history #1

A 35-year-old white man presents with a history of unprotected insertive anal sex with 2 male partners and a 3-day history of urethral irritation, dysuria, and purulent discharge at the meatus.

Case history #2

A 24-year-old black woman presents with a history of unprotected vaginal sex with one male partner who told her that he had purulent urethral discharge that was treated as gonorrhea 1 week ago. The woman has had some increased vaginal discharge and pain with intercourse.

Other presentations

Gonorrhea can be symptomatic or asymptomatic at any site where unprotected sex has occurred. Pharyngeal gonorrhea is most often asymptomatic but can cause tonsillitis or pharyngitis. [Fig-2]

Rectal gonorrhea infection can also be asymptomatic or have symptoms of rectal pain and discharge. Although gonococcal urethritis is typically symptomatic, it can also be asymptomatic. Women with cervicitis may have no obvious symptoms or signs such as mucopurulent discharge at the cervical os. Similarly, upper genital tract infections (epididymitis, prostatitis, orchitis, and pelvic inflammatory disease) do not always have overt signs of urethritis or cervicitis. Exposure to infected genital secretions can lead to gonorrhea conjunctivitis that presents with thick white/yellow discharge. [Fig-3]

A more severe and uncommon presentation of gonorrhea is disseminated gonococcal infection (DGI), which results from gonococcal bacteremia. DGI can present with petechial or pustular acral skin lesions, asymmetric arthralgia, tenosynovitis, or septic arthritis. [Fig-4] [Fig-5]

It is occasionally complicated by perihepatitis, endocarditis, meningitis, or myocarditis. Patients with DGI may have no urogenital symptoms.[2]

Step-by-step diagnostic approach

Diagnostic testing for gonorrhea should be considered with any genitourinary symptom in sexually active people: in particular, men who have dysuria, urethral irritation, or urethral discharge, and women with vaginal discharge, pelvic pain or suspected pelvic inflammatory disease (PID), and tubo-ovarian abscess.

History

Eliciting a history of sexual activity and risk factors is important when considering the diagnosis of gonorrhea. A sexual history must be included in any assessment of genitourinary symptoms or for
Gonorrhea infection

Diagnosis

Patients with systemic symptoms that may be uncommon presentations of gonorrhea, such as arthritis, meningitis, or endocarditis. At-risk populations (e.g., women ages 15-24 years, and men ages 20-29 years) can be prompted about sexual history as an important prevention measure for their age group.

Important elements of the sexual history include the 5 Ps:

- Partners (sex of partners, number of partners in prior 2 months/1 year)
- Prevention of pregnancy - trying to conceive or contraceptive use
- Protection from STIs/HIV - what does the patient do to protect him/herself from STIs and HIV?
- Practices or types of sexual activities (oral/vaginal/anal and insertive/receptive), condom use
- Past STIs/HIV - any prior diagnoses of STIs or HIV or viral hepatitis.

In men, the presenting complaint may be a mucopurulent or purulent urethral discharge. However, if this is not present, other symptoms that suggest urethritis are dysuria and urethral pruritus. Urethritis can be asymptomatic. Frequency and urgency are typically absent in urethritis. Symptoms of prostatitis include pain in the lower back and genital area, urinary frequency and urgency (often at night), and burning or painful urination.

In women, signs and symptoms to enquire about are vaginal discharge, pelvic pain, or fever. Women with gonorrhea may have some vaginal discharge, but lack of a discharge does not exclude infection.

Gonorrhea infections in the rectal area are common in men who have sex with men (MSM), but perianal contamination from a cervical infection or a direct infection from anal intercourse can cause anorectal infections in women. Symptoms include anal pruritus and mucopurulent discharge, usually with a bowel movement. Rectal pain, tenesmus, and bleeding are more common in MSM.

To help with treatment planning, patients should be asked about any known allergies to antibiotics, particularly penicillin (immunoglobulin E-mediated), cephalosporins, and azithromycin. An infectious disease specialist should be consulted if there is known antibiotic allergy.

Physical examination

Male genital tract

- Inspection and palpation of the testis, epididymis, and spermatic cord should be performed. The penis shaft, glans, and meatus should also be examined and the presence of discharge assessed.
  A prostate exam is required if symptoms of prostatitis are present.
- A swollen and/or tender testicle (usually one-sided) on palpation may indicate orchitis.
- A swollen and/or tender epididymis on palpation may indicate epididymitis, which occurs in <5% of men with gonorrhea.[39] Unilateral testicular pain (without discharge or dysuria) and fever are also symptoms of epididymitis.[2]

Female genital tract

- The external genitalia (labia and clitoris) should be inspected before speculum exam of the cervix and vagina. It is recommended that lubricant jelly not be used as it can destroy Neisseria gonorrhoeae. Presence of mucopurulent or purulent exudate at the endocervix is looked for.
- PID is the most important complication of gonorrhea in women. It may develop in up to one third of women with gonorrhea, and can lead to long-term sequelae even after resolution of infection.[40] [41] The most common sequelae of PID are chronic pelvic pain (40%), tubal infertility (10.8%), and ectopic pregnancy (9.1%).[42] [43] A bimanual exam for cervical motion tenderness, uterine...
tenderness, and adnexal tenderness is particularly important to assess possible ascending infection resulting in PID. Cervical motion tenderness is assessed using 1 or 2 fingertips to move the cervix and asking the patient if any pain results. Presence of a cervical mass suggests PID.

- Bleeding that occurs with gentle passage of a cotton swab through the cervical os suggests cervical friability and cervicitis.[23]

Extragenital infection

- Rectal gonorrhea may cause mucopurulent discharge from the anus.
- The pharynx is examined for erythema and exudate.
  [Fig-2]
  Anterior cervical lymphadenopathy may also be present.[2]
  - Gonococcal conjunctivitis can present with a thick white/yellow discharge. Examination of the eyes with a slit lamp is recommended so that infection of the cornea can be excluded.

**Suspected disseminated gonococcal infection (DGI)**

DGI occurs when infection with *N gonorrhoeae* is left untreated. It occurs in <3% of gonorrhea infections.[44] Women are thought to be more likely to develop DGI than men, possibly related to menses. It commonly causes skin (75%) and synovium (68%) infections. Fever occurs in 60% of patients with DGI. Rare complications include endocarditis, meningitis, myocarditis, and perihepatic abscesses. Patients with DGI often do not present with urogenital symptoms.

Clinical findings include papules that progress into hemorrhagic pustules, bullae, petechiae, or necrotic lesions on the extremities; slight joint pain; or severe polyarthritis, which if left untreated will develop into septic arthritis.
  [Fig-4]
  [Fig-6]
  [Fig-5]

Commonly affected joints are the wrists, ankles, hands, and feet, and initial joint aspiration may be negative for infection. If septic arthritis develops, the commonly involved joints are elbows, wrists, knees, or ankles. Joint aspiration in this case will detect >40,000 leukocytes per mm³ and contain gram-negative intracellular diplococci. Synovial fluid sent for culture usually comes back negative.[2]

The patient may also present with sepsis. Gonococcal meningitis will present like other bacterial meninges infections with positive Brudzinski and Kernig signs, purpuric rash, seizures, signs of increased cerebrospinal fluid (CSF) pressure (hypertension with bradycardia), and focal cerebral signs. Gonococcal endocarditis can present with systemic manifestations such as fever, cardiac manifestations such as murmurs, and extracardiac manifestations such as embolic events.

**Pediatric gonococcal infection**

Infants

- The most severe manifestations of pediatric gonococcal infection are ophthalmia neonatorum and sepsis, which can include arthritis and meningitis. Less severe manifestations include rhinitis, vaginitis, urethritis, and reinfection at site of fetal monitoring: for example, through scalp electrodes.
• Infants at increased risk for gonococcal ophthalmia neonatorum are those who do not receive ophthalmia prophylaxis and those whose mothers have had no prenatal care, or have a history of STIs or substance abuse.[23] In the US, routine prophylactic eye drops are recommended for all newborns.[37] [45]

Children

• Sexual abuse is the most frequent cause of STIs (including gonococcal infection) in preadolescent children.[14] Anorectal and pharyngeal infection are common and frequently asymptomatic in sexually abused children. Vaginitis is the most common manifestation in preadolescent girls.

Laboratory evaluation: overview

Nucleic acid amplification testing (NAAT), culture, Gram stain, and urinalysis form the mainstay of diagnostic laboratory tests for *N gonorrhoeae*. There is no clinically available serologic test for *N gonorrhoeae*. [46] The order of tests initially depends on patient's sex, whether the patient is symptomatic or asymptomatic, and which site(s) is involved (e.g., genitalia, pharynx, rectum, or conjunctivae).

NAAT is generally available and is recommended as a first-line method of testing for most purposes.[23] [47] The Association of Public Health Laboratories and the Centers for Disease Control and Prevention recommend NAAT for the detection of genital tract gonorrhea infections without routine repeat testing for positive results.[46] [48] NAAT of urine or genital specimens is preferable to culture in most settings because it has better sensitivity.[48] It is also more convenient as samples can be collected by the clinician/healthcare provider or the patient (self-collected).[23] Self-collected specimens sent for NAAT have been found to be noninferior to clinician-collected specimens, although local laboratory validation of this collection method should be conducted.[49] [50] If available through a local laboratory, NAAT can be used for pharyngeal and rectal specimens, but otherwise culture is the only Food and Drug Administration (FDA)-approved method for detection at nongenital sites. Individual laboratories must pursue verification studies and satisfy regulations for Clinical Laboratory Improvement Amendments (CLIA) compliance in order to perform NAAT for nongenital sites; therefore, this option may not be widely available. When considering NAAT screening it is important to adhere to guidelines on risk groups because imperfect specificity allows the possibility of false-positive results. This can result in lower positive predictive values in very low prevalence populations. If there is a positive result in someone with very low suspicion from clinical history, repeat testing with an alternative NAAT or culture would be ideal but should not prevent treatment. This is particularly an issue with nongenital sites because mixed flora and inhibitors that can accompany specimens can further impair the specificity of NAAT for gonorrhea.[46]

Culture has been the definitive diagnostic test and is the only way to assess for antimicrobial sensitivity. Culture is reasonably sensitive and highly specific. It is cheap and suitable for use with different types of specimens, and allows retention of the isolate for additional testing such as for antimicrobial sensitivities. Disadvantages are that the specimen must be transported under conditions that are adequate to maintain the viability of the organisms.[46] Culture also has deficiencies in sensitivity with pharyngeal and rectal anal sites (sensitivity of pharynx culture is around 50%).

Gram stain is used for male urethral discharge only as Gram stain of endocervical, pharyngeal, or rectal specimens is not considered sufficient to detect infection.[23]
Point-of-care tests for gonorrhea have limited sensitivity and are not recommended for routine use.[51] Near point-of-care polymerase chain reaction assays where results are available within one hour can provide faster turnaround and avoid unnecessary treatment.

It is recommended that all patients who are being tested for gonorrhea also be considered for other STI testing including chlamydia, syphilis, and HIV.[23]

**Laboratory evaluation: men with urethral discharge**

Gram stain of the discharge is recommended as the initial test because it has high specificity (99%) and sensitivity (95%).[23] The test is considered highly suggestive for infection with *N gonorrhoeae* in symptomatic men if the smear contains typical gram-negative diplococci within polymorphonuclear leukocytes. It is suggested that if possible all men have a confirmatory laboratory test (i.e., culture of urethral discharge, NAAT of urethral swab or urine) following this procedure.

**Laboratory evaluation: men without urethral discharge**

Urinalysis of a first-void urine specimen can be performed. A presumptive diagnosis of urethritis can be made if urinalysis strip is positive for leukocyte esterase.

Urine can also be sent for Gram stain; the presence of leukocytes with ≥10 white blood cell (WBC) count per high-power field or ≥2 WBC count per oil immersion field suggests urethritis. The presence of intracellular gram-negative diplococci has a high sensitivity for gonorrhea, although the lack of diplococci should not stop further testing for gonorrhea if the patient has signs of urethritis.[23] A definitive diagnosis can be obtained by NAAT of the urine or urethral swab.[46] Gonorrhea screening for asymptomatic men may also be done by a urine NAAT test alone with no urinalysis.

For men who are asymptomatic a Gram stain is not recommended because of lower sensitivity in this patient group.[23]

**Laboratory evaluation: women**

Laboratory testing in women can be performed by NAAT using self-collected vaginal swab or urine sample, or using clinician-collected endocervical swab.[23] Evidence suggests that the sensitivity and specificity of self-collected vaginal sampling are comparable to provider-collected sampling.[50] For determination of antimicrobial susceptibility, an endocervical swab is taken and sent for culture. A presumptive identification of *N gonorrhoeae* isolates recovered on selective medium can be made with a Gram stain and oxidase test. A presumptive identification indicates only that a gram-negative, oxidase-positive diplococcus is present; however, this is sufficient to start antimicrobial treatment. Additional tests are performed to confirm the identity of the isolate as *N gonorrhoeae*.

Women with vaginitis symptoms who do not have a cervix can have vaginal/urine culture or NAAT testing.

**Laboratory evaluation: nongenital sites**

Rectal and pharyngeal gonorrhea are often asymptomatic. Men who have sex with men (MSM) have been found to have a high incidence of pharyngeal gonorrhea[54] [55] and rectal gonorrhea.[56] Routine screening of MSM at nongenital sites is advisable where possible. Screening high-risk women for rectal gonorrhea may identify cases that are not identifiable from cervical testing, even in the absence of a history of anal sex.[57] However, there are no recommendations for routine testing of the rectum in women.
Gonorrhea infection

Culture is the only FDA-approved method for testing rectum and pharynx specimens in some regions.[23] However, NAAT is preferred to culture, and can be performed if a local laboratory is CLIA-compliant and authorized to carry out NAAT on nongenital specimens.[23] [46] [48]

Gram stains of endocervical, pharyngeal, or rectal specimens are not sufficient to detect infection and are therefore not recommended.[46]

**Laboratory evaluation: patients with suspected DGI**
Cultures need to be drawn from any sterile site that may be involved (e.g., blood, pharynx synovial fluid, or CSF).

**Laboratory evaluation: infants with suspected gonococcal infection**
In all cases of neonatal conjunctivitis, conjunctival exudates should be cultured for *N gonorrhoeae* and tested for antibiotic susceptibility before a definitive diagnosis is made.

Detection of gonococcal infection in neonates other than ophthalmia neonatorum requires cultures of the relevant body fluid or site. Positive gram-stained smears provide a presumptive basis for initiating treatment. However, diagnoses based on gram-stained smears or presumptive identification of cultures should be confirmed with definitive tests on culture isolates.[23]

**Laboratory evaluation: children with suspected gonococcal infection**
Due to the legal implications of a diagnosis of *N gonorrhoeae* infection in a child, standard culture procedures for the isolation of the pathogen should be used. Nonculture gonococcal tests (for example, gram-stained smear and NAAT) should not be used without standard culture. An exception may be the use of NAAT for vaginal secretions or urine in girls.[23]

**Further investigations**
If PID is suspected, a transvaginal ultrasound, computed tomography, or magnetic resonance imaging can be performed due to their high specificity for PID.

**Risk factors**

**Strong***

**age 15 to 29 years**

- One of the strongest predictors of gonorrhea, with rates 4 to 5 times higher than the national average.
  
  According to US data from 2017, the highest rates in women are seen in the 15 to 24 years age group, and the highest rates in men are seen in the 20 to 29 years age group.[3]

**men who have sex with men (MSM)**

- In the US, gonorrhea incidence among MSM was estimated to be around 5241 cases per 100,000 in 2017.[3]
In 2016, the Centers for Disease Control and Prevention's MSM Prevalence Monitoring Project in several urban STI clinics in the US showed high median site-specific positivity for rectal gonorrhea (15.9%) and pharyngeal gonorrhea (8.8%) among MSM.[24]

**black ancestry**

- In the US, people of black ancestry have a rate that remains higher than other races/ethnicities and is between 8 and 9 times higher than the rate in white people (548.1 vs. 66.4 cases per 100,000).[3] There is no biologic basis for this; rate differences by race/ethnicity may represent contextual factors such as geography, socioeconomic status, and social structure that affect sexual networks.[25] Highest rates among black people are seen in the age group 20 to 24 years.[3] In the US-based National Longitudinal Study of Adolescent Health (Add Health) study the highest rate among those ages 18 to 26 years was seen in black people (2.13%).[26]

**current or prior history of STI**

- This is consistently found to be a risk factor for repeat infections and therefore is a clear indication for screening.[27] [28] [29] In the Add Health study (a US-based cohort study of adults ages 18 to 26 years), chlamydia was found as a coinfection in 69% of those with gonorrhea.[26] In this study most gonorrhea was asymptomatic, which may be because symptomatic people had received treatment. Women with prior bacterial vaginosis had a 26% increased risk of having gonorrhea. Bacterial vaginosis is associated with an increased risk of subsequent gonorrhea infection.[30]

**multiple recent sexual partners**

- The definition of multiple sex partners is variable, but 2 or more partners in the most recent 2 months is a commonly accepted definition.[29] [31] [32] Working in the commercial sex industry qualifies as exposure to multiple partners.

**inconsistent condom use**

- Sexual contact without a condom is a primary risk factor for gonorrhea infection. This includes any penetrative sex (usually referring to a penis) that involves a mucosa-lined orifice (oropharynx, vagina, and anus).[5] [6] [7] [8]

**risk factors of partner**

- Unprotected sex is required for gonorrhea infection, but it does not constitute a high risk on its own if it is within a monogamous relationship. However, it is important to also consider the partner's risk factors because even if the patient has one partner, that partner may be linked to a high-risk sexual network by any of the same factors listed.

**history of sexual or physical abuse**

- Reinfection of women with gonorrhea or chlamydia is associated with a history of physical or sexual abuse.[33]

**Weak substance use**

- Often linked to high-risk sexual networks and therefore in many circumstances can be reasonably considered a risk factor.[5] [6] [7] [8]
past incarceration

- Some studies have demonstrated that people with a history of imprisonment may have higher rates of STIs (including gonorrhea) than those with no history of imprisonment.[23] In the US, 4.4% of females and 1.2% of males entering a juvenile correctional institution in 2011 were positive for gonorrhea.[34]

high-morbidity community

- It is always important to consider the local epidemiologic factors in a decision to screen a person. Within the context of a local outbreak of gonorrhea the threshold to initiate screening may be different.

History & examination factors

Key diagnostic factors

urethral discharge in men (common)

- Early symptom of gonorrhea.

tenderness and/or swelling of the epididymis (uncommon)

- Suggests epididymitis. This requires specialized treatment and needs to be distinguished from testicular torsion.

mucopurulent or purulent exudate at the endocervix (uncommon)

- Mucopurulent cervicitis is the classical sign of gonorrhea infection in women but as a sign it is not common enough nor specific enough for the predictive value to be sufficient to make a diagnosis without supportive laboratory tests.
- Physical findings include frank mucopus on swab and cervical os friability.

Other diagnostic factors

pelvic pain in women (common)

- Considered for an STI and needs a bimanual exam. A significant number of women may have endometritis without overt symptoms.[40] If no overt pelvic pain is reported it also important to elicit whether pain occurs with sex.

urethral irritation in men (common)

- Early symptom of gonorrhea usually followed by discharge hours to days later.[18]

dysuria in men (common)

- The most common symptom of gonorrhea in men and will precede discharge.

tenderness and/or swelling of testis (uncommon)

- Orchitis is usually one-sided.

tenderness and/or swelling of prostate (uncommon)

- Prostatitis is an uncommon finding with gonorrhea but is suspected if urinary obstructive symptoms or pelvic pain is present.

anal pruritus (uncommon)
mucopurulent discharge from the rectum (uncommon)
• Associated with rectal gonorrhea infection. Usually occurs with a bowel movement.

rectal pain (uncommon)
• Associated with rectal gonorrhea infection. More common in men who have sex with men.

tenesmus (uncommon)
• Associated with rectal gonorrhea infection. More common in men who have sex with men.

rectal bleeding (uncommon)
• Associated with rectal gonorrhea infection. More common in men who have sex with men.

vaginal discharge (uncommon)
• Women with gonorrhea may have some vaginal discharge, but lack of a discharge does not exclude infection.
• In most vaginal discharges, other types of vaginitis such as trichomonas, yeast, and bacterial vaginosis predominate.
• The discharge should be sent for microscopy. Leukorrhea is defined as >10 white blood cell count on high-power field of a vaginal fluid smear.[23]

cervical friability (uncommon)
• Bleeding that occurs with gentle passage of a cotton swab through the cervical os suggest cervicitis.[23]

uterine, adnexal, or cervical motion tenderness (uncommon)
• Tenderness suggests pelvic inflammatory disease, which requires specialized treatment.

uterine mass (uncommon)
• The presence of a mass suggests pelvic inflammatory disease, which requires specialized treatment.

anterior cervical lymphadenopathy (uncommon)
• May be present in pharyngeal gonorrhea infection.

conjunctivitis (uncommon)
• Gonococcal conjunctivitis presents with thick/white yellow discharge.
  [Fig-3]

fever (uncommon)
• Can be seen with ascending gonorrhea infection or disseminated gonorrhea infection.

skin lesions (papules, bullae, petechiae, or necrotic) at extremities (uncommon)
• Indication of disseminated gonococcal infection.
  [Fig-5]

polyarthritis (uncommon)
• Indication of disseminated gonococcal infection. Most commonly affected joints are wrists, ankles, and small joints of hands and feet.

[Fig-6]

**purpuric rash (uncommon)**

• Manifestation of gonococcal meningitis.

**positive Brudzinski and Kernig sign (uncommon)**

• Manifestation of gonococcal meningitis.

**seizures (uncommon)**

• Manifestation of gonococcal meningitis.

**focal cerebral signs (uncommon)**

• Manifestation of gonococcal meningitis.

**murmur (uncommon)**

• Manifestation of gonococcal endocarditis

**ophthalmia neonatorum (uncommon)**

• Neonatal conjunctivitis. One of the most severe manifestations of pediatric gonococcal infection.

[Fig-7]

**rhinitis (uncommon)**

• Less severe manifestation of pediatric gonococcal infection.

**urethritis (infantile) (uncommon)**

• Less severe manifestation of pediatric gonococcal infection.

**vaginitis (uncommon)**

• Most common manifestation of gonococcal infection in preadolescent girls. May occur in infants with gonococcal infection.
Diagnostic tests

1st test to order

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>nucleic acid amplification test (NAAT)</strong></td>
<td>positive for gonorrhea</td>
</tr>
<tr>
<td>• Nonculture testing using NAAT is available and is generally recommended as a first-line method of testing.[23] [47] The Association of Public Health Laboratories and the Centers for Disease Control and Prevention recommend NAAT for the detection of genital tract infections with gonorrhea without routine repeat testing for positive results.[46] [48]</td>
<td></td>
</tr>
<tr>
<td>• Useful for urine, urethral, cervical, and vaginal specimens. However, it is not Food and Drug Administration-approved for use in nongenital sites (pharyngeal and rectum). Individual laboratories can perform NAAT at nongenital sites if they satisfy regulations for Clinical Laboratory Improvement Amendments compliance before reporting results.[46] [48]</td>
<td></td>
</tr>
<tr>
<td>• Most sensitive method to detect gonorrhea but has less than 100% specificity, particularly with pharyngeal and rectum specimens.</td>
<td></td>
</tr>
<tr>
<td>• Samples for NAAT can be collected by the clinician/healthcare provider or the patient (self-collected).[23] Self-collected specimens sent for NAAT have been found to be noninferior to clinician-collected specimens, although local laboratory validation of this collection method should be conducted.[49] [50]</td>
<td></td>
</tr>
<tr>
<td>• NAAT for chlamydial infection is also recommended.[23]</td>
<td></td>
</tr>
<tr>
<td><strong>culture</strong></td>
<td>positive chocolate agar culture</td>
</tr>
<tr>
<td>• Urethral, endocervical, rectal, pharyngeal, blood, synovial fluid, cerebrospinal fluid, or conjunctival specimen can be used.</td>
<td></td>
</tr>
<tr>
<td>• Definitive diagnostic test but has deficiencies in sensitivity with pharyngeal and rectal sites: sensitivity of culture for the pharynx is about 50%.[58]</td>
<td></td>
</tr>
<tr>
<td>• It is the only available method to test for antimicrobial sensitivities.</td>
<td></td>
</tr>
<tr>
<td>• Culture is the only Food and Drug Administration-approved method for testing rectum and pharyngeal specimens, and it may be the only available option in some regions.[23]</td>
<td></td>
</tr>
<tr>
<td>• Culture of swabs for chlamydial infection may also be requested.</td>
<td></td>
</tr>
<tr>
<td><strong>urinalysis in men</strong></td>
<td>positive leukocyte esterase</td>
</tr>
<tr>
<td>• Useful if patient has no urethral discharge.</td>
<td></td>
</tr>
<tr>
<td>• Provides a presumptive diagnosis of urethritis and guides differential and further investigation.[23]</td>
<td></td>
</tr>
<tr>
<td><strong>Gram stain of urine sediment</strong></td>
<td>≥10 WBC per high-power field or ≥2 WBC per oil immersion field; intracellular gram-negative diplococci in polymorphonuclear leukocytes</td>
</tr>
<tr>
<td>• Useful if patient has no urethral discharge.</td>
<td></td>
</tr>
<tr>
<td>• Confirms urethritis and guides differential and further investigation.</td>
<td></td>
</tr>
<tr>
<td>• Strongly suggests gonorrhea if organism seen. But does not rule out gonorrhea if organisms not seen.[59]</td>
<td></td>
</tr>
</tbody>
</table>
Gonorrhea infection

**Diagnosis**

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gram strain of urethral discharge</strong></td>
<td><strong>intrascellular gram-negative diplococci in polymorphonuclear leukocytes</strong></td>
</tr>
<tr>
<td>• Confirms urethritis and guides differential and further investigation. [Fig-8]</td>
<td></td>
</tr>
<tr>
<td>• Strongly suggests gonorrhea if organism seen. But does not rule out gonorrhea if organisms not seen. [59]</td>
<td></td>
</tr>
<tr>
<td><strong>HIV test</strong></td>
<td><strong>may be positive</strong></td>
</tr>
<tr>
<td>• Routine to rule out HIV. Time to HIV seropositivity with a third-generation enzyme immuno assay (EIA) can be &gt;21 days.</td>
<td></td>
</tr>
<tr>
<td><strong>Syphilis test</strong></td>
<td><strong>may be positive</strong></td>
</tr>
<tr>
<td>• Routine to rule out syphilis. A venereal disease research laboratory (VDRL) test or serum rapid plasma reagin (RPR) test can take up to 3 months to become positive. Some laboratories may perform a reverse sequence screening algorithm that uses a serologic test before the RPR.</td>
<td></td>
</tr>
</tbody>
</table>

**Other tests to consider**

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transvaginal ultrasound</strong></td>
<td><strong>thickening of endometrium or tubes; fluid in the tubes or abscess</strong></td>
</tr>
<tr>
<td>• Highly specific for pelvic inflammatory disease. Useful in presence of chronic ascending infection resulting in tubo-ovarian abscess.</td>
<td></td>
</tr>
<tr>
<td><strong>Pelvic CT/MRI</strong></td>
<td><strong>inflammatory changes of fallopian tubes and ovaries; abnormal fluid collection; thickened ligaments</strong></td>
</tr>
<tr>
<td>• Highly specific for pelvic inflammatory disease (PID). When diagnosis of PID is uncertain or ultrasound is equivocal, either a CT or MRI may be performed, if available.</td>
<td></td>
</tr>
</tbody>
</table>
**Differential diagnosis**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Differentiating signs / symptoms</th>
<th>Differentiating tests</th>
</tr>
</thead>
</table>
| Chlamydia infection  | • There are no history or physical exam features that can distinguish between chlamydia and gonorrhea infection except for disseminated infection, which is unique to gonorrhea.  
  • Chlamydia is around 10 times more common than gonorrhea in young populations.[26]  
  • Chlamydia does not seem to be efficient at colonizing the pharynx and is less likely to be found there. In men having sex with men, Chlamydia is the most common cause of rectal infections.[56]  
  • A specific form of genital ulcers and proctitis (lymphogranuloma venereum) is also caused by Chlamydia from a less common strain of Chlamydia trachomatis.                                                                 | • The absence of diplococcus on microscopic exam with sufficient WBC for a diagnosis of urethritis is suggestive of chlamydia. Commercial nucleic acid amplification test (NAAT) is usually a coupled test combining both gonorrhea and chlamydia, therefore an ideal way to give a definite pathogenic diagnosis.  
  • Diagnosis of chlamydia of the pharynx or rectum is by culture or with NAAT if available.  
  • Diagnosis of lymphogranuloma venereum is suggested from high titers of chlamydial antibodies, NAAT positive for Chlamydia, and the typical clinical presentation. |
| Trichomonas          | • Trichomonas vaginalis is a common STI and is generally underreported. A survey of young Americans found an overall prevalence of 2.3%.[40] Common symptoms (e.g., vaginal discharge and itching) are not sufficient to distinguish gonorrhea from trichomonas.  
  • T vaginalis is often diagnosed after failure of treatment for urethritis, in cases with negative tests for gonorrhea and Chlamydia.                                                                 | • Culture is the most efficacious test, but newer nucleic acid amplification tests are becoming available and will allow more rapid diagnosis. T vaginalis can be diagnosed by wet preparation from vaginal or urethral discharge but this technique has low sensitivity. |

---

This PDF of the BMJ Best Practice topic is based on the web version that was last updated: Sep 13, 2019. BMJ Best Practice topics are regularly updated and the most recent version of the topics can be found on bestpractice.bmj.com. Use of this content is subject to our disclaimer. © BMJ Publishing Group Ltd 2019. All rights reserved.
<table>
<thead>
<tr>
<th>Condition</th>
<th>Differentiating signs / symptoms</th>
<th>Differentiating tests</th>
</tr>
</thead>
</table>
| Other infectious causes of urethritis, cervicitis, pelvic inflammatory disease (PID), and epididymitis | • Other microorganisms, which are sexually transmitted but are not easily diagnosed, may cause both cervicitis and urethritis. These include atypical herpes simplex recurrences, *Mycoplasma genitalium*, and *Ureaplasma urealyticum*.  
• PID may also be caused by a mixture of organisms.  
• Epididymitis may be caused by enteric gram-negative organism, especially when there is a history of insertive anal sex. It may also occur in older men (≥35 years), usually resulting from bladder outlet obstruction.[23]  
• There are no specific differentiating features between these other infectious agents and gonorrhea. | • No commercial tests are available for *M genitalium* or *U urealyticum*.  
• Suggestive symptoms with a positive antibody test to herpes simplex virus (HSV)-2 and repeated negative test results for other etiologies suggests HSV infection.  
• Urinary culture of gram-negative organisms may be positive in cases of epididymitis.                                                                                                                                 |
| Candidal vaginitis or bacterial vaginosis                                  | • Does not usually involve the upper genital tract and is caused by yeast species or a disruption in normal bacterial flora (bacterial vaginosis). These types of vaginitis are not sexually transmitted.  
• Presents as vaginal discharge, odor, and irritation. | • Wet mount microscopic examination, cultures, or smears may show *Candida*.  
• In bacterial vaginosis, clue cells may be seen on wet mount and amine whiff test may be positive.                                                                                                                                 |
| Urinary tract infection, female                                           | • Symptoms include dysuria, hematuria, and urgency. Left untreated the ascending infection may result in pyelonephritis with flank pain and fever. | • Mid-stream urine culture positive for causative infectious agent.                                                                                                                                                                                                       |
| Urinary tract infection, male                                             | • Symptoms include dysuria, hematuria, and urgency. Left untreated the ascending infection may result in pyelonephritis with flank pain and fever. | • Mid-stream urine culture positive for causative infectious agent.                                                                                                                                                                                                       |
Step-by-step treatment approach

The main goal of treatment for gonorrhea is to reduce morbidity and mortality, and to interrupt transmission, thereby preventing further infections. Presumptive treatment can be provided to those at risk with symptoms and signs (such as mucopurulent discharge) consistent with gonorrhea and those at high risk who are unlikely to return for follow-up. Asymptomatic people or those with mild symptoms and signs (dysuria) should await definitive diagnosis.

Therapy is based on the latest Centers for Disease Control and Prevention (CDC) STD guidelines, which are subject to periodic updates.[23] The CDC currently recommends dual therapy (i.e., two antimicrobials with different mechanisms of action). As patients infected with Neisseria gonorrhoeae are frequently coinfected with Chlamydia trachomatis, the regimen should cover both organisms. Metronidazole is added to the recommended drug regimen for people when there is a history of sexual abuse.

For all patients with gonorrhea, every effort should be made to ensure that the patients’ sex partners from the preceding 60 days are evaluated and treated for N gonorrhoeae with a recommended regimen.[23] [CDC: guidance on the use of expedited partner therapy in the treatment of gonorrhea]

Uncomplicated gonococcal infection

Uncomplicated infections of the cervix, urethra, rectum, or pharynx

- First-line treatment is intramuscular ceftriaxone plus oral azithromycin, preferably given together under direct observation.[23] Azithromycin is preferred to doxycycline as the second antibiotic as it can be given as a single dose and the incidence of gonococcal resistance is higher with doxycycline; however, doxycycline may be used in patients who are allergic to azithromycin. A meta-analysis found that ceftriaxone had better efficacy for uncomplicated gonorrhea compared with other antibiotics.[67]

- Oral cefixime plus azithromycin is a suitable alternative regimen if ceftriaxone is not available. However, cefixime has a lower response rate and reduced susceptibility compared with ceftriaxone when used for nongenital sites.[23] Other single-dose injectable cephalosporins that may be used in place of ceftriaxone include cefoxitin (administered with probenecid) and cefotaxime.

- In patients who have a cephalosporin allergy, oral gemifloxacin or intramuscular gentamicin in a single dose plus a higher dose of azithromycin may be considered; however, gastrointestinal adverse effects may limit the use of these regimens. An infectious disease specialist should be consulted if there is known penicillin/cephalosporin allergy.

- Pharyngeal infections are more difficult to treat than urogenital or anorectal infections. A test-of-cure is recommended 14 days after treatment if an alternative regimen is used for pharyngeal infections.[23] Use of an antiseptic mouthwash may help with clearance of pharyngeal infections.[68]

Gonococcal conjunctivitis

- First-line treatment is intramuscular ceftriaxone plus oral azithromycin, preferably given together under direct observation.[23] Clinical studies have used a higher dose of ceftriaxone for gonococcal conjunctivitis than that used in other types of gonococcal infections.[69] There are no data for the use of oral cephalosporins in gonococcal conjunctivitis.
• As gonococcal conjunctivitis is uncommon and data on treatment in adults is limited, an infectious disease specialist should be consulted.

Treatment failure

• Persistent infection after treatment may be due to reinfection or resistance/treatment failure. Patients who have persistent symptoms after treatment should be retested by culture, and if these cultures are positive for gonococcus, isolates should be submitted for resistance testing.[23]

• Persistent infections should be retreated with intramuscular ceftriaxone plus high-dose oral azithromycin, and an infectious disease specialist should be consulted.

• Single-dose oral gemifloxacin or intramuscular gentamicin given with high-dose oral azithromycin can be used as an alternative regimen, particularly if resistance to cephalosporins is suspected. High-dose oral azithromycin is commonly accompanied by nausea and vomiting in patients.

• A test-of-cure should be done 14 days after retreatment. Treatment failures should be reported to the CDC through the local or state health department within 24 hours of diagnosis.[23]

Complicated gonococcal infection

Pelvic inflammatory disease (PID)

PID is the most important complication of gonorrhea in women. It may develop in up to one third of women with gonorrhea and can lead to long-term sequelae even after resolution of infection.[40] [41] The most common sequelae of PID are chronic pelvic pain (40%), tubal infertility (10.8%), and ectopic pregnancy (9.1%).[42] [43]

Mild to moderate PID:

• The recommended regimen is dual therapy with single-dose intramuscular ceftriaxone plus oral doxycycline for 14 days.[23]

• Cefotaxime or cefoxitin (plus probenecid) may be used instead of ceftriaxone.

• Metronidazole may be added if extended anaerobic coverage is required.

• Outpatient treatment with intramuscular and oral agents can be considered because they may be as efficacious as inpatient parenteral treatment in mild to moderate PID, but reassessment after 72 hours is recommended.[23] [70]

• A Cochrane review assessing CDC-recommended antibiotic regimens for PID found no conclusive evidence that one antibiotic regimen is safer or more effective than another.[71]

Severe PID:

• Signs and symptoms of severe infection include: surgical abdomen; tubo-ovarian abscess; severe illness with nausea, vomiting, and fever; inability to take oral regimen; and no response from outpatient therapy.

• Intravenous antibiotic therapy is required. Intravenous therapy with cefotetan or cefoxitin plus doxycycline, or clindamycin plus gentamicin, are the recommended first-line regimens.[23] Ampicillin/sulbactam plus doxycycline is a suitable alternative.

• If the patient can take oral medication, oral doxycycline may be preferred to intravenous doxycycline to minimize pain associated with intravenous infusion.
Gonorrhea infection

Treatment

- Metronidazole is added if there is a tubo-ovarian abscess, or suspicion of any anaerobic organism or trichomonas involvement.
- Reassessment can be made at 24 to 48 hours as to whether to discontinue intravenous therapy and continue with suitable oral therapy to complete 14 days of treatment if there is clinical improvement.[23]

Disseminated gonococcal infection (DGI)

DGI occurs in <3% of gonorrhea infections.[44] Women are thought to be more likely to develop DGI than men, possibly related to menses. Fever occurs in 60% of DGI. The most common features are skin rash (75%) followed by tenosynovitis (68%), polyarthritis (52%), and monoarticular arthritis (48%). Septic arthritis may develop without any of the other features of DGI. Joint aspiration will reveal a high leukocyte count of predominantly polymorphonuclear cells, and \textit{Neisseria gonorrhoeae} should be detectable in the joint fluid. Rarer manifestations of DGI include endocarditis, meningitis, and epidural abscess.

It is recommended that patients with DGI be hospitalized for initial therapy. Treatment of DGI should be undertaken with an infectious disease specialist. In cases of penicillin/cephalosporin allergy, desensitization may be required.

DGI (excluding meningitis and endocarditis):

- The recommended first-line regimen is intravenous or intramuscular ceftriaxone plus oral azithromycin.[23] Cefotaxime plus azithromycin is a suitable alternative regimen.
- Parenteral therapy should be continued for 24 to 48 hours after substantial clinical improvement, and then the patient switched to a suitable oral regimen for at least 7 days guided by antimicrobial sensitivity testing.
- Arthrocentesis may be required if there is evidence of arthritis associated with gonorrhea infection.

DGI (meningitis and endocarditis):

- The recommended first-line regimen is intravenous ceftriaxone plus oral azithromycin.[23]
- Treatment for meningitis is continued for 10 to 14 days, and for endocarditis treatment is continued for at least 4 weeks.[23]

Epididymitis

Epididymitis occurs in <5% of men with gonorrhea.[39] Hospital admission is required for severe cases. Rarely epididymitis can lead to infertility or chronic inflammation. Diagnosis of the offending organism should be pursued because gram-negative rods can also be a causative agent.

- Due to the high rate of quinolone resistance, intramuscular ceftriaxone plus oral doxycycline is recommended for 10 days if epididymitis infection is suspected to be sexually transmitted (i.e., gonorrhea or chlamydia).[23] Chlamydia will be covered by doxycycline.
- Reassessment should be made after 48 hours.
- If the patient is suspected to have epididymitis due to an enteric organism, then quinolone therapy could be used, but it is important to rule out gonorrhea and chlamydia first.

Pregnant women

Intramuscular ceftriaxone plus azithromycin is the recommended first-line regimen in pregnant women, preferably given together under direct observation.[23][72] Consultation with an infectious disease specialist is recommended.
Gonorrhea infection

Treatment

specialist is recommended if the patient has a cephalosporin allergy or there are any other considerations that preclude treatment with this regimen. Pregnant women treated with dual therapy (ceftriaxone and azithromycin) for gonorrhea do not require a test-of-cure. Women with pharyngeal gonorrhea treated with an alternative regimen should return 14 days after treatment for a test-of-cure using either culture or nucleic acid amplification test (NAAT).[72]

Complicated infection in pregnant women requires hospitalization and management by an experienced provider.

**Neonates, infants, and children**

Neonates with ophthalmia neonatorum should receive a single dose of intravenous/intramuscular ceftriaxone. Neonates with scalp abscesses or DGI (i.e., bacteremia, arthritis, or meningitis) should receive intravenous/intramuscular ceftriaxone or cefotaxime for 7 days (bacteremia, arthritis) or 10 to 14 days (meningitis).[23] An infectious disease specialist should be consulted for advice on management if there is known penicillin/cephalosporin allergy.

Infants and children with uncomplicated vulvovaginitis, cervicitis, urethritis, pharyngitis, or proctitis who weigh ≤45 kg should be treated with a single dose of intravenous/intramuscular ceftriaxone. Those with complicated gonococcal infection should be treated with intravenous/intramuscular ceftriaxone for 7 days (bacteremia, arthritis), 10 days (meningitis), or 4 weeks (endocarditis).[23]

Children who weigh >45 kg should be treated with adult regimens; however, the one difference is that children with bacteremia or arthritis should continue parenteral therapy for 7 days.

It is important to consider the possibility of sexual abuse in children with gonorrhea.[14] If suspected it should be reported and child protection procedures should be followed accordingly.

**Treatment details overview**

Please note that formulations/routes and doses may differ between drug names and brands, drug formularies, or locations. Treatment recommendations are specific to patient groups: see disclaimer

<table>
<thead>
<tr>
<th>Acute</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>nonpregnant &gt;45 kg: urogenital/ anorectal or pharyngeal infection (excluding complicated genitourinary infection)</strong></td>
<td><strong>( summary )</strong></td>
</tr>
<tr>
<td>with history of sexual assault</td>
<td>1st dual antibiotic therapy plus metronidazole</td>
</tr>
</tbody>
</table>

| **nonpregnant >45 kg: conjunctivitis** |  |
| with history of sexual assault | 1st ceftriaxone plus azithromycin plus metronidazole |
Gonorrhea infection

TREATMENT

Acute

<table>
<thead>
<tr>
<th>nonpregnant &gt;45 kg: complicated genitourinary infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>with mild to moderate pelvic inflammatory disease (PID)</td>
</tr>
<tr>
<td>adj unc metronidazole</td>
</tr>
<tr>
<td>with severe pelvic inflammatory disease (PID)</td>
</tr>
<tr>
<td>adj unc metronidazole</td>
</tr>
<tr>
<td>1st intravenous clindamycin plus gentamicin</td>
</tr>
<tr>
<td>plus switch to oral therapy</td>
</tr>
<tr>
<td>adj unc metronidazole</td>
</tr>
<tr>
<td>2nd ampicillin/sulbactam plus doxycycline</td>
</tr>
<tr>
<td>adj unc metronidazole</td>
</tr>
<tr>
<td>with epididymitis (suspected sexually transmitted)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>nonpregnant &gt;45 kg: disseminated gonococcal infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>excluding meningitis and endocarditis</td>
</tr>
<tr>
<td>adj unc arthrocentesis</td>
</tr>
<tr>
<td>2nd desensitization to penicillin/cephalosporin + interim quinolone</td>
</tr>
<tr>
<td>with meningitis or endocarditis</td>
</tr>
<tr>
<td>2nd desensitization to penicillin/cephalosporin + interim quinolone</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>pregnant: uncomplicated urogenital/anorectal or pharyngeal infection (excluding complicated genitourinary infection)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st ceftriaxone plus azithromycin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>pregnant: conjunctivitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st ceftriaxone plus azithromycin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>pregnant: complicated infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st ceftriaxone plus azithromycin</td>
</tr>
</tbody>
</table>
## Acute

<table>
<thead>
<tr>
<th></th>
<th>1st hospitalization and management by an experienced provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>neonate</td>
<td></td>
</tr>
<tr>
<td>1st ceftriaxone</td>
<td>with ophthalmia neonatorum</td>
</tr>
<tr>
<td>1st ceftriaxone or cefotaxime</td>
<td>with scalp abscesses or disseminated gonococcal infection</td>
</tr>
<tr>
<td>child ≤45 kg</td>
<td></td>
</tr>
<tr>
<td>1st ceftriaxone</td>
<td>with uncomplicated vulvovaginitis, cervicitis, urethritis, pharyngitis, or proctitis</td>
</tr>
<tr>
<td>1st ceftriaxone</td>
<td>with bacteremia, meningitis, endocarditis, or arthritis</td>
</tr>
</tbody>
</table>

## Ongoing

<table>
<thead>
<tr>
<th>recurrent/resistant: urogenital/anorectal infection or conjunctivitis or pharyngitis</th>
<th>1st repeat investigations and retreatment + report to health department</th>
</tr>
</thead>
</table>
# Treatment options

Please note that formulations/routes and doses may differ between drug names and brands, drug formularies, or locations. Treatment recommendations are specific to patient groups: [see disclaimer](#)

<table>
<thead>
<tr>
<th>Acute</th>
<th>1st dual antibiotic therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>nonpregnant &gt;45 kg: urogenital/anorectal or pharyngeal infection (excluding complicated genitourinary infection)</td>
<td>Primary options</td>
</tr>
<tr>
<td>nonpregnant &gt;45 kg: urogenital/anorectal or pharyngeal infection (excluding complicated genitourinary infection)</td>
<td>Secondary options</td>
</tr>
<tr>
<td>1st</td>
<td>OR</td>
</tr>
<tr>
<td>Primary options</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Primary options</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Primary options</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Primary options</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Primary options</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

This PDF of the BMJ Best Practice topic is based on the web version that was last updated: Sep 13, 2019. BMJ Best Practice topics are regularly updated and the most recent version of the topics can be found on bestpractice.bmj.com. Use of this content is subject to our disclaimer. © BMJ Publishing Group Ltd 2019. All rights reserved.
Gonorrhea infection

Treatment

**Acute**

- **gemifloxacin**: 320 mg orally as a single dose
- **gentamicin**: 240 mg intramuscularly as a single dose

**AND**

- **azithromycin**: 2 g orally as a single dose

- It is recommended that adult patients with a suspected or confirmed diagnosis of gonorrhea be treated with dual antibiotic therapy (i.e., two antimicrobials with different mechanisms of action). As patients infected with *Neisseria gonorrhoeae* are frequently coinfected with *Chlamydia trachomatis*, the regimen should cover both organisms.

- The Centers for Disease Control and Prevention (CDC) recommends intramuscular ceftriaxone plus oral azithromycin as a first-line regimen, preferably given together under direct observation. A meta-analysis found that ceftriaxone had better efficacy for uncomplicated gonorrhea compared with other antibiotics.

- Azithromycin is preferred to doxycycline as the second antibiotic as it can be given as a single dose and the incidence of gonococcal resistance is higher with doxycycline; however, doxycycline may be used in patients who are allergic to azithromycin.

- Oral cefixime plus azithromycin is a suitable alternative regimen if ceftriaxone is not available. Other single-dose injectable cephalosporins that may be used in place of ceftriaxone include cefoxitin (administered with probenecid) and cefotaxime.

- In patients who have a cephalosporin allergy, oral gemifloxacin or intramuscular gentamicin in a single dose plus a higher dose of azithromycin may be considered; however, gastrointestinal adverse effects may limit the use of these regimens. An infectious disease specialist should be consulted for advice on management if there is known penicillin/cephalosporin allergy.

- Pharyngeal infections are more difficult to treat than urogenital or anorectal infections. The CDC recommends a test-of-cure 14 days after treatment if an alternative regimen is used for pharyngeal infections. Use of an antiseptic mouthwash may help with clearance of pharyngeal infections.

- The management of the patient’s sex partners is an important consideration to prevent...
Acute

- with history of sexual assault

<table>
<thead>
<tr>
<th>nonpregnant &gt;45 kg: conjunctivitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>nonpregnant &gt;45 kg: conjunctivitis</td>
</tr>
</tbody>
</table>

**Primary options**

- ceftriaxone: 1 g intramuscularly as a single dose
- azithromycin: 1 g orally as a single dose

- It is recommended that adult patients with a suspected or confirmed diagnosis of gonorrhea (including gonococcal conjunctivitis) be treated with dual antibiotic therapy (i.e., two antimicrobials with different mechanisms of action).[23] As patients infected with *Neisseria gonorrhoeae* are frequently coinfected with *Chlamydia trachomatis*, the regimen should cover both organisms.

- The Centers for Disease Control and Prevention recommends intramuscular ceftriaxone plus oral azithromycin as a first-line regimen, preferably given together under direct observation.[23] Clinical studies have used a higher dose of ceftriaxone for gonococcal conjunctivitis than that used in other types of gonococcal infections.[69] There are no data for the use of oral cephalosporins in gonococcal conjunctivitis.

- As gonococcal conjunctivitis is uncommon and data on treatment in adults is limited, an infectious disease specialist should be consulted.[23]

- The management of the patient’s sex partners is an important consideration to prevent reinfection and further transmission.[23] [CDC: guidance on the use of expedited partner therapy in the treatment of gonorrhea]
### Acute

- with history of sexual assault

  **plus** metronidazole
  
  Treatment recommended for ALL patients in selected patient group

  **Primary options**
  
  - **metronidazole**: 2 g orally as a single dose
  
  - Metronidazole is added to the recommended drug regimen for people when there is a history of sexual abuse.

### nonpregnant >45 kg: complicated genitourinary infection

- with mild to moderate pelvic inflammatory disease (PID)

  **1st** cephalosporin plus doxycycline

  **Primary options**
  
  - **ceftriaxone**: 250 mg intramuscularly as a single dose
    - **doxycycline**: 100 mg orally twice daily for 14 days

  **Secondary options**
  
  - **cefotaxime**: 500 mg intramuscularly as a single dose
    - **doxycycline**: 100 mg orally twice daily for 14 days
  
  OR
  
  - **cefoxitin**: 2 g intramuscularly as a single dose
    - **probenecid**: 1 g orally as a single dose
      - **doxycycline**: 100 mg orally twice daily for 14 days

  - The Centers for Disease Control and Prevention recommends dual therapy with single-dose intramuscular ceftriaxone plus oral doxycycline for 14 days as first-line treatment.[23] Cefotaxime or cefoxitin (plus probenecid) may be used instead of ceftriaxone.

  - Outpatient treatment with intramuscular and oral agents can be considered because they may be as efficacious as inpatient parenteral treatment in mild to moderate PID, but reassessment after 72 hours is recommended.[23] [70]
<table>
<thead>
<tr>
<th>Acute</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PID is the most important complication of gonorrhea in women. It may develop in up to one third of women with gonorrhea and can lead to long-term sequelae even after resolution of infection. The most common sequelae of PID are chronic pelvic pain (40%), tubal infertility (10.8%), and ectopic pregnancy (9.1%).</td>
</tr>
<tr>
<td></td>
<td>The management of the patient’s sex partners is an important consideration to prevent reinfection and further transmission. [23] [CDC: guidance on the use of expedited partner therapy in the treatment of gonorrhea]</td>
</tr>
<tr>
<td>adjunct metronidazole</td>
<td>Treatment recommended for SOME patients in selected patient group</td>
</tr>
<tr>
<td>Primary options</td>
<td></td>
</tr>
<tr>
<td></td>
<td>metronidazole: 500 mg orally twice daily for 14 days</td>
</tr>
<tr>
<td></td>
<td>Until it is known that extended anaerobic coverage is not important for the treatment of acute PID, the addition of metronidazole should be considered. [23]</td>
</tr>
<tr>
<td>with severe pelvic inflammatory disease (PID) 1st cephalosporin plus doxycycline</td>
<td></td>
</tr>
<tr>
<td>Primary options</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cefotetan: 2 g intravenously every 12 hours -and- doxycycline: 100 mg intravenously/orally every 12 hours</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cefoxitin: 2 g intravenously every 6 hours -and- doxycycline: 100 mg intravenously/orally every 12 hours</td>
</tr>
<tr>
<td></td>
<td>Severe PID requires intravenous antibiotic therapy.</td>
</tr>
<tr>
<td></td>
<td>The Centers for Disease Control and Prevention recommends dual therapy with either intravenous cefotetan or cefoxitin plus doxycycline as first-line treatment. [23] If the patient can take oral medication, oral doxycycline may be preferred to intravenous doxycycline to minimize pain associated with intravenous infusion. However, cefotetan or cefoxitin must be given intravenously.</td>
</tr>
<tr>
<td></td>
<td>Reassessment can be made at 24 to 48 hours as to whether to discontinue intravenous therapy</td>
</tr>
</tbody>
</table>
**Acute**

and continue with oral therapy (doxycycline) to complete 14 days of treatment if there is clinical improvement.[23]

- PID is the most important complication of gonorrhea in women. It may develop in up to one third of women with gonorrhea and can lead to long-term sequelae even after resolution of infection.[40] [41] The most common sequelae of PID are chronic pelvic pain (40%), tubal infertility (10.8%), and ectopic pregnancy (9.1%).[42] [43]

- Signs and symptoms of severe infection include: surgical abdomen; tubo-ovarian abscess; severe illness with nausea, vomiting, and fever; inability to take oral regimen; and no response from outpatient therapy.

- The management of the patient’s sex partners is an important consideration to prevent reinfection and further transmission.[23] [CDC: guidance on the use of expedited partner therapy in the treatment of gonorrhea]

**adjunct metronidazole**

Treatment recommended for SOME patients in selected patient group

**Primary options**

- **metronidazole**: 15 mg/kg intravenously as a loading dose, followed by 7.5 mg/kg intravenously every 6 hours for 14 days; 500 mg orally twice daily for 14 days

- Metronidazole is added if there is a tubo-ovarian abscess, or suspicion of any anaerobic organism or trichomonas involvement.

**1st intravenous clindamycin plus gentamicin**

**Primary options**

- **clindamycin**: 900 mg intravenously every 8 hours
- **gentamicin**: 2 mg/kg intravenously/intramuscularly as a loading dose, followed by 1.5 mg/kg every 8 hours; or 3-5 mg/kg intravenously/intramuscularly once daily

- Severe PID requires intravenous antibiotic therapy.

- The Centers for Disease Control and Prevention recommends dual therapy with clindamycin plus gentamicin as first-line treatment.[23]
### Acute

- **Reassessment can be made at 24 to 48 hours as to whether to discontinue intravenous therapy and continue with oral therapy to complete 14 days of treatment if there is clinical improvement.**

- **PID** is the most important complication of gonorrhea in women. It may develop in up to one third of women with gonorrhea and can lead to long-term sequelae even after resolution of infection.[40] [41] The most common sequelae of PID are chronic pelvic pain (40%), tubal infertility (10.8%), and ectopic pregnancy (9.1%).[42] [43]

- **Signs and symptoms of severe infection include:** surgical abdomen; tubo-ovarian abscess; severe illness with nausea, vomiting, and fever; inability to take oral regimen; and no response from outpatient therapy.

- The management of the patient's sex partners is an important consideration to prevent reinfection and further transmission.[23] [CDC: guidance on the use of expedited partner therapy in the treatment of gonorrhea]

#### plus switch to oral therapy

Treatment recommended for **ALL patients in selected patient group**

**Primary options**

- **clindamycin:** 450 mg orally four times daily

**OR**

- **doxycycline:** 100 mg orally twice daily

**Oral antibiotic therapy is continued following discontinuation of intravenous therapy, with either oral doxycycline or oral clindamycin to complete a total of 14 days of therapy.[23]**

- Doxycycline is preferred if chlamydia is confirmed.

#### adjunct metronidazole

Treatment recommended for **SOME patients in selected patient group**

**Primary options**

- **metronidazole:** 15 mg/kg intravenously as a loading dose, followed by 7.5 mg/kg intravenously every 6 hours for 14 days; 500 mg orally twice daily for 14 days

- Metronidazole is added if there is a tubo-ovarian abscess, or suspicion of any anaerobic organism or trichomonas involvement.
Gonorrhea infection

Treatment

<table>
<thead>
<tr>
<th>Acute</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2nd</strong></td>
</tr>
</tbody>
</table>

**Primary options**

- **ampicillin/sulbactam**: 3 g intravenously every 6 hours
  - Dose consists of 2 g ampicillin plus 1 g sulbactam.
  - **and**
  - **doxycycline**: 100 mg intravenously/orally every 12 hours

- Severe PID requires intravenous antibiotic therapy.

- The Centers for Disease Control and Prevention recommends intravenous ampicillin/sulbactam plus doxycycline as an alternative to first-line treatments.[23] If the patient can take oral medication, oral doxycycline may be preferred to intravenous doxycycline to minimize pain associated with intravenous infusion. However, ampicillin/sulbactam must be given intravenously.

- Reassessment can be made at 24 to 48 hours as to whether to discontinue intravenous therapy and continue with oral therapy (doxycycline) to complete 14 days of treatment if there is clinical improvement.[23]

- PID is the most important complication of gonorrhea in women. It may develop in up to one third of women with gonorrhea and can lead to long-term sequelae even after resolution of infection.[40] [41] The most common sequelae of PID are chronic pelvic pain (40%), tubal infertility (10.8%), and ectopic pregnancy (9.1%).[42] [43]

- Signs and symptoms of severe infection include: surgical abdomen; tubo-ovarian abscess; severe illness with nausea, vomiting, and fever; inability to take oral regimen; and no response from outpatient therapy.

- The management of the patient's sex partners is an important consideration to prevent reinfection and further transmission.[23] [CDC: guidance on the use of expedited partner therapy in the treatment of gonorrhea]

adjunct metronidazole

Treatment recommended for SOME patients in selected patient group

**Primary options**
### Treatment

#### Acute

<table>
<thead>
<tr>
<th>Disease</th>
<th>Treatment</th>
<th>Primary options</th>
</tr>
</thead>
<tbody>
<tr>
<td>with epididymitis (suspected sexually transmitted)</td>
<td><strong>1st</strong></td>
<td><strong>ceftriaxone plus doxycycline</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>ceftriaxone</strong>: 250 mg intramuscularly as a single dose - <strong>doxycycline</strong>: 100 mg orally twice daily for 10 days</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The Centers for Disease Control and Prevention recommends intramuscular ceftriaxone plus oral doxycycline as the first-line antibiotic regimen in patients with epididymitis in which the infection is suspected to be sexually transmitted (i.e., gonorrhea or chlamydia). [23] Chlamydia will be covered by doxycycline.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- If the patient is suspected of having epididymitis due to enteric organisms, a quinolone could be used, but it is important to rule out gonorrhea and chlamydia first. [23]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Reassessment should be made after 48 hours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Epididymitis occurs in &lt;5% of men with gonorrhea. [39] Hospital admission is required for severe cases. Rarely epididymitis can lead to infertility or chronic inflammation. Diagnosis of the offending organism should be pursued because gram-negative rods can also be a causative agent.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- The management of the patient's sex partners is an important consideration to prevent reinfection and further transmission. [23] [CDC: guidance on the use of expedited partner therapy in the treatment of gonorrhea]</td>
</tr>
</tbody>
</table>

#### nonpregnant >45 kg: disseminated gonococcal infection

<table>
<thead>
<tr>
<th>Disease</th>
<th>Treatment</th>
<th>Primary options</th>
</tr>
</thead>
<tbody>
<tr>
<td>excluding meningitis and endocarditis</td>
<td><strong>1st</strong></td>
<td><strong>cephalosporin plus azithromycin</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>ceftriaxone</strong>: 1 g intramuscularly/ intravenously once daily; continue for 24-48 hours after substantial clinical improvement then switch to a suitable oral regimen</td>
</tr>
</tbody>
</table>
Gonorrhea infection

**Treatment**

<table>
<thead>
<tr>
<th>Acute</th>
</tr>
</thead>
<tbody>
<tr>
<td>-and-</td>
</tr>
<tr>
<td>» azithromycin: 1 g orally as a single dose</td>
</tr>
</tbody>
</table>

**Secondary options**

| » cefotaxime: 1 g intravenously every 8 hours; continue for 24-48 hours after substantial clinical improvement then switch to a suitable oral regimen |
| -and- |
| » azithromycin: 1 g orally as a single dose |

Disseminated gonococcal infection is a serious medical condition and it is recommended that the patient be hospitalized for initial therapy.[23] Treatment should be undertaken with an infectious disease specialist.

The Centers for Disease Control and Prevention recommends intramuscular or intravenous ceftriaxone plus oral azithromycin as a first-line regimen.[23] Cefotaxime plus azithromycin is a suitable alternative regimen.

Parenteral therapy should be continued for 24 to 48 hours after substantial clinical improvement, and then the patient switched to a suitable oral regimen for at least 7 days guided by antimicrobial sensitivity testing.[23] Children with bacteremia or arthritis should continue parenteral therapy for 7 days.

The management of the patient’s sex partners is an important consideration to prevent reinfection and further transmission.[23] [CDC: guidance on the use of expedited partner therapy in the treatment of gonorrhea]

**adjunct arthrocentesis**

Treatment recommended for SOME patients in selected patient group

May be required if there is evidence of arthritis associated with gonorrhea infection.

**2nd desensitization to penicillin/cephalosporin + interim quinolone**

**Primary options**

| » ofloxacin: 400 mg intravenously every 12 hours |

Allergy to specific antibiotic is a contraindication for that antibiotic. A much smaller number of patients than previously thought have cross-reactivity of penicillin antibiotics and cephalosporin as an allergy.[73] If the history of the penicillin allergy does not
**Gonorrhea Infection**

### Treatment

**Acute**

<table>
<thead>
<tr>
<th>with meningitis or endocarditis</th>
<th>1st</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary options</strong></td>
<td></td>
</tr>
<tr>
<td>ceptriaxone plus azithromycin</td>
<td></td>
</tr>
<tr>
<td><code>Primary options</code></td>
<td></td>
</tr>
<tr>
<td>ceftriaxone: 1-2 g intravenously every 12-24 hours</td>
<td></td>
</tr>
<tr>
<td><strong>and</strong></td>
<td></td>
</tr>
<tr>
<td>azithromycin: 1 g orally as a single dose</td>
<td></td>
</tr>
</tbody>
</table>

Disseminated gonococcal infection is a serious medical condition and it is recommended that the patient be hospitalized for initial therapy. Treatment should be undertaken with an infectious disease specialist.

- The Centers for Disease Control and Prevention recommends intravenous ceftriaxone plus oral azithromycin as a first-line regimen.
- Treatment for meningitis should be continued for 10 to 14 days; treatment for endocarditis should be continued for at least 4 weeks.
- The management of the patient's sex partners is an important consideration to prevent reinfection and further transmission. [CDC: guidance on the use of expedited partner therapy in the treatment of gonorrhea]

**2nd desensitization to penicillin/cephalosporin + interim quinolone**

<table>
<thead>
<tr>
<th>Primary options</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ofloxacin: 400 mg intravenously every 12 hours</td>
<td></td>
</tr>
</tbody>
</table>

Allergy to specific antibiotic is a contraindication for that antibiotic. A much smaller number of patients than previously thought have cross-reactivity of penicillin antibiotics and cephalosporin as an allergy. If the history of the penicillin allergy does not suggest immunoglobulin E-mediated allergy, then use of cephalosporin with close observation is warranted.

- Desensitization to cephalosporins is an option if cephalosporin allergy is documented.
### Acute

- Quinolones can be used in the interim in adults, but should not be used in children.

**Pregnant: uncomplicated urogenital/anorectal or pharyngeal infection (excluding complicated genitourinary infection)**

<table>
<thead>
<tr>
<th>1st</th>
<th>ceftriaxone plus azithromycin</th>
</tr>
</thead>
</table>

**Primary options**

- **ceftriaxone**: 250 mg intramuscularly as a single dose
- **azithromycin**: 1 g orally as a single dose

- It is recommended that adult patients with a suspected or confirmed diagnosis of gonorrhea be treated with dual antibiotic therapy (i.e., two antimicrobials with different mechanisms of action). As patients infected with *Neisseria gonorrhoeae* are frequently coinfected with *Chlamydia trachomatis*, the regimen should cover both organisms.

- The Centers for Disease Control and Prevention recommends intramuscular ceftriaxone plus oral azithromycin as a first-line regimen in pregnant women, preferably given together under direct observation.[23]

- Consultation with an infectious disease specialist is recommended if the patient has a cephalosporin allergy or there are any other considerations that preclude treatment with this regimen.

- Pregnant women treated with dual therapy (ceftriaxone and azithromycin) for gonorrhea do not require a test-of-cure. Women with pharyngeal gonorrhea treated with an alternative regimen should return 14 days after treatment for a test-of-cure using either culture or nucleic acid amplification test (NAAT).[72]

- The management of the patient’s sex partners is an important consideration to prevent reinfection and further transmission.[23] [CDC: guidance on the use of expedited partner therapy in the treatment of gonorrhea]

**Pregnant: conjunctivitis**

<table>
<thead>
<tr>
<th>1st</th>
<th>ceftriaxone plus azithromycin</th>
</tr>
</thead>
</table>

**Primary options**

- **ceftriaxone**: 1 g intramuscularly as a single dose
**Acute**

- **and-**
  - azithromycin: 1 g orally as a single dose

- It is recommended that adult patients with a suspected or confirmed diagnosis of gonorrhea (including gonococcal conjunctivitis) be treated with dual antibiotic therapy (i.e., two antimicrobials with different mechanisms of action). As patients infected with *Neisseria gonorrhoeae* are frequently coinfected with *Chlamydia trachomatis*, the regimen should cover both organisms.

- The Centers for Disease Control and Prevention recommends intramuscular ceftriaxone plus oral azithromycin as a first-line regimen in pregnant women, preferably given together under direct observation.[23] Clinical studies have used a higher dose of ceftriaxone for gonococcal conjunctivitis than that used in other types of gonococcal infections.[69] There are no data for the use of oral cephalosporins in gonococcal conjunctivitis.

- As gonococcal conjunctivitis is uncommon and data on treatment in adults is limited, an infectious disease specialist should be consulted.[23] Consultation with an infectious disease specialist is also recommended if the patient has a cephalosporin allergy or there are any other considerations that preclude treatment with this regimen.

- Pregnant women treated with dual therapy (ceftriaxone and azithromycin) for gonorrhea do not require a test-of-cure.[72]

- The management of the patient's sex partners is an important consideration to prevent reinfection and further transmission.[23] [CDC: guidance on the use of expedited partner therapy in the treatment of gonorrhea]

<table>
<thead>
<tr>
<th>pregnant: complicated infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st hospitalization and management by an experienced provider</td>
</tr>
</tbody>
</table>

- Pregnant women with complicated infection require hospitalization and specialist management from an experienced provider.

- The management of the patient's sex partners is an important consideration to prevent reinfection and further transmission.[23] [CDC: guidance on the use of expedited partner therapy in the treatment of gonorrhea]

<table>
<thead>
<tr>
<th>neonate</th>
</tr>
</thead>
</table>

This PDF of the BMJ Best Practice topic is based on the web version that was last updated: Sep 13, 2019. BMJ Best Practice topics are regularly updated and the most recent version of the topics can be found on bestpractice.bmj.com. Use of this content is subject to our disclaimer. © BMJ Publishing Group Ltd 2019. All rights reserved.
### Acute

<table>
<thead>
<tr>
<th>Condition</th>
<th>Treatment</th>
<th>Primary options</th>
</tr>
</thead>
<tbody>
<tr>
<td>with ophthalmia neonatorum</td>
<td>1st ceftriaxone</td>
<td>- ceftriaxone: 25-50 mg/kg intravenously/ intramuscularly as a single dose, maximum 125 mg/dose</td>
</tr>
<tr>
<td>with scalp abscesses or disseminated gonococcal infection</td>
<td>1st ceftriaxone or cefotaxime</td>
<td>- ceftriaxone: 25-50 mg/kg intravenously/ intramuscularly every 24 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OR cefotaxime: 25 mg/kg intravenously/ intramuscularly every 12 hours</td>
</tr>
<tr>
<td>child ≤45 kg</td>
<td>1st ceftriaxone</td>
<td>- ceftriaxone: 25-50 mg/kg intramuscularly/ intravenously as a single dose, maximum 125 mg/dose</td>
</tr>
</tbody>
</table>

- The Centers for Disease Control and Prevention recommends ceftriaxone as a first-line agent.[23] An infectious disease specialist should be consulted for advice on management if there is known penicillin/cephalosporin allergy.

- Infants with scalp abscesses or disseminated gonococcal infection in the form of bacteremia or arthritis should receive treatment for 7 days. Infants with meningitis should receive treatment for 10 to 14 days.

- An infectious disease specialist should be consulted for advice on management if there is known penicillin/cephalosporin allergy.

- If suspected it should be reported and child...
## Acute

<table>
<thead>
<tr>
<th>Protection procedures should be followed accordingly.</th>
<th>1st</th>
<th>ceftriaxone</th>
</tr>
</thead>
<tbody>
<tr>
<td>with bacteremia, meningitis, endocarditis, or arthritis</td>
<td>Primary options</td>
<td></td>
</tr>
<tr>
<td>» ceftriaxone: 50 mg/kg intravenously/intramuscularly once daily, maximum 1000 mg/day</td>
<td>The Centers for Disease Control and Prevention recommends ceftriaxone as a first-line agent.[23]</td>
<td></td>
</tr>
<tr>
<td>» Meningitis should be treated for 10 to 14 days.</td>
<td>Endocarditis should be treated for at least 4 weeks.</td>
<td></td>
</tr>
<tr>
<td>» Bacteremia and arthritis should be treated for 7 days.</td>
<td>It is important to consider the possibility of sexual abuse in children with gonorrhea.[14]</td>
<td></td>
</tr>
<tr>
<td>» It is important to consider the possibility of sexual abuse in children with gonorrhea.[14] If suspected it should be reported and child protection procedures should be followed accordingly.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Ongoing

<table>
<thead>
<tr>
<th>recurrent/resistant: urogenital/anorectal infection or conjunctivitis or pharyngitis</th>
<th>1st</th>
<th>repeat investigations and retreatment + report to health department</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>Primary options</td>
<td></td>
</tr>
<tr>
<td>ceftriaxone: urogenital/anorectal infection or pharyngitis: 250 mg intramuscularly as a single dose; conjunctivitis: 1 g intramuscularly as a single dose</td>
<td>azithromycin: 2 g orally as a single dose</td>
<td></td>
</tr>
<tr>
<td>and-</td>
<td>Secondary options</td>
<td></td>
</tr>
<tr>
<td>gemifloxacin: 320 mg orally as a single dose</td>
<td>gentamicin: 240 mg intramuscularly as a single dose</td>
<td></td>
</tr>
<tr>
<td>or-</td>
<td>--AND--</td>
<td></td>
</tr>
<tr>
<td>azithromycin: 2 g orally as a single dose</td>
<td>Persistent infection after treatment may be due to reinfection or resistance/treatment failure.</td>
<td></td>
</tr>
</tbody>
</table>
Ongoing

Reinfection is a likely possibility, and partner treatment should be reinforced.

» Patients who have persistent symptoms after treatment should be retested by culture and, if these cultures are positive for gonococcus, isolates should be submitted for resistance testing.

» Persistent gonorrhea infections should be retreated with intramuscular ceftriaxone plus high-dose oral azithromycin, and an infectious disease specialist should be consulted.[23]

» Single-dose oral gemifloxacin or intramuscular gentamicin given with high-dose oral azithromycin can be used as an alternative regimen, particularly if resistance to cephalosporins is suspected.[23] High-dose oral azithromycin is commonly accompanied by nausea and vomiting in patients.

» A test-of-cure should be done 14 days after retreatment.

» Treatment failures should be reported to the Centers for Disease Control and Prevention through the local or state health department within 24 hours of diagnosis.[23]
Emerging

Challenges for new antibiotic therapy development

A potential for pan-resistant gonorrhea strains has been recognized and there is evidence of rising minimum inhibitory concentration in some isolates for cephalosporins and azithromycin. Whole-genome sequencing of *Neisseria gonorrhoeae* has identified molecular signatures for reduced susceptibility to current antibiotics,[74] and use of genomic tests to predict antibiotic choice may be one approach to manage emerging antimicrobial resistance. Intramuscular ceftriaxone remains superior to all other antibiotic options for most presentations of gonorrhea. Zoliflodacin is a new antibiotic that is showing efficacy for the treatment of *N gonorrhoeae*. [75]
Gonorrhea infection

Recommendations

Monitoring

Test-of-cure requires repeating diagnostic methods to confirm that infection has cleared.

If the patient was treated with first-line treatment, no further specific follow-up is needed for test-of-cure.

Test-of-cure is indicated if a nonrecommended treatment is used. Patients should be told to have rescreening in 3 months or at the first presentation in the following 3 months, because they are at risk of reinfection. Rescreening men and women with recent gonorrhea infections every 3 to 6 months is an important method to detect new gonorrhea infections. This is because those who have had a gonorrhea infection are at higher risk of acquiring it again due to reinfection from the original source or from their sexual network.[77] [78]

Retesting pregnant women is recommended because of the possible morbidity related to unresolved infection. Retesting in the third trimester is recommended in pregnant women with prenatal gonococcal infection unless recently treated.[72]

When using a nucleic acid amplification test to assess for gonorrhea infection, it is uncertain how long a positive test may persist following treatment, but 2 to 3 weeks should be adequate.

Patient instructions

Contact tracing and management of the patient’s recent sex partners is an important consideration to prevent reinfection and further transmission. This becomes especially important in cases of suspected disseminated gonococcal infection when the cultures may be negative. Patients are advised to refer their sex partners for evaluation and treatment. Patients should be told to avoid sexual intercourse for the duration of treatment, until they and their partners are tested and/or have completed a course of treatment. Otherwise they should be aware that they might become reinfected. They should be informed of need for follow-up and rescreening. Patients may find online resources helpful.

[CDC: gonorrhea fact sheet]

Complications

<table>
<thead>
<tr>
<th>Complications</th>
<th>Timeframe</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>ectopic pregnancy (resulting from pelvic inflammatory disease)</td>
<td>short term</td>
<td>medium</td>
</tr>
<tr>
<td>Pelvic inflammatory disease (PID) complicating gonorrhea infection may develop in up to one third of women with gonorrhea.[40] [41] The most common sequelae of PID are chronic pelvic pain (40%), tubal infertility (10.8%), and ectopic pregnancy (9.1%).[42] [43]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>infertility in women (resulting from pelvic inflammatory disease)</td>
<td>long term</td>
<td>medium</td>
</tr>
<tr>
<td>Pelvic inflammatory disease (PID) complicating gonorrhea infection may develop in up to one third of women with gonorrhea.[40] [41] The most common sequelae of PID are chronic pelvic pain (40%), tubal infertility (10.8%), and ectopic pregnancy (9.1%).[42] [43]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>Timeframe</th>
<th>Likelihood</th>
</tr>
</thead>
<tbody>
<tr>
<td>infertility in men</td>
<td>long term</td>
<td>low</td>
</tr>
</tbody>
</table>

Rarely epididymitis, complicating gonorrhea infection, can lead to infertility or chronic inflammation.

| Blindness | long term | low |

May be a complication of ophthalmia neonatorum.

| Chronic pelvic pain (resulting from pelvic inflammatory disease) | variable | high |

Pelvic inflammatory disease (PID) complicating gonorrhea infection may develop in up to one third of women with gonorrhea.[40] [41] The most common sequelae of PID are chronic pelvic pain (40%), tubal infertility (10.8%), and ectopic pregnancy (9.1%).[42] [43]

| Fitz-Hugh-Curtis syndrome | variable | low |

Gonococci may spread up toward the liver causing perihepatitis, which mimics acute cholecystitis in its presentation. It resolves with antibiotic therapy.

### Prognosis

Appropriate treatment with recommended antibiotics should resolve gonorrheal infections. The key related morbidity in women is infertility, ectopic pregnancy, and chronic pelvic pain secondary to pelvic inflammatory disease. In men, treatment will help prevent ascending infection to the prostate, epididymis, and testis. Death is rare but can be the result of disseminated infection.
# Diagnostic guidelines

## International

**Sexually transmitted diseases treatment guidelines, 2015** [23]

*Published by:* Centers for Disease Control and Prevention  
*Last published:* 2015

**Screening for chlamydia and gonorrhea: recommendation statement** [62]

*Published by:* US Preventive Services Task Force  
*Last published:* 2014

**Recommendations for the laboratory-based detection of Chlamydia trachomatis and Neisseria gonorrhoeae** [46]

*Published by:* Centers for Disease Control and Prevention  
*Last published:* 2014

**Recommendations for partner services programs for HIV infection, syphilis, gonorrhea, and chlamydial infection** [63]

*Published by:* Centers for Disease Control and Prevention  
*Last published:* 2008

**WHO guidelines for the treatment of Neisseria gonorrhoeae** [64]

*Published by:* World Health Organization  
*Last published:* 2016

**British Association for Sexual Health and HIV national guideline for the management of infection with Neisseria gonorrhoeae** [47]

*Published by:* British Association for Sexual Health and HIV  
*Last published:* 2019

**Guidance on tests for sexually transmitted infections** [65]

*Published by:* British Association for Sexual Health and HIV  
*Last published:* 2015

**Management of epididymo-orchitis** [66]

*Published by:* British Association for Sexual Health and HIV  
*Last published:* 2010

# Treatment guidelines

## International

**Guidance on the use of expedited partner therapy in the treatment of gonorrhea** [76]

*Published by:* Centers for Disease Control and Prevention  
*Last published:* 2016

**Sexually transmitted diseases treatment guidelines, 2015** [23]

*Published by:* Centers for Disease Control and Prevention  
*Last published:* 2015
### International

**Recommendations for partner services programs for HIV infection, syphilis, gonorrhea, and chlamydial infection** [63]

*Published by:* Centers for Disease Control and Prevention  
*Last published:* 2008

**WHO guidelines for the treatment of Neisseria gonorrhoeae** [64]

*Published by:* World Health Organization  
*Last published:* 2016

**British Association for Sexual Health and HIV national guideline for the management of infection with Neisseria gonorrhoeae** [47]

*Published by:* British Association for Sexual Health and HIV  
*Last published:* 2019

**Management of epididymo-orchitis** [66]

*Published by:* British Association for Sexual Health and HIV  
*Last published:* 2010
Online resources

1. CDC: guidance on the use of expedited partner therapy in the treatment of gonorrhea (external link)
2. CDC: gonorrhea fact sheet (external link)
Key articles

- Centers for Disease Control and Prevention. Gonococcal isolate surveillance project (GISP). Jul 2016 [internet publication]. Full text


References


Gonorrhea Infection


Gonorrhea infection

References

47. British Association for Sexual Health and HIV. British Association for Sexual Health and HIV national guideline for the management of infection with Neisseria gonorrhoeae. 2019 [internet publication]. Full text


64. World Health Organization. WHO guidelines for the treatment of Neisseria gonorrhoeae. 2016 [internet publication]. Full text

65. British Association for Sexual Health and HIV. 2015 BASHH CEG guidance on tests for sexually transmitted infections. Dec 2015 [internet publication]. Full text

66. British Association for Sexual Health and HIV. 2010 United Kingdom national guideline for the management of epididymo-orchitis. 2010 [internet publication]. Full text


Figure 1: This gram-stained micrograph of a rectal smear specimen reveals the presence of diplococcal Neisseria gonorrhoeae bacteria

CDC/ Joe Miller
Figure 2: This patient presented with symptoms later diagnosed as due to gonococcal pharyngitis

CDC/ Dr N. J. Flumara, Dr Gavin Hart
Figure 3: Gonococcal conjunctivitis of the right eye

CDC/ Joe Miller, VD
Figure 4: Gonococcal arthritic patient with inflammation of the skin of her right arm due to a disseminated Neisseria gonorrhoeae bacterial infection.

CDC/ Emory
Figure 5: Cutaneous lesions on the left ankle and calf due to a disseminated Neisseria gonorrhoeae infection

CDC/ Dr S. E. Thompson, VDCD/ J. Pledger
Figure 6: Gonococcal arthritis of the hand, which caused the hand and wrist to swell

CDC/ Susan Lindsley, VD
Figure 7: A newborn with gonococcal ophthalmia neonatorum caused by a maternally transmitted gonococcal infection

CDC/ J. Pledger
Figure 8: Photomicrograph revealing the histopathology in an acute case of gonococcal urethritis using gram-stain technique

CDC/ Joe Millar
Disclaimer

This content is meant for medical professionals. The BMJ Publishing Group Ltd ("BMJ Group") tries to ensure that the information provided is accurate and up to date, but we do not warrant that it is. The BMJ Group does not advocate or endorse the use of any drug or therapy contained within nor does it diagnose patients. Medical professionals should use their own professional judgement in using this information and caring for their patients and the information herein should not be considered a substitute for that.

This information is not intended to cover all possible diagnosis methods, treatments, follow up, drugs and any contraindications or side effects. We strongly recommend that users independently verify specified diagnosis, treatments and follow up and ensure it is appropriate for your patient. This information is provided on an “as is” basis and to the fullest extent permitted by law the BMJ Group assumes no responsibility for any aspect of healthcare administered with the aid of this information or any other use of this information.

View our full Website Terms and Conditions.

Contact us
+1 855-458-0579 (toll free from USA)
ussupport@bmj.com

BMJ Americas Office
2 Hudson Place, Suite 300
Hoboken, New Jersey 07030
Contributors:

// Authors:

Sheldon Morris, MD, MPH
Assistant Professor
Division of Infectious Diseases, Department of Medicine, UCSD Antiviral Research Center, Division of Family Medicine, Department of Family and Preventive Medicine, UCSD La Jolla Family and Sports Medicine, San Diego, CA
DISCLOSURES: SM has received funding from the National Institutes of Health (Clinical and Healthcare Research Policy division), the California Institute for Regenerative Medicine, and Gilead Sciences. SM has financial interests in Impact Biomedicines (now Celgene) and Forty Seven Inc. SM is an author of a number of references cited in this topic.

// Peer Reviewers:

Vani Dandolu, MD, MPH
Associate Professor
Ob/Gyn and Urology, Director, Division of Urogynecology, Associate Residency Program Director, Temple University Hospital, Philadelphia, PA
DISCLOSURES: VD declares that he has no competing interests.

Eva Jungmann, FRCP MSc
Consultant in Genitourinary and HIV Medicine
Archway Centre & Mortimer Market Centre, London, UK
DISCLOSURES: EJ declares that she has no competing interests.