Bacterial Sexually Transmitted Diseases

Charles B. Whitlow, M.D.[1]

ABSTRACT

Common sexually transmitted bacterial organisms may affect the anorectum and perianal skin. While some of these infections are a result of contiguous spread from genital infection, most result from receptive anal intercourse. Polymicrobial infection is common and there is overlap in symptoms caused by the organisms that may infect the anorectum. This article addresses the most common bacterial organisms that are sexually transmitted and affect the anorectum. It includes discussions of gonorrhea, campylobacter, chlamydia, shigella, chancroid, granuloma inguinale, and syphilis. Incidence, mode of transmission, presenting signs and symptoms, diagnostic modalities, and treatment are reviewed.

KEYWORDS: Sexually transmitted diseases, anal ulcerations, proctitis

Objectives: Upon completion of this article, the reader should be familiar with the diagnosis and management of bacterial sexually transmitted diseases of the anus and rectum.

There are over 15 million cases of sexually transmitted diseases (STDs) annually in the United States and the etiologic agents for these infections exceed 25 in number.[1] The symptoms of any particular sexually transmitted disease are largely dependent on the route and site of infection. Organisms that typically cause genital and perineal infection result in similar symptoms when the distal anal canal, anoderm, and perianal skin are the site of infection. While most anorectal STDs are acquired via anal receptive intercourse, contiguous spread from genital infection occurs. Certain organisms, more commonly thought of as water- or food-borne diseases, are included with other STDs because they are spread by direct or indirect fecal-oral contact from various sexual practices.

Data on the frequency of homosexual and anoerotic activity are limited. It is estimated that ~2% of adult males in the United States regularly practice anal receptive intercourse.[2] Females may actually be a larger at risk group for STDs of the anorectum since between 5% and 10% engage in anal intercourse and they are more likely than men to have unprotected anal intercourse.[2]

Several factors contribute to establishing a correct diagnosis of STDs of the anorectum. Included in these are: (1) a great deal of overlap of signs and symptoms between organisms; (2) simultaneous infection by multiple organisms; (3) the presence of colonizing organisms versus true pathogens; and (4) a paucity of rapid diagnostic tests results in a high percentage of patients undergoing empiric treatment. This article focuses on the most common bacterial STDs. Table 1 presents the common symptoms, endoscopic findings, appropriate laboratory tests, and treatment of these organisms.

GONORRHEA

Albert Neisser first described the gram-negative diplococcus, *Neisseria gonorrhoeae*, in 1879 from exudates from urethritis and cervicitis.[3] The incidence of gonorrhea in the United States is ~650,000 cases per year and it is the

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Table 1 Sexually Transmitted Bacterial Organisms That Cause Anorectal Pathology*

Organism	Symptoms	Anoscopy and Proctoscopy	Laboratory Test	Treatment
Campylobacter jejuni	Diarrhea, cramps, bloating	Erythema, edema, grayish-white ulcerations of rectal mucosa	Culture stool using selective media	Erythromycin 500 mg PO qid for 7 days or azithromycin 500 mg daily for 3 days
Chlamydia	Tenesmus	Friable, often ulcerated rectal mucosa +/– rectal mass	Serological antibody titer, biopsy for culture	Doxycycline 100 mg PO bid or erythromycin 500 mg PO qid for 7 days, azithromycin 1 g PO single dose
Lymphogranuloma venereum	Enlarged inguinal nodes, fever, malaise, anorexia	Friable, often ulcerated rectal mucosa	Serological antibody titer, complement fixation test	Doxycycline 100 mg PO bid or erythromycin 500 mg PO qid for 21 days
Chancroid *Haemophilus ducreyi*	Anal pain	Anorectal abscesses and ulcers	Culture	Single-dose azithromycin 1 g, or ceftriaxone 250 mg IM
Gonorrhea	Rectal discharge	Proctitis, mucopurulent discharge	Thayer-Mayer culture of discharge	Ceftriaxone 125 mg IM single dose plus doxycycline 100 mg PO bid for 7 days
Granuloma inguinale	Perianal mass	Hard, shiny perianal masses	Biopsy of mass	Doxycycline 100 mg PO bid, bactrim DS one tab PO bid, ciprofloxin 750 mg PO bid, erythromycin 500 mg PO qid for 21 days—see text
Syphilis	Rectal pain	Painful anal ulcer	Dark-field exam of fresh scrapings	Benzathine penicillin 2.4 million units IM

*Provider should check reference material for current indicated medication.

most common bacterial STD affecting the anorectum.[1] African Americans have a much higher gonorrhea infection rate than white Americans and the incidence for gonorrhea is highest in females in their late teens and males in their early 20s.

Asymptomatic infection from *N. gonorrhoeae* is common and may affect the urethra, endocervix, rectum, and pharynx. Culture-positive rectal gonorrhea is asymptomatic in ~50% of males and 95% of females. This asymptomatic infection makes up the main reservoir for gonococcal infection among homosexual men. Anorectal transmission is by anoreceptive intercourse in homosexual men while up to 50% of women with gonococcal cervicitis develop simultaneous rectal infection due to contiguous spread of their genital infection.[4] A small percentage of patients may acquire gonococcal infection via anal-oral sexual practices.

Symptomatic infection appears 3 days to 2 weeks after exposure and is manifest by pruritis tenesmus, bloody discharge, mucopurulent discharge, or pain. Ulceration and erythema of the anus may be seen on inspection although more commonly this portion of the examination is unremarkable. The classic finding of anorectal gonococcal involvement is a thick purulent discharge that is expressed from the anal crypts in response to external anal pressure. Nonspecific findings of mucosal erythema, edema, friability, and pus are noted in patients with proctitis from rectal infection.

The diagnosis of anorectal gonorrhea is confirmed by Gram's stain of directly visualized discharge or by culturing the organism on selective media such as Thayer-Martin. The diagnostic yield of culture may be reduced if lubricants with antibacterial agents are used during anoscopy, making water the recommended lubricant in this setting. While nonculture techniques are gaining acceptance in genital gonoccocal infections, there are no approved nucleic acid amplification tests for rectal infection.[5]

Untreated infection with gonococcus may lead to transient bacteremia, arthritis, or dermatitis. More severe sequelae such as endocarditis and meningitis are rare. Penicillinase-producing *N. gonorrhoeae* have rendered penicillin G inadequate therapy for infections caused by this organism. Centers for Disease Control and Prevention guidelines for treatment of gonorrhea include single-dose therapy with ceftriaxone (125 mg IM), ciprofloxacin (500 mg PO), ofloxacin (400 mg PO), levofloxacin (250 mg PO), or cefixime (400 mg PO).[6] Cefixime is no longer commercially available in the United States. Alternative treatment includes spectinomycin, 2 g as a single IM injection, other cephalosporins (ceftizoxime, cefoxitin, or cefotaxime), or other quinolones. Quinolone-resistant *N. gonorrhoeae* have been reported, the greatest concentration coming from Asia, the Pacific, and the west coast of the United States[7] Decreased susceptibility to cephalosporins is uncommon. Current antibiotics are extremely effective; for this reason, only patients whose symptoms persist after treatment warrant follow-up evaluation.

As with all sexually transmitted diseases, prevention of spread to sexual partners and patient education is an integral part of treatment. Sexual contacts from the 2 months prior to infection should be treated and infected patients should abstain from intercourse until completion of treatment and symptom resolution. Concomitant chlamydia infection is common in patients with gonorrhea and should be treated empirically or excluded by laboratory testing.

CAMPYLOBACTER

Campylobacter jejuni is a gram-negative rod and is one of the most common bacterial causes of diarrhea in the United States.[8] In healthy patients it is typically acquired by ingestion of contaminated food or water. Sexual transmission by practices that promote fecal-oral contact has been suggested. *C. jejuni* and other *Campylobacter* species have been isolated from stool and rectal cultures obtained from homosexual men with proctocolitis.[8]

Acute infection with *C. jejuni* may involve the small bowel or the colon and causes a diarrheal illness. Severe cases manifest systemic complaints of myalgias, chills, fever, and abdominal pain. The clinical picture can be similar to appendicitis or inflammatory bowel disease.[9] HIV-positive patients tend to have more severe infection of longer duration; are more likely to have bacteremia; and are more likely to manifest extraintestinal disease (cellulitis, pneumonia).[10] Sigmoidoscopy may reveal a nonspecific proctocolitis and fecal leukocytes are normally present but the diagnosis is made by stool culture of the organism on selective media in a microaerophilic atmosphere.[11] Mild cases resolve without treatment but severe cases or those in immunocompromised patients are treated with azithromycin 500 mg daily for 3 days or erythromycin 500 mg four times a day for 1 week.

CHLAMYDIA

Chlamydia is the most commonly reported sexually transmitted disease in the United States.[12] The etiologic agent of chlamydia is *Chlamydia trachomatis*, an obligate intracellular organism that produces clinical illness 5 days to 2 weeks after exposure. Anorectal transmission is mostly via anal intercourse, but secondary involvement from genital infection can occur. Infection from nonlymphogranuloma venereum (LGV) serovars is frequently asymptomatic but can result in proctitis and common genital infections. LGV serovars (L1, L2, L3) produce a more aggressive infection manifest by perianal, anal, or rectal ulceration with resulting pain and discharge. Anal infection produces abscesses, fistulae, or

structuring, which inspection of the rectal mucosa reveals a proctitis that may be indistinguishable from Crohn's disease. Lymphadenopathy, characterized by large matted nodes and overlying erythema, can occur in iliac, perirectal, inguinal, or femoral nodes. Tissue culture of *C. trachomatis* is technically difficult, costly, and not widely available.[13]

Proper specimen collection consists of cotton or Dacron swabs with an inert shaft followed by transport on specific medium and refrigerated storage. Direct fluorescent antibody testing is a highly specific, widely available technique for *C. trachomatis* antigen detection. Nucleic acid amplification tests are being used more frequently to diagnose genital chlamydial infections but have not yet been proven for anorectal infections.[14]

Non-LGV rectal chlamydia is treated with a single dose of azithromycin, 1 g orally, or doxycyline, 100 mg PO twice daily for 7 days.[6] Erythromycin, ofloxacin, or levofloxacin are all effective alternatives. LGV is treated with either erythromycin or doxycycline for 21 days and even longer in patients who are HIV-positive. Management of sexual partners and abstinence recommendations are the same as mentioned earlier for gonorrhea.

SHIGELLA

Shigella sonnei and *S. flexneri* are highly contagious and the two most common species identified in Shigella infections in the United States.[15] Sexual transmission of Shigella was first reported in 1974 and HIV-positive patients appear to be more susceptible to symptomatic shigellosis.[16] The common presenting symptoms of shigellosis are watery or bloody diarrhea, abdominal cramping, and fever. Sigmoidoscopy reveals a proctitis but inflammatory changes may extend proximal to the rectum. Diagnosis is made by culturing the organism on selective media, although a polymerase chain reaction test has been described.[17] Treatment of shigellosis is mostly supportive but antimotility agents are contraindicated. Immunocompromised patients are treated with antibiotics that are selected based on regional antibiotic susceptibility profiles due to the high rate of antibiotic resistance.

CHANCROID

Chancroid is an ulcerating sexually transmitted disease caused by the gram-negative, facultative anaerobic bacillus *Haemophilus ducreyi*. The transmission of *H. ducreyi* facilitates and is facilitated by HIV. In the United States, it is an uncommonly reported disease with fewer than 200 cases in 1999.[1] However, it is a disease of global importance with an estimated incidence of 6 million.[18]

H. ducreyi is transmitted by sexual contact through breaks in the skin during intercourse. Within days of exposure, infection manifests as infected tender papules with erythema that eventually become pustules and over the ensuing days to weeks ulcerate and erode. The ulcers of chancroid are painful and frequently multiple ulcers are present, but there are no gross features that distinguish them from ulcers causes by other STDs.[19] They are most commonly located on the genitalia, but perianal abscesses and ulceration may occur. Drainage from adjacent genital infections may be the cause of anal ulcerations in females. Painful unilateral inguinal adenopathy is seen in about half of chancroid infections in male patients and is less common in females.

Diagnosis of chancroid is made by culture of *H. ducreyi* on selective medium. Gram's stain of material from the base of suspicious ulcers is only 40 to 60% sensitive relative to culture and demonstrates nonmotile gram-negative rods in small groups. Polymerase chain reaction is more sensitive than culture for detecting *H. ducreyi* but is not yet commercially available.[20] Treatment for *H. ducreyi* is single-dose treatment with azithromycin (1 g PO) or ceftriaxone (250 mg IM). Alternative regimens include ciprofloxacin 500 mg PO twice a day for 3 days or erythromycin 500 mg PO three times a day for 1 week.[6] Resolution of adenopathy generally takes longer than healing of the accompanying ulcers.

GRANULOMA INGUINALE (DONOVANOSIS)

Calymmatobacterium granulomatis (also called *Donovania granulomatis*), a gram-negative bacillus, causes an ulcerating infection of the genitalia and anus. Transmission is believed to occur from both sexual and nonsexual contact and it has a relatively long incubation period. Donovanosis is rarely seen in the United States but is common in parts of Africa, South America, and Australia. Initially, a small firm nodule appears in the skin. Subsequent lesions caused by this organism vary grossly and include an ulcerogranulomatous form (nontender, fleshy, beefy red ulcers), hypertrophic or verrucous lesions, necrotic ulcers, or cicatricial form (which may cause anal stenosis).[21] Anal infection can occur primarily or from contiguous spread of genital lesions.

Diagnosis is made by tissue smear or biopsy that reveal Donovan bodies (small inclusions) within macrophages. Culture of *C. granulomatis* has been accomplished only by highly specialized techniques—between 1962 and 1996 there were no reports of successful culture. Several antibiotic regimens have been recommended, including doxycycline (100 mg PO twice daily for 1 week) or trimethoprim-sulfamethoxazole (one 800 mg/160 mg tablet PO twice a day for at least 3 weeks).[6] Alternative treatments include at least 3 weeks of ciprofloxacin, azithromycin, or erythromycin.

Azithromycin was been suggested as the preferred treatment in one report.[21]

SYPHILIS

Syphilis is a sexually transmitted disease caused by the spirochete *Treponema pallidum* and is one of the oldest known infectious diseases. Untreated, the disease can present in one of several progressive stages—primary (chancre or proctitis), secondary (condyloma latum, or tertiary. The incidence of syphilis in the United States decreased in the late 1990s to 2.2 per 100,000 in 2001 and led to development of a national plan for the elimination of syphilis.[22,23]

The primary stage of anorectal syphilis appears within 2 to 10 weeks of exposure via anal intercourse. The anal chancre is a small indurated papule that eventually ulcerates but heals without treatment in 2 to 4 weeks.[24] Anal ulcers are located on the perianal skin or in the anal canal; may be single or multiple; are associated with painless but prominent inguinal lymphadenopathy; and in contrast to genital ulcers are frequently painful. Proctitis from syphilis may occur in the absence of anal chancres.[18]

Four to 10 weeks after primary lesions appear, hematogenous dissemination of untreated syphilis leads to a secondary stage. Nonspecific systemic symptoms, including fever, malaise, arthralgias, weight loss, sore throat, and headache, along with a maculopapular rash on the trunk and extremities, characterize this stage. Another manifestation of secondary syphilis is condyloma latum. These spirochete-filled lesions are gray or whitish wart-like lesions that appear adjacent to the primary chancre. Untreated, the symptoms of syphilis spontaneously resolve after 3 to 12 weeks. One fourth of these untreated patients will experience early latent syphilis—relapse of symptoms in the first year.

Spirochetes seen on dark-field microscopic exam of scrapings from chancres are diagnostic of syphilis. Another method for diagnosis is demonstration of spirochetes in biopsy specimens stained with Warthin-Starry silver. Alternatively, a direct fluorescent antibody test for *T. pallidum* is performed by some laboratories.[11,25] Nontreponemal (not specific for treponemal antibodies) serologic tests such as rapid plasma regain and Venereal Disease Research Laboratory (VDRL) have a false-negative rate of up to 25%. If positive, nontreponemal tests should be confirmed by a treponemal test such as the fluorescent treponemal antibody absorption test.

A single intramuscular injection of 2.4 million units of benzathine penicillin G is the treatment for primary and secondary syphilis. Penicillin-allergic patients are treated with doxycycline (100 mg PO twice daily for 14 days) or tetracycline (500 mg PO four times a day for 14 days). Follow-up serology (VDRL or rapid plasma regain) should be checked at 6 months after therapy for HIV-negative patients and every 3 months for HIV-positive patients.[6] Treatment failures are retreated with the same dose of penicillin but at weekly intervals for a total of 3 weeks. Partner notification, testing, and treatment depend on stage at diagnosis of the index case. At-risk partners include sexual contacts (1) within the prior 3 months plus duration of symptoms for patients with primary syphilis; (2) within the prior 6 months plus duration of symptoms for patients with secondary syphilis; and (3) within the prior year for those with early latent syphilis.[26]

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