

sensitivities achieved in routine clinical practice are often lower, several medical and professional societies continue to recommend that all negative rapid antigen-detection tests in children be confirmed by a throat culture to limit transmission and complications of illness caused by group A streptococci. The Centers for Disease Control and Prevention, the Infectious Diseases Society of America, and the American Academy of Family Physicians do not recommend backup culture when adults have negative results from a highly sensitive rapid antigen-detection test, however, because of the lower prevalence and smaller benefit in this age group.

Cultures and rapid diagnostic tests for other causes of acute pharyngitis, such as influenza virus, adenovirus, HSV, EBV, CMV, and *M. pneumoniae*, are available in many locations and can be used when suspected. The diagnosis of acute EBV infection depends primarily on the detection of antibodies to the virus with a heterophile agglutination assay (monospot slide test) or enzyme-linked immunosorbent assay. Testing for HIV RNA or antigen (p24) should be performed when acute primary HIV infection is suspected. If other bacterial causes are suspected (particularly *N. gonorrhoeae*, *C. diphtheriae*, or *Y. enterocolitica*), specific cultures should be requested since these organisms may be missed on routine throat swab culture.

## TREATMENT PHARYNGITIS

Antibiotic treatment of pharyngitis due to *S. pyogenes* confers numerous benefits, including a decrease in the risk of rheumatic fever, the primary focus of treatment. The magnitude of this benefit is fairly small, since rheumatic fever is now a rare disease, even among untreated patients. Nevertheless, when therapy is started within 48 h of illness onset, symptom duration is decreased modestly. An additional benefit of therapy is the potential to reduce the transmission of streptococcal pharyngitis, particularly in areas of overcrowding or close contact. Antibiotic therapy for acute pharyngitis is therefore recommended in cases in which *S. pyogenes* is confirmed as the etiologic agent by rapid antigen-detection test or throat swab culture. Otherwise, antibiotics should be given in routine cases only when another bacterial cause has been identified. Effective therapy for streptococcal pharyngitis consists of either a single dose of IM benzathine penicillin or a full 10-day course of oral penicillin (Fig. 44-2).



Azithromycin can be used in place of penicillin, although resistance to azithromycin among *S. pyogenes* strains in some parts of the world (particularly Europe) can prohibit the use of this drug. Newer (and more expensive) antibiotics also are active against streptococci but offer no greater efficacy than the agents mentioned above. Testing for cure is unnecessary and may reveal only chronic colonization. There is no evidence to support antibiotic treatment of group C or G streptococcal pharyngitis or pharyngitis in which mycoplasmas or chlamydiae have been recovered. Cultures can be of benefit because *F. necrophorum*, an increasingly common cause of bacterial pharyngitis in young adults, is not covered by macrolide therapy. Long-term penicillin prophylaxis (benzathine penicillin G, 1.2 million units IM every 3–4 weeks; or penicillin VK, 250 mg PO bid) is indicated for patients at risk of recurrent rheumatic fever.

Treatment of viral pharyngitis is entirely symptom based except in infection with influenza virus or HSV. For influenza, the armamentarium includes the adamantanes amantadine and rimantadine and the neuraminidase inhibitors oseltamivir and zanamivir. Administration of all these agents needs to be started within 48 h of symptom onset to reduce illness duration meaningfully. Among these agents, only oseltamivir and zanamivir are active against both influenza A and influenza B and therefore can be used when local patterns of infection and antiviral resistance are unknown. Oropharyngeal HSV infection sometimes responds to treatment with antiviral agents such as acyclovir, although these drugs are often reserved for immunosuppressed patients.

**Complications** Although rheumatic fever is the best-known complication of acute streptococcal pharyngitis, the risk of its following acute infection remains quite low. Other complications include acute glomerulonephritis and numerous suppurative conditions, such as peritonsillar abscess (*quinsy*), otitis media, mastoiditis, sinusitis, bacteremia, and pneumonia—all of which occur at low rates. Although antibiotic treatment of acute streptococcal pharyngitis can prevent the development of rheumatic fever, there is no evidence that it can prevent acute glomerulonephritis. Some evidence supports antibiotic use to prevent the suppurative complications of streptococcal pharyngitis, particularly peritonsillar abscess, which can also involve oral anaerobes such as *Fusobacterium*. Abscesses usually are accompanied by severe pharyngeal pain, dysphagia, fever, and dehydration; in addition, medial displacement of the tonsil and lateral displacement of the uvula are often evident on examination. Although early use of IV antibiotics (e.g., clindamycin, penicillin G with metronidazole) may obviate the need for surgical drainage in some cases, treatment typically involves needle aspiration or incision and drainage.

## ORAL INFECTIONS

Aside from periodontal disease such as gingivitis, infections of the oral cavity most commonly involve HSV or *Candida* species. In addition to causing painful cold sores on the lips, HSV can infect the tongue and buccal mucosa, causing the formation of irritating vesicles. Although topical antiviral agents (e.g., acyclovir and penciclovir) can be used externally for cold sores, oral or IV acyclovir is often needed for primary infections, extensive oral infections, and infections in immunocompromised patients. Oropharyngeal candidiasis (*thrush*) is caused by a variety of *Candida* species, most often *C. albicans*. Thrush occurs predominantly in neonates, immunocompromised patients (especially those with AIDS), and recipients of prolonged antibiotic or glucocorticoid therapy. In addition to sore throat, patients often report a burning tongue, and physical examination reveals friable white or gray plaques on the gingiva, tongue, and oral mucosa. Treatment, which usually consists of an oral antifungal suspension (nystatin or clotrimazole) or oral fluconazole, is typically successful. In the uncommon cases of fluconazole-refractory thrush that are seen in some patients with HIV/AIDS, other therapeutic options include oral formulations of itraconazole or voriconazole as well as an IV echinocandin (caspofungin, micafungin, or anidulafungin) or amphotericin B deoxycholate, if needed. In these cases, therapy based on culture and susceptibility test results is ideal.

*Vincent's angina*, also known as *acute necrotizing ulcerative gingivitis* or *trench mouth*, is a unique and dramatic form of gingivitis characterized by painful, inflamed gingiva with ulcerations of the interdental papillae that bleed easily. Since oral anaerobes are the cause, patients typically have halitosis and frequently present with fever, malaise, and lymphadenopathy. Treatment consists of debridement and oral administration of penicillin plus metronidazole, with clindamycin or doxycycline alone as an alternative.

*Ludwig's angina* is a rapidly progressive, potentially fulminant form of cellulitis that involves the bilateral sublingual and submandibular spaces and that typically originates from an infected or recently extracted tooth, most commonly the lower second and third molars. Improved dental care has reduced the incidence of this disorder substantially. Infection in these areas leads to dysphagia, odynophagia, and “woody” edema in the sublingual region, forcing the tongue up and back with the potential for airway obstruction. Fever, dysarthria, and drooling also may be noted, and patients may speak in a “hot potato” voice. Intubation or tracheostomy may be necessary to secure the airway, as asphyxiation is the most common cause of death. Patients should be monitored closely and treated promptly with IV antibiotics directed against streptococci and oral anaerobes. Recommended agents include ampicillin/sulbactam, clindamycin, or high-dose penicillin plus metronidazole.

Postanginal septicemia (*Lemierre's disease*) is a rare anaerobic oropharyngeal infection caused predominantly by *F. necrophorum*. The illness typically starts as a sore throat (most commonly in adolescents and young adults), which may present as exudative tonsillitis or peritonsillar abscess. Infection of the deep pharyngeal tissue allows