INTRODUCTION

Group A streptococcal pharyngitis is defined as an acute infection of the oropharynx and sometimes the nasopharynx by Streptococcus pyogenes. The purpose of this guideline is to provide recommendations for the accurate diagnosis and optimal treatment of Group A streptococcal pharyngitis in children and adults. Following these recommendations should result in fewer cases of acute rheumatic fever, fewer cases of suppurative complications (e.g., peritonsillar abscesses, cervical lymphadenitis, and mastoiditis), a more rapid return to usual activities, and a decrease in infectivity. This decrease in infectivity will result in a reduced transmission of Group A β-hemolytic streptococci among family members and close contacts of the patient. Another important benefit to the widespread use of this guideline will be the minimization of inappropriate antibiotic therapy use.

Acute pharyngitis accounts for about 2% of all outpatient visits in the United States. Of these visits, only about 10% are actually infected by Group A β-hemolytic streptococci. Accurate diagnosis of the etiology of this presenting complaint is critical because of the small number of cases that actually do
require antibiotic therapy. Despite these statistics, most patients presenting with acute pharyngitis receive presumptive antibiotic therapy. One large retrospective study revealed that 73% of adults presenting to their primary care doctors with acute pharyngitis were prescribed with antibiotics; 68% of which were broad spectrum, expensive, and not recommended in established guidelines. This vast potential for inappropriate antibiotic use represents a significant contribution to growing antimicrobial resistance.

**DIFFERENTIAL DIAGNOSIS**

Most cases of acute pharyngitis are of viral etiology. These possible viral agents include adenovirus, influenza, parainfluenza, rhinovirus, and respiratory syncytial virus. Less common viral agents include coxsackievirus, echoviruses, herpes simplex virus, Epstein–Barr virus, cytomegalovirus, rubella, and measles.

The most common cause of bacterial pharyngitis is Group A β-hemolytic streptococci. This bacterium is also the only common cause of pharyngitis for which antibiotic therapy is definitely indicated with the exception of two very rare pathogens: *Corynebacterium diphtheriae* and *Neisseria gonorrhoeae*. For most patients presenting with acute pharyngitis, the clinical decision to be made is whether the infection is caused by a virus or Group A β-hemolytic streptococci. Other less common causes of bacterial pharyngitis normally have other historical or physical exam findings associated with them. These include Groups C and G streptococci, which can cause tonsillitis with a scarlatiniform rash. Mixed anaerobes may cause Vincent’s angina. *N. gonorrhoeae* may cause a pharyngitis and tonsillitis in sexually active patients. *C. diphtheriae* can cause a pseudomembranous pharyngitis. *Arcanobacterium haemolyticum* can also cause a pharyngitis with a scarlatiniform rash. *Yersinia enterocolitica* can cause enterocolitis along with pharyngitis.

**Clinical Diagnosis**

Group A β-hemolytic streptococcal pharyngitis has specific clinical features and epidemiological characteristics. Typically, it is a disease of children aged 5–15. It also typically occurs in winter and early spring in temperate climates. Patients with Group A β-hemolytic streptococcus typically present with sudden onset of a sore throat, severe pain during swallowing, and fever. At times, children may present with headache, nausea, vomiting, and abdominal pain.

Objectively, patients present with tonsillopharyngeal erythema, sometimes with exudates, and enlarged, tender anterior cervical lymph nodes. Other clinical findings can include an erythematous, swollen uvula, petechia on the palate, excoriated nares, and a scarlatiniform rash. It is important to keep in mind that none of these findings are specific for Group A β-hemolytic streptococcal pharyngitis. The absence of fever or the presence of conjunctivitis, cough,
hoarseness, coryza, anterior stomatitis, discrete ulcerative lesions, viral exanthema, or diarrhea strongly suggests a viral etiology. In many cases, the signs and symptoms of streptococcal pharyngitis overlap with those of nonstreptococcal pharyngitis too much to make a diagnosis based on clinical criteria alone. Microbiological testing is often necessary to establish a definitive diagnosis.

**Microbiological Testing**

Certainly the application of either throat culture or rapid antigen detection testing (RADT) is necessary to properly diagnose many presenting cases of acute pharyngitis. Accurate diagnosis on clinical presentation alone is simply not possible even by the most experienced clinicians. However, testing is normally not necessary for patients presenting with acute pharyngitis of clearly viral etiology. Selective application of diagnostic microbiological tests will increase the percentage of positive test results for patients who are truly infected with Group A β-hemolytic streptococcus and helps to avoid regular antibiotic therapy for those who are in a transient carrier state. The application of any clinical algorithm for the diagnosis and treatment of acute pharyngitis that does not incorporate microbiological testing is not recommended. These algorithms result in an unacceptably large number of patients receiving inappropriate antibiotic therapy.

**Throat Culture**

Culture of a throat swab on sheep-blood agar remains the standard for documenting the presence of Group A streptococci in the upper respiratory tract. It is also the standard for confirming the clinical diagnosis of an acute streptococcal pharyngitis. With proper technique throat culture yields a sensitivity of 90–95% for detecting Group A β-hemolytic streptococci. The method in which the throat culture is obtained is crucial in order to maintain this level of sensitivity. The swab should be of both tonsils or tonsillar fossae and the posterior pharyngeal wall. Other areas of the mouth and pharynx should never be touched with the swab. False-negative results may be obtained if the patient has been taking antibiotics either shortly before or at the time of obtaining the throat swab. Another factor that can affect the sensitivity of throat culture is the length of incubation. A culture should be incubated at 35°C–37°C for 18–24 h before reading. An additional 24 h of incubation will yield a considerable number of positive throat culture results that would not have otherwise been identified. Therefore, although initial therapeutic decisions can be made based on culture results after 24 h of incubation, the throat culture should be examined again after 48 h before it is read as negative.

The most widely used method of differentiating Group A streptococci from other β-hemolytic streptococci on a culture plate is the bacitracin disk test. More
than 95% of Group A streptococci demonstrate a zone of inhibition around the bacitracin disk, whereas 83–97% of non-Group A streptococci do not demonstrate this zone of inhibition. Another method of establishing specificity of a throat culture involves the identification of streptococcal serogroups by detection of group-specific cell wall carbohydrate antigen in isolated bacterial colonies. These tests are highly specific and most commonly used in clinical microbiology laboratories.

**Rapid Antigen Detection Testing**

RADT has been developed for the immediate detection of Group A β-hemolytic streptococci from throat swabs. Because RADT does not require 24–48 h to yield results, patients are treated earlier, return to work or school earlier, and reduce the risk of spreading of Group A β-hemolytic streptococci. The majority of RADTs currently available have an excellent specificity of more than 95%. False-positive test results are unusual and so therapeutic decisions can be made based on a positive test result. Unfortunately, the older RADTs use either latex agglutination methods or enzyme immunoassay techniques, which yield a sensitivity of 80–90% when compared with throat culture. This relatively high rate of false-negative results for RADTs led to the prior recommendation that any negative RADT should be followed up with a confirmatory throat culture. However, the newest RADTs, which involve optical immunoassay and DNA probes, offer sensitivity that rivals that of throat cultures. There is conflicting data involving the optical immunoassay RADT and other commercially available RADTs, as well as the lack of studies directly comparing the different commercially available RADTs.

It is recommended that physicians confirm that the RADT being used in their own particular office has a sensitivity and specificity comparable with that of throat culture, especially if RADTs are being used in the evaluation of children and adolescents. If the practice-specific RADT evaluation is not available, then negative RADTs in children and adolescents should be followed by a confirmatory throat culture. However, a negative RADT in an adult is sufficient evidence to support withholding antibiotic therapy. The physician should also realize that some of the RADTs require proper certification of the physician’s laboratory under the Clinical Laboratory Improvement Act of 1988.

**ASO Titers**

Antistreptococcal antibody titers are of no value in the detection of acute streptococcal pharyngitis because they reflect past immunological events. They are useful for the confirmation of previous streptococcal infections in patients suspected of having acute rheumatic fever or poststreptococcal acute glomerulonephritis. They are also helpful epidemiologically in distinguishing patients with acute infection from those who are carriers.

No microbiological test is able to differentiate between acutely infected patients and asymptomatic carriers of Group A β-hemolytic streptococci, who
happen to have a viral pharyngitis. These tests do allow physicians to withhold antibiotic therapy for the majority of patients who present with a sore throat and negative culture or RADT results. This is extremely significant because nationally 70% of patients presenting to their primary care doctor with a sore throat receive antibiotics.

**MANAGEMENT OF GROUP A STREPTOCOCCAL PHARYNGITIS**

Antimicrobial therapy is indicated in patients with symptomatic pharyngitis if the presence of Group A β-hemolytic streptococci is confirmed by throat culture or RADT. If there is a high index of suspicion for this specific infection, antimicrobial therapy can be initiated, whereas the results of a throat culture are pending as long as the antibiotic is discontinued, if the culture results are negative. Group A streptococcal pharyngitis is usually a self-limited disease. Even without the use of antibiotics, symptoms commonly go away spontaneously within 3 or 4 d of onset. Antimicrobial therapy can be safely postponed for up to 9 d after the appearance of symptoms and still safely prevent acute rheumatic fever. These facts offer the physician flexibility in initiating antibiotic therapy during the evaluation of a patient with presumed Group A streptococcal pharyngitis.

Numerous antibiotics have been examined in clinical trials and have been shown to eradicate Group A streptococci from the upper respiratory tract. However, the only antibiotic that has been examined in controlled studies and has been shown to prevent an acute attack of rheumatic fever is intramuscular repository penicillin therapy. These studies were performed with procaine penicillin G in oil containing aluminum monostearate, which has since been supplanted with benzathine penicillin G. It is because of this that none of the recommended antibiotic regimens are rated A–I. There are data indicating that benzathine penicillin G is effective in the prevention of acute rheumatic fever after Group A streptococcal pharyngitis. Other antibiotics can effectively clear Group A streptococci from the upper respiratory tract. It is assumed that eradication is equivalent to primary prevention of rheumatic fever.

**TREATMENT REGIMENS**

**Standard**

- Penicillin V: children: 250 mg bid or tid po × 10 d; adults: 250 mg tid or qid po × 10 d OR 500 mg bid × po 10 d.
- Amoxicillin can be used in place of penicillin.
- First- and second-generation cephalosporins also are effective.
- Benzathine Pen G: Children: 600,000 U intramuscular once, Adults: 1,200,000 U intramuscular once.
For Penicillin-Allergic Patients

- Erythromycin (dose varies with formulation).
- Note: Sulfonamides and tetracyclines are not recommended for streptococcus Group A because of resistance.

RECURRENT STREPTOCOCCAL INFECTIONS

It is recommended that patients with recurrent Group A streptococcal pharyngitis receive a throat culture. If the throat culture is positive for streptococcal, explanations include carrier state with intercurrent viral illnesses, noncompliance with the antibiotics prescribed, and newly acquired infection from a close contact. Treatment failures for Group A streptococcal pharyngitis are rare. When “Ping-Pong” effect with multiple family members passing streptococcal on to each other is suspected, all family members can be cultured and those with positive tests can be treated at the same time. There is no evidence that pets spread streptococcal.

For patients with multiple episodes of streptococcal for more than 6–24 mo, tonsillectomy may decrease recurrences (NEJM 1984;310:674). For patients who are having multiple recurrent episodes of culture-positive streptococcal pharyngitis, treatment to eradicate streptococcal from the pharynx has been effective using clindamycin, amoxicillin/clavulanate, or benzathine Penicillin G.

SOURCES