

Commentary

Antibiotic Treatment of Pharyngitis

In March 2000, we published an article on tonsils and adenoids by CW Gross and SE Harrison, to which we received numerous comments regarding their views about antibiotics and the treatment of pharyngitis. We asked *Pediatrics in Review* editorial board member Ellen Wald, MD, to respond from the standpoint of a pediatric infectious disease specialist.

Causes of Pharyngitis

Sore throat is the most common indication for an acute physician visit in the school age child, adolescent, and adult. When the inflammation is limited to the throat, it is designated as pharyngitis or tonsillitis. When the nose also is inflamed, it is designated as nasopharyngitis. Most infections of the nose and throat are caused by viral agents, and most viruses can cause infection of the pharynx. The common respiratory viruses, such as respiratory syncytial virus and parainfluenza virus, are more notable as causes of croup and bronchiolitis, but they also may cause pharyngitis or nasopharyngitis. Adenovirus and influenza A are well recognized as common and severe causes of sore throat. Epstein-Barr virus causes severe pharyngitis, most notably in adolescents, but it may cause infection at any age. Herpes simplex is said to account for approximately 15% of cases of pharyngitis in adolescents, and it may be particularly severe. Rhinovirus and coronaviruses, the most frequent agents of the common cold, also can cause pharyngitis. Finally, the enteroviruses, coxsackie and echo, often cause pharyngitis with or without fever and rash in the summer and late fall.

Group A streptococcus (GAS) or

Streptococcus pyogenes is the most common cause of bacterial pharyngitis in children and adults worldwide. Other, less common bacterial causes of pharyngitis include *Corynebacterium diphtheriae*, *Neisseria gonorrhoeae*, and *Arcanobacterium hemolyticum*. These agents must be suspected specifically to make a precise diagnosis; each requires special media. Bacterial agents such as nontypeable *Haemophilus influenzae*, *S pneumoniae*, viridans streptococci, *Staphylococcus aureus*, *S epidermidis*, and *Moraxella catarrhalis* are considered normal flora of the pharynx and nasopharynx. Many laboratories will not identify these agents when a throat culture is performed because they are not regarded as pathogens; their recovery from a culture of the throat is expected.

Group A Streptococci—Carriage Versus Actual Infection

GAS also can be part of the normal flora of the throat and usually is noted in approximately 10% of children who are regarded as "carriers" of GAS. The percentage of carriers may be as high as 15% to 20% when highly skilled laboratory technicians are interested in finding the organism. However, it has been established that GAS is also the most common bacterial cause of pharyngitis; they have been recovered more frequently from a cohort of children who have pharyngitis than from children who do not have upper respiratory tract infection. Furthermore, causality has been established in previous studies by demonstrating at least a fourfold rise in streptococcal antibody titers after infection. When similar types of

investigations are undertaken for other bacteria (eg, *H influenzae* and *S aureus*), these organisms are not recovered more often from children who have pharyngitis than from healthy children.

Classic streptococcal pharyngitis is characterized by the abrupt onset of pharyngitis, fever, headache, and often-times abdominal pain in the school-age child. However, streptococcal infections that are "less classic" are very common. On physical examination of the throat, there may be erythema, exudate, or both. Exudate is observed in only about 50% of patients who have infection caused by GAS. Fever often is noted, as is tender swelling of the anterior cervical nodes. A microbiologic test, either a standard throat culture or a rapid strep test, must be performed to ascertain the presence of GAS. Treatment is instituted with penicillin once GAS have been identified.

In clinical practice, recovery of GAS from a throat culture obtained from a child who has pharyngitis is regarded as proof that GAS is the cause of that episode of infection. However, recovery of the organism does not establish causality. Recovery of the organism may be due to carriage rather than to acute infection. There is no easy way to differentiate the carrier from the child who is acutely infected. Nonetheless, when there is microbiologic proof of the presence of GAS, clinicians agree to behave as though GAS is the causative organism, and it is in 80% to 90% of the cases. The motivation to treat the child who has a GAS infection is threefold: to achieve a rapid clinical cure, to prevent transmission of GAS to others,

and most importantly, to prevent acute rheumatic fever.

Treatment

No GAS are resistant to penicillin. When a child develops recurrent symptoms of pharyngitis after receiving an appropriate course of antibiotics and again has a positive throat culture, the usual explanation is reacquisition of the GAS, either the same or a different strain. The child who experiences a microbiologic failure (ie, has a positive throat culture but no symptoms after treatment with penicillin) almost always is a carrier, which is why routine "tests of cure" no longer are recommended in children who presumably have GAS pharyngitis. Under most circumstances, a microbiologic failure, which indicates carriage of GAS, is of no clinical importance.

There has been some controversy in the literature regarding the role of the beta-lactamase-producing normal flora in children who have recurrent GAS infections. However, the majority of infectious disease specialists and both of the recommending agencies (Committee on Infectious Diseases of the American Academy of Pediatrics and the Infectious Disease Society of America) recommend unequivocally that treatment of GAS infections of the throat be undertaken with penicillin. Amoxicillin, which is much more palatable than penicillin V, may be substituted for penicillin in the young child who requires a liquid medication.

Tonsillectomy

Recurrent episodes of pharyngitis may be an indication for tonsillectomy. Par-

adise et al have established that tonsillectomy is highly efficacious in children defined as "severely affected." The frequency of infection that qualifies for consideration is at least three episodes in each of 3 successive years or five episodes in each of 2 successive years or seven episodes in 1 year. The benefits of tonsillectomy have been marginal when less stringent criteria have been employed.

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Editorial Board

Suggested Reading

Paradise JL, Bluestone CD, Bachman RZ, et al. Efficacy of tonsillectomy for recurrent throat infection in severely affected children. Results of parallel randomized and nonrandomized clinical trials. *N Engl J Med.* 1984;310:674-683