

## **Pediatric Pharyngitis: Etiology and Management Approaches**

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### **ABSTRACT**

**Background:** Acute pharyngitis is infection of the tonsils and the pharynx and is very common among children and adolescents. They can be viral or bacterial in origin. The causative organism varies from geography, age, and season of infection. Although viral pharyngitis is more common, the complications of bacterial pharyngitis can be severe, and thus proper identification of the cause and management is very important.  
**Methodology:** We conducted this review using a comprehensive search of MEDLINE, PubMed, and EMBASE, January 1985, through February 2017. The following search terms were used: acute pharyngitis, pediatric pharyngitis, bacterial infection, streptococcus pharyngitis, viral pharyngitis, rapid strept test, throat culture  
**Aim:** In this review, we aim to study the common causative organisms of acute pharyngitis among pediatric population and study the best course of management that must be followed.  
**Conclusion:** Acute pharyngitis is a relatively common disease, with a viral cause most likely. An etiology due to a streptococcal infection is a major concern and should always be ruled out due to its association with significant morbidity and mortality. Long-term sequelae of streptococcal pharyngitis include rheumatic fever, rheumatic heart disease, and acute post-streptococcal glomerulonephritis  
**Keywords:** acute pharyngitis, pediatric pharyngitis, bacterial infection, streptococcus pharyngitis, viral pharyngitis.

### **INTRODUCTION**

Infection of the tonsils and the pharynx is called acute pharyngitis. This is very common to occur among children up to adolescence, and is due to various organisms. These organisms are highly related to several factors including epidemiology, geographical distribution, age, and season. Patients may present with sore throat that is associated with tonsillitis, nasopharyngitis, and/or tonsillopharyngitis. These findings along with rhinorrhea are strongly suggestive of a viral etiology. However, it is not proper to distinguish between different etiologies (bacterial, viral, or noninfectious) based solely on the physical examination. Untreated group A beta hemolytic streptococcus (GABHS) will strongly predispose to rheumatic fever, which makes accurate diagnosis and management a major concern especially in children older than two years<sup>[1]</sup>. In order to prevent this, it is recommended to administrate antibiotics within the first nine days following symptoms. To confirm the diagnosis, GABHS rapid antigen detection assays provide a method that has a specificity of 99%. However, it has a relatively low sensitivity (about 70%) which makes it difficult to

rule out the disease in cases of negative results, especially in a highly suggestive clinical presentation<sup>[2]</sup>.

### **METHODOLOGY**

#### **• Data Sources and Search terms**

We conducted this review using a comprehensive search of MEDLINE, PubMed, and EMBASE, January 1985, through February 2017. The following search terms were used: acute pharyngitis, pediatric pharyngitis, bacterial infection, streptococcus pharyngitis, viral pharyngitis, rapid strept test, throat culture.

**The study was done after approval of ethical board of King Saud Bin Abdulaziz university.**

#### **• Data Extraction**

Two reviewers have independently reviewed the studies, abstracted data, and disagreements were resolved by consensus. Studies were evaluated for quality and a review protocol was followed throughout.

## ETIOLOGY

### Viruses

Viral infections are responsible for most acute pharyngitis cases, and can be also accompanied with infections of other sites in the respiratory tract. Most common involved viruses include influenza A and B, rhinoviruses, parainfluenza viruses, and coronaviruses. Some causative agents produce clinical signs and symptoms that help in the establishment of an accurate diagnosis. Examples include infectious mononucleosis (caused by Epstein-Barr virus), herpangina (caused by Coxsackie A), pharyngoconjunctival fever, acute respiratory disease of military recruits (caused by adenovirus), pharyngitis, gingivitis, and stomatitis (caused by herpes simplex virus), and cytomegalovirus mononucleosis (caused by cytomegalovirus). However, even in these cases, it may sometimes be challenging to clinically rule out streptococcal pharyngitis<sup>[3]</sup>.

The presence of HSV-1 has been reported in most college students with acute pharyngitis. HSV-2 has also been reported to cause similar manifestations but it is more associated with sexual contact and transmission. HSV infections usually involve the anterior oral cavity along with the posterior pharynx and cause gingivostomatitis that can be ulcerative or vesicular. However, only one quarter of cases present with this typical classic presentation<sup>[4]</sup>.

Another important causative organism that has been responsible for acute pharyngitis is human immunodeficiency virus (HIV) during its acute phase. In fact, it may present with sore throat along with mononucleosis for days or weeks, myalgia, malaise, fever, photophobia, arthralgia, maculopapular rash, and/or lymphadenopathy<sup>[5]</sup>.

### Bacteria

#### *Streptococcus pyogenes (Group A streptococcus).*

The most common cause of bacterial pharyngitis is Group A streptococcus. This is specifically a major concern due to its association with severe long-term sequelae that include poststreptococcal glomerulonephritis and acute rheumatic fever. Bacterial pharyngitis with Group A streptococcus has a relatively high incidence among children between 5 and 15 years, and are responsible for up to 20% of acute pharyngitis cases. However, it is considered significantly less common among infants and adults, and does not usually occur unless there is an outbreak or in endemic places (like military recruit camps)<sup>[6]</sup>.

#### *Streptococci of Lancefield Groups C and G.*

Acute pharyngitis that is associated with contaminated food has usually been reported to be due to beta-hemolytic streptococci. An outbreak of acute pharyngitis among 85 patients was milk borne and caused by *S. zooepidemicus* (Group C), and about third the patients developed later renal complications. Another similar outbreak with the same organism and route of transmission was reported in a family of farmer. Food borne outbreaks of acute pharyngitis have also been reported following Group G streptococci infections. Food in these cases included contaminated egg salad and chicken salad<sup>[7]</sup>.

The previous examples, along with other examples present in the medical literature, represent important evidence that group C and G streptococci are strongly associated with pharyngitis epidemics. However, their strong involvement in endemic sore throat is still controversial. Moreover, they are usually detected in asymptomatic adults. In conclusion, current evidence suggest that they may be present in some cases of pharyngitis<sup>[8]</sup>.

In a previously published study, researchers found that group C streptococci are significantly more likely to be found in cultures obtained from adults who have sore throats. Additionally, they found that clinical manifestations associated with group C streptococci are similar to both culture-negative pharyngitis and Group A streptococcal pharyngitis. An observational study on students revealed that pharyngitis patients who have large positive cultures of *S. equisimilis* have clinical manifestations that are more similar to other pyogenic infections than patients with negative cultures. These findings were later confirmed by Cimolai *et al*<sup>[9]</sup>, who were able to detect a positive correlation between pharyngitis and group C and G streptococci, but could not detect correlation with Group A streptococci. It has also been reported and proven that several large outbreaks of pharyngitis were attributed to group G streptococcus. Patients with group G streptococcus were found to be significantly older than patients with group A streptococcus. Moreover group G streptococci were found to be strongly with later development of acute glomerulonephritis<sup>[10]</sup>.

M proteins are present in both group C and group G streptococci, and are generally similar to group A regarding structure and functions. In addition, virulent strains of group G streptococci are associated with expression of a C5a peptidase enzyme that is

similar to group A. All this indicate the significant importance of non-group A streptococci in the development of acute pharyngitis <sup>[11]</sup>.

Another rare cause of acute tonsillitis and pharyngitis is arcanobacterium haemolyticum. This cases are somewhat similar to pharyngitis due to a streptococcal infection, with the addition of a scarlatiniform rash. A haemolyticum was found to occur more among young adults than children. Treponema pallidum, Neisseria gonorrhoea, Oral anaerobes, Yersinia enterocolitica, Francisella tularensis, Yersinia pestis and Corynebacterium diphtheria were also found to be associated with a significant number of acute pharyngitis <sup>[12; 13]</sup>.

### Management Approaches

Achieving ideal management in a pediatric patient with acute pharyngitis is quite challenging, although extremely important to prevent long-term complications and sequelae, which include peritonsillar abscess (PTA), acute rheumatic fever (ARF) and rheumatic heart disease, and possibly death in rare cases. Several approaches for proper management have been suggested, with all having both advantages and disadvantages. The first approach include the empiric treatment of all patients with pharyngitis with antibiotics. However, this approach will lead to the unnecessary treatment of about 90% of patients with pharyngitis that is not due to streptococcus. This unnecessary treatment is dangerous due to the high incidence of adverse events (like anaphylaxis) and the emergent of resistant bacteria <sup>[14]</sup>.

The second approach involves strict observation of all patients before administration of any test or treatment. This approach will cause significant decrease in costs, with minimal long term complications, as most cases will resolve spontaneously. However, rare complication like ARF will occur and may sometimes result in death <sup>[15]</sup>.

The third approach involves using the rapid antigen test for all pharyngitis cases, and later treating only those who have positive results. Both the Infectious Diseases Society of America (IDSA) and the American Academy of Pediatrics (AAP) recommend this approach for children and adults <sup>[16]</sup>.

The fourth approach includes obtaining a throat culture from all patients, and later treating those who get positive results with antibiotics. The advantages of this approach include the detection of cases that could be missed by the previous one. However,

culture needs about two days to get results, causing significant possible morbidity in severe cases <sup>[15]</sup>.

The fifth approach indicates the use of a rapid antigen test followed with treatment of positive patients, and culture from negative patients. This approach is commonly used as it allows for rapid treatment with high sensitivity and specificity of the diagnosis. However, it is associated with higher costs for patients with pharyngitis due to causes other than streptococci <sup>[16]</sup>.

The final approach is to use a clinical system that provides a specific score and help achieving a proper diagnosis. When using this score, patients with a low score results will not receive antibiotics treatment. Whereas patients with a high score will receive antibiotics treatment without further testing. Patients with intermediate score results will require further investigations to either provide treatment or not. This approach is considered the best one as it has the advantages of the previous approaches and avoids that disadvantages. It is recommended for patients of all ages <sup>[14]</sup>.

### CONCLUSION

In the emergency and ambulatory care settings, acute pharyngitis is a relatively common disease, with a viral cause most likely. An etiology due to a streptococcal infection is a major concern and should always be ruled out due to its association with significant morbidity and mortality. Long-term sequelae of streptococcal pharyngitis include rheumatic fever, rheumatic heart disease, and acute post-streptococcal glomerulonephritis. Clinical presentation is usually not enough to establish and confirm a diagnosis of streptococcal pharyngitis. Therefore, it is crucial to use diagnostic tests like rapid antigen test and culture. Several approaches have been suggested to provide the ideal and most proper management.

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