NCC Pediatrics Continuity Clinic Curriculum: **Pharyngitis**

Goals & Objectives:

- To recognize the common etiologies of pharyngitis in children and their associated clinical presentations
- To understand the indications for diagnostic testing for Group A strep pharyngitis
- To learn the appropriate treatment for Group A strep pharyngitis
- To recognize the suppurative and non-suppurative complications of Group A strep pharyngitis

Pre-Meeting Preparation:

Please read the following:

- "Throat Infections" (*PIR 2011*)
- Summary if IDSA Clinical Practice Guidelines (*2012*)
- Modified Centor Score (excerpt from *JAMA 2004*)

Conference Agenda:

- Review Pharyngitis Quiz
- Complete Pharyngitis Cases

Extra-Credit Readings:

- Shulman et al. Clinical practice guidelines for the diagnosis and management of group A streptococcalpharyngitis: 2012 update by the infectious diseases society of America. Clin Infect Dis. 2012 Nov 15; 55(10): 1279-82.
- McIsaac et al. Empirical validation of guidelines for the management of pharyngitis in children and adults. JAMA. 2004 Apr 7; 291(13):1587-95.
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Throat Infections

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Throat Infections

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Author Disclosure
Drs Gereige and Cunill-De Sautu have disclosed no financial relationships relevant to this article. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.

Objectives

After completing this article, readers should be able to:

1. Discuss the causes of pediatric throat infections.
2. Identify the usual clinical presentation of pharyngitis in children.
3. Describe the laboratory testing available to aid in the diagnosis of pharyngitis.
4. Explain the treatment of bacterial throat infections.
5. Understand the complications of pharyngeal infections.
6. Know the differentiating features of peritonsillar and retropharyngeal abscess.

Introduction

Sore throat in children accounts for up to 7.3 million outpatient visits to the physician each year in the United States and a significant number of missed school days and parental work days. Thus, this common pediatric complaint imposes both a medical and nonmedical burden on families and society as a whole. (1) Clinicians are challenged to evaluate complaints of sore throat judiciously with careful consideration of the presenting signs and symptoms and epidemiologic factors to distinguish between patients who require further testing and antimicrobial therapy and those with benign self-limited conditions. This article reviews the common causes, clinical presentation, diagnostic evaluation, treatment, and potential complications of throat infections.

Definition and Epidemiology

The medical dictionary defines pharyngitis as "inflammation of the pharynx." Pharyngitis can be due to infectious (bacteria, viruses, and fungi) or noninfectious causes (irritants, smoking, etc.). This article will focus primarily on the infectious causes of pharyngitis.

Most infectious causes of pharyngitis are transmitted by close contact via respiratory secretions, and children serve as the major reservoir of infection. Additionally, spread of illness among family members is a frequent occurrence and family illness is an important detail to elicit in the history.

Viral infections are the most common cause of acute pharyngitis in infants and preschool-age children. Group A *Streptococcus* (GAS; *Streptococcus pyogenes*) is the most important bacterial cause of acute pharyngitis in older children. Streptococcal pharyngitis is rare before 2 to 3 years of age and has a peak incidence in school-age children between 5 and 11 years of age. Gonococcal pharyngitis occurs more frequently in adolescents and young adults, with 40% of reported cases occurring in females age 15 to 19 years. (2)

Seasonality of pharyngitis depends on the cause, with most cases occurring during the respiratory disease season in the colder months; however, pharyngoconjunctival fever caused by adenovirus usually is seen in the summer. Pharyngitis caused by GAS is seen most frequently in winter and early spring.

Abbreviations

CT:	computed tomographic
EBV:	Epstein-Barr virus
GAS:	group A *Streptococcus*
HSV:	herpes simplex viruses
RADT:	rapid antigen detection tests
US:	ultrasonography

Clinical Presentation

The presentation of pharyngitis virtually always includes sore throat, fever, and pharyngeal erythema (Fig. 1, A and B). Other signs and symptoms are more variable depending on the cause. In general, sore throat in the presence of rhinitis,

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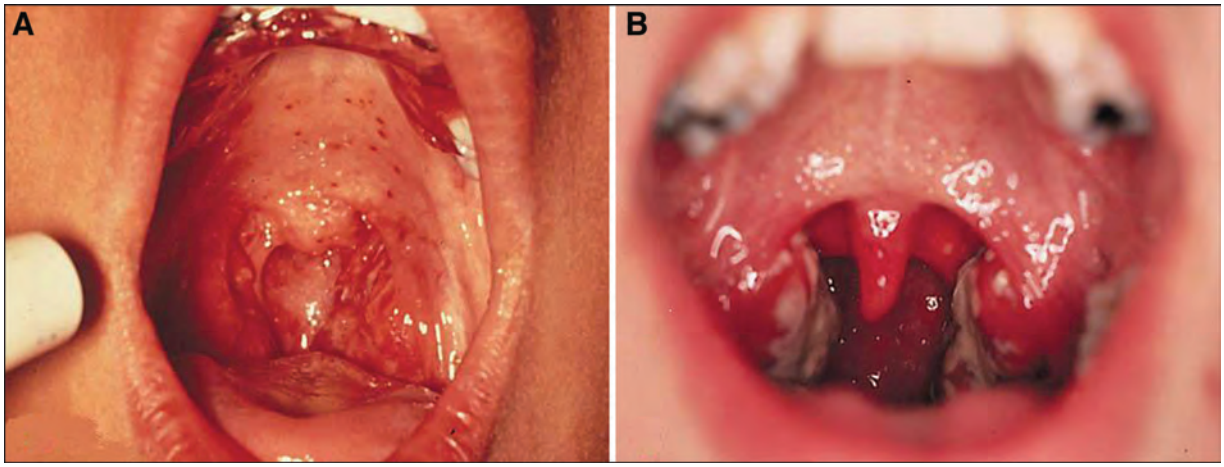

Figure 1. (A) Petechiae on the palate is a clinical finding suggestive of group A *Streptococcus* (GAS) infection. (B) Tonsillar exudate can be seen in both GAS and viral pharyngitis. Reprinted with permission from Zitelli BJ, Davies HW, eds. In: *Atlas of Pediatric Physical Diagnosis.* 5th ed. Philadelphia, PA: Mosby/Elsevier; 2007.

cough, stridor, conjunctivitis, or diarrhea is more likely to be caused by a viral infection. Conversely, the abrupt onset of fever, sore throat, headache, nausea, vomiting, abdominal pain in the absence of coryza, and cough is highly suggestive of GAS infection, the most common form of bacterial pharyngitis. GAS pharyngitis accompanied by a diffuse, erythematous rash of rough, sandpaper-like texture is called scarlet fever. This scarlatiniform rash usually blanches with pressure and concentrates along flexor creases such as the anticubital, axillary, and inguinal areas (Pastia lines). Desquamation may occur as the rash begins to fade. (3)(4)(5) Table 1 compares features of viral and GAS pharyngitis.

Differential Diagnosis

Although infections are by far the most common causes of pharyngitis in children, noninfectious causes also must be considered in the differential diagnosis of a patient presenting with sore throat (Table 2). Noninfectious causes include irritants and noninfectious inflammatory conditions.

Etiology

Adenovirus

Adenoviruses are DNA viruses whose transmission may occur by direct contact with droplets from the respiratory tract, eye, or feces. (2)(3)(4)(5)(6)(7)(8) Adenoviruses

Table 1. Comparison of Viral Pharyngitis and Group A Streptococcal Pharyngitis

	Viral	Group A *Streptococcus*
Most common age	Infants–preschool age	5–11 y
Transmission	Inhalation or direct contact with respiratory secretions Fecal–oral (when there is enteric infection)	Inhalation or direct contact with respiratory secretions
Seasonality	Year-round, more common during colder months	Winter–early spring
Unique signs and symptoms	Coryza Cough Hoarseness, stridor Stomatitis Conjunctivitis Diarrhea +/– Hepatosplenomegaly +/– Nonspecific rash	Headache Nausea, vomiting Abdominal pain Palatal petechiae Scarlatiniform rash
Onset	Gradual	Sudden, abrupt
Duration of symptoms	>4–5 d	3–5 d

Table 2. **Causes of Pharyngitis in Children**

Bacterial	Viral	Noninfectious
Streptococcus, group A	Rhinovirus	Gastroesophageal reflux
Streptococcus, group C, G	Coronavirus	Postnasal drip
Neisseria gonorrhoeae	Influenza A, B	Allergic rhinitis
Mycoplasma pneumoniae	Parainfluenza	Chronic cough
Chlamydophila pneumoniae	Respiratory syncytial virus	Foreign body
Chlamydia trachomatis	Adenovirus	Inhaled irritants, tobacco
Corynebacterium diphtheriae	Enterovirus	Caustic ingestions
Arcanobacterium haemolyticum	Epstein-Barr virus	Malignancy
Francisella tularensis	Herpes simplex virus	Rheumatologic syndromes

may remain infectious for up to two weeks at room temperature; therefore, infection can occur indirectly via contact with contaminated objects or surfaces. The clinical presentation of adenoviral infection includes signs of acute upper respiratory illness such as fever, rhinorrhea, and cough; exudative pharyngitis; and conjunctivitis. Pharyngoconjunctival fever caused by adenoviruses is manifested by fever, pharyngitis, conjunctivitis, and cervical lymphadenopathy and is associated with outbreaks during the summer due to contaminated swimming waters.

Enterovirus

Enteroviruses are a group of single-stranded RNA viruses whose transmission is via the fecal-oral or respiratory routes and which present most commonly in warm months. The manifestations of enteroviruses in general include fever; upper respiratory symptoms such as coryza, cough, and sore throat; gastrointestinal symptoms such as vomiting and diarrhea; and rash. Specific entities such as coxsackie virus can present with herpangina, which is characterized by pharyngeal vesicular and ulcerative lesions, or with hand–foot–mouth disease, characterized by similar vesicular lesions in the oropharynx along with a vesicular rash in the distal extremities. Tonsillar exudates are uncommon in enteroviral infection.

Herpes Simplex Virus

Herpes simplex viruses (HSVs) are double-stranded DNA viruses and are transmitted via contact with infected bodily fluids or sores in the oral or genital tract. HSV-1 is more commonly transmitted via the oral route, whereas HSV-2 is acquired primarily via sexual contact. However, HSV-2 also may present as pharyngitis after oral–genital contact. Clinical manifestations of HSV may include fever, cervical lymphadenopathy, pharyngeal erythema, and gingivostomatitis characterized by vesicular and ulcerative lesions involving the buccal mucosa and the lips, but sparing the posterior pharynx. Adolescents and adults with HSV may have mild pharyngitis without typical vesicular lesions.

Epstein–Barr Virus

Epstein-Barr virus (EBV) is a herpesvirus whose primary infection of children usually is manifested as infectious mononucleosis. Transmission usually is from close personal contact with bodily fluids, more commonly via the oral route. EBV is an insidious infection with an incubation period of 4 to 7 weeks and clinical symptoms lasting an additional 1 to 3 weeks. The clinical presentation of infectious mononucleosis includes fever, fatigue, pharyngitis, lymphadenopathy, hepatosplenomegaly, and lymphocytosis. Additionally, a rash of variable morphology may develop, especially if antibiotic therapy, particularly with a beta-lactam antibiotic such as ampicillin, is administered in the presence of EBV infection.

Group A *Streptococcus*

GAS is a beta-hemolytic, spherical, gram-positive bacterium transmitted via inhalation of or contact with respiratory secretions. GAS infections cause 15% to 30% of acute pharyngitis in children, peaking in those from 5 to 11 years of age. The clinical presentation of GAS pharyngitis includes sudden onset of fever, sore throat, headache, abdominal pain, nausea, and vomiting, along with the development of pharyngeal erythema with or without exudates, petechiae on the palate, and cervical lymphadenopathy. GAS infection generally is not associated with other classic upper respiratory symptoms such as rhinorrhea and cough. GAS pharyngitis with a scarlatiniform rash is caused by a strain of the bacterium that produces erythrogenic toxin.

Neisseria gonorrhoeae

Neisseria gonorrhoeae is a gram-negative diplococcus bacteria whose transmission occurs via sexual contact. Although gonoccocal infections usually are associated with genital tract disease, the agent also may also cause pharyngitis in both males and females who engage in oral–genital sexual contact. Pharyngeal infection may be completely asymptomatic or can present with acute signs and symptoms such as fever, sore throat, pharyngeal erythema, exudate, and cervical lymphadenopathy.

Diagnosis

The main objective of the primary care physician in making the diagnosis of acute pharyngitis is distinguishing which patients have a high likelihood of having GAS infection. (3)(4) Virtually all viral throat infections are benign and self-limited in immunocompetent hosts. Therefore, patients presenting with signs and symptoms consistent with viral infection do not need to undergo diagnostic testing or be treated with antibiotics. However, because there is a degree of overlap in the presentation of viral versus bacterial pharyngitis, clinical judgment alone often is not accurate in diagnosing GAS infections and often leads to overtreatment with antimicrobial therapy. Figure 2 highlights a general plan for the diagnostic evaluation and management of pharyngitis.

The gold standard for diagnosing GAS pharyngitis continues to be the throat culture, which has a sensitivity of over 90%. Bacterial throat culture also may detect the presence of *gonorrhoeae*. Despite its high sensitivity, the quality of the throat culture specimen is dependent on collection and inoculation technique. Additionally, a positive throat culture for GAS does not distinguish between infection causing acute illness and colonization. Although throat culture is useful in the diagnosis of pharyngitis caused by GAS and *gonorrhoeae*, it is of no value in isolating the infectious agents associated with other diseases, such as otitis media, sinusitis, pneumonia, or meningitis.

The advent of rapid antigen detection tests (RADTs), however, has given clinicians an inexpensive and rapid tool to facilitate the diagnosis of GAS pharyngitis. RADTs generally have a high specificity (95% to 99%); however, their sensitivity can range anywhere from 70% to 90%. Consequently, a positive RADT result can be considered diagnostic of GAS infection, and antimicrobial therapy may be initiated without further confirmatory testing. However, because the sensitivity of RADTs is so variable, a negative RADT result does not rule out GAS infection, and a confirmatory throat culture should be sent. As with traditional throat cultures, a positive RADT result does not distinguish between acute GAS infection and a chronic carrier state.

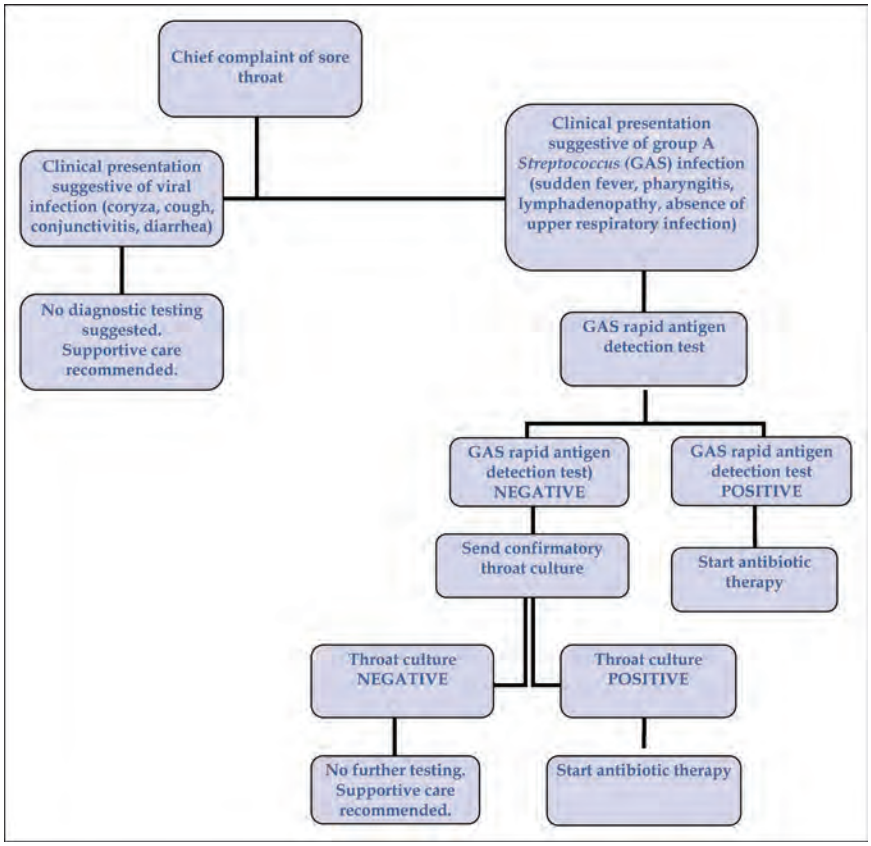

Figure 2. Diagnostic evaluation and management of pharyngitis.

Rapid diagnostic tests for the outpatient office setting also exist for various viral pathogens. Examples include tests for respiratory syncytial virus, influenza A and B viruses, and heterophile antibody spot tests for EBV. Of note, heterophile antibody tests have a low sensitivity in young children. Therefore, children younger than 5 years of age whose clinical presentation is suggestive of EBV infection but whose heterophile antibody test is

negative warrant further serologic tests. Because the vast majority of viral pharyngeal infections is benign and self-limited and generally requires only supportive care, diagnostic tests to identify the viral pathogen usually are not clinically useful and will not change the patient's management.

Treatment

Although throat infections caused by GAS are known to be self-limited even without treatment with antibiotics, there are secondary benefits to management with antimicrobials. (9) Antibiotic therapy decreases the duration of symptoms mildly, diminishes transmission, reduces the likelihood of suppurative complications such as retropharyngeal and peritonsillar abscesses, and prevents the development of acute rheumatic fever if treatment is given within 9 days of onset of illness. First-line therapy for GAS pharyngitis continues to be penicillin, which may be given as a single intramuscular dose of benzathine penicillin G 600,000 units if <27 kg (60 lb) or 1.2 million units if >27 kg (60 lb). Oral penicillin VK 250 mg twice a day if <27 kg or 500 mg twice a day if >27 kg (60 lb) for 10 days also is considered first-line therapy. Oral amoxicillin suspension is also commonly used as an alternative to oral penicillin because of its palatable taste and subsequent better compliance. Children with penicillin allergy can be treated with macrolides such as erythromycin, clarithomycin, and azithromycin (12 mg/kg per d for 5 d) as long as macrolide resistance has not been documented in the community. Cephalosporins and clindamycin are additional options if other first-line antibiotics are contraindicated. Clindamycin is effective also for the eradication of the carrier state in patients who continue to test positive for GAS despite treatment with penicillin. Patients with GAS pharyngitis are no longer considered contagious after 24 hours of antibiotic therapy.

Viral throat infections do not require antimicrobial therapy and can be treated conservatively with supportive care. Acetaminophen or ibuprofen can be used for fever and pain management. Adequate oral hydration, frequent gargling, and over-the-counter anesthetic sprays and lozenges also may relieve the sore throat. Finally, contact sports should be avoided in patients with acute EBV infection until they are recovered and have no signs of splenomegaly.

Complications

Complications of pharyngitis in children can be early, such as retropharyngeal and peritonsillar abscesses, or late, such as rheumatic fever or glomerulonephritis. Although rare, complications such as retropharyngeal and peritonsillar abscesses are serious due to their potential for respiratory compromise and diagnosis requires a high degree of suspicion from the clinician and an immediate but careful action plan. We will discuss the two more serious early complications of retropharyngeal and peritonsillar abscesses. Table 3 gives a comparative summary of the differences between retropharyngeal and peritonsillar abscesses.

Anatomic Considerations

Pediatric patients are more susceptible to acute airway compromise than adults due to specific anatomic differences. (10) Children have proportionately larger heads, more lax neck muscles, relatively larger tongues, and smaller oropharynges. The subglottic area is the narrowest segment of the pediatric airway, whereas the glottis is the narrowest in adults.

Retropharyngeal Abscess

The retropharyngeal space, under normal conditions, is sterile and contains loose connective tissue and lymph nodes that drain the nasopharynx, paranasal sinuses, middle ear, teeth, and adjacent bones. (10) Retropharyngeal abscesses are caused by infection of the retropharyngeal space due to lymphatic spread. Other rare causes include penetrating trauma, foreign body, or iatrogenic instrumentation. Retropharyngeal abscess is seen most commonly in young children (<6 y of age).

The clinical presentation of retropharyngeal abscess often is nonspecific and vague. Typically, patients start with a viral upper respiratory infection for several days. Gradual onset, over days, of fever, sore throat, and poor feeding are some of the initial presenting signs and symptoms. Neck stiffness or tenderness, due to irritation of prevertebral soft tissue, might be mistaken as meningeal signs. As symptoms progress, patients begin to show signs of extrathoracic respiratory compromise, the earliest of which is tachypnea. Drooling and stridor also are seen. Hypoxia and cyanosis are late signs and indicate impending respiratory failure. On physical examination, a retropharyngeal mass may be seen in some patients as well as tender enlarged cervical lymph nodes. It is important to note that forceful introduction of tongue depressors to try to visualize the retropharyngeal mass is strongly discouraged due to the risk of abscess rupture and secondary aspiration.

The diagnostic evaluation for suspected retropharyngeal abscess begins with an inspiratory lateral neck radiograph in full extension. An abnormally increased thickness of the prevertebral soft tissue (Fig. 3), in the proper

Table 3. Comparison of Retropharyngeal Abscess and Peritonsillar Abscess

	Retropharyngeal Abscess	Peritonsillar Abscess
Most Common Age Presentation	<6 y	20–40 y
History	Fever (gradual onset) Symptoms of upper respiratory infection Sore throat Dysphagia Stridor	Fever Sore throat Dysphagia Ipsilateral otalgia
Physical Examination	Tachypnea Neck pain or stiffness Drooling Cervical lymphadenopathy Retropharyngeal mass	Trismus Muffled "hot potato" voice Cervical lymphadenitis Ipsilateral palatal edema Contralateral uvular deviation
Etiology	Polymicrobial, primarily *Streptococcus pyogenes* *Staphylococcus aureus*	Aerobes *Streptococcus pyogenes* *Staphylococcus aureus* *Haemophilus influenzae* *Neisseria* species Anaerobes *Fusobacterium* *Peptostreptococcus* *Prevotella* *Bacteroides*
Diagnosis	Inspiratory lateral neck radiograph Contrast-enhanced CT	Needle aspiration Ultrasonography (transcutaneous or intraoral) Contrast-enhanced CT or magnetic resonance imaging
Treatment	Medical (successful alone in 25% of cases) Antistaphylococcal antibiotic with or without surgical incision and drainage CT-guided needle aspiration	Aspiration or surgical incision and drainage AND Antibiotics (10–14 d)–Cover aerobes and anaerobes
Complications	Aspiration pneumonia due to abscess rupture Local extension Airway obstruction Poststreptococcal glomerulonephritis Rheumatic fever	Aspiration pneumonia due to abscess rupture Carotid sheath rupture hemorrhage and death Poststreptococcal glomerulonephritis Rheumatic fever

CT=computed tomography.

clinical context, strongly suggests a retropharyngeal infection with edema. The presence on lateral neck radiograph of gas or air-fluid levels in the retropharyngeal space, as well as the presence of foreign bodies, and the loss of the normal cervical lordosis are other important and supportive clues. A contrast-enhanced computed tomography (CT) scan is needed to define the precise anatomic extension and to differentiate a true abscess from retropharyngeal cellulitis (Fig. 4). Laboratory studies are nonspecific because blood cultures are generally negative, often there is an elevated white blood cell count and the erythrocyte sedimentation rate is elevated. If surgical drainage is performed, aerobic and anaerobic cultures of the abscess material usually yield a polymicrobial flora, including *Staphylococcus aureus*, various *Streptococcus* species, and anaerobes.

The treatment of retropharyngeal abscess should start with empiric antibiotic therapy (including an antistaphylococcal antibiotic). Medical management is reportedly effective in 25% of cases (10) and requires close airway monitoring and management including otolaryngology and surgical consultation. Surgical management is reserved for cases refractory to antibiotic therapy when there is a mature abscess. Careful endotracheal intuba-

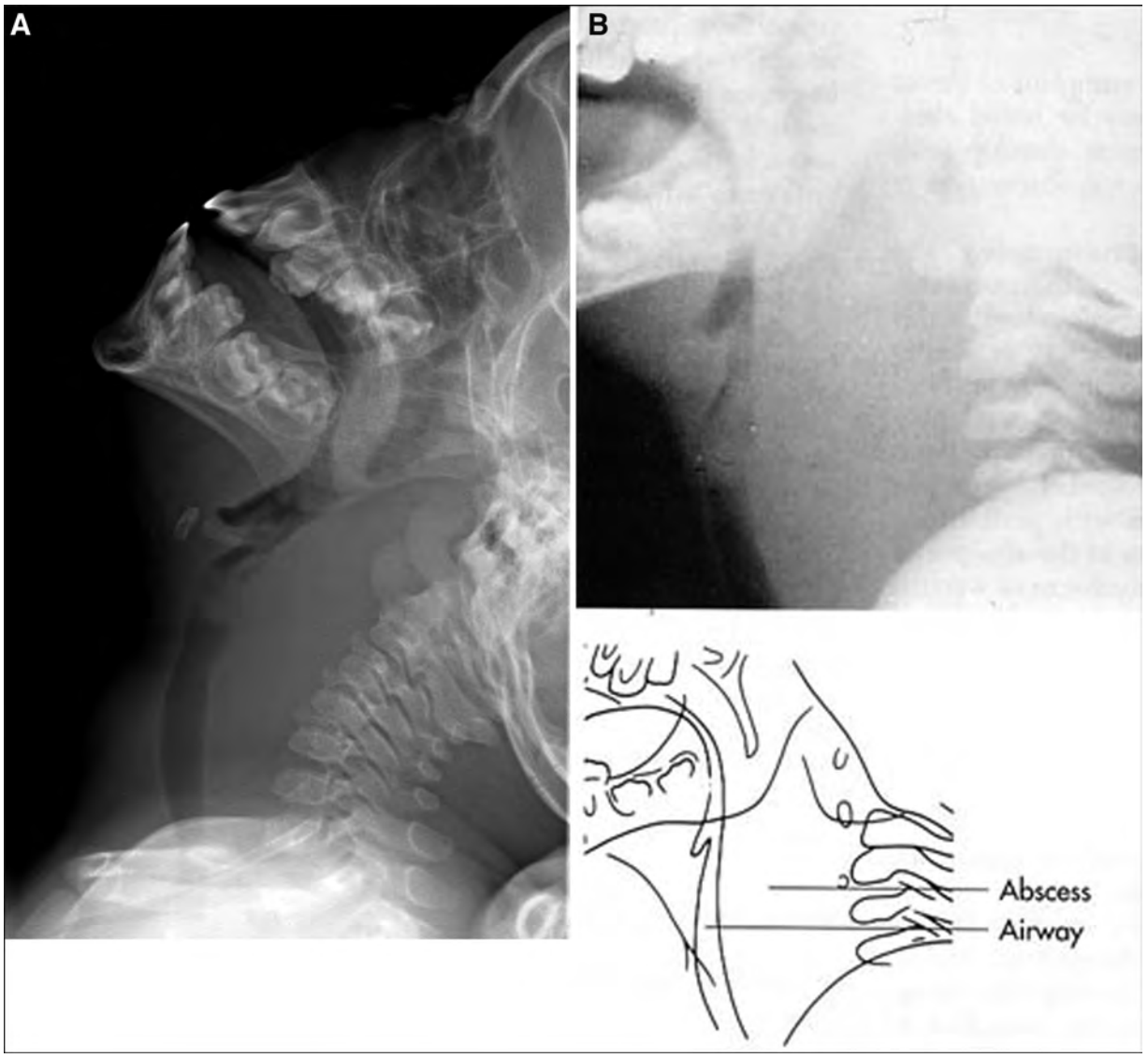

Figure 3. Lateral neck radiograph showing abnormally increased thickness of the prevertebral soft tissue (A and B) and loss of the normal cervical lordosis (B). (A) Department of Radiology, Miami Children's Hospital, FL. (B) Reprinted with permission from Zitelli BJ, Davies HW, eds. In: *Atlas of Pediatric Physical Diagnosis.* 5th ed. Philadelphia, PA: Mosby/Elsevier; 2007.

tion followed by intraoral surgical drainage is the standard of care. CT-guided needle aspiration has been reported as an alternative that causes less trauma to surrounding tissue and carries the potential of avoiding general anesthesia. Regardless of the drainage mode, great care should be exercised to avoid aspiration of purulent material or infectious material into the airway.

Peritonsillar Abscess

Peritonsillar abscess is caused by an infection in the area between the palatine tonsil and its capsule. (10)(11) It is the most common deep infection of the head and neck in adults and occurs more commonly in 20 to 40 years olds than in children, with an equal incidence in males and females. Peritonsillar abscess is seen mostly in November to December and April to May, which correspond to peak incidence times for streptococcal pharyngitis. Chronic tonsillitis is a predisposing factor for peritonsillar abscess.

The clinical manifestations of peritonsillar abscess include fever, sore throat, dysphagia, muffled or "hot potato voice," trismus, referred ear pain, and odynopha-

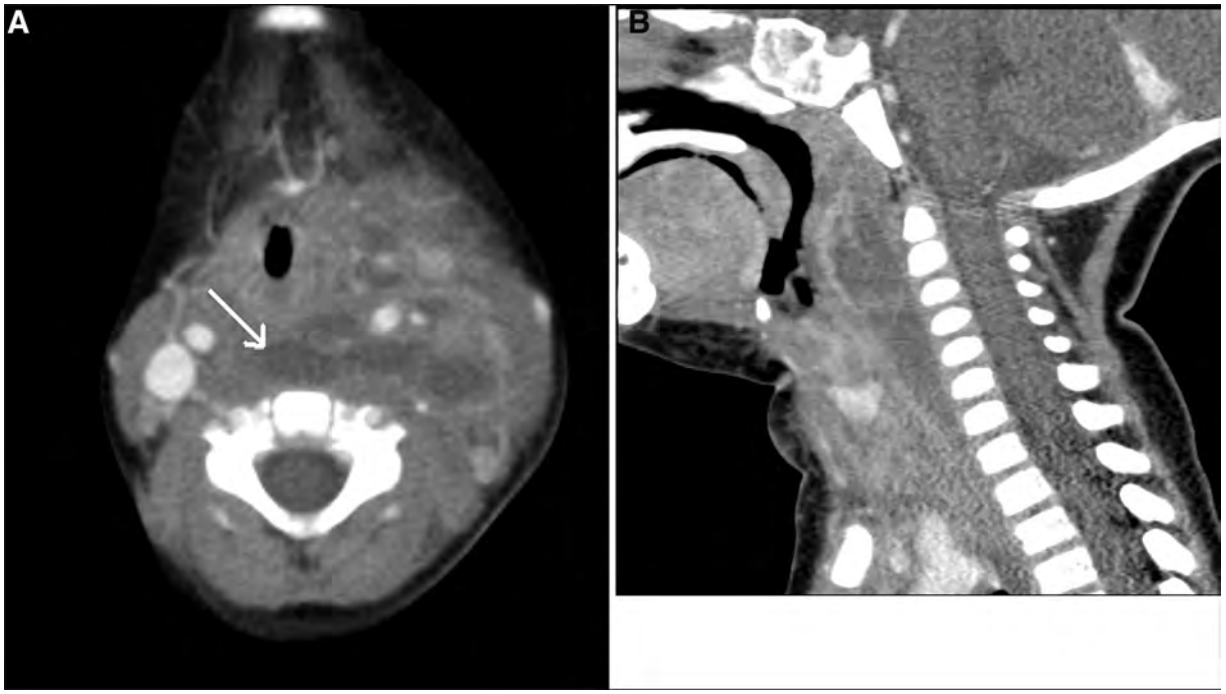

Figure 4. Computed tomography scans with contrast showing retropharyngeal abscess. Department of Radiology, Miami Children's Hospital, FL.

gia. On physical examination, ipsilateral palatal edema is noted leading to inferior medial displacement of the infected tonsil with contralateral deviation of the uvula (a distinguishing feature; Fig. 5). Table 4 shows the differential diagnosis of peritonsillar abscess.

Figure 5. Clinical examination finding of peritonsillar abscess with contralateral uvular deviation. Reprinted with permission from Zitelli BJ, Davies HW, eds. In: *Atlas of Pediatric Physical Diagnosis.* 5th ed. Philadelphia, PA: Mosby/Elsevier; 2007.

Peritonsillar abscess typically is caused by a combination of aerobic and anaerobic bacteria. The most common etiologic organisms include aerobic pathogens such as *pyogenes*, *aureus*, *Haemophilus influenzae*, and *Neisseria* species, as well as anaerobic pathogens such as *Fusobacterium*, *Peptostreptococcus*, *Prevotella*, and *Bacteroides*. *Bacteroides* and *Prevotella* infections associated with human disease are polymicrobial and are pleomorphic, nonspore forming, facultative anaerobic, gram-negative bacilli. They are part of the normal flora of the mouth and gastrointestinal and female genitourinary tracts. These organisms can cause chronic sinusitis, chronic otitis media, dental infection, peritonsillar

Table 4. Differential Diagnosis of Peritonsillar Abscess

Peritonsillar cellulitis	Cervical adenitis
Tonsillar abscess	Dental infections
Infectious mononucleosis	Salivary gland infection
Foreign body aspiration	Mastoid infection
Neoplasms (lymphoma, leukemia)	Aneurysm of internal carotid artery

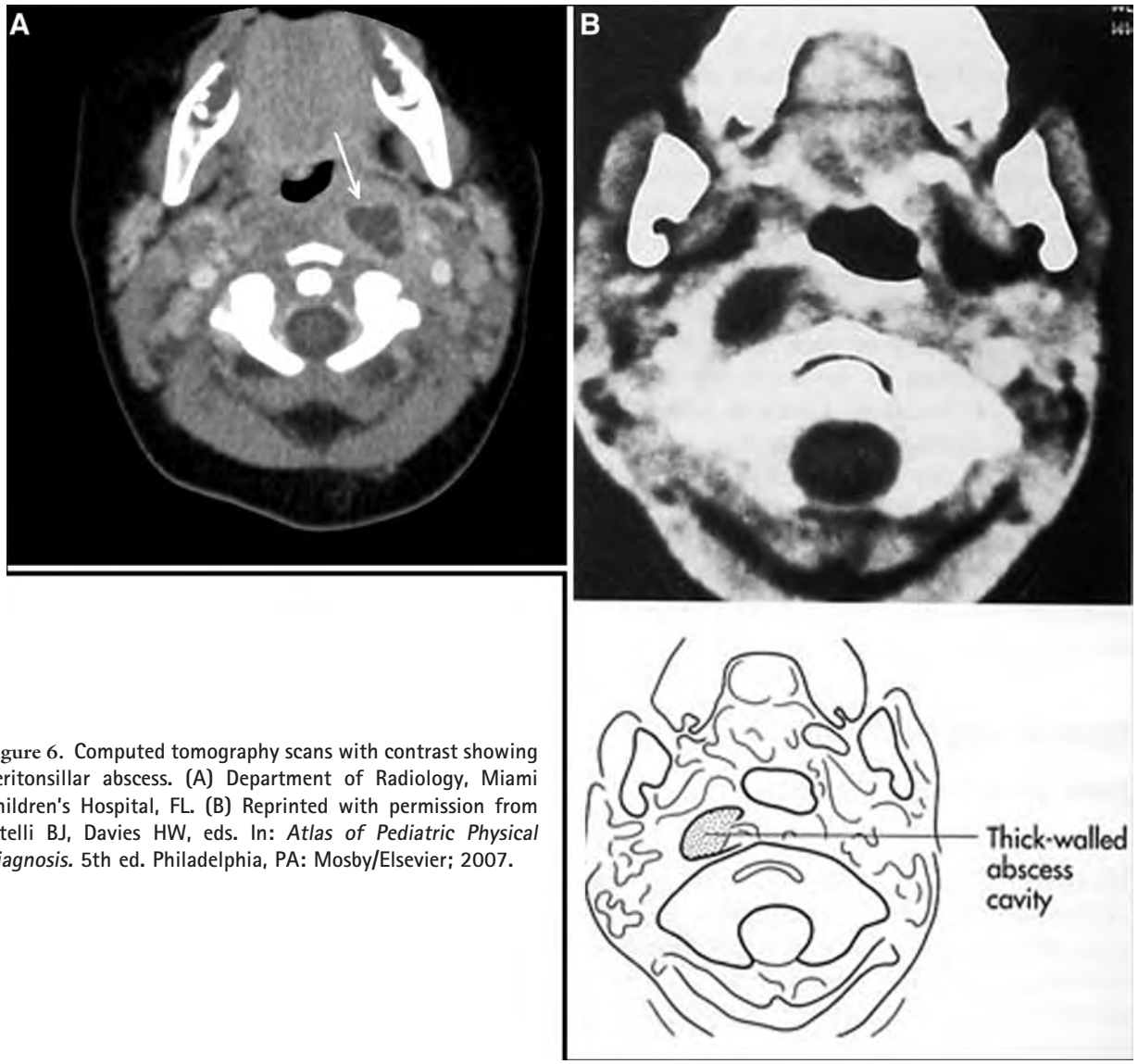

Figure 6. Computed tomography scans with contrast showing peritonsillar abscess. (A) Department of Radiology, Miami Children's Hospital, FL. (B) Reprinted with permission from Zitelli BJ, Davies HW, eds. In: *Atlas of Pediatric Physical Diagnosis.* 5th ed. Philadelphia, PA: Mosby/Elsevier; 2007.

abscess, cervical adenitis, retropharyngeal space infection, aspiration pneumonia, lung abscess, empyema, and necrotizing pneumonia. They show no evidence of person-to-person transmission except in infections resulting from human bites.

The diagnosis of peritonsillar abscess can be difficult to make based on clinical grounds alone because both peritonsillar abscess and peritonsillar cellulitis may have similar clinical presentations. A study (12) that reviewed ultrasonography, CT scan, and clinical diagnosis of peritonsillar infections revealed the sensitivity and the specificity of the clinical diagnosis by an otolaryngologist to be 78% and 50%, respectively, when compared with contrast-enhanced CT and intraoral ultrasonography, demonstrating that clinical impression alone is unreliable.

Several diagnostic modalities can be used to confirm clinical suspicion. Needle aspiration is the gold standard for diagnosis; however, it should be performed only by a trained physician due to serious complications such as aspiration of purulent drainage, bleeding, and carotid puncture. The aspirate should be sent for both aerobic and anaerobic cultures. Blind needle aspiration should be avoided because of pain, potential serious complications, and a false-negative rate of 10% to 24%.

Ultrasonography is the easiest and most useful tool for differentiating peritonsillar abscess from other conditions, for detecting the presence or absence of fluid in

the posterior pharynx, and for making management decisions. The study can be performed either transcutaneously or intraorally, which is best done by utilizing a high frequency endocavitary probe (usually 8 to 13 MHz in frequency) after spraying the pharynx with topical anesthetic for comfort. CT with contrast (Fig. 6) or magnetic resonance imaging may be indicated if spread beyond the peritonsillar space to deeper neck tissues is suspected.

The treatment of peritonsillar abscess consists of aspiration or surgical incision and drainage and antibiotic therapy for 10 to 14 days. Most otolaryngologists consider incision and drainage to be the gold standard, although in one study, (13) no significant difference was found between needle aspiration and incision and drainage with respect to duration of symptoms or initial treatment failure. There is no evidence of benefit from tonsillectomy acutely. Tonsillectomy should be done 3 to 6 months after the occurrence of abscess in patients with recurrent tonsillitis or peritonsillar abscesses.

Antibiotic therapy should be directed toward aerobes and anaerobes. *Bacteroides* species of the mouth and respiratory tract are susceptible to penicillin G, ampicillin, and broad-spectrum penicillins such as ticarcillin or piperacillin, as opposed to *Bacteroides* species of the gastrointestinal tract, which are resistant to penicillin G but sensitive to metronidazole, chloramphenicol, and sometimes clindamycin. Clindamycin is active against virtually all mouth and respiratory tract *Bacteroides* and *Prevotella* isolates and is recommended by some experts as the drug of choice for anaerobic infections of the oral cavity and lungs. Some species of *Bacteroides* and almost 50% of *Prevotella* species produce beta-lactamase. Cefuroxime, cefotaxime, and ceftriaxone are not reliably effective. It is important to highlight that no evidence has been found for the use of oral or systemic corticosteroids.

Peritonsillar abscess has several potential complications, including airway obstruction, aspiration pneumonia or lung abscess in cases of rupture of abscess; death due to hemorrhage from erosion or septic necrosis of the carotid sheath; extension of infection into deeper neck tissues or posterior mediastinum; and post-*Streptococcus* sequelae (glomerulonephritis, rheumatic fever) when the infection is caused by *pyogenes*. The overall risk of recurrence after first peritonsillar abscess is reportedly 10% to 15%.

Summary

- Based on strong research evidence, viral infections are the most common causes of acute pharyngitis in infants and preschool-age children, whereas GAS pharyngitis occurs primarily in school-age children. (2)
- Based on consensus, in sexually active adolescents with pharyngitis, the clinician should think of *gonorrhea* as one of the potential causes and test for it in addition to GAS. (2)
- Based on strong research evidence, RADTs have a high specificity, but variable sensitivity. (3)(4) Therefore, a negative RADT result does not rule out GAS infection, and a confirmatory throat culture should be sent.
- Based on some research evidence, retropharyngeal abscess occurs primarily in children <6 years of age, caused mostly by *pyogenes* and *aureus*, and responds to medical management in 25% of cases. (10)
- Based on strong research evidence, peritonsillar abscess is caused by polymicrobial aerobic and anaerobic pathogens. Evaluation and treatment must cover both aerobes and anaerobes. (10)(11)
- Based on some research evidence, peritonsillar abscesses are treated by medical and surgical interventions together. (10)(11)

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Summary of IDSA Clinical Practice Guidelines for the Diagnosis and Management of Group A Streptotoccal Pharyngitis: 2012 Update by the Infectious Diseases Society of America

RECOMMENDATIONS FOR THE DIAGNOSIS OF GAS PHARYNGITIS

How should the diagnosis of GAS pharyngitis be established?

1. Swabbing the throat and testing for GAS pharyngitis by rapid antigen detenction test (RADT) and/or culture should be performed because the clinical features alone do not reliably discriminate between GAS and viral pharyngitis except when overt viral features like rhinorrhea, cough, oral ulers, and/or hoarseness are present. In children and adolescents, negative RADT tests should be backed up by a throat culture. Postive RADTs do not necessitate a back-up culture because they are highly specific.
2. Routine use of back-up throat cultures for those with a negative RADT is not necessary for adults in usual circumstances, because of the low incidence of GAS pharyngitis in adults and because the risk of subsequent acute rheumatic fever is generally exceptionally low in adults with acute pharyngitis. Physicians who wish to ensure they are achieving maximal sensitivity in diagnosis may continue to use conventional throat culture or to back up negative RADTs with a culture.
3. Anti-streptococcal antibody titers are not recommended in the routine diagnosis of acute pharyngitis as they reflect past but not current events.

Who should undergo testing for GAS pharyngitis?

4. Testing for GAS pharyngitis usually is not recommended for children or adults with acute pharyngitis with clinical and epidemiological features that strongly suggest a viral etiology (i.e. cough, rhinorrhea, hoarseness, and oral ulcers).
5. Diagnostic studies for GAS pharyngitis are not indicated for children <3 years old because acute rheumatic fever is rare in children <3 years old and the incidence of streptococcal pharyngitis and the classic presentation of streptococcal pharyngitis are uncommon in this age group. Selected children <3 years old who have other risk factors, such as older siblings with GAS infection, may be considered for testing.
6. Follow-up posttreatment throat cultures or RADT are not recommended routinely but may be considered in special circumstances.
7. Diagnostic testing or empiric treatment of asymptomatic household contacts of patients with acute streptococcal pharyngitis is not routinely recommended.

RECOMMENDATIONS FOR THE TREATMENT OF PATIENTS WITH GAS PHARYNGITIS

What are the treatment recommendations for patients with a diagnosis of GAS pharyngitis?

8. Patients with acute GAS pharyngitis should be treated with an appropriate antibiotic at an appropriate dose for a duration likely to eradicate the organism from the pharynx (usually 10 days). Based on their narrow spectrum of activity, infrequent adverse reactions, and modest cost, penicillin or amoxicillin is the recommended drug of choice for the non-allergic to these agents.
9. Treatment of GAS pharyngitis in penicillin-allergic individuals should include a first generation cephalosporin (for those not anaphylactically sensitive) for 10 days, clindamycin or clarithromycin for 10 days, or azithromycin for 5 days.

Should adjunctive therapy with NSAIDs, acetaminophen, aspirin, or corticosteroids be given to patients diagnosed with GAS pharyngitis?

10. Adjuctive therapy may be useful in the management of GAS pharyngitis.
    a. If warranted, use of an analgesic/antipyretic agent such as acetaminophen or an NSAID for treatment of moderate to severe symptoms or control of high fever associated with GAS pharyngitis should be considered as and adjunct to an appropriate antibiotic.

b. Aspirin should be avoided in children.
c. Adjunctive therapy with a corticosteroid is not recommended.

Is the patient with frequent recurrent episodes of apparent GAS pharyngitis likely to be a chronic pharyngeal carrier of GAS?

11. We recommended that clinicians caring for patients with recurrent episodes of pharyngitis associated with laboratory evidence of GAS pharyngitis consider that they may be experiencing >1 episode of bona fide streptococcal pharyngitis at close intervals, but they should also be alert to the possibility that the patient may actually be a chronic pharyngeal GAS carrier who is experiencing repeated viral infections.
12. We recommend that GAS carriers do not ordinarily justify efforts to identify them nor do they generally require antimicrobial therapy because GAS carriers are unlikely to spread GAS pharyngitis to their close contacts and are at little or no risk for developing suppurative or nonsuppurative complications.
13. We do not recommend tonsillectomy solely to reduce the frequency of GAS pharyngitis.

Summarized from *Shulman et al. Clinical practice guidelines for the diagnosis and management of group A streptococcal pharyngitis: 2012 update by the infectious diseases society of America. Clin Infect Dis. 2012 Nov 15; 55(10): 1279-82.*

EXCERPT FROM *Empirical Validation of Guidelines for the Management of Pharyngitis in Children and Adults*

Strategy 5: Modified Centor Score and Culture Management Approach

Perform throat culture on all children and adults having a Centor score of 2 or 3 and treat those having positive culture results. Treat those having a score of 4 or more empirically. (*Clinical outcome of this approach*: 100% sensitivity, 90% specificity for Group A strep. 6.4% of prescriptions written using these criteria were "unnecessary" based on negative throat culture).

MODIFIED CENTOR SCORE	
Criteria	**Points**
Temp >38°C	1
Absence of Cough	1
Swollen, Tender Anterior Cervical Nodes	1
Tonsillar Swelling or Exudate	1
Age *3-14 Years* *15-44 Years* *45 Years or Older*	 1 0 -1

Modified from McIsaac et al. Empirical validation of guidelines for the management of pharyngitis in children and adults. JAMA. 2004. Apr 7;291(13):1587-95.

Pharyngitis Quiz

1. Name 3 non-infectious causes of pharyngitis in children: _____, _____, _____.

2. The most common causes of acute pharyngitis in children are _____.

3. The most common bacterial cause of pharyngitis is _____, causing _____% of acute pharyngitis in children. Peak incidence is between _____ years; infection is rare before _____.

4. One rash manifested by Group A strep infection concentrates along flexor creases (antecubital fossa, axillary, inguinal areas), these are called _____**.**

5. Match the clinical description with the most suspicious etiology:

Adolescent with 2 weeks of sore throat, fatigue, and hepatosplenomegaly.	NEISSERIA GONORRHOEAE
4-year-old girl with vesicles along posterior pharynx, hands, and feet.	ADENOVIRUS
2-year-old boy with pharyngeal erythema and vesicles isolated to lips and buccal mucosa.	EBV (Infectious mononucleosis)
Exudative pharyngitis with conjunctivits after swimming in pool during summer.	ENTEROVIRUS
Teenage girl with exudative pharyngitis following oral-genital sexual contact.	HSV (gingivostomatitis)

6. RADTs for Group A Strep have a high _____ (95-99%) but lower _____ (70-90%). A negative RADT **should/should not** be followed up with a confirmatory throat culture.

7. The primary goal of treating Group A Strep infections is to prevent _____ (effective within ____ days of symptom onset) as well as suppurative complications such as _____ and _____. Treatment is not effective in preventing _____.

8. The first-line treatment for Group A strep infections is _____, given as 10-day oral course of _____or single IM injection of _____**.** In younger children, oral _____ may be used as a more palatable alternative.

9. **TRUE/FALSE:** Tonsillectomy is recommended for patients with recurrent Group A Strep infections (without other complications).

10. A throat culture you sent on a patient grows out *Group C beta-hemolytic streptococci*. Will you treat with antibiotics?

PHARYNGITIS CASES

Case 1

You log into AHLTA and see that your first appointment is for "sore throat". Reviewing the chart, you see that the patient is a previously healthy 7-year-old boy with no acute visits in the recent past. The patient has checked in late and is just being brought back by the corpsman to get vitals. While you are waiting you think of the questions you will ask his parents. What would you like to know?

He is accompanied by his mother, who states that he was completely fine until he came home from school yesterday looking "wiped out" and said that his head, throat, and stomach hurt. Since then he has thrown up twice and eaten very little but mother has been pushing fluids. Denies any congestion or cough. Has not taken any medications. His vitals show T *103.7* HR *95* BP *95/57* RR *15* SpO2 *100% on room air*. What will you focus on and look for on exam?

On exam, he is lying curled up on the table and appears uncomfortable when asked to sit up. His tonsils are symmetrically enlarged with bilateral purulent exudate and palatal peticheae and he has scattered palpable anterior cervical lymph nodes. He has moist mucous membranes with cap refill <2 seconds. Exam is otherwise normal.

What is your suspected diagnosis?

How will you initially confirm your diagnosis?

Rapid strep returns positive. What is your management plan?

His mother remembers that he was diagnosed with an ear infection in the emergency department when he was 15 months old and had an allergic reaction to amoxicillin. He got a rash and might have had mouth swelling, she can't remember. How would you treat him?

He lives at home with his parents and 1-year-old younger brother. No one else has symptoms. She wants to know if she should bring his brother and father in to have the whole family tested.

She wants to know if there is any way you can give the rest of the family a prescription to take to prevent them from getting strep throat?

Case 2

Your next patient, a 5-year-old girl, is also running late. You see that her complaint is "ED f/u strep throat." Looking back in her AHLTA record, you see that she has been to the ED or urgent care for cough, congestion, and runny nose 3 times in the past 2 months and diagnosed with strep throat each time. Are you suspicious?

Father carries her into the room and she is crying with a runny nose but otherwise well-appearing. Vital signs are normal with no concerning findings on exam (oropharynx clear, non-tender shotty anterior cervical lymphadenopathy). Father states that she has been having low-grade fevers for the past 4 days (Tmax 101) with mild sore throat, cough and a lot of congestion and runny nose. She has been fussy but symptoms are gradually improving. Her appetite has decreased but she has maintained normal fluid intake and urine output. They went the ED 3 days ago to get her checked out with her history of strep throat. At that time they performed a urinalysis and urine culture which were negative but rapid strep was positive. She was given a 10-day course of amoxicillin (50mg/kg/d), is on day 3 and tolerating well. She attends daycare and has experienced 2 similar episodes in the past 3 months, both lasting about a week. They went to the ED and urgent care with positive rapid strep both times. What are your thoughts on the history and recommended management recommendations?

She returns 1 month later and is asymptomatic. Repeat rapid strep and throat culture are positive, consistent with being a chronic pharyngeal carrier of Group A strep. Her father wants to know if she needs to take antibiotics to get rid of it, and if she might spread it to others.