

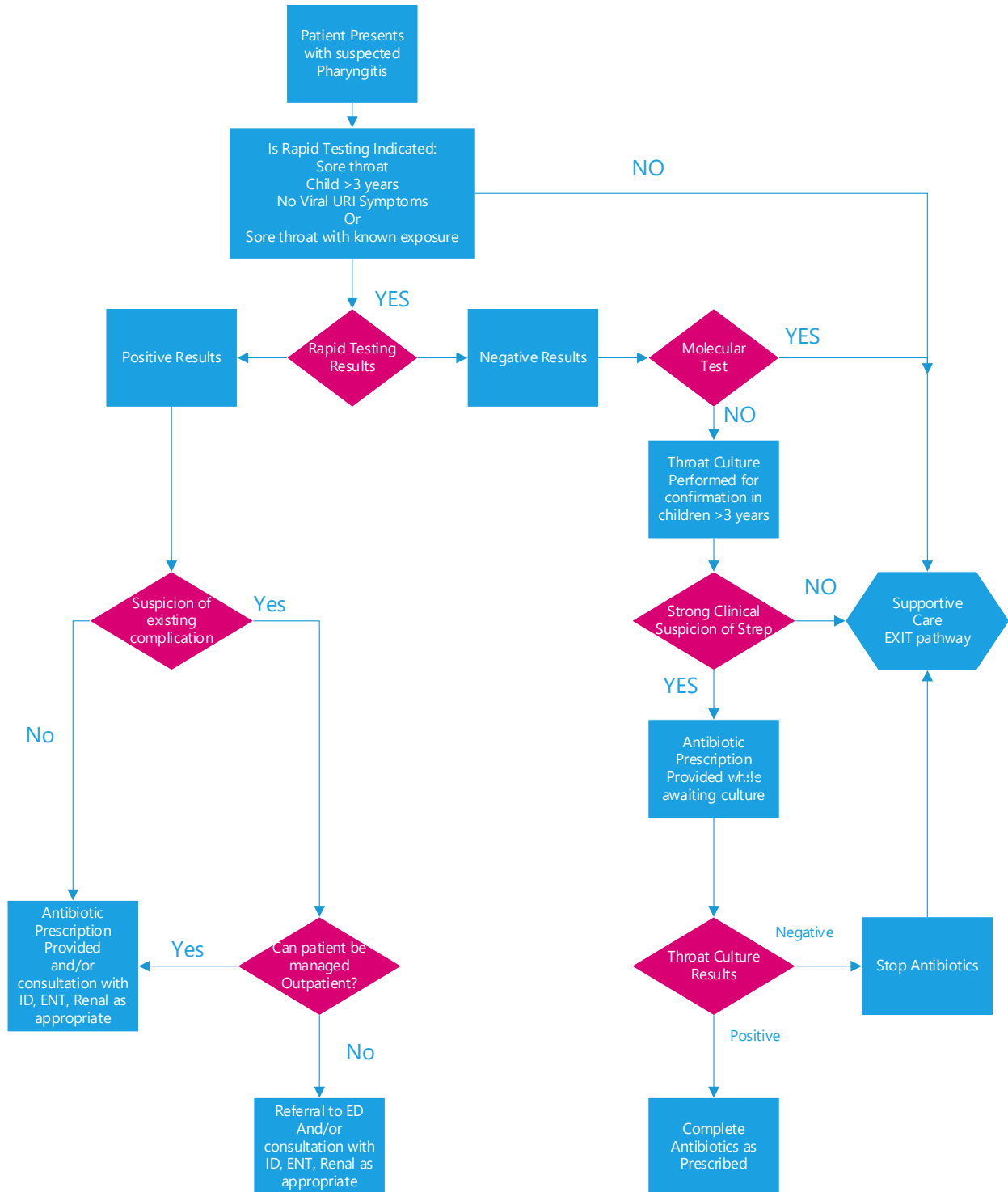
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DIAGNOSIS AND MANAGEMENT OF PHARYNGITIS WITHIN THE AMBULATORY CARE SETTING



- I. Inclusion Criteria
 - a. Children ages >3 years who present to an ambulatory care site with a suspected diagnosis of pharyngitis.
 - b. Symptomatic children <3 years with strong history of exposure such as family member who has tested positive.

- II. Exclusion Criteria
 - a. History of antibiotic therapy for GAS pharyngitis within the previous 4 weeks
 - b. Recent history of neck surgery
 - c. Recent history of neck space infection
 - d. History of tracheostomy or difficult/critical airway
 - e. Asymptomatic patients previously identified as carriers

- III. Goals
 - a. Improve understanding of best practice for diagnosis and management of pharyngitis across the system
 - b. Decrease rates of inappropriate testing in less than 3 year olds
 - c. Improve antimicrobial stewardship surrounding antibiotic usage for pharyngitis
 - d. Increased use of first line antibiotics for treatment of GAS pharyngitis

- IV. Metrics
 - a. Rates of testing for GAS in patients suspected of having GAS Pharyngitis
 - b. Appropriate prescribing of first line antibiotics at appropriate dosages as outlined in Table 1
 - c. For patients with negative testing, withholding of antibiotics unless other competing diagnosis or clinical reasoning provided
 - d. Avoidance of treatment or testing for asymptomatic family members

- V. Background
 - a. Acute pharyngitis is a frequent trigger for medical care
 - b. GAS is the only common form of acute pharyngitis requiring antibiotics
 - c. GAS is cause of acute pharyngitis 15-30% of cases
 - d. Desired outcomes of treatment include prevention of acute rheumatic fever, prevention of complications, improvement in clinical symptoms, and reduction in transmission of GAS to exposures
 - e. Primarily a disease of children ages 5-15 years
 - f. Occurs winter and early Spring
 - g. Symptoms include:
 - i. Sore throat
 - ii. Fever
 - iii. Headache
 - iv. Nausea, vomiting and abdominal pain
 - h. GAS pharyngitis is a self-limited disease with symptoms lasting 3-4 days

- i. Therapy can be safely postponed for up to 9 days and still prevent the occurrence of major non suppurative sequela, acute rheumatic fever
- VI. Definitions
- a. Group A Strep (GAS) pharyngitis is acute infection of the oropharynx or nasopharynx by *Streptococcus pyogenes*
 - b. Carrier Status represent patients in whom the persistence of GAS has been clinically identified despite treatment
- VII. Diagnosis
- a. Clinical features alone do not reliably distinguish between GAS and viral pharyngitis
 - b. Swabbing should not routinely be performed if viral features such as rhinorrhea, cough, oral ulcers or hoarseness are present
 - c. In children and adolescents, Negative Rapid antigen detection testing should be backed up by throat culture
 - d. Anti-streptococcal antibody titers are not recommended in the routine diagnoses as they are reflective of past and not current events
 - e. Clinical findings include (although none considered specific for GAS):
 - i. Tonsillopharyngeal erythema with or without exudates
 - ii. Tender enlarged anterior cervical lymph nodes
 - iii. Beefy red swollen uvula
 - iv. Petechiae on the palate found to be highly associated with GAS



- v. Excoriated nares





vi. Scarletinaform rash





- f. Scarlet fever represents the clinical presentation of GAS symptoms combined with the scarlatinaform rash.
 - g. Features suggestive of a viral etiology
 - i. Conjunctivitis
 - ii. Coryza
 - iii. Cough
 - iv. Diarrhea
- VIII. Testing – Who and When
- a. Recommended
 - i. Children less than 3 years who have other risk factors such as a sibling with GAS infection or strong exposure
 - ii. Any patient age 3 years or older presenting with clinical features of pharyngitis
 - b. Not Recommended
 - i. When clinical and epidemiological features suggest a viral cause
 - ii. Not in children less than 3 years as acute rheumatic fever rare in this age group
 - iii. Follow up throat cultures not recommended except in special circumstances
 - iv. Diagnostic testing of asymptomatic household contacts not recommended
 - c. Methods
 - i. Throat swab specimens should be obtained from the surface of both tonsils and the posterior pharyngeal wall
 - ii. Saliva can cause false negatives so care should be taken to not swab cheeks or tongue
 - iii. False negative results may occur if inadequate sampling or if patient has received antibiotics shortly before or at the time of the swab
 - iv. Most commercially available tests have an excellent specificity of greater than or equal to 95%
 - v. Rapid antigen testing NOTE Robin working on swab pictures
 - 1. Sensitivity results range from 80-90%

- 2. Throat culture swab recommended to rule out false negatives
- vi. Point of Care Nucleic Acid amplification Tests (Molecular)
 - 1. Rapid results
 - 2. Sensitivity – 98.5%
 - 3. Specificity - 93.4 %
 - 4. The increased sensitivity of NAATs could lead to treating for the presence of detectable nucleic acid and/or colonization but not true disease
- vii. Testing swabs
 - 1. Send out cultures

External Laboratory	Required Swab/Specimen Collection Requirements for Strep A/Throat Cultures	Picture of Required Swab	Additional Comments
Quest Diagnostics	<p style="text-align: center;">eSwab (Aerobic, Anaerobic & Fastidious Bacteria)</p>	 <p style="text-align: center;">SWAB, E-SWAB, MINI-TIP, 1/EA Product Id: S10</p> <p style="text-align: center;">SWAB, E-SWAB, ROUTINE, WHITE CAP, AMIES MED, 1/EA Product Id: S12</p>	
Laboratory Corporation of America (LabCorp)	<p style="text-align: center;">Transport Swab, Liquid Amies</p> <p style="text-align: center;">Order Throat Culture</p>		

2. In clinic testing swabs

Name of POCT/Manufacturer	Name of Collection Swab	Picture of Swab
BD Veritor Strep A	Puritan Sterile Rayon Tipped Applicator	
Abbott ID NOW Strep A	Puritan Sterile Foam Tipped Applicator	

IX. Treatment

- a. Empiric treatment of asymptomatic household contacts not recommended
- b. With high sensitivity of rapid antigen diagnostic testing, throat culture, or molecular testing, a positive test result establishes the diagnosis
- c. If clinician awaiting throat swab results and high clinical suspicion of illness it is reasonable to begin antibiotics with discontinuation after diagnosis not confirmed
- d. First line course due to low cost and infrequency of adverse reactions is Penicillin or Amoxicillin for 10 day course (see Table1)
- e. Completion of fully prescribed antibiotic treatment courses is recommended based on studies showing improved bacterial eradication with such courses
- f. In Penicillin allergic individuals options include a 10 days course of cephalexin, clindamycin or clarithromycin, or a 5 day course of azithromycin
- g. A single intramuscular dose of Benzathine penicillin G is preferred if unlikely to complete 10 day course
- h. GAS is uniformly sensitive to Beta lactam antibiotics (penicillin and cephalosporins)
- i. Macrolide resistance in GAS is about 15% and Clindamycin 22-24% from US data 2011 to 2018
- j. Adjunctive therapy can include analgesic/antipyretic agents
- k. Aspirin should be avoided
- l. Adjunctive therapy with a corticosteroid is not recommended

X. Return to School and activities recommendations: Children may return to school with the following criteria:

- a. They are afebrile AND
- b. At least 12-24 hours after starting antibiotics

Table 1: Recommended Therapeutic Antibiotics/Dosages for uncomplicated GAS Pharyngitis

Antibiotic	Dosage	Length of therapy
If no penicillin allergy		
Penicillin V, Oral	Children: 250mg BID or TID Adolescents: 250mg QID or 500 mg BID	10 Days
Amoxicillin	50 mg/kg once daily (max 1000 mg) or 25 mg/kg (max 500 mg) twice daily	10 days
Benzathine penicillin G	< 27 kg 600,000 units IM >27 kg 1,200,000 units IM	1 dose
If penicillin allergy (non IgE mediated)*		
Cephalexin	20 mg/kg/dose twice daily (max 500 mg/dose)	10 days
If penicillin allergy (IgE mediated)*		
Clindamycin	7 mg/kg/dose 3 times daily (max 300 mg/dose)	10 days
Azithromycin	12 mg/kg once daily (max 500 mg)	5 days
Clarithromycin	7.5 mg/kg/dose twice daily (max 250 mg/dose)	10 days

***Reaction features of immediate IgE-mediated reactions: anaphylaxis, hives, urticaria, angioedema, bronchospasm, hypotension**

- XI. Testing after completion of antibiotics
 - a. Not routinely recommended if asymptomatic at completion of antibiotics
 - b. Follow up culture of throat swabs should be routinely performed for patients with a history of rheumatic fever

- XII. Management of recurrent GAS
 - a. The reasons for treatment failure remain unclear, despite the many proposed explanations, including poor compliance, carrier state with a viral upper respiratory infection misdiagnosed as new GAS infection, recurrent exposure to GAS, inadequate antibiotic penetration, and in vivo eradication of normal protective flora
 - b. Strong consideration should be made to repeated viral episodes
 - c. GAS carriers do not justify efforts to identify or treat as unlikely to spread and little or no risk for complications
 - d. Tonsillectomy not recommended solely based on frequency of GAS

- XIII. Differential Diagnosis of Pharyngitis - There are other etiologies that cause pharyngitis and many of these are not responsive to conventional GAS antimicrobial therapy
- a. Respiratory viral infections
 - i. Present with upper respiratory symptoms, cough, conjunctivitis, headache and sometimes rash
 - ii. Cough, coryza and rash favor a viral etiology
 - iii. Clinicians also need to keep in mind that there are Individuals that may be asymptotically colonized with viruses (SARS CoV-2 40-45%, adenovirus 8-10%, rhinovirus/enterovirus 5-16%)
 - b. Epstein Barr Virus (EBV) and human cytomegalovirus (CMV)
 - i. 2 most common causes of infectious mononucleosis (IM), which is characterized by pharyngitis, hepatosplenomegaly, and lymphadenopathy
 - ii. It can be difficult to distinguish between IM associated pharyngitis and GAS pharyngitis
 - c. Other Non- Group A streptococcal infections
 - i. Associated with zoonotic or college outbreaks which present clinically like GAS pharyngitis (Group C and Group G *streptococcus*).
 - ii. These infections, however, are not associated with the non suppurative complications (post streptococcal glomerulonephritis, acute rheumatic fever); therefore the utility of antibiotic therapy has been questioned in the pursuit of antimicrobial stewardship and the mitigation of antimicrobial resistance.
 - d. *Arcanobacterium haemolyticum*
 - i. Gram positive bacillus that resembles coryneform gram positive rods.
 - ii. Found in comprehensive throat cultures but will not be identified on a culture specifically targeting GAS.
 - iii. Patients with this infection exhibit symptoms that closely mimic streptococcal infections.
 - iv. Usually seen in teenagers and young adults.
 - v. Patients can present with a rash that resembles scarlet fever.
 - vi. Organism is susceptible to antibiotics used to treat GAS pharyngitis, however there are reports of resistance to penicillin and macrolides for which culture and antimicrobial susceptibility is recommended.
 - e. *Fusobacterium necrophorum* is the
 - i. Most common causative agent for Lemiere syndrome
 - ii. Anaerobic septicemia associated with venous thrombosis in otherwise healthy, adolescents and young adults.
 - f. Toxigenic *Corynebacterium diphtheriae* causes
 - i. Pharyngeal diphtheria.

- ii. Humans are reservoir of the organism with 3-5% of the population deemed asymptomatic.
- iii. Cases reported in the United States in non-immunized persons and individuals from indigenous populations.
- iv. should be suspected in individuals that are non-immunized with pharyngitis and pseudomembranous lesions
- v. A selective media (Loeffler's or Tindale's).
- vi. Toxigenic strains of corynebacterium ulcerans can be transmitted to humans that consume raw unpasteurized milk.
- g. Sexually transmitted infections (STD) :
 - i. Gonococcal: it should be
 - 1. Considered in the differential diagnosis of individuals presenting with pharyngitis and history of orogenital sex or sexual abuse.
 - 2. Men who have sex with men (MSM) are at greatest risk for *N. gonorrhoea* pharyngitis.
 - 3. Clinical signs and symptoms include erythematous oropharynx, bilateral tonsillar enlargement, a grayish yellow exudate and occasionally cervical lymphadenitis, gingivitis and glossitis.
 - 4. Requires a special culture media (Modified Thayer Martin medium) and nucleic acid amplification test.
 - 5. NAAT in younger than 14 years of age needs to be confirmed with more than one identification modality to ensure accuracy.
 - 6. Therapy is ceftriaxone 500 mg IM once. Oral cephalosporins are no longer recommended.
 - ii. Chlamydia and syphilis
 - 1. Can present with pharyngitis but not as often.
 - 2. Clinicians should consider sexual history of their patients and be aware of clinical symptoms of STD oropharyngeal infections.
- h. Pathogens of reemerging potential must be considered given declining US vaccination rates. Also important to keep into account public health news such as monkey pox outbreak which can present with related features and pharyngitis in sexually active patients.

XIV. Group A streptococcus (GAS) chronic Carrier Data

- a. Definition: Patients that experience frequent viral illnesses and test positive for GAS (rapid antigen, throat culture or pcr testing) due to colonization for whom repeated testing and therapy is not necessary.
- b. Presentation:
 - i. Repeated episodes of acute pharyngitis at short intervals.
 - ii. Important to note that 10-25% of children with pharyngitis with positive testing for GAS represent carriers
- c. GAS Carrier Data

- i. GAS carriers do not ordinarily require antimicrobial therapy
- ii. During the winter and spring in temperate climates as many as 20% of asymptomatic school-aged children may be Streptococcus carriers
- iii. Streptococcus carriers are unlikely to spread the organism to their close contacts
- iv. There is no evidence that family pets are reservoirs
- d. Clues to the diagnosis/recognition of patient as a GAS chronic carrier:
 - i. Clinical findings are more suggestive of a viral illness vs GAS
 - ii. Household or community epidemiology support GAS or viral infection.
 - iii. Nature of clinical response to antimicrobial therapy (in GAS pharyngitis, the response to therapy usually is less than 24 hours)
 - iv. Whether test results are positive for GAS between episodes of acute GAS.
- e. Treatment of carrier state
 - i. Antimicrobial therapy is not indicated for most GAS pharyngeal carriers. There are few exceptions including:
 - 1. Local outbreak of rheumatic fever, post streptococcal glomerulonephritis or severe invasive GAS
 - 2. Outbreak of GAS pharyngitis in a closed or semi closed community
 - 3. Family history of acute rheumatic fever
 - 4. Multiple ping-pong GAS infections occurring within a family for many weeks despite appropriate antibiotic therapy.
- f. GAS carrier state is difficult to eradicate with conventional therapy. Clindamycin at 30 mg/kg per day divided every 8 hours for 10 days is the most effective therapy.

XV. GAS testing scoring systems

- a. Modified Centor Scoring Criteria
 - i. Five Scoring criteria include with each criteria giving 1 point:
 - 1. Fever >38 C
 - 2. Tonsillar Exudate
 - 3. Tender/swollen anterior cervical lymph nodes
 - 4. Absence of cough
 - 5. Age 3-14 years
- b. Testing recommendations based on score

Total Score	Is testing indicated	Testing Positive Yield
0-1	Not Indicated	1 – 10 %
2	Optional	11 – 17%
3	Indicated	28 – 53%
4	Indicated	28 – 53%
5	Indicated	28 – 53%

XVI. Complications

a. Peritonsillar Abscess

i. Background

1. Incidence of 19-30/100,000
2. Highest incidence in ages 15 – 19 years
3. If untreated significant morbidity and mortality

ii. History

1. Inability to open mouth
2. Unilateral throat pain
3. Otolgia, ipsilateral
4. If signs of airway obstruction such as drooling or tripodding referral to ED indicated
5. Hot potato voice

iii. Physical Exam

1. Palatal fullness
2. Uvula deviation
3. Trismus or loss of range of motion of jaw



iv. Diagnosis

1. Clinical exam forms basis for diagnosis
2. Consider Imaging, gold standard is CT neck with IV Contrast
3. Consult with ENT if concerns

v. Treatment

1. If suspicion for early peritonsillar abscess, outpatient treatment could be considered if patient tolerating PO well and pain controlled
2. ED referral for evaluation if not tolerating PO or concerning clinical picture
3. Amoxicillin/Clavulanate 22.5 mg amoxicillin/kg/dose every 12 hours with max 875 mg amoxicillin/dose
4. For penicillin allergy, Clindamycin 10 mg/kg/dose TID with max 600 mg/dose
5. Close clinical follow up required with ENT or PCP within 48 hours to evaluate clinical response

- b. Acute Rheumatic Fever represents a rare complication of GAS pharyngitis with annual incidence of 0.04-0.06 cases per 1000 children in the continental US. Exceptions to this rate exist in residents of American Samoa where rates can be as high as 0.1 cases per 1,000 children. Diagnosis is based on Jones Criteria and made if either 2 major or 1 major and 2 minor Criteria plus evidence of a recent streptococcal infection exist
 - i. Major Criteria
 1. Migratory polyarthritis
 2. Carditis
 3. Erythema Marginatum
 4. Sydenham chorea
 5. Subcutaneous nodules
 - ii. Minor Criteria
 1. Arthralgia
 2. Fever
 3. First degree heart block
 4. Elevated inflammatory markers (ESR, CRP)
 - c. Poststreptococcal glomerulonephritis results from rapid deterioration of kidney function following a streptococcal infection.
 - i. Can occur in children 1-2 weeks after a sore throat or 6 weeks after a skin infection.
 - ii. Presenting signs include hematuria (30 – 50%), oliguria (<50%), hypertension (60-80%) and edema (65-90%)
 - iii. Classic presentation is “coca-cola” urine
 - iv. Most commonly a self-limited disease
 - v. Treatment of GAS Pharyngitis does prevent illness
 - vi. US based outbreaks due to nephrogenic strains of GAS have been historically documented
- XVII. Patient Education
- a. Pharyngitis....To be made with Patient Education
 - b. Posters on when and why we test for strep in production
 - c. Antibiotics: [Antibiotics-Probiotics.pdf](#)

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