

The sore throat

Antibiotics are overprescribed for sore throats in general practice.

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The sore throat is one of the most common conditions encountered in a general practice and overtreatment is a common occurrence. Not only are antibiotics overprescribed, but the antibiotics chosen are often more expensive and of a broader spectrum than needed. Although not much has changed over the years a few very basic management principles remain important.

The first problem that arises is with the definition of acute pharyngitis. A spectrum exists from diffuse pharyngeal inflammation to inflammation localised to the tonsils. The two terms, acute pharyngitis and acute tonsillitis, are therefore being used synonymously.

The anatomy, physiology and embryology of this region need to be integrated to make a decision about treatment of disease in this area. What role the tonsils play in the immune system and what the possible complications of removing them in early life might be are

some of the pressing issues raised by parents. The majority of sore throats in children are of viral origin.

The aetiology remains elusive in the majority of cases because of the self-limiting nature of the condition. The frequency of each pathogen varies according to age, season, geographical area and also the immune status of the patient (Table 1). Group A beta-haemolytic *Streptococcus* remains the major treatable organism and needs a specific work-up. It also remains the most common bacterial cause of pharyngitis in children and adolescents.

The differences in evaluating children and adults need to be understood. Pharyngitis in adults is caused by a bacterial infection in approximately 5 -10% of patients, while in children bacterial pharyngitis accounts for 30 - 40% of cases.¹ Approximately 75% of adults presenting with a sore throat are prescribed antibiotics for a

Table 1. Aetiology of a sore throat

| Bacterial | Viral | Other |
|---|------------------------------------|---|
| Group A β -haemolytic <i>Streptococcus pyogenes</i> | Rhinovirus | Abscess (peritonsillar, parapharyngeal, retropharyngeal) |
| Groups C,G and F streptococci | Coronavirus | |
| <i>Arcanobacterium haemolyticum</i> | Para-influenza | Epiglottitis |
| <i>Neisseria gonorrhoeae</i> | Influenza types A and B | Cancer (squamous cell carcinoma, lymphoma) |
| <i>Treponema pallidum</i> | Human immunodeficiency virus | Autoimmune (Behçet's disease, benign mucous membrane pemphigoid, sarcoidosis) |
| <i>Chlamydia pneumoniae</i> | Adenovirus | Laryngopharyngeal reflux |
| <i>Mycoplasma pneumoniae</i> | Epstein-Barr virus | Postnasal drip |
| <i>Mycobacterium tuberculosis</i> | Herpes simplex virus types 1 and 2 | Eagle's syndrome |
| <i>Francisella tularensis</i> | Cytomegalovirus | Glossopharyngeal neuralgia |
| <i>Corynebacterium diphtheriae</i> | | Crohn's disease |
| <i>Yersinia enterocolitica</i> | | Foreign body |
| <i>Yersinia pestis</i> | | Trauma |
| <i>Trichomonas vaginalis</i> | | |
| Fungal | Protozoa | <i>Toxoplasma gondii</i> |
| <i>Candida</i> | | |

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presumed pharyngitis, even though this practice will only help a minority of patients.²

Not every sore throat is caused by an infective process and not all sore throats are 'just a cold'. A long list of non-infective causes exists and these need to be considered as a possible cause in patients not responding to medical management and who have a persistent sore throat (Table 1). Life-threatening complications can occur and need to be diagnosed and managed early and effectively. Airway obstruction and abscess formation should be identified and acted on.

We have also seen shifting trends in throat infection where severe life-threatening epiglottitis or supraglottitis affects an older immune compromised group of patients in their late teens or early twenties, needing prompt airway management. This is possibly due to immunisation failures against *Haemophilus influenzae* type B (Hib) and also because the epidemiology of epiglottitis has shifted toward other causative organisms in the Hib vaccine era.³ The majority of cases of epiglottitis are thought to be caused by other bacterial organisms, viral or combined viral-bacterial infections, and non-infectious aetiologies. In addition to Hib, the bacterial organisms responsible for epiglottitis include *Streptococcus pneumoniae*, other *Streptococcus* species, *Staphylococcus aureus*, *Moraxella catarrhalis*, *Pseudomonas* species, *Candida albicans*, *Klebsiella pneumoniae*, *Pasturella multocida*, and *Neisseria* species. Bacterial superinfection of viruses such as herpes simplex, para-influenzae, varicella zoster and Epstein-Barr also results in epiglottitis.³ Red flags in these patients would be progressively worsening symptoms and neck swelling. Lemierre syndrome, which is a severe suppurative complication of bacterial pharyngitis, needs to be considered.⁴

Finally, when surgery is contemplated, it is very important to do a proper preoperative assessment. The surgeon needs to know the indications for an adenotonsillectomy and be able to handle the potential complications and, more importantly, know how to avoid them. Many techniques have been described

and continue to be used to perform an adenotonsillectomy. The physician must have knowledge of all the surgical options available and must make an informed choice about the

method used. Whatever technique is chosen, careful surgical technique is important as well as an awareness of potential complications of the different techniques used.

Text box 1. Clinical and epidemiological findings and diagnosis of pharyngitis due to group A β -haemolytic streptococci (GABHS)

Features suggestive of GABHS as aetiological agent

- Sudden onset
- Sore throat
- Fever
- Headache
- Nausea, vomiting, and abdominal pain
- Inflammation of pharynx and tonsils
- Patchy discrete exudate
- Tender, enlarged anterior cervical nodes
- Patient aged 5 - 15 years
- Presentation in winter or early spring
- History of exposure

Text box 2. Clinical manifestations of specific organisms in acute pharyngitis

Viruses

| | |
|------------------------------|---------------------------------------|
| Rhinovirus | Common cold |
| Coronavirus | Common cold |
| Adenovirus | Pharyngoconjunctival fever |
| Influenza virus | Influenza |
| Para-influenza virus | Cold, croup |
| Coxsackie virus | Herpangina, hand-foot-mouth disease |
| Herpes simplex virus | Gingivostomatitis (primary infection) |
| Epstein-Barr virus | Infectious mononucleosis |
| Cytomegalovirus | Mononucleosis-like syndrome |
| Human immunodeficiency virus | Acute (primary) infection syndrome |

Bacteria

| | |
|-------------------------------------|--|
| Group A streptococci | Pharyngitis, scarlet fever |
| Group C and group G streptococci | Pharyngitis |
| Mixed anaerobes | Vincent's angina (necrotising gingivostomatitis) |
| <i>Fusobacterium necrophorum</i> | Lemierre's syndrome (septic thrombophlebitis of the internal jugular vein) |
| <i>Arcanobacterium haemolyticum</i> | Pharyngitis, scarlatiniform rash |
| <i>Neisseria gonorrhoeae</i> | Pharyngitis |
| <i>Treponema pallidum</i> | Secondary syphilis |
| <i>Francisella tularensis</i> | Pharyngeal tularemia |
| <i>Corynebacterium diphtheria</i> | Diphtheria |
| <i>Yersinia enterocolitica</i> | Pharyngitis, enterocolitis |
| <i>Yersinia pestis</i> | Plague |
| <i>Mycoplasma pneumoniae</i> | Bronchitis, pneumonia |
| <i>Chlamydophila pneumoniae</i> | Bronchitis, pneumonia |
| <i>Chlamydophila psittaci</i> | psittacosis |

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Anatomy

Waldeyer's ring, a ring of lymphoid tissue in the pharynx, is formed by the palatine tonsils, as well as the pharyngeal tonsils (adenoids), tubal tonsils and lingual tonsils. The arterial supply to the tonsils is extensive and comes from the external carotid system. The main supply enters the tonsil inferiorly from three separate arteries:

- tonsillar branch of the dorsal lingual artery
- ascending palatine artery
- tonsillar branch of the facial artery.

Venous drainage is through the peritonsillar venous plexus to the lingual and pharyngeal veins. The nerve supply to the tonsillar region is via the branches of the glossopharyngeal nerve and branches of the lesser palatine nerves. Lymph from the tonsillar area drains primarily to the jugulodigastric nodes.

Presentation of a patient with pharyngitis

Viral

A viral pharyngitis usually presents with mild symptoms, most patients complaining

of a sore throat, dysphagia, fever and erythema of the pharyngeal mucosa with enlarged tonsils. There is normally not an exudate present, as would be seen with certain bacterial pharyngitis.

Coxsackie virus causes small vesicles to form with erythematous bases that can ulcerate and spread over the anterior tonsillar pillars, palate and pharyngeal wall. Herpes simplex virus is normally associated with a 'cold sore'. It affects older children and young adults, and may cause exudative or non-exudative pharyngitis.

Epstein-Barr virus (EBV) infection is important for two characteristic clinical traits. Firstly, it can lead to very rapid enlargement of tonsils (sudden onset of snoring in patient with large dirty-gray tonsils). Petechiae at the junction of the hard and soft palate may be present. The airway obstruction may be life-threatening and should be managed promptly. Secondly, it can lead to the formation of a maculopapular rash in a large percentage of patients who are given penicillin (as high as 95%), even if no previous incidents of reactions against penicillin are documented.

Influenza is readily transmitted and therefore of epidemiological importance. The sore throat associated with influenza may be distinguished from streptococcal pharyngitis by several features:

- the presence of influenza cases in the community (epidemic)
- association with cough
- myalgias.

Bacterial

Group A β -haemolytic *Streptococcus* (GABHS) is the most common cause of acute bacterial pharyngitis. Acute rheumatic fever and glomerulonephritis are part of the autoimmune-mediated group of complications due to group A *Streptococcus* infection and can occur after a latent period of 2 - 3 weeks. Acute rheumatic fever presents with various manifestations that may include carditis, chorea, arthritis, subcutaneous nodules and erythema marginatum. GABHS infection has a peak incidence at about 5 - 6 years

of age but can occur in children younger than 3 and in adults older than 50.⁵ Acute symptoms include: dry throat, malaise, fever, odynophagia, dysphagia, otalgia, headache, body aches and pains and cervical lymphadenopathy (text box 2).

Examination of the mouth and pharynx may reveal a dry tongue and enlarged tonsils with yellowish white spots on the tonsils. A membrane or purulent exudates may be present over tonsils or pharynx.⁵ When symptoms that include coughing, diarrhoea, conjunctivitis and coryza are present, a viral aetiology is more likely. With other non-infective causes of pharyngitis (reflux, postnasal drip, cancer, fungal infections, cigarette smoke), the aetiology is normally identifiable and can be treated or avoided.

Approach to a patient with a sore throat

The principles for diagnosing a patient rest on taking a good history followed by a complete examination. Some specific symptoms and signs may reveal the identity of certain organisms but in most cases it only presents as a general sore throat (Algorithm 1).

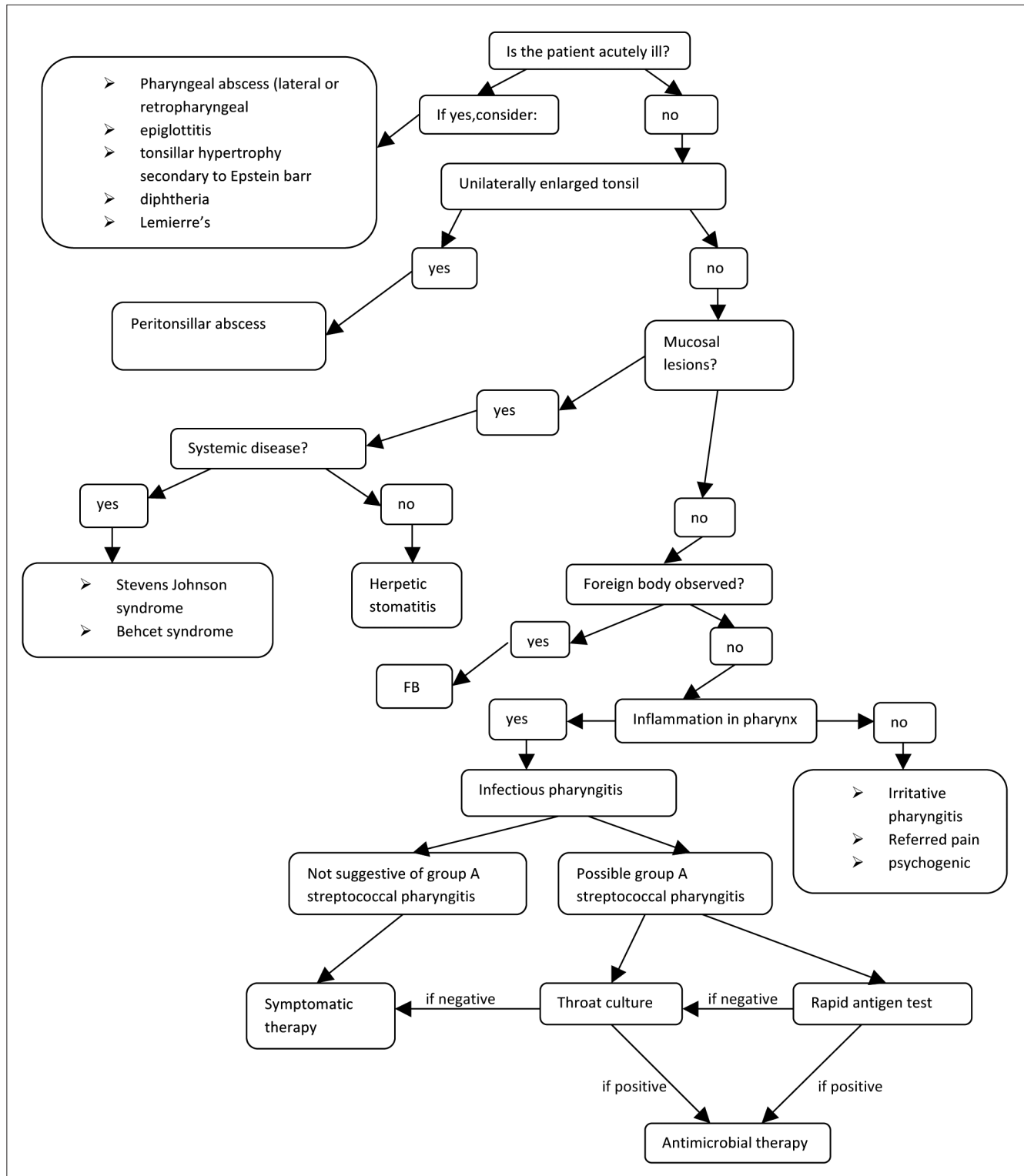
The decision to treat with antimicrobials remains a difficult one despite the available special investigations, and most decisions are still made on clinical findings. This unfortunately leads to massive overtreatment of patients with antibiotics. Listen to the patient – if the symptoms initially improved and then worsened (2nd time sicker), it may indicate an initial viral infection that became complicated by a secondary bacterial infection, which normally happens after 7 - 8 days.

GABHS remains the most prominent pathogen requiring treatment in patients of all ages, so the decision is whether or not the pharyngitis is attributable to group A streptococci.

Other pathogens that may require specific treatment are:

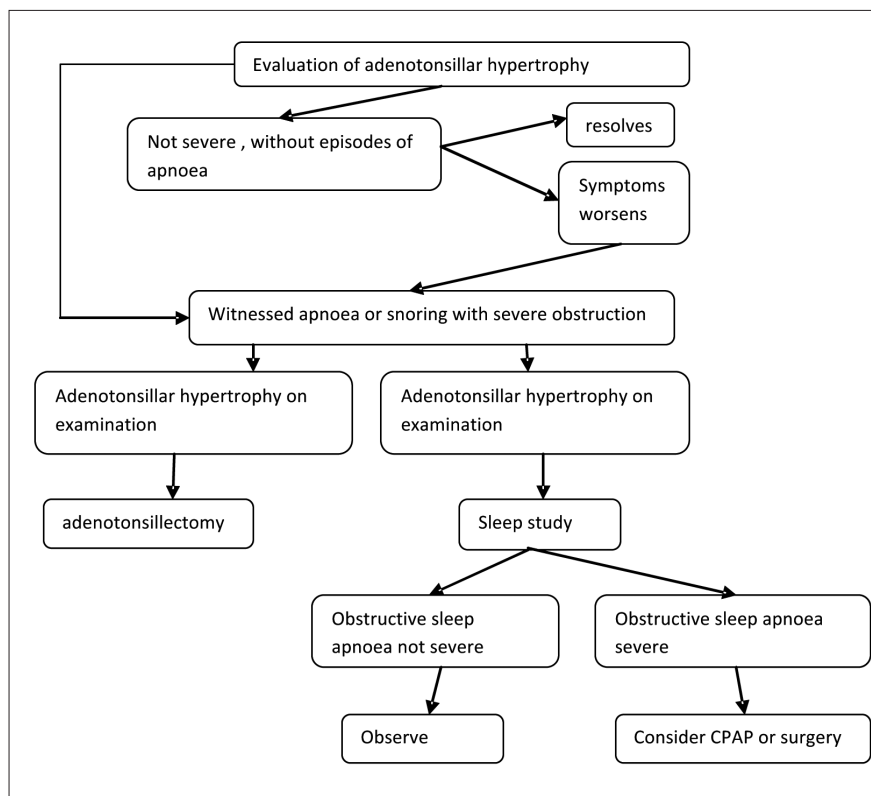
- EBV mononucleosis (splenic enlargement and airway obstruction)
- non-group A streptococci (confirmed by culture)

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Algorithm 1. Approach to a patient with a sore throat.

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Algorithm 2. Evaluation of adenotonsillar hypertrophy.

- influenza virus (high-risk patient with severe symptoms)
- primary HIV infection
- *N. gonorrhoeae*.

Diagnosis of acute GABHS tonsillitis

Most cases are diagnosed clinically, and the Centor criteria are based on clinical evaluation of symptoms and signs. It is widely used and accepted. The four criteria are:

- tonsillar exudates
- tender anterior cervical adenopathy
- fever by history
- absence of coughing.

The presence of 3 - 4 of the criteria has a positive predictive value for GABHS of 40 - 60%. The absence of 3 - 4 of the criteria has negative predictive value of 80%.

A rapid antigen test for GABHS has been developed which has helped the decision whether or not to treat patients with

antibiotics. Unfortunately even one prior dose of antibiotics may result in a negative test. It is highly specific but not as sensitive as a throat culture, which remains the gold standard, although results are delayed.⁶ Proper collection (vigorous swabbing of tonsils and posterior pharyngeal wall) and transport of the sample are key to making a correct diagnosis. If the rapid antigen test is negative it should be followed by a throat swab for culture if streptococcal tonsillitis is strongly suspected. This, however, might lead to over-treating because it is difficult to reliably differentiate between acute and chronic infection from a throat culture.

Reasons to treat GABHS:

- to prevent post-streptococcal sequelae
 - acute rheumatic fever is a significant problem in developing countries
- to prevent suppurative complications
 - peritonsillar abscess, sinusitis and retropharyngeal abscess
- to reduce symptoms – there is a modest (approximately one day) reduction in symptoms with early antibiotic treatment and for patients with more severe symptoms it might be two and a half days (severe symptoms ≥ 3 Centor criteria)⁷
- to prevent transmission – while this is important in paediatrics, due to extensive exposures, it is considered far less important in adults.

Management of a sore throat

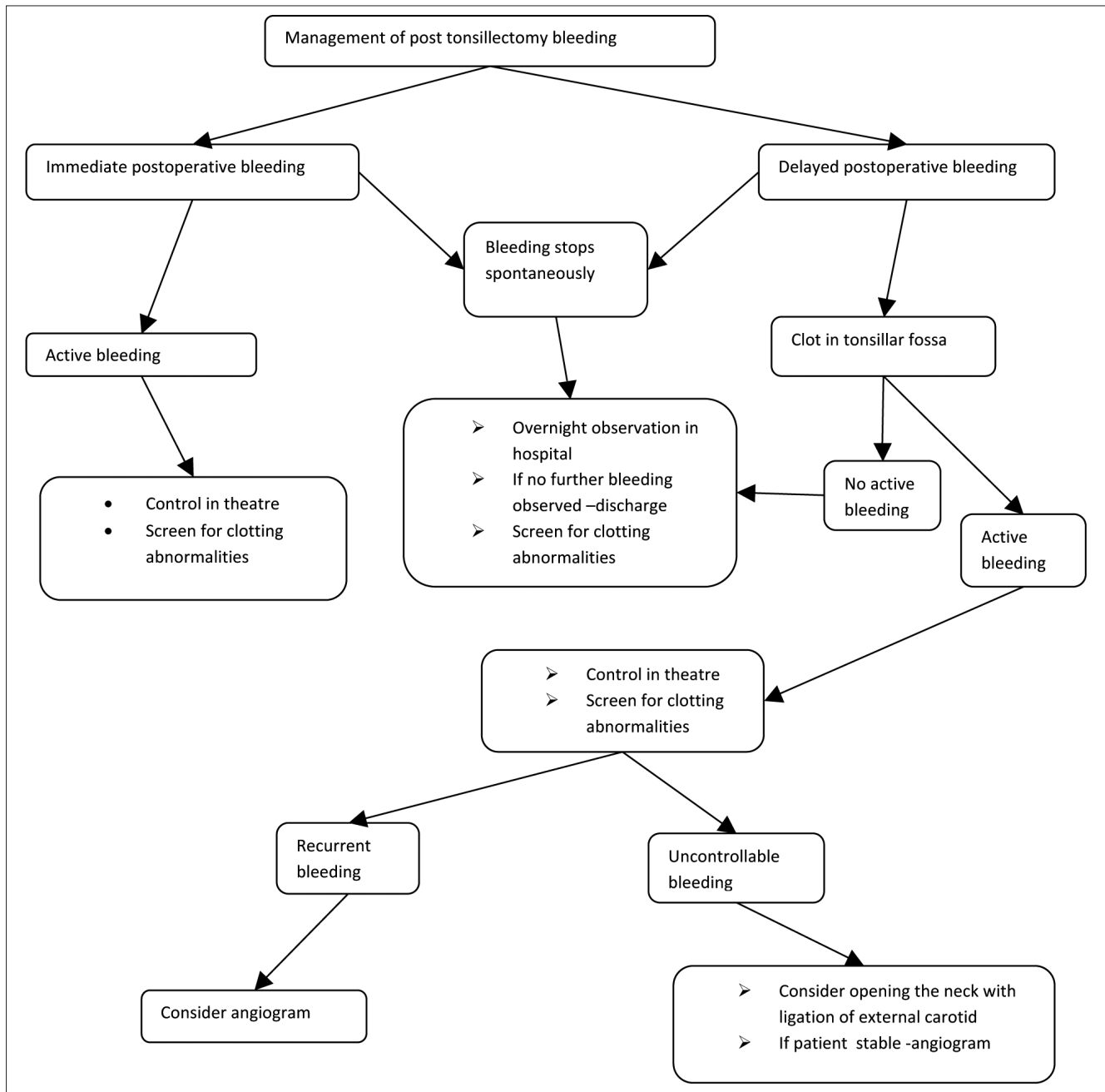
Symptomatic management

The primary decision in these patients is whether to give antibiotics and to treat the specific underlying aetiology, e.g. reflux. If no antibiotics are given treatment is symptomatic. Basic principles remain:

- rest
- adequate fluid intake
- antipyretics
- pain management.

Systemic treatment options include antimicrobial agents, pain medication and possibly anti-inflammatory agents. The use of glucocorticoids remains controversial and the benefit may be limited to infectious mononucleosis.

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Algorithm 3. Management of post-tonsillectomy bleeding.

The local or topical treatment options include:

- lozenges
- sprays
- oral rinses (gargles)
- alternative medicines.

Antimicrobial management of streptococcal pharyngotonsillitis

The current guidelines for the management of upper respiratory tract infections in South Africa should be applied.

Penicillin

Penicillin has a particularly narrow spectrum of activity and also lacks the resistance by GABHS. Resistance in the macrolide group is associated with excessive use.

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Table 2. Indications for adenotonsillectomy

| | Tonsillectomy | Adenoidectomy |
|-------------|--|---|
| Infection | <p>More than 6 episodes of acute recurrent tonsillitis or 3 episodes per year for 2 years or longer</p> <p>Recurrent acute tonsillitis associated with:</p> <ul style="list-style-type: none"> • cardiac valvular disease • recurrent febrile convulsions <p>Chronic tonsillitis associated with:</p> <ul style="list-style-type: none"> • halitosis • persistent sore throat • cervical adenitis with tenderness <p>Peritonsillar abscess</p> <p>Mononucleosis with obstructive symptoms not responding to medical treatment</p> | <p>Purulent adenoiditis</p> <p>Adenoid hypertrophy associated with:</p> <ul style="list-style-type: none"> • chronic recurrent acute otitis media • chronic middle-ear effusions • chronic otitis media with perforations of tympanic membranes • chronic otorrhea |
| Obstruction | <p>Obstructive sleep apnoea or excessive snoring</p> <p>Chronic mouth breathing</p> <p>Complications present of adenotonsillar hypertrophy:</p> <ul style="list-style-type: none"> • cor pulmonale • failure to thrive • dysphagia • speech abnormalities • craniofacial growth abnormalities associated with occlusion abnormalities | <p>Obstructive sleep apnoea or excessive snoring</p> <p>Chronic mouth breathing</p> <p>Adenotonsillar hypertrophy associated with complications of obstructions:</p> <ul style="list-style-type: none"> • cor pulmonale • failure to thrive • dysphagia • speech abnormalities • craniofacial growth abnormalities associated with occlusion abnormalities |
| Other | Suspected neoplasia | <p>Suspected neoplasia</p> <p>Chronic sinusitis associated with adenoid hypertrophy</p> |

Children

- Penicillin VK: 250 mg twice daily for 10 days (<27 kg); 500 mg twice daily for 10 days (>27 kg) (given 30 minutes before food)
- Benzathine penicillin as intramuscular injection: 3 - 5 years: 600 000 U; >5 years: 1.2 MU

Adults and adolescents

- Penicillin VK, 500 mg twice daily for 10 days (given 30 minutes before food)
- Benzathine penicillin (intramuscular injection): 1.2 MU as single dose.

To minimise the discomfort of parenteral administration, the medication should be given at room temperature. For patients receiving 1.2 million U, 300 000 U can be given as procaine penicillin.¹¹

Amoxicillin

Can be used as an alternative to penicillin VK. If patients infected with Epstein-Barr virus are treated with amoxicillin, a rash might occur.

Children

- <30 kg: amoxicillin, 750 mg once daily for 10 days
- >30 kg: amoxicillin 1 500mg once daily for 10 days.

Adults

- Amoxicillin, 500 mg twice daily for 10 days

Short-course therapy

This is a recent development. Adam and colleagues showed equivalence between penicillin given 3 times daily for 10 days and a number of regimens (including use of new macrolides or second-generation cephalosporins) given for 5 days.⁸

Children

- Amoxicillin-clavulanate 40 mg/kg/day in 3 divided doses
- Azithromycin 10 - 20 mg/kg once daily for 3 days
- Clarithromycin 7.5 mg/kg twice daily
- Cefpodoxime 4 mg/kg twice daily
- Cefprozil 7.5 mg/kg twice daily
- Cefuroxime 10 mg/kg twice daily.

Adults

- Amoxicillin-clavulanate 375 mg 3 times daily
- Azithromycin 500 mg once daily for 3 days
- Clarithromycin (modified release) 500 mg once daily
- Cefpodoxime 100 mg twice daily
- Cefprozil 500 mg twice daily
- Cefuroxime 250 mg twice daily
- Telithromycin 800 mg once daily.

Chronic adenotonsillar hypertrophy

The various degrees of airway obstruction that are caused by adenotonsillar hypertrophy are currently the most common indication for an adenotonsillectomy in the USA.⁹ Great loads of pathogenic bacteria occur in hypertrophied and chronically infected tonsils.^{10,11} It is important to note that second-hand smoke is also listed as a cause for adenotonsillar hypertrophy (Fig. 1).

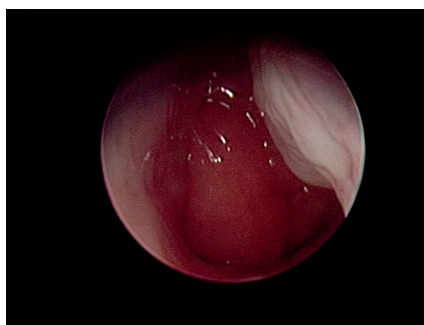


Fig. 1. Adenoids obstructing posterior choanae.

The importance of this condition rests on prevention of the possible serious complication that can be caused by obstructive sleep apnoea, namely pulmonary hypertension and cor pulmonale, failure to thrive and developmental delay.¹² Behavioural problems in these children are common, particularly attention deficit hyperactivity disorder (see algorithm 2).

These findings have been well correlated with formal sleep study results. Not all children need to have a polysomnograph done and not all children tested have positive results. In various different studies the association between behavioural and/or academic problems has been well

correlated with various degrees of sleep-disordered breathing.¹³ However, there is limited literature on diminished symptoms after adenotonsillectomy. Enuresis is another indicator that there might be severe underlying obstructive sleep apnoea symptoms.

Indications for adenotonsillectomy

Tonsillectomy or adenotonsillectomy is a surgical procedure that can cause serious complications and therefore the indications for surgery need to be considered with caution (Table 2).

Possible complications of adenotonsillectomy

Postoperative haemorrhage is the most common and most serious complication of adenotonsillectomy. Rates vary from 0.5% to 10%. This can be prevented by a good preoperative assessment focusing on medication usage and possible coagulation abnormalities, a thorough knowledge of the anatomy, and meticulous attention to intra-operative haemostasis (see algorithm 3).

Other complications include injury to the teeth or lips, airway obstruction and pulmonary oedema, velopharyngeal insufficiency, nasopharyngeal stenosis and cervical spine stenosis.

Persistent sore throat

It is important to reconsider the initial diagnosis. Consider an alternative diagnosis or further investigation if the individual has not responded to a course of antibiotics. Consider a neoplasm if the sore throat is persistent, especially if there is a neck mass.

Indications for urgent referral include:

- an unexplained persistent sore or painful throat – ‘persistent’ refers to a time frame of 3 - 4 weeks
- red, or red and white patches, or ulceration or swelling of the oral/pharyngeal mucosa for more than 3 weeks
- odynophagia or dysphagia for more than 3 weeks
- unexplained hoarseness accompanied by persistent sore throat.

Consider non-infectious causes of sore throat (e.g. gastro-oesophageal reflux disease, chronic irritation from cigarette smoke, alcohol or hay fever).

References available at www.cmej.org.za

IN A NUTSHELL

- It is important to understand the possible underlying aetiology involved in a sore throat, both infective and non-infective causes. The most important decision revolves around antibiotics, and the question to give or not to give remains a daily challenge for most practitioners.
- A good history is the most important part of your assessment. Explaining the different possibilities to the patient or parents normally helps them understand the need to withhold or to give antibiotics
- If there is an indication for surgery, be sure to clarify your indication to the parents or patient.
- Know your anatomy and be sure to follow sound surgical principles. Know how to manage the possible complications of adenotonsillectomy and, more importantly, know how to prevent them!