CLINICAL PRACTICE GUIDELINES

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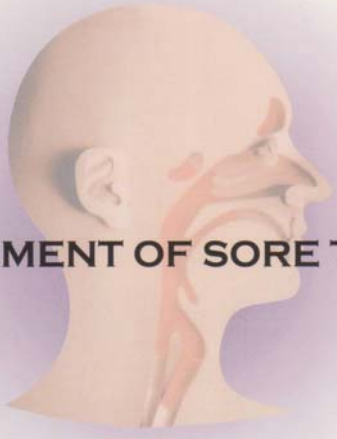

MANAGEMENT OF SORE THROAT

MINISTRY OF HEALTH MALAYSIA

ACADEMY OF MEDICINE OF MALAYSIA

MALAYSIAN SOCIETY OF INFECTIOUS DISEASES AND CHEMOTHERAPY

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FOREWORD

Sore throat is inevitably one of the most common symptoms experienced by people at one time or another. As there are many causes of sore throats, it is important that the medical practitioner be familiar with the possibilities so that the best evidence-based treatment can be offered to the patient. As infective etiologies of sore throat are arguably among the most common causes of sore throat and with widespread injudicious antimicrobial therapy for sore throat in the community, there is a danger of increasing antimicrobial resistance and untoward side effects of therapy. Furthermore, accurate clinical diagnosis of the most common infective pathogen for sore throat, i.e. Group A Streptococcus, is often difficult to establish. Diagnostic facilities for accurate detection of this particular organism are often lacking and results are often delayed in most ambulatory practices, compounding the difficulties in accurate diagnosis and appropriate management. Also, tonsillectomy has often been recommended for patients with recurrent sore throat although the indications may be questionable. It is with this multi-faceted background that a working group was commissioned to formulate a clinical practice guideline (CPG) on the management of sore throat, with unique reference to Group A Streptococcal pharyngitis because it is the most common bacterial cause of sore throat where treatment is indicated. It is hoped that this CPG will be able to address some of these issues and meet the needs of the medical practitioner towards managing this common symptom. Finally, I would like to acknowledge the fervent support of the Malaysian Society of Infectious Diseases & Chemotherapy and Pharmacia Malaysia for excellent secretarial assistance and publication of this document.

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GUIDELINE DEVELOPMENT AND OBJECTIVES

Guideline Development

Sore throat is a very common symptom in both children and adults, caused by many etiologies including infections due to bacterial and viral pathogens. It is also a common cause of presentation to medical practitioners. Sore throat is a frequent indication of antibiotic prescription in the community, resulting in significant healthcare costs and may potentially contribute to increasing antimicrobial resistance with widespread and inappropriate use of antibiotics. Furthermore, tonsillectomy is often recommended unjustifiably for patients with recurrent sore throat although the outcome is as yet undefined, and may potentially cause appreciable morbidity in some patients. Sore throat in this guideline refers to both tonsillitis and pharyngitis or both, occurring in the context of infection.

Objectives

The main aim of the guideline is to present evidence based recommendations to assist medical practitioners in providing a rational approach in the management of sore throat and also would highlight the need for rational and judicious use of antibiotics in its management.

Clinical Question

The clinical questions of these guidelines are:

i. What is the rational approach to the management of sore throat in the community?
ii. What is a reasonable criterion to refer cases for tonsillectomy?

Target Population

These guidelines are to be applied to both paediatric and adult patients from the community with complaints of sore throat.

Target Group

These guidelines are developed for all health care professionals involved in the diagnosis and management of cases with sore throat.

LEVELS OF EVIDENCE SCALE

I	Evidence obtained from at least one properly randomized controlled trial
II - 1	Evidence obtained from well-designed controlled trials without randomization
II - 2	Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than one center or research group
II - 3	Evidence obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments (such as the results of the introduction of penicillin treatment in the 1940s) could also be regarded as this type of evidence
III	Opinions of respected authorities, based on clinical experience; descriptive studies and case reports; or reports of expert committees

SOURCE: U.S. / CANADIAN PREVENTIVE SERVICES TASK FORCE

TABLE OF CONTENTS

1. INTRODUCTION

1.1 Epidemiology

The epidemiology of sore throats in Malaysia with respect to its prevalence, age-specific incidence, aetiology and complications has not been well studied and documented. In a 1984 hospital-based study involving three general hospitals in Kuala Lumpur, Kota Baru and Ipoh, acute respiratory infections (ARIs) were responsible for 44.1 % of all paediatric admissions (1). In a later study in 1996, the prevalence for ARIs in the preceding 2 weeks in children below 5 years was 39.3 %, of which 91% of the cases were upper respiratory tract infections (URTI). Although the prevalence of tonsillopharyngitis in these studies was not documented, undoubtedly URTI is the most common reason for seeking treatment in general practice and hospital outpatient departments. (2, 3)

Epidemiological data from Western countries on sore throat in general and specifically Group A β-hemolytic Streptococcus (GABHS) infections , both community and hospital-based, are more readily available. However, there is considerable variation in the prevalence of GABHS sore throats from one country to another (4-9), both in Asian and Western countries.For example, in Dhaka 22 % of 601 children studied had a positive culture but only 2.2 % is due to GABHS. In Israel the prevalence is 15 % among 152 symptomatic children aged 3 month to 5 years old. In the Italian-French study, 26 % of 865 children from 5 months to 14 years had GABHS pharyngitis. Overall, the figure is less than 30 % in most countries. In the adult population GABHS is responsible for 5-10% of cases of acute pharyngitis (9, 10).

1.2 Economic cost

The economic impact of pharyngitis locally is not known due to paucity of studies, although this has been studied in some Western countries. In the adult population, about 6.7 million visits annually to a medical practitioner were for sore throat (12). In the UK it is estimated that visits for consultation for sore throat alone (before any investigation or treatment) cost the NHS £60 million per annum (13). Consequently, treating pharyngitis in both children and adults has significant economic and health impact.

2. CLINICAL MANIFESTATIONS OF SORE THROAT

The etiologic agents of sore throat are listed in Table 1 (14). Viral pathogens are more frequent causes of infective sore throat compared to bacterial pathogens. GABHS is the most common bacterial cause of acute pharyngitis ,accounting for approximately 15-30% of cases in children and is also the only common form of pharyngitis for which antibiotic therapy is indicated (9,15). Streptococcal sore throat is usually rare in children < 3 years, occurring more frequently in children between 5-15 years old (9). Symptoms and signs of GABHS pharyngitis are fairly similar in children and adults. Symptoms include sudden onset of sore throat, pain on swallowing, fever, headache, abdominal pain, nausea and vomiting. Signs include tonsillopharyngeal erythema, tonsillopharyngeal exudate, soft-palate petechiae; beefy-red swollen uvula, swollen and tender anterior cervical

lymph nodes and rash (9). Not all patients have the full-blown syndrome and many cases are milder and do not have exudates.

Table 1. Microbial Causes of Sore Throat*

Pathogen	Estimated %
Viral	
Rhinovirus	20
Coronavirus	>5
Adenovirus	5
Herpes virus	4
Parainfluenza virus	2
Influenza virus	2
Coxsackie A	<1
Epstein-Barr virus	<1
Cytomegalovirus	<1
HIV	<1
Bacterial	
Streptococcus , Group A	15-30
Streptococcus , Group C	5
Neisseria gonorrhoea	<1
Corynebacterium diptheriae	<1
Arcanobacterium haemolyticus	<1
Chlamydia pneumoniae	Unknown
Mycoplasma pneumoniae	<1

* Adapted from Gwaltney JM et al (14)

Prevalence of GAS pharyngitis is significantly lower in adults, accounting for only 5-10% of cases (9). A recent study in Hong Kong revealed a rate of only 2.65% in those > 14 years of age (17). In both children and adults, the usual incubation period for streptococcal pharyngitis is 2-5 days (18).

The clinical picture in adults is characterized by an abrupt onset of the following:

- Sore throat associated with difficulty in swallowing
- Fever moderate (39-40.5°C)
- Chills maybe present but rigors rare
- Malaise
- Headache
- GI symptoms: anorexia, nausea, vomiting & abdominal pains (35-50% of cases) but not verified by objective studies.

Rhinorrhea, cough, hoarseness, conjunctivitis, and diarrhea are typically not seen in streptococcal infection, being more often seen in infections of viral aetiology (9, 19). However, there is a broad overlap in the clinical presentation of streptococcal and viral pharyngitis making it difficult clinically to differentiate between them. Some of these features have been used as a form of clinical scoring (one of which is described below) to assist clinicians in making a clinical diagnosis of GABHS pharyngitis (20-22).

A scoring system has been devised by McIsaac to increase the clinical diagnostic accuracy , based on age and four clinical symptoms ,i.e. tonsillar swelling / exudates, swollen anterior cervical nodes, fever > 38°C & lack of a cough (22). Even if a patient has all four classic symptoms, there is a significant probability that it is not Group A streptococcal sore throat. However , presence of certain clinical features such as rhinorrhea ,hoarseness , cough , conjunctivitis ,diarrhea and oropharyngeal ulceration may suggest a likely viral etiology (9,19,23).

3. DIAGNOSIS AND LABORATORY INVESTIGATIONS

As the precise clinical diagnosis of GABHS pharyngitis is difficult , it is recommended that the clinician's decision to perform a laboratory test for a patient with suspected GABHS pharyngitis be based on the McIssac scoring system (Evidence level II-2)(22) . This system attempts to predict the probability that the pharyngitis is caused by GABHS. Hence, testing need not be performed for patients with acute pharyngitis whose clinical and epidemiological features do not suggest GABHS infection. As diagnosis of group A streptococcal pharyngitis cannot be confidently excluded, bacteriologic studies should be performed guided by this scoring system (Evidence level II-2). Selective use of the suggested diagnostic test for group A streptococci will result in an increase in both the proportion of positive test results and the percentage of patients with positive test who are truly infected than are merely carriers (Evidence level II-2). Methods for the diagnosis of group A streptococcal pharyngitis are based on recommendations from the Public Health Laboratory Service Standard Operating Procedure on Investigation of Throat Swabs (24) and the guideline on diagnosis of GAS pharyngitis by the Infectious Diseases Society of America (25).

3.1 Laboratory diagnosis

Culture of throat swab for the presence of GABHS remains the gold standard for the confirmation of the clinical diagnosis of acute streptococcal pharyngitis (Evidence level II-2). A single throat swab collected, transported and cultured under recommended conditions has a sensitivity of 90%-95% in detecting the presence of group A streptococcus in the pharynx. Variations in the collection, transport and culture methods can affect the accuracy of the culture results.

3.2 Specimen collection

Throat swab specimens must be obtained from surface of both the tonsils and the posterior pharyngeal wall. The mouth, uvula and oropharynx are not acceptable sites for sampling and the swab should not be contaminated by touching these sites before or after the sampling process. Manner in which the swab is obtained has an impact on the yield of streptococci from the throat culture (26, 27). Optimal time of specimen collection is at the onset of symptoms and before antimicrobial therapy is started.

3.3 Specimen transport and storage

Specimens should be transported and processed as soon as possible. Swabs should be transported in Amies or Stuart's transport medium. If processing is delayed, refrigeration is preferable to storage at ambient temperature (24). Delays of over 48 hours are undesirable.

3.4 Specimen processing

The culture should be plated and streaked carefully and efficiently as described by Kaplan (28).The swab should be firmly rolled over onto approximately one-fifth of the 5% sheep blood agar surface (primary inoculation), this will ensure organisms present on one part of the swab make contact with the culture medium. Secondary inoculation is then carried out with a sterile loop and without heating the loop. A final inoculation with the loop is done with several stabs into the agar to allow observation of subsurface haemolysis. Some strains of group A streptococci are haemolytic only under conditions of reduced oxygen tension. Detection of *Streptococcus pyogenes* from culture plates is based on typical colony morphology with beta haemolysis. Figure 1 is an illustration of the streaking method reproduced from an American Heart Association's brochure (29). This method of streaking the culture medium is to minimize overgrowth or antagonism of *Streptococcus pyogenes* by the normal flora and to maximize the ability to detect beta – haemolysis.

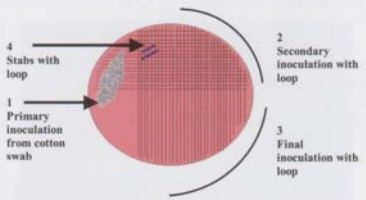


Figure 1.
Proper method for inoculation of blood agar plate for identification of group A beta haemolytic streptococci

3.5 Atmosphere of incubation

The culture plates are then incubated at 35°C– 37°C for 18 –24h, aerobically, before they are read. Additional overnight incubation at room temperature allows identification of a considerable number of positive throat cultures (24). Therefore, it is recommended that plates which are negative during the first 24 hours are reexamined at 48 hours for growth resembling group A beta-haemolytic streptococci. Any colonies usually less than 1mm in diameter, grey-white or colourless with beta-haemolysis, dry or shiny and usually with an irregular outline is suggestive of group A streptococcus (Figure 2). Not all beta-haemolytic streptococci are Lancefield group A, therefore differentiation of group A from non-group A strains should be accomplished as stated below.

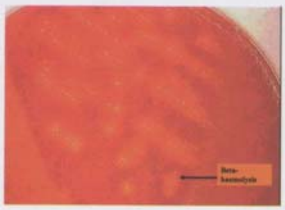


Figure 2.
Beta-haemolytic streptococci on sheep blood agar

Sensitivity to bacitracin (using a 0.004u disc) is used to assist in the identification of group A streptococci. This test provides a presumptive identification based on the observation that more than 95% of group A streptococci show a zone of inhibition around a disc of bacitracin (Figure 3) while 83%-97% of non-group A streptococci do not (30, 31).

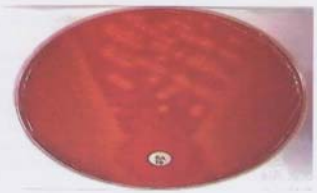


Figure 3.
Streptococcus pyogenes : zone of inhibition around bacitracin disc.

A highly specific method (32) for identifying group A streptococci is by the detection of group specific cell wall carbohydrate antigen directly from bacterial cultures (Figure 4) , using group specific antiserum which are obtained commercially.

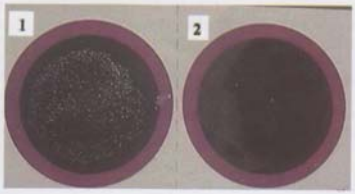


Figure 4.
Detection of group specific carbohydrate antigen from bacterial cultures.
Showing : 1-Agglutination (Confirms group A streptococcus)
2-No agglutination (Negative control)

3.6 Rapid Antigen Detection Tests (RADT)

With the availability of RADT (Figure 5) , group A streptococci can be identified directly from throat swabs. The former has an advantage of speed in providing

Figure 5.
Rapid Antigen Detection Test.

results (within minutes) as compared to the gold standard culture method (48 hours). Other advantages of this diagnostic test, besides being a point of care test, in view of its turn around time would help reduced the risk of spread of this infection, allow patients to return to work or school earlier, reduce acute morbidity as well as increase the number of patients appropriately treated for streptococcal pharyngitis (33). With the availability of RADT locally, as well as the excellent specificity (>95%), this test allows therapeutic decisions to be made with greater

degree of confidence during the patient's initial encounter with the clinician. Techniques of RADT include optical immunoassay and EIA (19, 34). Since local evaluation of the RADT has not been carried out and validated against throat culture, it is recommended that a negative RADT result should be confirmed with conventional culture methods (Evidence level II-2).

3.7 Recommendations for diagnosis

Diagnosis of acute GAS pharyngitis should be suspected on clinical and epidemiological grounds, and then supported by laboratory test. Either a positive throat culture or RADT provides adequate confirmation of GAS in the pharynx, but a negative RADT result should be confirmed with a throat culture, whenever possible. (Evidence level II-2).

4. COMPLICATIONS

Complications of GABHS pharyngitis include both suppurative and nonsuppurative. Suppurative complications are peritonsillar abscess (PTA) and retropharyngeal abscess (RPA). Peritonsillar abscess is the most common complication of acute tonsillitis (35). 15-36% of patients with PTA had prior history of oropharyngeal infections (36-38). PTA occur as a direct communication and progression of acute exudative tonsillitis and the incidence is mainly in adolescent (39, 40). 12-45% of patients with RPA had preceding history of upper respiratory illness and is more common in children under 3 years of age (41-45). Nonsuppurative complications include acute rheumatic fever, acute post streptococcal glomerulonephritis and reactive arthritis (16). The most important nonsuppurative complication is acute rheumatic fever which occurs approximately 3 weeks after streptococcal pharyngitis and its major clinical manifestations are arthritis, carditis, chorea, erythema marginatum and subcutaneous nodules (16). The risk of acute rheumatic fever complicating untreated streptococcal pharyngitis is 1% and at least one third of episodes of acute rheumatic fever result from sub clinical streptococcal infections (23, 46). However, a delay of therapy up to 9 days is acceptable without compromising the beneficial effects of antibiotics on the prevention of rheumatic fever (19, 23). Acute post streptococcal glomerulonephritis also usually occurs 3 weeks after throat or skin infection by Group A streptococci of specific nephritogenic serotypes. Although the general underlying mechanisms may be similar, they differ in their pathogenesis, clinical manifestations, epidemiology and potential morbidity.

5. MANAGEMENT

Management of sore throat include 1) symptomatic treatment, 2) antibiotic therapy for GABHS pharyngitis and, if clinically indicated, 3) surgical treatment, including tonsillectomy.

5.1 Symptomatic treatment

Symptomatic treatment is an integral part in the management of children and adults with sore throat. It can be broadly divided into following categories:

1. General Measures (Evidence level III) (9, 47)
Prevention of dehydration by maintaining an adequate fluid intake and relief of throat discomfort by using warm saline gargle are helpful and inexpensive.

2. Simple Analgesics / Antipyretics (48, 49)
Paracetamol is an effective and safe analgesic and antipyretic. It is the drug of choice for analgesia in sore throat (Evidence level I). Aspirin is not recommended for general use especially in children because of the risk of Reye's syndrome.

3. Non-Steroidal Anti-inflammatory Agents (NSAIDs)
Ibuprofen, one of the many non-steroidal anti-inflammatory agents (NSAIDs) available has been used increasingly for the treatment of pain and fever in children as well as adults with sore throat. Studies suggest that it is a safe and effective alternative for analgesia and antipyrexia compared to placebo, aspirin or paracetamol but their sample size were relatively small(Evidence level I) (48-50). As NSAIDs are well recognised to be associated with significant risk of gastrointestinal bleeding, their routine use in the management of sore throat is not recommended.

4. Throat Lozenges / Gargles
Throat lozenges and gargles are frequently used by the patient even before they see a general practitioner. They are helpful as adjunctive therapy especially in those with significant throat pain or discomfort (Evidence level I & II-2)(51-55).

5. Others
Dexamethasone has been used as an adjuvant therapy for severe acute exudative pharyngitis and was found to result in more rapid onset and greater degree of pain relief (Evidence level 1)(57). However, the study only involved small number of patients and further studies are needed to evaluate its effectiveness and safety especially those with positive culture.

Vaccination against both influenza and pneumococcus has been shown to result in significant reductions in the number of future episodes of acute sore throat (Evidence level I) (48). Similarly, spraying the throat to colonise it with less pathogenic streptococcus appeared to reduce sore throat recurrences. However data on these measures are still limited and need further evaluation before they can be recommended for routine use in sore throat.

5.2 Antibiotic therapy for GABHS pharyngitis

The majority of sore throats are of viral origin and do not need antibiotic therapy. Antibiotics should not be used routinely to secure symptomatic relief in sore throat (Evidence level I) (57). Antimicrobial therapy is of no proven benefit in the treatment of acute pharyngitis due to bacteria other than Group A streptococci (9). The exceptions are infections caused by Corynebacterium diptheriae and Neisseria gonorrhea. Over-prescription of antibiotics for sore throat may lead to

emergence of antibiotic resistance and exposes the patient to potential adverse effects (9). Ideally, a throat swab should be taken before starting empiric antibiotics and treatment started only for documented Group A streptococcal infection. However, due to practical constraints such as lack of accessibility and cost of throat cultures and lack of follow-up, antibiotics may be started if streptococcal sore throat is clinically suspected, the patient is toxic-looking and follow-up is not possible. The objectives of treating Group A streptococcal pharyngitis are to prevent acute rheumatic fever, prevent suppurative complications, decrease infectivity and shorten the clinical course of the disease. Penicillin remains the drug of choice for Group A streptococcal pharyngitis because of its proven efficacy, narrow spectrum, safety and low cost (Evidence level I) (19, 23, 58). There has never been a clinical isolate of Group A streptococci documented to be resistant to penicillin so far. If oral therapy is chosen, a full 10-day course of treatment is recommended to ensure maximal rate of eradication of the infection from the pharynx. Erythromycin may be considered in patients who are allergic to penicillin (Evidence level I) (59-61), while clindamycin may be offered to those patients who are both penicillin-allergic and erythromycin-intolerant (Evidence level II-1) (60).

5.2.1 Antibiotics for streptococcal sore throat: Pediatric age group

Oral: Penicillin V – 250mg bid or tid x 10 days
Intramuscular: Benzathine penicillin - <27kg: 600,000 units x 1 dose;
>27kg: 1,200,000 units x 1 dose

For patients allergic to penicillin:

erythromycin estolate: 20-40mg/kg/day bid-qid (max. 1g/day) x 10 days
erythromycin ethylsuccinate: 40mg/kg/day bid-qid (max. 1g/day) x 10 days

For patients allergic to penicillin & also erythromycin-intolerant:

Clindamycin : 20-30 mg/kg/day tid x 10 days

Clinical response of children with Group A streptococcal pharyngitis to appropriate antimicrobial therapy is usually evident within 24-48 hours. Persistence of symptoms beyond 48 hours may indicate alternative causes such as viral pharyngitis, development of suppurative complications such as peritonsillar abscess and warrant reassessment. Recurrence of acute streptococcal pharyngitis following a course of antibiotic therapy may be due to inappropriate antibiotic therapy (e.g. cotrimoxazole), inadequate dose or duration of previous therapy, non-compliance and co-pathogenicity by beta-lactamase producing organisms (19). Therapy with intramuscular benzathine penicillin (Evidence level I) (62), clindamycin (Evidence level II-1) (63-65), amoxycillin-clavulanate (Evidence level II-1) (66) and cefuroxime (Evidence level II-1) (67) may be beneficial in these cases. Although broader spectrum oral antibiotics such as second and third generation cephalosporins and newer macrolides demonstrate both clinical and bacteriologic efficacy, emergence of antimicrobial resistance and high cost are practical concerns (19, 68).

5.2.2 *Antibiotics for streptococcal sore throat: Adults*

Acute pharyngitis (sore throat) is one of the most frequent illnesses seen at primary care level. Although the group A streptococcus is the most common bacterial cause of acute pharyngitis, only a small percentage of patients with this condition are infected by group A streptococci. The majority of sore throats are viral in nature. Antibiotics confer relative benefits in the treatment of sore throat. However, the absolute benefits are modest (Evidence level I) (69).

Group A streptococcal pharyngitis is the only commonly occurring form of acute pharyngitis for which antibiotic therapy is definitely indicated (19). Antibiotics reduce the incidence of both suppurative and non-suppurative complications of sore throat (70). Therefore, for a patient with acute pharyngitis, the clinical decision that usually needs to be made is whether the pharyngitis is attributable to group A streptococci.

Patients with acute streptococcal pharyngitis should receive therapy with an antimicrobial agent in a dose and for a duration that is likely to eradicate the infecting organism from the pharynx. A number of antibiotics have been shown to be effective in treating group A streptococcal pharyngitis. These include penicillin and semi synthetic penicillin's, ampicillin and amoxycillin, as well as numerous cephalosporins and macrolides and clindamycin.

As in children, penicillin remains the drug of choice because of its proven efficacy, safety, narrow spectrum, and its low cost. Phenoxymethylpenicillin or penicillin V, 250 mg t.i.d. or q.i.d (Evidence level II-1) or 500 mg b.i.d(Evidence level III) is recommended for 10 days(71). Shorter treatment eradicates GAS less effectively and clinical recurrence level is more common (Evidence level I) (72-73).

Erythromycin is a suitable alternative for patients allergic to penicillin (in four times daily or twice daily dosage)(Evidence level II-2). However, unwanted gastrointestinal effects are common. Newer macrolides such as clarithromycin cause fewer unwanted side effects but are expensive and no more effective against resistant strains. First generation cephalosporins are also acceptable for patients allergic to penicillin and who do not manifest immediate-type hypersensitivity to β-lactam antibiotics.

For the rare patient infected with an erythromycin-resistant strain of group A streptococcus who is unable to tolerate β-lactam antibiotics, clindamycin is an appropriate alternative.

5.3 Surgical treatment

There are four randomized controlled trials (RCT) on tonsillectomy versus non surgical intervention studies in children (74-78) but no RCT in adults. Scottish Intercollegiate Guidelines Network advised more than 5 episodes (47) and American Academy of Otolaryngology more than 3 episodes as indication for tonsillectomy (74). Non-controlled studies demonstrated reduction in number of sore throats and improved general health with tonsillectomy (79-81).

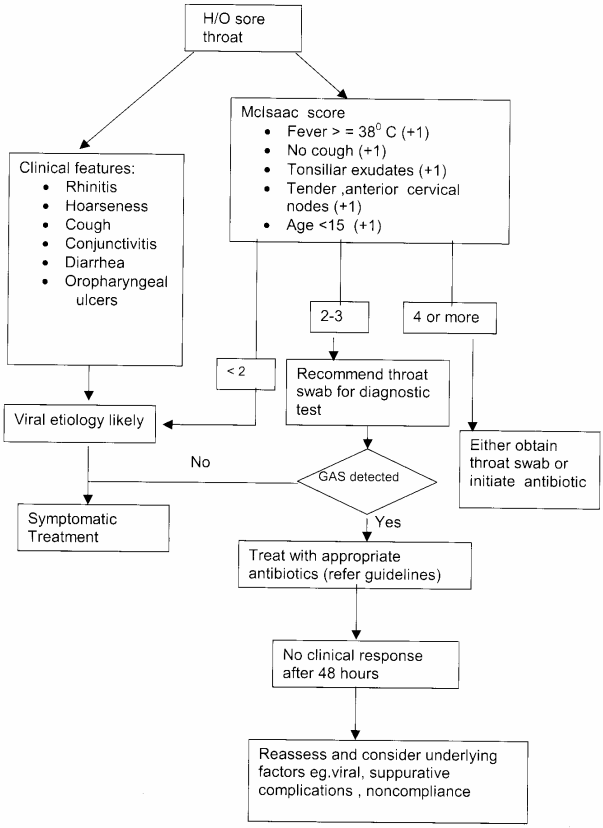
Indications for tonsillectomy are recurrent tonsillitis and peritonsillar abscess or quinsy that fulfills following criteria:

a) Recurrent tonsillitis
   i) The symptom of sore throat is due to inflammation of the tonsils.
   ii) > 6 episodes of tonsillitis over a 12-month period.
   iii) Duration of symptoms should be over a 12-month period.
   iv) The symptoms interfere with the patient's normal daily function.

   All the above criteria must be met before tonsillectomy is performed for recurrent tonsillitis (Evidence level III).

b) Peritonsillar abscess or quinsy
   i) Tonsillectomy indicated when the abscess has failed to respond to appropriate antibiotics together with incision and drainage. This is rarely required (Evidence level III). It is an accepted surgical practice that all abscesses should be drained.
   ii) Tonsillectomy is indicated if patients develop quinsy and has a history of recurrent tonsillitis (Evidence level III) (82-87). However, one episode of quinsy and no significant history of tonsillitis is not an indication for surgery.

6. ALGORITHM FOR MANAGEMENT OF SORE THROAT



7. REFERENCES

1. Mohd Said N, SL Wong. National Health Morbidity Survey II, Malaysia, 1996.
2. Public Health Institute, Ministry of Health Malaysia ; 1997:99-103.
3. SC Chan, Paul ES. The demographic and morbidity patterns of patients seen in an outpatient department in a Malaysian General Hospital. Family Physician 1995;7:3-10.
4. TO Lim. Content of general practice. Med J Malaysia 1991;46:155-62.
5. Tanz RR, Shulman ST. Streptococcal pharyngitis: the carrier state, definition, and management. Pediatric Annals 1998 ; 27(5):281-5 .
6. Faruq QO, Rashid AK, Ahmed J, Waiz A, Haque KM, Rouf MA, Khan SM, Khan TN. Prevalence of streptococcal sorethroat in the school children of Dhaka. Bangladesh Medical Research Council Bulletin 1995 ; 21(3):87-94.
7. Amir J, Shechter Y, Eilam N, Varsano I. Group A beta-hemolytic streptococcal pharyngitis in children younger than 5 years. Israel Journal of Medical Sciences 1994 ; 30(8):619-22 .
8. Principi N. Marchisio P. Calanchi A. Onorato J. Plebani A. Reali E. Rancilio L. Grasso E. Magni L. Caramia G. Streptococcal pharyngitis in Italian children: epidemiology and treatment with miocamycin. Drugs Under Experimental & Clinical Research 1990 ; 16(12):639-47 .
9. Van Cauwenberge P. Berdeaux G. Morineau A. Smadja C. Allaire JM. Use of diagnostic clusters to assess the economic consequences of rhinopharyngitis in children in Italy and France during the winter. Rhinitis Survey Group Clinical Therapeutics 1999 ; 21(2):404-21.
10. Bisno AL. Acute pharyngitis. N Eng J Med 2001;344:205-11.
11. Komarkoff AL, Pass TM, Aronson MD, et-al. The prediction of streptococcal pharyngitis in adults. J Gen Intern Med 1986; 1:1-7.
12. Barlet JG. Management of respiratory tract infections. Baltimore, Maryland: William & Wilkins, 1997: 150-98
13. National Ambulatory Medical Care Survey, US (1989-1999).JAMA 2001;186:1181-1186.
14. Little P, Williamson I. Sorethroat management in general practice. Family Practice 1996 ;13:317-21.
15. Gwaltney JM , Bisno AL. Pharyngitis. In : Mandel GL,Bennett JE , Dollin R , eds. Mendell , Douglas , and Bennett 's Principles and Practice of Infectious Diseases. 5th ed. Vol. 1. Philadelphia: Churchill Livingstone , 2000:656-62.

16. Tsevat J,Kotagal UR. Management of sore throats in children: A cost - effectiveness analysis. Arch Pediatr Adolesc Med 1999;153:681-8.

17. Efstratiou A. Group A streptococci in the 1990s. J Antimicrob Chemother 2000;45:3-12.

18. MCK Wong et al. GAS infection in patients presenting with sore throat at an A&E dept: a prospective study. HKMJ 2002;8:92-98

19. Poses RM et al. The importance of disease prevalence in transporting clinical prediction rules. Ann Intern Med 1986;105:586-589.

20. Bisno AL,Gerber MA, Gwaltney JM,Kaplan EL,Schwartz RH. Practice guidelines for the diagnosis and management of Group A Streptococcal pharyngitis. Clin Infect Dis 2002;35:113-25.

21. Wigton RS et al. Transportability of a decision rule for the diagnosis of streptococcal pharyngitis. Arch Intern Med 1986;146:81-83.

22. Meland E at al. Assessment of clinical features predicting streptococcal pharyngitis. Scand J Infect Dis 1993;25:177-183.

23. McIsaac WJ,Goel V,To T,Low DE. The validity of a sore throat score in family practice. CMAJ 2000;163:811-5.

24. Dajani A,Taubert K,Ferrieri P,Peter G,Shulman S , and the Committee on Rheumatic Fever,Endocarditis,and Kawasaki Disease of the Council on Cardiovascular Disease in the Young,American Heart Association. Treatment of acute streptococcal pharyngitis and prevention of rheumatic fever : a statement for health professionals. Pediatrics 1995;96:758-64.

25. PHLS STANDARD OPERATING PROCEDURE – INVESTIGATION OF THROAT SWABS. Reference no: B.SOP 9 Version: 1 Issue date: 29.4.1998 Issued by: Technical services, PHLS HQ Page no. 1 of 8.

26. Bisno et al. Diagnosis and Management of group A Streptococcal Pharyngitis: A Practice Guideline. CID 1997;25:574-83

27. Brien JH, Bass JW. Streptococcal pharyngitis: optimal site for throat culture. J Pediatr 1985;106:781-3.

28. Gunn BA, Mesrobian R, Keiser JF, Bass J. Cultures of *Streptococcus pyogenes* from the oropharynx. Laboratory Medicine 1985;16:369-71.

29. Edward Kaplan. The throat Culture: It's Techniques, Pitfalls, Limitations And Meaning. Connecticut Medicine, February;1978:45-48.

30. Wannamaker, L.W, "A Method for culturing Beta-Haemolytic Streptococci from the Throat." American Heart Association East 23rd Street, New York,1965.

31. Ederer GM, Herrmann MM, Bruce R, Masten JM, Chapman SS. Rapid

extraction method with pronase B for grouping beta-haemolytic streptococci. Appl Microbiology 1972;23:285-8.

32. .Murray PR, Wold AD, Hall MM, Washington JA 11. Bacitracin differential of presumptive identification of group A beta-haemolytic streptococci: comparison of primary and purified plate testing. J Pediatr 1976;89:576-9.

33. Gerber MA. Diagnosis of pharyngitis : methodology of throat cultures. In: Shulman ST, ed. Pharyngitis: management in an era of declining rheumatic fever. New York: Praeger. 1984:61-72.

34. .Lieu TA, Fleisher Gr, Schwartz Js. Clinical evaluation of a latex agglutination test for streptococcal pharyngitis: performance and impact on treatment rates. Pediatr Infect Dis J 1988;7:847-54.

35. .Gerber MA, Tanz RR , Kabat W, Denis E , Bell GL , Kaplan EL et al. Optical immunoassay test for group A beta-hemolytic streptococcal pharyngitis : an office-based , multicenter investigation. JAMA 1997 ; 277 : 899-903.

36. .Epperly TD , Wood TC. New trends in management of peritonsillar abscess. Am Fam Physician 1990 ; 42 : 102-12.

37. Holt GR , Tinsley PP. Peritonsillar abscess in chidlren. Laryngoscope 1981; 91 : 1226-30 .

38. Wolf M , Kronenberg J , Kessler A , Modan M. Peritonsillar abscess in children and its indication for tonsillectomy. Int J Ped Otorhinolaryngol 1988 ; 113-7.

39. Herzon FS. Peritonsillar abscess: incidence , current management practices and a proposal for treatment guidelines. Laryngoscope 1995 ; 105 :1-17.

40. Passy V. Pathogenesis of peritonsillar abscess. Laryngoscope 1994 ; 104 : 184-90.

41. Nicklaus PJ , Kelly PE. Management of deep neck infection. Pediatr Clin North Am 1996 ;

42. Parhisar A ; Har-El G. Deep neck abscess : a retrospective review of 210 cases. Ann Otol Rhinol Laryngol 2001 ; 110 : 1051-4.

43. Coulthard M , Isaacs D. Retropharyngeal abscess. Arch Dis Child 1991 ; 66 : 1227-30.

44. Millan SB , Cumming WA . Community-acquired respiratory infection in children: supraglottic airway infection. Primary Care ; Clinic of Office practice 1996 ; 23 : 741-50.

45. Richardson MA. Sorethroat , tonsillitis and adenoiditis. Medical Clin North Am 1999 ; 88 : 75-84 .

46. Kirse DJ. Surgical management of retropharyngeal space infections in

children. Laryngoscope 2001 ; 111 : 1413-22.

47. Olivier C. Rheumatic fever- is it still a problem? J Antimicrob Chemother 2000 ; 45: 13-21.

48. Scottish Intercollegiate Guidelines Network. Management of sore throat and indications for tonsillectomy. A national clinical guideline Jan 1999.

49. Thomas M, Del Mar C, Glasziou P. How effective are treatments other than antibiotics for acute sore throat? British J Gen Pract 2000;50:817-20

50. Lesko SM. Mitchell AA. The safety of acetaminophen and ibuprofen among children younger than two. Pediatrics 1999;104(4)e 39.

51. Wong A, Sibbald A, Ferrero F. Antipyretic effects of dipyrone versus ibuprofen vs acetaminophen in children: results of a multinational randomized modified double – blind study. ClinPediatr (Phila) 2001: 40 (6) 325 –6.

52. Joseph F. Wethington. Double Blind Study of Benzydamine Hydrochloride: a new treatment for sorethroat. Clinical therapeutics / Vol 7 No.5 1985.

53. N.A. Batista . R Kyrmie. Effects of diclofenac resinate drops in combination with an antibiotic in the treatment of infection of the upper airways . Anq Bras Med 1985;59(6) 479 –84.

54. Watson N, Mimmo WS, Christian J et-al. Relief of sore throat with the anti-inflammatory throat lozenge flurbiprofen 8.75mg: a randomised, double blind, placebo controlled study of efficacy and safety. Int J. Clin Pract 2000;54(8): 490 –6.

55. Benrimoj SI, Langford JH, Christian J et-al. Efficacy & tolerability of the anti-inflammatory throat lozenge flurbiprofen 8.75mg in the treatment of sore throat. Clin Drug Invest 2001;21(3):183-93.

56. Blagden M, Christian J, Miller Ket-al. Multidose flurbiprofen 8.75mg lozenges in the treatment of sore throat: a randomised, double blind, placebo-controlled study in UK general practice centres. Int J Clin Pract 2002;56(2):95-100.

57. O'Brien JF,Meade JL,Falk JL. Dexamethasone as adjuvant therapy for severe acute pharyngitis. Ann Emerg Med 1993;22(2):212-5.

58. Royal College of Paediatrics and Child Health . Management of acute and recurring sore throat and indications for tonsillectomy;2000,RCPCH:London.

59. Bass JW. Antibiotic management of Group A streptococcal pharyngotonsillitis. Pediatr Infect Dis J 1991;10:S43-49.

60. Shapera RM,Hable KA,Matsen JM. Erythromycin therapy twice daily for streptococcal pharyngitis:controlled comparison with erythromycin or penicillin phenoxymethyl four times daily or penicillin G benzathine. JAMA 1973;226:531-5.

61. Breese BB,Disney FA,Talpey W.et al.Streptococcal infections in children: comparison of the therapeutic effectiveness of erythromycin administered twice daily with penicillin phenoxymethyl and clindamycin administered three times daily. Am J Dis Child 1974;128:457-60.

62. Breese BB,Disney FL,Green JL,et al. The treatment of beta hemolytic streptococcal pharyngitis : comparison of amoxicillin , erythromycin estolate and penicillin V. Clin Pediatr 1977;16:460-3.

63. Sirimanna KS,Madden GJ,Miles SM. The use of long-acting penicillin in the prophylaxis of recurrent tonsillitis. J Otolaryngol 1990 ;19:343-4.

64. Brook I,Hirokawa R. Treatment of patients with a history of recurrent tonsillitis due to group A beta-hemolytic streptococci. A prospective randomized study comparing penicillin , erythromycin, and clindamycin. Clin Pediatr 1985;24:331-6.

65. Orrling A,Stjernquist-Desatnik A,Schalen C. Clindamycin in recurrent group A streptococcal pharyngotonsillitis- an alternative to tonsillectomy? Acta Oto-Laryngologica 1997;117:618-22.

66. Raz R,Hamburger S,Flatau E. Clindamycin in the treatment of an outbreak of streptococcal pharyngitis in a kibbutz due to beta-lactamase producing organisms. J Antimicrob Chemother 1990;2:182-4.

67. Kaplan EL,Johnson DR. Eradication of group A streptococci from the upper respiratory tract by amoxicillin with clavulanate after oral penicillin V treament failure. J Pediatr 1988;113:400-3.

68. .Holm SE, Henning C,Grahn E,Lomberg H,Staley H. Is penicillin the appropriate treatment of recurrent tonsillopharyngitis? Results from a comparative randomized blind study of cefuroxime axetil and phenoxymethyl penicillin in children. Scan J Infect Dis 1995;27:221-8.

69. Gerber MA,Tanz RR. New approaches to the treatment of group A streptococcal pharyngitis. Curr Opinion Pediatrics 2001;13:51-55.

69. Del Mar CB, Glasziou PP, Spinks AB. Antibiotics for sore throat. Cochrane Review. Cochrane Library 2000, Issue 2.

70. Del Mar C. Sore throats and antibiotics (Editorial). Brit Med J 2000; 320:130 - 1.

71. Anon. Diagnosis and treatment of Streptococcal sore throat. Drug and Therapeutics Bulletin 1995; 33: 9-12.

72. Schwartz RH,Wientzen Redreira F, Feroli EJ, Mella GW, Guandolo VL. Penicillin V for group A streptococcal pharyngotonsillitis: a randomised trial of seven vs ten days therapy. *JAMA* 1981; 246: 1790-5.

73. Zwart S, Sachs APE, Ruijs GJHM, Gubbels JW, Hoes AW, de Melker RA.

74. Penicillin for acute sore throat: randomised double blind trials of seven days versus three days treatment or placebo in adults. *Brit Med J* 2000; 320: 150-154.

75. Paradise JL, Bluestone CD, Bachman RZ, Colborn DK, Bernard BS, Taylor FH, et al. Efficacy of tonsillectomy for recurrent throat infection in severely affected children. Results of parallel randomized and non randomized clinical trials. N Engl Med 1984; 310: 674-83

76. Laing MR, McKerrow WS. Adult Tonsillectomy. Clin Otolaryngology 1991; 16: 21-4.

77. Mawson SR, Adlington P, Evans M. A controlled study evaluation of adenotonsillectomy in children. J Laryngology Otol 1967; 81: 777-90

78. McKee WJ. A controlled study of the effects of tonsillectomy and adenoidectomy in children. J Br Soc Prev Med 1963; 17: 49-69.

79. Roydhouse N. A controlled study adenotonsillectomy. Arch Otolaryngol 1970; 92: 611-6.

80. Camilleri AE, MacKenzie K, Gatehouse S. The effect of recurrent tonsillitis and tonsillectomy on the growth in childhood. Clin Otolaryngology 1995; 20 : 153-7

81. Ahlqvist-Rastad J, Hultcrantz E, Melander H, Svanholm H. Body growth in relation to tonsillar enlargement and tonsillectomy. Int J Pediatr Otorhinolaryngol 1992; 24 : 55-61

82. Wiclliams EF III, Woo P, Miller R, Kellman RM. The effects of adenotonsillectomy on the growth in young children. Otolaryngol Head Neck Surg. 1991; 104 : 509-16

83. Peritonsillar abscess: the rationale for interval tonsillectomy. Raut VV, Yung MW. ENT j 2000 Mar; 79(3):206-9

84. Peritonsillar abscess. Herbild O, Bonding P. Arch Otolaryngol 1981 Sept; 107(9):540-2

85. Peritonsillar abscess in children. Holt GR, Tinsley PP Jr. Laryngoscope 1981 Aug;91(8):1226-30.

86. Is single quinsy an indication for tonsillectomy? Harris WE. Clin Otolaryngology.1991 Jun; 16(3):271-3.

87. Peritonsillar abscess in children and its indication for tonsillectomy. Wolf M, Kronenberg J, Kessler A, Modan, Leventon G. Int J Pediatr Otorhinolaryngol 1988 Nov;16(2):113-7.

88. Peritonsillar abscess: recurrence rate and the indication for tonsillectomy. Kronenberg J, Wolf M, Leventon G. Am J Otolaryngol 1987 Mar-Apr;8(2):824.