# Tonsillitis and strep throat and its management – a brief review

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## Abstract

Tonsillitis is a common condition that affects mainly children, but can also affect adults. It is caused by both viral and bacterial infections, with streptococcal species being a common bacterial cause. Differentiation between bacterial and viral causes is important to prevent overuse of antibiotics and potential complications. Management includes controlling pain and fever, hydrating the patient, and administering appropriate antimicrobials. Tonsillectomy is indicated in cases of recurrent or chronic tonsillitis. This article provides an overview of the epidemiology, aetiology, pathophysiology, and evaluation of tonsillitis, as well as current management strategies and recent advances in screening and pain management during tonsillectomy.

**Keywords:** tonsillitis, strep throat, sore throat, tonsillectomy, screening, group A beta-haemolytic *Streptococcus pyogenes* (GABHS)

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## Introduction

Tonsillitis is the inflammation of the palantine tonsils, usually extending to the adenoid and lingual tonsils; therefore, the term pharyngitis may also be use. Often sore throat is one of the symptoms present in uncomplicated tonsillitis (inflammation of the tonsils), pharyngitis (inflammation of the pharynx) and tonsillopharyngitis (inflammation of the pharynx, tonsils or both). Symptoms of acute tonsillitis present with fever, sore throat, tonsillar exudate, foul breath, dysphagia (difficult swallowing), odynophagia (painful swallowing) and headache. Pharyngitis (strep throat) presents with similar symptoms of sudden onset of sore throat, pain with swelling and fever.[1]

Tonsillopharyngitis is generally self-limiting, but approximately 12% of adult patients experience recurrent tonsillitis with debilitating episodes that impair daily functioning.[2] Tonsillitis most often occurs in children; however, the condition rarely occurs in children younger than two years. Tonsillitis may be viral or bacterial, where bacteria causes 15–30% of cases of pharyngotonsillitis.[3] Bacterial infection is typically due to Group A beta-haemolytic *Streptococcus pyogenes* (GABHS).[4] Most viral causes include rhinovirus, respiratory syncytial virus, adenovirus and coronavirus. These typically have low virulence and rarely lead to complications.[5]

Differentiation between bacterial and viral causes may be difficult; however, this is crucial so as to prevent the overuse of antibiotics. Untreated GABHS may lead to complications like acute rheumatic fever, rheumatic heart disease, poststreptococcal glomerulonephritis, bacteraemia and retropharyngeal abscess. Transmission of GABHS results from contact with respiratory tract secretions of infected individuals with an incubation period of two to five days. Treatment reduces the period of communicability to 24 h in 80% of cases.[1]

Management includes controlling pain and fever, adequate hydration and appropriate antimicrobials.[4] Tonsillectomy is indicated in recurrent, chronic tonsillitis. This article summarised the current management of tonsillitis and strep throat and highlights the recent advances in screening and management of this condition as well as pain management in tonsillectomy.

## Epidemiology

Tonsillitis is more common in children but rarely occurs in children younger than two years. In adults GABHS accounts for 5–15% of individuals with pharyngitis. Streptococcal species cause 15–30% of tonsillitis cases in children aged 5–15 years, while viral tonsillitis is more prevalent in younger children. One study found that recurrent tonsillitis affects 12,1% of Turkish children while another study estimated that 11,7% of Norwegian children are affected.[3]

## Aetiology

The most common viral causes include rhinovirus, respiratory syncytial virus, adenovirus and coronavirus. Epstein-Barr virus (EBV) can cause tonsillitis that may be associated with the presence of palatal petechiae.[3] One study identified *Staphylococcus pyogenes* (14.4%) as the most common isolates in chronic tonsillitis and *H. influenzae* (31.4%), *S. pyogenes* (24.2%), *S. aureus* (22.9%) and *S. pneumoniae* (12.6%) as the most common isolates in tonsillar hypertrophy.[6] Tuberculosis has also been associated with recurrent tonsillitis, so clinicians should assess the patients' risks.[5] Rare cases include pertussis, Fusobacterium, diphtheria, syphilis and gonorrhoea.

## Pathophysiology

Tonsillitis refers to inflammation of the tonsils. The tonsils are composed of lymphatic tissue and are a component of *Waldeyer's ring* in the pharynx, consisting of the palatine tonsils, adenoids,

lingual tonsils, and tubal tonsils. They serve as an important defence against inhaled or ingested pathogens by providing the initial immunological barrier to insults.[5] However, by convention, the terms "tonsillitis" and "tonsils" often are used when specifically referring to the palatine tonsils, which are located between the palatoglossal and palatopharyngeal folds in the lateral walls of the oropharynx.[7] Microorganisms that penetrate the tonsillar epithelium are phagocytised and processed by macrophages, presented to B and T lymphocytes and subsequently stimulate both humoral and cell-mediated immune response. Lymphoid hyperplasia and reactivity occur when chronic infection overwhelms the tonsillar defence mechanism.[8]

## Evaluation: Examination

The type of tonsillitis (acute, recurrent or chronic) presenting in a patient is determined by their history of previous illness. It is important to visually examine the tonsils and note any features such as swelling, erythema, and exudate. Recurrent streptococcal tonsillitis is diagnosed when a patient has six culture-proven episodes in one year, five infections in two consecutive years or three infections each year for three years consecutively. Patients with strep throat typically do not present with a cough, coryza or conjunctivitis.[3]

## Signs and symptoms

Individuals with acute tonsillitis exhibit enlarged inflamed tonsils, fever, sore throat, foul breath, difficulty swallowing, painful swallowing and tender cervical lymph nodes. Airway obstruction may cause mouth breathing, snoring and sleep disorders. Malaise and lethargy are common. A gray membrane may cover tonsils that are inflamed from an EBV infection. This membrane can be removed without bleeding. Palatal mucosal erosions and mucosal petechiae of the hard palate may also be observed.[3]

## Physical examination and diagnosis

Evaluation for tonsillitis should begin with a thorough history, physical examination, risk stratification by scoring system and consideration of rapid antigen testing and/or throat culture.

Physical examination of the pharynx may be facilitated by opening the mouth without tongue protrusion, followed by gentle central depression of the tongue.

Flexible fibreoptic nasopharyngoscopy, performed by an ear, nose and throat (ENT) specialist, may be useful in selected cases, particularly in severe trismus (muscle spasms of the temporomandibular joint).[3]

The scoring system uses the following criteria: the presence of a fever, tonsillar enlargement and/or exudates, tender cervical lymphadenopathy and the absence of a cough. Each finding is worth one point. The most commonly used scoring system is the Centor criteria, which is summarised in Table I.[5]

Patients who meet one or no criteria are unlikely to have GABHS and should not undergo rapid testing. Patients who meet two criteria can be tested (RADTs) and those who meet three or four criteria can be tested or treated empirically for GABHS. Patients with higher scores generally have higher probability of positive GABHS test results (4 points, 56%; 3 points, 32%; 2 points, 15%; 1 point,6.5% and 0 points, 0,2.5%).[9]

**Table I:** Centor score

| Signs and symptoms | Point |
|---|---|
| Tonsillar exudate | 1 |
| Tender anterior cervical lymph nodes | 1 |
| History of fever > 38 °C | 1 |
| No cough | 1 |
| Maximum score | 4 |

In South Africa, pharmacists who have a primary care drug therapy (PCDT) permit can diagnose and prescribe antibiotics for acute tonsillitis.[10] In the United Kingdom (UK), the first NHS-funded sore throat test and treatment (STTT) community pharmacy services were implemented in Wales in 2018. Data from a study showed that screening for GABHS has potential benefits such as timely diagnosis, targeted antimicrobial utilisation or promoting symptomatic (non-antibiotic) treatment which would reduce the burden on primary care, limiting unnecessary visits from patients who have non-severe symptoms.[11] The STTT utilises a combination of FeverPAIN score (Table II) and Centor Score. Antibiotics are considered for FeverPAIN score of 2–3, or Centor Score 3–4 with FeverPAIN Score 4–5.[12]

**Table II:** FeverPAIN score

| Signs and symptoms | Point |
|---|---|
| Fever > 38 °C | 1 |
| Purulence | 1 |
| Attend within 3 days or less | 1 |
| Inflamed tonsils | 1 |
| No cough or coryza | 1 |
| Maximum score | 5 |

A throat culture can test for GABHS alone or in conjunction with rapid antigen testing. Rapid antigen testing is 88–100% specific with 61–95% sensitive, and false negatives are possible.[5]

The differential diagnosis for tonsillitis is broad and includes pharyngitis, retropharyngeal abscess, epiglottitis and Ludwig angina. The presence of dental or peritonsillar abscess is also a possibility. Kawasaki disease, Ebstein-Barr virus, Coxsackie virus and oral candidiasis may also present with throat pain and differentiation can be via history and other clinical features.[13]

In rare case, syphilis can cause tonsillitis and clinicians should consider also obtaining pharyngeal swabs for gonorrhoea and chlamydia and HIV testing in the appropriate clinical setting.[5] The

prevalence of sexually transmitted diseases (STI) is high in South Africa, with an incidence rate of 20% in women.[14] In individuals presenting with a sore throat, STIs should be considered. In individuals with herpes simplex virus (HSV), pharyngitis presents with red, swollen tonsils that may have aphthous ulcers on their surface.[3]

## Management

Given the frequency of viral aetiologies, the mainstay of treatment of acute tonsillitis is supportive care, including hydration, analgesia and patients rarely require hospitalisation.

The goals of treatment for GABHS tonsillitis is:

1. Provide symptom relief
2. Shorten duration of illness
3. Prevent nonsuppurative and suppurative complications
4. Decrease the risk of contagion
5. Decrease the unnecessary use of antibiotics, slowing the development of antibiotic resistance[4]

Non-pharmacological management includes adequate hydration and bed rest. Symptomatic relief includes analgesic and antipyretic agents like paracetamol.

The appropriate antibiotics reduce the duration of illness by approximately one day with the greatest reduction in symptoms seen on the third day of treatment. Several studies note that treatment within 48 h of the onset of symptoms provides the best chance of relief.[4]

The infectious disease society of America (IDSA) guidelines recommends a ten-day course of either penicillin or amoxicillin. Penicillin V is the first-choice antibiotic for GABHS since there is no known resistance to it. Azithromycin, as a five-day course, is an alternative for individuals with penicillin allergy; a ten-day course of cephalosporin or clindamycin are also options.[5]

The Standard Treatment Guidelines/Essential Medicine List (STG/EML) provides similar guidelines: benzathine benzylpenicillin single dose intramuscular (IM) or amoxicillin. Patients with penicillin allergy should receive azithromycin.[15] The use of corticosteroids is not recommended due to limited effectiveness.[2]

## When to refer patients

Patients consulting at a public primary health care clinic who have the following symptoms should be referred to a physician, according to the STG/EML guidelines:[15]

- Any suppurative complications e.g. retropharyngeal or peritonsillar abscess, otitis media and sinusitis.
- Tonsillitis accompanied by difficulty in opening the mouth (trismus).
- Recurrent tonsillitis (six or more documented episodes/year) for possible tonsillectomy.
- Suspected acute rheumatic fever.
- Suspected acute glomerulonephritis.
- Heart murmurs not previously diagnosed.
- Patients with severe immunosuppression such as long-term use of steroids, AIDS, neutropenia, congenital or acquired immune defects or severe comorbidities.

It is worth noting that most cases of viral pharyngitis or tonsillitis are self-limiting with clinical improvement in three to four days without the need of antibiotics. Clinical practice guidelines recommend avoiding antibiotic therapy during this time period as it is safe to do so. A delay of up to nine days from symptom onset to antimicrobial treatment should still prevent the major complications of GABHS (such as rheumatic fever).[3]

## Tonsillectomy

Tonsillectomy is a surgical procedure recommended for individuals who have had more than six confirmed cases of streptococcal pharyngitis in a year, five cases in two consecutive years or three or more infections for three years in a row. The severity of illness and time missed from school or work are also important factors in deciding whether to recommend tonsillectomy. In some cases, an adenoidectomy may also be performed if the adenoids are inflamed and present. Tonsillectomy reduces the bacterial load of GABHS and may also allow increase in alpha-Streptococcus, which protects against GABHS infection. Recurrent tonsillitis is usually due to regrowth of tonsillar tissue, but is extremely rare.[3]

Complications and risks associated with tonsillectomy include risk of postoperative bleeding, which increases with age (between 9 and 18 years).[16] In published reports, the rate of primary bleeding (within 24 h after surgery) ranges from 0.2–2.2%, while the secondary bleeding rate (more than 24 h after surgery), ranges from 0.1–3%.[17] A 2016 study found that obesity increases the risk for haemorrhage by about 2.3 times.[16]

## Postoperative pain management

Tonsillectomy is ranked among the top 25 procedures with the highest pain intensities. Patients with preoperative chronic pain due to other diseases, females and young adults are associated with higher postoperative pain intensity. A recent systematic review analysed preoperative and intraoperative interventions to reduce postoperative pain. Paracetamol, nonsteroidal anti-inflammatory drugs (NSAIDs), ketamine, gabapentinoids, dexmedetomidine improved postoperative pain. Pain management with non-opioid analgesics, should be initiated during tonsillectomy. Mono-analgesics only have a limited analgesic efficacy in the postoperative setting after tonsillectomy. Therefore, it is recommended to use analgesic in combination (e.g. paracetamol plus NSAID). There is no evidence that NSAIDs increase the risk of postoperative bleeding. Opioids are only recommended as rescue analgesics. Codeine is forbidden in many countries for children. The patient can expect to have high pain scores typically for three to five days after surgery.[2]

## Conclusion

Recurrent acute tonsillitis is a common condition affecting both children and adults worldwide. To determine the appropriate treatment, each sore throat/tonsillitis episode should be evaluated to differentiate between viral and bacterial GABHS infection. If the probability of a bacterial infection is high, the recommended antibiotic regimen should be followed to prevent the unnecessary use of antibiotics. Additionally, since tonsillectomy is ranked among the top 25 procedures with the highest pain intensities, it is important to manage pain optimally to improve the patient's quality of life

### *Conflict of interest*

The author declares that there are no conflicts of interest.

### *Ethical approval*

Ethical approval was not required

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