The role of pharmacists in optimising patient outcomes to reduce the burden of tonsillitis

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Abstract

Tonsillitis is a common upper respiratory tract infection frequently encountered in pharmacy practice, with significant implications for antimicrobial stewardship. It typically involves inflammation of the palatine tonsils, most often caused by viral infections, but occasionally by bacterial pathogens such as *Streptococcus pyogenes* (Group A Streptococcus, GAS). This article reviews the anatomy, epidemiology, aetiology, complications, and management of tonsillitis, with an emphasis on evidence-based pharmacological and supportive care. It also highlights the essential role pharmacists play in optimising treatment, counselling patients and promoting rational antibiotic use to reduce antimicrobial resistance.

Keywords: tonsillitis, treatment, pharmacist, antimicrobial resistance, antimicrobial stewardship

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Introduction

The palatine tonsils, located in the lateral oropharynx between the palatoglossal and palatopharyngeal arches, are part of Waldeyer's ring – a group of lymphoid tissues that also includes the adenoids, tubal tonsils and lingual tonsils.[1] As components of the mucosa-associated lymphoid tissue (MALT), the tonsils play a key role in innate immune surveillance, facilitating antigen recognition and immune activation.[2] They are rich in T and B lymphocytes and macrophages, enabling them to mount rapid immunological responses to pathogens entering through the upper respiratory tract.[2]

Tonsillitis, the inflammation of the tonsils, remains one of the most common ENT conditions globally. It is associated with a substantial healthcare burden due to its frequency, especially in children aged 4–8 years and young adults aged 15–25 years.[3] Epidemiological studies report millions of annual cases worldwide, though current data specific to South Africa is limited. In 2019, 40 million annual cases were reported in the USA, nine million in France, and four million in Spain.[3] In the USA, 5.7% of hospital visits are attributed to a sore throat and tonsillitis. A 2023 study[4] reported 600 million symptomatic cases of tonsillitis worldwide annually. The condition impacts health systems through frequent consultations, medication use, absenteeism, and in some cases, surgical intervention.[5]

Aetiology

Tonsillitis most commonly results from viral infections, accounting for approximately 50–80% of cases. Typical viral causes include rhinovirus, adenovirus, coronavirus, influenza virus and respiratory syncytial virus—pathogens frequently associated with the common cold.[6] These cases are generally self-limiting and resolve without the need for antimicrobial therapy. Less frequent viral causes include Epstein–Barr virus (the agent of infectious mononucleosis), cytomegalovirus, HIV and rubella.[5]

The predominant bacterial cause of tonsillitis is *Streptococcus pyogenes*, a Group A Streptococcus (GAS), which is responsible for a significant proportion of cases, particularly among school-aged children and adolescents. *S. pyogenes* is of clinical importance due to its association with complications such as acute rheumatic fever and post-streptococcal glomerulonephritis.[6] Other less common bacterial pathogens include *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Haemophilus influenzae*. In specific contexts, organisms such as *Corynebacterium diphtheriae, Treponema pallidum, Neisseria gonorrhoeae* and *Chlamydia trachomatis* should be considered, particularly in unvaccinated individuals or in those with orogenital exposure. Chronic or recurrent tonsillitis may also be associated with *Mycobacterium tuberculosis*, especially in high-burden settings such as South Africa.[6]

Transmission of infectious agents occurs primarily via respiratory droplets, direct person-to-person contact or fomites.[7] In some rare cases, animals may act as reservoirs of infection. Environmental and socio-demographic factors such as crowding, poor ventilation, seasonal variation (typically peaking in late winter and early spring) and suboptimal hygiene increase the risk of transmission.[8,9]

Notably, the incidence of tonsillitis declined during the COVID-19 pandemic, likely due to widespread public health interventions such as mask-wearing, social distancing, and enhanced hand hygiene practices, which limited the spread of respiratory pathogens more broadly.[10]

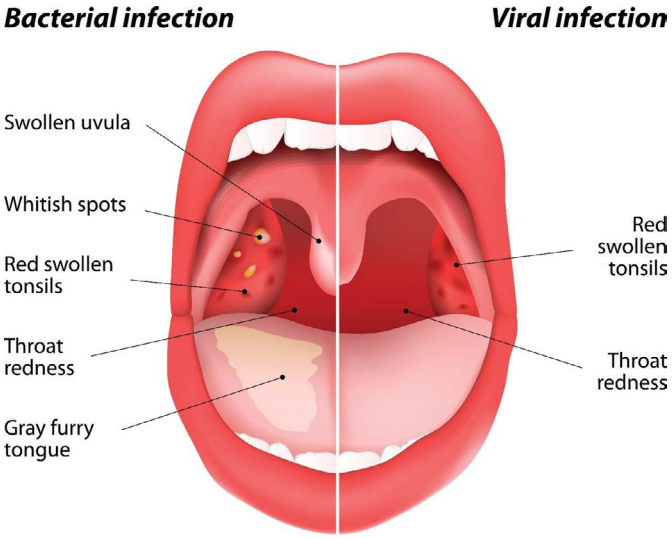

Figure 1: Vector illustration of open mouth view of tonsil inflammation caused by viral or bacterial infection (source: iStock 517419127)

Clinical presentation and diagnosis

Tonsillitis typically presents with an acute onset of sore throat, odynophagia (painful swallowing) and fever. On clinical examination, the tonsils appear erythematous and swollen, often with white or yellow exudates (Figure 1).[11] Associated features may include halitosis, headache, malaise, cervical lymphadenopathy and occasionally referred otalgia. In some patients, particularly young children, symptoms may also include nausea, vomiting, abdominal pain and irritability.[11]

Viral tonsillitis often co-presents with symptoms of an upper respiratory tract infection, such as nasal congestion, rhinorrhoea, cough, hoarseness and conjunctivitis. These features suggest a viral rather than bacterial origin.[11] In contrast, bacterial tonsillitis, particularly due to *S. pyogenes*, typically has a more abrupt onset, higher fever, absence of cough and more prominent tonsillar exudates and tender anterior cervical lymph nodes.[11-12]

In children, tonsillitis may manifest with a barking cough, hoarseness and respiratory distress, especially if the adenoids are concurrently inflamed. Very young children may present non-specifically with symptoms such as refusal to feed, excessive drooling or lethargy.[9,13]

Accurately distinguishing between viral and bacterial aetiologies is essential to avoid inappropriate antibiotic use and to minimise the risk of antimicrobial resistance.[14] Clinical scoring systems such as the Centor or McIsaac criteria may aid decision-making by assessing features including fever, tonsillar exudate, absence of cough and lymphadenopathy. A higher score suggests a greater likelihood of streptococcal infection.[6-7]

Rapid antigen detection tests offer quick identification of *S. pyogenes*, but their sensitivity can be limited, especially in children.[7,14] A throat culture remains the gold standard for diagnosis, with high sensitivity and specificity, although it requires 24–48 hours for results.[6,15] Serological testing may be useful in select cases, particularly when viral causes such as Epstein–Barr virus are suspected.[16]

Ultimately, diagnosis should integrate the clinical history, physical examination, and where available, laboratory testing, to guide appropriate management and reduce unnecessary antibiotic use.

Complications

Non-suppurative complications of *S. pyogenes* tonsillitis includes acute rheumatic fever, post-streptococcal glomerulonephritis and scarlet fever.[17-18] Acute rheumatic fever typically presents two to four weeks after the initial infection and is a systemic inflammatory disease that may affect the heart (often as pancarditis), joints, central nervous system (notably as Sydenham chorea) and skin.[18] Importantly, acute rheumatic fever is preventable with timely and appropriate antibiotic treatment of the initial streptococcal infection.[18] In contrast, post-streptococcal glomerulonephritis arises one to three weeks post-infection due to immune complex deposition in the glomeruli, leading to haematuria, hypertension and renal dysfunction.[19] Unlike rheumatic fever, post-streptococcal glomerulonephritis is not preventable by antibiotics, underscoring its distinct pathophysiology.[19] Scarlet fever, another immune-mediated complication, results from infection with toxin-producing GAS strains. It is characterised by a fine sandpaper-like rash, strawberry tongue, and fever, and though dramatic in appearance, it typically resolves with appropriate antibiotic therapy.[20]

Role of pharmacists

Acute tonsillitis can significantly affect a patient's quality of life through symptoms such as sore throat, fever and difficulty swallowing. While most cases are viral and self-limiting, bacterial tonsillitis—especially when caused by *S. pyogenes*—requires timely and appropriate antibiotic therapy to prevent complications.[2] However, the widespread misuse and over prescription of antibiotics in treating tonsillitis has contributed to the growing global concern of antimicrobial resistance.[21] Pharmacists, as accessible healthcare professionals, play a central role in guiding evidence-based treatment, supporting antimicrobial stewardship and educating patients on the appropriate use of medications.[22]

Medical management

Supportive care remains the foundation of acute tonsillitis treatment, especially in viral cases, with key goals including symptomatic relief (fever reduction, inflammation control and pain alleviation) along with maintenance of adequate hydration and nutrition.[8] If symptoms escalate or complications arise—such as airway obstruction or severe dehydration—patients may require additional interventions including intravenous fluids, systemic corticosteroids or humidified oxygen.[8]

In viral tonsillitis, antibiotics are not indicated. Management involves rest, hydration and symptomatic relief. Most cases resolve within 7–10 days. Sore throat persisting beyond two weeks, or

recurrent episodes, warrant evaluation for chronic tonsillitis, which may require surgical intervention.[23,24-25]

For bacterial tonsillitis, particularly cases caused by *S. pyogenes*, antibiotic therapy is warranted to reduce symptom duration, prevent complications such as acute rheumatic fever and limit transmission.[7] First-line therapy is phenoxymethylpenicillin (penicillin V) due to its narrow spectrum, low cost and proven efficacy.[9] The dose depends on the patient's age and weight (Table I).[4,7,9] Penicillin V is best taken on an empty stomach to enhance absorption. A 10-day course is standard to prevent serious sequelae like rheumatic fever. Amoxicillin is an acceptable alternative.[9]

For patients with non-anaphylactic penicillin allergies, cephalosporins (e.g. cefadroxil, cephalexin) may be used. For those with Type 1 hypersensitivity reactions, however, macrolides (e.g. erythromycin, clarithromycin, azithromycin) or clindamycin are recommended.[4] Azithromycin and clarithromycin, due to their significantly longer half-lives, may be prescribed for shorter durations (3–5 days), although resistance rates are increasing globally.[2,7]

In patients unlikely to complete a full oral course, a single intramuscular injection of benzathine penicillin G is effective.[4]

Table I: Penicillin's for acute tonsillitis

Phenoxymethylpenicillin (Penicillin V) oral
Adults and adolescents: 500–1 000 mg orally, 2–3 times daily for 10 days.
Children 1–12 years: 250 mg orally 2–3 times daily.
Children > 12 years: 500 mg orally 2–3 times daily.
Weight-based dosing: 15–50 mg/kg/day in 2–3 divided doses, not exceeding the adult dose.
Amoxicillin oral
Adults: 500 mg three times daily for 10 days.
Children under 40 kg: 50 mg/kg/day divided in 2–3 doses (max 1500 mg/day).
Benzathine IM penicillin single dose
≥ 27 kg: 1.2 million units IM once.
< 27 kg: 600,000 units IM once.

Antibiotics not recommended for tonsillitis include sulphonamides, tetracyclines and fluoroquinolones, due to resistance or limited efficacy against *S. pyogenes*.[9]

Corticosteroids (e.g. dexamethasone or prednisone) may be used in cases with severe inflammation, particularly when swallowing or breathing is compromised.[23]

Over-the-counter (OTC) analgesics such as paracetamol, ibuprofen or naproxen are widely used to relieve pain and fever. While effective, NSAIDs should be used cautiously due to risks of gastric irritation and ulceration with prolonged use.[26] In children, ibuprofen suspension and combination formulations with pseudoephedrine or nimesulide (where approved) may be used, although the latter is not universally recommended.[23]

Topical therapies (e.g. throat sprays, oral rinses, lozenges) can offer local symptom relief. Many contain local anaesthetics, anti-inflammatory agents or antiseptics.[23] Lozenges should be avoided in children under four due to choking risk.[27] Oral rinses are generally suitable for children aged 12 and above who can reliably gargle without swallowing. Throat sprays are safe from age six and up.[27]

In addition to conventional medical treatments, several complementary and alternative medicine (CAM) approaches have been explored for managing tonsillitis, particularly in cases of viral origin where antibiotics are not indicated. Common supportive measures include saltwater gargles, warm fluids and herbal teas containing soothing agents like honey, pectin and glycerine.[27] Among herbal preparations, BNO 1030 (Imupret®), a phytotherapeutic blend of Althea root, chamomile flowers, horsetail herb, walnut leaves, yarrow herb, oak bark and dandelion herb, has demonstrated efficacy in reducing symptoms of acute non-bacterial tonsillitis in children when used alongside standard symptomatic therapy.[28] Clinical studies have reported significant symptom relief and reduced need for antipyretics without notable adverse effects.[28] Similarly, EPs 7630 (Umckaloabo®), an extract from *Pelargonium sidoides* roots, has shown effectiveness in alleviating symptoms of acute tonsillopharyngitis in children. A double-blind, placebo-controlled trial found that EPs 7630 significantly reduced tonsillitis severity scores compared to placebo, with good tolerability.[29]

Carvacrol, a compound found in oregano and thyme essential oils, exhibits anti-inflammatory and antibacterial properties. *In vitro* studies have demonstrated its ability to suppress inflammatory markers in human tonsil epithelial cells and exert bactericidal effects against *GAS*, suggesting potential as a supportive therapy in streptococcal pharyngitis.[30]

Traditional remedies such as Kanchnara Guggulu and Tankana-Madhu Pratisarana have been evaluated in Ayurvedic medicine for managing tonsillitis (Tundikeri) in children. A clinical study reported that these treatments led to significant improvements in symptoms, indicating their potential as safe and effective options in paediatric populations.[31]

While these CAM therapies show promise, they should complement, not replace, evidence-based medical treatments. Patients are advised to consult healthcare professionals before initiating any alternative therapies to ensure safety and appropriateness within their overall treatment plan.

Antimicrobial resistance (AMR)

Antibiotic consumption and antimicrobial resistance (AMR) are closely linked. When antibiotics are used inappropriately, whether through unnecessary prescribing, incorrect dosing or insufficient treatment duration, they exert selective pressure that favours the survival and proliferation of resistant bacterial strains.[32] This is particularly problematic in the treatment of self-limiting conditions such as acute viral tonsillitis, where antibiotics are often prescribed despite minimal or no clinical benefit.[11,32]

Multiple studies have demonstrated a high prevalence of antibiotic-resistant organisms in patients with recurrent tonsillitis.[33] A study by Jyothsna et al. reported significant resistance among isolates of *Streptococcus* species and other pathogens, with the highest resistance observed against ampicillin, followed by cefazolin and ceftriaxone.[34] Additional data have revealed concerning resistance rates to amoxicillin, azithromycin and clindamycin, all of which are frequently prescribed in the management of acute bacterial tonsillitis.[33]

The increasing resistance observed in *S. pyogenes* and *S. aureus* is of particular concern. While *S. pyogenes* remains largely susceptible to penicillin, treatment failures have been reported.[35] These failures may not be due to intrinsic resistance, since *S. pyogenes* does not produce beta-lactamase, but rather due to beta-lactamase–producing co-pathogens in the oropharynx such as *S. aureus* and *H. influenzae*, which may inactivate penicillin before it reaches the target organism.[35] Other factors contributing to therapeutic failure include incorrect antibiotic selection, suboptimal dosing, inadequate treatment duration and poor patient adherence.[36]

Macrolides (e.g. azithromycin, erythromycin), often used as alternatives in penicillin-allergic patients, are also facing rising resistance rates, particularly in regions such as North America and Europe, where empirical use is common. This trend limits their utility and reinforces the need for judicious prescribing.[36]

While data on resistance related to OTC topical antibiotics for sore throat is limited, *in vitro* studies raise concerns.[37] Westgate et al. reported reduced susceptibility of *S. pyogenes* and *S. aureus* to commonly used OTC topical agents such as tyrothricin, gramicidin, bacitracin and neomycin. Though topical agents may offer symptomatic relief, their widespread, unregulated use may contribute to local resistance development.[32]

These findings reinforce the need for targeted antibiotic therapy based on accurate diagnosis and for improved antimicrobial stewardship to curb resistance emergence in community and clinical settings.

Role of pharmacists in antimicrobial stewardship (AMS)

Prescription patterns for antibiotics vary both internationally and regionally. Numerous factors, including cost, physician choice, antibiotic susceptibility and pathogenic organisms, contribute to this difference.[38] Antimicrobial stewardship is a corrective action which aids in improving prescription practices, monitors and controls broad spectrum antibiotic use, improves clinical outcomes in patients and reduces emergence of antibiotic-resistant pathogens.[39]

Overprescription had led to irrational antibiotic use for tonsillitis, resulting in bacterial resistance and treatment failure. In the clinical capacity, the problem stems from prescribing behaviours, whereby national guidelines are not being adhered to. Additionally, improperly performed clinical assessments lead to inaccurate aetiology, and hence treatment is misinformed.[40] Antimicrobial therapy for acute tonsillitis should be targeted, with a correct antibiotic, dosage and a duration that will likely eliminate the pathogen.[36]

Walijee et al.[11] recommends a delayed antibiotic prescription strategy. In this practice, patients are advised against taking any antimicrobial immediately after onset and prescription is delayed for at least seven days. Patients are also recommended to seek medical advice to manage the condition. While penicillin administered for 10 days remains the most common treatment, alternative antibiotics such as cephalosporins and certain macrolides have also proven to be clinically effective for a shorter period: 5–7 days.[36] At the same time, over-reliance on macrolides as an alternative therapy should be discouraged, and instead these antibiotics should only be prescribed in cases of patients with type 1 penicillin allergy.[36] Rational prescribing of antibiotics should be adopted. Antimicrobial resistance, poor patient compliance and additive problems such as treatment costs and adverse effects can be combated by reducing the number of prescribed antibiotics.[38]

Community pharmacists are the first point of contact for the general populace, especially when patients are seeking medical advice regarding treatment of upper respiratory tract infections such as tonsillitis.[41-42] In recent years, the role of a pharmacist has changed from solely being dispensers or distributors of medicines to an important role-player in healthcare management.[43] Their accessibility and expertise to medicines allow them to help diagnose patients, educate them on treatment options and manage common conditions.[42]

Hence, it is imperative that pharmacists are well-versed in disease management and can minimise complications. In a study by Aldomah et al.,[41] the majority of pharmacists cited azithromycin as the first line of therapy for tonsillitis, despite the treatment guidelines recommending penicillin as the mainstay antibiotic. Additionally, most pharmacists were unaware of the use of corticosteroids as an adjuvant therapy. Mansour and Al-Kayali's[43] 2017 study demonstrated inadequate knowledge of pharmacists regarding antibiotic resistance, as many chose to dispense broad-spectrum antibiotics for tonsillitis, oblivious to the threat of the emergence of resistance.

While antibiotics are largely prescription-based medicines, they can still be obtained without prescription from drug outlets or pharmacies in several countries.[43] The problem of OTC antimicrobials is especially rampant in South America, Africa and Asia, where drug regulations governing sales and distribution of medicines are either inadequate or not enforced. This problem has also plagued some developed countries.[44] In pharmacies, especially in low and middle-income countries, patients often rely on the pharmacist consultation and advice due to economic constraints.[43] Additionally, many consumers seek OTC products and antibiotics for sore throat or upper respiratory tract infections with similar symptomatic profiles, unaware if the condition is caused by a virus or a bacterium.[42]

Education and training are cornerstones of AMS. Pharmacists are important in educating not only patients, but also healthcare

professionals engaged in poor prescribing practices and members of the public.[39] They play a significant role in disease management, discouraging self-diagnosis, clearing common misconceptions and dispelling myths surrounding treatment of self-limiting conditions such as tonsillitis. They ought to advocate for the prudent, safe and suitable use of medicine.[42] Being a key player in healthcare management, they have a responsibility to be a reliable source of information for patients, especially in terms of disease intervention, treatment plans and optimised use of antibiotics.[39]

In terms of acute respiratory infections, pharmacist intervention also includes informing patients about risks and benefits of antibiotic usage, considering diagnosis and clinical management. This is a shared decision-making approach, likely to improve patient health outcomes, while providing satisfaction.[45]

In developed countries, especially the USA, UK and France, clinical pharmacists are actively involved in AMS programmes, whereby they receive training to equip them in lowering antibiotic consumption in patients. They oversee good prescribing practices, manage antimicrobial drugs, and review relevant policies, audits and feedback that play a role in monitoring antibiotic consumption.[46] Prescription surveillance systems, coupled with restrictive or enablement interventions have been shown to improve adherence to antimicrobial policies.[39] However, it should be noted that although such systems are readily available in hospitals, they might not be accessible in communities.[39]

Evidence synthesis by Wu et al.[45] showed that pharmacist's involvement in public health education programmes reduced inappropriate antibiotic prescriptions by 20% in primary healthcare settings for acute respiratory infections. The study also suggested how shared decision-making, usage of viral prescriptions (non-antibiotic) could be implemented in patient counselling, especially in the management of conditions such as tonsillitis, otitis media and sinusitis.

The above evidence underscores the significance of antibiotic stewardship, targeted therapy and enhanced diagnostic techniques to diminish wasteful antibiotic prescriptions and alleviate resistance development in recurring illnesses.[33]

Conclusion

Tonsillitis is generally a self-limiting condition, and while medical management may offer symptomatic relief, a definitive diagnosis is essential before initiating antibiotic therapy, particularly given the alarming rise in antimicrobial resistance. There is a pressing need to improve prescribing practices for conditions like tonsillitis and to strengthen AMS efforts. Pharmacists, often serving as the first point of contact for patients, play an important role in AMS by raising awareness, educating both patients and the public, and promoting responsible prescribing and dispensing practices.

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