

# Throat infections

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Throat infections, referred to as pharyngitis, are most commonly of viral origin; however, bacterial pharyngitis does occur, in which case group A streptococci (GAS) is the most observed causative pathogen. Regardless of the aetiology, pharyngitis is typically a self-limiting condition. Viral cases are managed by providing symptomatic treatment of inflammation and pain. GAS is managed with antimicrobials, after a Centor Criteria score has been calculated and a throat swab or rapid antigen test performed, should it be indicated. The biggest concern with GAS is the associated complications, such as acute rheumatic fever, which enforces the importance of an accurate diagnosis.

**Keywords:** group A streptococcus, Centor score, sore throat, NSAIDs, penicillin

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## Introduction

Throat infections, or pharyngitis as referred to in medical terms, defines an irritation or infection of the pharynx or tonsils. Most causes are typically infectious, either as a result of a viral or bacterial infection. The main culprits of viral infections are rhinoviruses and adenoviruses. Bacterial throat infections are mostly creditable to group A streptococci (GAS) in both adults and children. However, allergies, trauma, neoplasia or toxins may also result in a throat infection.<sup>1</sup>

An infectious throat infection may disrupt the pharyngeal mucosa, leading to local inflammation, while others may cause an increase in nasal secretions, leading to irritation of the mucosa.

Viral throat infections are typically self-limiting and mild, while bacterial cases, also self-limiting, pose a bigger concern due to the possibility of suppurative and nonsuppurative complications.<sup>1</sup>

## Causes of throat infections

### Viral and bacterial aetiology

Oropharyngeal infections can be classified as being mild, self-limiting viral conditions or severe bacterial infections.<sup>2</sup> An acute sore throat is often the chief complaint in throat infections and is caused due to acute pharyngitis or tonsillitis.<sup>3</sup>

Commonly, rhinovirus, coronavirus and parainfluenza viruses account for up to 25% of all sore throats. However, a reasonably measurable amount of sore throats has been caused by influenza type A and B, adenovirus, herpes simplex virus and Epstein-Barr virus.<sup>3</sup> Bacterial related sore throats account for about 10% of sore throats and are caused by *Streptococcus pyogenes*, a GAS that requires an antibiotic. GAS can cause pharyngitis, tonsillitis or scarlet fever<sup>3-6</sup> and are the causative agent of these illnesses in up to one-third of children aged between 5 and 15 years. However, it is less frequently found amongst adults and young children.<sup>7</sup> Groups C or G  $\beta$ -haemolytic streptococci,

VIRAL	BACTERIAL
Slow onset Conjunctivitis Coryza Hoarseness Low or absent fever Discrete ulcerative lesions	Sudden onset Absence of coughing Fever Enlargement of lymph nodes in the neck Headache Pharyngeal pain Abdominal pain Hyperaemic pharyngeal membrane with exudate Tonsillar hypertrophy Tender anterior cervical adenopathy

Figure 1: Signs and symptoms of viral versus bacterial pharyngitis<sup>1,2,8</sup>

*Mycoplasma pneumoniae* and *Chlamydia pneumoniae* can be pathogens as well.<sup>2</sup>

### Signs and symptoms

Acute pharyngitis caused by group A, C or G β-haemolytic streptococci presents similarly from mild illness to severe pharyngeal pain, fever, chills, and abdominal pain. Conjunctivitis, coryza, cough, hoarseness, or discrete ulcerative lesions of the buccal or pharyngeal mucosa symptoms indicate a viral source; however, a hyperaemic pharyngeal membrane with exudate, tonsillar hypertrophy and tender anterior cervical adenopathy is of bacterial aetiology. Furthermore, a strawberry tongue and an erythematous rash indicate scarlet fever caused by *S. pyogenes*.<sup>2,8</sup> Figure 1 outlines the main differences in the presentation of a viral pharyngitis compared to a bacterial case.

### Diagnosis

Due to the difficulty in distinguishing between a viral and bacterial sore throat, prediction rules or clinical scoring tests were established based on signs and symptoms to determine the necessity for an antibiotic. A commonly used tool to identify a streptococcal infection is the Centor Criteria score.<sup>5</sup> If the patient presents with three or four of the symptoms listed in Table I, a streptococcal infection is suspected (Figure 2).

**Table I:** Centor Criteria score<sup>5</sup>

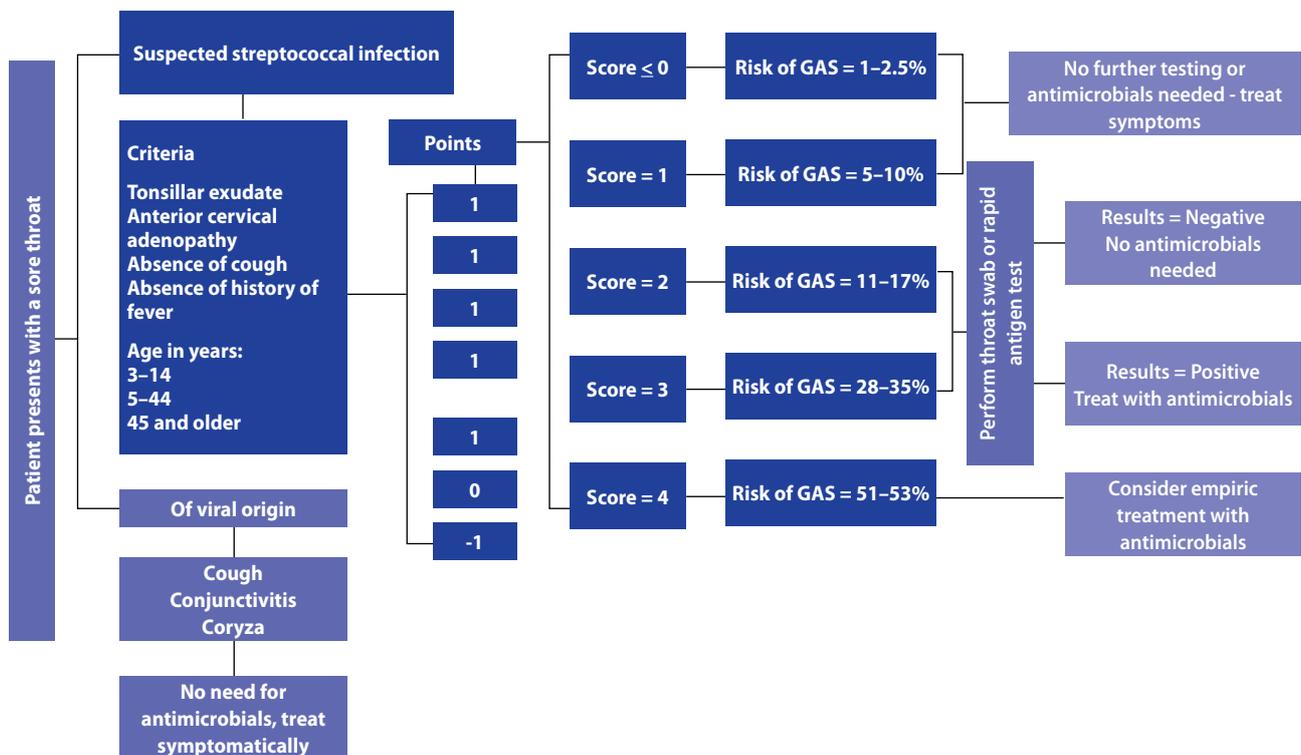
Tonsillar exudate
Tender anterior cervical adenopathy
Absence of cough
Absence of history of fever > 38 °C

At-risk patients, such as those of advanced age, have respiratory or immunocompromising comorbidity and a long duration of symptoms need to be monitored and treated accordingly.<sup>5</sup>

Rapid antigen testing can play an additional role in confirming a strep A infection for sore throat as they are quicker than an agar plate test, have a 95% specificity and their sensitivity increases in the presence of positive clinical symptoms. Furthermore, they are more affordable than a throat swab culture; however, their use in adults has been well documented while children’s data is lacking.<sup>7</sup> The rapid test or a throat swab, although valuable tools, are usually only used when the Centor Criteria score confirms a streptococcal infection or when the risk factors such as a history of acute rheumatic fever, rheumatic heart disease or exposure to a streptococcal infected person are confirmed.<sup>8</sup>

### Complications of group A streptococcus

Acute rheumatic fever is a complication that occurs from infection with GAS. This autoimmune reaction affects multi-systems which resolves unless there is cardiac valvular damage (rheumatic heart disease). Rheumatic heart disease affects 60% of patients who have had acute rheumatic



**Figure 2:** Adapted from the Clinical Scoring Rule guide for identifying and treating a streptococcal (bacterial) infection and a viral throat infection<sup>9,10</sup>

**Table II:** Antimicrobial treatment options in GAS pharyngitis. (Adapted from Brink AJ, Cotton MF, Feldman C, et al.)<sup>15</sup>

	Paediatric patients	Adult patients	Duration
<b>Penicillin VK</b>	< 27 kg: 250 mg twice daily > 27 kg: 500 mg twice daily	500 mg twice daily	10 days
<b>Benzathine penicillin</b>	3–5 years: 600 000 U > 5 years: 1.2 MU	1.2 MU	Single dose
<b>Amoxicillin</b>	50 mg/kg once daily (Max 1 000 mg)	50 mg/kg once daily or 500–1 000 mg twice daily (Max 3 000 mg)	10 days
Recommendations for beta-lactam allergy			
<b>Azithromycin</b>	10–20 mg/kg once daily	500 mg once daily	Paediatrics: 5 days Adults: 3 days

fever.<sup>11</sup> Resource-limited countries have a ten-fold higher incidence of GAS infections in combination with rheumatic heart disease.<sup>8</sup>

Additionally, post-streptococcal glomerulonephritis is another complication of GAS caused by a previous skin or throat infection.<sup>12</sup> In underdeveloped countries, it is an epidemic; however, it affects mainly the elderly in developed countries.<sup>13</sup>

## Management of throat infections

In the treatment of GAS related throat infections, one must provide symptomatic relief, reduce the period of the condition, prevent nonsuppurative and suppurative complications, decrease the risk of passing the pathogen onto someone else and lastly, reduce the use of antibiotics as summarised in Figure 3.<sup>14</sup>

### Pharmacological treatment

#### Antimicrobial treatment

If GAS is suspected, empiric treatment, as highlighted in Table II, should be initiated. Due to its narrow spectrum, low cost, low profile for side effects, proven safety, and excellent patient compliance (a single intramuscular dose), benzathine penicillin (Pen G) is still the drug of choice to treat GAS pharyngitis. Several other beta-lactam antimicrobials exist for the treatment of GAS pharyngitis, as outlined in Figure 3. In the case of a penicillin allergy, macrolides may be used. Lastly, not indicated in the table is the treatment option of first-generation cephalosporins, like cephalexin. However, as broader spectrum antimicrobials have an increased cost implication and risk for the development of GAS resistance, amoxicillin is preferred.<sup>1,14,15</sup>

#### Corticosteroids

In patients with severe exudative pharyngitis, corticosteroids like dexamethasone and prednisone have been shown to improve symptoms. However, it is only indicated to be used in selective patients with severe swelling or odynophagia.<sup>1</sup>

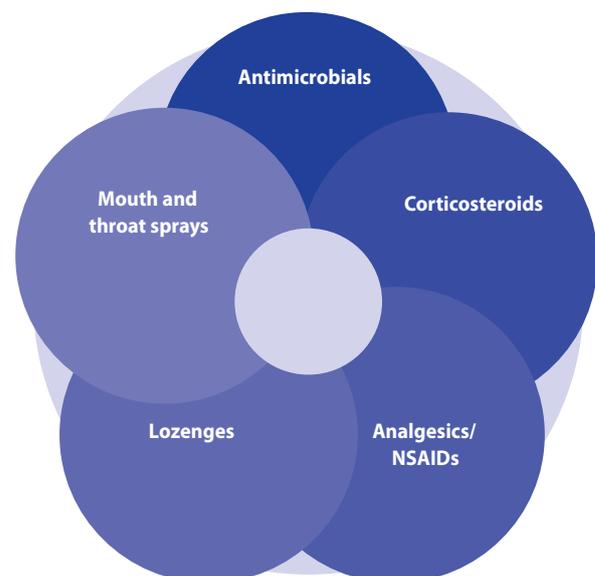
### Symptomatic treatment

If the symptoms indicate a viral infection, then no antimicrobials are recommended, and treatment should instead be aimed at symptomatic relief for the patient.<sup>14</sup>

### Pain management

A variety of over-the-counter (OTC) products are available to assist in managing pain in throat infections. Paracetamol and nonsteroidal anti-inflammatory drugs (NSAIDs) are typically used to manage pain, fever and inflammation.<sup>16</sup> Lozenges and mouth and throat sprays containing benzydamine may alleviate symptoms in both viral and bacterial pharyngitis by treating the inflammation and providing analgesic and anaesthetic effects to provide targeted pain relief. Furthermore, antiseptic mouth and throat sprays may also assist in the prevention of a secondary bacterial infection.<sup>17,18</sup>

Lozenges and mouth and throat sprays may also provide local anaesthetic properties, as well as disinfectant and anti-inflammatory benefits.<sup>17,18</sup>



**Figure 3:** The five focus areas of pharmacologically managing pharyngitis<sup>1,14-18</sup>

## Conclusion

Globally, throat infections are common conditions that affect many adults and children, with the main complaint being a sore throat. Typically, pharyngitis is a self-limiting condition and can be treated symptomatically. If of viral origin, usually presenting as sore throat and a cough, the treatment is symptomatic with NSAIDs, mouth and throat sprays or lozenges and paracetamol to manage the inflammation and pain. However, if a bacterial infection has been confirmed using the appropriate tools as a GAS infection, penicillin VK, benzathine penicillin, or amoxicillin is the empiric therapy or azithromycin or clarithromycin if there is a penicillin allergy.

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