Streptococcal throat infection (strep throat, streptococcal tonsillitis, pharyngitis, or tonsillitis)

Streptococcal throat infection (also known as strep throat, pharyngitis, or tonsillitis) is one of the most common infectious disease, most often caused by infection with Group A *Streptococcus pyogenes* (GAS).

_____

The most common bacterial cause of strep throat is *Streptococcus pyogenes*, which accounts for 20% to 40% of all acute strep throat cases in children and 5% to 15% in adults. Strep throat is also the most common infection caused by *S. pyogenes*.

The disease most commonly occurs during the colder months (late fall, winter, and early spring).

Strep throat can affect people of all ages. It most commonly occurs in children between the ages of 5 and 15. It is rare in children under the age of 3.

Cause

The most common cause of strep throat is *Streptococcus pyogenes* (group A beta-haemolytic streptococcus), although it can also be caused by group C and G beta-haemolytic streptococci.

Reservoir

The reservoirs of group C and G beta-haemolytic streptococci are animals and humans. In humans group C and G streptococci are most commonly found in the oropharynx. For group A streptococci (GAS), humans are the sole reservoir. In humans, *S. pyogenes* is found in the nasopharynx and on the skin.

Transmission

The source of infection is patients and individuals without obvious symptoms or signs of the disease (asymptomatic carriers). Infection occurs through close contact, and the entry point for streptococci is usually the throat mucosa (droplet transmission through talking, coughing, and sneezing via contact with droplets of saliva or nasal secretions) and, less commonly, broken skin.

Indirect transmission via contaminated surfaces, objects, and food plays a minor role in the spread of the infection.

People with strep throat are much more contagious than those without obvious symptoms or signs of the disease (asymptomatic carriers).

Risk factors

The most common risk factor is close contact with another person who has strep throat. Adults who are frequently in contact with children – such as parents of school-aged children – have an increased risk of strep throat, and the infection often spreads to other people in their household.

Crowded conditions, such as in day-care centres and schools, increase the risk of the disease spreading.

Incubation

The incubation period (the time between infection and the appearance of the firs symptoms or signs of the disease) usually lasts 2–5 days.

Clinical picture

Symptoms and signs characteristic of strep throat:

- Pain when swallowing, as well as pain in the throat and neck;
- Malaise, headache, chills, high fever;
- The throat is noticeably red, the uvula (the small hanging structure at the back of the soft palate) is swollen, and the tonsils are covered with white spots or greyish-white patches;
- Petechial haemorrhages may be present on the soft palate;
- The lymph nodes are enlarged and tender;
- Children often vomit and have abdominal pain;
- There are no cold symptoms or cough.

Symptoms and signs characteristic of strep throat in children under the age of 3:

- No fever or only a mild fever;
- The throat mucosa is almost unchanged;
- Enlarged lymph nodes;
- Frequent purulent nasal discharge;
- Irritability and loss of appetite.

Strep throat can occur at the same time as the rash-causing disease called scarlet fever.

Complications and disease outcome

Complications following strep throat are rare. Complications arise due to the spread of bacteria to nearby and/or distant tissues and organs early in the course of the illness. Strep throat can lead to:

- Otitis media (middle ear inflammation);
- Peritonsillar abscess and cellulitis (and abscess and inflammation of the subcutaneous tissue around the tonsils);
- Retropharyngeal abscess (an abscess of the lymph nodes on the posterior and lateral walls of the throat);

- Acute sinusitis and mastoiditis (acute inflammation of the paranasal sinuses and inflammation of the mastoid bone);
- Streptococcal pneumonia;
- Purulent meningitis (purulent inflammation of the meninges) and brain abscess;
- Endocarditis (inflammation of the heart valves);
- Osteomyelitis (inflammation of the bone marrow and bone);
- Arthritis (inflammation of the joints);
- Streptococcal toxic shock syndrome (a serious infection caused by *pyogenes*, which secrete exotoxins that damage tissues, enter the bloodstream, and can lead to sepsis, multiple organ failure, and death);
- Sepsis (the body's extreme systemic response to infection, which triggers a chain reaction of tissue damage and organ failure and can lead to death).

Very rarely, late immune-mediated complications occur, such as acute post-streptococcal glomerulonephritis (kidney inflammation that occurs 7–21 days after infection) and acute rheumatic fever (an inflammatory systemic rheumatic disease that occurs 2–3 weeks after infection).

Acute post-streptococcal glomerulonephritis and acute rheumatic fever can be confirmed a few weeks after infection with *S. pyogenes* by detecting antistreptococcal antibodies in the patient's blood.

Most complications can be prevented with timely and consistent treatment using appropriate antibiotics.

The illness is usually mild. Symptoms typically resolve within 3 to 5 days. Death from strep throat is extremely rare.

Diagnosis

The diagnosis is based on the characteristic clinical picture.

Laboratory tests reveal an elevated white blood cell count with a predominance of neutrophils and elevated C-reactive protein levels.

Centor Score can help us decide how to proceed in cases of strep throat. Based on the total score, we can determine which patients would benefit from additional microbiological testing.

Four Centor Score Criteria support a diagnosis of infection with *S. pyogenes*:

- Body temperature > 38 °C;
- Tender/enlarged lymph nodes;
- Palatal exudate;
- Absence of cough.

A score of 3–4 (according to the Centor Score Criteria) in adults indicates a high probability of streptococcal infection, whereas the use of the Centor Score Criteria is somewhat less reliable in children.

The clinical diagnosis of strep throat is confirmed by detecting *S. pyogenes* antigen in a throat swab (rapid tests) or by isolating the bacterium in culture.

Differential diagnosis

If signs and symptoms outside the throat are present a viral infection should be considered. Patients with strep throat typically do not have:

- Cough
- A runny nose
- Hoarseness
- Mouth sores
- Conjunctivitis (inflammation of the conjunctiva)

These symptoms strongly suggest a viral cause.

Inflection with influenza viruses, adenoviruses, herpes simplex virus (HSV), and cytomegalovirus (CMV) can be confirmed using polymerase chain reaction (PCR) and direct immunofluorescence (DIF) tests.

Infection with Epstein-Barr virus (EBV), CMV, HSV, and human immunodeficiency virus (HIV) is also confirmed by detecting the presence of antif+viral antibodies in the patient's blood.

In some cases, laboratory tests are indispensable for differential diagnosis:

- Infectious mononucleosis (caused by EBV, less commonly by CMV; elevated white blood cell count and increased proportion of lymphocytes);
- Agranulocytosis (a condition characterized by a severely reduced number of granulocytes in the blood; may present as necrotizing angina; a significantly reduced white blood cell count, with neutrophils absent or present in very low numbers);
- Leukaemia (initially, necrotizing inflammation of the throat may be prominent; immature (atypical) cells are present in the blood).

Treatment

Antibiotic treatment is necessary and medically justifies as it shortens the duration and severity of symptoms, reduces the likelihood of transmitting the infection, and prevents the development of complications.

Strep throat is typically treated with penicillin for 10 days. Another class of antibiotics is selected only for patients who are hypersensitive to penicillin. Accompanying symptoms (fever, pain) are treated with analgesics and antipyretics.

Chemoprophylaxis

The goal of chemoprophylaxis is to protect individuals from infection and disease using appropriate medications. For patients and their close contacts who have had acute rheumatic fever or acute post-streptococcal glomerulonephritis, we may prescribe appropriate antibiotic prophylaxis, typically benzathine penicillin. We select the other antibiotic group only for patients who are hypersensitive to penicillin. The duration of chemoprophylaxis is determined on a case-by-case basis.

Prevention

There is no vaccine against strep throat.

To prevent infection, it is especially important to avoid close contact with patients and to maintain proper personal and general hygiene. Proper hand hygiene is particularly important, especially after coughing or sneezing and before preparing food.

To prevent the spread of strep throat, it is important to:

- Avoid contact with others and wear a mask while infectious (self-isolation);
- Wash your hands frequently with soap and water for at least 20 seconds;
- Use a hand sanitizer;
- Cover your mouth and nose with a tissue when coughing or sneezing and dispose tissues in the trash;
- Cough and sneeze into the upper part of your sleeve or elbow, not into your hands;
- Wash glasses, cutlery, and plates used by the infected person;
- Frequently ventilate enclosed spaces.

Infectiousness

A patient is infectious from the onset of symptoms until 24 hours after effective treatment with penicillin. The patient must be isolated for the first 24 hours of treatment. They should stay away from work, school, or day-care until 24 hours have passed since the start of treatment with penicillin and until their fever has subsided.

Immunity

Immunity does not develop. A person who has had strep throat may get it again several times in the future.