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## Group A Streptococcal Infections

### OVERVIEW

Group A streptococcal (strep) infections are caused by group A streptococcus, a bacterium responsible for a variety of health problems. These infections can range from mild skin infection or sore throat to severe, life-threatening conditions such as toxic shock syndrome (multi-organ failures) and necrotizing fasciitis (soft tissue disease), commonly known as flesh eating disease. Most people are familiar with strep throat, which along with minor skin infection, is the most common form of the disease. Health experts estimate that more than 10 million mild infections (throat and skin) like these occur every year.

In addition to strep throat and superficial skin infections, group A strep bacteria can cause infections in tissues at specific body sites, including lungs, bones, spinal cord, and abdomen.

### STREP THROAT

#### ***What is strep throat and what are the symptoms?***

Your health care provider may call it acute streptococcal pharyngitis. If you have strep throat infection, you will have a red and painful sore throat with white patches on your tonsils. You also may have swollen lymph nodes in your neck, run a fever, and have a headache. Nausea, vomiting, and abdominal pain can occur but are more common in children than in adults.

#### ***How does Group A strep spread to others?***

You can get a group A strep infection by direct contact with saliva or nasal discharge from an infected person. Most people do not get group A strep infections from casual contact with others, but a crowded environment like a dormitory, school, or an institutional setting such as a nursing home can make it easier for the bacteria to spread. There have also been reports of contaminated food, especially milk and milk products, causing infection. You can get sick within 3 days after being exposed to the germ. Once infected, you can pass the infection to others for up to 2 to 3 weeks even if you don't have symptoms. After 24 hours of antibiotic treatment, you will no longer spread the germs to others.

#### ***How is strep throat diagnosed?***

Your health care provider will take a sample of tissue from your throat. This will be used for a culture or a rapid strep test, which only takes 10 to 20 minutes. If the result of the rapid test is negative, you may get a follow-up culture to confirm the results, which takes 24 to 48 hours. If the culture test is also negative, your health care provider may suspect you do not have strep, but rather another type of infection. The results of these throat cultures will affect what your health care

provider decides to be the best treatment. Most sore throats are caused by viral infections, however, and antibiotics are useless against them.

### ***What is the treatment for strep throat?***

If your health care provider confirms you have a strep infection, he or she will prescribe antibiotics. This will help reduce symptoms, and after 24 hours of taking the medicine, you will no longer be able to spread the disease to others.

Treatment will also reduce the chance of complications.

Health experts think penicillin is the best medicine for treating strep throat because it has been proven to be effective, safe, and inexpensive. Your health care provider may have you take pills for 10 days or give you a shot. If you are allergic to penicillin there are other antibiotics your health care provider can give you to clear up the illness. Doctors often prefer to give amoxicillin to children with strep throat.

During treatment, you may start to feel better within 4 days. This can happen even without treatment. Still it is very important to finish all the medicine to prevent complications.

### ***What are the complications of strep throat?***

Untreated group A strep infection can result in rheumatic fever and post-streptococcal glomerulonephritis (PSGN). Rheumatic fever develops about 18 days after a bout of strep throat and causes joint pain and heart disease. It can be followed months later by Sydenham's chorea, a disorder where the muscles of the torso and arms and legs are marked with dancing and jerky movements. PSGN is an inflammation of the kidneys that may follow an untreated strep throat but more often comes after a strep skin infection. Both disorders are rarely seen in the United States because of prompt and effective treatment of most cases of strep throat.

## **SKIN INFECTIONS: IMPETIGO, CELLULITIS, ERYSIPELAS**

### ***What is impetigo?***

Impetigo is an infection of the top layers of the skin and is most common among children ages 2 to 6 years. It usually starts when the bacteria get into a cut, scratch, or insect bite. Impetigo is usually caused by staphylococcus (staph), a different bacterium, but can be caused by group A streptococcus. Skin infections are usually caused by different types of strep bacteria than those that cause strep throat. Therefore, the types of strep germs that cause impetigo are usually different from those that cause strep throat.

### ***What are the symptoms of impetigo?***

Symptoms start with red or pimple-like lesions (sores) surrounded by reddened skin. These lesions can be anywhere on your body, but mostly on your face, arms, and legs. Lesions fill with pus, then break open after a few days and form a thick crust. Itching is common. Your health care provider can diagnose the infection by looking at the skin lesions.

### ***How is impetigo spread?***

The infection is spread by direct contact with wounds or sores or nasal discharge from an infected person. Scratching may spread the lesions. From the time of infection until you show symptoms is usually 1 to 3 days. Dried streptococci in the air are not infectious to skin with no breaks.

***What is the treatment for impetigo?***

Your health care provider will prescribe oral antibiotics, as with strep throat. This treatment may also include an antibiotic ointment to be used on the skin.

***What are cellulitis and erysipelas?***

Cellulitis is inflammation of the skin and deep underlying tissues. Erysipelas is an inflammatory disease of the upper layers of the skin. Group A strep germs are the most common cause of both conditions.

***What are the symptoms of cellulitis and erysipelas?***

Symptoms of cellulitis may include fever and chills and swollen “glands” or lymph nodes. Your skin will be painful, red, and tender. Your skin may blister and then scab over. You may also have perianal (around the anus) cellulitis may with itching and painful bowel movements.

With erysipelas, a fiery red rash with raised borders may occur on your face, arms, or legs. Your skin will be hot, red, and have sharply defined raised areas. The infection may come back, causing chronic swelling of your arms or legs (lymphedema).

***How does a person get cellulitis or erysipelas?***

Both cellulitis and erysipelas begin with a minor incident, such as a bruise. They can also begin at the site of a burn, surgical cut, or wound, and usually affect your arm or leg. When the rash appears on your trunk, arms, or legs, however, it is usually at the site of a surgical cut or wound. Even if you have no symptoms, you carry the germs on your skin or in your nasal passages and can transmit the disease to others.

***How are these skin infections diagnosed and what is the treatment?***

A health care provider may take a sample or culture from your skin lesions to identify the bacteria causing infection. He or she may also recover the bacteria from your blood. Depending on how severe the infection is, treatment involves either oral or intravenous (through the vein) antibiotics.

**SCARLET FEVER**

***What is scarlet fever?***

Scarlet fever is another form of group A strep disease that can follow strep throat. It is usually self-limited and contagious.

***What are the symptoms of scarlet fever?***

In addition to the symptoms of strep throat, a red rash appears on the sides of your chest and abdomen. It may spread to cover most of your body. This rash appears as tiny, red pinpoint and has a rough texture like sandpaper. When pressed on, the rash loses color or turns white. There may also be dark red lines in the folds of skin. You may get a bright strawberry-red tongue and flushed (rosy) face, while the area around your mouth remains pale. The skin on the tips of your fingers and toes often peels after you get better. If you have a severe case, you may have a high fever, nausea, and vomiting.

***How does a person get scarlet fever?***

You can get scarlet fever the same way as strep throat – through direct contact with throat mucus, nasal discharge, and saliva of an infected person.

***What is the treatment for scarlet fever?***

Like strep throat, a health care provider treats scarlet fever with antibiotics.

## **SEVERE STREP INFECTIONS**

### ***What are the more severe streptococcal infections?***

Some types of group A strep bacteria cause severe infections. These include

- Bacteremia (blood stream infections)
- Toxic shock syndrome
- Necrotizing fasciitis (flesh-eating disease)

According to the Centers for Disease Control and Prevention (CDC), 4,844 cases of severe group A streptococcal disease were reported in 2003.

All severe group A strep infections may lead to shock, organ failure, and death.

Health care providers must recognize and treat such infections quickly.

Health care providers diagnose these infections by looking at blood counts and doing urine tests as well as cultures of blood or fluid from a wound site. Antibiotics used to treat these severe infections include penicillin, erythromycin, and clindamycin. If tissue damage is severe, a health care provider may need to remove the tissue surgically or amputate the limb.

### ***Who is at greatest risk for severe infection?***

- Children with chickenpox
- People with suppressed immune systems
- Burn victims
- Elderly people with cellulitis, diabetes, blood vessel disease, or cancer
- People taking steroid treatments or chemotherapy
- Intravenous drug users

Severe group A strep disease may also occur in healthy people with no known risk factors.

## **RESEARCH**

Through research, health experts have learned that there are more than 120 different strains of group A streptococci, each producing its own unique proteins.

Some of these proteins are responsible for specific group A streptococcal diseases. With the support of the National Institute of Allergy and Infectious Diseases (NIAID), scientists have determined the genetic sequence, or DNA code, for three different strains of the group A streptococcus organism.

By studying an organism's genes, scientists learn which proteins are responsible for virulence, crucial information that will lead to new and improved drugs and vaccines. NIAID funds are supporting research for developing a group A streptococcus vaccine. As a result of NIAID-supported research, the first group A streptococci vaccine clinical trial in 30 years was conducted. The vaccine was well tolerated by patients and has led to further clinical evaluation of a similar vaccine candidate. An effective vaccine will prevent not only strep throat and impetigo, but more serious invasive disease and post-infectious complications like rheumatic fever.