'STREP'

Demands Immediate Care

by Margie Patlak

Few childhoods go by without the tell-tale fever and sore throat of a *Streptococcus*, or "strep," infection. Although these throat infections are common and easily treated, the recent rise of particularly deadly or troublesome strains of Group A *Streptococcus* has pushed the bacterium into the medical limelight—again.

In the past, Group A strep has played a starring role in a number of deadly medical epidemics, particularly the scourges of rheumatic fever that swept across the nation in the first half of this century, killing or debilitating thousands of children each year.

After World War II, the number of cases of rheumatic fever dramatically declined until, during the 20 years between 1965 and 1985 alone, the yearly number of cases of rheumatic fever among school-age children dropped by more than 90 percent. The medical community had assumed that less crowded living conditions and the use of antibiotics were keeping the disease at bay. Some physicians even went so far as to call rheumatic fever a "vanishing disease in suburbia."

That complacency was shaken in the mid-1980s when outbreaks of rheumatic fever were reported among children and young adults in various cities scattered throughout the country. Those reports were followed by others of a new and deadly form of strep infection that was afflicting adults. This disease, which is called toxic streptococcal syndrome, made the headlines when public television's "Sesame Street" puppeteer Jim Henson was reported to have died from it last year. There's also evidence to suggest that blood infections caused by Group A strep are on the rise.

"Group A *Streptococcus* seems to have taken a little twist again," says Rosemary Roberts, M.D., a medical officer with the Food and Drug Administration's division of anti-infective drug products. "We're seeing manifestations like rheumatic fever that we haven't seen for awhile, as well as more invasive strains of Group A strep that are making people sicker much more quickly."

The jury isn't in yet on why Americans are experiencing such a boost in the severity of strep infections. Preliminary findings by researchers at the national Centers for Disease Control in Atlanta suggest that a population increase among previously rare strep types may be behind both the recent rheumatic fever outbreaks and cases of the new toxic streptococcal syndrome. Heightened production of disease-causing toxins by more common strep types may also be responsible for the latest strep casualties.

There are more than 80 known types of Group A *Streptococcus*, which can cause more than a dozen different illnesses. Group A *Streptococcus*, in turn, is part of a broader category of strep organisms that cause an even larger number of diseases. (See box on next page.)

Some of the more well-known Group A strep afflictions include upper respiratory diseases such as strep throat and

Signs of a Group A Strep Infection

- **sore throat accompanied by fever**
- **shortness of breath**
- **red rash accompanied by fever**
- **involuntary jerky movements**
- **yellow flaky crusts on the skin**
- **chest pain**
- **shock**
- **tender joints**
- **blood in urine**
- **puffy face and malaise**

Persons developing any of these symptoms should seek immediate medical care. ■

scarlet fever, skin disorders such as impetigo, and inflammatory diseases such as rheumatic fever or kidney disease. In addition, blood infections due to Group A strep are a serious and frequent complication of wounds or surgery.

Group A strep infections are treatable with antibiotics, the drug of choice being penicillin. Other antibiotics, such as erythromycin and various cephalosporins, are effective alternatives for patients allergic to penicillin. FDA is responsible for ensuring the safety and effectiveness of these drugs.

Strep Throat

Strep throat (streptococcal pharyngitis) is probably the most well-known Group A strep infection. Although strep throat can occur at any age and at any time of the year, it mainly afflicts school-age children during the winter and spring. The many symptoms of strep throat include an extremely red and painful sore throat, ear pain, fever, enlarged and tender lymph nodes in the neck, white spots on the tonsils, or dark red spots on the soft palette. However, about 1 out of 5 people who has strep throat experiences no symptoms.

Because nearly all the symptoms of strep throat can also occur with viral infections, laboratory tests are used to confirm a doctor's suspicion that a patient's sore throat is caused by Group A strep. The traditional laboratory test to identify strep is a throat culture. To isolate and identify Group A strep from a throat swab takes from one to three days using the culture method. In recent years, a number of tests have become available that use antibodies to detect the presence of Group A strep directly on a throat swab, and these devices can provide test results in a matter of minutes. Many physicians feel that the rapid tests do not detect as many positive results as the culture method, so if the rapid test results are negative, a follow-up throat culture is recommended.

Strep throat is highly contagious among children because they are in close contact with one another. In addition, they have not yet developed resistance to any of the strains, as adults have.

The Streptococci Family

The streptococcal bacteria are extremely versatile and common. Able to invade almost any part of the body, streptococci cause a host of diseases. These microbes are divided into more than a dozen different groups, based on the proteins they harbor in their cell walls and their performance on various laboratory tests. Here's a list of some of the more troublesome categories or species of *Streptococcus* and the diseases for which they are well known:

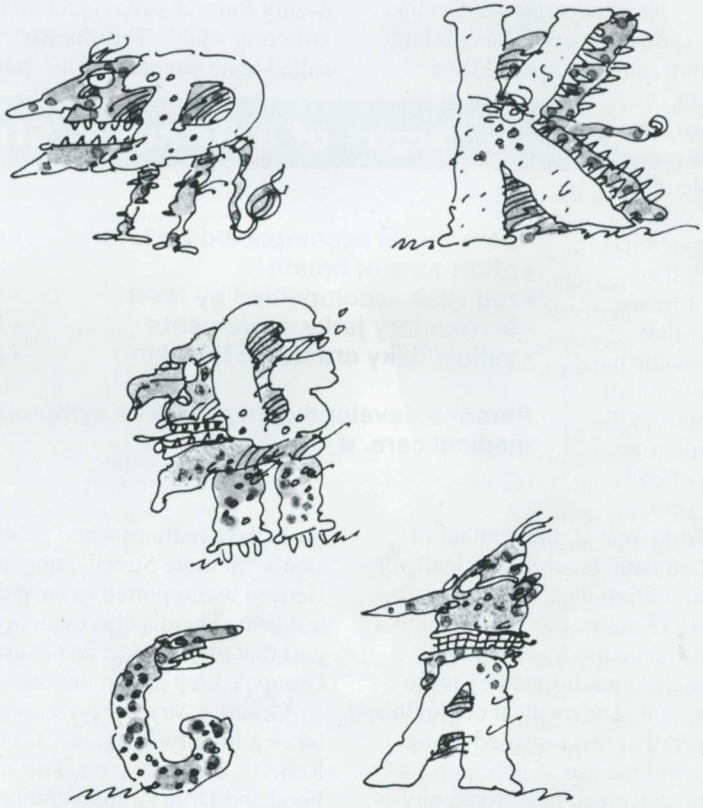
Group A: strep throat, scarlet fever, rheumatic fever, impetigo, toxic streptococcal syndrome, streptococcal kidney disease, blood infections

Group B: blood infections in newborns, meningitis, childbed fever

Groups C,D,G,H,K: urinary tract infections, heart infections, meningitis, upper and lower respiratory tract infections

***Streptococcus mutans*:** dental caries (cavities)

***Streptococcus pneumoniae*:** pneumonia, ear infections, meningitis, sinus infections. ■



There is evidence to suggest that blood infections caused by Group A strep are on the rise.

The incubation period for strep throat is two to five days. During epidemics, siblings of a strep throat patient have a fifty-fifty chance of also succumbing to the disease, whereas only 20 percent of the parents of such patients will develop strep throat. Children with strep throat should not return to school until their fever returns to normal and they've had at least a day's worth of antibiotics.

Strep throat is easily treated with antibiotics. Treatment is usually not necessary for those individuals who harbor the strep throat microbe but show no signs of an active infection. These people are unlikely to spread infection to others, according to the American Academy of Pediatrics, or experience the complications of a strep infection, which include rheumatic fever and kidney disease.

Scarlet Fever

One of the more colorful variants of a strep infection is scarlet fever. The hallmarks of this disease include a bright red tongue, a brilliant scarlet rash (particularly on the trunk, arms and thighs), a flushed face, sore throat, and fever.

"Scarlet fever is simply strep throat with a rash," says Roberts. The red rash that typifies this disease is prompted by a toxin generated by the *Streptococcus* bacterium. The striking symptoms of scarlet fever make it easy to diagnose, but most physicians confirm their clinical diagnosis with laboratory tests.

Like strep throat, scarlet fever primarily afflicts school-aged children during the winter and spring months. Scarlet fever is easily treated with antibiotics, and, if left untended, the disease can foster the same complications prompted by strep throat.

Rheumatic Fever

Lurking behind several types of strep infections is the possibility of rheumatic fever. Although a relatively uncommon disease, the effects of rheumatic fever are serious enough to warrant concern. Signs of rheumatic fever include a red rash, pea-sized lumps under the skin, tender joints, fever, involuntary jerky movements, heart palpitations, chest pain, and, in severe cases, heart failure. Although most symptoms disappear within weeks to months, about half the time the disease leaves behind deformed heart valves that may limit patients' physical activities and foster premature death from heart failure.

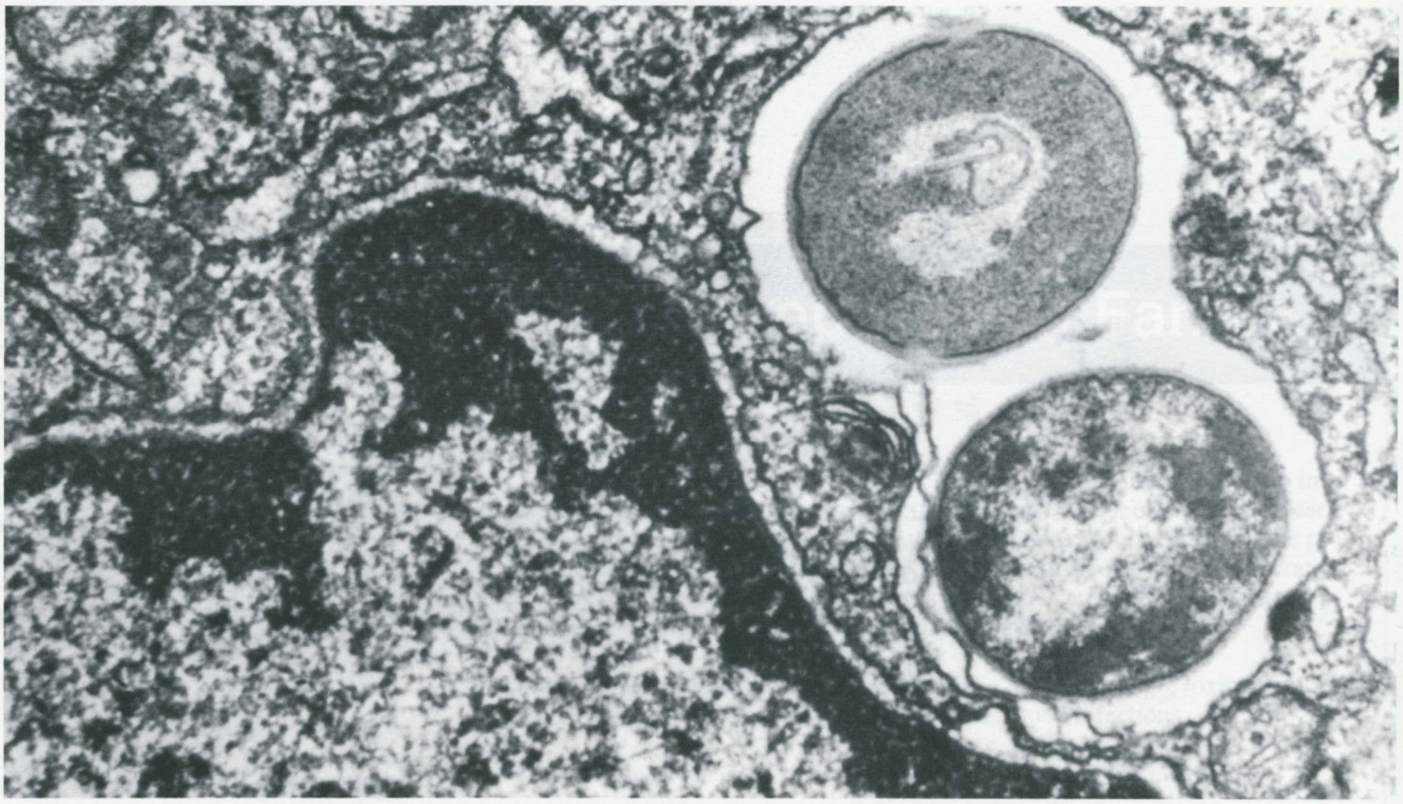
Diagnosis of rheumatic fever is based on its symptoms in conjunction with a history of a recent strep infection, which can be confirmed by tests for strep antibodies in the blood.

Rheumatic fever is thought to be triggered by an overly active immune system, which inadvertently destroys body tissues in its zeal to rid the body of a strep infection. Most symptoms of rheumatic fever crop up one to four weeks after a strep infection, although involuntary jerky movements may not surface for as long as six months after infection. About half of the recent cases of rheumatic fever, however, developed with mild to no previous signs of a strep throat infection, such as a sore throat with fever.

It's these signs of a strep infection that physicians rely on to prevent rheumatic fever. As many as 3 percent of untreated cases of strep throat can develop into rheumatic fever. But antibiotic treatment, even if it's not started until several days after the onset of symptoms, can squelch the possibility of rheumatic fever.

Once rheumatic fever occurs, doctors can do little to prevent its damage in the body. Anti-inflammatory drugs (such as aspirin or steroids) can ease many of the symptoms and possibly prevent some of rheumatic fever's more serious developments. Antibiotics are also used to treat any lingering strep infections. But even with such therapies, the disease often wreaks such damage on heart valves that they have to be surgically repaired or replaced with synthetic or animal implants.

Rheumatic fever usually recurs whenever its victims experience any new strep infections. To prevent such flare-ups, the American Heart Association recommends that anyone who has experienced



A white cell ingests two round streptococci.
(Source: National Institute of Allergy and Infectious Diseases)

rheumatic fever take prophylactic (preventive) doses of antibiotics. How long rheumatic fever patients require such a preventive drug regime depends on whether they experienced heart damage and whether they're likely to develop a future strep infection. Children who've had rheumatic fever, for example, generally take antibiotics on a daily basis until they reach adulthood, when the risk of a strep infection greatly diminishes.

Skin Infection

When Group A *Streptococci* literally get under the skin, they can foster a common skin disease known as impetigo. This contagious disease frequently afflicts mainly children during the *summer*, when insect bites, cuts and scrapes are prevalent. These skin infringements serve as portals of entry for the *Streptococci*.

Impetigo starts out as a rash of pinhead-sized blisters or pimples that rapidly run together to form yellow, flaky crusts. The impetigo rash may itch or burn, but rarely causes pain. The disease is diagnosed with the aid of cultures of the fluid lodged beneath the crusts. If large numbers of strep bacteria crop up in these cultures, their guilt in causing the disease is firmly established. Impetigo can also be caused by other bacteria, including *Staphylococcus*, or by mixtures of staphylococcal and streptococcal bacteria.

Impetigo is combated with the use of topical or oral antibiotics, depending on its severity and frequency within a given population. Doctors advise impetigo patients to remove the skin crusts and wash their rash with soap on a regular basis. Occasionally, if not treated, streptococcal impetigo develops into a blood infection, and it can also foster kidney disease.

Kidney Disease

All kinds of strep infections can foster an inflammation of the kidneys (acute glomerulonephritis), although the disease most often follows impetigo. Less than 1 percent of all strep infections foster kidney disease, but because certain strains of strep are particularly prone to causing this complication, small epidemics of acute glomerulonephritis can crop up in private homes or in schools.

Symptoms of the disorder include a puffy face due to water retention, blood in the urine, pain in the loins, malaise, nausea, headache, and high blood pressure. These symptoms usually surface one to three weeks following a strep infection and subside within the same amount of time.

Diagnosis of acute post-streptococcal glomerulonephritis is based on symptoms, a history of a recent strep infection, and elevated levels of antibodies to strep in the blood. This form of kidney disease, like rheumatic fever, is thought

Only about 4 to 5 people out of 100,000 develop bloodstream infections due to Group A strep, but of those who do get infected, nearly a third die.

to stem from an overactive immune response to strep.

Little can be done to prevent this heightened immune response once it's begun, although various drugs (such as diuretics) and dietary measures (such as restricted salt or protein intake) can ease many of its symptoms. Most patients recover without any permanent problems, although occasionally kidney damage inflicted by the disease may require dialysis or a kidney transplant.

Patients rarely experience a recurrence of acute glomerulonephritis following additional strep infections because of the immunity they develop to the specific type of strep bacterium that caused their disorder. (Only a handful of strep types can cause glomerulonephritis, and most cases of the disorder can be traced to a specific Group A streptococcal strain known as Type 12.)

Blood Infection

Although the number of bloodstream infections (septicemia) of Group A strep appears to be on the rise, they are still extremely rare. Only about 4 to 5 people out of 100,000 develop these infections each year, according to the national Centers for Disease Control in Atlanta. But nearly one-third of all patients with *Streptoccocus* blood infections will die from them.

Septicemia usually gets its start when streptococcal bacteria on the skin delve into an opening as large as a surgical or battle wound or as small as a minor cut or scrape. Normally, the body's immune system checks these bloodstream invaders before they wreak havoc in the body. In those individuals whose resistance is lowered, however, *Streptoccocus* travels far and wide, causing such symptoms as fever, low blood pressure, chills, confusion, diarrhea, vomiting, or a red skin rash. Septicemia usually afflicts people over 60 who have an underlying disease such as diabetes or renal failure that compromises their immune defenses.

In addition to relying on clinical signs to diagnose septicemia, physicians use laboratory findings, including positive blood cultures, positive antibody tests, and extremely high numbers of white blood cells in the blood.

Toxic Streptococcal Syndrome

The new toxic streptococcal syndrome, first described in 1987 in this country, is similar to septicemia. Patients with this disorder have many of the same symptoms as those of septicemia, but because of the disease's rapid progression, by the time they seek treatment they are often gravely ill. Toxic streptococcal syndrome patients frequently go into shock and experience multi-organ failure, as well as complications such as the pneumonia that reportedly killed Jim Henson.

Only 1 or 2 people out of 100,000 fall prey to toxic streptococcal syndrome each year. Unlike septicemics, most of these patients don't have any underlying diseases hampering their immune defenses. Of 21 cases studied extensively by researchers, most patients were in their 30s and the youngest was 25 years old.

"The individuals who are getting strep septicemia and toxic strep syndrome," points out CDC epidemiologist Walter Straus, "are not the same ones who are getting strep throat."

Patients with toxic streptococcal syndrome are treated with antibiotics as well as with medical measures aimed at curbing the severe complications of the disease. The sooner patients are treated with antibiotics, the more likely they will recover from the syndrome, which kills about one-third of its victims.

Whether Group A *Streptococcus* infects the skin, blood, internal organs, or the throat, it is usually checked by prompt and appropriate antibiotic therapy. This is why, though recent outbreaks of serious strep infections are cause for some concern, they are not likely to prompt the extensive death or debilitation once tied to them. ■

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