

GROUP A STREPTOCOCCAL INFECTIONS

Some strains of group A streptococci (GAS) cause severe infection. Those at greatest risk include children with chickenpox; persons with suppressed immune systems; burn victims; elderly persons with cellulitis, diabetes, blood vessel disease, or cancer; and persons taking steroid treatments or chemotherapy. Intravenous drug users also are at high risk. Severe GAS disease may also occur in healthy persons with no known risk factors. All severe GAS infections may lead to shock, multisystem organ failure, and death. Early recognition and treatment are critical. Diagnostic tests include blood counts and urinalysis as well as cultures of blood or fluid from a wound site. Antibiotics of choice include penicillin, erythromycin, and clindamycin.

Bacteremia: An invasion of bacteria into the bloodstream. Once in the bloodstream, the infection can spread to other parts of body, producing abscesses, peritonitis (inflammation of abdominal cavity), endocarditis (inflammation of the heart), or meningitis. Bacteremia may lead to sepsis or shock, causing a systemic illness with high fever, blood coagulation (thickening) and eventually organ failure.

Focal infections with or without bacteremia: GAS can cause focal infections, which are limited to a particular site. These include pneumonia, abscess of tissues near the tonsils, joint infections (septic arthritis), bone infections (osteomyelitis), peritonitis, and meningitis. Bacteremia can be associated with these infections, but it is not always present. Treatment depends on the specific clinical findings.

Toxic shock syndrome: Streptococcal toxic shock syndrome begins with flu-like symptoms (fever, chills, and muscle aches). Pain is common, usually in an extremity, sometimes in the abdomen or chest. The condition progresses to confusion and coma. Blood pressure drops, kidneys malfunction, and soft tissues may be infected. The source of streptococcus, when identified, is most often the site of a minor wound or bruise. The syndrome occurs most often in healthy adults between the ages of 20-50.

Necrotizing fasciitis: A serious but rare infection (fascia) of the deeper layers of skin and fatty subcutaneous tissues. While many other types of bacteria can cause necrotizing fasciitis, most cases result from GAS.

The infection rarely starts with a sore throat. It more often begins at a site of minor, or sometimes no apparent, trauma. The affected skin is very painful, red, hot and swollen. Skin color may progress to violet and blisters may form, with subsequent necrosis (death) of subcutaneous tissues. Patients with necrotizing fasciitis typically have a fever and appear very ill. More severe cases progress within hours, and the death rate is high. Necrotizing fasciitis is diagnosed by either blood cultures or aspiration of pus from tissue. Surgical exploration may be necessary. Early medical treatment is critical. Treatment often includes

intravenous penicillin and clindamycin, along with aggressive surgical debridement (removal of infected tissue). Limb amputation may be necessary.

Complications of group A streptococcal infections:

Acute rheumatic fever (ARF) is a complication of a strep throat caused by particular strains of GAS. Although common in developing countries, ARF is rare in the United States, with small isolated outbreaks reported only occasionally. It is most common among children between 5-15 years of age. A family history of ARF may predispose an individual to the disease. Symptoms typically occur 18 days after an untreated strep throat. An acute attack lasts approximately 3 months. The most common clinical finding is a migratory arthritis involving multiple joints. The most serious complication is carditis, or heart inflammation (rheumatic heart disease), as this may lead to chronic heart disease and disability or death years after an attack. Less common findings include bumps or nodules under the skin (usually over the spine or other bony areas) and a red expanding rash on the trunk and extremities that recurs over weeks to months. Because of the different ways ARF presents itself, the disease may be difficult to diagnose. A neurological disorder, chorea, can occur months after an initial attack, causing jerky involuntary movements, muscle weakness, slurred speech, and personality changes. Initial episodes of ARF as well as recurrences can be prevented by treatment with appropriate antibiotics.

Post streptococcal glomerulonephritis (PSGN) is an uncommon complication of either a strep throat or a streptococcal skin infection. Symptoms of PSGN develop within 10 days following a strep throat or 3 weeks following a GAS skin infection. PSGN involves inflammation of the kidney. Symptoms include pale skin, lethargy, loss of appetite, headache and dull back pain. Clinical findings may include dark-colored urine, swelling of different parts of the body (edema), and high blood pressure. Treatment of PSGN consists of supportive care.

HOPE THROUGH RESEARCH

Through research, we have learned that there are more than 80 different variants of group A streptococci, each producing its own unique proteins. Some of these proteins are responsible for specific group A streptococcal syndromes. With the support of the National Institute of Allergy and Infectious Diseases, scientists have determined the genetic sequence, or DNA code, for more than 95 percent of the group A streptococcus organism. By studying an organism's genes we learn which proteins are responsible for virulence, crucial information that will lead to new and improved drugs and vaccines.

Funds from NIAID are supporting research for the development of a broadly-effective GAS vaccine. It is expected that this vaccine will prevent not only strep throat and impetigo, but more serious invasive disease and post-infectious complications like rheumatic fever.

Additional information on group A strep infection is available through MEDLINE Plus, a service of the National Library of Medicine. You can access MEDLINE Plus at the following Web site:

<http://www.nlm.nih.gov/>. If you do not have Internet access, ask a librarian for assistance.