Streptococcus Disease, Invasive, Group A
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Streptococcal Disease, Invasive, Group A

Overview[1,2]

For a complete description of invasive, group A streptococcal disease refer to the following texts:

- Control of Communicable Diseases Manual (CCDM).
- Red Book, Report of the Committee on Infectious Diseases.

Case Definition[3]

Clinical description

Invasive group A streptococcal infections may manifest as any of several clinical syndromes, including pneumonia, bacteremia in association with cutaneous infection (e.g., cellulitis, erysipelas, or infection of a surgical or nonsurgical wound), deep soft-tissue infection (e.g., myositis or necrotizing fasciitis), meningitis, peritonitis, osteomyelitis, septic arthritis, postpartum sepsis (i.e., puerperal fever), neonatal sepsis, and nonfocal bacteremia.

Special Cases

- In the mid 1980s outbreaks of acute rheumatic fever began to occur throughout the United States, concomitant with the reappearance of certain streptococcal strains of highly rheumatogenic M serotypes. In some instances the infections give rise to shock and multiorgan failure, features that simulate in certain respects the staphylococcal toxic shock syndrome. This entity has thus been named the **streptococcal toxic shock syndrome** (STSS). [4]
- **Necrotizing fascitis** characteristically begins at a site of trivial or even in apparent trauma. The initial lesion may appear only as an area of mild erythema but over the next 24–72 hours undergoes a rapid evolution. By the fourth to fifth day, frank gangrenous changes are evident in the affected skin; followed by extensive sloughing. The process may march inexorably over large bodily areas unless measures are taken to contain it. Mortality rates are high even with appropriate treatment. [4]

Laboratory criteria for diagnosis

Isolation of group A *Streptococcus* (*Streptococcus pyogenes*) by culture from a normally sterile site (e.g., blood or cerebrospinal fluid, or, less commonly, joint, pleural, or pericardial fluid)

Case classification

Confirmed: a case that is laboratory confirmed

Information Needed for Investigation

Verify the diagnosis. What laboratory tests were conducted and what were the results? Laboratory testing will vary depending on the site of the infection. In general, a culture from a normally sterile site is necessary to establish a diagnosis. "Rapid" strep tests, while relatively accurate, are based on throat swabs and do not distinguish between invasive infections and normal carriage.

Establish the extent of illness. Determine if household or other close contacts are, or have been ill, by contacting the health care provider, patient or family member.

Contact the District Communicable Disease Coordinator if an outbreak is suspected; if cases are in high-risk settings or jobs such as food handlers, childcare, or health care; or for a single case of necrotizing fasciitis or STSS.

Contact Bureau of Child Care Safety and Licensure if cases are associated with childcare issues.

Case/Contact Follow Up And Control Measures

Determine the source of infection. The source may vary with the type or site of infection.

- Is there a history of pharyngitis or tonsillitis in the case or a household contact, especially a sibling?
- Does the case have contact with child care or school (especially elementary) children?
- Does the case or a member of the case's household work as a foodhandler or healthcare provider?
- Is there a history of cellulitis, surgery, or traumatic wound (regardless of severity)?
- Has the case consumed raw or unpasteurized milk?
- Does the case wrestle or engage in other sports that might combine abrasion with skin to skin contact?
- Have there been other cases linked by time, place or person?

Control Measures

See the Streptococcal Diseases section of the Control of Communicable Diseases Manual (CCDM), "Control of patient, contacts and the immediate environment".

See the Group A Streptococcal Infections section of the Red Book.

General:

- The spread of all types of GAS infection can be reduced by good hand washing, especially after coughing and sneezing and before preparing foods or eating.
- Personal hygiene, good nutrition and housing, good sanitation, and proper handling of secretions are important in controlling the spread of GAS.
- Penicillin continues to be the drug of choice. Many strains show resistance to Chloramphenicol, the aminoglycosides, sulfonamides, and tetracycline. While resistance to

erythromycin only runs from 1 - 5% in the US, elsewhere in the world it has been reported to be as high as 60%.[5] As a result, antibiotic sensitivity testing is highly recommended.

Foodhandlers:

- Persons diagnosed with streptococcal sore throat or with infected wounds or cuts on their hands should not handle food. They may return to food handling duties when they are afebrile and when approved by either the local health department or the Missouri Department of Health and Senior Services.
- Symptomatic contacts of persons with diagnosed GAS infections should be tested to determine the cause of their illness. Persons whose test for GAS is positive should refrain from handling food until they are afebrile and approved to return to work by either the local health department or the Missouri Department of Health and Senior Services.

Child Care:

- Strep sore throat can be common in childcare programs. Educating childcare attendants and the children on the importance of handwashing is key to preventing the spread of GAS in the child-care setting.
- All children and staff who have strep sore throat should be excluded from attendance until 24 hours after starting appropriate antibiotic therapy and they are afebrile
- When GAS infection is identified in a childcare attendee or staff member, other symptomatic attendees and staff members should be tested and appropriate antibiotic therapy should be instituted.
- To prevent spread of the infection, efforts should be made to prevent the transfer of children to other childcare centers. Closure of affected childcare centers may lead to placement of infected children in other centers (with subsequent transmission in those centers) and is generally counterproductive.
- When two or more symptomatic cases of GAS are identified in children or employees of a child- care facility, contact the District Communicable Disease Coordinator and the Bureau of Child Care *immediately.*

Laboratory Procedures

The State Public Health Lab does not currently test for GAS. Testing is available from most commercial and many hospital labs, which include antibiotic sensitivity to illuminate the growing possibility of antibiotic resistance. "Rapid" strep tests are available for use in physician's offices and elsewhere, and they have good specificity. They vary in their sensitivity, and may produce false negative results depending on the level of infection and the technique used to collect the specimen. They are generally used only for throat swabs. They do not distinguish between invasive infection and normal carriage.

Reporting Requirements

Invasive infection with Group A Streptococcus is a Category I disease and shall be reported to the local health authority or to the Missouri Department of Health and Senior Services within 24 hours of first knowledge or suspicion by telephone, facsimile or other rapid communication.

1. For all reported cases, complete a DHSS Disease Case Report form (CD-1).
2. For confirmed cases complete a "Record of Investigation of Communicable Disease (CD-2)
3. Entry of the completed CD-1 into the MOHSIS database negates the need for the paper CD-1 to be forwarded to the District Health Office.
4. Send the completed secondary investigation form to the District Health Office.
5. All outbreaks or "suspected" outbreaks must be prepared as soon as possible (by phone, fax or e-mail) to the District Communicable Disease Coordinator. This can be accomplished by completing the Missouri Outbreak Surveillance Report (CD-51).
6. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the District Communicable Disease Coordinator.

References

1. Chin, James, ed. "Streptococcal Diseases Caused by Group A (Beta Hemolytic) Streptococci." Control of Communicable Diseases in Man, 17th ed. Washington, D.C.: American Public Health Association, 2000: 470-476
2. American Academy of Pediatrics. "Group A Streptococcal Infections." In: Pickering, LK, ed. 2000 Red Book: Report of the Committee on Infectious Diseases. 25th ed. Elk Grove Village, IL. 2000: 526-536
3. Centers for Disease Control. Case Definitions for Infectious Conditions Under Public Health Surveillance. MMWR 1997; 32 (RR-10)
4. Mandell, GL, Bennett, JE, and Dolin, R, ed. Mandell Douglas and Bennett's Principles and Practice of Infectious Diseases, 4th ed. New York: Churchill Livingstone, 1995: 1789-1799.
5. Evans, AS and Brachman, PS, ed. Bacterial Infections of Humans Epidemiology and Control, 3rd ed. New York: Plenum, 1998: 673-711.
6. Donowitz, Leigh G., ed. Infection Control in the Child Care Center and Preschool, 3rd ed., Baltimore, MD, Williams & Wilkins, 1996: 264-267

Other Sources Of Information

Web Sites

1. NCID Fact Sheet. Group A Streptococcal (GAS) Disease http://www.cdc.gov/groupastrep/index.html (27 June 2002)
2. New York State HD Fact Sheet. Invasive Group A Streptococcus. http://www.health.state.ny.us/nysdoh/consumer/gas.htm (27 June 2002)
3. NIH/NIAID Fact Sheet. Group A Streptococcal Infections. http://www.niaid.nih.gov/factsheets/strep.htm (27 June 2002)
4. Centers for Disease Control and Prevention. Research Article on Trends of Infection; EID Vol. 2, No. 1; January – March 1996. http://www.cdc.gov/ncidod/EID/vol2no1/strepyro.htm (27 June 2002)
5. University of Texas, Houston Medical School Course Ref. Streptococcus. http://medic.med.uth.tmc.edu/path/00001457.htm (27 June 2002)

Group A Streptococcal (GAS) Disease

Fact Sheet

What is group A streptococcus (GAS)?

Group A streptococci are bacteria often found in the throat and on the skin. People may carry group A streptococci in the throat or on the skin and have no symptoms of disease. The vast majority of GAS infections are relatively mild illnesses, such as strep throat and impetigo. On rare occasions, these bacteria can cause much more severe and even life-threatening diseases such as necrotizing fasciitis or streptococcal toxic shock syndrome (STSS).

How are group A streptococci spread?

These bacteria are spread through direct contact with mucus from the nose or throat of persons who are infected or through contact with infected wounds or sores on the skin. Ill persons, such as those who have strep throat or skin infections, are most likely to spread the infection. Persons who carry the bacteria but have no symptoms are much less contagious. Treating an infected person with an antibiotic for 24 hours or longer generally eliminates their ability to spread the bacteria. However, it is important to complete the entire course of antibiotics as prescribed. It is not likely that household items like plates, cups, or toys spread these bacteria.

What kind of illnesses are caused by group A streptococcal infection?

Infection with GAS can result in a range of symptoms:
No illness
Mild illness (strep throat or a skin infection such as impetigo)
Severe illness (necrotizing faciitis, streptococcal toxic shock syndrome)

Severe, sometimes life-threatening, GAS disease may occur when bacteria get into parts of the body where bacteria usually are not found, such as the blood, muscle, or the lungs. These infections are termed "invasive GAS disease." Two of the most severe, but least common, forms of invasive GAS disease are necrotizing fasciitis and STSS. Necrotizing fasciitis (occasionally described by the media as "the flesh-eating bacteria") destroys muscles, fat, and skin tissue. STSS causes blood pressure to drop rapidly and organs (e.g., kidney, liver, lungs) to fail. STSS is not the same as the "toxic shock syndrome" frequently associated with tampon usage. About 20% of patients with necrotizing fasciitis and more than half with STSS die. About 10%-15% of patients with other forms of invasive group A streptococcal disease die.

How common is invasive group A streptococcal disease?

About 10,000 cases of invasive GAS disease occurred in the United States in 1998. Of these, about 600 were STSS and 800 were necrotizing fasciitis. In contrast, there are several million cases of strep throat and impetigo each year. In 1998 there were 18 cases of invasive GAS disease reported in Missouri.

Why does invasive group A streptococcal disease occur?

Invasive GAS infections occur when the bacteria get past the defenses of the person who is infected. This may occur when a person has sores or other breaks in the skin that allow the bacteria to get into the tissue, or when the person’s ability to fight off the infection is decreased because of chronic illness or an illness that affects the immune system. Also, some virulent strains of GAS are more likely to cause severe disease than others.

Who is most at risk of invasive group A streptococcal disease?

Few people who come in contact with a virulent strain of GAS will develop invasive GAS disease; most will have a routine throat or skin infection and some may have no symptoms whatsoever. Although healthy people can get invasive GAS disease, people with chronic illnesses like cancer, and diabetes, people receiving kidney dialysis, and those who use medications such as steroids, are at higher risk. In addition, breaks in the skin, like cuts, surgical wounds or chickenpox may provide an opportunity for the bacteria to enter the body.

What are the early signs and symptoms of necrotizing fasciitis and streptococcal toxic shock syndrome?

Early signs and symptoms of necrotizing fasciitis:
Fever
Severe pain and swelling
Redness at a wound site

Early signs and symptoms of STSS:
Fever
Dizziness
Confusion
A flat red rash over large areas of the body

How is invasive group A streptococcal disease treated?

GAS infections can be treated with many different antibiotics. Early treatment may reduce the risk of death from invasive group A streptococcal disease. However, even the best medical care does not prevent death in every case. For those with very severe illness, supportive care in an intensive care unit may be needed. For persons with necrotizing fasciitis, surgery often is needed to remove damaged tissue.

What can be done to help prevent group A streptococcal infections?

The spread of all types of GAS infection can be reduced by good hand washing, especially after coughing and sneezing and before preparing foods or eating. A doctor who can perform tests to find out whether the illness is strep throat should see all persons with sore throats. If the test result shows strep throat, the person should stay home from work, school, or childcare until 24 hours after taking an antibiotic. All wounds should be kept clean and watched for possible signs of infection such as redness, swelling, drainage, and pain at the wound site. A person with signs of an infected wound, especially if fever occurs, should seek medical care. It is not necessary for all persons exposed to someone with an invasive group A strep infection (i.e. necrotizing fasciitis or strep toxic shock syndrome) to receive antibiotic therapy to prevent infection. However, in certain circumstances, antibiotic therapy may be appropriate. That decision should be made after consulting with your doctor.

Missouri Department of Health and Senior Services
Section of Communicable Disease Control and Veterinary Public Health
Phone: (800) 392-0272 (573) 751-6113

MISSOURI DEPARTMENT OF HEALTH AND SENIOR SERVICES

RECORD OF INVESTIGATION OF COMMUNICABLE DISEASE*

Patient's Name

Address | City | State | Zip Code

Birth / / | Sex ☐M ☐F | Race: | County of Residence

Parent's Name If Not Adult | Phone

Hospitalized ☐Yes ☐No | Hospital Name | Date of Onset

FOR CODING ONLY

County		City
Twnshp.		Disease
Hospital		Source
Physician		

Physician's Name | Phone Number

Address | Date

Previous Address (if significant) | Date Moved

Place Employed or School Attended | Occupation

Date Reported | How did you first learn of this case? | Date

Disease _____ ☐ Confirmed ☐ Suspected } or } at beginning of investigation.

Chief Clinical Symptoms with Dates: _____

Treatment (type, amount, dates): _____

DIAGNOSTIC LABORATORY TESTS ON PATIENT

Type of Specimen	Date Collected	Result	Name of Laboratory

Are there other associated cases? _____ If yes, how many, and how associated? _____

Household Sanitation: ☐ Good ☐ Fair ☐ Poor

Milk Supply _____

Water Supply _____

(Continued on reverse side)

* Special forms should be used for investigations of Diphtheria (CD 2A), Encephalitis or Meningitis (CD 2B), Enteric Infections (CD 2C), and Foodborne Outbreaks (CD 2D).

Other Pertinent Epidemiological Data (exposure to birds and animals, insect bites, vaccination, travel, etc.): _____

CONTACTS (Household and Other)

Name and Address	Age / Sex	Relation to Patient	Similar Illness? Onset Date	Laboratory Specimen	Date Collected	Result

Narrative and Follow-up Notes: _____

Probable Source _____

☐ Recovered ☐ Died Date of Death _____ Cause of Death _____

Investigated by _____ Final Diagnosis _____

Name of Agency _____ Date _____

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