

STREPTOCOCCUS, GROUP A, INVASIVE DISEASE*
(Group A Streptococcal Invasive Disease)

REPORTING INFORMATION

- **Class B:** Report by the end of the next business day after the case or suspected case presents and/or a positive laboratory result to the local public health department where the patient resides. If patient residence is unknown, report to the local public health department in which the reporting health care provider or laboratory is located.
- Reporting Form(s) and/or Mechanism:
The Ohio Disease Reporting System (ODRS) should be used to report lab findings to the Ohio Department of Health (ODH). For healthcare providers without access to ODRS, you may use the [Ohio Confidential Reportable Disease form](#) (HEA 3334).
- Key fields for ODRS reporting include the onset date.

*** Routine streptococcal pharyngitis (strep throat) and scarlet fever are NOT to be reported.**

AGENT

Streptococcus pyogenes (group A *Streptococcus* or GAS). There are more than 80 serologically distinct types of *S. pyogenes* which cause a variety of diseases ranging from relatively mild illnesses such as pharyngitis and impetigo to severe infections including septicemia and streptococcal toxic shock syndrome (STSS).

CASE DEFINITION

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, 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
- Non-focal bacteremia

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

Suspected*: A clinically compatible case that is not laboratory confirmed.

Confirmed: A case that is laboratory confirmed.

Not a Case: This status will not generally be used when reporting a case, but may be used to reclassify a report if investigation revealed that it was not a case.

*This case classification can be used for initial reporting purposes to ODH as the Centers for Disease Control and Prevention (CDC) has not developed a classification.

Comment

See also **Streptococcal Toxic-Shock Syndrome (STSS)**.

SIGNS AND SYMPTOMS

See clinical description. Invasive GAS infections can be severe, with or without an identified focus of local infection, and can be associated with streptococcal toxic shock syndrome. The portal of entry of invasive infections often is the skin but often may not be identified. Infection can follow minor or unrecognized trauma.

DIAGNOSIS

Laboratory criteria for diagnosis.

EPIDEMIOLOGY

Source

Group A streptococcal bacteria are commonly found in the throat and on the skin. Invasive group A streptococcal disease occurs when the bacteria invade parts of the body (e.g. blood, lungs, deep muscle, fat tissue) where bacteria are not usually found. Epidemiologic data show an association between GAS invasive disease and GAS serotypes M1 and M3. Infection often begins at the site of a break in the skin (e.g. a surgical or non-surgical wound). Cases have also been associated with minor non-penetrating trauma and with varicella-zoster virus infections.

Occurrence

CDC estimates that approximately 11,000 to 13,000 cases of invasive group A strep disease, like cellulitis with blood infection, pneumonia, and necrotizing fasciitis, occur each year in the United States. Each year between 1,100 and 1,600 people die due to invasive group A strep disease. In contrast, there are estimated to be several million cases of non-invasive group A strep illnesses, like strep throat and impetigo, each year. Persons of all ages are affected; however invasive GAS infections are highest in infants and older people. Varicella-zoster virus (VZV) infection is the most commonly identified risk factor in children. Risk groups have been defined by race/ethnicity (notably Native Americans), underlying disease (e.g. VZV, diabetes mellitus, HIV infection) and behaviors (IV drug use). For the most part, infections occur sporadically, but clusters of invasive GAS infection and STSS have been reported in several settings including hospitals, nursing homes, families and military training facilities. Community-wide outbreaks have also been reported.

Mode of Transmission

Transmission is by direct contact with secretions from infected persons. There is some evidence that close contacts of a case (e.g. family/household members, healthcare providers, nursing homes) may be at an increased risk for infection with GAS. The same strain of GAS can cause different disease in different hosts ranging from asymptomatic or mild infection to invasive disease.

PUBLIC HEALTH MANAGEMENT

Case

Treatment

Early recognition of invasive GAS infections is important because of their potential for rapid progression and fatal outcome. Penicillin is effective for treating most invasive GAS infections. More aggressive infections, however, do not respond as well to penicillin

and it may be helpful to add clindamycin to the penicillin regimen. Where deep-seated infection with invasive GAS is suspected, prompt and aggressive exploration and debridement are mandatory. Intravenous fluids and other supportive measures typically used in the management of shock and multi-organ failure are often necessary.

Isolation

Ohio Administrative Code 3701-3-13 (Z) states:

“Streptococcal infection: a person with a streptococcal infection shall be excluded from school or child care center for twenty-four hours after the initiation of effective antimicrobial therapy.”

Contacts

There are no official recommendations for culture and therapy or prophylaxis for close contacts of persons with invasive GAS. However, because of evidence that close contacts of a case might have an increased risk of developing GAS, throat cultures and cultures of any lesions may be considered in those persons with close contact to the case, especially if contacts have severe underlying illness. Culture-positive persons should be treated.

Household contacts of patients with severe invasive GAS disease, including toxic shock syndrome, are at increased risk of developing severe invasive GAS disease compared with the general population, but the risk is not sufficiently high to warrant routine testing for GAS colonization or routine chemoprophylaxis of all household contacts of people with invasive GAS disease. Because of the increased risk of sporadic, invasive GAS disease among certain populations and because of the increased risk of death in people 65 years of age and older who develop invasive GAS disease, healthcare professionals may choose to offer targeted chemoprophylaxis to high risk populations (e.g. people with human immunodeficiency virus infection, varicella, diabetes mellitus). Because of the rarity of subsequent cases and the low risk of invasive GAS infections in children in general, chemoprophylaxis is not recommended in schools and child care facilities.

Infection Control

The following guidelines for infection control in healthcare personnel have been published by the CDC and the Hospital Infection Control Practices Advisory Committee (HICPAC) (*American Journal of Infection Control*. 1998;26:289-354.)

Patient-to-Personnel Transmission: Healthcare-associated spread of group A streptococci to personnel can be prevented by adherence to standard precautions or other transmission precautions. Personnel should wash their hands thoroughly after each patient contact, wear gloves when contact with potentially contaminated secretions is anticipated and wear gowns when soiling with infective material is likely. Items contaminated by respiratory secretions or wound drainage should be disposed of in a proper manner. Secondary spread and illness among hospital personnel have occurred following direct contact by personnel with secretions from infected patients.

Personnel-to-Patient Transmission: Sporadic outbreaks of surgical wound infections or postpartum infections caused by group A streptococci have been associated with carriers among operating room or delivery room personnel. The main reservoirs of group A streptococci in implicated carriers are the pharynx, skin, rectum and female genital tract. Direct contact and airborne spread are the major modes of transmission in these settings. Since surgical wound infections or postpartum infections due to GAS occur infrequently, any isolate from cases should be saved for possible serotyping should an

outbreak ensue. The occurrence of ≥ 2 cases should prompt an epidemiologic investigation and a search for a carrier-disseminator.

Restriction from patient care activities and food handling is indicated for personnel with GAS infections until 24 hours after they have received appropriate therapy. No work restrictions are necessary for personnel who are colonized with GAS, unless they have been epidemiologically linked to transmission of infection within the facility.

Child Care Centers and Preschools

The most important means of controlling any GAS disease is prompt identification and treatment of infections. Children with GAS infections should not return to the child care center or preschool until at least 24 hours after beginning antimicrobial therapy and until they are afebrile. Contacts of documented cases of streptococcal infection who have recent or current clinical evidence of GAS infection should have appropriate cultures taken and should be treated if the culture is positive.

What is group A streptococcal (GAS) invasive disease?

Streptococcus pyogenes (group A *Streptococcus*) bacteria are commonly found in the throat and on the skin. Many healthy people carry these bacteria and have no symptoms of illness. Invasive group A streptococcal disease is a serious, and sometime life-threatening disease, that occurs when *Streptococcus pyogenes* bacteria invade parts of the body where bacteria are not usually found, including blood, cerebral spinal fluid, lungs, wounds, deep muscle and fat tissue.

What is streptococcal toxic shock syndrome (STSS)?

STSS is a form of invasive GAS. STSS may occur with an infection at any body site, but most often occurs in association with infection of a skin lesion. The disease is characterized by the occurrence of shock and failure of organs such as the kidneys, liver, lungs and brain, early in the course of GAS infection.

Who gets invasive GAS disease?

Anyone can get invasive GAS disease or STSS. People with underlying health problems such as diabetes, chronic heart, lung or kidney problems, cancer and HIV infection are at greater risk to develop invasive GAS disease. A break in the skin, such as a cut or surgical wound, or chickenpox may increase a person's risk. There is some evidence that close contacts of a case (family/household members, health care providers, nursing homes) may be at increased risk for infection with GAS due to direct contact with secretions from infected persons.

How common is invasive GAS disease?

The Centers for Disease Control and Prevention (CDC) estimates that about 11,000-13,000 cases of invasive GAS disease occur each year in the United States, resulting in 1,100-1,600 deaths annually. STSS and necrotizing fasciitis each comprise an average of about 6%-7% of these invasive cases. In contrast, there are several million cases of strep throat and impetigo each year.

How is invasive GAS disease treated?

Penicillin is effective for treating most GAS infections. Surgery is necessary in some cases. Intravenous fluids and other supportive measures typically used in the management of shock and multi-organ failure are often necessary.

Should close contacts of persons with invasive GAS disease be tested or treated?

As previously mentioned, there is some evidence that close contacts of a case (family/household members, healthcare providers, nursing homes) may be at an increased risk for infection with GAS due to direct contact with secretions from infected persons. Throat cultures and cultures of any lesions may be considered in those persons with close contact to the case, especially if contacts have severe underlying illness. Culture-positive persons should be treated.