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**IN THIS ISSUE: STREPTOCOCCAL TOXIC SHOCK SYNDROME (STSS)**

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**Streptococcal Toxic Shock Syndrome (STSS)****Introduction**

Streptococcal toxic shock syndrome (STSS) is a rare infection caused by a toxin-producing bacteria called group A *Streptococcus* (GAS), more specifically *Streptococcus pyogenes*. This bacterium can spread deep into tissues and the bloodstream and is often followed by sudden onset of shock, organ failure, and death.<sup>1</sup>

**Etiology & Epidemiology**

Group A *Streptococci* (*Streptococcus pyogenes*) have more than 240 distinct serotypes that have been identified based on M-protein serotypes or M-protein gene sequences (*emm* types).<sup>2</sup> STSS can be caused by many *emm* types, however, most cases are associated with *emm* 1 and *emm* 3 strains that produce at least 1 pyogenic exotoxin, most commonly streptococcal pyogenic exotoxin A (*speA*). The exotoxins can overstimulate the immune response and stimulate production of tumor necrosis factor and other inflammatory processes (cytokine cascades) that can lead to shock or organ failure.<sup>2</sup>

The incubation period for GAS infections is not known but can be as short as 14 hours and is dependent on site of entry.<sup>2</sup> Identification of STSS requires detection of the GAS organism with a rapid onset of hypotension and signs of multiorgan involvement (2 or more systems).<sup>1</sup> The GAS bacteria can enter the body through the skin (wound or surgical site) or through mucosal membranes (throat, nose). Group A strep is easily transmissible, however STSS is rarely transmitted person-to-person.<sup>3</sup> The mortality rate for STSS is estimated at 30% and increases with age and other risk factors. More severe disease more commonly occurs in adults 65 years of age and older; individuals that have alcohol use disorder or diabetes; use of non-steroidal anti-inflammatory drugs (NSAIDs); and those that recently had surgery, a viral infection that causes open sores (i.e., varicella) or other skin injury.<sup>1</sup> In the

U.S. over a 5 year time span, invasive GAS infections have been responsible for 20,000-27,000 cases per year and 1,800-2,400 deaths per year.<sup>4</sup>

**Prevention**

Chemoprophylaxis should be considered for household contacts over the age of 65 years or those at increased risk of invasive group A strep. Spread of group A strep can be reduced by standard infection control practices, including good hand hygiene and respiratory etiquette.<sup>1,2</sup>

**Signs & Symptoms**

STSS can present with influenza-like symptoms, including fever, chills, myalgia, nausea, and vomiting. Symptoms can progress quickly to sepsis, hypotension, tachycardia, tachypnea, and lead to specific organ failure (including kidney, liver, lung, and blood).<sup>1</sup>

**Diagnosis & Testing**

Due to early stages of STSS being broad, including other bacterial and viral infections, patients are often misdiagnosed. The diagnosis of STSS is made based off the Nationally Notifiable Surveillance System 2010 case definition. This definition defines an illness associated with invasive or noninvasive group A strep infections with the following clinical manifestations:

- **Hypotension**- systolic blood pressure  $\leq 90$ mm Hg for adults or less than the fifth percentile by age for children aged less than 16 years.
- **Multi-organ involvement** of 2 or more organ systems (blood, kidney, liver, respiratory, and skin). See [STSS case definition](#) for parameters for each system.<sup>1</sup>

**Treatment**

Treatment for STSS requires both hospitalization and antibiotic therapy. Initiate standard treatment of shock and organ failure, such as aggressive fluid

resuscitation, management of respiratory and cardiac failure, and if needed prompt surgical debridement of any deep tissue infection.<sup>1</sup> If sepsis is suspected, initiate antibiotics as soon as possible, vancomycin and clindamycin are recommended since it is often hard to distinguish between *S. pyogenes* and *S. aureus* toxic shock syndrome. Check prognosis frequently and assess antibiotic therapy within 24-48 hours to stop or change therapy as needed. Once GAS infection is confirmed, antibiotics should be tailored to penicillin and clindamycin. Surgical evaluation and biopsy as well as debridement of necrotic tissue may be necessary, especially if STSS with necrotizing fasciitis is suspected. Other therapies often used include intravenous immunoglobulin (IGIV) in adjunct early in the clinical course in those that are considered severely ill.<sup>1,2</sup>

## Reporting

The list of reportable communicable diseases and reporting forms can be found at:

<http://tinyurl.com/WashoeDiseaseReporting>

**Report communicable diseases to Northern Nevada Public Health. To report a communicable disease, please call 775-328-2447 or fax your report to the NNPH at 775-328-3764.**

## Acknowledgement

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## References

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