



Handout: Toxic Shock Syndrome

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Key Points:

- TSS is a potentially lethal, toxin-mediated illness that can mimic several other diseases.
- Disease results from toxin production (superantigens) and the local site of infection.
- *Staphylococcus aureus* and *Streptococcus pyogenes* are the most common microbes associated with TSS.
- Sources of TSS include burns, soft tissue injuries, post-surgical wounds, post-partum, post-abortion, pharyngitis, and focal infections.
- Symptoms are non-specific and include fever, chills, rash, headache, vomiting, diarrhea, and hypotension. Staph TSS is associated with symptoms from toxin production, while symptoms from strep TSS are more commonly linked to the site of infection.
- Labs may show anemia, thrombocytopenia, elevated liver enzymes, renal injury, elevated lactate, and abnormal coagulation studies.
- Diagnostic criteria from the CDC are available to facilitate the diagnosis, but they miss early disease.
- Management involves IV fluids, source removal, and antibiotics. Antibiotics should include a penicillinase-resistant penicillin or cephalosporin (piperacillin-tazobactam or cefepime), vancomycin (in methicillin-resistant *S. aureus* prevalent areas), and clindamycin or linezolid. IVIG is an adjunctive therapy.
- Knowledge of the clinical features, laboratory testing, and treatment can assist emergency clinicians in diagnosing and management this condition.

Table 1. Centers for Disease Control and Prevention TSS Diagnostic Criteria

TSS Type	Criteria
Staphylococcal TSS	<p>Clinical Criteria:</p> <ul style="list-style-type: none"> - Fever: > 38.9C or 102.0F - Rash with diffuse macular erythroderma - Desquamation 1-2 weeks after rash onset - Hypotension with SBP \leq 90 mm Hg (adults) or \leq 5th percentile by age (less than 16 years old) - Multiorgan involvement (3 or more systems): Gastrointestinal (vomiting/diarrhea), Muscular (severe myalgias or creatine kinase \geq 2 times upper limit of normal), Mucous membrane involvement, Renal (BUN or Cr \geq 2 times upper limit of normal or urinary sediment with pyuria with no urinary tract infection), Hepatic (total bilirubin, ALT or AST \geq 2 times upper limit of normal), Hematologic (platelets \leq 100,000/mm³), Neurologic (alteration in consciousness without focal neurologic signs when fever and hypotension are absent) <p>Laboratory Criteria (these must be negative if obtained):</p> <ul style="list-style-type: none"> - Blood or cerebrospinal fluid cultures (blood cultures may be positive for <i>S. aureus</i>) - Serologies for Rocky Mountain spotted fever, leptospirosis, or measles <p>Classification:</p> <ul style="list-style-type: none"> - Probable: > 4 clinical criteria and laboratory criteria met - Confirmed: 5 clinical criteria and laboratory criteria met, including desquamation
Streptococcal TSS	<p>Clinical Criteria:</p> <ul style="list-style-type: none"> - Hypotension with SBP \leq 90 mm Hg (adults) or \leq 5th percentile by age (less than 16 years old) - Multiorgan involvement (2 or more systems): Gastrointestinal (vomiting/diarrhea), Muscular (severe myalgias or creatinine kinase \geq 2 times upper limit of normal), Mucous membrane involvement, Renal (Cr \geq 2 mL/dL or Cr > 2 times upper limit of normal, > 2 fold elevation from patient baseline), Hepatic (total bilirubin, ALT, AST \geq 2 times upper limit of normal), Hematologic (platelets \leq 100,000/mm³, disseminated intravascular coagulation, or > 2 fold elevation from patient baseline), Acute respiratory distress syndrome, Skin (generalized erythematous macular rash that can desquamate), Soft tissue necrosis (gangrene, myositis, necrotizing fasciitis) <p>Laboratory Criteria:</p> <ul style="list-style-type: none"> - Group A <i>Streptococcus</i> isolation from culture <p>Classification:</p> <ul style="list-style-type: none"> - Probable: All clinical criteria met and absence of other etiology for illness with isolation of group A <i>Streptococcus</i> from nonsterile site. - Confirmed: All clinical criteria met and isolation of group A <i>Streptococcus</i> from sterile site (blood, cerebrospinal fluid, synovial fluid, pleural/pericardial fluid)

TSS, toxic shock syndrome; BUN, blood urea nitrogen; Cr, creatinine; AST, alanine aminotransferase; AST, aspartate aminotransferase

Table 2. Signs or symptoms suggestive of TSS

- Systemic illness with diffuse, blanchable erythematous rash
- Young patient with viral-like illness (vomiting, diarrhea, headache, myalgias) and severe septic shock without alternative etiology
- Focal soft tissue pain that is severe and out of proportion to examination with evidence of systemic toxicity (fever, hypotension, tachycardia), similar to necrotizing fasciitis
- Septic shock due to group *A Streptococcal* infection
- Vital signs out of proportion to the degree of infection