Group A Streptococcus (GAS) Infections

Group A streptococcus was the feared cause of epidemic hospital deaths from "childbed" fever as described by Semmelweis (1840's) into the 20th century. While it is no longer a frequent cause of obstetric infections, the importance of Group A *Streptococcus* (GAS) (*Streptococcus pyogenes*) cannot be overemphasized. It is still **the organism most commonly responsible for FATAL maternal sepsis.** Invasive GAS can cause a range of infections, including endomyometritis, fulminant endomyonecrosis, necrotizing fasciitis, and streptococcal toxic shock syndrome (STSS). Invasiveness is likely dependent on the virulence of the GBS strain. It is also **a common organism associated with missed abortions/fetal demise cases and vaginal deliveries with retained products of conception (POC)**, underscoring the critical need to evacuate the uterus for source control.

While not all pregnant or postpartum patients with severe invasive GAS infection will develop toxic shock syndrome caused by release of toxins by certain strains of GAS, see Table 1, it is important to be aware of this syndrome because the recommended antimicrobial regimen is different from that for sepsis due to other sources. Furthermore, most hospital microbiology laboratories are unable to test for the Streptococcal toxins responsible for STSS. Blood culture collection prior to antibiotic administration is strongly recommended when possible. Blood cultures will result positive in only about half of all cases of STSS; cultures collected after antibiotic administration have a reduced likelihood of identifying the organism, leading to a risk of misdiagnosis. Table 1 lists the clinical criteria for Streptococcal toxic shock syndrome.

Table 1. CDC Case Definition for Streptococcal Toxic Shock Syndrome in Adults

Hypotension--Systolic blood pressure <90mmHg
Multiorgan involvement characterized by two or more of the following: ▸ Renal impairment – creatinine ≥ 2mg/dL or ≥ 2 xelevation above baseline in patients with pre-existing renal disease ▸ Coagulopathy – Platelets ≤ 100,000/mm^3 or disseminated intravascular coagulation, defined by prolonged clotting times, low fibrinogen level, and the presence of fibrin degradation products ▸ Liver dysfunction– Alanine aminotransferase, aspartate aminotransferase, or total bilirubin levels ≥ 2x the upper limit of normal or ≥ 2x elevation over baseline in patients with pre-existing liver disease ▸ Acute respiratory distress syndrome ▸ Erythematous macular rash (may desquamate) ▸ Soft tissue necrosis (e.g., necrotizing fasciitis, myositis, or gangrene)

A patient who meets the clinical criteria with isolation of GAS from a normally sterile site (e.g., blood or surgical site) has a **confirmed diagnosis** of STSS. **A probable diagnosis** of STSS may be made for patients who meet the clinical criteria (in the absence of another explanation for the illness) with isolation of GAS from a nonsterile site (e.g. throat or vagina). See next page for discussion of antibiotic therapy.

Modified from: Main EK, Sakowski C, Nath R, Bauer ME, Gibbs RS. Improving Diagnosis and Treatment of Maternal Sepsis: A Quality Improvement Toolkit. 2025. Stanford, CA: California Maternal Quality Care Collaborative. (p65-66)

GAS Necrotizing Fasciitis

In the setting of pregnancy, GAS infection is the most common cause of necrotizing fasciitis and other soft tissue infections which have very high rates of mortality and severe morbidity. The differential diagnosis includes infection due to *Clostridium perfringens* and *Clostridium sordellii*, which are also associated with high morbidity and mortality. The most common sites for these infections are skin breaks and incisions (including episiotomy and cesarean incisions). From the patient perspective the most common signs to watch for are severe pain and red rash (erythema) near an incision. **Necrotizing infections are absolute emergencies; progression can occur to death in a matter of hours. Rapid admission of high dose antibiotics, fluids and early surgical intervention** (wound debridement, vulvar debridement, evacuating the uterus, or hysterectomy or a combination of these interventions) for source control **are critically important** for necrotizing fasciitis. Cultures and tissue for Gram stain should be obtained at the time of surgical intervention or debridement. Table 2 describes the key clinical features of Necrotizing Fasciitis.

Table 2. Key clinical manifestations of Necrotizing Fasciitis:[1]

- Erythema (without sharp margins; 72 percent)
- Edema that extends beyond the visible erythema (75 percent)
- Severe pain (out of proportion to exam findings in some cases; 72 percent)
- Fever (60 percent) (may be absent, particularly early in course)
- Crepitus (50 percent)
- Skin bullae, necrosis, or ecchymosis (38 percent)

Antibiotics for Severe GAS and Necrotizing Fasciitis

Antibiotic therapy for severe GAS infections and STSS includes combination therapy with high dose penicillin (4 million units IV q4h) and clindamycin (600 to 900 mg IV q8h). Clindamycin is used to ensure optimal anti-streptococcal activity and most importantly decrease the production of exotoxin and other virulence factors. Linezolid is another option, in place of clindamycin, to limit toxin production, and has excellent activity against streptococcal species and clostridium spp. In patients with reported allergies to penicillin, including Type 1 hypersensitivity reactions (i.e., anaphylaxis), high-dose cefazolin could be considered under close surveillance and based on clinician evaluation of risks/benefits per institutional guidelines. If a patient is allergic to penicillin and cephalosporins, or if MRSA is also a pathogenic concern, the patient should receive vancomycin (or daptomycin) and clindamycin. Linezolid could also be used as a single agent as it has excellent MRSA coverage. It is critically important for facilities to follow their institution's resistance trends for clindamycin not only for streptococcal species but also pelvic anaerobes.

Empiric treatment of Necrotizing Fasciitis should consist of rapid broad-spectrum antimicrobial therapy with activity against gram-positive, gram-negative, and anaerobic organisms (the specific bacteria is not initially known): Piperacillin/tazobactam 4.5 g IV q8h OR meropenem 1 g IV q8h BOTH WITH clindamycin (600 to 900 mg IV q8h) AND vancomycin (per institutional protocol). Antibiotic treatment should be tailored to Gram stain, culture, and sensitivity results when available.

[1]Modified from: Stevens DL, Baddour LM. Necrotizing soft tissue infections, in *UpToDate*, Accessed February 5, 2026.