

# Group G streptococcus leading to necrotizing soft tissue infection after left lower extremity radiofrequency venous ablation

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## ABSTRACT

A 73-year-old morbidly obese woman developed a severe group G Streptococcus (GGS) necrotizing soft tissue infection (NSTI), superimposed by toxic shock-like syndrome after undergoing radiofrequency venous ablation of her left lower extremity. NSTI secondary to GGS are relatively uncommon, with only nine cases described in the literature. We present a case of GGS NSTI, a debilitating wound infection, occurring after radiofrequency venous ablation. Early identification and treatment are imperative to prevent mortality from NSTI and care must be taken when selecting patients for percutaneous endovascular ablation as they are at risk for such infections. (*J Vasc Surg Cases and Innovative Techniques* 2019;5:110-2.)

**Keywords:** Venous; Ablation; Necrotizing; Infection; Obesity

Necrotizing soft tissue infections (NSTIs) were first described in the fifth century as a complication of streptococcal infections. These infections are uncommon, with an annual incidence of 1000 cases in the United States. Organisms leading to potential NSTI and subsequent complications include group A Streptococcus, methicillin-resistant *Staphylococcus aureus*, *Clostridia*, and group G Streptococcus (GGS).<sup>1</sup> GGS is a member of the normal bacterial flora occupying the upper airway, skin, gastrointestinal, and female genital tracts. Although GGS is a commensal organism, it has been known to rarely cause debilitating infections of the skin and soft tissues, bacteremia, endocarditis, intra-abdominal abscess, meningitis, and streptococcal toxic shock-like syndrome (TSLs). Severe manifestations of GGS infections may occur in the elderly, immunocompromised, and those with chronic illnesses.

Endovenous ablation is a minimally invasive procedure to treat venous insufficiency and reduce varicose veins with thermal energy delivered either by a laser fiber or radiofrequency probe. Even though this procedure has replaced vein stripping, complications can arise, such as infection, skin burns, phlebitis, and puncture site ulcer formation.<sup>2</sup> Herein, we describe the initial presentation and proceeding hospital course of a patient who was found to have GGS NSTI superimposed by TSLs 4 weeks

after undergoing endovenous thermal ablation of the left leg for symptomatic venous insufficiency. The patient and family allowed their case details to be published for further education.

## CASE DESCRIPTION

A 73-year-old woman body mass index of 54.7 kg/m<sup>2</sup> and a history significant for hypertension, insulin-dependent diabetes, and peripheral vascular disease was being followed as an outpatient for approximately 6 months where she failed conservative measures for symptomatic venous stasis without ulceration. Despite the compression stockings, she continued to have lower extremity throbbing, burning, and cramping. Venous reflux duplex demonstrated an incompetent great saphenous vein (GSV) from the saphenofemoral junction with sustained retrograde flow in excess of 500 m/sec and 5.4 mm in size. Noninvasive arterial studies demonstrated an ankle-brachial index of 1.13 with noncompressible calf vessels with monophasic signals below popliteal artery. She underwent ambulatory radiofrequency ablation (RFA) of the GSV under local and tumescent anesthesia (1% lidocaine with epinephrine, sodium bicarbonate, and normal saline solution). A 7F percutaneous sheath was used to introduce the radiofrequency probe just above the medial malleolus. Treatment was performed at 120°C. Based on the operative notes, it does not seem that she received prophylactic antibiotics and the surgical preparation was not specified. Her leg was placed in a compression bandage after the operation with no immediate complications. She was seen in follow-up for left leg swelling and underwent a repeat duplex ultrasound scan, which demonstrated thrombosed GSV without evidence of deep vein thrombosis; at that time, there was no evidence of cellulitis at the puncture site.

She presented to our emergency department febrile and tachycardic with progressive dyspnea and left leg swelling. Physical examination demonstrated left leg venous stasis and edema. She developed acute hypoxic respiratory failure and cardiovascular shock. Fifteen hours after intubation and vasopressor support, she developed cellulitis with blistering and serous drainage over the skin superior to the medial malleolus

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Author conflict of interest: none.

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The editors and reviewers of this article have no relevant financial relationships to disclose per the Journal policy that requires reviewers to decline review of any manuscript for which they may have a conflict of interest.

2468-4287

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<https://doi.org/10.1016/j.jvscit.2018.11.002>

with worsening lactic acidosis and a calculated Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score of 7. The initial wound and blood cultures speciated as GGS.

At bedside, two 5-cm incisions were made on the medial and lateral aspects of the lower calf and ankle, expelling serosanguinous drainage. She was taken to the operating room where the incisions were extended and demonstrated healthy muscle tissue; however, a small area of nonviable tissue was present medial to the malleoli. No substantial debridement was initially performed given the presence of viable underlying muscle and subcutaneous fat. Intravenous clindamycin and penicillin G were initiated owing to suspicion of TSLs. Serial debridement was required because she developed increasing blistering of her pretibial skin and dorsal foot. Her wounds were initially managed with wet-to-dry dressings and eventually transitioned to negative pressure therapy. Her condition gradually improved and she was discharged to rehabilitation with plans to return for skin grafting.

## DISCUSSION

We describe a case of a GGS NSTI after RFA for venous insufficiency. There has been a single case described in the English literature of a NSTI after an endovenous laser ablation procedure coupled with invasive stab phlebectomy; however, the organism responsible was group A *Streptococcus*.<sup>2</sup> Although infrequent, infections secondary to GGS have been increasingly recognized, and a retrospective study by Schwartz et al<sup>3</sup> investigating the incidence of invasive bacteremia found that, between 2007 and 2014, there was an increase in proportion of GGS bacteremia, approximately 0.4% to 1.5%.<sup>3</sup> Although toxic shock syndromes are primarily associated with *Streptococcus pyogenes*, GGS has been found to have similar systemic effects as seen in our patient.

One must have a high index of suspicion when diagnosing a NSTI. The LRINEC score considers the hemoglobin, white blood cell count, C-reactive protein, glucose, creatinine, and sodium to predict the risk of necrotizing fasciitis. A score of greater than 6 is suggestive of infection, with a score of greater than 8 being strongly predictive. Our patient initially presented with a LRINEC score of 7; laboratory tests during the peak of her infection calculated a score of 8. A retrospective analysis was conducted for patients admitted with necrotizing fasciitis between 2000 and 2013. They were divided into two groups, group 1 with LRINEC scores of less than 6 and group 2 with LRINEC scores of greater than 8. Comparison of the cohorts demonstrated that patients in group 2 were more likely to suffer from diabetes mellitus, with prolonged stay in intensive care, and a hospital stay of approximately 22 days. Septic shock and in-hospital mortality were significantly higher in group 2 individuals. Moreover, it was found that 45% of individuals in group 2 suffered from a streptococcal infection.<sup>4</sup>

Risk factors for NSTIs include cardiopulmonary disease, diabetes mellitus, immunocompromised states, obesity,

arteriovenous insufficiency and lymphatic insufficiency. Decreased tissue perfusion leads to fluid stasis and a decreased ability to fight infection. Diabetes mellitus favors polymicrobial infections, particularly with *Streptococcus* species and anaerobes. Gram stains and wound and blood cultures have a high specificity for the presence of infection and once an organism has been isolated. Initial fluid resuscitation and airway maintenance is standard therapy for patients presenting with septic shock. Intravenous broad-spectrum antibiotics should be administered quickly with aggressive debridement of necrotic tissue to obtain source control. Even with optimal treatment, NSTIs prognosticate substantial morbidity, with mortality rates of 20% to 40% in recent series<sup>5</sup> and delayed surgical treatment implicated with increased morbidity.<sup>6</sup>

Our patient underwent RFA, known for its minimally invasive treatment for venous insufficiency. RFA is performed with percutaneous catheters piercing the skin, which allows the RFA probe to cause heat-induced venous spasm and collagen shrinkage resulting in subsequent ablation.<sup>7</sup> These skin entry points provide a potential haven for bacterial growth and subsequent infection. Minor complications include skin changes at the procedure site without significant clinical sequelae; major complications are those that necessitate surgery or hospitalization such as vessel perforation, deep vein thrombosis, thrombophlebitis, hematoma, wound infection, necrosis, and skin burns.

The management of venous insufficiency in the obese is quite difficult, with most studies performed excluding these patients. Almeida et al<sup>8</sup> compared endovenous laser and RFA outcomes in a cohort with an average calculated body mass index of approximately 24.5.<sup>8</sup> The literature is lacking data of outcomes of these minimally invasive venous ablation procedures in the morbidly obese population.<sup>9</sup> The pathogenesis of venous insufficiency in the obese population is multifactorial and a multidisciplinary approach to the obesity and venous insufficiency is necessary to ensure a good outcome.

## CONCLUSIONS

NSTIs are among the most life-threatening disease processes owing to rapid, irreversible destruction of deep tissues. This case is only the second reported of a severe soft skin tissue infection occurring after venous ablation, and the only known case of GGS being the underlying causative organism. RFA, a relatively quick and minimally invasive procedure, is now becoming the standard of care for individuals with venous insufficiency. The risk of NSTI with subsequent bacteremia, and overall prognosis of RFA treatment, especially in the morbidly obese population, may not replicate the outcomes reported in the literature. Proper patient recruitment and steadfast observation are necessary in

treating individuals undergoing RFA to decrease the likelihood of skin infections and to ensure the desired outcome for surgical management of venous insufficiency and varicose veins.

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Submitted Jul 4, 2018; accepted Nov 7, 2018.