Amputations and Necrotizing Fasciitis: A Case Report

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ABSTRACT

Necrotizing fasciitis is a necrotizing soft tissue bacterial infection of the muscle fascia and subcutaneous fat. It is a medical emergency that threatens both the patient’s limb and life. Necrotizing fasciitis has the potential to become quite severe; in such cases, an amputation or radical debridement of necrotic tissue is often required to save a patient’s life. The decision to amputate or radically debride is made by weighing the risks versus benefits of each procedure. This report will present a relevant case and summarize the literature to discuss amputation versus radical debridement in patients with necrotizing fasciitis who are severely ill. We describe the case of a 76-year-old obese woman who developed severe sepsis secondary to necrotizing fasciitis of the right lower limb. She underwent a right proximal above knee amputation to quickly and promptly control the septic focus. The development of severe sepsis secondary to necrotizing fasciitis indicated a poor prognosis, and the chances of our patient surviving the necrotizing infection via multiple debridement attempts were less favorable compared to an amputation. This report summaries the logic behind choosing an amputation against radical debridement in a patient with necrotizing fasciitis. It reviews the pros and cons of each treatment modality and weighs the risks and benefits of each to provide the best patient care.

CASE PRESENTATION

A 76-year-old obese woman presented to the emergency department (ED) with fevers, rigors, chills, confusion, and an increasingly severe infection of the right lower thigh following an episode of non-resolving cellulitis from a laceration sustained during a motor vehicle collision one week prior to presentation. She also complained of a three-day history of rapidly worsening left thigh pain, with associated redness and swelling. She denied any history of diabetes mellitus, cardiopulmonary diseases, vascular diseases, recent surgeries, or smoking. On examination, she was febrile at 38.0°C, tachycardic at 90 beats/minute, and normotensive. She had a Glasgow Coma Scale (GCS) of 13 (E4, V4, M5). She was not able to bear weight due to her right thigh pain. There was an area of erythema measuring 7cm in length with blistering and a central area of necrosis at the lower lateral aspect of the right knee and thigh. The knee was grossly swollen,
warm, extremely tender to palpation, and there was crepitus beneath the skin underlying the rectus muscle. Range of motion was reduced to only 45° extension and 90° flexion due to pain and swelling.

Laboratory investigations revealed a leukocytosis of 22.8 x 10⁹ g/L with a marked left shift, and a high C-reactive protein level of 65 mg/L. Plain radiography of the affected area showed soft tissue inflammation with air in soft tissue but no bony destruction (Figure 1). A clinical diagnosis of severe necrotizing fasciitis was made. Empiric antibiotic therapy was commenced with immediate surgical debridement. The debridement was successful, and the initial plan was to re-evaluate the patient within 24 hours for further debridement if necessary.

However, the patient became severely toxic one day after her first debridement, fulfilling the diagnostic criteria for systemic inflammatory response syndrome (SIRS). She also developed acute renal failure and her GCS fluctuated to 9 (E2, V3, M4). In the absence of any other sources of infection, she was diagnosed with severe sepsis with end organ dysfunction secondary to necrotizing fasciitis. The decision was made to perform a proximal above knee amputation after careful discussion with another surgeon, the patient, and her partner. After a six-week course of intravenous antibiotic therapy, the patient eventually became stable enough for discharge.

**DISCUSSION**

Necrotizing fasciitis is a necrotizing soft tissue bacterial infection of the muscle fascia and subcutaneous fat which often tracks along the deep fascial plane, due to its relatively poor blood supply.¹ The cardinal feature of necrotizing fasciitis is pain that is disproportionate to physical findings and pain that is beyond the areas of erythema and edema.²-⁴ Necrotizing fasciitis is a medical emergency which endangers both the patient’s limb and life. Even with treatment, the mortality rate of necrotizing fasciitis is high, at about 30%.¹,⁴,⁵ The natural history of this necrotizing infection without intervention almost always leads to death.⁶ Antibiotic therapy without surgical intervention is also associated with a high mortality rate approaching 100%.² From the natural history of this disease, it is clear that early and complete surgical debridement is mandatory with antibiotic therapy a necessary adjunct to treatment.

Usually, a surgeon will surgically debride all necrotic tissue until only healthy viable tissue remains. Once successful debridement is achieved, the surgeon will close the wound and review the need for further debridement.
approximately one day later. It is not uncommon for multiple debridement attempts to be performed before the infection is successfully controlled. Once the infection resolves, secondary reconstruction of limb defects will then be performed to maximize functional and aesthetic results.

However, our patient developed severe sepsis post-surgical debridement despite complete and adequate debridement of necrotic tissue. Severe sepsis is a complication of necrotizing fasciitis. It can clinically progress to septic shock and death. The mortality rate of sepsis approaches 50% even with appropriate antibiotic and supportive treatment. As our patient developed severe sepsis, death would be inevitable without prompt antibiotic treatment and immediate control of the septic focus as per a study by Dellinger et al.

Necrotizing fasciitis and sepsis both have a high mortality rate. These two pathologies, when concurrently occurring, isochronously yield a very poor prognosis. Hence, the managing team was forced to reconsider their treatment strategies. The treatment options from there onwards were either to perform a radical debridement of skin and fascia or to perform an amputation to control the infection. The decision to choose one treatment option over the other was based on the risks versus benefits of each treatment modality.

Amputations are preferred over a radical debridement because amputations are the quicker option. An amputation also requires minimal reconstructive surgery, and hence has a shorter recovery period. Amputations are also associated with less blood loss and have the ability to quickly control the septic focus. These factors are advantageous in a patient with severe sepsis, where protracted surgeries, longer recovery periods, and blood losses are intolerable. There is, however, a high rate of post-operative complications (especially cardiopulmonary complications), but appropriate post-operative care will minimize the risk of complications. There is also a long term survival rate of 69.7% and 34.7% at 1 and 5 years respectively, with cardiac events the greatest factor for mortality and morbidity. This is not ideal, especially in our morbidly obese patient.

A radical debridement of infected and necrotic tissue could be beneficial because it has less post-operative complications and the patient will be more likely to mobilize early after debridement when compared to post-amputation. However, when compared to an amputation, a radical debridement will not be able to control the septic focus as quickly as its alternative, and multiple debridement attempts would often have to be done. This is not ideal in a patient with severe sepsis, where quick eradication of septic focus is important for survival. There is not much literature about the natural history of our patient’s condition should they undergo radical debridement, but Tang et al. reported that patients with concurrent medical diseases (including severe sepsis) may not tolerate a protracted operation. Plus, the risk of death from severe sepsis, as previously discussed, approaches 50% and immediate eradication of septic focus is mandatory to improve survival outcomes.

While it may seem that amputation might be the answer, Tang et al. reported that amputations did not actually correlate with survival rates. However, it should be noted that patients in their study with severe infections underwent amputation, therefore skewing the mortality rate. The literature regarding amputations and survival rates is limited because it is unethical to perform a case control study in patients who require amputations. Nevertheless, amputations can still be life saving for necrotizing fasciitis of the extremities and surgeons are more likely to
amputate for severe infections to save a patient’s life. In conclusion, an amputation was necessary to quickly and promptly control the septic focus. The development of severe sepsis secondary to necrotizing fascitis indicates a poor prognosis, and the chances of our patient surviving the infection via multiple debridement attempts were less favorable compared to their chances with amputation.

**REFERENCES**


**LEARNING POINTS**

- Necrotizing fasciitis is a limb and life threatening soft tissue infection.
- An amputation might be necessary to control an infection, especially in a critically ill patient.
- In a critically ill patient with necrotizing fasciitis, the risks versus benefits of an amputation against a radical debridement must be carefully considered as both procedures have their own advantages and disadvantages.

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