



A Novel Approach to the Treatment of Necrotizing Fasciitis

Erin Koprince*, Mona Ramani and Alexander Perez

Founder and Surgeon at Aire Podiatry Studio, Western University of Health Sciences, United States

***Corresponding Author:** Erin Koprince, Founder and Surgeon at Aire Podiatry Studio, Western University of Health Sciences, United States.

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Abstract

In this case study, a 49-year-old male presents to the emergency room in acute respiratory distress. He was subsequently found to be septic and the cause was determined to be necrotizing fasciitis to the left lower extremity. The patient was admitted to the intensive care unit and taken to the operating room for emergent debridement. The patient continued to worsen after multiple debridements and a decision was made to attempt a final salvage procedure before amputation. Following the final radical debridement, the decision was made to incorporate a novel topical antimicrobial in the daily dressing changes. The first application was applied in the operating room and during daily dressing changes. The patient began to show immediate improvement and stabilized at post admission day 19. Skin grafting was successful and the patient was discharged to rehab. At the 6 week follow up appointment the patient had returned to work and was ambulating without assistive devices.

Our case report suggests that the use of a topical antimicrobial as ancillary therapy yields better outcomes in muscle preservation than traditional treatment methods alone. These results warrant further evaluation utilizing the addition of a topical antimicrobial to the treatment of necrotizing fasciitis in a randomized control study. The rarity of the disease makes this a difficult feat to accomplish, however the mortality of the disease makes it necessary.

Keywords: Necrotizing Fasciitis; Diagnosis; Liquefaction

Introduction

Necrotizing fasciitis (NF) is a rare, complex disease with a mortality rate between 25-35% [1,4]. Typically the infecting agent invades the soft tissues, aggressively attacking deep soft tissue layers with resultant liquefaction within hours of the initial exposure [6].

Early diagnosis is key in lowering mortality rates. However, disease rarity, along with the inverse relationship of physical exam to symptom severity may contribute to a delay in diagnosis and treatment [5]. The gold standard treatment includes emergent fasciectomy, serial débridements, broad spectrum antibiotics, local wound care, and eventual skin grafting [2,5]. The invasive nature of the disease and the treatments results in severe debilitation to the affected muscular structures thereby altering the patients functioning.

In this case study, a 49-year-old male presented with acute NF of the left lower extremity. A novel antimicrobial formula was employed in the treatment protocol which saved the maximum amount of musculature to the affected limb.

Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC)

Case Report

This is a case study of a 49-year-old Hispanic male with complaints of shortness of breath and left leg pain. Patient was hypotensive, tachycardic, hyponatremic, and hyperglycemic; a small wound was present on his anterior left leg due to a splinter two days prior. White blood cell count (WBC) was 23×10^3 cells/mL, serum creatinine was elevated, and hemoglobin decreased, giving a LRINEC

| VARIABLE | UNITS | SCORE |
|---|-----------------------------|---------------------|
| C-reactive protein | ≥150 mg/L | 4 points |
| White blood cell count (per mm ³) | 15-25 >25 | 1 point 2 points |
| Hemoglobin | 11.0-13.5 g/dl < 11 g/dl | 1 point 2 points |
| Serum sodium | ≥135 mmol/l <135 mmol/l | 1 point 2 points |
| Serum creatinine | >1.6 mg/dl (or >141 μmol/l) | 2 points |
| Serum glucose | >180 mg/dl (or >10 mmol/L) | 1 point |

Figure 1

*A LRINEC score of > 8 correlates with a 93.4% likelihood of NF infection [3].

score of 8. It was determined that he was in septic shock secondary to NF of the left lower extremity. He was rushed to the OR for emergent débridement and fasciectomy within four hours of admission. Intra-op evaluation found erythema, edema, and liquefaction of LLE. Extensive incisions were made from the mid thigh medially and laterally down to the ankle. Significant purulence was present in the subcutaneous tissues, surrounding fascia and deep into the lateral compartment of the lower leg. The first post-op cultures showed WBC rising to 25×10^3 cells/mL. Wound cultures positive for beta-hemolytic group A strep. Broad spectrum IV antibiotics begun. Follow up debridement utilizing versajet in the OR 2 days later revealed extensive damage to the peroneus longus. Negative pressure therapy was attempted however the WBC rose to 30×10^3 cells/mL and viability of the limb was called into question.

Day 6 of treatment the patient returned to the OR and one last attempt at salvage was made utilizing a topical antimicrobial applied directly to the affected area. For the first time since admission the post-surgical labs showed WBC reduced to 22×10^3 cells/mL and this trend continued with daily dressing changes with Hexagen antimicrobial therapy and kerlix.

Nineteen days after admission, a split thickness skin graft was harvested from the contralateral thigh and applied to the wound. This was then placed under negative pressure therapy and the WBC normalized.

Once the graft adhered, the patient was discharged to outpatient rehabilitation. The patient underwent extensive therapy

including bracing secondary to damage to the peroneus longus muscle. Physical therapy was utilized to strengthen the surrounding structures and at the 6 week follow up had returned to his work as a construction worker with his manual muscle strength 4/5 to the lateral compartment and 5/5 to all other muscles. His gait was noted to be mildly antalgic which he was still addressing in therapy and achieving his clinical goals.

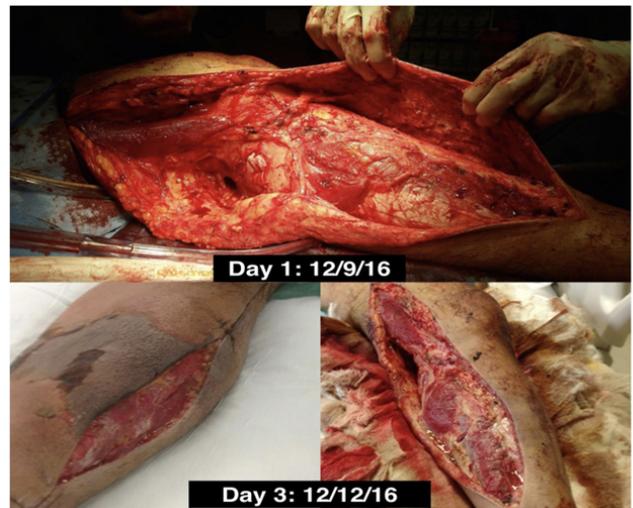


Figure 2



Figure 3



Figure 4



Figure 5



Figure 6

Discussion

Necrotizing fasciitis (NF) is a limb and life-threatening soft-tissue infection with acute onset and rapid progression which, when survived, can significantly alter the patient's muscular structure. The rapidly progressive nature of NF requires prompt and aggressive surgical débridement, tissue reconstruction or amputation may be required. In the interest of tissue preservation, rapidly working to save the muscular structures is critical. The elevated WBC on admission increased with traditional interventions but rapidly decreased following the application of Hexagen antimicrobial gel which positively correlated with a preservation of the muscular structures. This could indicate that the use of topical treatments such as Hexagen antimicrobial gel may serve as a useful adjunctive treatment to traditional methods and early use of this could improve outcomes in NF patients ambulatory recovery.

Conclusion

There are limited studies in regards to the use of novel topical treatments such as Hexagen antimicrobial therapy for NF. Our case report suggests that its use as ancillary therapy yields better outcomes in muscle preservation than traditional treatment methods alone. While the rarity of the disease is a limiting factor in future study design, it is our recommendation that utilization of this adjunctive treatment should be implemented and all cases documented to add to the body of research regarding this difficult and debilitating disease.

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