From Crisis to Closure: Early Aggressive Debridement and Use of Skin Grafting in Limb Threatening Necrotizing Fasciitis

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Purpose

This case highlights the potential for limb salvage through early aggressive surgical intervention and staged reconstruction, even in the context of profound systemic compromise and delayed presentation

Introduction

- ➔ Necrotizing fasciitis (NF) in the setting of diabetic ketoacidosis (DKA) and septic shock presents a formidable challenge, often necessitating major limb amputation. Early aggressive surgical debridement remains the cornerstone of NF management.
- ➔ Multiple studies underscore that time-to-operating room is a decisive factor in survival and limb preservation.
- ➔ Gelbard et al. (2018) found that delays beyond 12 hours from diagnosis significantly increased mortality and complication rates [2].
- ➔ Wong et al. (2024) described a 4 step approach to debridement—diagnosis, extent mapping, radical excision, and post-excision wound care—emphasizing that systematic, aggressive excision is essential to halt disease progression [3].
- ➔ In limb-threatening cases, especially involving the foot and ankle, early radical debridement can be limb-saving.
- ➔ Sevimli et al. (2016) reported that recurrent aggressive debridement, paired with interdisciplinary care, enabled limb preservation in a patient with extensive lower extremity NF [5].
- ➔ Advanced wound coverage techniques—including split-thickness skin grafting (STSG)—are increasingly viable following early source control.
- ➔ Zhu et al. (2019) documented successful STSG in a patient with Klebsiella pneumoniae NF and DKA, reinforcing that grafting is feasible even in metabolically unstable hosts [6].
- ➔ Early, aggressive debridement is not only life-saving but limb-saving, especially when paired with strategic reconstruction and interdisciplinary coordination.

Case Report

A 64-year-old female with a longstanding history of poorly controlled Type 2 Diabetes Mellitus-who had not engaged with medical care in over two decades—presented to the emergency department in diabetic ketoacidosis (DKA) and septic shock. She described a foul-smelling wound on her right lower extremity, which had worsened significantly in the past 24 hours. She endorsed localized pain in the affected limb but denied fevers or chills.

Domain	Findings	Clinical Implications
History	Fall, poor appetite, foul-smelling wound, delayed care, lives alone	High risk for delayed presentation and systemic compromise
Vitals	BP 73/67, HR 94, RR 18, Temp 98.1°F	Hemodynamic instability consistent with septic shock
Labs	WBC 38.47, Na^+ 119, Glucose 557	Severe leukocytosis, hyponatremia, and hyperglycemia in DKA
XR	Subcutaneous gas in medial foot and anterior tibial soft tissues	Suggestive of gas-forming infection; concern for NF
Duplex	No DVT or PAD	Confirms vascular access for limb salvage
CT- Bone	Osseous erosions, intraosseous gas in 1st metatarsal and phalanges	Osteomyelitis and septic arthritis
CT - ST	Extensive gas from ankle to proximal femur, large bullae, edema	Necrotizing fasciitis with deep fascial and muscular spread

Table 1. *Correlations of diagnostic findings and clinical implications concerning for NF.*

These findings were highly concerning for necrotizing fasciitis (Table 1). Sepsis protocol was initiated immediately, including aggressive fluid resuscitation, high-dose intravenous broad-spectrum antibiotics, and strict glucose control via continuous intravenous insulin infusion.

Results

1st Stage – Source Control:

- Emergent radical debridement → Involvement included the dorsal hallux, medial midfoot, and plantar first metatarsophalangeal joint, with hemorrhagic blistering and purulent drainage.
- The necrotic first ray and second digit were resected.
- Exposed midtarsal and subtalar joints with dishwater drainage and ankle joint purulence.
- A incision connected medial and lateral fasciotomy sites, allowing thorough debridement of necrotic fascia, muscle, and skin using electrocautery and a hydrosurgical debridement system.
- Cultures/Biopsies: E.Coli, E.Faecalis, and MRSA.

2nd Stage – Further Debridement & STSG:

- Returned to the operating room 72 hours later, where devitalized tissue of the RLE were debrided down to tendon
- By the third debridement (2 weeks later) robust granulation tissue had developed across previously exposed structures.
- STSG was harvested from the right thigh, meshed 1.5:1 and stapled down.

Conclusion

This case illustrates that even in profound compromise, early aggressive intervention can shift the trajectory from crisis to recovery. Radical debridement within hours prioritized source control and fascial decompression, aligning with literature emphasizing time-to-OR as critical for survival and limb preservation.

Despite initial concern for non-salvageability, dynamic surgical planning and interdisciplinary collaboration enabled limb salvage through four serial debridements. STSG with negative pressure therapy achieved >90% graft take by POD 14, supporting its use in metabolically unstable hosts when paired with meticulous wound prep and team-based care.

References

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