Necrotizing Soft Tissue Infections in the Extremities
*Service Agreement*

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**Background:**

Necrotizing soft tissue infections (NSTI) are rare but life-threatening conditions associated with severe systemic toxicity and can be rapidly fatal unless diagnosed promptly and treated aggressively (1). The single most important variable influencing mortality is time to surgical debridement. Despite much clinical experience, the management of this disease process remains suboptimal, with mortality rates reported to be approximately 30% (2, 4). The infection progresses rapidly, and septic shock may ensue, necessitating *prompt surgical debridement (a)*, intravenous antibiotics, *fluid and electrolyte management (b)*, and analgesia.

**Diagnosis:**

Fulminant NSTI is a clinical diagnosis and treatment should not be delayed in such cases. If the diagnosis is clear upon presentation to the emergency department, then the first surgeon available should facilitate expeditious transfer to the operating room for emergent surgical debridement. The Emergency Department physician will contact the surgeon based on the anatomic boundaries listed below. *Any resuscitation required within the Emergency Department shall be the responsibility of the Emergency Department team.*

For cases where the diagnosis of NSTI is being considered but the patient is more hemodynamically stable, then the Emergency Department will perform a minimum necessary workup to include:

- Age
- Medical Comorbidities, especially history of Diabetes Mellitus
- Vital Signs (Temperature, Heart Rate, Respiratory Rate, Blood Pressure)
- LRINEC Score
    - CRP (>150 mg/L = 4 pts)
    - WBC (< 15 = 0 pts, 15-25 = 1 pt, > 25 = 2 pts)
    - Hgb (> 13.5 = 0 pts, 11-13.5 = 1 pt, < 11 = 2 pts)
    - Sodium (> 135 = 0 pts, < 135 = 2 pts)
    - Creatinine (< 1.6 = 0 pts, > 1.6 = 2 pts)

- Glucose (< 180 = 0 pts, > 180 = 2 pts)
- Score > 6 very concerning for NSTI, score < 5 can help rule out if exam and imaging correlate and reassuring. Score cannot be used alone to rule out NSTI.

**Imaging:**

If hemodynamically stable, then advanced imaging can also be performed. Ultrasound is quick and convenient, and can be entertained as a first option in the Emergency Department, with the understanding that false negatives are higher than with CT.

CT with IV contrast of the affected extremity can be obtained as well. Presence of air in the soft tissues is highly specific for NSTI and should prompt immediate surgical intervention. Other findings can include fluid collections, absence or heterogeneity of tissue enhancement with intravenous contrast, and inflammatory changes beneath the fascia.

The Emergency Department will also do its best to also put a CLINICAL PHOTO into HealthConnect for documentation and so the consultant is able to have a visual image of the extremity at the time of consultation.

If the general surgeon sees the patient and decides the patient does not have necrotizing fasciitis then the guidelines for non necrotizing soft tissue infections apply based on location.

If the infection involves ONLY the foot – no matter if NF suspected or not – podiatry should be the primary surgeon consulted. Of note podiatry has call coverage Monday – Friday 0800-1700. If the consult is required after hours then orthopedic surgery should be called. General surgery is always available for consultation if orthopedics needs assistance with patient management.

**Guidelines for Consultation:**

Once initial formal workup is completed by the Emergency Department or Inpatient Medical team if already admitted, they will consult General Surgery regardless of anatomic location.

- The General Surgeon will admit and take the patient to the OR for debridement
- If the General Surgeon requires help with debridement distal to the elbow, they will contact the Hand Surgeon on call (Ortho/Plastics) for assistance
- If the General Surgeon requires help with debridement distal to the knee, they will contact the Orthopedic Surgeon on call for assistance
- The Orthopedic Surgeon/Hand Surgeon who operates on the patient with the General Surgeon will continue to round on the patient, help decide if reoperation is necessary, etc.
- The General Surgeon will be primary and manage the patient in the ICU

- If the area operated on is below the elbow, once the patient is stabilized and going to the floor the Hand team will take over the patient's care until they are discharged.
- If the area operated on is below the knee, once the patient is stabilized and going to the floor the Orthopedic team will take over the patient's care until they are discharged.
- If the area operated on is above the elbow or knee, then General Surgery will remain primary until the patient is discharged.
- If there is involvement BOTH proximal and distal to the elbow or knee, then the consulting services will use their judgement as to which area is *more significantly* involved and the appropriate service will remain as primary or co-manage as needed.
- It is always appropriate for one surgical service to request the assistance another surgical service in the operating room for decision-making and surgical debridement in this life-threatening condition regardless of anatomic location. Both services understand the critical nature of this condition and will put the patient's well-being as the highest priority and work together to provide the best care possible for the critical patient.
- Once the patient is stable and the wound is clean, if further surgical assistance is needed for soft tissue coverage (skin grafting and/or flap coverage), Plastic Surgery should be consulted at this time (if not already primary Hand service).
- For non-necrotizing soft tissue limb infections (cellulits/abscess/etc), the consulting services remain the same as the previous agreement:
    - Proximal to Elbow: General Surgery
    - Distal to Elbow: Hand Surgery
    - Proximal to Knee: General Surgery
    - Distal to Knee: Orthopedics Surgery

References


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