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Visual Diagnosis in Emergency Medicine

PUTTING THE GAS IN GASTROCNEMIUS: KNEE PAIN IN A 61-YEAR-OLD AGORAPHOBIC MAN

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CASE REPORT

A 61-year-old man with a history of agoraphobia, was found unresponsive on the floor of his bathroom by his sister, with whom he lives. He had not left his home for more than 5 minutes in the past 20 years. His sister reported that he was ambulatory the day before but had asked her to bring him peroxide to treat two toenails that had fallen off. She noticed a wound on his left ankle that day as well. After finding him unresponsive she called Emergency Medical Services.

The patient's vital signs on arrival to our facility were as follows: blood pressure 80/51 mm Hg, heart rate 88 beats/min, temperature 36.2°C (97.1°F), oxygen saturation 95% (room air), and respiratory rate 15 breaths/min. On examination he was awake and following commands but confused. He reported left knee pain but was unable to provide additional history, mumbling mostly incomprehensible words. He appeared disheveled with poor grooming. Cardiopulmonary examination was unremarkable. His abdominal examination revealed an obese and soft abdomen with tenderness to palpation in the left lower quadrant. His left leg was noted to have dry gangrene over three lateral toes, boggy soft tissue and desquamating skin over the dorsum of the foot and lateral ankle, and erythema extending up to the mid-calf. No crepitus was appreciated; however, his left calf and thigh were both exquisitely tender to palpation.

Initial laboratory tests were notable for marked leukocytosis ($25.1 \times 10^3/\mu L$), mild anemia (11.5 g/dL), thrombocytopenia ($113 \times 10^3/\mu L$), hyponatremia (125 mmol/L), hyperkalemia (5.6 mmol/L), renal impairment (blood urea nitrogen 87 mg/dL, creatinine 1.42 mg/dL), marked hyperglycemia (717 mg/dL), elevated C-reactive protein (158 mg/L), and elevated lactate (5.4 mmol/L). The plain radiographs shown below were obtained at bedside (Figures 1–3), and a diagnosis was made.

DISCUSSION

Based on his vital signs and physical examination, the patient was immediately presumed to be in septic shock, and was given intravenous crystalloid fluids and empiric antibiotics (piperacillin-tazobactam, vancomycin, and clindamycin). Bedside plain radiographs of the patient's left foot (Figure 1) and lower leg (Figures 2 and 3) demonstrate extensive subcutaneous emphysema. In conjunction with his abnormal vital signs, physical examination, and laboratory abnormalities, this finding was extremely concerning for a necrotizing soft tissue infection (NSTI). An immediate surgical consult was obtained, and the patient was taken to the operating room within two hours of his arrival to our facility.

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Figure 1. Portable radiograph, lateral view of the left foot.

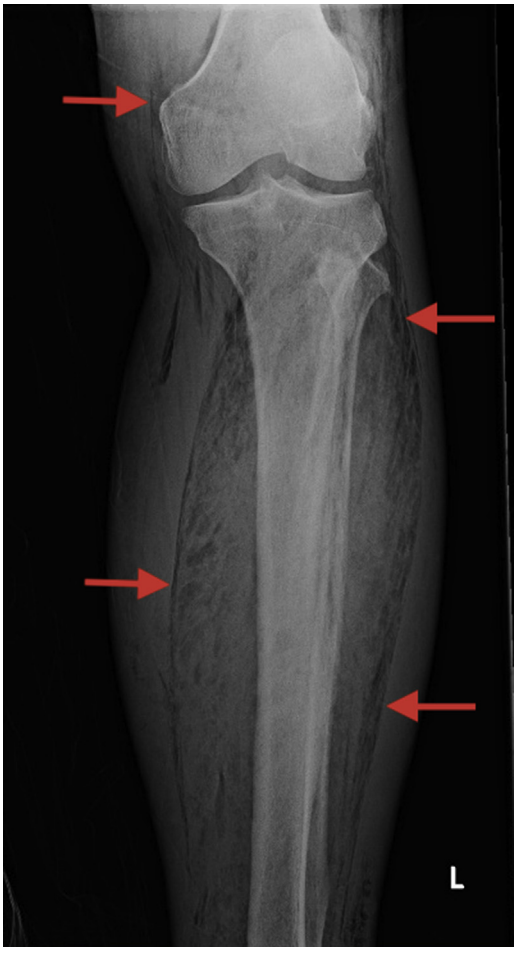

Figure 2. Portable radiograph, anterior-posterior view of the left leg.

Figure 3. Portable radiograph, lateral view of the left leg.

The estimated mortality burden of NSTI in the United States has been estimated at 4.8 per 1,000,000 person-years (1). Although uncommon, NSTIs carry an extremely high mortality rate, estimated at 23.5% in one meta-analysis (2). Delay in surgical care of > 24 h is associated with increased mortality (3). Diabetes mellitus has been identified as the most frequent comorbidity in patients with NSTI (44.5–70.8% prevalence) (3,4). Although relatively uncommon, the presence of gas in the soft tissues on plain radiographs may aid significantly in early diagnosis (4,5). The Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score was developed to aid in the early detection of severe soft tissue infections. The score divides patients into three groups based on the risk of NSTI: low (score $\leq$ 5), moderate (6,7), or high ($\geq$8), and the authors suggest that a score of 6 or higher should raise significant concern for NSTI. Whereas some studies suggest the LRINEC score may be a useful tool in identifying at-risk patients, others demonstrate that it is no more sensitive than physician gestalt, and cannot adequately "rule out" NSTI (6–8).

This patient had an initial LRINEC score of 10, with clear examination and radiographic findings concerning for NSTI. In the operating room, incision to the level of the fascia of the leg led to the immediate expression of dishwater-type fluid, with devitalized muscle noted

throughout the leg. Healthy tissue was seen at the level of the knee, despite the patient's examination raising concern for more proximal spread into the abdomen. An above-knee amputation was performed, and was closed in a delayed fashion the following day. The patient's blood cultures from his initial presentation grew multiple pathogens, including *Enterococcus faecalis*, *Aerococcus*, and *Staphylococcus hominis*, and the surgical specimen also had polymicrobial culture results, including *Klebsiella pneumonia* and *Streptococcus anginosus*. The patient ultimately recovered well and was discharged from the hospital to a rehabilitation facility.

CONCLUSION

Bedside plain radiographs can expedite the diagnosis of NSTI, particularly if they demonstrate subcutaneous emphysema. The LRINEC score cannot be relied upon to exclude necrotizing soft tissue infections, but a score of 6 or greater may be useful to increase probability of the diagnosis. As in this case, NSTIs often result from a polymicrobial infection, making broad-spectrum antibiotics a necessity. Early identification and rapid treatment of NSTI with antibiotics and surgical debridement can lead to a good outcome, even when the patient's presentation to the hospital is delayed.

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