Total body necrotizing fasciitis

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ABSTRACT

Necrotizing fasciitis is uncommon in the United States. Despite medical advances, its mortality rate has remained unchanged over the past 20 years at 25% to 35%. Risk scoring tools have been created but often fall short when used in the clinical setting. We present a case of an elderly woman with necrotizing fasciitis but with extensive intraparenchymal air that is undocumented in the literature. Imaging demonstrated significant air collections originating from an infection on the right foot that extended through the body, including the cranial vault. Despite aggressive resuscitative efforts, the patient was not considered a surgical candidate and ultimately died. Using a scoring tool for our patient suggested a low probability of infection, demonstrating that clinical suspicion should take precedence over any test or scoring system.

KEYWORDS Intraparenchymal air; laboratory risk indicator for necrotizing fasciitis; necrotizing fasciitis

CASE REPORT

A 64-year-old woman with multiple chronic medical problems, including controlled type 2 diabetes mellitus, presented with an altered mental status after she was found confused by her home health nurse. The patient was unable to participate in her history, but her nurse reported that she was at baseline 1 day prior to presentation. Physical exam was notable for a fever of 101.2°F, a heart rate of 114 beats/minute, blood pressure of 78/52 mm Hg, respiratory rate of 16 breaths/minute, and oxygen saturation of 78% on room air. The patient was somnolent, alert to person only, and in moderate distress. Auscultation disclosed crackles in the left middle and lower lung fields, and precordial examination showed tachycardia with a normal S1/S2. Her abdomen was distended and tender with diminished bowel sounds. Her extremities were edematous with warm skin but the pulses were difficult to palpate. A 4-cm blister was present on the plantar aspect of the right foot.

After initial intubation, fluid resuscitation, broad-spectrum antibiotics, and vasopressors were administered for septic shock. Her blood glucose was 245 mg/dL, platelet count was 85,000/ μ L, and white cell count 12,400 cells/ μ L, 83% of which were granulocytes. The patient's calculated Laboratory Risk Indicator for Necrotizing Fasciitis score at the time of admission was 7 (scores >6 have a positive predictive value of 92% for necrotizing fasciitis).

Radiographs of the right lower foot revealed extensive subcutaneous emphysema (*Figure 1a*). Computed tomography (CT) of the lower extremities showed subcutaneous air within the thighs and legs extending down to the ankles bilaterally. Intraluminal gas was identified within the superficial femoral arteries, popliteal arteries, peroneal arteries, anterior tibial arteries, and posterior tibial arteries. Intraosseous air was noted within the visualized spine, both hips, and both knees (*Figure 1b*). CT of the chest, abdomen, and pelvis showed a branching air pattern within the left hepatic lobe representing portal venous gas (*Figures 1c, 1d*). Intravascular gas was visualized within the bilateral iliac arteries and aorta, within the retroperitoneum, and in the psoas muscles. Gas was seen about the bladder, which may have also been within the bladder walls, and extensive free air was noted within the pelvis. Subcutaneous air was noted throughout the subcutaneous soft tissues, including bilateral axilla, inferior anterior neck, and bilateral flanks. CT of the head revealed an interval development of a rounded, complex, focal collection of predominantly intraparenchymal gas in the right parieto-occipital region with subtle adjacent vasogenic edema (*Figure 1e*).

The patient's clinical status continued to deteriorate despite continued fluid resuscitation and vasopressor therapy and she died.

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Figure 1. (a) Radiograph of the right foot with extensive subcutaneous emphysema. (b) CT scan of lower extremities with subcutaneous gas from the flanks to ankles. Gas is visualized within the vasculature of the lower extremities. (c, d) Coronal CT of chest, abdomen, and pelvis with extensive subcutaneous air and free air in the peritoneum and vasculature. (e) Axial CT of the head with a complex collection within the right parieto-occipital region of the brain.

DISCUSSION

Necrotizing fasciitis is a rapidly progressing infection involving the deeper layers of soft tissue and usually spreads along fascial planes. Cases arise more commonly in immunocompromised individuals, and patients with multiple comorbidities are at a greater risk for developing severe infections like necrotizing fasciitis.^{1–3} Infections can be monomicrobial or polymicrobial, and causative agents include anaerobes (*Clostridium perfringens*, *Bacteroides fragilis*, etc.), as well as *Streptococcus* species (including group A beta-hemolytic streptococci), and *Staphylococcus* species.⁴ Physical findings indicative of necrotizing fasciitis can be subtle, and laboratory values, such as white blood cell count, may not correlate with the severity of infection; thus, one must maintain a high degree of clinical suspicion for such disease processes, taking predisposing risk factors into consideration.^{1,2,5} Because pathogenicity includes multiple potential causative organisms, recommended empiric antibiotic therapy is broad, with treatment recommendations consisting of penicillin G with an aminoglycoside and clindamycin or vancomycin with anaerobic coverage (piperacillin/tazobactam, meropenem, etc.).⁴ The clinical course can progress rapidly, so surgical consultation should be prioritized because the time to operative intervention is the most important factor in patient mortality.¹ Treatment with 100% oxygen at two to three times atmospheric pressure can improve the oxidative burst of leukocytes, can restrict the growth of anaerobes, and can limit the release of bacterial toxins, but it should not delay emergency surgery and aggressive fluid resuscitation.⁴

Though various tools have been developed to aid in the diagnosis of equivocal cases (Laboratory Risk Indicator for Necrotizing Fasciitis, for example), the most important factor in diagnosing necrotizing fasciitis is a high degree of suspicion. Once this diagnosis is suspected, prompt surgical treatment is paramount to improve survival chances.

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