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An Unusual ED Case: Spontaneous Necrotizing Fasciitis presenting as Hypoxic Pneumonia

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Introduction:

We present a case of necrotizing fasciitis initially presenting as septic hypoxic pneumonia, and discuss imaging modalities and diagnostic evaluation.

Necrotizing soft tissue infection (NSTI) is a rapidly progressive surgical emergency with a mortality rate of 30%.¹ In approximately 80% of cases, it is introduced through a break in the skin. It can also occur after any invasive procedure or surgery. It is most commonly associated with skin flora including staph and strep, though polymicrobial infections are most common.¹ It usually presents with signs of systemic infection, including fever, chills, sepsis, altered mental status - and signs of cutaneous involvement on physical exam, including erythema / discoloration, sloughing and blistering, and pain out of proportion to exam, and crepitus. The crepitus or findings of subcutaneous emphysema on imaging are due to gas-producing bacteria from polymicrobial infection. Blood work can help support the diagnosis of a systemic infection, including things like elevated white blood cell count, elevated lactic acidosis, and other systemic inflammatory markers.³ Imaging can show signs of free air, particularly on x-ray, ultrasound, or CT.⁴ Poor prognosis is associated with comorbidities, advanced age, immunocompromised state, shock.

The definitive treatment is early surgical debridement of the necrosed tissue, and antibiotics.¹ Surgical exploration usually confirms the diagnosis, with foul gray fluid expressed, necrosis and gangrene of underlying tissues and muscles, and friability of muscles on dissection.⁵

Hypoxia and tachypnea can have a broad differential diagnosis, including but not limited to reactive airway disease, heart failure, pneumonia, pulmonary emboli. In the setting of fever and cough, a working clinical diagnosis of pneumonia can be considered.³

Case Presentation:

A 78 year old male presented from home with his family to the emergency department with the chief complaint of fever, cough, congestion, and chills for the past two days. Upon further discussion and review of systems, the family endorsed an episode about two weeks ago, where the patient fell down about 5 steps. He has had decreased range of motion of the right hip and pain with movement of the right hip since then. He has overall felt weaker the past two weeks with limited mobility, but did not come in earlier as did not want to be evaluated medically. The worsening cough and fever the past two days is what prompted him to finally present to the ER. He denied chest pain, shortness of breath, abdominal pain, issues with his colostomy bag, or vomiting. Of note, the family also felt he had been breathing "strangely," the last two days. He endorsed the medical history of hypertension, hyperlipidemia. He endorsed a history of rectal cancer with resection and radiation in 2013. He did not have a history of any pulmonary issues requiring oxygen at home.

His oxygen saturation was 90-92% on room air. He was visibly tachypneic upon evaluation for a respiratory rate of 21-22. His blood pressure was 116/93, and his pulse was tachycardic to 108.

On a physical exam, he appeared ill and tachypneic. He was alert / oriented, he was at his baseline mental status. Other than tachycardia, he did not have irregularities in cardiac auscultation. He additionally did not have wheezing or rales on auscultation bilaterally. He did not have any abdominal pain or tenderness. He had a colostomy bag in place without any surrounding erythema or abnormal drainage. He had a decreased range of motion of right hip compared to left hip. He endorsed mild pain with hip movement and hip palpation. He did not have any erythema or swelling of the right hip. He had normal capillary refill and distal pulses. Notably he did not have crepitus on hip or thigh, and he did not have any open areas of skin or laceration.

Initially, as the patient had clinical signs of pneumonia, we obtained blood counts, metabolic panel, and chest radiograph. Additionally, due to history of immobility after fall, and tenderness of hip, XRays were obtained for evaluation of hip fracture. As the patient was meeting SIRS criteria, with a likely source of infection, we obtained blood cultures and lactate levels and started a fluid bolus. He additionally had a Creatinine of 3.19 including urea nitrogen of 70, which was increased from his baseline of creatinine of 1.5. Despite no history of diabetes, the patient had a blood glucose level of 221. He had an anion gap of 19 with a CO2 of 16. He had a lactate of 6.7 and a CRP of 35.8 and a procalcitonin of 14.8. He additionally had a WBC of 19.1, and Hgb of 12.9. X-ray hips did not show acute findings. X-ray of the chest did not show any acute abnormalities. Due to the elevations in CRP and lactate, without x-ray signs of pneumonia, we started to revisit our differential diagnoses; we then obtained CT chest abdomen pelvis without contrast. This showed a large amount of gas in the pelvis and right gluteus, extending down the right hamstring.

The patient was empirically started on clindamycin, meropenem and transferred to a tertiary care facility due to the extent of the necrosis and potential for necessary vascular intervention. Upon arrival at the tertiary care hospital, the patient had a blood pressure of 89/48, and remained tachycardic, tachypneic. Despite 4L total the patient ended up requiring vasopressors to maintain blood pressure. He was started on vancomycin and taken directly to the OR. Debridement showed gray turbid, foul smelling fluid, requiring significant drainage of necrotic tissue and muscle, down to the posterior knee. Total wound dimensions post op was 60 cm x 20 cm x 7 cm. Wound and blood cultures showed growth of bacteroides thetaiotaomicron group. Fungal and AFB stains did not have any growth.

On post op day 2 the patient was saturating well on room air, and had resolution of leukocytosis. He was discharged on POD 12 to a subacute rehab, with no unexpected issues to date.



Figure 1. Gaseous collection noted on CT right femur.

Discussion:

Upon initial presentation, this patient's history and physical was consistent with a community acquired pneumonia and resultant sepsis. Upon further questioning it was noted that the patient had decreased mobility after a fall on his right hip 2 weeks prior, causing hip pain. Initially, we considered this to be separate from the primary issue, and obtained plain radiographs to assess for fracture or dislocation. When lab work came back positive for inflammatory markers including a highly elevated lactate, WBC, CRP, and an acute kidney injury, the significant lab derangements did not clinically correlate with the hypoxia of only 90% on room air. Paired with no acute findings consistent with pneumonia on chest radiograph, it caused us to re-expand our differential. We obtained a CT of the chest abdomen and pelvis to search for an occult infection that would correlate with the laboratory findings. There we found evidence of the underlying diagnosis. This case highlights the importance of taking the time to think through alternative diagnoses, especially when presented with conflicting information or new clinical results. This case also highlights the importance of completing a thorough ROS, without which we may not have known about the patients right hip pain.

Our case also emphasizes limitations of diagnostic imaging vs clinical picture and diagnosis. Initially x-ray of the hip was obtained for evaluation of trauma - associated mechanical injury, which was not noted to have any acute findings. Based on the literature, plain film radiography is 25-55% sensitive for gas.⁴ This is a marked improvement from the sensitivity of crepitus as a physical exam finding (4.9%).⁷ CT or MRI is significantly more sensitive at 80% and 93%.⁴ While necrotizing fasciitis is generally a clinical diagnosis, imaging is often incorrectly obtained to rule it in or out, when it should be used as more of a diagnostic support. Interestingly, ultrasound was found to be 100% sensitive for subcutaneous thickening, but with 5.8% sensitivity; it also was found to have ~ 70-80% sensitivity for fluid above fascia, facial thickening, loss of fascial homogeneity.⁸ This is a significant improvement from the sensitivity of plain radiographs and should be considered as an initial diagnostic support, especially considering ease of availability of point of care ultrasound in many emergency departments.

Our patient initially presented with cough, fever, tachypnea, and hypoxia. Initially we considered that the patient may have had concurrent developing pneumonia or viral infection, but CT was also negative, and our patient's tachypnea and oxygenation improved shortly after surgical intervention. The pathophysiology is still unclear. One proposed method is decreased perfusion/oxygen saturation due to bacteremia / systemic shock. In this case, our patient's tachypnea was likely a compensatory method. Similarly, sepsis and systemic inflammation due to the NSTI may cause inflammatory sequelae in the lungs, causing decreased oxygen ventilation. Our literature review does not show any previous cases of a similar presentation of NSTI.

Conclusions:

Necrotizing soft tissue infection (NSTI) is a rapidly progressing surgical emergency with a high mortality rate especially if not promptly diagnosed and treated. The condition is traditionally diagnosed by history and physical, primarily based on high clinical suspicion and utilizing labs and imaging as supporting elements. We present a case where initial history and physical pointed towards a clinical community acquired pneumonia with sepsis, without any cutaneous physical exam findings or penetrating trauma. CT imaging obtained showed extensive necrotizing fasciitis and myositis. The patient was transferred to a tertiary care center for prompt extensive surgical debridement, confirming the diagnosis. Shortly after, the patient's hypoxia and tachypnea improved. Our case depicts an atypical, novel presentation of NSTI and highlights the importance of expanding a differential diagnosis in the setting of conflicting or atypical findings.

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