>> EMERGENCY IMAGING

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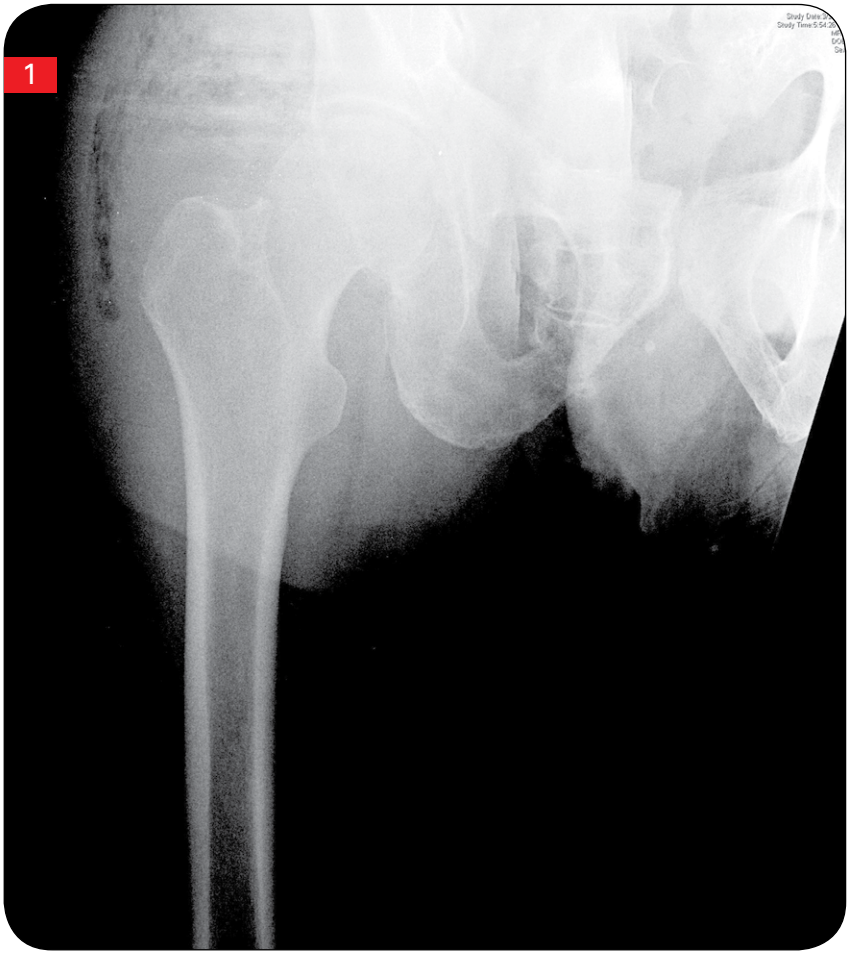
PROBLEM



>> A 65-year-old man presents with right hip pain, swelling, and erythema following minor nonpenetrating trauma. He has a history of immunosuppression secondary to advanced hematologic malignancy. A radiograph is obtained (Figure 1).

What is your diagnosis?

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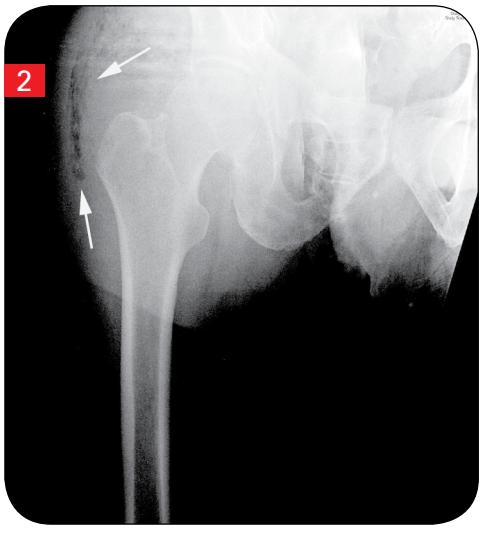
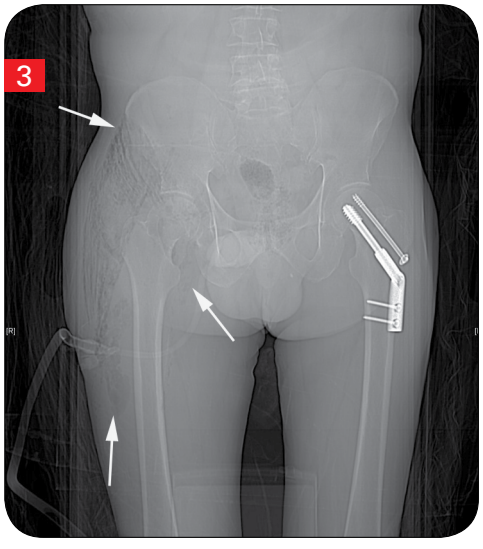
ANSWER



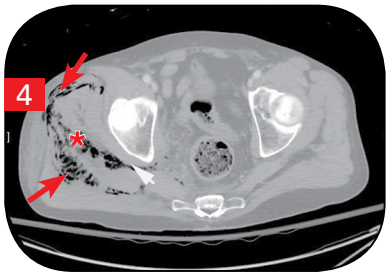


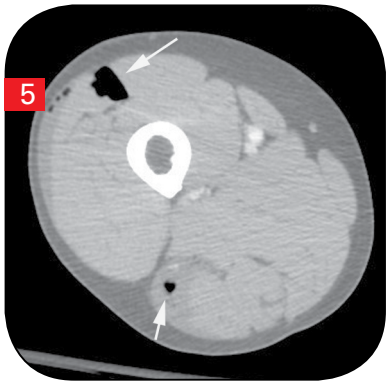
>>The radiograph of the right hip demonstrates soft tissue swelling with linear air density opacities in the region of the gluteus musculature (white arrows, Figure 2). The presence of soft tissue gas without a history of penetrating trauma suggested a possible necrotizing infection (fasciitis), and CT was ordered. The scout film from the CT examination, which was performed less than 90 minutes after the initial radiograph was obtained, shows interval progression of both the amount and the extent of the soft tissue gas (white arrows, Figure 3). Note the dynamic hip screw and adjacent lag screw on the patient's left side, consistent with prior internal fixation of an intertrochanteric fracture. Figure 4, an axial image from the CT exam, confirms the presence of the soft tissue gas and demonstrates the gas to involve the gluteus medius muscle (asterisk) and its surrounding fascial planes (red arrows). An axial slice obtained just above the knee (Figure 5) shows the inferior extent of the soft tissue gas, which not only reaches the knee but also involves both the anterior and posterior compartments. Another axial slice (Figure 6), this one obtained through the pelvis, demonstrates the necrotizing process (red arrow) to extend into the retroperitoneum along the right psoas muscle (asterisk). An additional focus of gas noted within the spinal column (black arrow) represents a vacuum phenomenon related to degenerative disk disease and not an additional focus of infection. The presence of vacuum phenomenon within a disk space virtually rules out infection at that site.

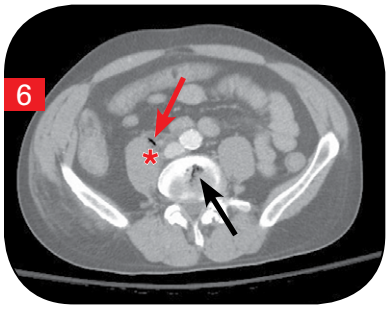
Necrotizing fasciitis is a rapidly progressive soft tissue infection affecting both the superficial and deep fascia—unlike cellulitis, which affects only the superficial fascia. Although necrotizing fasciitis can affect anyone, patients with immunosuppression or vascular compromise are at higher risk. Necrotizing fasciitis typically presents with nonspecific findings such as acute pain, swelling, and erythema. The mortality rate from necrotizing fasciitis may be as high as 30% to 70% from sepsis and multiorgan failure; thus, a high level of clinical suspicion is essential to ensure a timely diagnosis.[1]

Radiographically, necrotizing fasciitis most commonly presents as nonspecific soft tissue swelling. Gas within the soft tissues, although characteristic, is frequently absent and usually associated with advanced disease. On CT, necrotizing fasciitis is demonstrated by fascial thickening, hemorrhage, enhancement of deep fascial layers, soft tissue gas and, possibly, fluid collections.[2] Lack of deep fascial involvement rules out the diagnosis. MRI provides the best characterization of fascia

ANSWER







and is helpful in detecting or excluding fascial edema and enhancement. This modality is also useful in defining the extent of disease, which is important in planning surgical debridement.

A suggested algorithm for imaging in patients with suspected necrotizing fasciitis would be plain radiographs followed by non–contrast-enhanced CT. If findings are equivocal or the margins need to be better delineated, MRI with contrast should be performed. CT with contrast is the next option if MRI is not readily available.

References

1. Fugitt JB, Puckett ML, Quigley MM, Kerr SM. Necrotizing fasciitis. *Radiographics* 2004;24(5):1472-1476.
2. Wysoki MG, Santora TA, Shah RM, Friedman AC. Necrotizing fasciitis: CT characteristics. *Radiology*. 1997;203(3):859-863.

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