

AMSER Case of the Month: March 2019

73 YO male presenting with left hip pain

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Patient Presentation

- HPI: 73 year old male presented with left hip pain status post fall 7 days prior, with acute worsening of mental status prompting presentation to ED
- PMH: Type II diabetes mellitus, COPD, hypertension
- PSH: s/p total arthroplasty of left hip, date unknown
- Physical exam identified crepitus and skin necrosis over left hip

Pertinent Labs

- Lactic acid 4.3
- Na 125
- HCO₃ 13
- BUN 74
- Creatinine 3.36
- WBC 21 (23% bands)

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 8: Clinical examination suggesting crepitus. Suspected soft-tissue gas. First study.

Radiologic Procedure	Rating	Comments	RRL*
X-ray area of interest	9		Varies
		This procedure may be appropriate but there was disagreement among panel members on the appropriateness rating as defined by the panel's median rating. X-ray is the preferred initial study. Contrast is preferred for evaluation of possible concomitant soft-tissue abscess.	
CT area of interest with IV contrast	5		Varies
CT area of interest without IV contrast	5	This procedure may be appropriate but there was disagreement among panel members on the appropriateness rating as defined by the panel's median rating. X-ray is the preferred initial study. This procedure may be appropriate if there is contraindication to contrast.	Varies
CT area of interest without and with IV contrast	1		Varies
MRI area of interest without IV contrast	1		0
MRI area of interest without and with IV contrast	1		0
US area of interest	1		0

Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

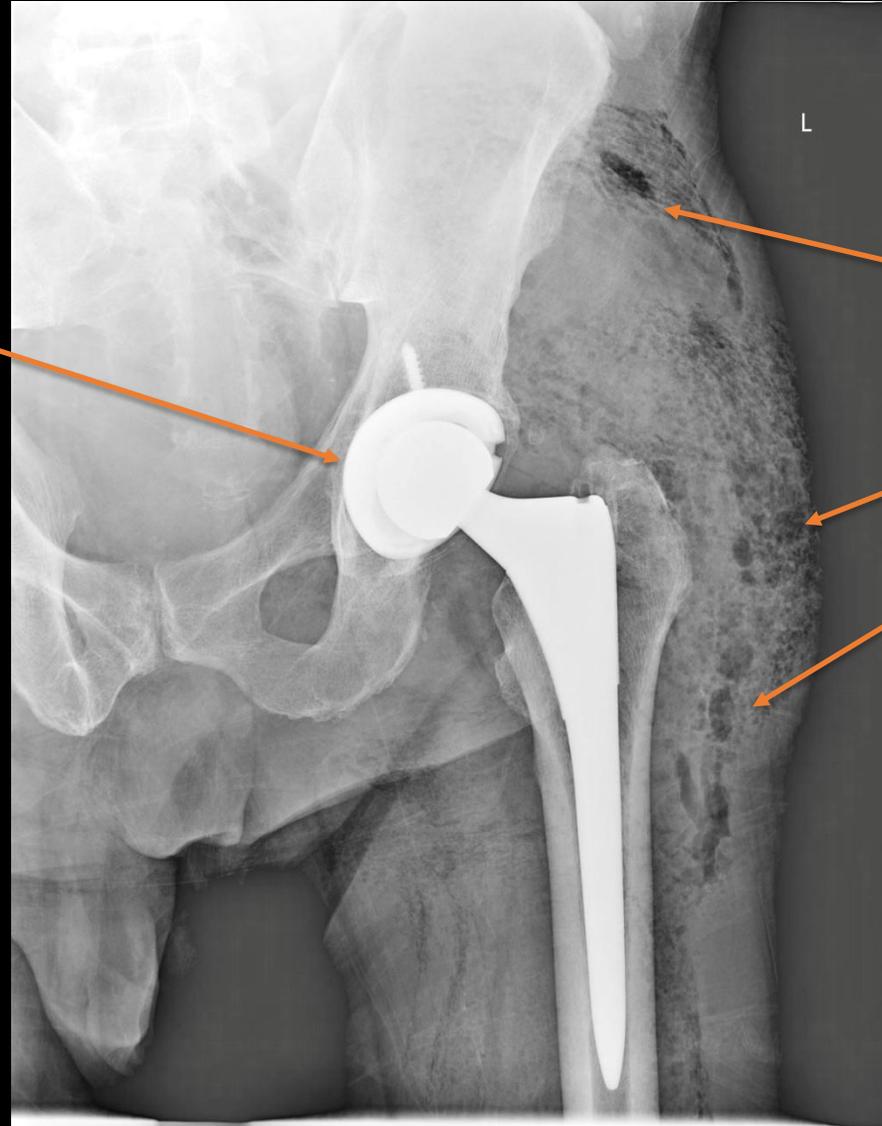
*Relative Radiation Level

Findings: (unlabeled)



Findings: (labeled)

Total hip arthroplasty hardware intact, no evidence of fracture or dislocation



Large quantity of gas within the soft tissues of the left hip, possibly due to gas-forming infection or penetrating injury

Variant 9:**Initial radiographs showing soft-tissue gas in absence of puncture wound.**

Radiologic Procedure	Rating	Comments	RRL*
CT area of interest without IV contrast	6	CT is useful due to rapid acquisition and high sensitivity.	Varies
CT area of interest with IV contrast	5	This procedure may be appropriate but there was disagreement among panel members on the appropriateness rating as defined by the panel's median rating. CT is useful due to rapid acquisition and high sensitivity.	Varies
MRI area of interest without IV contrast	5	This procedure may be appropriate but there was disagreement among panel members on the appropriateness rating as defined by the panel's median rating.	O
MRI area of interest without and with IV contrast	5	This procedure may be appropriate but there was disagreement among panel members on the appropriateness rating as defined by the panel's median rating.	O
CT area of interest without and with IV contrast	1		Varies
US area of interest	1		O
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

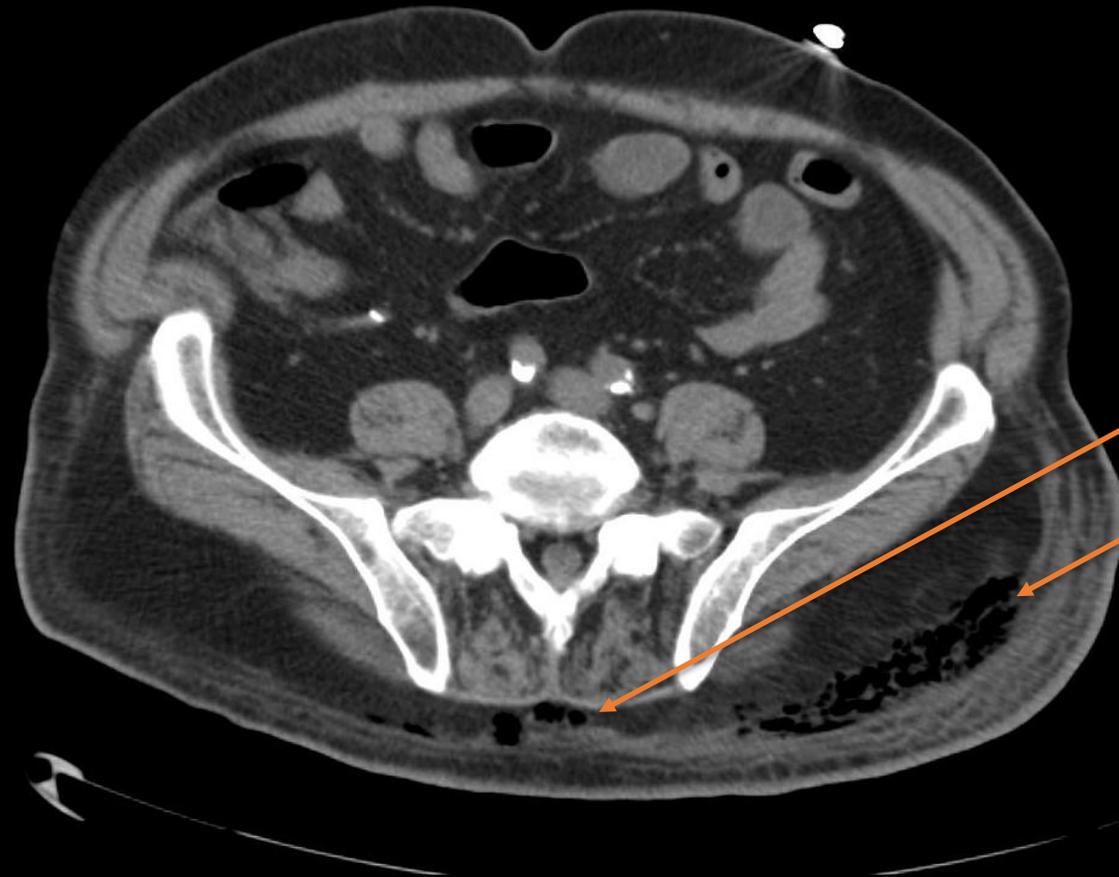
Findings (unlabeled)



Findings (unlabeled)



Findings: (labeled)



Extensive subcutaneous air in the soft tissues in both gluteal muscles and in the subcutaneous fat of the left buttock extending into left upper thigh

Findings: (labeled)



Free air in the subcutaneous tissues and in gluteus maximus muscles



Free air in the subcutaneous tissues and in the posterior compartment extending down to the level of the knee

Final Dx:

Septic shock secondary to necrotizing fasciitis

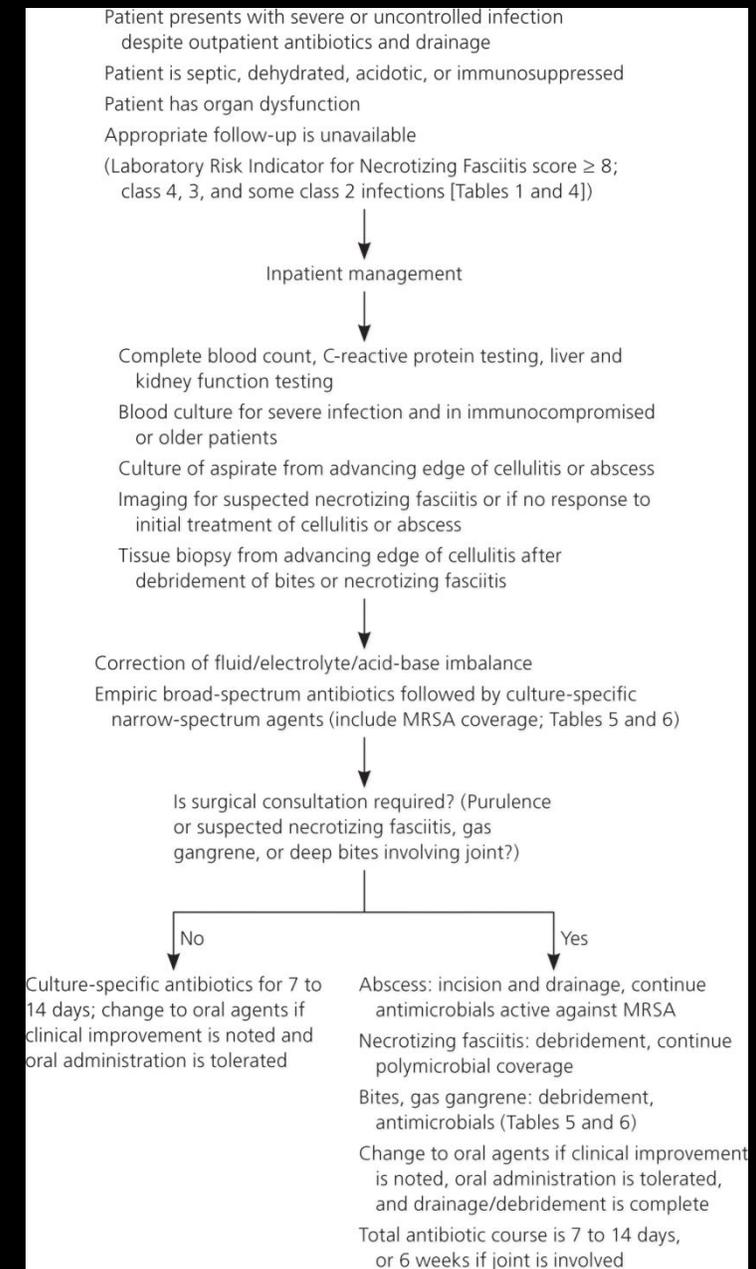
- Multiple surgical debridements and broad spectrum antibiotic coverage were ultimately unsuccessful, with continued spread of infection
 - Spread as far down as mid-calf, up to mid-back and around left lateral abdominal wall at time of final surgery
- Two days after presentation, patient passed away

Case Discussion

- Necrotizing fasciitis
 - Infection of deep soft tissues with destruction of muscle fascia and subcutaneous fat
 - Rapidly progressing, high mortality
 - caused by various species of Gram-positive cocci (*Staphylococcus aureus*, *Streptococcus pyogenes*, and enterococci), Gram-negative rods (*Escherichia coli*, *Pseudomonas aeruginosa*), and anaerobes (*Bacteroides* and *Clostridium* species)
- Risk factors
 - Penetrating trauma or skin breach
 - Blunt trauma (ex: fall, as was the case in this patient)
 - Immunosuppression, including diabetes (another risk factor in this patient)
- Clinical and laboratory findings
 - Erythema, edema, pain out of proportion, fever, crepitus, skin necrosis
 - Leukocytosis, acidosis, hyponatremia, elevated lactate, elevated creatinine

Case Discussion

- Treatment of necrotizing fasciitis requires early recognition and surgical intervention for debridement of necrotic tissue, along with coverage with broad-spectrum antibiotics
- Initial imaging modality if presence of soft tissue gas is suspected: x-ray area of interest
- Radiographic imaging should NOT delay surgical exploration when crepitus is present or patient's clinical status is rapidly deteriorating
- CT is more useful than MRI for detection of gas in soft tissues, and is the preferred imaging modality after initial radiograph demonstrates possible air in soft tissue



AAFP: Inpatient Management of a Patient With Skin and Soft Tissue Infection

<https://www.aafp.org/afp/2015/0915/p474.htm>

References:

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- American Family Physician. Skin and Soft Tissue Infections. September 2015. Retrieved from <https://www.aafp.org/afp/2015/0915/p474.html>
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- Radiographics. Soft-Tissue Infections and Their Imaging Mimics: From Cellulitis to Necrotizing Fasciitis. October 2016. Retrieved from <https://pubs.rsna.org/doi/full/10.1148/rg.2016160068>
- Uptodate. Necrotizing Soft Tissue Infections. December 2018. Retrieved from https://www.uptodate.com/contents/necrotizing-soft-tissue-infections?search=necrotizing%20fasciitis&source=search_result&selectedTitle=1~134&usage_type=default&display_rank=1