

Necrotising Soft Tissue Infection: Imaging options

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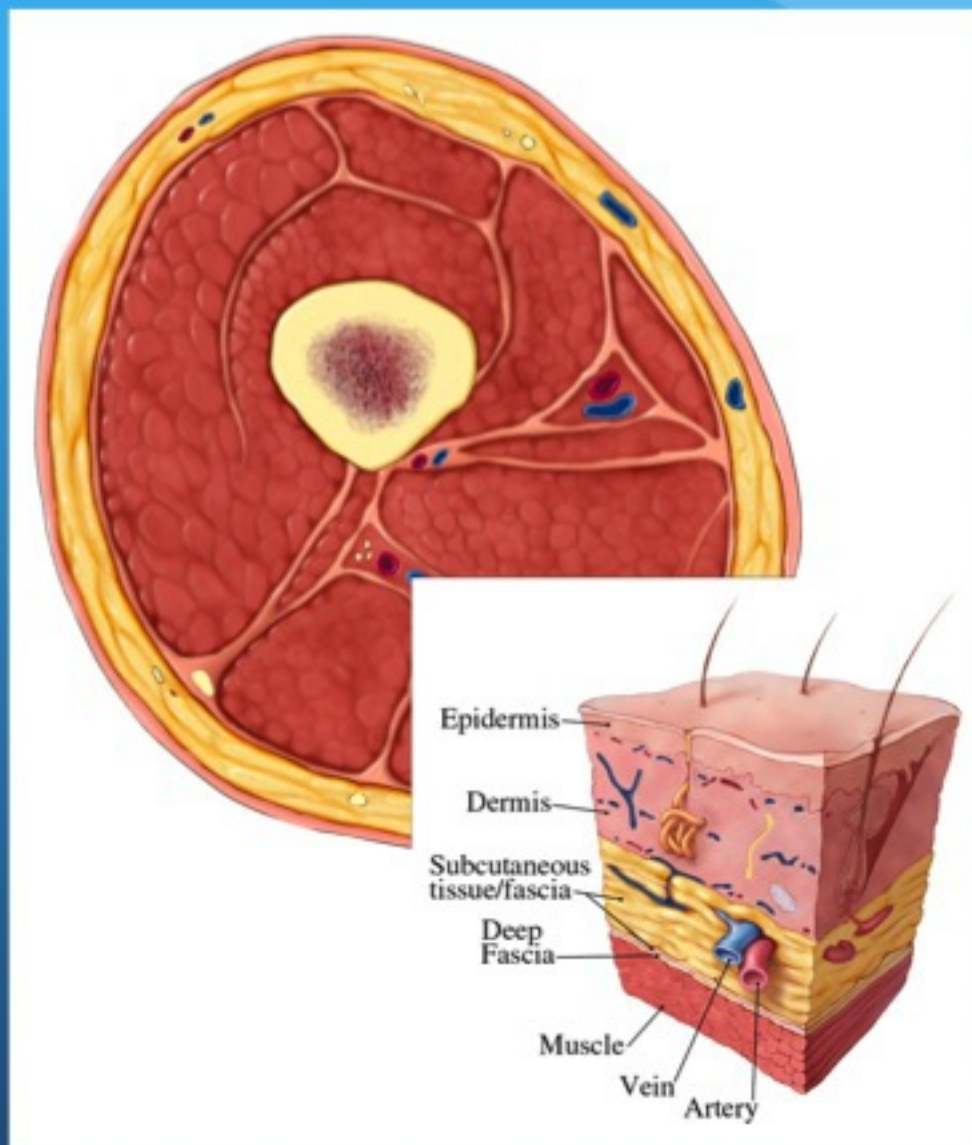
Soft tissue infection classifications - options:

- Local/spreading/necrotising or not/site...
- Cellulitis: subcutaneous tissue-fat and skin
- Fasciitis: sheet or band of fibrous tissue such as lies deep to the skin or invests muscles and various body organs
- Myositis: muscle

Necrotising Fasciitis

- a progressive, rapidly spreading inflammatory bacterial infection located in the deep fascia, with secondary necrosis of the subcutaneous and other tissues. Because of the presence of gas-forming organisms, “air” is classically described in NF.
- “Rare” - but increasing due to proportion of susceptible population - immunocompromised eg Diabetics, post surgical/trauma, CVD, IVDU, etc Note some subtypes eg streptococcal necrotising myositis or spontaneous gangrenous myositis - usually no risk factors
- Clinical hallmark is intense pain, out of proportion to the physical evidence - frequently present before development of fever, malaise, and myalgia.

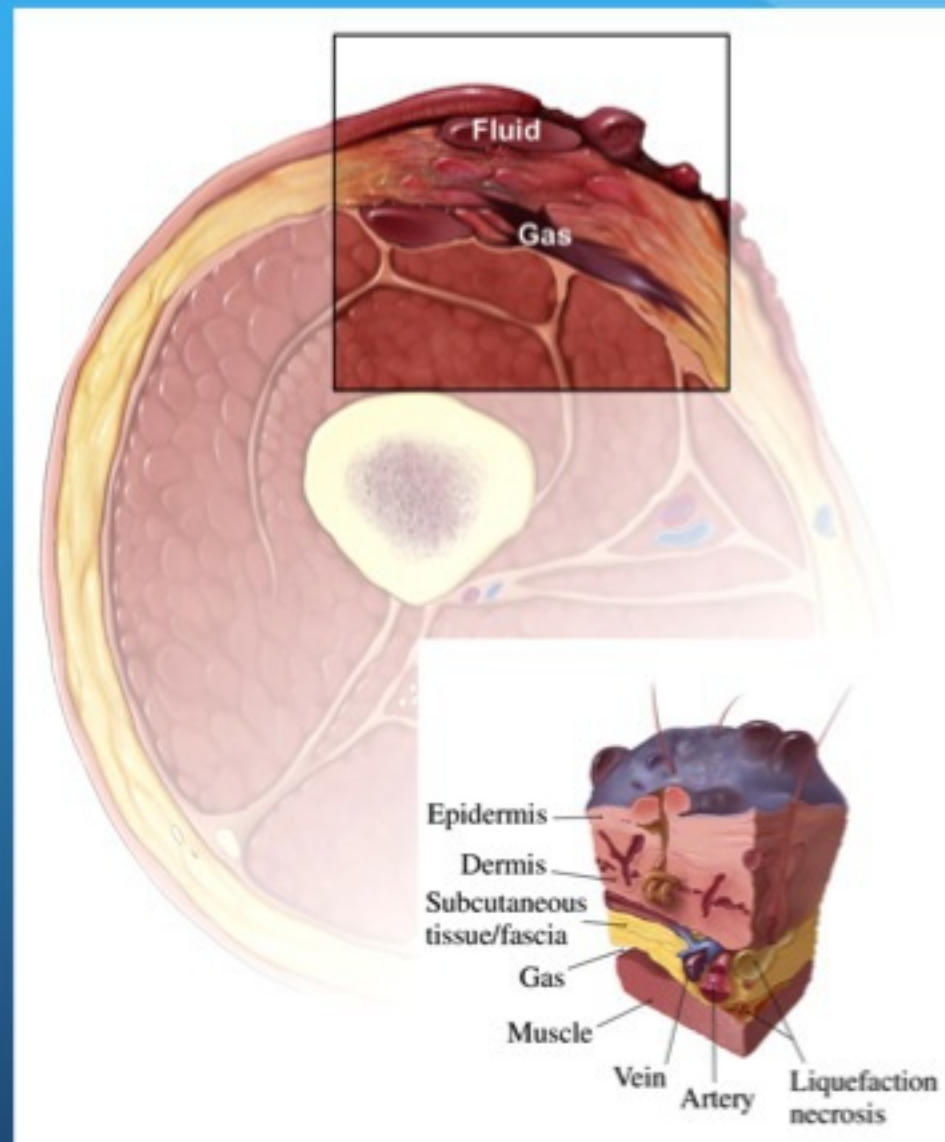
Figure 1. Drawings illustrate the normal soft-tissue and bone compartments that may be affected by musculoskeletal infection.



Fayad L M et al. Radiographics 2007;27:1723-1736

RadioGraphics

Figure 5. Necrotizing fasciitis.



Fayad L M et al. Radiographics 2007;27:1723-1736

RadioGraphics

How can radiology help?

- Is there gas present to indicate necrotising fasciitis?
- Where is the infection/what compartments?
- Is there a collection?

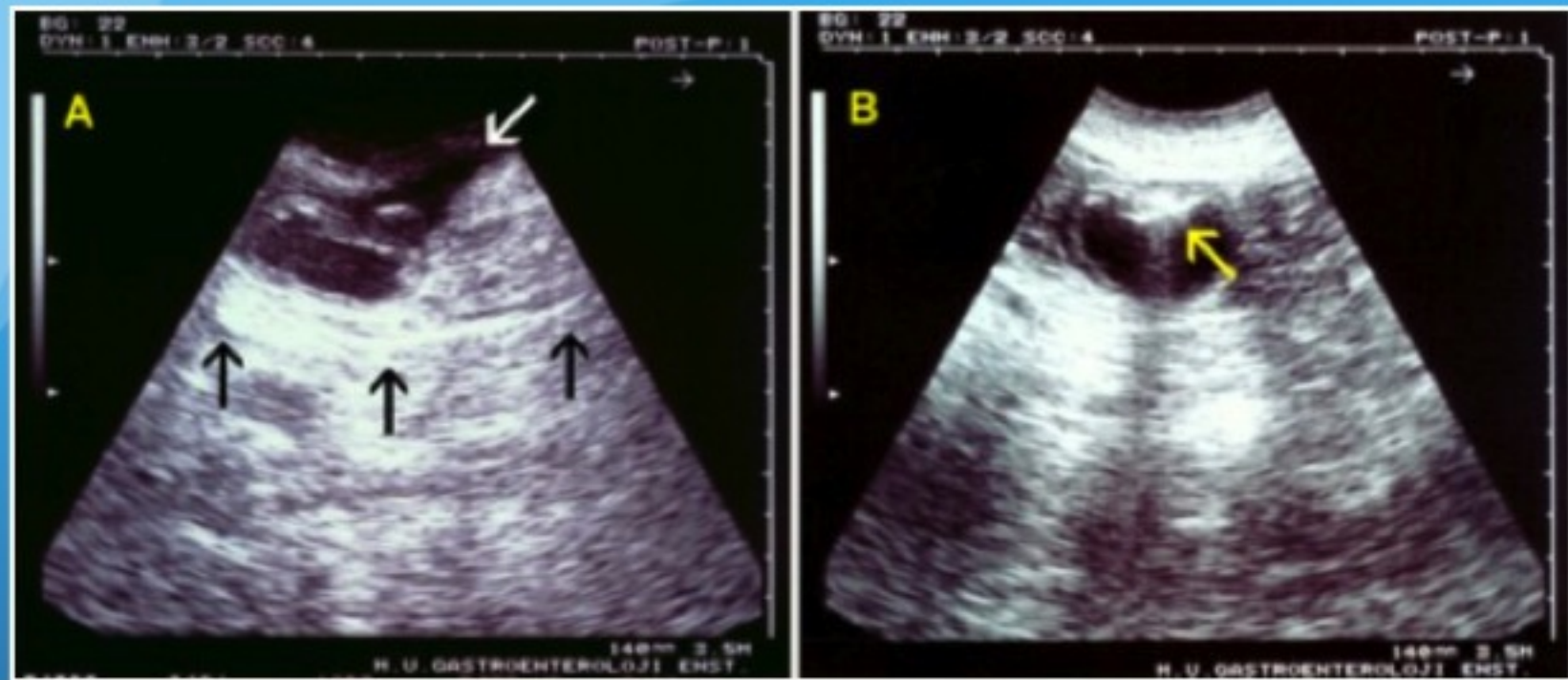
- OR NOT HELP:
- -BEWARE A DELAY-
- PROMPT and AGGRESSIVE treatment is required.

Diagnostic studies

- Radiology is part of the work up: labs, FNA, finger test/rapid frozen section biopsy...
- Appropriate radiological studies may allow early diagnosis and permit localisation of the infection.
- Radiographs
- Ultrasound
- CT -Computed Tomography
- MR -Magnetic Resonance Imaging

PLAIN RADIOGRAPHS

- Radiographs are of no value in the diagnosis of necrotising infections.
- They often cause delay.
- VERY LOW YEILD



ULTRASOUND

Has been shown to be useful/correlate with histology; but no major data available and it is not generally used for diagnosis (cadaver study 2011: 100% sensitivity for presence and amount of subcut air)

Role is currently assessment of FLUID COLLECTIONS and GUIDING ASPIRATION for drainage or diagnosis/culture

COMPUTED TOMOGRAPHY

- A rapid, available, useful test
- Accurately localise extent of infection/inflammation
- Most accurate for detecting gas in soft tissue
- (radiation; iv contrast - nephrotoxic)



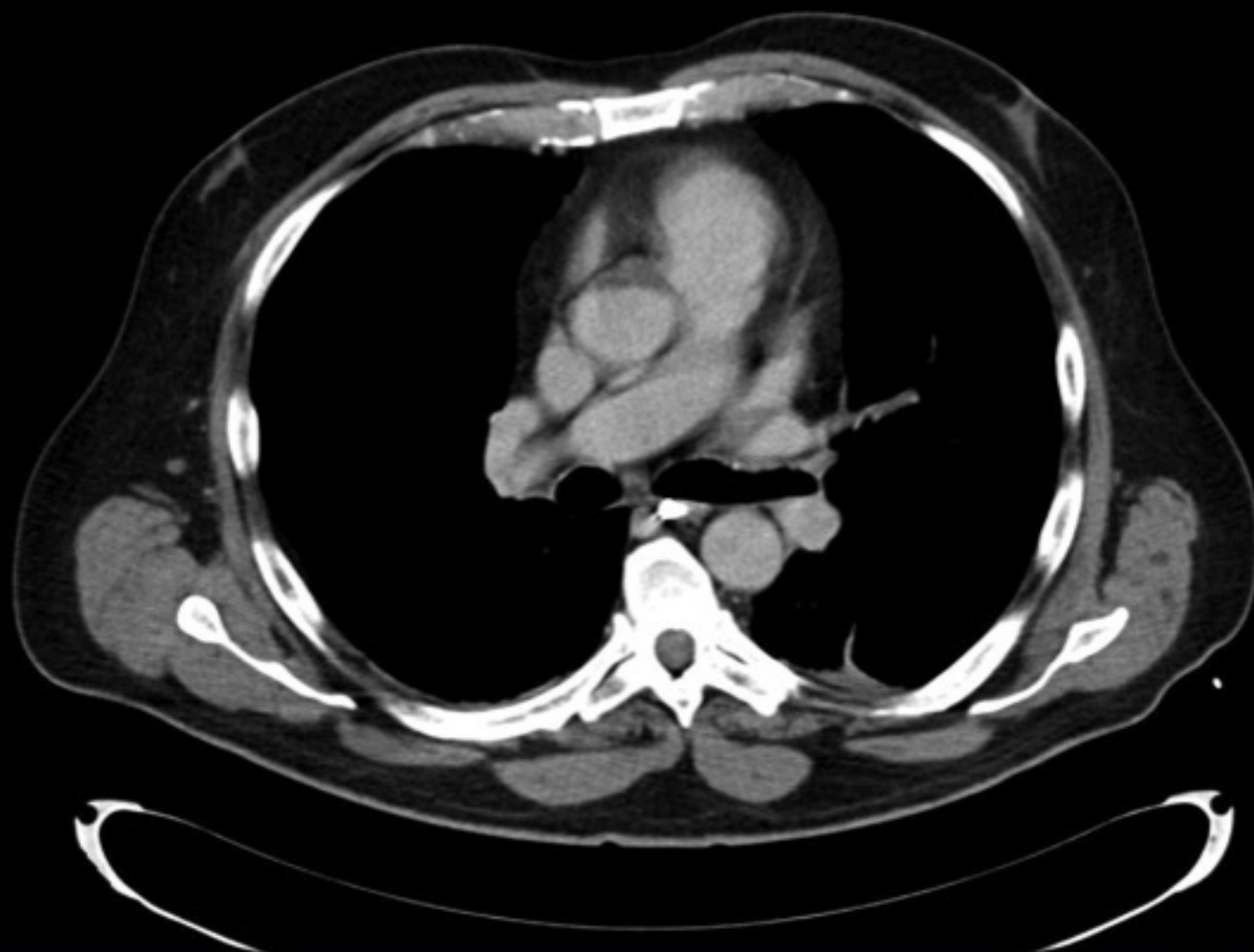
COMPUTED TOMOGRAPHY

- The imaging findings in necrotising fasciitis are similar to those in cellulitis but are more severe and show involvement of deeper structures.
- One specific distinguishing sign of necrotizing fasciitis is the *presence of gas* in the subcutaneous tissues caused by gas-forming anaerobic organisms, although gas is not observed in all cases (55% Radiology '97)

CT FINDINGS:

- thickening of the affected fascia, fluid collections along the deep fascial sheaths, and extension of edema into the inter-muscular septa and the muscles
- Contrast-enhanced CT: no demonstrable enhancement of the fascia
 - a finding that confirms the presence of necrosis and helps distinguish non-necrotising fasciitis from necrotising fasciitis.

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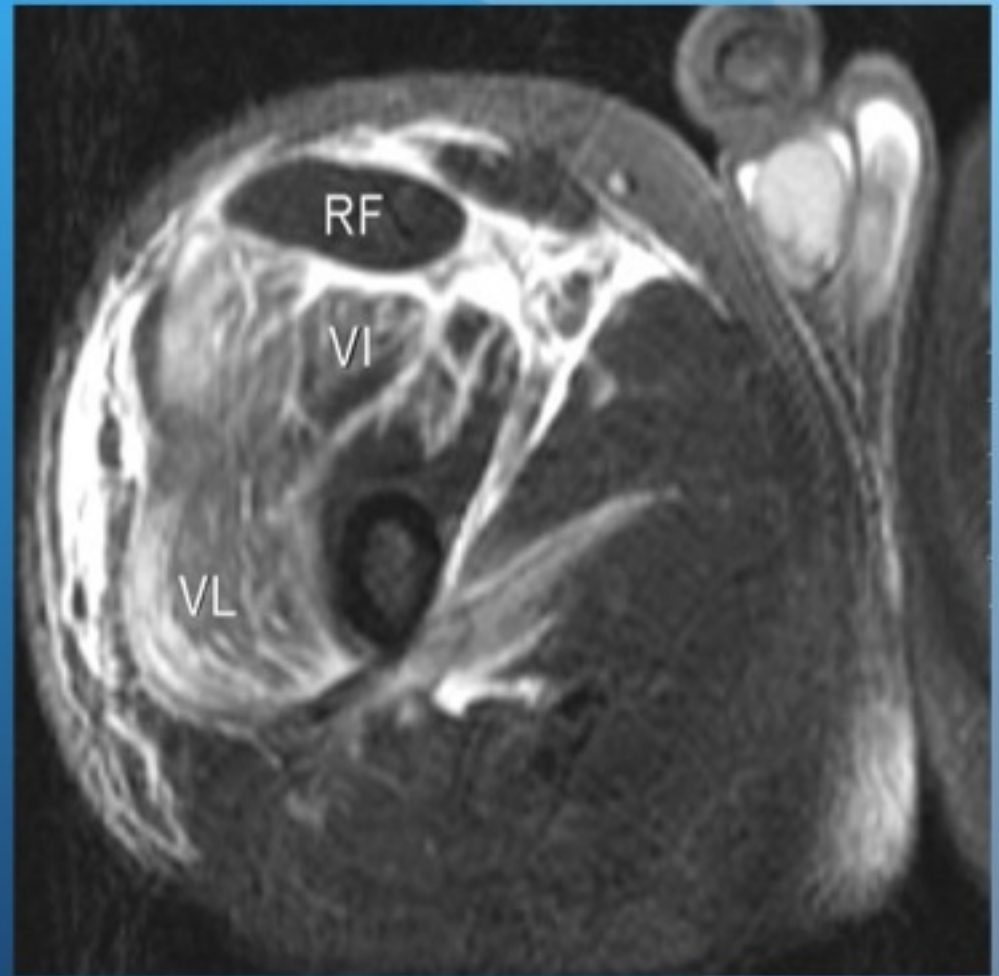
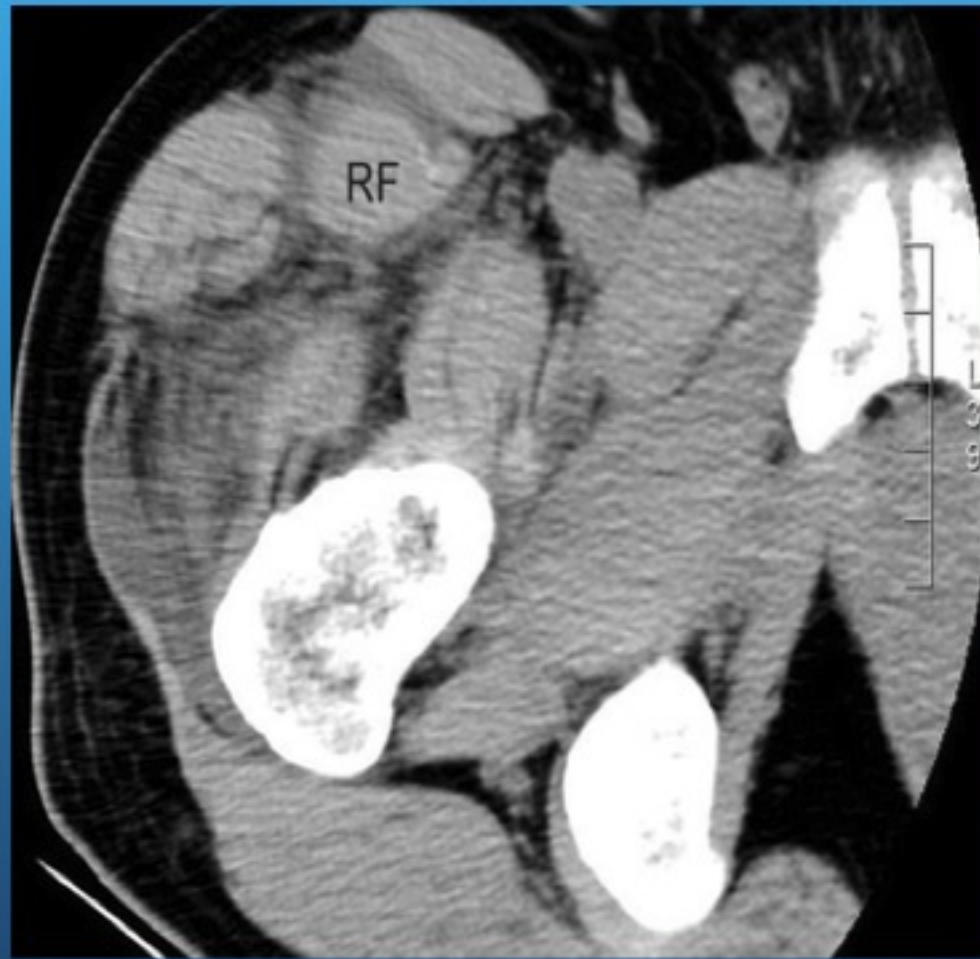


W 350 : L 40

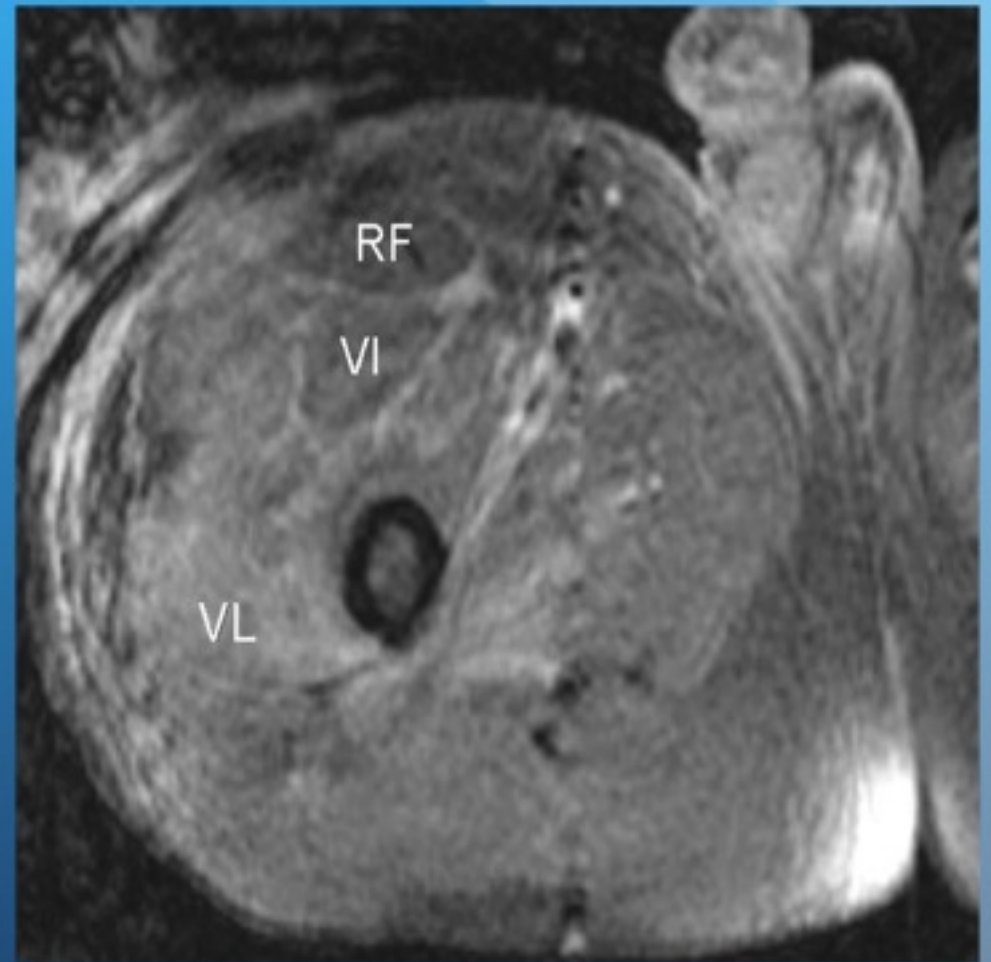
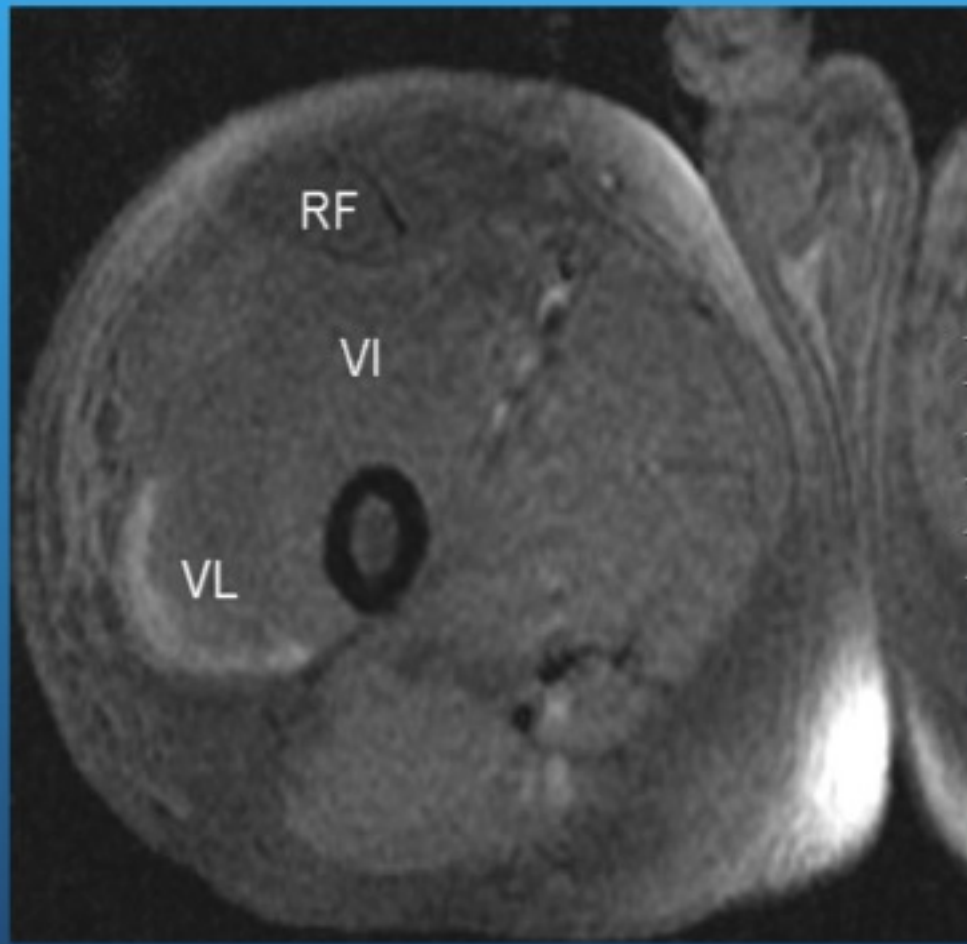
MAGNETIC RESONANCE IMAGING:

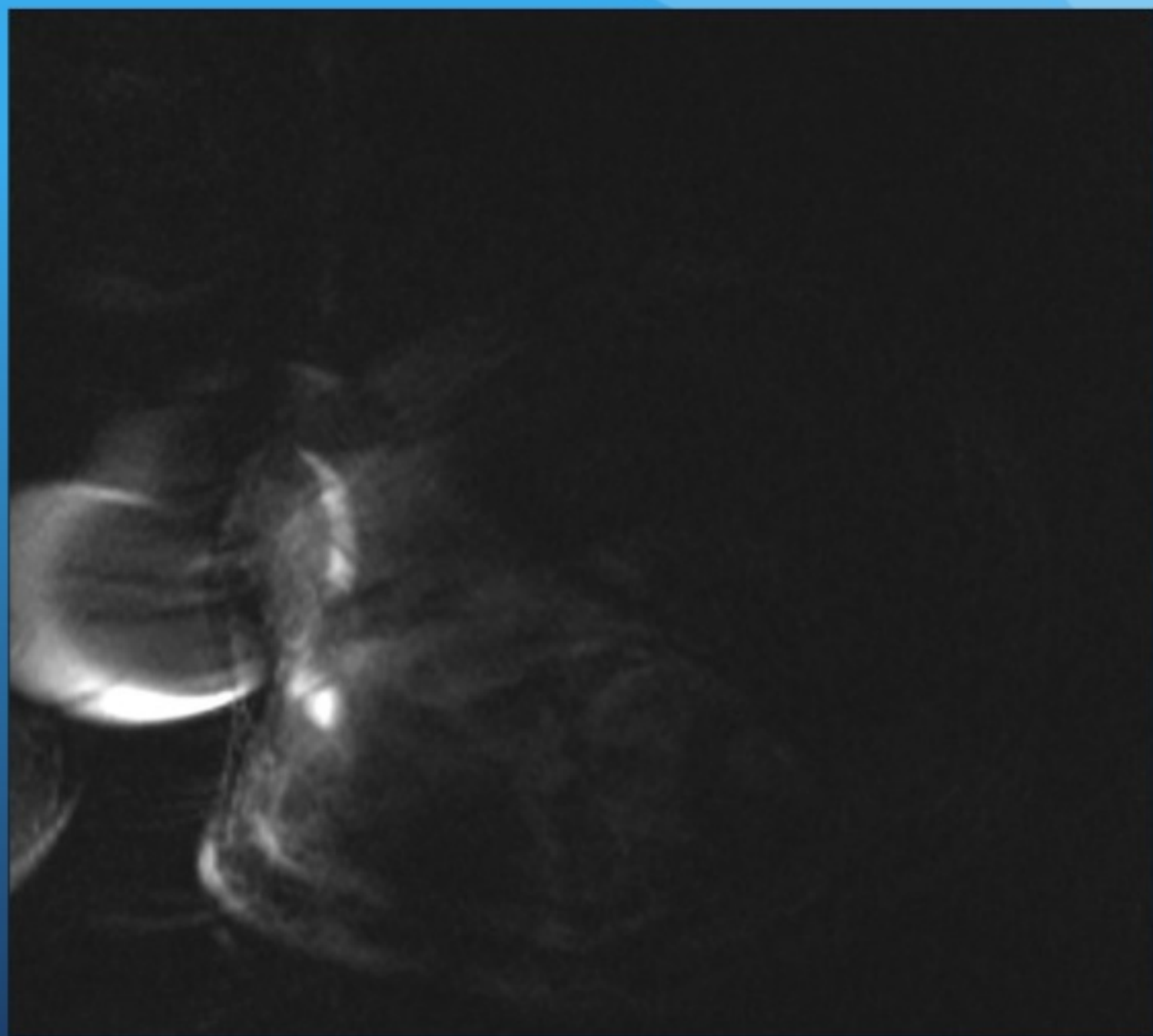
- MRI is the preferred technique to detect soft tissue infection because of its unsurpassed soft tissue contrast and sensitivity in detecting soft tissue fluid.
- It is NOT as sensitive for the presence of air as CT
- Contrast enhancement assessment of fascial planes
- (contrast - risk NSF - no ionising radiation)
- (Pacemaker present: cannot have MRI)

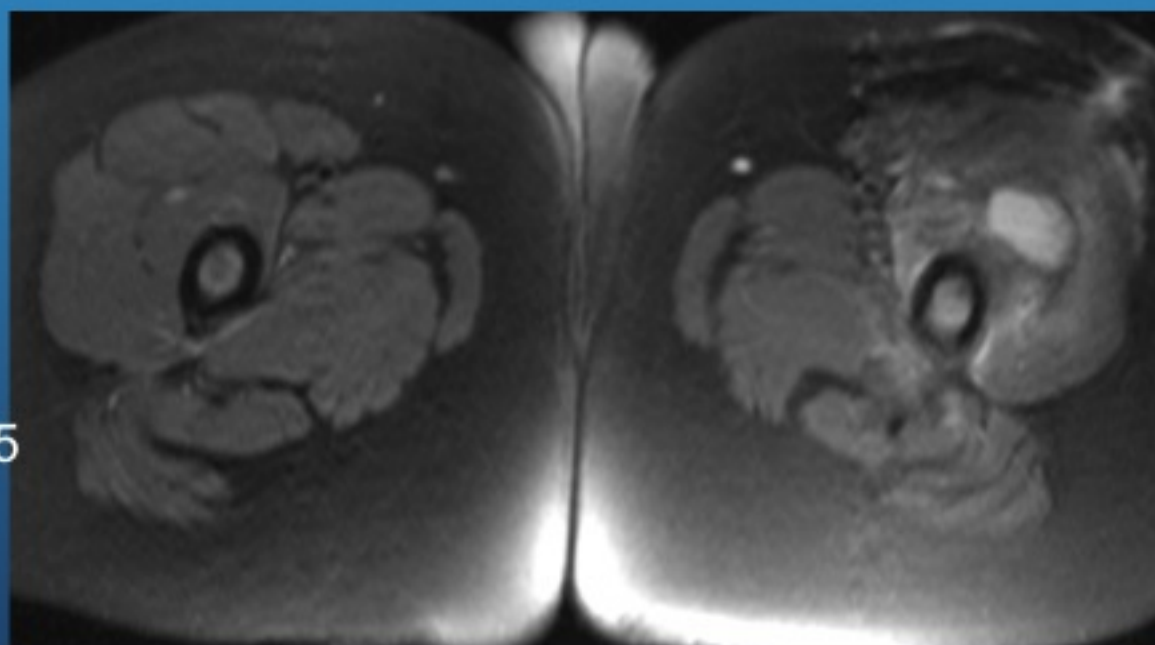
CT and MRI - Axial right groin/leg



MRI - Axial T1 pre and post Gadolinium







H H 09.10.2005

- Images courtesy of Dr. Clinton Pinto

Conclusion - take home points:

- CT/MR are both extremely helpful for
 - diagnosis ?gas
 - localisation
 - extent
- Initial presentation: SPEED essential - do not let radiology issues delay surgery
- During the course of the illness (multiple debridements etc) CT, MRI, and US are invaluable for detection of collections/complications

Thanks for your attention😊

CT - Axial right groin



- Relatively “clean” fat
- Stranding and thickening of fascia around the muscles
- No gas evident
- Radiographics 2004