Calcific myonecrosis - a "do not touch" lesion

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Section: Musculoskeletal system
Area of Interest: Musculoskeletal bone Musculoskeletal soft tissue Musculoskeletal system
Procedure: Diagnostic procedure
Imaging Technique: Conventional radiography
Imaging Technique: CT
Imaging Technique: CT-Angiography
Imaging Technique: MR
Special Focus: Calcifications / Calculi Trauma Blood
Case Type: Clinical Cases
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Patient: 64 years, male

Clinical History:

A 64-year-old man was admitted after minor trauma to his right lower leg. He was found to have a large palpable swelling in his lower leg along with absent foot pulses. Further questioning revealed previous trauma 40 years ago, resulting in femoral shaft fracture and compartment syndrome of the lower leg.

Imaging Findings:

Radiographs revealed a large soft tissue mass in the anterolateral compartment of the right lower leg with peripheral calcification with erosive changes of the adjacent fibula (Fig. 1).

Computed Tomography angiogram (CTA) was performed to assess the lower limb vasculature. This revealed a large soft tissue mass with peripheral calcification and erosion of the lateral cortex of the fibula (Fig. 2). Intralesional areas of high attenuation (Fig. 3) involving the anterolateral compartment with numerous collaterals were noted (Fig. 4). The popliteal artery and run-off vessels were patent.

As the erosive changes of the fibula were not typical of a non-aggressive lesion (smooth scalloping) a Magnetic Resonance (MR) examination was advised to characterise the mass further.

MR demonstrated a non-enhancing mass (Fig. 5) with nodular areas of low T1/T2 signal, cystic/solid components and fluid-fluid levels in keeping with acute and chronic bleeding (Fig 6 and 7). Bone marrow signal was normal.

The diagnosis was made with the combined information of CT & MR. The patient deteriorated due to increased intralesional haemorrhage and sepsis. Subsequently amputation was performed, confirming the diagnosis.

Discussion:

Calcific myonecrosis (CM), initially described in 1960 [1], is a rare latent condition as a consequence of compartment syndrome [2], ischaemia and fibrosis [3]. There is usually a history of remote trauma ranging from 10-64 years. The infarct is ellipsoid with its main axis parallel to the long axis of the limb [1]. Repeated intralesional
haemorrhage can occur resulting in increasing size of the mass and dystrophic calcification. CM commonly occurs in the anterolateral compartment of the lower leg, but occurrence in the forearm [5, 6] and foot [7, 8] has also been reported. CM usually occurs unilaterally, but two publications report bilateral CM [4, 9].

History of trauma may be difficult to elicit and so radiology is vital in diagnosing CM. Plain radiographs demonstrate a fusiform mass with peripheral plaque/sheet-like calcification. Ultrasound demonstrates irregular or linear echoes with posterior acoustic shadowing [10]. On CT images the fusiform mass has a rim-like calcification with central heterogeneous fluid attenuation, secondary to haemorrhage. There is usually smooth cortical scalloping in keeping with the chronic nature of the lesion, but at times this process can appear destructive mimicking an aggressive process as in our case. Although not necessary, MR can be used to confirm the diagnosis. This can demonstrate thick and nodular or frond-like low signal peripheral rim on T1/T2 weighted sequences, corresponding to the peripheral calcification [11]. The central portion of the mass demonstrates a heterogeneous signal on T1 and T2 weighted sequences as a result of varying age of haemorrhage. Nuclear medicine is non-specific and of limited use [10].

Differentials include malignant lesions such as soft tissue sarcoma (STS), myositis ossificans and posttraumatic pseudoaneurysm. CM can often be distinguished from STSs because of its lack of contrast enhancement and perilesional oedema [2], although there has been one case of enhancing CM [12].

Previously, surgical intervention was advocated, but conservative management is more appropriate as there is high risk of complications, including conversion of sterile necrotic tissue into an abscess, excessive bleeding or fistula formation [3]. It was emphasised not to perform biopsy as this may lead to devastating haemorrhage. Intervention should be considered only when necessary, e.g. in patients with uncontrolled pain. History of trauma may not be elicited, however, classical radiological features should help avoid unnecessary tests and misdiagnosis.

In conclusion, radiology is crucial to the diagnosis of CM preventing a potentially dangerous biopsy or unnecessary intervention. Hence, CM has been classed as a “do not touch lesion”.

**Differential Diagnosis List:** Calcific myonecrosis, Soft tissue osteosarcoma, Synovial sacroma, Myositis ossificans, Post-traumatic pseudoaneurysm

**Final Diagnosis:** Calcific myonecrosis

**References:**


**Figure 1**

Description: AP radiograph demonstrates soft tissue mass with rim calcification with erosive changes of the fibula (red arrows). **Origin:** Shah A, Department of Radiology, University hospitals of Leicester, UK.
Description: Axial CT on soft tissue windows, demonstrating a large soft tissue mass with peripheral calcification and erosive changes of the adjacent fibula. Intralional areas of high attenuation (arrows) represent haemorrhage. Origin: Shah A, Department of Radiology, University Hospitals of Leicester
Description: CT 3D reconstructions demonstrating a large soft tissue mass in the anterolateral aspect of the lower leg. There is marked peripheral calcification with erosive changes of the adjacent fibula.

Origin: Shah A, Department of Radiology, University Hospitals of Leicester, UK.
Description: CT 3D reconstruction demonstrating collaterals feeding vessels supplying the large soft tissue mass demonstrating how vascular calcific myonecrosis is. Origin: Shah A, Department of Radiology, University Hospitals of Leicester, UK.
Description: T1 axial and coronal demonstrating mixed signal intensities in keeping with mixed acute/chronic blood with peripheral frond-like thick wall. Fibula scalloping seen (arrows). Origin: Shah A, Department of Radiology, University Hospitals of Leicester, UK.
Description: Axial T2 demonstrating fluid-fluid levels in keeping with layering of blood and solid/cystic areas with peripheral low signal indicating calcification and layering of blood. 

Origin: Shah A, Department of Radiology, University Hospitals of Leicester, UK.
Description: Axial T1 fat-saturated pre-contrast (A) and corresponding post-contrast (B) images demonstrating no significant enhancement post-contrast. Fluid-fluid levels with frond-like low signal intensities were noted, in keeping with differently aged blood products. Origin: Shah A, Department of Radiology, University Hospitals of Leicester, UK.
Figure 8

**Description:** (A) axial and (B) coronal T1 fat-saturated images of the lower leg demonstrating no significant enhancement post-contrast. **Origin:** Shah A, Department of Radiology, University Hospitals of Leicester, UK.