Case 14631

Eurorad

Pyomyositis in a child

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Section: Musculoskeletal system
Area of Interest: Musculoskeletal soft tissue
Procedure: Education
Imaging Technique: Conventional radiography
Imaging Technique: Ultrasound
Imaging Technique: MR
Special Focus: Infection Case Type: Clinical Cases
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Patient: 7 years, male

Clinical History:

A 7-year-old male patient presented to the emergency department with a history of sore throat and pain and swelling affecting the left leg, with no history of trauma. On physical examination the patient was feverish (39ºC), had swelling of the affected leg and the tonsils, which showed exudates on them.
Imaging Findings:

Frontal and lateral view radiographies of the left leg were normal (Fig. 1).
Ultrasound revealed enlargement and heterogeneity of the solear muscle contacting the peroneal diaphysis. There were no obvious collections suggesting haematomas or abscesses (Fig. 2).
MRI performed two days later showed high signal intensity on T2WI involving the posterior tibial and flexor hallucis longus muscles and the deeper fibres of the solear muscle (Fig. 3). After gadolinium injection, a poorly defined central area with low signal intensity surrounded by a hyperenhancing rim was depicted, suggesting the presence of an associated abscess. There was also medullary bone oedema, but no cortical disruption or periosteal reaction were seen (Fig. 4).
MRI after 3 months of antibiotherapy revealed disappearance of the abscess and marked decrease of the oedema involving the referred muscles and the peroneal bone marrow (Fig. 5).
Punction of the abcess wasn't performed because the clinical condition was typical and there was good response to antibiotherapy.
Discussion:

Pyomyositis is a primary bacterial infection of skeletal muscles. It used to be considered a tropical disease but now it can be found in temperate climates, mainly because of the emergence of HIV infection. Risk factors for pyomyositis include rhabdomyolisis, muscle trauma, overlying cellulitis, infected insect bites, injection of illicit drugs, diabetes mellitus and bacteraemia from other sources (such as bacterial tonsillitis, which, in our case, was the probable source). Staphylococcus aureus is the most common pathogen in both tropical and temperate climates, and is responsible for 90% of the infections [1].
Primary pyomyositis can involve any muscle group in the body. Large muscles of the lower extremities are commonly affected, with the quadriceps muscle followed by the gluteal and iliopsoas muscles being the most common sites of infection [1].
Pyomyositis has three distinct stages, which represent a gradual progression from diffuse inflammation to focal abscess formation and to a septic state. Stage 1 involves the insidious onset of diffuse pain that progresses to

erythema, swelling, and oedema of the affected muscle over a 1-2-week course (invasive stage). Stage 2 involves progressive induration, pain, and enlargement of the mass over a 2-3 week period (purulent stage), and stage 3 involves intensifying pain, suppuration, and muscle involvement with possible extension into an adjacent bone or joint eventually progressing to septicaemia, shock, and death [2].
Since delay in accurate diagnosis is frequent and clinical deterioration can be precipitous, early imaging is essential to detect, localize, and define the disease extent.
Depending on the stage of the disease, ultrasound can initially show a localized area of muscle oedema and later, in the course of the disease, an intramuscular fluid collection corresponding to a formed abscess [1].
MRI is the most useful imaging technique for the diagnosis of pyomyositis, as it clearly demonstrates diffuse muscle inflammation, with high signal intensity of the affected muscle(s) on T2FS and an hyperintense rim on T1 weighted images, and any subsequent abscess formation, which shows high signal intensity on T2, low signal intensity on T1 and peripheral contrast enhancement after gadolinium administration. There may also be diffuse muscle enlargement [3].
The choice of treatment for pyomyositis depends on the stage at presentation. During the early stage of the infection, the diffuse inflammatory changes can be effectively treated with antibiotics alone. However, if an abscess has formed, appropriate drainage before the initiation of antibiotic therapy is required and can be guided by ultrasound [2].
Differential Diagnosis List: Pyomyositis, Sarcoma, Osteomyelitis, Auto-imunne myositis

Final Diagnosis: Pyomyositis

References:

Bureau, N.J. et al (1999) Musculoskeletal Infections: US Manifestations. Radiographics (PMID:10555676)
Gordon, B.A. et al (1995) Pyomyositis: characteristics at CT and MR imaging. Radiology (PMID:7568838)
Schulze, M. et al (2009) MRI Findings in Inflammatory Muscle Diseases and Their Noninflammatory Mimics. American Journal of Roentgenology (PMID: 7568838)

Figure 1

a

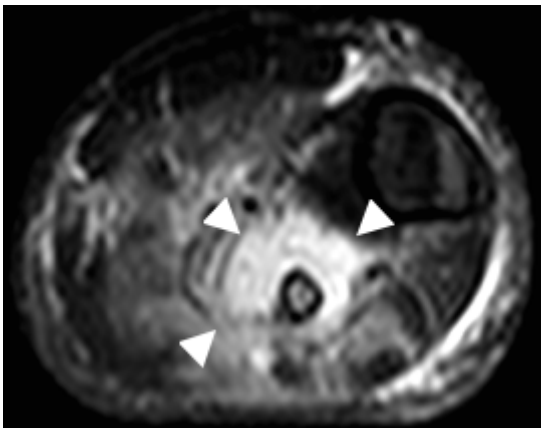
Description: AP (A) and lateral (B) radiographs of the left leg don't show any abnormality. **Origin:** Radiology Department Braga Hospital

Figure 2

a

Description: Sagittal T2-WI MRI revealing a hyperintense mass around the peroneal bone (arrowheads). Note the diffuse high signal intensity of the tissues surrounding the collection. **Origin:** Radiology Department Braga Hospital

b



Description: Axial T2-SPIR confirms the presence of a fluid collection involving the flexor hallucis longus, tibial posterior and solear muscles (arrowheads). Note the hyperintensity of the surrounding muscles due to reactive oedema. **Origin:** Radiology Department Braga Hospital

Figure 3

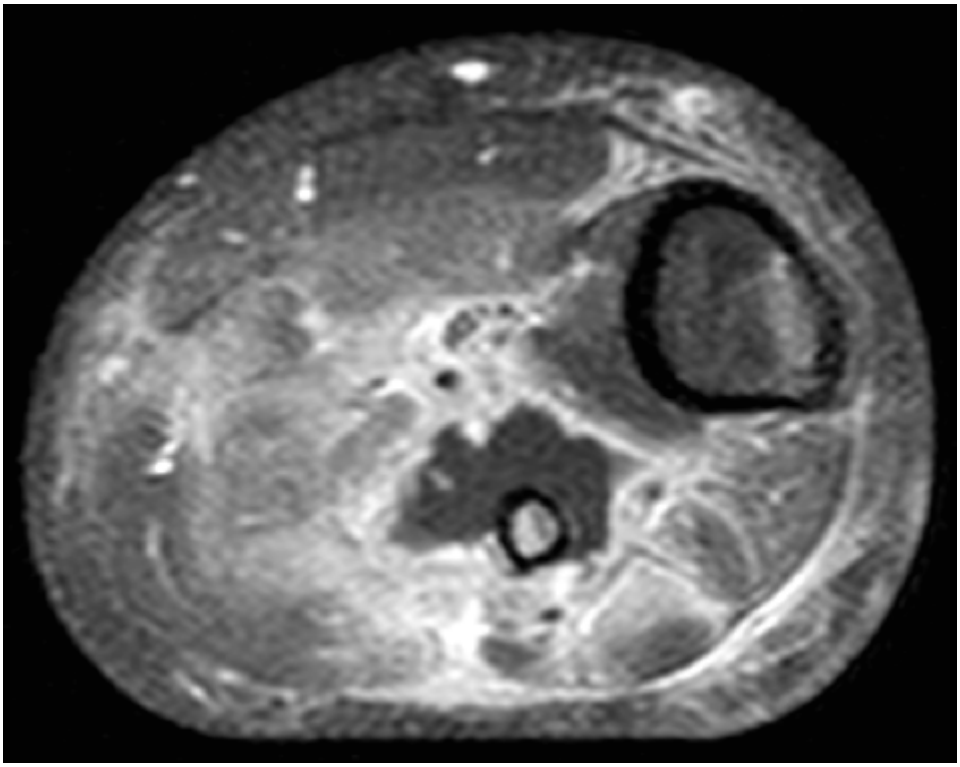
a

Description: Sagittal (4a), coronal (4b) and axial (4c) T1FS post-gadolinium demonstrates a central hypointensity surrounded by a hyperenhancing rim, confirming the presence of an abscess. **Origin:** Radiology Department; Braga Hospital

b

Description: Coronal T1FS post-gadolinium showing the thick enhancing walls of the abscess. There is also subcutaneous, fascial, and muscular inflammation, as well as osseus enhancement concerning the fibula. **Origin:** Radiology Department; Braga Hospital

c



Description: Axial T1FS post-gadolinium showing the deep relation of the abcess with the fibula as well as the surrounding muscle enhancement due to inflammation. **Origin:** Radiology Department; Braga Hospital

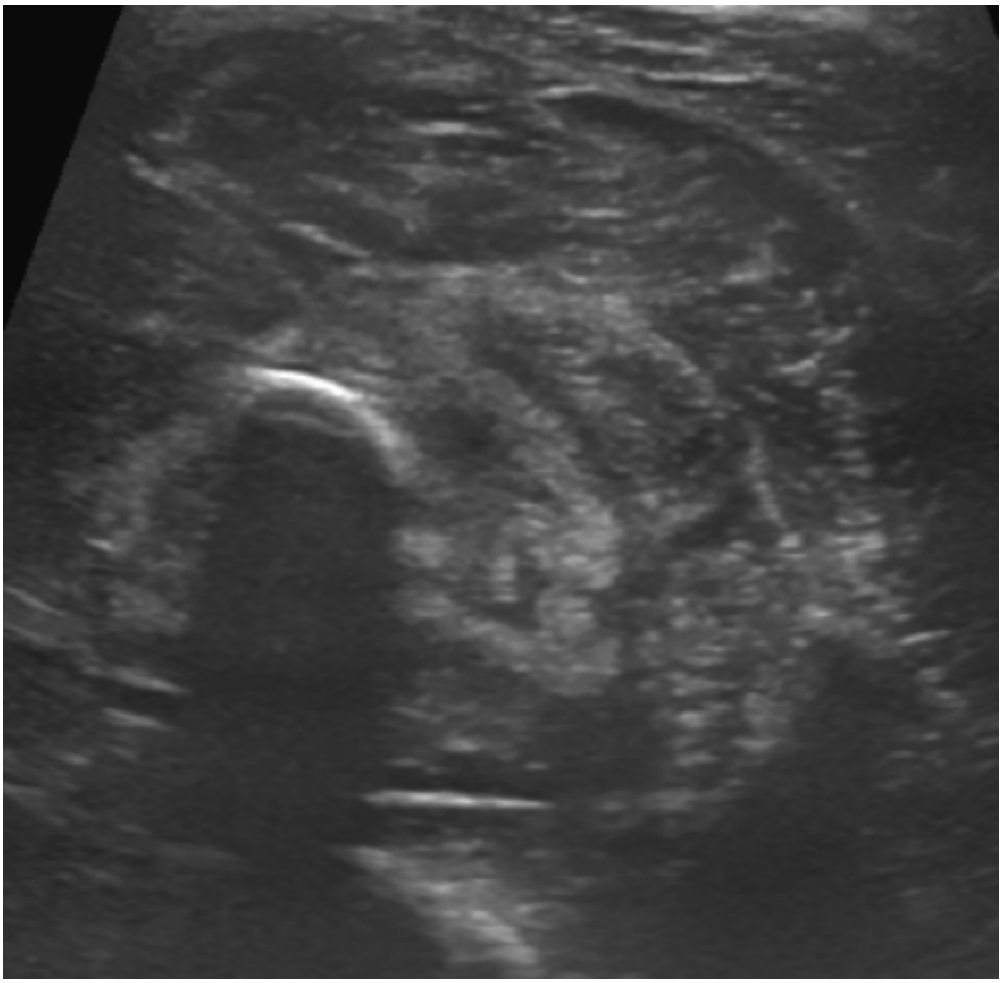
Figure 4

a

Description: PD-SPAIR MRI after 3 months of antibiotherapy reveals disappearance of the abscess and marked decrease of the oedema involving the referred muscles, showing only slight remaining oedema in the proximal fibula (arrow). **Origin:** Radiology Department; Braga Hospital

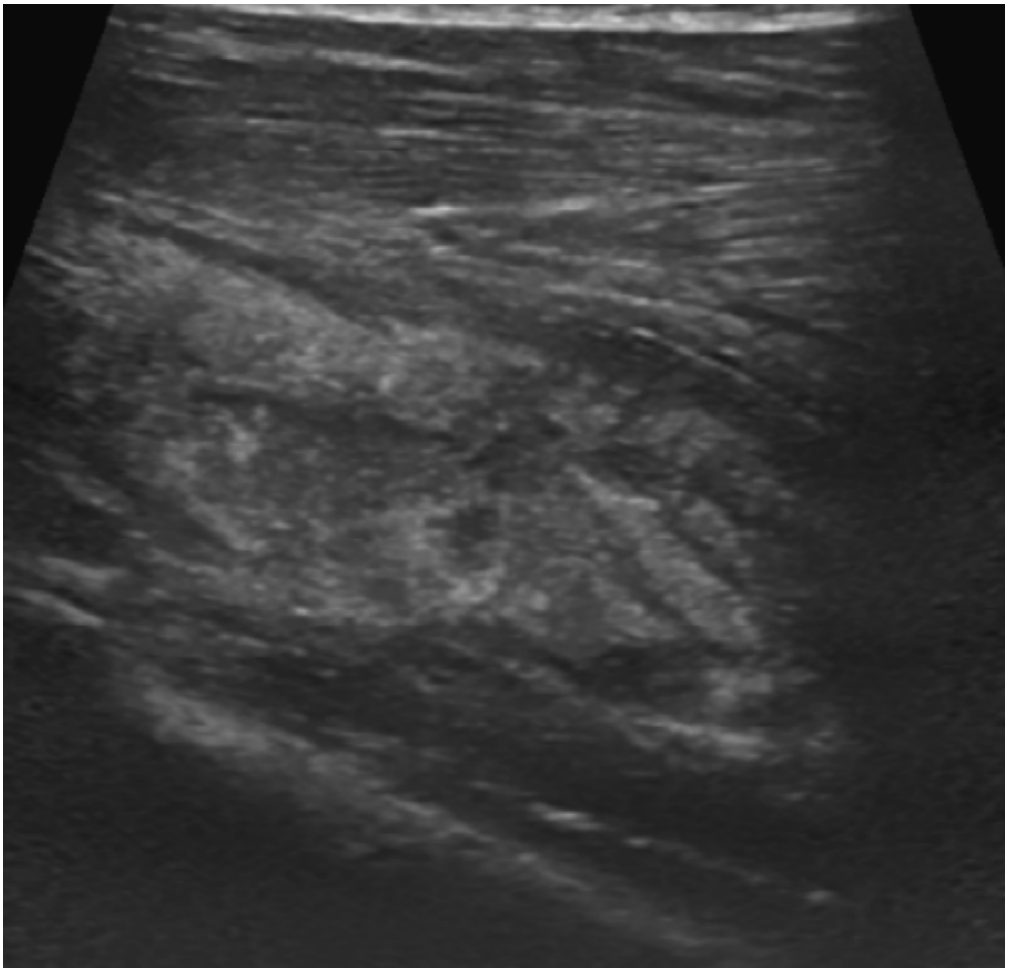
Figure 5

a



Description: Ultrasound (a, b) revealed enlargement and heterogeneity of the deeper muscles which are in contact with the peroneal diaphysis. There were no obvious collections suggesting haematomas or abscesses. **Origin:** Radiology Department; Braga Hospital

b



Description: Ultrasound (a, b) revealed enlargement and heterogeneity of the solear muscle contacting the peroneal diaphysis. There were no obvious collections suggesting haematomas or abscesses.
Origin: Radiology Department; Braga Hospital