Case 14915

Myositis ossificans of the thigh with CT, MRI, and US findings in a paediatric patient
Published on 16.08.2017

DOI: 10.1594/EURORAD/CASE.14915
ISSN: 1563-4086
Section: Paediatric radiology
Area of Interest: Musculoskeletal soft tissue
Procedure: Diagnostic procedure
Imaging Technique: CT
Special Focus: Calcifications / Calculi Case Type:
Clinical Cases
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Patient: 11 years, female

Clinical History:

An 11-year-old girl was admitted with increasing pain, stiffness, and limited motion of left knee for one week, following a fall from a trampoline. Physical examination demonstrated locally increased warmness and hardness of posterior inferior thigh on palpation. Her body temperature was within normal limits.

Imaging Findings:

WBC was normal (9740 x 10³/mm³) while CRP (29, 3 mg/L) and sedimentation (39 mm/hr) levels were increased. X-ray was normal. Ultrasonography (US) revealed a heterogeneous, hypoechoic mass in the posterior left thigh measuring 34x31x30 mm. Doppler US showed no vascularisation. On magnetic resonance imaging (MRI), the lesion was within biceps femoris muscle, and hyperintense on T2- (Fig. 1) and isointense on T1-weighted (Fig. 2) sequences. It enhanced vividly (Fig. 3). The biceps femoris muscle was hyperintense on T2-weighted images spanwise length (Fig. 4). Re-evaluation with US (Fig. 5) and computed tomography (CT) (Fig. 6) at first week of admission revealed typical peripheral calcification for myositis ossificans (MO). The patient underwent physical therapy and oral naprosyn sodium, and was discharged following relief of symptoms. The patient was followed up with US after 1 month. The MO lesion was stable in size with peripheral calcification.

Discussion:

MO is heterotopic ossification in skeletal muscle with no definite aetiology. Some cases may be associated with trauma, however, more than 80% of cases have been reported to have no causative factors [1]. Children are rarely affected [2, 3]. It is usually detected within the large muscles of the extremities [2, 3]. Patients usually present with a lump, pain, and tenderness where the lesion is located. Erythema of the overlying skin may be present. Due to inflammatory response in early stages of MO, acute phase proteins may elevate. C reactive protein is reported to better correlate with the inflammatory activity of heterotopic ossification compared to
erythrocyte sedimentation rate [4].

In early stages (1-2 weeks), MO is revealed as a well-defined solid mass with MRI. It appears to be isointense on T1- and hyperintense on T2-weighted image compared to muscle. Following intravenous gadolinium-based contrast medium injection, it enhances vividly. In early stages, adjacent muscle may have increased signal on T2 compatible with oedema. Peripheral calcification detected > 2 weeks is pathognomonic of MO and CT has been reported to be superior to demonstrate compared to other imaging modalities [5]. During the maturation stage (up to 5-6 months), peripherally located calcification proceeds through central part of MO.

In the presence of a peripherally calcified mass within the skeletal muscles with/without a history of trauma, the diagnosis of MO is established. Differential diagnosis consists of pyomyositis, extraskeletal osteosarcoma, and soft tissue sarcomas. The T2 hyperintensity of the muscle (muscle oedema) adjacent to MO on MRI may raise the suspicion of pyomyositis radiologically. However, lack of systemic (e.g. fever) and laboratory (e.g. leukocytosis) findings of infection lead to the diagnosis of MO [6]. In early stages of MO, MRI may be confusing and mimic soft tissue sarcomas. When peripheral calcification appears, other soft tissue sarcomas including osteosarcoma (central calcification is expected) may be ruled out.

As MO is self-limiting and may resolve completely in time, the management is conservative, including application of ice and resting in early stages and physiotherapy with passive stretching and strengthening.

Radiological methods, particularly CT, are invaluable in making the accurate diagnosis of MO. Although rarely encountered in paediatric age group, paediatric radiologists should be familiar with the imaging findings of MO to establish the diagnosis without necessity of biopsy.

Differential Diagnosis List: Myositis ossificans of the thigh, Pyomyositis, Soft tissue sarcoma, Extraskeletal osteosarcoma

Final Diagnosis: Myositis ossificans of the thigh

References:


Description: On T2-weighted fat saturated axial MR image, the myositis ossificans lesion is seen hyperintense compared to muscle. Note that the adjacent muscle is also hyperintense (asterix) compatible with strain. Origin: Koc G, Department of Pediatric Radiology, Emel-Mehmet Tarman Children’s Hospital, Kayseri, Turkey
**Description:** Myositis ossificans is isointense compared to muscle on T1-weighted MR image. **Origin:**
Koc G, Department of Pediatric Radiology, Emel-Mehmet Tarman Children's Hospital, Kayseri, Turkey
Figure 3

**Description:** Following gadolinium-based contrast medium administration, the lesion enhances vividly on coronal T1-weighted MR image. **Origin:** Koc G, Department of Pediatric Radiology, Emel-Mehmet Tarman Children's Hospital, Kayseri, Turkey
Description: On sagittal fat - aturated T2-weighted image biceps femoris muscle is hyperintense (arrows) compatible with strain. Myositis ossificans lesion is located at posterior of thigh (asterisk).
Origin: Koc G, Department of Pediatric Radiology, Emel-Mehmet Tarman Children's Hospital, Kayseri, Turkey
Description: Ultrasonography obtained with linear transducer (10 MHz) reveals myositis ossificans as peripherally calcified solid mass lesion. Origin: Koc G, Department of Pediatric Radiology, Emel-Mehmet Tarman Children's Hospital, Kayseri, Turkey
Description: On axial CT image, peripheral calcification of myositis ossificans is shown. Origin: Koc G, Department of Pediatric Radiology, Emel-Mehmet Tarman Children's Hospital, Kayseri, Turkey