Pediatr Radiol (1999) 29: 135–137

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Calcified leiomyoma of deep soft tissue in a child

Received: 29 September 1997
Accepted: 15 June 1998

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Abstract We report the case of a 7-year-old boy with a calcified leiomyoma in the right gluteal muscle. Radiography and CT showed a well-defined soft tissue mass with mulberry-like calcifications that superficially resembled chondroid matrix calcification. The mass exhibited high-signal intensity intermingled with spotty low-signal intensity on T2-weighted MRI which was attributable to extensive non-malignant degeneration of the tumour.

Introduction

Leiomyoma is a benign tumour commonly encountered in the genitourinary and gastrointestinal organs in adults but seldom encountered in deep soft tissue in any age group, particularly children [1]. Intratumoral calcification of a leiomyoma is common in adults but is uncommon in children [2, 3]. We describe a 7-year-old boy with a calcified soft tissue leiomyoma which was evaluated with MRI. Although several cases of soft tissue leiomyoma have been reported, MR findings have not been sufficiently documented [4].

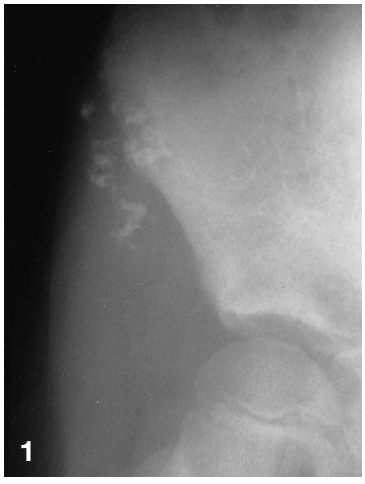
Case report

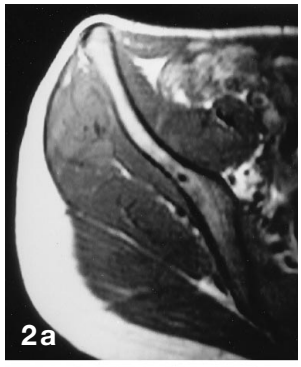
A 7-year-old boy presented with a 3-year history of a painful right buttock; the pain had increased in severity and frequency over the previous 6 months. He had engaged in athletic activities, including running, soccer and baseball, almost every day. Physical examination demonstrated a slight soft tissue bulge with tenderness in the right buttock. He complained of pain in the groin with extension and abduction of the hip, but there was full range of movement. The radiograph of the pelvis (Fig. 1) showed mulberry-like calcifications in the right buttock without bony destruction. CT showed a well-circumscribed mass measuring $5 \times 3.5 \times 2.5$ cm, with tiny calcifications in the gluteal muscles. T1-weighted (T1-W) spin-echo (TR/TE, 500/15) MRI showed a well-circumscribed mass of intermediate signal intensity (Fig. 2). The mass showed high-signal intensity on T2-weighted (T2-W) spin-echo (TR/TE, 2000/80) images (Fig. 2a). Spotty low signal was evident on both sequences. Homogeneous contrast enhancement was noted on post-contrast T1-W images using gadopentetate dimeglumine (0.1 mmol/kg).

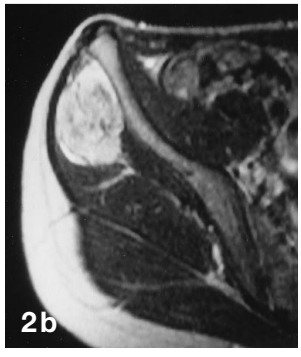
An open biopsy was performed, followed by marginal resection. The gross specimen was an encapsulated fibrous tumour measuring 4.2×2.0 cm and with many calcified foci. Histology of the surgical specimen showed proliferation of smooth muscle fibres, which were arranged in bundles and whorls. The tumour cells showed elongated, oblong fusiform nuclei and eosinophilic cytoplasm without nuclear pleomorphism, which is compatible with leiomyoma (Fig. 3). Non-malignant degenerative changes with calcification were scattered throughout the tumour.

Discussion

Leiomyoma is histologically characterised by the orderly pattern of intersecting fascicles of deeply acidophilic cells with blunt-ended nuclei, without significant cellular pleomorphism and mitotic activity. Mitotic activity







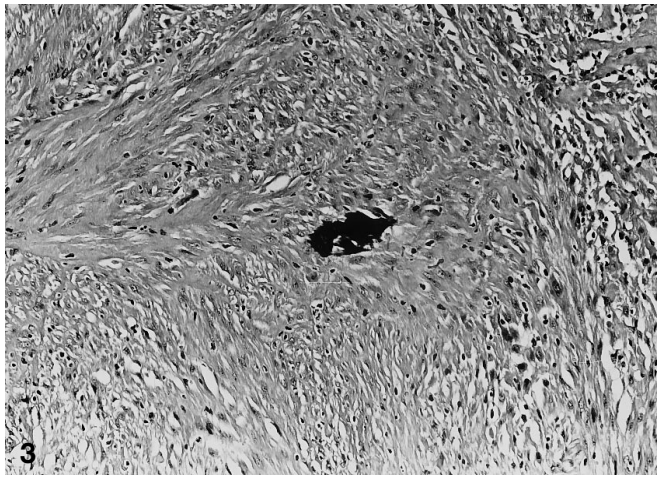


Fig. 1 Right anterior oblique radiograph of the pelvis shows mulberry-like calcifications in the right buttock. There is no bony destruction

Fig. 2 MRI of the pelvis. **a** Axial T1-W image shows a mass of intermediate signal intensity with multiple foci of very low signal intensity. **b** Axial T2-W image shows a high-intensity tumour with very low, focal signal changes

Fig. 3 Histology (H&E, × 40) of the pathologic specimen shows leiomyoma composed of bundles of well-differentiated smooth muscle cells, with elongated, oblong and fusiform nuclei and eosinophilic cytoplasm. Mitotic figures are rare

is the criterion relied on most heavily to differentiate benign from malignant varieties. These histological characteristics of leiomyoma do not differ among genitourinary, gastrointestinal or soft tissue sites, including deep soft tissue leiomyoma and its cutaneous counterpart. However, it is notable that deep soft tissue leiomyoma is more likely to undergo degenerative or regressive changes [1].

Calcifications in soft tissue leiomyomas are common in adults [1], but radiographically detectable calcifications in children younger than 16 years are extremely rare, with only three such cases having been reported [3, 5]. These calcifications result from non-malignant degenerative changes (e.g. fibrosis, calcification), and three patterns of calcifications (scattered small flecks or sand-like calcification, plaque-like calcification and large mulberry-like calcifications) on plain radiographs have been reported [3].

In this patient, a predominant feature of the lesion was the presence of intratumoral calcifications that superficially resembled those of cartilaginous matrices, which may lead to diagnoses such as tumoral calcinosis, myositis ossificans, extraskeletal chondroma, synovial sarcoma and calcifying neurilemmoma. However, most of these disorders are readily excluded from the radiological pattern of calcifications and/or tumour extension. Subcutaneous conglomerates of multiple rounded opacities, separated by radiolucent lines (fibrous septa) with distinct fluid levels in some of the nodules, is typical of tumoral calcinosis. Myositis ossificans exhibits a distinct mineralisation pattern which appears as a peripheral rim of lamellar bone. Multiple, small spotty calcifications occur in synovial sarcoma. The dystrophic calcifications of neurilemmoma may mimic those of our patient. However, the degenerative process usually ensues in large tumours of long duration. Extraskeletal chondroma has ring-like and arc-like calcifications similar to those in our patient. MRI may help to distinguish extraskeletal chondroma from other calcified tumours and from soft tissue leiomyoma, because chondrogenic tumours possess distinctive rim or arc-like enhancement.

MRI is considered superior to CT for delineating the extent of a soft tissue mass and defining its relationship to adjacent neurovascular structures. MRI, however, may fail to depict soft tissue calcification or gas, or may not differentiate them from other lesions of low signal intensity, such as haemosiderin. Therefore, it is essential to interpret MR images in conjunction with other imag-

ing studies, such as radiographs or CT, which is very sensitive to soft tissue calcifications and allows the characterisation of them.

The MRI appearance of leiomyoma in deep soft tissue has been described in only one previous case report [4]. The findings were similar to those in our patient, but no pathological correlation was provided. The tumour in our case exhibited low signal on T1-W images and high signal on T2-W images. This difference was attributed to extensive degenerative changes in the tumour rather than to the inherent nature of the leiomyoma because degenerated leiomyoma of the uterus is hyperintense on T2-W images. Ordinary leiomyoma is hypointense on T2-W images because of the hypercellularity of smooth muscle cells presenting as typical whorls with intervening collagen.

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