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CASE REPORT

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MR appearances in a case of femoral ecchinococcosis

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Abstract Magnetic resonance (MR) findings of a rare case of osseous echinococcosis with involvement of the femur are described. Attention is drawn to the typical MR appearances and therapeutic management.

Key words Femur echinococcosis · MRI, echinococcosis · Hydatid cyst surgery · Hydatid cyst, anticestodal

Introduction

Osseous echinococcosis accounts for 1–2% of all cases of hydatid disease [1, 2]. The initial diagnosis is often difficult and made peroperatively because of the uncommon occurrence of such a lesion. It mimics other more common bone diseases, both clinically and radiographically. This case report discusses the radiographic findings in a diagnosed case of femoral echinococcosis, with particular emphasis on the appearance and the role of magnetic resonance (MR) images.The unique orthopedic management is also discussed.

Case report

A 32-year-old man sustained a subtrochanteric fracture of the left femur following a slip and fall in October 1995. He was managed conservatively for 6 months, but the pain persisted and he was unable to bear weight. At a secondary referral centre a pathological fracture was suspected and he was investigated. As the aetiology could not be established, open reduction and K-nailing with bone grafting was done in March 1996. During surgery, multiple grape-like whitish cysts were found in the muscle planes and were also aspirated from the medullary canal. the patient was referred to our hospital in July 1996, 9 months after the injury, with persistence of the symptoms and a now established diagnosis of osseous echinococcosis. The K-nail was removed and a radiographic assessment was made.

The plain radiograph (Fig. 1) revealed a large diametaphyseal medullary lesion of the femur with widening of the medullary canal, osteolysis and cortical thinning. A nonunited pathological fracture with some callus formation was seen at the junction of the proximal and middle third of the bone. In addition a soft tissue mass was present medially. MRI confirmed all the plain film findings and demonstrated a large intramedullary lesion with expansion and replacement of the medullary canal and a pathological fracture. The entire diaphyseal medullary canal was hypointense on T1-weighted coronal and axial sequences (Figs. 2, 3) and markedly hyperintense on T2-weighted sequences (Fig. 4). There was at least one small round cystic structure identified within the middle third of the medullary canal, which had a relatively hyperintense thin wall and central low intensity on T1-weighted oblique coronal sequence (Fig. 2), and a hypointense wall with central

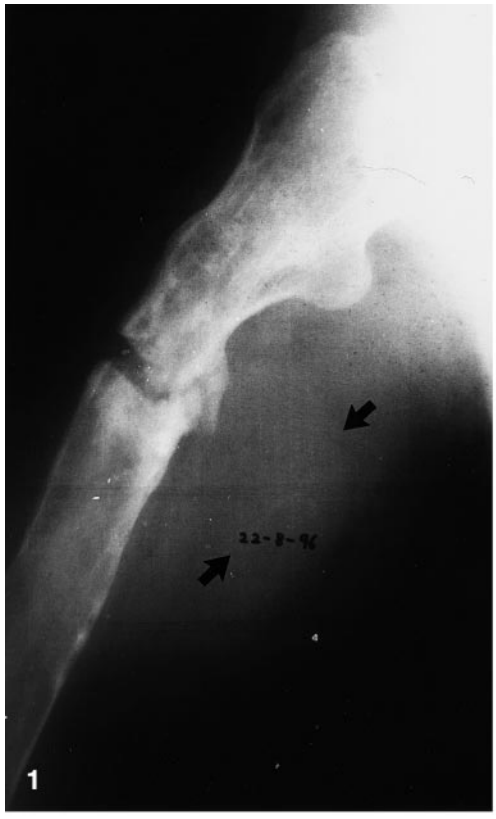

Fig. 1 Plain film of the upper left thigh shows a non-united pathological fracture with surrounding osteolysis of the diaphysis of the femur. Medullary expansion and thinning of the cortices of the middle third of femur is seen. Soft tissue swelling is seen posteriorly (*arrows*)

Fig. 2 T1-weighted (TR 550 ms, TE 19 ms) oblique coronal images show medullary expansion and hypointensity with a pathological fracture (*large arrow*). A daughter cyst with hyperintense rim and central low signal intensity is seen in the middle third of the diaphysis (*small arrow*). Associated large cysts are seen postero-medially and superior to the greater trochanter along the K-nail removal tract (*arrowheads*). A large fluid-fluid level is seen within the posterior cyst

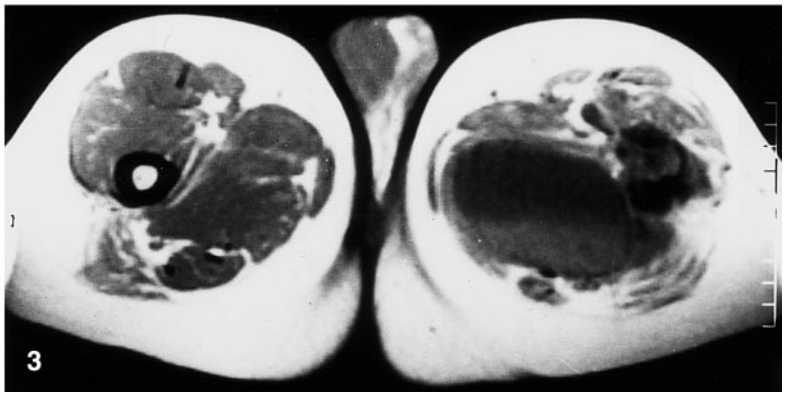

Fig. 3 T1-weighted (TR 550 ms, TE 19 ms) axial images show medullary expansion and hypointensity with a break in the cortex in the left femoral diaphysis. A large associated cyst with a fluid-fluid level is seen in the postero-medial compartment of the left thigh

hyperintense contents on the T2-weighted oblique coronal sequence (Fig. 4). This was highly suggestive of a daughter cyst. A large postero-medially placed cyst was seen lying within the muscle planes of the medial thigh compartment, in close proximity to the site of the pathological fracture. This cyst was hypointense on the T1-weighted sequence with a large fluid-fluid level (Figs. 2, 3). Uniformly markedly hyperintense on the T2-weighted sequence, the cyst had a thin wall. The surrounding muscles also showed some hyperintensity on T2-weighted images, suggestive of associated myositis. Another cyst with similar signal intensity characteristics was also seen lying cranial to the greater trochanter at the site of K-nail removal tract, which could be seen only on MR imaging.

The medial as well as the gluteal (at the K-nail removal tract) cysts were excised. The medullary canal was reamed thoroughly using flexible reamers and interspersed with povidone-iodine (Betadine standardised solution) solution lavage. Postoperatively, balanced skeletal traction was applied via an upper tibial pin for 6 weeks, followed by a single hip spica for 3 months. The fracture united (Fig. 5) and the patient has not had a recurrence.

Discussion

Hydatid cyst disease, although worldwide in distribution, is rarely

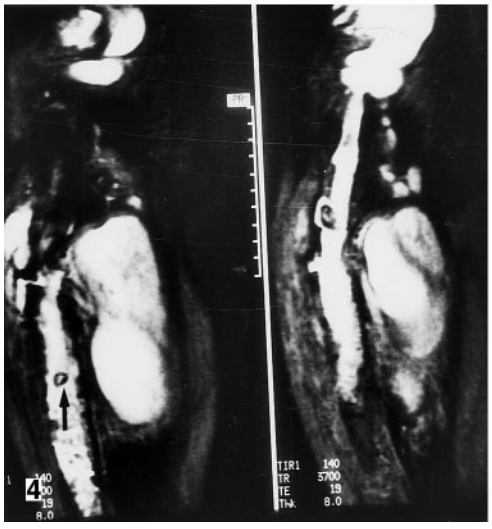

Fig. 4 Short tau inversion recovery sequence (STIR) (TR 3700 ms, TE 19 ms, TI 140 ms) oblique coronal images show the marked hyperintensity of the medullary cavity and the two associated cysts. The daughter cyst with hypointense rim and central high signal intensity is seen in the middle third of diaphysis (*small arrow*)

Fig. 5 Post-treatment plain film showing good union of the fracture and improvement of the cortical thickness

seen in the human skeleton. Primary osseous echinococcosis accounts for only about 1–2% of all the cases of hydatid disease [1, 2] and is most commonly seen in the vertebrae and pelvic bones. Growth of the cyst in bone is slow. Infection is usually acquired in childhood, but the clinical presentation may be delayed until adulthood [1]. The high intracystic pressure in unyielding bone causes rupture of the cyst, resulting in intramedullary spread. Eventually, the entire bone may be involved [3]. The slow growth and small cysts result from the resistance of bone to the growth of the parasite [1]. The cortex of the bone may, however, get slowly eroded, with extension into the surrounding soft tissues. The disease then assumes its more typical form, with larger cysts. Pathological fracture is a common presentation, because of cortical weakening.

This sequence of events also occurred in the present patient, who presented with a pathological fracture, a large diametaphyseal medullary lesion with presence of intramedullary cysts and a large cyst lying in the soft tissues of the thigh. The soft tissue cyst had a fluid-fluid level. The clinical and radiographic findings of osseous hydatid are usually non-specific, and because of the uncommon nature of the lesion, the preoperative diagnosis is usually elusive [4]. Intramedullary multilocular spaces with bone expansion and lack of sclerosis may be seen in fibrous dysplasia, aneurysmal bone cyst, tuberculosis, giant cell tumor, enchondroma or even metastatic carcinoma. Similarly, the findings of a lucent expanding bony lesion along with soft tissue calcification may suggest echinococcosis [5], but the combination of these findings is not so common.

Modern radiological modalities are of value, as both computerized tomography (CT) and MR imaging may show uncalcified cysts separate from the bone lesions, and so enable the diagnosis to be made [6]. The use of these modalities is mainly confined to helping stage the extent of the disease so as to plan treatment. This is also well illustrated in our case, where MR imaging helped in planning the surgical procedure. The diagnosis was available in our case due to a prior surgery with gross and histopathological diagnosis. MR imaging, however, did show the presence of daughter cysts within the medullary canal, which, when combined with the medullary lesion and an adjacent soft tissue cyst, would have allowed a prospective diagnosis, had the patient been subjected to this modality earlier. MR probably scores over CT in localising intramedullary daughter cysts, which would not be seen by the latter technique.

The treatment of hydatid disease is essentially surgical, with pharmacological modalities as an adjunctive measure. Scolicidal agents are used mainly during surgical manipulation

of the cysts, with the objective of preventing dissemination and avoiding recurrence [7]. Surgical excision and curettage can remove only macroscopic cysts, and most of the scolicidal agents used, such as formalin and hypertonic saline, do not kill all the microscopic daughter cysts [8]. Surgical excision of the soft tissue cysts was done and flexible reamers were used for curetting the intramedullary disease through the fracture site.The procedure was interspersed with povidone–iodine (Betadine standardised solution) solution lavage and suction. Although the use of povidone–iodine as a scolicidal agent has been studied in in vivo animal models (in the mouse peritoneal cavity) [7], this is the first time we are aware of its successful use for human osseous echinococcosis.

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