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CASE REPORT

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Initial change in transient osteoporosis of the hip on magnetic resonance images: a case report

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Abstract We report the case of a 29-year-old Japanese man with transient osteoporosis of the left hip (TOH) following contralateral TOH, paying special attention to the initial changes on MRI. MR images showed no abnormal findings 6 weeks before the clinical manifestation, but the images just after the onset depicted a linear abnormality equivalent to a subchondral insufficiency fracture. Both radiological findings and clinical symptoms disappeared completely without any surgical intervention within 10 months.

Key words Bone marrow edema · Femoral head · Magnetic resonance imaging (MRI) · Transient osteoporosis of the hip (TOH)

Introduction

MR images have become an important diagnostic tool in transient osteoporosis of the hip (TOH). However, MRI findings before and immediately after the onset are not well known. We encountered a patient with TOH in whom MR images were taken both 6 weeks before and just after the clinical manifestation of pain during the follow-up period for TOH on his opposite side.

Case report

A 29-year-old man, who had recovered from TOH of his right hip 2 months before, felt pain in his left hip without any traumatic episodes. Radiographs at that time showed mild bone atrophy on the lateral side of the left femoral head. MR images 10 days after onset showed an abnormal linear area, with a low signal in the T1-weighted image and high signals in both the T2-weighted and the fat suppression (STIR) images (Fig. 1a–c), while there had been no abnormal findings on images taken 6 weeks before the clinical manifestation for the follow-up of his previous contralateral TOH. A typical bone marrow edema pattern was observed on the MR images 4 weeks after onset (Fig. 2a–c), which was considerably diminished 6 months later (Fig. 3a–c). Both the pain in his left hip and the bone marrow edema pattern on MR images had disappeared completely by 10 months after the onset through conservative treatment of non-weight bearing and occasional doses of nonsteroidal anti-inflammatory drugs. His radiographs showed no joint-space narrowing, osteosclerosis, or collapse of the femoral head throughout his course.

Discussion

Although TOH was initially reported in a female patient in late pregnancy,[1] the disease has since been recognized as being more common in young and middle-aged men.[2] There may be a recurrence in the same hip, in the contralateral hip, or in other joints in as many as 41% of patients.[3] MRI characteristically shows a bone marrow edema pattern, which may represent histological edematous changes, frequently with vascular congestion and/or interstitial hemorrhage.[4] These changes are reversible, and the band pattern which is a characteristic feature in femoral head necrosis does not appear.[5] In this case, a bone marrow edema pattern was seen 4 weeks after the clinical manifestation of pain, whereas the initial findings were the abnormal linear areas of low signal on the T1-weighted image and a high signal on both T2-weighted and fat suppression (STIR) images. This linear pattern was equivalent to that of a fracture line.[6] A subchondral low-signal area, not necessarily well-defined by linear area, was seen even in osteonecrosis of the femoral head in T2-weighted images. The presence of an

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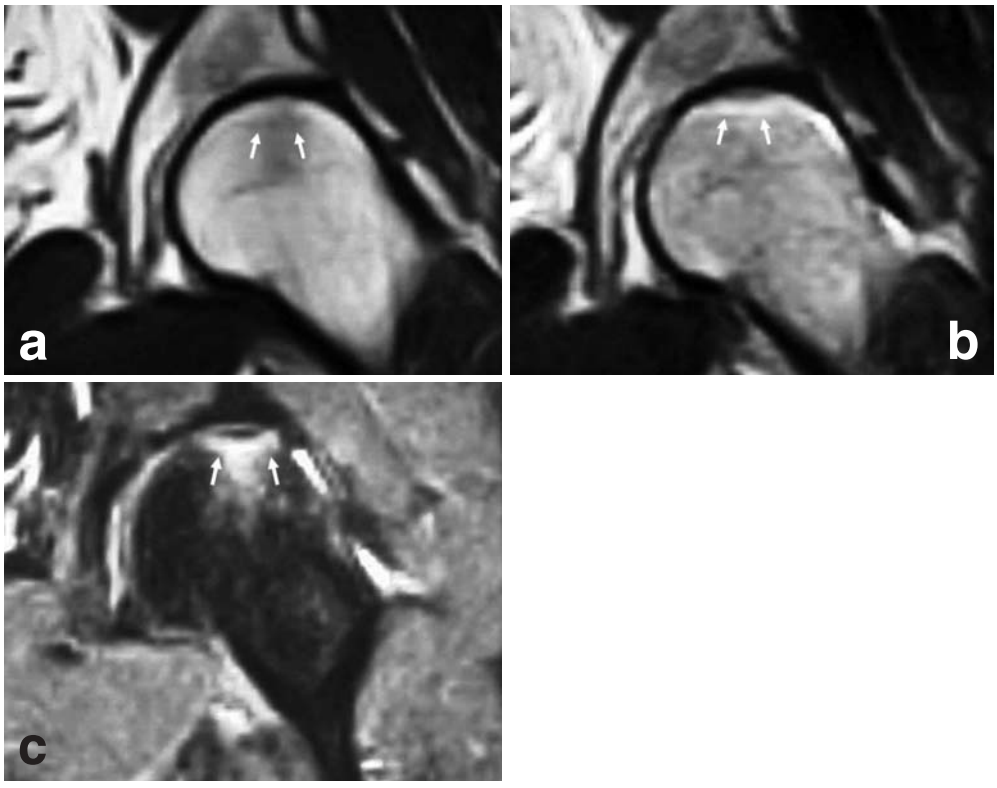

Fig. 1. MR images of the left hip taken 10 days after onset. *Arrows* depict **a** a linear low-signal-intensity area in the T1-weighted image, and **b** a high-signal-intensity area in the T2-weighted image, as well as **c** in the fat suppression image

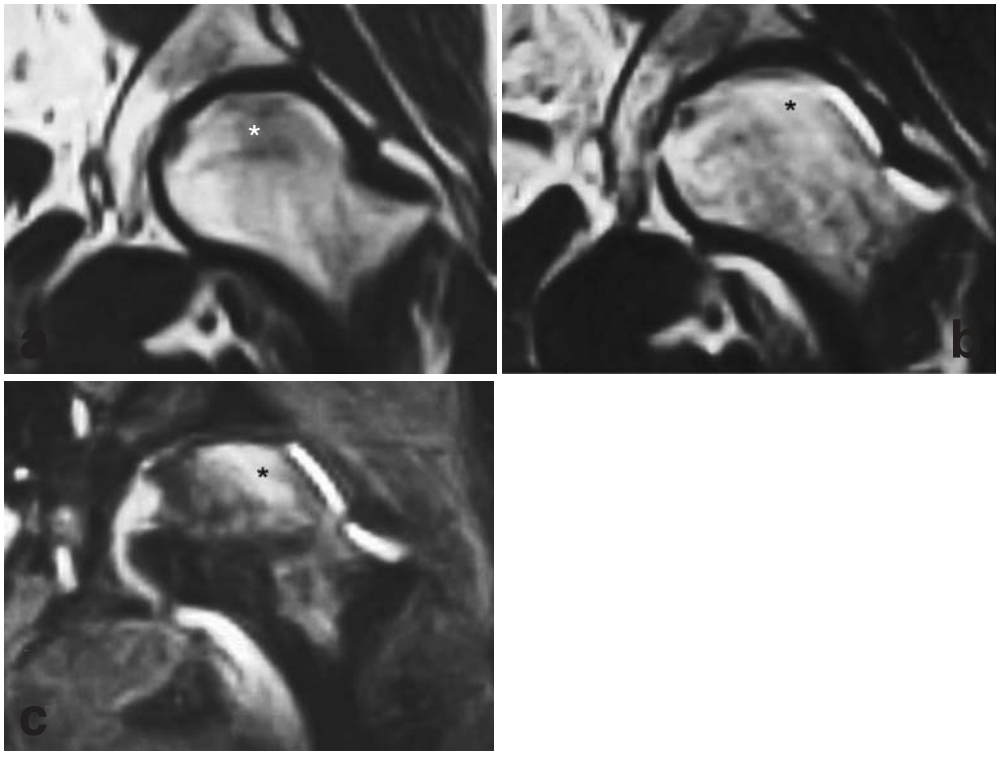

Fig. 2. MR images 4 weeks after onset. The T1-weighted image (**a**) shows a diffuse area of low signal in the femoral head (*). This area has high signal (*) on the T2-weighted image (**b**) and the fat suppression image (**c**). These findings are compatible with a bone marrow edema pattern

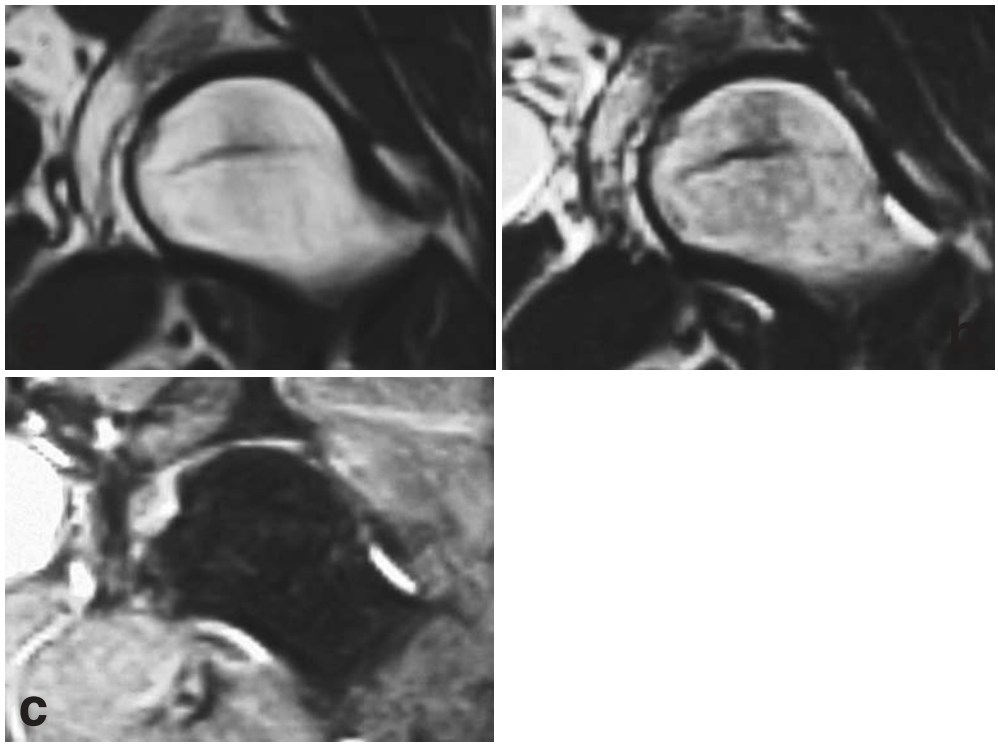

Fig. 3. MR images 7 months after onset. The bone marrow edema pattern is considerably diminished on the T1-weighted image (**a**), the T2-weighted images (**b**), and the fat suppression image (**c**)

area at least 4 mm thick and 12.5 mm long was reported to have a high positive value for irreversible lesions.[7] In this case, a similar subchondral low-signal area adjacent to the linear area was seen in the early stage. However, the lesion was small and had completely disappeared 7 months after the onset. Although the condition remains idiopathic, minor trauma, synovitis, dysfunction of nerves and blood vessels, and transient ischemia[1,4,8] are indicated as possible causes of the disease. Mechanical weakness of bone trabeculae was suggested histologically for TOH,[4] and the anterosuperior portion of the femoral head, where the linear pattern was seen, has been reported to be subject to the highest contact pressure during level walking.[9] Miyanishi et al.[10] suggested that a subchondral insufficiency fracture may be important as the pathophysiology of TOH. This was strongly supported by finding that the MR images in this case showed the linear pattern at a very early stage without any preceding abnormality before the onset of pain.

References

1. Curtiss PH Jr, Kincaid WE. Transitory demineralization of the hip in pregnancy. J Bone Joint Surg Am 1959;41:1327–33.
2. Lakhanpal S, Ginsburg WW, Luthra HS, Hunder GG. Transient regional osteoporosis. A study of 56 cases and review of the literature. Ann Intern Med 1987;106:444–50.
3. Guerra JJ, Steinberg ME. Distinguishing transient osteoporosis from avascular necrosis of the hip. J Bone Joint Surg Am 1995; 77:616–24.
4. Yamamoto T, Kubo T, Hirasawa Y, Noguchi Y, Iwamoto Y, Sueishi K. A clinicopathologic study of transient osteoporosis of the hip. Skeletal Radiol 1999;28:621–7.
5. Kubo T, Yamazoe S, Sugano N, Fujioka M, Naruse S, Yoshimura N, et al. Initial MRI findings of non-traumatic osteonecrosis of the femoral head in renal allograft recipients. Magn Reson Imaging 1997;15:1017–23.
6. Yamamoto T, Bullough PG. Subchondral insufficiency fracture of the femoral head. Arthritis Rheum 1999;42:2719–23.
7. Vande Berg BC, Malghem JJ, Lecouvet FE, Jamart J, Maldague BE. Idiopathic bone marrow edema lesions of the femoral head: predictive value of MR imaging findings. Radiology. 1999;212:527–35.
8. Pantazopoulos T, Exarchou E, Hartofilikidis GA. Idiopathic transient osteoporosis of the hip. J Bone Joint Surg Am 1973;55: 315–21.
9. Hodge WA, Carlson KL, Fijan RS, Burgess RG, Riley PO, Harris WH, et al. Contact pressures from an instrumented hip endoprosthesis. J Bone Joint Surg Am 1989;71:1378–86.
10. Miyanishi K, Yamamoto T, Nakashima Y, Shuto T, Jingushi S, Noguchi Y, et al. Subchondral changes in transient osteoporosis of the hip. Skeletal Radiol 2001;30:255–61.