

Insufficiency fracture of the femoral head in patients with severe osteoporosis—report of 2 cases

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Case 1

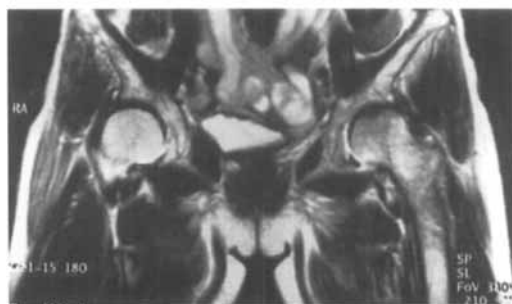
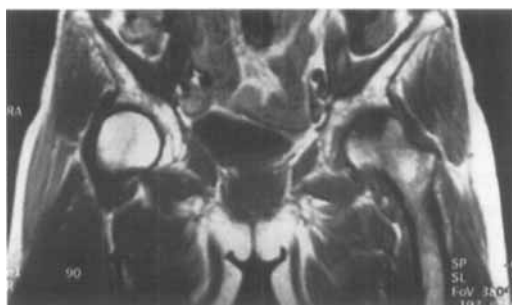
A 74-year-old woman complained of increasing left hip pain on walking without any trauma for the past 2 months. She attended our hospital in August 1996. She had been treated by her home doctor for osteoporosis, and had received Alfacalcidol for 1 year. The left hip exhibited a slightly limited range of motion and pain on internal rotation. Her radial bone mineral density was 0.38 g/cm² (58% of the young adult mean).

Radiography of the left femoral head showed a depression fracture in the weight bearing area. MRI revealed low signal intensity in the subchondral area on both T1 weighted (T1W) and T2 weighted images (T2W). As non-weight bearing seemed impossible, a hemiarthroplasty was performed 3 months later. Histological findings revealed live osteocytes around the compression fracture area, as in other fractures.

Case 2

A 75-year-old woman with multiple vertebral fractures attended our hospital every month for treatment

of osteoporosis. She was given Alfacalcidol for 3 years. Right hip pain on walking started in June 1997, but radiographs of her right hip were normal. Her ra-



MRI, T1W (top) and T2W (bottom), shows a subchondral area of low signal intensity on both T1W and T2W images.

Case 1.



On admission, with a depression fracture in the weight bearing area of the left femoral head.



Histological findings. Vital osteocytes around the compression fracture region, except in a small area filled with fibrous tissue (×100).

Case 2.



1 month after the onset of pain, with a subchondral insufficiency fracture of the right femoral head.

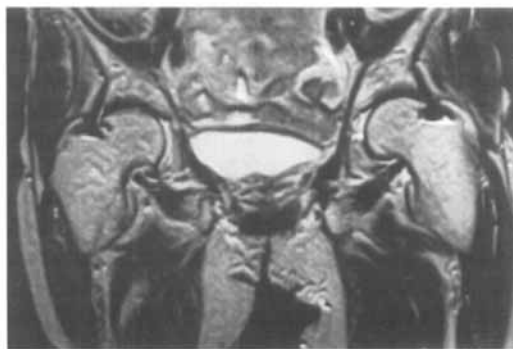
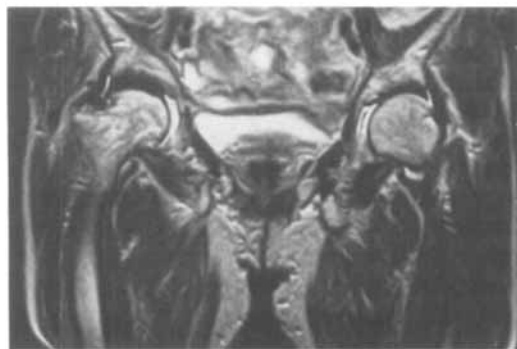
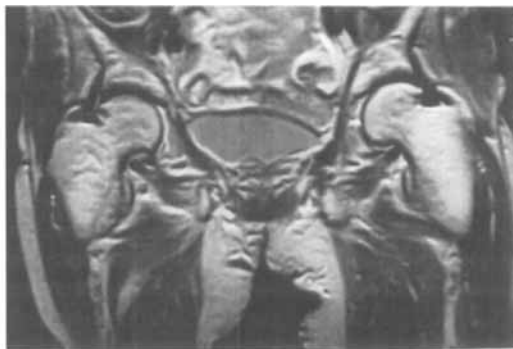
dial bone mineral density was 0.23 g/cm^2 (47% of the young adult mean), revealing severe osteoporosis. The pain persisted and, 1 month after the onset of her symptoms, a second radiograph showed a subchondral insufficiency fracture of the right femoral head.

MRI revealed a decreased signal intensity region in the subchondral area on T1W and iso signal intensity on T2W. She was admitted to our hospital and weight bearing of the right leg was not allowed for 6 weeks, followed by 6 weeks of partial weight bearing. Her hip pain disappeared completely 3 months later. Radiography, 5 months after the onset of pain, showed no increase in the femoral head deformity and MRI showed delimitation of the low signal intensity area on T1W.

Discussion

Trabecular fatigue fractures of the femoral head, examined in necropsy specimens, suggest an association with age-related osteoporosis (Freeman et al. 1974). However, an insufficiency fracture of the femoral head is not always considered in the differential diagnosis of hip pain. Recently, a few cases of this lesion have been reported (Linthoudt and Ott 1987, Bangil et al. 1996, Rafii et al. 1997).

The clinical features of an insufficiency fracture of the femoral head are observed in patients with severe osteoporosis, with no apparent trauma, who have acute or sub-acute hip pain, sometimes without any



MRI, T1W (top) and T2W (bottom) 1 month after the onset demonstrates a decreased signal intensity lesion in the subchondral area on T1W and iso signal intensity on T2W.

MRI, T1W (top) and T2W (bottom) 5 months after the onset shows limitation of the low signal intensity area on T1W.

radiographic change in the early stages. The presence of severe osteoporosis in such cases is of considerable value in the diagnosis of this condition.

Differential diagnosis of early stage fractures should include femoral head necrosis, reflex sympathetic dystrophy, and transient osteoporosis of the proximal femur. MRI is useful for the diagnosis of this lesion. T1W and T2W images of insufficiency fractures of the femoral head yield low intensity areas in the early stages. However, if tissue edema is present, there is a high intensity area on the T2W image (Bangil et al. 1996). A straight or serpiginous line of low signal intensity is thought to represent the fracture line or trabecular impaction (Rafii et al. 1997). Visuri (1997) reported stress fractures of the femoral head among young military recruits. MRI showed a diffuse decrease in the signals in bone marrow, spreading from the femoral head to the femoral neck on T1W, which is a wider zone than that seen in osteoporotic elderly patients with femoral head insufficiency fracture.

Insufficiency fracture of the femoral head should be considered in the diagnosis of hip pain in patients

with osteoporosis. Rapidly destructive arthropathy, in which the femoral head collapses within a short period, is seen in patients with osteoporosis. Insufficiency fracture may have preceded this condition. Early diagnosis by MRI is essential, as in case 2, when no weight bearing is allowed in the early stages of the lesion. This may have prevented the advancement of the fracture, followed by a good clinical outcome without surgical treatment.

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Late repair of rupture of the hamstring tendons from the ischial tuberosity—a case report

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A 39-year-old woman played badminton and, when trying to reach the ball in a splinting-like position, she developed severe pain in her right buttock. She attended the emergency ward. The physical examination revealed a large ecchymosis on the proximal posterior part of the thigh. A diagnosis of hamstring sprain was made. She then underwent physical therapy a few times but it did not relieve the symptoms.

On admission to our department, 2 months after the injury, she complained of muscle fatigue daily. The patient had, since the trauma, been unable to partake in any sports, because of pain in her proximal thigh and give-way symptoms. The physical examination showed a tender defect just distal to the ischial tuberosity and weakness of flexion of the knee. The symptoms were interpreted as a second degree strain and the patient was referred to intensive physical therapy for a 3-month period with no effect. MRI was then

performed, revealing a complete avulsion of the hamstring muscles from the ischial tuberosity (Figure). The muscles were retracted 5–6 cm and showed some signs of degeneration.

Operation was performed 8 months after the injury. A straight-line incision was made over the defect. The gluteus maximus was lifted proximally, showing the totally avulsed hamstring muscles. The muscles were mobilized as much as possible. To strengthen the reconstruction, a polypropylene ligament augmentation device (LAD; 3M, St Paul, MN) was inserted through a drill-hole in the ischium and threaded through the semitendinosus and biceps femoris muscle 3 times and sutured in place. Heavy, nonabsorbable sutures were used to reinforce the attachment to the ischium. The semimembranosus was left adherent to the surrounding tissue. Finally, a fascia lata graft was used to strengthen the origins of the semitendinosus and biceps femoris.