CASE REPORT

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Transient osteoporosis of the hip

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Abstract We report four cases of transient hip osteoporosis studied between 1995 and 1997. All patients were men. The diagnosis was based on clinical symptoms, absence of abnormal laboratory tests, increased uptake in the femoral head and neck on Tc-99 bone scans and magnetic resonance imaging showing Oedema of the bone marrow. In three patients radiographs showed osteopenia of the head and neck of the involved femur, whereas no major radiographic changes were seen in the fourth patient. The clinical symptoms lasted 7 months and there was no recurrence after 8–24 months' follow-up.

Résumé Quatre cas d'Ostéoporose Transitoire de la Hanche ont été étudiés entre 1995 et 1997. Le diagnostic a été retenu sur des arguments cliniques, l'absence d'anomalies dans les analyses et l'existence d'une hypercaptation gammagraphique homogène à la tête et au col du fémur ainsi que sur un patron d'oedème de la moelle osseuse en Résonance Magnétique. Dans un cas, la radiologie conventionnelle a été normale pendant tout le processus tandis que les trois autres cas ont présenté une ostéoporose radiologique depuis la tête du fémur jusqu'à la zone trochantérienne. La durée de la symptomatologie a été de 7 mois. Il ne s'est pas produit de récurrence locale après un suivi de 8–24 mois.

Introduction

Transient hip osteoporosis (THO) was first reported by Ravault in 1947, and then by Curtiss and Kincaid in 1959 [3]. Several hundred cases have now been reported [6] but the condition still poses many questions. These have given rise to different names and descriptions of which transient osteoporosis, regional migrational osteoporosis, migrational osteolysis, transient hip demineralization, regional tran-

sient osteoporosis and bone marrow Oedema syndrome (BMOS) are among the more common. Ten possible causal mechanisms have been proposed [3,7,11,15,17,18], and the treatment is usually symptomatic [6]. However, recent reports [5,8,9] have suggested a significant improvement after drilling of the femoral head. We have made a major review of all the cases reported in the English literature. In this study we have attempted to clarify the patterns of this disease and we report four new cases.

Case reports

Between 1995 and 1997, four cases of transient hip osteoporosis (THO) were diagnosed in our unit. The patients were all men with an average age of 46.5 years (range 35 to 65 years) who had been referred because of persistent hip pain. The left hip was affected in three cases, and the right hip in one case (Table 1).

All cases were thoroughly investigated with a haemogram, erythrocyte sedimentation rate and biochemistry (including uric acid and alkaline phosphatase), rheumatic serology, Mantoux and agglutination tests for Brucella. Joint aspirations and bone biopsies were not performed. Imaging included conventional radiography of the pelvis, Tc-99 diphosphonate (20 Mci), radioisotope bone scans and magnetic resonance imaging (MRI) studies.

Results

The average period between the onset of symptoms and the first hospital attendance was 6 weeks (range 4–12 weeks). Minor injury caused exacerbation of symptoms with sudden onset of pain in one patient and gradual onset of pain in the other three. Pain was located in the groin and radiated to the inner thigh. It increased on weight bearing and improved but did not disappear at rest. By the third week the pain had increased, causing the patients to limp, and necessitating the use of crutches. Physical examination showed minimum restriction of flexion, abduction and internal rotation, with

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Table 1 Findings at radiography, bone scintigraphy and magnetic resonance imaging of the hips in four patients with transient osteoporosis of the hip

Case	Side	Age (years)	X-ray findings 4 weeks after onset	X-ray findings 7 weeks after onset	X-ray findings 12 weeks after onset	Bone scan uptake (Tc 99)	Magnetic resonance imaging
1	L	34	Radiolucency	Radiolucency	Increased		Uniform and diffuse signals with reduced intensity
2	L	42	Normal	Radiolucency	Increased		Uniform and diffuse signals with reduced intensity
3	L	45	Normal	Radiolucency	Increased		Uniform and diffuse signals with reduced intensity
4	R	65	Normal	Normal	Normal	Increased	Non-uniform signals with alternate areas of different signal intensity

Fig. 1 Case 1. Anterior-posterior view with diffuse uniform radiological osteopenia of the left hip**Fig. 2** Case 4. Bone scan showing diffuse uniform uptake in the right hip and acetabulum**Fig. 3** Case 2. Magnetic resonance imaging T1-weighted study showing lower signal intensity in the left hip**Fig. 4** Case 4. Magnetic resonance imaging T2-weighted sequences showing unusual non-uniform marrow edema pattern

slight quadriceps atrophy in all the patients but there were no signs of inflammation. A raised erythrocyte sedimentation rate was noted in all four patients, but no abnormalities were detected in other laboratory tests.

Conventional radiography showed a uniform diffuse radiolucency from the femoral head (with acetabulum involvement) to the intertrochanteric region, and there was marked cephalad subchondral bone blurring but no cavitation, subchondral collapse or interline impingement (Fig. 1). These findings were already present 4 weeks after onset in case 1, while in cases 2 and 3 they were not seen until 7 weeks after onset. In case 4, a small interline

impingement with a slight acetabular subchondral sclerotic reaction was seen, but no further radiological changes developed during follow-up.

Radioisotope bone scans showed a diffuse increased uptake in the femoral neck and head in all four cases. In cases 1 and 4 an increased uptake was also seen in the acetabulum (Fig. 2). In MRI T1-weighted sequences the signal was uniform and diffuse and less intense between the head and the intertrochanteric area (Fig. 3), and more intense in the T2-weighted sequences where a joint effusion was seen in three of the four cases. In case 4 the pattern was not uniform, with alternate areas of different signal intensity, particularly in the femoral head and to a lesser degree in the neck and trochanters (Fig. 4).

Non-steroidal anti-inflammatory drugs were used regularly for at least 4 weeks, and analgesics for at least 2 weeks. In case 2, calcitonin in the form of a nasal spray was used (200 IU daily) for 2 months. None of the patients was hospitalized.

On average the symptoms lasted a total of 7 months, with an average of 9 weeks between onset and diagnosis, and a total non-weight-bearing period of 2.5 months. All four patients were able to return to their previous jobs.

During 14 months (range 8 to 24 months) of follow-up there was no local or contralateral recurrence. Case 2 had an adductor tendinitis on the same side as the involved hip at 3 months (MRI normal) and this resolved uneventfully.

Discussion

We agree with other authors that there are two clinically different conditions [5] – THO and regional migratory osteoporosis (RMO) [1]. In THO recurrences are seen [4,9,10,15,16], but migration is exceptional [14]. In RMO both recurrences and migration are often found [1,5]. This latter syndrome is associated with more severe and longer lasting symptoms [1], predominance in the ankles and/or feet [1,11], more frequent spinal and/or upper limb involvement [1,15] and earlier, more diffuse and massive radiological osteopenia [1,11]. In order to anticipate the long-term development it is important to distinguish between the two patterns.

In the past, both the existence of symptoms conventionally designated as THO but without radiological evidence of osteopenia [9,18,19], as well as symptoms of radiological osteopenia but progressing to avascular necrosis of the femoral head have been described [8,17,18]. With the availability of supplementary MRI studies to aid establishing a diagnosis, we propose that bone marrow Oedema syndrome (BMOS) would be a more appropriate nomenclature.

Classical BMOS [6,9,11,12] is self-limiting but may be recurrent. Men aged 30–50 years and women in the last 3 months of pregnancy may be affected without prior injury. Radiography shows a typical presentation with a “spectral appearance of the femoral head”. Patients are usually treated conservatively. Another variant in the classic pattern (case 4 in our series) includes cases reported in children [13] and during the first 2 months of

pregnancy [2]. It is bilateral and radiographs either demonstrate no changes, or involvement of only part of the femoral head. MRI shows either a migratory or heterogeneous pattern [7,8]. A third variant includes bone marrow edema found in avascular necrosis of the femoral head [18], in Sudeck’s disease, osteomyelitis, stress fractures [17] and neoplastic infiltration. We consider that THO should be renamed bone marrow oedema syndrome (BMOS), and that MRI should play an essential part as the diagnosis must still be established by exclusion.

References

1. Banas MP, Kaplan FS, Fallon MD, Haddad JG (1990) Regional migratory osteoporosis: a case report and review of the literature. *Clin Orthop* 250:303–309
2. Brodell JD, Burns JE, Heiple KG (1989) Transient osteoporosis of the hip of pregnancy. Two cases complicated by pathological fracture. *J Bone Joint Surg [Am]* 71:1252–1257
3. Curtiss PH, Kincaid WE (1959) Transitory demineralisation of the hip in pregnancy. *J Bone Joint Surg [Am]* 41:1327–1333
4. Daniel WW, Sanders PC, Alarcon GS (1992) The early diagnosis of transient osteoporosis by magnetic resonance imaging. *J Bone Joint Surg [Am]* 74:1262–1264
5. Dunstan CR, Evans RA, Somers NM (1992) Bone death in transient regional osteoporosis. *Bone* 13:161–165
6. Guerra JJ, Steinberg ME (1995) Distinguishing transient osteoporosis from avascular necrosis of the hip. *J Bone Joint Surg [Am]* 77:616–624
7. Hauzeur JP, Hanquinet S, Gevenois PA, Appleboom T, Bentin J, Perlmutter N (1991) Study of magnetic resonance imaging in transient osteoporosis of the hip. *J Rheumatol* 18:1211–1217
8. Hayes CW, Conway WF, Daniel WW (1993) MR imaging of bone marrow oedema pattern: transient osteoporosis, transient bone marrow oedema syndrome, or osteonecrosis. *Radiographics* 13:1001–1011
9. Hofmann S, Engel A, Neuhold A, Leder K, Kramer J, Plenck H (1993) Bone marrow oedema syndrome and transient osteoporosis of the hip: an MRI-controlled study of treatment by core decompression. *J Bone Joint Surg [Br]* 75:210–216
10. Kaplan SS, Stegman CJ (1985) Transient osteoporosis of the hip. *J Bone Joint Surg [Am]* 67:490–492
11. Langlosh ND, Hunder GG, Riggs L, Kelly PJ (1973) Transient painful osteoporosis of the lower extremities. *J Bone Joint Surg [Am]* 55:1188–1196
12. Marti-Valls J (1994) Osteoporosis transitoria de cadera. *Rev Esp Rheumatol* 21:326–328
13. Nishiyama K, Sakamaki T (1992) Transient osteopenia of the hip in children. *Clin Orthop* 275:199–203
14. Potter H, Moran M, Schneider R, Bansal M, Sherman C, Markisz J (1992) MRI in diagnosis of transient osteoporosis of the hip. *Clin Orthop* 280:223–229
15. Shifrin LZ, Reis ND, Zinman H, Besser MI (1987) Idiopathic transient osteoporosis of the hip. *J Bone Joint Surg [Br]* 69:769–773
16. Takatori Y, Kokubo T, Ninomiya S, Nakamura T, Okutsu I, Kamogawa M (1991) Transient osteoporosis of the hip. *Clin Orthop* 271:190–194
17. Turner DA, Templeton AC, Selzer PM, Rosenberg AG, Petasnick PJ (1989) Femoral capital osteonecrosis: MR finding of diffuse marrow abnormalities without focal lesions. *Radiology* 171:135–140
18. Van de Berg BE, Malghem JJ, Labaisse MA, Noel HM, Maldague BE (1993) MRI of avascular necrosis and transient marrow oedema of the femoral head. *Radiographics* 13:501–520
19. Wilson AJ, Murphy WA, Hardy DC, Totty WG (1988) Transient osteoporosis: transient bone marrow oedema? *Radiology* 167:757–760