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ORIGINAL STUDY

Intra- and periarticular osteoid osteoma : Percutaneous destruction and alcoholisation

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Intra- or periarticular osteoid osteoma (00) is uncommon, and therefore a diagnostic challenge. Symptoms are : chronic synovitis, decreased range of motion, joint effusion, and joint contracture. Radiographically, the classical perifocal sclerotic margin is often absent, which leads to a significant delay in diagnosis. The authors retrospectively studied 50 cases of intra- and peri-articular OO, treated with percutaneous destruction and alcoholisation. The mean follow-up period was 8.7 years (range, 1 to 15 years). The diagnosis was only made after +/- 14 months (range, 8 to 18 months), due to atypical symptoms (nightly pain absent in 38%) and uselessness of plain radiographs (in 100%). CT-scan, contrast enhanced MRI and bone scan brought the solution. The technique was successful in 48 out of 50 cases (96%) : incomplete excision occurred in 2 patients. The diagnosis of intra- or periarticular OO should be considered in case of unexplained joint pain where conservative treatment is inefficient.

Keywords : Osteoid osteoma ; peri-articular ; alcoholisation.

INTRODUCTION

Osteoid osteoma (OO) is a benign skeletal neoplasm composed of osteoid and woven bone (*6*). It has been categorized by location as subperiosteal, cortical or cancellous (*18,24*). The lesion is most commonly located in the cortex of long bones (especially in the lower extremities) of children, adolescents or young adults. Less often, it is located in cancellous bone, where reactive osteosclerosis usually is less intense and may be distant from the lesion (*6*).

Distinct clinical presentation and classical radiological appearance make the diagnosis of cortical OO an easy problem. However, the diagnosis of intra- and periarticular OO is difficult and usually delayed, because the site is uncommon, while the clinical signs are nonspecific (*4,20,26*). Intra- or periarticular OO usually presents with chronic synovitis, decreased range of motion, joint effusion and joint contracture (*1,20*). Radiographically, there is little or no reactive sclerosis, so that the radiolucent nidus often is overlooked. As the clinical and radiological findings are uncharacteristic and misleading, the diagnosis of this type of OO is difficult and there is always significant delay in diagnosis (*15,17*). This

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delay leads to complications affecting the joint prior to surgery (*22*).

The classical treatment of OO consists of en bloc resection of the nidus, and is successful in the majority of cases (*22*). However, intra- and periarticular OO may require extensive approach, arthrotomy, and wide bone resection, which may require bone grafting (*2,12,14*). All these details increase the occurrence of complications, in addition to the delayed diagnosis (*22*). In recent years, several techniques of mini-invasive treatment under CT control have been described. Percutaneous radiofrequency ablation under CT guidance is a very successful method in treating intra-articular OO, but it has a harmful effect on the articular surface, and it makes histopathological confirmation impossible (*19*). Percutaneous excision under CT guidance is a mini-invasive technique, suitable for deep and hardly accessible lesions (*7,8,9,23*).

Most studies about percutaneous techniques are based on small series, and focus on a single anatomical site. This encouraged the authors to report on a series of 50 patients with intra- or periarticular OO, treated with percutaneous destruction and alcoholisation. To the best of their knowledge this is the largest series of this type of OO reported in the English literature.

PATIENTS AND METHODS

Ethical committee approval was obtained for this retrospective study. It included 50 patients (34 males, 16 females) with intra- and periarticular OO, seen between January 1998 and January 2011. Their mean age was 22 years (range, 17 to 26 years). The diagnosis was made after a mean of 14 months (range, 8 to 18 months). The mean follow-up period was 8.7 years (range, 1 to 15 years).

All patients complained of dull aching pain, not relieved by rest. Clinical symptoms were : joint effusion, joint contracture and limited range of motion.

Imaging studies included plain radiographs (all cases), CT-scan (all cases), MRI imaging (12 cases) and technetium bone scan (4 cases). Contrast enhanced MRI was used to confirm the diagnosis when the CT-scan could not detect the nidus (6 cases). Contrast enhanced MRI was also used to evaluate the maturity of the nidus, and to assess the associated synovitis. A technetium bone scan was used for small lesions undetectable with CT-scan or with contrast enhanced MRI.

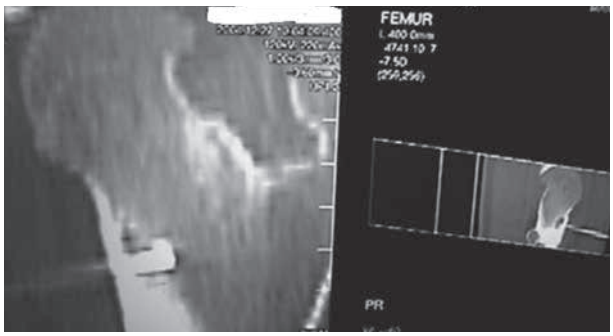

Fig. 1. — Peroperative CT-scan : coronal and sagittal sections of the pelvis showing accurate placement of a Kirschner wire into the nidus.

Laboratory tests included nonspecific tests of inflammation (erythrocyte sedimentation rate, C-reactive protein, white blood cell count) and rheumatology tests (rheumatoid factor assay, antinuclear antibody (ANA) assay, antistreptolysin O titer, HLA-B27 gene assay).

All patients were treated with percutaneous destruction and alcoholisation, as described by El-Mowafi *et al* (*9*). Computed tomography was used to insert a guide wire into the center of the nidus (Fig. 1). Bone samples, obtained from drill bit and speed burr, were sent for histological analysis. A CT-scan was performed within a week to confirm complete destruction of the nidus.

All patients left the hospital after 3 to 4 days. A first follow-up took place after 3 weeks to make sure that the pain had disappeared, and to assess the range of motion. Subsequently, a radiological check-up was performed every 3 months in the first year, to assess healing at the site of nidus destruction. Finally, a clinical and radiological evaluation was done on an annual basis to trace recurrence or arthritis.

RESULTS

The mean time interval between the onset of pain and the correct diagnosis was 14 months (range, 8 to 18 months). Interestingly, the characteristic night pain, relieved by salicylates (aspirin test), was absent in 38 out of 50 patients (76%). The most frequent location was the hip : 52% of the cases (Table I). Conventional radiographs missed the nidus in all 50 patients. The CT-scan detected the nidus in 44 out of 50 patients (88%) (Fig. 3). Five

Table I. — Location of the osteoid osteomas (n = 50)

Site	Hip region		Ankle region			Wrist region		Shoulder region
	Femoral head and neck	Acetabulum	Talus	Lateral malleolus	Calcaneus	Scaphoid	Lunate	Head of humerus
Number	26	4	4	3	1	5	2	5

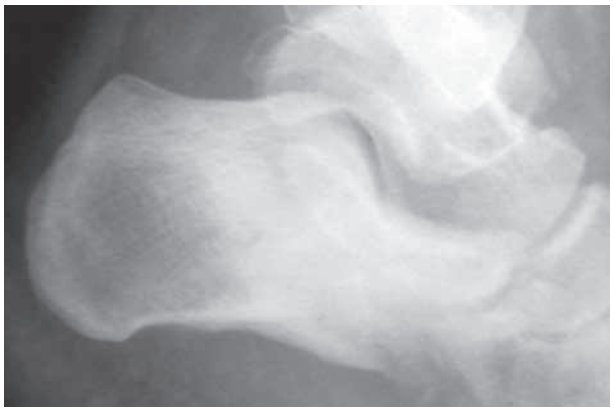

Fig. 2. — Plain lateral view of a right calcaneus. Normal at first sight.

cases (10%) were rheumatoid factor positive and 2 cases (4%) were HLA-B27 positive. The mean size of the nidus was 8 mm (range, 6 mm-12 mm).

The pain disappeared in 24 to 48 hours. The post-operative CT-scan showed that the nidus was completely removed in 48 out of 50 patients (success rate 96%). Persistence of symptoms occurred in 2 cases with OO in the femoral neck. These two cases were re-treated with the percutaneous technique. One of them improved, while the other one needed surgical excision. In 2 other cases, with a nidus in the acetabulum, early mild osteoarthritis of the hip joint was noted during the follow-up period ; both cases had a positive rheumatoid factor. For these two cases medical treatment and physiotherapy were found to be satisfactory.

The range of motion was completely regained in all cases. At final follow-up (after a mean of 8.7 years) early osteoarthritis was seen in 2 out of 13 hip cases, and these 2 cases had a positive rheumatoid factor. There were no infections or major complications. There were no recurrences over a long follow-up period of +/-8.7 years (range, 1 to 15).

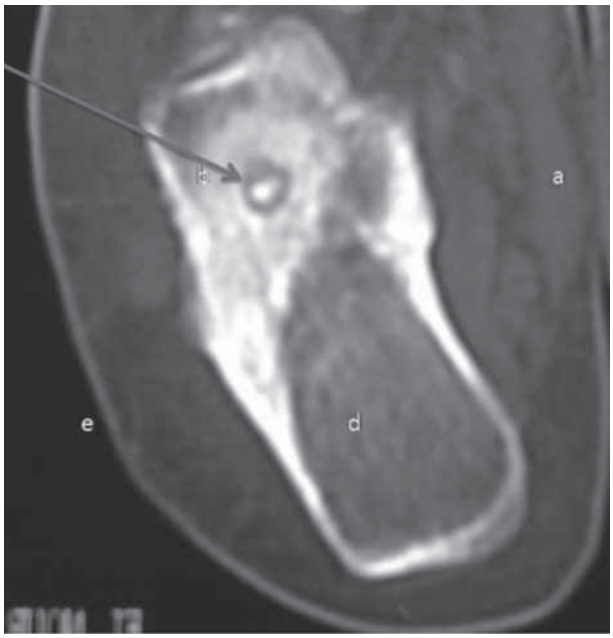

Fig. 3. — Same patient as in fig. 2. CT-scan : axial section of the right calcaneus. Osteoid osteoma, but the reactive sclerosis is wide-spread.

DISCUSSION

Intra- and periarticular OO is a painful benign bone tumor and it is relatively uncommon (*3*). Indeed, only 10% is intra-articular (*4*), and thus subject to a late diagnosis, as the symptoms may mimic an inflammatory mono-arthritis (*26*).

The diagnosis is usually difficult and is often made after multiple diagnostic errors (*24*). Clinically, juxta- and intra-articular OO may be mistaken for a traumatic or a degenerative affection of the joint (*10*). In turn, delay in diagnosis is then responsible for tenderness, localized swelling, muscle atrophy and joint contractures (*11*).

Intra-articular location makes surgical excision hazardous, as it requires arthrotomy which has its

own complications like reflex sympathetic dystrophy, infection, and secondary degenerative changes. Surgical excision may require bone grafting (*2,12,14*).

Although CT-guided radiofrequency (RF) ablation has been reported to be very successful (*16,27*), it may cause cartilage damage via thermal necrosis, when dealing with juxta-articular lesions (*16*). Another disadvantage of RF ablation is the lack of histological verification (*19*).

Franceschi *et al* (*10*) stated that juxta- or intra-articular osteoid osteoma can simulate several other articular pathologies, so they recommended that patients complaining of persistent joint pain with a strong nightly component should be examined more closely in order to avoid unnecessary surgical procedures.

Szendroi *et al* (*26*) reported in 2004 that clinical symptoms and imaging data of intra-articular OO were significantly different from the classical hallmarks of extra-articular OO. They compared 19 cases of intra-articular OO and 15 cases of extra-articular OO. In the intra-articular group the diagnosis was made after +/-26.6 months, versus +/-8.5 months in the extra-articular group. Moreover, a CT-scan was accurate in only two-thirds of the intra-articular group, versus 90% in the extra-articular group.

Norman *et al* (*21*) described 36 patients with OO of the hip : 30 with intra-articular nidus and 6 with extracapsular nidus. Osteoarthritis developed in 50% of the patients with an intra-articular nidus. Rheumatologic studies were conducted in 8 of the patients with intra-articular nidus and osteoarthritis. As 5 of the 8 patients had major histocompatibility (HLA) markers for rheumatoid arthritis, the presence of this HLA factor may indicate the patients at risk for inflammatory changes in the joint.

Kalb *et al* (*13*) reported 22 cases of OO in the hand. The diagnosis was made after about 2 years. Plain radiographs were often negative, but bone scan and gadolinium enhanced MRI brought the solution. High resolution CT-scans demonstrated the nidus in all cases.

The current study demonstrated that diagnosis was made after a mean delay of 14 months (range, 8 to 18 months). The authors agree that joint pain, not responding to conventional treatment, needs a special way of thinking, taking into consideration many pathologies, one of them intra-articular OO (*10,11,13, 21,26*). CT-scans are highly sensitive for the diagnosis of intra-articular OO (*26*). Also contrast enhanced MRI can be used to confirm the diagnosis of intra- and periarticular OO ; it can also give information about the maturity of the nidus, and about the associated synovial changes. A bone scan is useful to diagnose small lesions. Synovitis is classical in intra-articular OO, but the pathogenesis is not clear. It slowly leads to cartilage destruction, which means osteoarthritis (*5,25*). The current study showed that 2 cases with a nidus in the acetabulum had early mild osteoarthritis of the hip joint plus a positive rheumatoid factor. Likewise, Norman *et al* (*21*) found that 5 out of 8 hip cases with osteoarthitis were HLA-B27 positive. These data should be taken into consideration before one can state that an intra-articular OO is the only cause of joint problems.

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