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Osteoid Osteoma of the Femoral Neck Treated by Total Hip Arthroplasty: A Case Report and Literature Review

Alioune Badara Dione[1*], Chérif Sadibou Djiba[1], Mamadou Lamine Diagne[1], Badara Dembélé[2], Ndiaga Dieye[2], Charles Bertin Diémé[2]

[1]Department of Orthopedic and Trauma Surgery, Cheikh Ahmadoul Khadim Hospital, Touba, Senegal
[2]Department of Surgery and Surgical Specialties, University Cheikh Anta Diop, Dakar, Senegal
Email: *aliounebadaradione1@gmail.com

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Abstract

This case report describes a 29-year-old woman with chronic hip pain due to an intra-articular osteoid osteoma of the femoral neck. Computed tomography revealed an unusually large lesion. The patient underwent wide resection followed by total hip arthroplasty, with the diagnosis confirmed by histological examination. This article highlights the risk of delayed diagnosis in the presence of atypical intra-articular presentations and positions arthroplasty as a last resort option for extensive and destructive lesions.

Keywords

Osteoid Osteoma, Total Hip Arthroplasty, Femoral Neck

1. Introduction

Osteoid osteoma is an osteoid osteoma which is classically defined as a benign osteoblastic tumor characterized by a nidus measuring less than 1.5 - 2 cm in diameter. Lesions exceeding this size threshold are sometimes referred to in the literature as "giant osteoid osteomas", although this terminology remains debated, as larger lesions may overlap radiologically with osteoblastoma.

It is a relatively common benign osteoblastic tumor. It generally occurs in young adults, and its preferred location is the diaphysis and metaphysis of long bones. Intra-articular involvement is rare, representing 10% to 13% of cases.

While the classic clinical and radiological presentation is well known, the clinical picture can be less typical, even misleading, and diagnostic errors are not uncommon. Its detection on standard radiographs is not always easy and requires

the use of cross-sectional imaging. Treatment consists of in-bloc marginal resection of the nidus, which is the only tumorous part.

We report an unusual case of a giant osteoid osteoma of the femoral neck treated by resection and total hip arthroplasty.

2. Case Presentation

Mrs. D., a 29-year-old woman with no prior medical history, has presented for several years with mechanical-type pain in her left hip, which has been increasing in intensity and is exacerbated by walking, resulting in a limp.

The patient reported progressive hip pain, partially relieved by nonsteroidal anti-inflammatory drugs (NSAIDs). The pain gradually intensified and became resistant to conservative management. There was no history of trauma, fever, weight loss, or systemic symptoms.

Laboratory investigations, including complete blood count, C-reactive protein (CRP), and erythrocyte sedimentation rate (ESR), were within normal limits, thereby reducing the likelihood of infection.

Clinical examination reveals a painful limitation of movement in the left hip with flexion at 40˚, internal rotation at 10˚, and external rotation at 15˚. There is no leg length discrepancy. The remainder of the examination is unremarkable.

The hip radiograph (Figure 1) shows a lacunar image in the form of a nidus, occupying the lower two-thirds of the femoral neck, surrounded by a thick rim of osteosclerosis.

Figure 1. Hip radiograph showing an image of a nidus.

Computed tomography (CT) was performed using thin-slice acquisition (≤1 mm), allowing precise identification of the nidus and assessment of cortical involvement. Multiplanar reconstructions were analyzed to evaluate the extent of subchondral and cortical destruction.

The CT scan pinpoints the location of the tumor, extending from the lesser trochanter to the caudal edge of the femoral head, measuring 25 mm thick and 53.6 mm long (Figure 2) on the frontal sections, with a discontinuity of bone at the upper pole of the neck.

Coronal sections show a sclerosing and osteosclerotic image (Figure 3).

The staging workup was performed using thoracoabdominopelvic computed tomography and was negative.

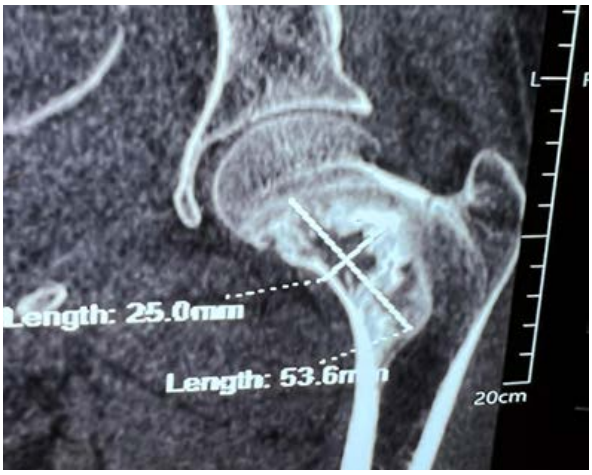

Figure 2. CT scan showing tumor dimensions.

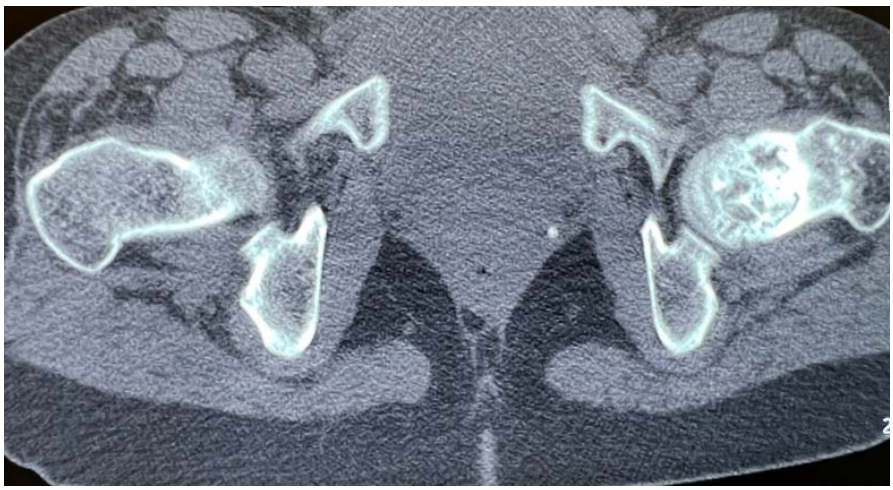

Figure 3. Coronal sections showing tumor thickness.

Based on these radiological images, the possibility of a giant osteoid osteoma was considered.

Wide resection combined with total hip arthroplasty was chosen due to extensive cortical destruction of the femoral neck and significant subchondral involvement, which rendered joint-preserving procedures unreliable. Curettage with bone grafting was considered; however, the anticipated residual structural weakness of the femoral neck posed a high risk of pathological fracture. Internal fixation alone would not have adequately addressed the lesion while ensuring long-

term mechanical stability. Therefore, total hip arthroplasty was deemed the safest and most definitive option in this advanced and destructive presentation.

The indication for wide resection and excision followed by total hip arthroplasty (**Figure 4**) was established and performed, with histopathological examination of the surgical specimen.

Figure 4. Total hip arthroplasty after resection.

Histological examination of the surgical specimen confirmed the diagnosis of osteoid osteoma of the femoral neck.

The postoperative course was marked by pain relief, and walking was possible with a pair of crutches on postoperative day 1.

3. Discussion

Osteoid osteoma is a relatively common benign tumor, representing 10% to 12% of benign bone tumors [1]. It preferentially affects young adults, with a predilection for long bones, particularly the femur and tibia [2]. However, its intra-articular location is rare, representing less than 13% of cases, and constitutes a diagnostic pitfall [3].

The main differential diagnoses included osteoblastoma, Brodie's abscess, stress fracture, and inflammatory arthropathy. Osteoblastoma was considered due to the lesion size but was less likely given the characteristic central nidus and clinical response to NSAIDs. Brodie's abscess was unlikely in the absence of inflammatory biological markers or systemic symptoms. Stress fracture was excluded based on imaging features and the absence of a history of mechanical overload. Inflammatory arthropathy was not supported by clinical or laboratory findings.

Clinically, the usual presentation involves typical nocturnal pain, rapidly relieved by non-steroidal anti-inflammatory drugs (NSAIDs) [4]. In intra-articular locations, this presentation can be atypical: limited mobility, reactive synovitis, or misleading mechanical pain [5]. In our case, the patient presented with chronic pain of a mechanical nature, without the nocturnal character or response to NSAIDs,

which contributed to delaying the diagnosis.

Standard imaging can reveal a lacunar lesion surrounded by osteosclerosis, but this presentation is less obvious within the joint [6]. Computed tomography remains the gold standard for identifying the nidus and assessing its extent [7]. In our case, it revealed a large lesion extending over nearly 5 cm, corresponding to a so-called "giant" form, an exceptional entity described in a few publications [8].

The treatment of osteoid osteoma relies on the complete excision of the nidus, the only tumor component. Traditional approaches include open surgery, but minimally invasive techniques, particularly percutaneous radiofrequency or laser ablation, are now preferred due to their efficacy and low morbidity [9] [10]. However, these techniques are limited in certain locations, especially intra-articular lesions or in cases of large lesions [11].

In our case, the size of the tumor and its location in the femoral neck made targeted, conservative excision impractical. Wide resection, although mutilating, was necessary to avoid a pathological fracture and ensure complete local control. Total hip arthroplasty was chosen to restore joint function and stability. Few similar cases are reported in the literature, where arthroplasty is considered an exceptional option reserved for destructive forms [12] [13].

The postoperative course was marked by rapid pain relief and an early return to walking, confirming the value of this approach in selected situations. This case, therefore, illustrates both the diagnostic difficulty of intra-articular osteoid osteomas and the need to adapt the therapeutic strategy to the extent of the lesion.

4. Conclusions

Osteoid osteoma of the femoral neck is a rare and often misleading location, which can lead to diagnostic delays. Diagnosis relies primarily on computed tomography (CT) to visualize the nidus. While minimally invasive percutaneous techniques are now the treatment of choice, some large or destructive forms necessitate more radical surgery. Total hip arthroplasty, although rarely reported, is an effective therapeutic option in these exceptional situations, allowing for complete tumor control and satisfactory functional recovery.

The desired treatment for osteoid osteoma should be simple, rapid, effective, and as inexpensive as possible.

Contrary to the literature's findings on the role of CT-guided percutaneous resection for small lesions, wide resection and total hip arthroplasty prove to be viable options for large tumors and those with a risk of pathological fracture of the femoral neck.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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