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HIP

Atypical hip pain: coexistence of femoroacetabular impingement (FAI) and osteoid osteoma

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Abstract The objective of this article was to emphasize the importance of including less common causes of hip pain in a differential diagnosis, particularly when clinical and radiographic variables are atypical. This article presents the case of a 52-year-old patient with a history of progressive hip pain resulting from the coexistence of both a femoroacetabular impingement (FAI) and an intraarticular osteoid osteoma. The intraarticular osteoid osteoma was initially overlooked due to its unremarkable features on radiographic and resonance imaging. Consequently, the patient was surgically treated for FAI with only partial relief. An osteolytic nidus characteristic of osteoid osteoma was discovered only 1.5 years following surgery. The patient was subsequently treated for osteoid osteoma with anti-inflammatories, after which his pain began to resolve. The patient was completely pain free after 7 months.
Level of evidence V.

Keywords Femoroacetabular impingement (FAI) · Osteoid osteoma · Hip pain

Introduction

Femoroacetabular impingement (FAI) is a well-known condition that causes mechanical hip pain in young adults and initiates inevitable damage within the joint, leading to secondary osteoarthritis [4]. In the last decade, abnormal osseous morphology (femoral and acetabular) has been increasingly recognized as a cause of hip pain and, possibly, primary hip arthritis [10, 11]. Patients with FAI are increasingly being treated with surgical intervention and obtaining good short-term results. However, there are less common hip conditions in young patients, which can exhibit clinical features similar to FAI, but which do not require surgical treatment. One such example is an osteoid osteoma. Osteoid osteomas are small, benign tumours often accompanied by severe pain, including night pain. An intraarticular osteoid osteoma, on the other hand, lacks this characteristic night pain and is less responsive to a non-steroidal anti-inflammatory drugs (NSAIDS) than a classical osteoid osteoma [1]. Intraarticular osteoid osteomas also show little or no signs of sclerosis due to a lack of new periosteal bone formation. Hence, the radiolucent nidus is often overlooked on initial radiographs, computerized tomography (CT) scans and magnetic resonance imaging (MRI). In fact, approximately 21 % of intraarticular niduses are not identified and a further 29 % poorly identified, on initial MRI [1].

Herein, the case of a 52-year-old male who presented with hip pain is reported. This patient was initially misdiagnosed with FAI, but was ultimately found to have an osteoid osteoma. There are few case reports and case series in the literature, such as this, that document concurrent causes of atypical hip pain and delayed diagnosis of an osteoid osteoma [9, 12]. Nevertheless, radiologists and orthopaedics surgeons should consider osteoid osteoma as part of the differential when diagnosing FAI. Correlation of history, clinical examination and radiological findings are extremely important in order to avoid misdiagnosis and provide patients with appropriate treatment and pain relief.

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Case report

A 52-year-old healthy male presented to a sports orthopaedic surgeon with a 1.5-year history of progressive left hip pain (sudden onset), which was activity dependent. Specifically, this pain was localized to the anterolateral aspect of the left hip. Occasionally, this pain radiated down to the anteromedial aspect of the left thigh as well. Initially, pain started with brisk walking and running, but soon progressed to daily activities and antalgic gait. As the hip pain progressed, the patient also started experiencing night pain, but there were no constitutional symptoms of weight loss or night sweats. The patient's pain was kept under control with naproxen, NSAID, as well as rest and protected weight bearing.

On examination, the patient had moderate tenderness over the groin area, just above the level of the greater trochanter. Hip flexion was restricted to 90°, as compared to 110° on the contralateral side. Internal rotation was also limited to 0° at 90° hip flexion, as compared to 30° on the contralateral side. Neurovascular examination was normal. Anterior impingement test on hip flexion, adduction and internal rotation was positive. Radiograph and MRI (Figs. 1, 2) findings were consistent with FAI. Specifically, the patient's MRI revealed a Cam-type impingement with an anterosuperior labral tear in the hip (Fig. 2). There was no arthritic change in the hip joint at this time, though there was evidence of oedema in the femoral neck (Fig. 2). The initial MRI also revealed no evidence of a nidus, which is characteristic of an osteoid osteoma, but did show non-specific, mild bone marrow oedema at the femoral neck. A bone scan was subsequently performed and found to be normal (image not provided). As a result, osteoid osteoma and stress fracture were both ruled out based on these initial findings.

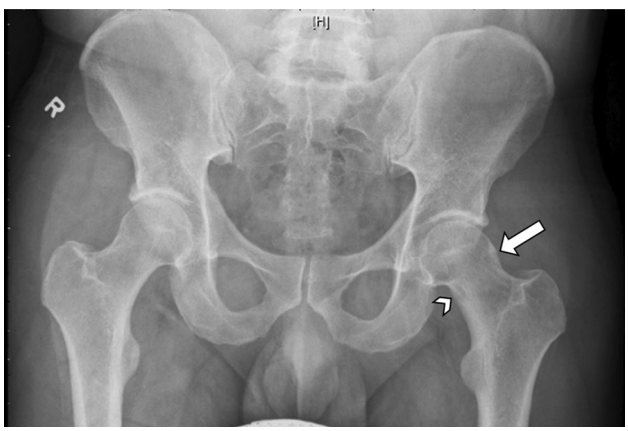

Fig. 1 Pre-operative X-ray showing Cam lesion and medial femoral neck thickening (*arrow*) characteristic of FAI; the nidus on the medial femoral neck (chevron), which was missed initially, can also be discerned radiographically

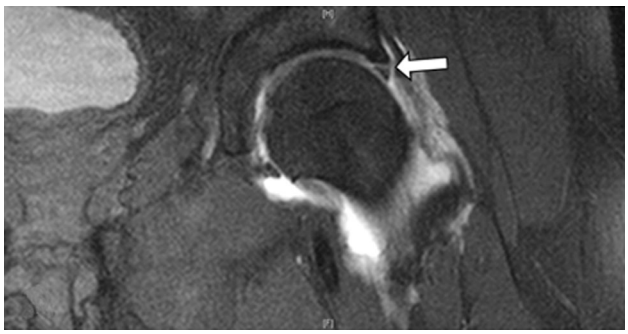

Fig. 2 Initial MRI coronal T1 image showing labral tear (*arrow*) and oedema

Following the FAI diagnosis, an intraarticular injection of 2 % lidocaine (5 ml) with depomedrol (80 mg) was administered in the hip joint. The patient experienced 20 % pain relief immediately after injection, which lasted for 2 months, after which pain returned to baseline. Non-operative modalities, such as physiotherapy, showed no benefit. Surgical intervention was discussed with the patient after non-operative treatments failed. A left hip arthroscopy was then performed 10 months following his initial visit.

During surgery, the patient was placed in supine position on a traction table and traction was applied. Standard trochanteric anterolateral, distal anterolateral and mid-anterior portals were made and access to the joint was achieved using the Seldinger technique [8]. The joint capsule was thickened, and synovium was inflamed. There was an anterosuperior labral tear accompanied by chondral wear, which was arthroscopically shaved and debrided. A bony bump at the femoral head–neck junction was noted consistent with Cam impingement. A head–neck osteoplasty was performed with a 5.5-mm burr. The hip was then tested for intraoperative range of motion (ROM), and no signs of impingement were noted. Standard follow-up visits were completed at 2 weeks, 6 weeks, 6 months and 1 year following surgery.

During the 2 weeks post-operative period, the deep-seated hip pain resolved and the patient's ROM (flexion and internal rotation) improved. However, the patient still had some anterior thigh pain. The anterior thigh and knee pain persisted at both the 6-month and 1-year follow-up visits and did not resolve with dedicated physiotherapy that utilized manual techniques (i.e. active-release therapy). Clinical examination at 1 year post-surgery was otherwise relatively benign. At this time, a repeat MRI was ordered to rule out labral re-tears and/or bony pathology in the left hip.

The repeat MRI was performed 1.5 years post-surgery and showed a mild increase in degenerative changes in the left hip and post-operative changes at the femoral head–neck junction, but no new labral tears (Fig. 3a). Moderate bone marrow oedema was noted on T1 fat-suppressed weighted signals, as well as cortical thickening (sclerosis) along the inferomedial aspect of the femoral neck and an

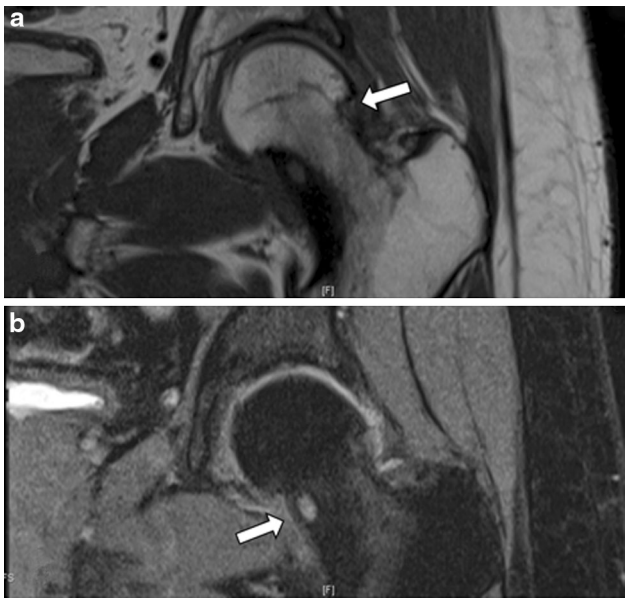

Fig. 3 Repeat MRI image 1.5 years post-surgery. **a** Coronal T1 image showing post-operative changes at the femoral head–neck junction osteoplasty; **b** coronal T1 fat-suppressed image showing the nidus over the medial femoral neck with thickening of neck and bone marrow oedema

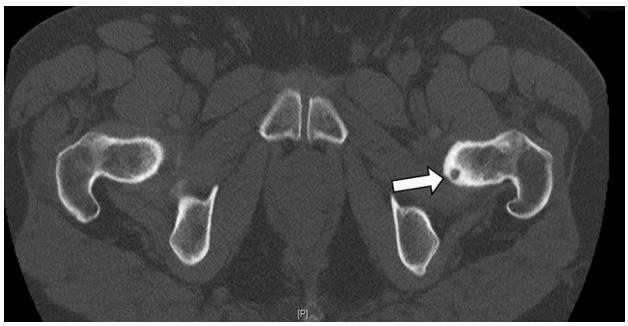

Fig. 4 CT scan (2-mm axial cut) approximately 2 years post-surgery showing the nidus with surrounding sclerosis

osteolytic nidus in the centre on T1 images (Fig. 3b). These findings were consistent with an osteoid osteoma. As a result, the patient was subsequently referred to an orthopaedic oncologist. A CT scan (Fig. 4) was ordered, which showed thickening of the medial neck cortex and a nidus, thus confirming the osteoid osteoma diagnosis. The patient was given another selective NSAID (meloxicam; 15 mg) for 2 weeks and reassessed. Of note, bone scan findings were not typical of an osteoid osteoma as no increased blood pool activity or hyperaemia was noted.

At the 2-week follow-up with the orthopaedic oncologist (2 years following the initial hip arthroscopy), the patient reported that his anterior thigh and knee pain had begun to resolve. Based on clinical examination, it was determined that the osteoid osteoma symptoms were subsiding. Non-surgical management with meloxicam was continued for another 4 weeks. The patient was completely symptom free 2.5 years after the initial hip arthroscopy and had no restricted ROM or pain upon examination.

Discussion

This case report highlights the importance of continuous work-up to uncover the cause of patient symptoms and to enhance patient outcomes. In the case presented herein, an intraarticular osteoid osteoma, which was the original source of pain, was overlooked on initial radiographs. However, persistence of the patient's symptoms after surgery led the clinician to further investigate and seek the opinion of a multidisciplinary team; this eventually led to the correct diagnosis and improved patient outcome. Of note, up to 25 % of osteoid osteomas are located on the proximal part of the femur, and 5–12 % of all osteoid osteoma are intraarticular [6]. Intraarticular osteoid osteomas remain a diagnostic challenge because of their atypical symptoms and atypical appearance on conventional radiographs [1, 12]. Intraarticular osteoid osteomas have little or no evidence of sclerosis because they often lack new periosteal bone formation. Hence, the radiolucent nidus is often overlooked on initial radiographs, CT and MRI. In addition, both femoroacetabular impingement (FAI) and intraarticular osteoid osteomas are potential sources of similar hip pain. Intraarticular osteoid osteomas, however, lack night pain typical of osteoid osteomas and are less responsive to NSAIDS [1]; thus, misdiagnosis of an osteoid osteoma is highly possible [9]. Increased FAI awareness (among both surgeons and physicians) and its prevalence in the asymptomatic general population make it is possible for other potential causes of pain to be missed as well. In the case described herein, the patient had an atypical clinical presentation of an intraarticular osteoid osteoma, which was already subsiding on the initial MRI and bone scan, and thus not detected when the patient initially consulted with the sports physician.

Osteoid osteomas can also lead to reactive bone formation, causing Cam impingement and labral tears. As a result of this coexistence, osteoid osteomas become more challenging to diagnose. Moreover, MRIs are not the ideal modality for diagnosing osteoid osteomas; CT scans are much more sensitive and, thus, considered the gold standard for detecting and diagnosing osteoid osteomas both in adults and paediatric population [2, 5]. The initial musculoskeletal radiologist in this case did, in fact, notice bone marrow oedema and medial femoral neck thickening on the initial MRI [3]; however, he ruled out stress fracture and osteoid osteoma based on the lack of nidus and the initial negative bone scan, thereby considering these as non-

specific findings [7]. Of note, a negative bone scan is possible in the case of an intraarticular osteoid osteoma, whereas a bone scan for a typical extraarticular osteoid osteoma shows increased activity (i.e. 'hot spots') [12]. In this particular case reported, a repeat bone scan from 1 year and 8 months post-surgery showed increased osteoblastic bone turnover at the femoral neck, which is consistent with changes following arthroscopy, but not typical of active osteoid osteomas. Consequently, the patient showed significant improvement following treatment for the osteoid osteoma with anti-inflammatories and was completely pain free after 2.5 years.

Our theory that the patient had an intraarticular osteoid osteoma that was slowly subsiding at the time of initial presentation was further consolidated by the fact that the patient had only partial relief of symptoms following the initial intraarticular injection. Because Cam impingement is a frequent source of symptoms in the same area and because intraarticular osteoid osteomas are generally not visible on radiographs, misdiagnosis is highly possible. It is important to be mindful of less common conditions that should be considered in the differential diagnosis for hip pain. These less common conditions include osteoid osteoma, pigmented villonodular synovitis (PVNS), synovial chondromatosis, osteonecrosis, femoral neck stress fractures and, least frequently, bone and soft tissue sarcomas [9].

Conclusion

As the awareness of FAI grows, it is tempting to diagnose impingement in patients who present with hip pain. However, the presence of FAI morphology does not necessarily mean that FAI is the primary source of hip pain [9]. Other less common causes of hip pain, which are often overlooked, should also be included in the differential diagnosis, especially when atypical clinical and radiological signs are found [13]. The outcome of this case thus emphasizes the importance of correlating patient history with both clinical and radiological findings in order to arrive at an accurate diagnosis and devise an effective treatment plan.

Conflict of interest The authors declare that they have no conflict of interest.

Ethical standards The manuscript does not contain clinical studies. Informed consent was obtained by the included patient, and details that might disclose the subject's identity were omitted.

References

1. Allen SD, Saifuddin A (2003) Imaging of intraarticular osteoid osteoma. Clin Radiol 58(11):845–852
2. Assoun J, Richardi G, Railhac JJ, Baunin C, Fajadet P, Giron J, Maquin P, Haddad J, Bonnevialle P (1994) Osteoid osteoma: MR imaging versus CT. Radiology 191(1):217–223
3. Gaeta M, Minutoli F, Pandolfo I, Vinci S, D'Andrea L, Blandino A (2004) Magnetic resonance imaging findings of osteoid osteoma of the proximal femur. Eur Radiol 14(9):1582–1589
4. Ganz R, Parvizi J, Beck M, Leunig M, Notzli H, Siebenrock KA (2003) Femoroacetabular impingement: a cause of osteoarthritis of the hip. Clin Orthop Relat Res 417:112–120
5. Hoselkar HS, Garg S, Moroz L, Pollack A, Dormans JP (2005) The diagnostic accuracy of MRI versus CT imaging for osteoid osteoma in children. Clin Orthop Relat Res 433:171–177
6. Jaffe HL (1935) Osteoid osteoma: a benign osteoblastic tumor composted of osteoid and atypical bone. Arch Surg 31:709–728
7. James SL, Connell DA, O'Donnell P, Saifuddin A (2007) Femoroacetabular impingement: bone marrow edema associated with fibrocystic change of the femoral head and neck junction. Clin Radiol 62(5):472–478
8. Vaughn ZD, Safran MR (2011) Supine approach to hip arthroscopy. In: Sekiya JK, Safran M, Ranawat AS, Leunig M (eds) Techniques in hip arthroscopy and joint preservation: expert consult. Elsevier Saunders, Philadelphia, pp 88–94
9. Mainzer J, Ganz R, Tibor L, Leunig M (2012) Not all hip pain is impingement: femoral neck osteoid osteoma in a patient with a coexisting Cam deformity. JBJS Case Connect 2(3):e311–e315
10. Norman A, Abdelwahed IF, Buyon J, Matzkin E (1986) Osteoid osteoma of hip stimulating an early onset osteoarthritis. Radiology 158(2):417–420
11. Notzli HP, Wyss TF, Stoecklin CH, Schmid MR, Teiber K, Hodler J (2002) The contour of femoral head–neck junction as a predictor for the risk of anterior impingement. JBJS Br 84(4):556–560
12. Szendroi M, Kollo K, Antal I, Lakatos J, Szoke G (2004) Intraarticular osteoid osteoma: clinical features, imaging results, and comparison with extraarticular localization. J Rheumatol 31(5):957–964
13. Vaz IM, Castro M, Cabete S, Rocha JA, Brito I (2009) Hip pain in young adults: a case report and review of the literature. Acta Rheumatol Port 34(4):656–662