

Case Report



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Atypical Osteoid Osteoma of Proximal Femur and its Surgical Challenges: A Technical Note on 'Wandering Nidus' and Double Lesion

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Abstract

Introduction: Osteoid osteomas are painful benign bone tumors, accounting for 10% of overall primary bone tumors. Typical osteoid osteomas are located intracortical or intramedullary in the metadiaphyseal region of the long bones. The Atypical ones are the Juxta and Intraarticular type, posing greater challenges in its diagnosis and management. CT and MRI scans have better chances of defining the nidus lesions in Atypical osteoid osteoma of the hip joints. Surgical treatment options include, image guided percutaneous interventions such as Radio frequency ablation, Laser or Cryo ablation. These modalities achieve surgical cure, but lacks the opportunity for a histo-pathological confirmation. Our cases will highlight the 'wandering nidus' in hip osteoid osteoma and the possibility of dual pathology (Osteoid osteoma and Osteomyelitis) in the same hip.

Case study: We present two cases of hip joint osteoid osteomas (aged 18 yrs and 10 yrs) to highlight the diagnostic challenges and to discuss the different methodology of treatment. CT scan with additional MRI studies confirmed the radiological diagnosis after a delay of 6-8 months. The first case will highlight the wandering nature of the nidus (explained by the position of the calcific spicule within the nidus with reference to the needle tip), the challenges for needle trajectory with close proximity to femoral vessels and the "coaxial technique using chopstick maneuver" for CT guided needle excision. The second case will highlight the feasibility of percutaneous excision and surgical curettage in the presence of dual pathology.

Conclusion: Both the cases were successfully treated by CT guided needle excision biopsy and had the histopathological confirmation. Needle technique allows confirmation of diagnosis and exclusion of other differential pathology.

Keywords: Wandering nidus, Atypical osteoid osteoma hip, Chopstick maneuver, Coaxial technique, Double hip lesion.

Introduction

Osteoid osteomas (OO) are painful benign bone tumors common over the age of 5 and under 30 years of life [1, 2] Pain is the most common presenting symptom and associated night pains get relieved with NSAIDS [2] The typical locations are intra cortical or medullary in the meta diaphyseal region of long bones in 80% of cases as per Edeiken's classification [10] The atypical ones are either juxta or intra articular lesions. The etiology of pain is due to the vascular and innervated nidus with high levels of prostaglandins and raised osseous pressure in the zone of lesion [2]. Radiolucent central nidus lesion < 2cm surrounded by a dense sclerotic rim of bone is better defined with a CT scan [7] than the plain x rays.

In atypical osteoid osteomas, the symptoms can be nonspecific. The 'classical night pains' may not be present and patients can have varied spectrum of presentations [5], that delays the initial diagnosis. Hip joint osteoid osteomas can present clinically as synovitis hip, fixed joint deformity, antalgic gait or limb length discrepancy

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Figure 1A: X-ray pelvis with both hips- difficult to point the lesion even in retrospect. **1B-** MRI; **1C-** CT sections with the pointer showing the nidus in the antero-superior region on the left hip.

Minimally invasive percutaneous radiofrequency ablation is a superior option [4] and is considered the gold standard method over open surgical treatment but it lacks the opportunity to have pathological confirmation. CT guided needle excision and curettage achieves the surgical goal and also facilitates sample collection for pathological confirmation.

Case 1

18-year-old student presented with 6 months history of left hip pain, worsening over time with weight-bearing activities. He had no trauma or associated fever to suggest an infective pathology. His pain pattern had relief with rest and NSAID's but the ongoing symptoms prevented him from sports-related activities. Clinical examination revealed an antalgic gait with no fixed deformity of the hip. His terminal active and passive range of flexion and rotations were painful and restricted.

Initial x-rays were equivocal (Fig. 1a, 1b). The radiological diagnosis of osteoid osteoma was made with an MRI and CT correlation. Supero- lateral aspect of the head and neck junction on the anterior side showed a characteristic central nidus surrounded by a very thin sclerotic rim lesion. Being an intra-articular location, the classical sclerotic bony rim was not a standing out feature as expected in a classical Osteoid osteoma.

Surgical options were challenging. Risks of the articular surface damage in doing radiofrequency ablation was contemplated. Under general anesthesia and patient in supine position, CT guided surgical needle excision biopsy was performed within the CT suite of our radiology department.

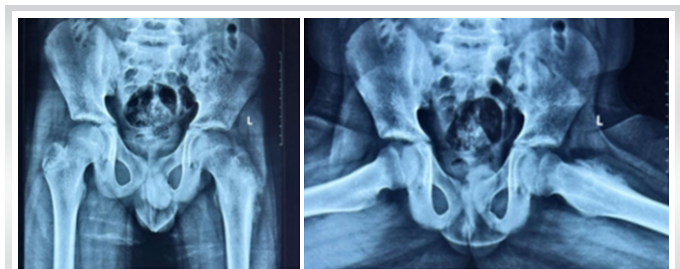


Figure 3: Xray pelvis AP and Frog lateral views: Shows the periosteal reaction around the left sub trochanteric region.

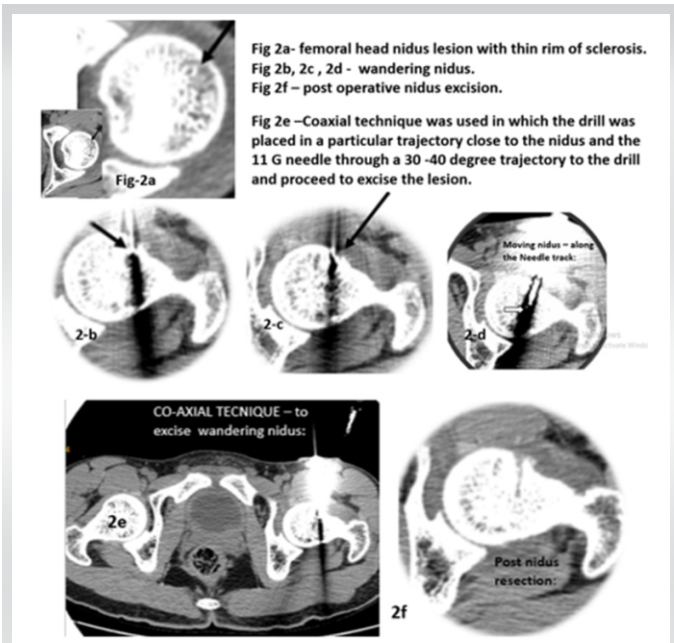


Figure 2: Please give a detailed description of chop-stick technique with the help of these figures.

CT planning and Intraoperative finding (wandering nidus):

His femoral vessels on the needle's perpendicular trajectory was anticipated and avoided. Pre marked site was drilled with 4.0 mm cannulated reamer after a guide placement in an oblique trajectory and size 11 G Murphy needle was used for the procedure. With the lack of dense sclerotic rim lesion, the 'wandering nidus' was guided by the small calcific spicule within the radiolucent nidus (Fig. 2a, 2b, 2c, 2d).

With reference to the needle tip the nidus kept moving constantly anterior to posterior and along the axis of the needle. "Coaxial -technique" using chopstick maneuver was used in which the drill was placed in a particular trajectory close to the nidus and the needle through a different trajectory to excise the lesion (Fig. 2e). Post excision the CT scan confirmed the disappearance of the calcific spicule and the nidus (Fig. 2f). Sample sent for histopathological examination confirmed osteoid osteoma. It showed bony trabeculae with a nidus of woven bone with haphazard trabeculae and prominent osteoblastic rimming along with some benign cartilage.



Figure 4 a,b: MR section of the trochanteric region showing the nidus suggestive of Osteoid osteoma.

Post-procedure patient recovered and had good pain relief. He was mobilized touch weight bearing for few weeks. At one year follow up he remained asymptomatic with his daily routine activities. He was also able to return back to his sports activities.

Case 2:

A 10-year-old boy presented with insidious onset of left hip pain for 8 months duration, without history of fever and trauma. He had no past medical issues or involvement of any other joint. Initial diagnostic attempts and treatment was from an outside hospital. He had persistent symptoms on his activities of daily living with weight loss of 3 kg over 3 months duration. On general assessment he had a thin built with appropriate weight for height. Local examination revealed no fixed deformity of left hip. Associated trochanteric tenderness with restricted terminal range of movements and antalgic gait were present. Initial blood values showed WBC– 10,300 units; ESR-16mm/ 60 mts; CRP– 0.9 units. Initial x-ray pelvis showed sub trochanteric lesion with periosteal reaction, suspected of osteomyelitis (Fig. 3).

Diagnostic dilemma in double lesions:

Additional CT and MR correlation showed the dual pathology of Osteoid osteoma of the greater trochanter (Fig. 4a, 4b) and suspected osteomyelitis of the proximal femur. MR showed the intra medullary and periosteal reaction with soft tissue extension at the the sub trochanteric region (Fig. 5a-d).

Procedure: Under general Anesthesia and patient in supine position, CT guided needle excision biopsy of the trochanteric lesion was done. Additionally, for the sub trochanteric intra-medullary lesion with periosteal reaction percutaneous curettage was performed. The lesion was wide and large that enabled us to use percutaneous surgical curette to excise the lesion. The needle resected lesion from the greater trochanter

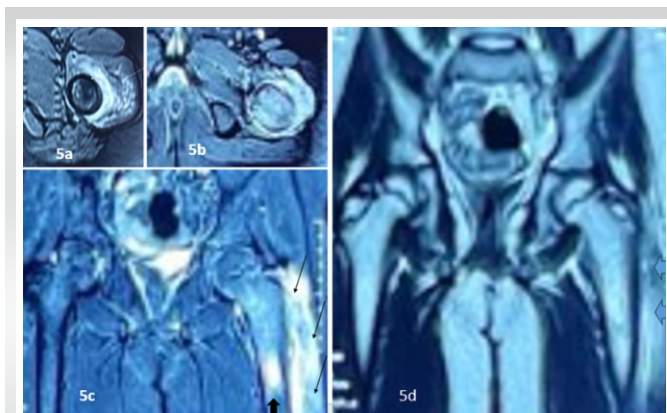


Figure 5: 5a,5b: MR axial sections showing the intra medullary extent of lesion with odema @ subtrochanteric level. 5c, 5d : signal changes with soft tissue extension beyond the lateral cortex of the sub trochanteric level in addition to extent of medullary canal extension.

confirmed osteoid osteoma and the sub trochanteric curettage sample had features of osteomyelitis but cultures grew no organism. Empirical antibiotics were continued for 2 weeks but stopped as his repeat inflammatory markers were all normal. Postoperatively he had uneventful recovery and good pain relief. He returned back to his active routine by the end of 6 weeks and at 6 months follow up he remained symptom free.

Discussion

Osteoid osteoma is a painful bone tumor that accounts for 10% of all benign bone tumors [2]. Musculoskeletal-society tumor board classifies them as stage 2 lesions [5]. Adolescents and young adult males are more commonly affected. Lower limbs are more common than upper limbs and typical osteoid osteomas accounts for 80-90% of cases [10]. Kayser et al classified them as sub periosteal, intracortical, and Intra medullary types, sub periosteal being the least common type [3]. The nidus represents the active vascular and neural network of tissue with active osteoblastic activity [9]. The unmyelinated fibers [11] with raised levels of prostaglandin E2 and raised intraosseous pressure causes nocturnal pain and relief with NSAIDs.

Atypical cases are uncommon and seen in the intra or juxta articular regions and can vary in their clinical presentation. Atypical Intra-articular osteoid osteoma accounts for 16% [9] and hip joint accounts for 50% of cases. Recurrent joint effusions, painful limp and persisting gait abnormality could be a feature of hip joint case. The less common spinal OO mostly affect the posterior elements and can present as back pain or associated scoliosis. The differential diagnosis for intraarticular osteoid osteoma needs to exclude infective causes, inflammatory causes including juvenile rheumatoid arthritis and reactive inflammatory effusions. Brodie's abscess needs to be excluded in intra cortical cases where the sequestrum is irregular but smooth inner margin will be a suggestive feature of Osteoid osteoma [7]. Growth arrest secondary to osteoid osteoma involving the physal zone needs to exclude physal bar and other causes.

Atypical presentation invariably delays diagnosis and the specific treatment. X-rays alone may not be ideal as the nidus may get masked by the sclerotic reaction. Intra articular cases lack sclerotic bone formation due to the lack of cambium layer. In atypical cases selective CT scan, MRI, and Isotope bone scan are the useful tools [8]. Aynaci et al reported a double nidus associated case [12]. He highlights the literatures with multiple niduses where in it mandates addressing multiple niduses, otherwise it is likely to have recurrences.

Some authors believe these cases are self-limiting and they undergo self-reparative process of healing without any intervention. If symptomatic despite medical management, then surgical intervention aims at percutaneous interventions

through CT, MR, Fluoroscopy, and Ultrasound guided ablation or removal of the nidus lesion. Minimally invasive approach always reduces the post-procedural morbidity, hospital stay and rehabilitation period [4]. Arthroscopic removal also remains a viable option.

Radiofrequency ablation remains an effective method [5, 6] but lacks the histopathological confirmation. Elodie Santiago et al showed even Cryo-ablation of the selective lesions has been very effective and can be performed without general anesthesia but availability and cost factors are the concern. In atypical juxta-articular and intra-articular cases, pre-operative clear definition of the lesion is mandatory. The ultimate aim of treatment is to destroy the inflammatory nidus and to have histopathological confirmation. Needle trajectory should be safe and away from the neurovascular bundles. Also, with the lack of thick sclerotic rim, the wandering nidus can be challenging for needle excision. Guided by the calcific spicule within the nidus, the Chopstick technique allows effective needle excision and also aids in histopathological confirmation. In case of dual pathology, CT guided percutaneous intervention allows needle biopsy for the nidus and curettage of the suspected osteomyelitis focus.

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Declaration of patient consent : The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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