Imaging in Osteoid Osteoma

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ABSTRACT

Osteoid osteoma is a benign osseous lesion which is mostly found in the appendicular skeleton. It produces excess bone and secretes pain-causing prostaglandins, resulting in intense night pain that is temporarily relieved by Aspirin or Ibuprofen. Few of the osteoid osteomas resolve spontaneously and some respond to a less-invasive procedure which is known as radiofrequency ablation. Surgical intervention is usually necessary for the rest. The imaging findings of osteoid osteoma are presented in this article.

Key Words: Osteoid osteoma, Nidus, CT, MRI

CASE SERIES

Case 1 A plain radiograph of a 22 years old male with pain and tenderness in the left thigh showed an ill defined region of increased cortical thickness near the lesser trochanter [Table/Fig-1a]. Plain MRI showed a hypo intense cortical thickening along the lesser trochanter [Table/Fig-2a & b]. Axial and coronal CT reformations showed a calcified nidus and excessive cortical thickening near the lesser trochanter [Table/Fig-1b and c], thus confirming the diagnosis of osteoid osteoma.

Case 2 A thoracic spine radiograph in a 19 years old male with mid thoracic pain, revealed the loss of the D4 vertebral pedicle [Table/Fig-3a], a calcified nidus and an early cortical thickening in the pedicle on the left side on CT [Table/Fig-3b] and a hypo intense nidus on all the MRI sequences [Table/Fig-3c].

Case 3 A radiograph of the left thigh in a 24 years old male with tenderness, revealed a poorly defined region of intertrochantric lucency [Table/Fig-4a and b], and a calcified nidus on axial CT [Table/Fig-4c].

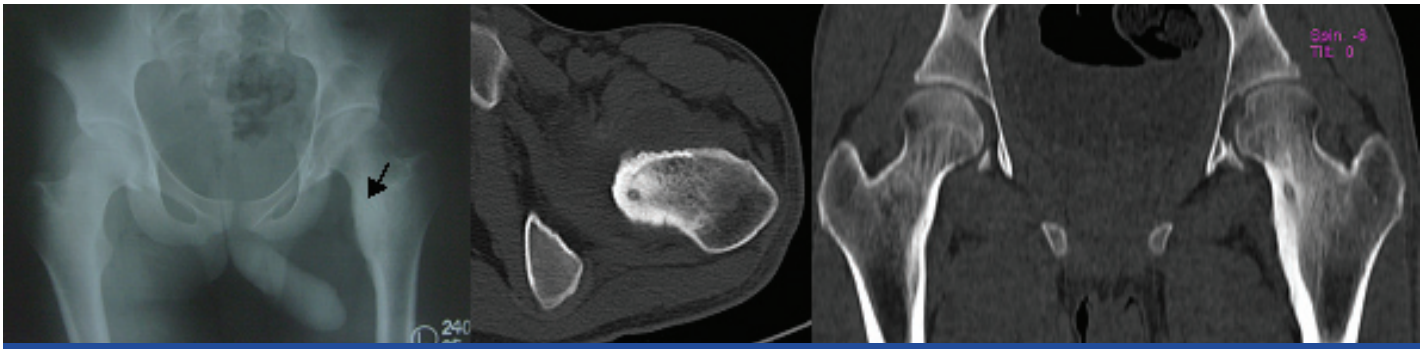
DISCUSSION

Osteoid osteoma is a benign osteoblastic bone neoplasm of unknown aetiology, which is usually < 1.5 cm in size, having a central core of vascular osteoid tissue and a peripheral zone of sclerotic bone [1]. It has fibrous tissues with varying amounts of osteoid or poorly formed bone spicules. 90% of the cases are < 25 years of age. It is commonly seen in males and mostly in the long bones and the vertebral arch. The classic presentation includes focal bone pain which worsens at night and is relieved by aspirin [2]. Its characteristic is a sclerotic bone island with a circular lucent defect (nidus), which is associated with overlying cortical and endosteal bone sclerosis. This can be intramedullary, subperiosteal or intacortical [3].

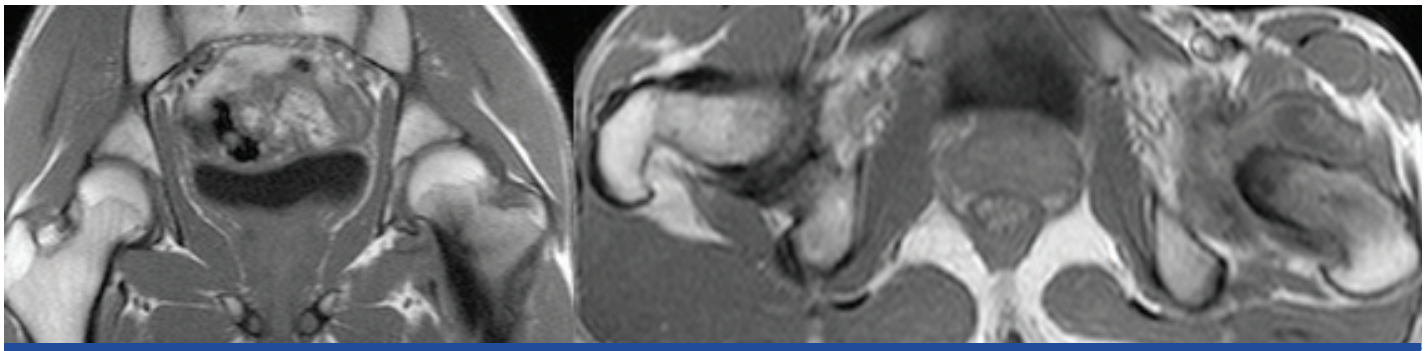
The classic radiographical appearance is that of a centrally located, one or more, round, < 1.5 cm sized radiolucent nidus, which is surrounded by a zone of uniform bone sclerosis and cortical thickening which is caused by endosteal and subperiosteal new bone formation. The nidus differentiates an osteoid osteoma from a stress fracture (which is accompanied by a linear, radiolucent, cortical area) and an osteoblastoma (which is commonly a larger lesion). CT is the best option to show the nidus [1] as in cases 1 and 2, provided that adequate window settings are used to identify and precisely locate the lesion to provide guidance for percutaneous treatment [4].

MR imaging is better than CT in showing intramedullary and soft tissue changes [5] and when the nidus is in a cancellous location [6] or when there are unexplained areas of bone marrow oedema [7]. The MRI findings may simulate a malignant tumour or osteomyelitis due to the marrow and soft tissue oedema. Therefore, MR imaging alone may lead to misdiagnosis.

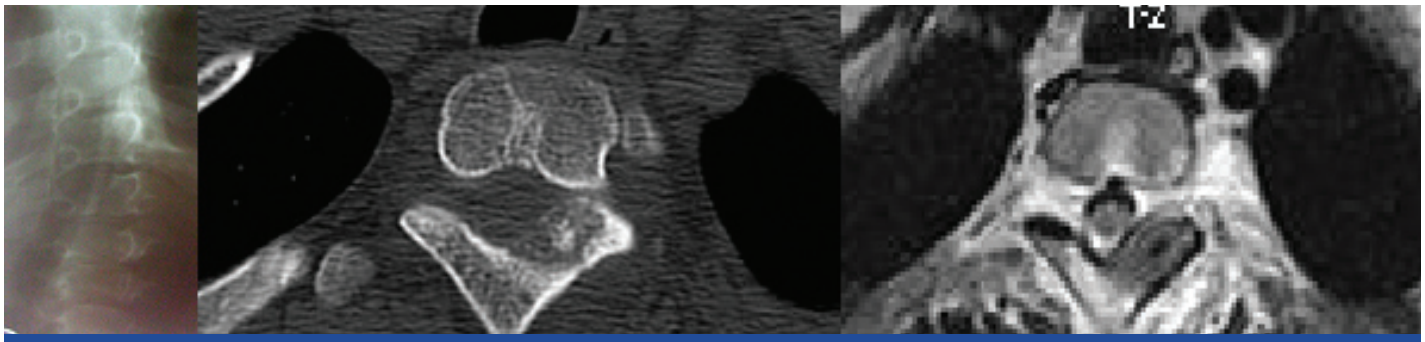
In our cases, sclerosis and cortical thickening due to subperiosteal bone formation was noted in the plain radiograph, with a questionably visualized radiolucent nidus and calcification within it. The location of the nidus, intranidal calcification, sclerosis, mature periosteal bone



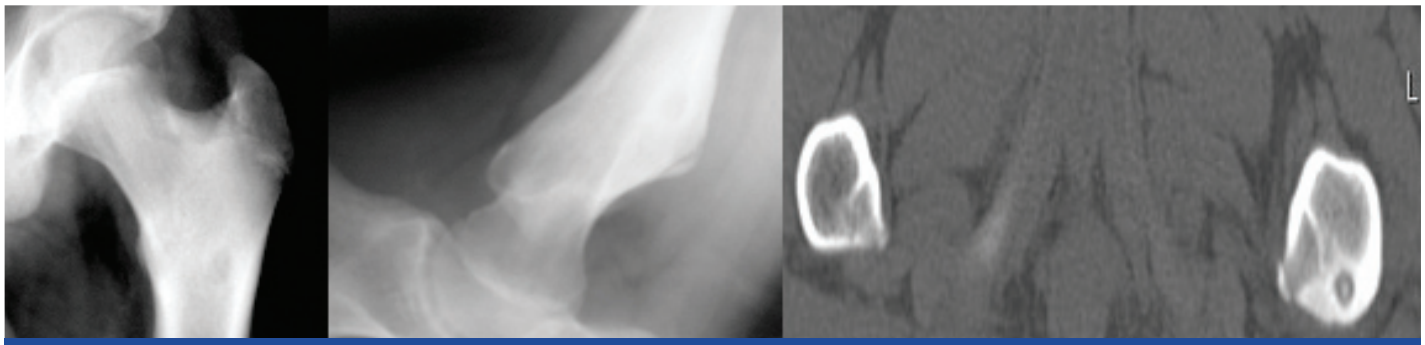
[Table/Fig-1]: Plain radiograph (a) reveals an illdefined region of increased cortical thickness (arrow) and CT axial (b) and coronal reformatted (c) reveals the presence of small well defined calcified nidus and dense cortical thickening near lesser trochanter.



[Table/Fig-2]: MRI coronal (a) and axial (b) images reveal hypo intense cortical thickening along lesser trochanter with welldefined small hypointense lesion adjacent to it (arrow).



[Table/Fig-3]: Radiograph of the thoracic spine (a) reveals questionable loss of D4 vertebral pedicle (arrow) and axial CT (b) and axial T1W MRI (c) showed the presence of small well defined calcified nidus with surrounding cortical thickening in the pedicle on left side (arrow).



[Table/Fig-4]: Radiograph of the thigh (a and b) reveals an illdefined region of lucency near intertrochantric region (arrow) and axial CT (c) shows the presence small well defined calcified nidus.

formation and the location of the original cortex were precisely demonstrated by CT. MRI also clearly showed the partially calcified nidus and the associated cortical thickening. In addition, the MR images revealed mild marrow and soft tissue oedema in the vicinity of the nidus, which were not demonstrated by CT.

CONCLUSION

We believe that CT, as well as MRI, have complimentary roles in evaluating osteoid osteomas.

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