Osteoid osteoma of the femur: masquerading the tethered cord syndrome

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ABSTRACT

We present an illustrative case of osteoid osteoma of the femur, in an 11 year old male child where the clinical features were masquerading the diagnosis of tethered cord syndrome and lead to the delay in diagnosis.

CASE REPORT

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INTRODUCTION

Osteoid osteoma is a benign bone tumor, most commonly located in the femur or tibia and an infrequent but important cause of musculoskeletal pain (that characteristically responds to mild analgesics) in children and young adults. (1-5) However it can be difficult to make an early diagnosis, particularly when these lesions present with neurological signs and symptoms. (2,5,7) We present an illustrative case of osteoid osteoma where the clinical features were masquerading the diagnosis of tethered cord syndrome and lead the delay in diagnosis.

CASE REPORT

11 year male child presented with pain in right lower limb starting from the hip and radiating to the knee and ankle of three year duration. It was more at night and was relived by analgesics. The parents also noticed the progressive and diffuse wasting (Fig. 1) of the right thigh and leg. There was no history of fall. There was history of mild fever for 2-3 days that could subside with medication. He was seen at a peripheral hospital for last one and half year and was diagnosed to have tethered cord syndrome and investigated accordingly. His X-ray hip (one half year back) was apparently interpreted normal (Fig. 2A). His lumbo-sacral spine MRI was normal. There was no history of bowel/bladder disturbances or weakness in the left lower limb. His general and systemic examination was normal. Higher mental functions, cranial nerves and motor and sensory examination in upper limbs and left lower limb was normal. There was gross wasting of the left thigh and leg muscles (Fig. 1). Motor power was grade 4/5 in right lower limb with diminished reflexes. Plantar reflex was flexor. There were no sensory deficits. Based on these findings the diagnosis of tethered was questioned and a repeat X-ray of the hip joints was performed that showed a cortical based lytic lesion in the right proximal femoral diaphysis with sclerotic margins suggestive of osteoid osteoma (Fig. 2B). The CT scan confirmed the diagnosis (Fig. 3).

DISCUSSION

Based on the clinical features, mode of presentation, and site of the lesion, patients with osteoid osteoma can present with neurological problems (predominantly disturbance of gait

and muscle wasting, with pain being a less prominent feature), orthopedic problems (hip or leg pain), without neurological symptoms or signs (only local or referred pain) and with a palpable bony swelling that can be associated with localized pain. (6) When osteoid osteoma patients present with radicular pain and neurological signs particularly atrophy, weakness, and diminished deep tendon reflexes of the affected limb, (2,6-8) than these can simulate lumbar spinal disease resulting in unnecessary neuroradiological investigations. (7,9) This can be partly because the characteristic radiological findings may not appear until late in the course of the disease. (5,6) Radiographically osteoid osteoma is visualized as a radiolucent nidus with a moderate reactive sclerotic rim. (10) High resolution CT scan will reveal well a defined sclerotic lesion with a central lucency suggestive of osteoid osteoma and is a specific and sensitive imaging modality for the diagnosis. (4,6,11) High-resolution images, thin section MR imaging help to clearly identify the nidus as well to visualize the reactive edema surrounding the lesion. (12) On MR imaging, the nidus appears as low or intermediate signal on T1-weighted images, variable signal on T2-weighted images, variable contrast enhancement after IV gadolinium administration and there may be associated, high signal in the bone marrow and soft-tissue abnormalities on T2- weighted images adjacent to the osteoid osteoma. (13) Initially it was recognized that osteoid osteoma can present with a wide spectrum of MR signal appearances and may instead point toward diagnoses of more aggressive tumors or infections that would lead to misdiagnosis. (14-17) This could be partly explained by the use of non-contrast enhanced MR imaging techniques, insufficient spatial resolution and obscuration by surrounding marrow and periosteal edema and a static non-dynamic mode used in gadolinium-enhanced MR imaging. (18) Recently MR imaging with higher spatial resolution techniques has demonstrated a nidus in all the patients (n=10) of with suspected osteoid osteoma and outperformed CT in two (out of five) patients. (19) It has also been demonstrated that dynamic gadolinium-enhanced MR imaging can depict osteoid osteomas with greater conspicuity than non-enhanced MR imaging techniques and with equal conspicuity compared with thin-section CT. (19) Technetium labeled MDP (Tc-99m-MDP) bone scan in osteoid osteoma demonstrates increased radiotracer on scintigraphy with increased uptake on blood-flow, blood-pool and delayed phases. The nidus is characterized by an intense area of radiotracer uptake and the sclerotic bone less intense uptake, a pattern has been called double-density sign virtually pathognomonic of osteoid osteoma. This helps to differentiate these lesions form osteomyelitis (has a more uniform pattern of radiotracer uptake), and an abscess cavity (that may actually have decreased radiotracer uptake). (20,21) The initial management of osteoid osteoma consists of oral administration of non-steroidal anti-inflammatory analgesics (NSAIDs). Definitive management of osteoid osteoma consists of en bloc excision of the tumor including nidus and some surrounding bone. (22) Apart from en-bloc resection, intralesional resection and percutaneous excision or destruction of the nidus, arthroscopic removal of the lesion in intra-articular locations, (1) CT-guided percutaneous RF ablation of osteoid osteomas using the water-cooled probe (23) and CT-guided thermo-ablation with radiofrequency (3) can be performed. Diagnosis of osteoid osteoma requires an accurate clinical history and most importantly an awareness of the possibility of the diagnosis. (6)

TEACHING POINT

Osteoid osteoma is an infrequent but important cause of musculoskeletal pain, however it can be difficult to make an early diagnosis, particularly when these lesions present with neurological signs and symptoms. In such cases the diagnosis of osteoid osteoma requires an accurate clinical history and most importantly an awareness of the possibility of the diagnosis.

ABBREVIATIONS

CT - Computerized tomography
MDP - Methylene diphosphonate
MRI - Magnetic resonance imaging
NSAIDs - Non-steroidal anti-inflammatory analgesics
RF - Radiofrequency

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FIGURES

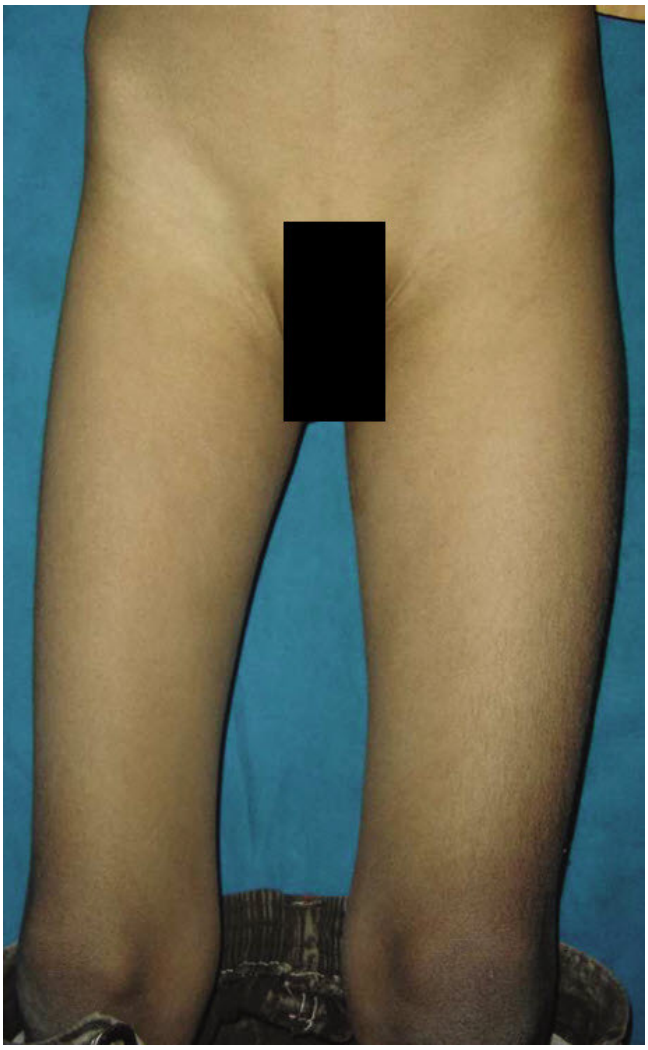
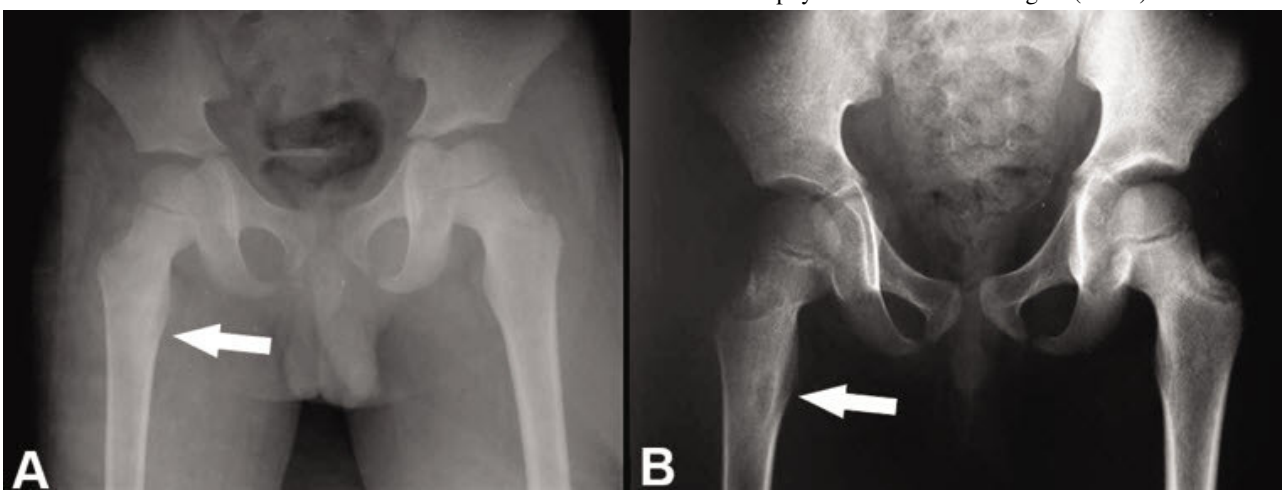


Figure 1 (top): 11 year old boy with an osteoid osteoma of the femur masquerading the tethered cord syndrome. Clinical photograph showing diffuse wasting of right vastus lateralis, vastus medialis, and gastrocnemius muscles

Figure 2 (bottom): Initial X-ray (AP view) (A) femur was apparently normal however, in retrospective it showed a faint ill-defined sclerotic lesion (arrow), latest x-ray (B) showed a cortical based well defined lytic lesion in the right proximal femoral diaphysis with sclerotic margins (arrow).



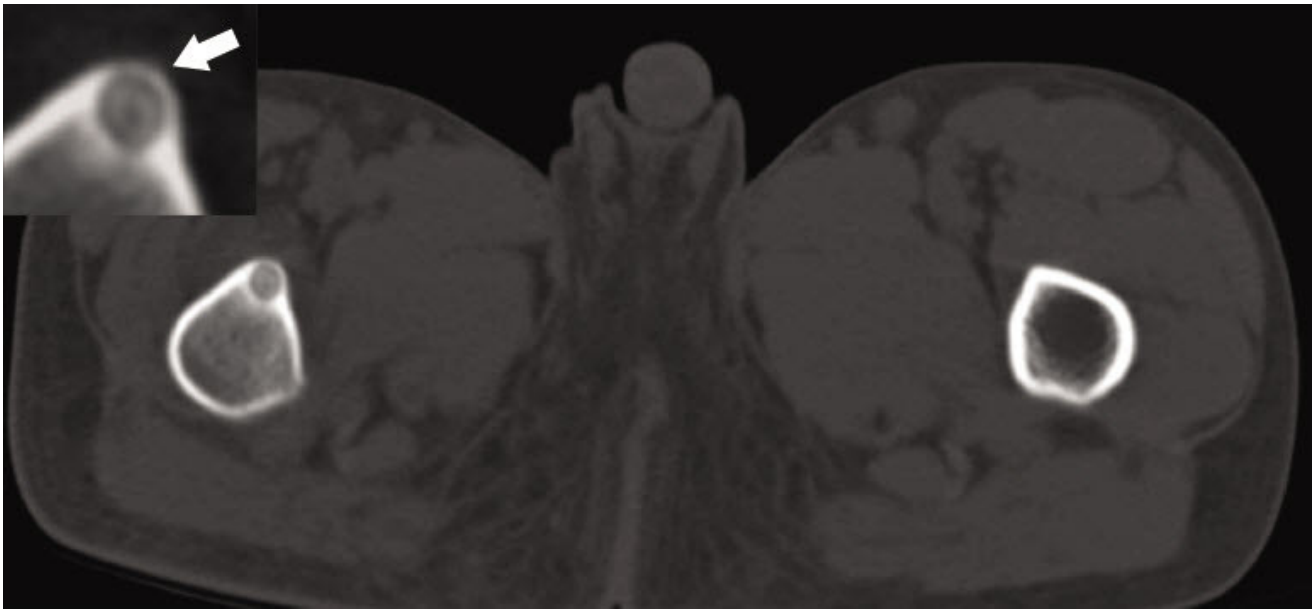


Figure 3: 11 year old boy with an osteoid osteoma of the femur masquerading the tethered cord syndrome. Non-contrast CT scan in bone window showing a well defined, round cortical lesion in the medial subtrochanteric area with a lucent center and a calcified nidus (inset showing enlarged view)

KEYWORDS

Osteoid osteoma, tethered cord syndrome, pediatric tumor, femur