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Answers to Medical Quiz

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1. Routine radiograph (Fig 1) showed scoliosis at mid dorsal level. Vertebral bodies and disc spaces were maintained.

2. CT scan (Fig 2) demonstrated a radiolucent nidus with high density in the centre surrounded by reactive sclerosis measuring about 1cm consistent with osteoid osteoma. Bone scan (Fig 3) shows fairly intense activity at the site of lesion.

3. Important differential diagnosis are;
   Osteoid Osteoma
   Osteobalstoma
   Brodie abscess
   Osteomyelitis / granuloma
   metastasis (unlikely)

4. Treatment involves image guided biopsy followed by surgical removal of nidus.

DISCUSSION

Osteoid ostoema is a well-recognized benign tumor characterized by formation of a vascular osteoid tissue surrounded by a margin of dense sclerotic bone[1,2.] It was first described by Jaffe in 1935[3,5]. Osteoid ostoema comprise only 10% of benign tumors with predilection of Males (3:1 male to female ratio). Tumor most often occurs in the second and 3rd decades of life[1].

The tumor is usually located in long bones of tibia and femur, but spinal involvements are not uncommon[1,2]. The classic presentation is that of focal pain at the site of tumor, which worsens at night and increases with activity[4]. Salicylates may relieve the pain. In some cases discomfort appears to originate in a nearby joint or occasionally in an area so distant that radiographic studies are misdirected[3]. Pain may be associated with spinal scoliosis, stiffness, and marked muscle atrophy.

Spinal osteoid ostoema has been identified as the most common lesion to produce a pain provoked reactive scoliosis[4,5]. Osteoid osteoma consists of a nidus that rarely exceeds 1 cm in its greatest dimension. If the tumor is larger than 1 cm the general characteristics tend to overlap those of benign osteoblastoma[1,2]. The two most important signs in these lesions are a painful scoliosis and marked spinal stiffness. Asymmetric location within the vertebral body or neural arch and inflammatory changes produced by the osteoid ostoema in the adjacent para spinal muscle results in unilateral muscle spasm resulting in scoliosis[4,7]. The lesion, therefore, is commonly on the concave side

rather than the convex aspect of the curve. Scoliosis is more marked in thoracic and lumbar while less in cervical and sacral[4,5].

Diagnosis of osteoid ostoema requires an accurate clinical history and a high index of suspicion. In most cases routine radiograph are adequate and may detect the cortical type of lesion except in cancellous or subperiosteal location where routine radiographs are almost always negative due to little or almost no sclerotic reaction[1,2,6]. Similarly in the axial skeleton, complex anatomy of the multiple superimposed bony structures as well as predominate cancellous nature of the bone can make conventional imaging extremely difficult, as happened in this case. Radiographically, osteoid ostoema appears as a radiolucent nidus under 1.5 cm in diameter with a surrounding variable degree of sclerosis, which is more in, cortical than in cancellous or subperiosteal[1,3,6]. Particular pitfalls in their differential diagnosis include osteoblastoma. Both tumors are osteblastic and have propensity for the posterior elements of the spine [4]. They are differentiated by their size. Osteoblastoma considerably become larger than osteoid osteoma and better depicted on plain radiograph.

CT is the ultimate diagnostic tool for the precise localization of the nidus particularly in areas with complex anatomy such as spinal pedicles, laminae, and femoral neck[3]. Dynamic CT scanning demonstrates significant contrast enhancement in the area of the nidus when compared with the surrounding muscle and normal medullary bone[3]. Contrast enhancement is of considerable value in distinction of the vascular nidus of an osteoid osteoma versus an avascular lesion such as a Brodie abscess in the appendicular skeleton. On CT scan, nidus is a well-defined area of low attenuation with smooth borders having various degree of surrounding reactive bone changes. Besides, precise localization of the lesion, CT may also be used for guiding percutaneous ablation and permitting less radical surgery without jeopardizing the stability of the spine[3,5].

Bone scan is highly sensitive technique, which shows intense activity but has low specificity[1,3,5]. , A technetium bone scan should therefore be carried out to localize the lesion where routine radiograph is negative. Bone scan also helps the radiologist to redirect CT at a specific spinal level. A double density sign on skeletal scintigraphy is diagnostic and helps differentiate it from a brodie abscess[5].

MR imaging also aids in the detection of non-cortical tumors that contain little reactive bone formation. T1-weighted imaging typically reveals low to intermediate signal with variable degree of enhancement of nidus. T2-weighted imaging with fat saturation shows variable signal intensity but can easily display marrow oedema[8].

The other differentials include osteomyelitis, granuloma, or metastatic tumor. Osteomyelitis usually begins with involvement of contiguous endplates, which then extends to the disc, which was not in this case. Sclerotic metastasis was ruled out, as the probability of being a primary with sclerosis was highly unlikely with this age.

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CONCLUSION

Osteoid osteoma is a common cause of pain-provoked scoliosis in young adult. Diagnosis of osteoid osteoma requires an accurate diagnosis and high index of clinical suspicion. Although routine radiographs are usually diagnostic in cortical osteoid osteoma while almost always negative in cancellous and subperiosteal type. CT scan and bone scan are usually required to demonstrate the lesion in axial skeleton, not visible on routine radiograph. Bone scan is an excellent method, although non-specific and helps in detecting the lesion with non localizing pain. CT scan ensures precise localization and to some extent its differentiation with other differentials. It also permits less radical surgery without jeopardizing the spinal stability.

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