



Case Report

Osteoid osteoma of the vertebral body: an unusual localization

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Abstract

As a benign skeletal neoplasm the osteoid osteoma that contains osteoblasts producing osteoid and woven bone, may be seen in various sites of the body. It is mostly seen in the long bones of the extremities and posterior elements of the vertebrae. Involvement of the vertebral body is not common. It may be confused with osteoblastoma; the only criteria in distinction the both condition is the lesion size. Here, we report a case of osteoid osteoma at the body of T8 vertebra, with its imaging findings.

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Key words [osteoid osteomal] [vertebral localization] [computed tomography] [magnetic resonance imaging] [bone scintigraphy]

Introduction

Osteoid osteoma (OO) is a benign lesion accounting for approximately 12% of benign skeletal neoplasms [1]. OO maybe in different localizations involving mainly long bones of the extremities and posterior elements of the vertebrae, mostly at the thoracic and lumbar region. Localization in the vertebral body is unusual [2].

In this article a case of OO localized in the thoracic vertebral body is presented, and the useful diagnostic imaging modalities are discussed along with a literature review.

Case Report

A 24-year-old male admitted to Orthopedics and Traumatology Department with a back pain aggravated within the one month that was presenting for one-year duration. No clinical history of trauma was present. On his physical examination no neurological deficit or any symptom was detected. No referred pain was present. The laboratory tests were unremarkable. The spinal computerized tomography (CT) was performed to reveal the cause of pain, depicting well-demarcated hyperdense sclerotic nodular lesion about 0.7x0.9x1 cm in size, with its hypodense peripheral rim on the left side of T8th vertebral body, and extended towards to the left neural foramen and partially to the spinal canal at the same vertebral level. The density of the vertebral body was

also increased (Figure 1). Patient then underwent to Thoracic magnetic resonance imaging (MRI) that showed a nodular lesion at the posterior portion of T8th vertebral body, which was hypointense in T1-weighted-imaging (WI), hyperintense in T2-WI and contrast enhancement in contrasted images. The lesion extended to the left vertebral pedicle and a cortical-subcortical sclerotic millimetric lesion with suspected nidus appearance was also detected (Figure 2). On whole body bone scintigram the focal increased enhanced activity was detected on the left portion of T8th vertebral body suggesting osteoid osteoma (Figure 3). The lesion underwent surgery and it was totally excised (Figure 4). The histopathology reported as osteoid osteoma.

Discussion

In 1935 Jaffe described a new bone lesion, which was named as osteoid osteoma. This entity arose in spongy bone and was less than 2 cm in diameter [3]. It is benign bone-forming and bone-producing tumor frequently involving long bones of the extremities (femoral neck, small bones of the hand and foot) and posterior elements of the vertebrae, particularly for that thoracic and lumbar region [3, 4]. Lesion limited to the vertebral body is unusual [2]. OO accounts for about 12% of benign skeletal neoplasms [1]. The most common seen symptom is pain; however, using aspirin can relieve this pain.

Histologically, osteoid osteoma is small, benign, and self-limited; contains osteoblasts that produce osteoid and woven bone [5]. There are two types of OO including cortical (the most common type) and the medullary [6].

The most and commonly accepted treatment method for OO is total resection of the lesion. The prognosis is good after the resection. The most important determinant and factor for successful removal of the tumor is the exact localization of the lesion. Recently, as another treatment method for OO, CT-guided percutaneous radiofrequency thermal ablation [7–13] and laser photocoagulation [12] have been offered as minimally invasive treatments, especially in patients with incomplete lesion resection.

Because of the close clinical, histological and imaging similarity, osteoblastoma should be considered in differential diagnosis. Distinction between osteoid osteoma and osteoblastoma mostly depends on size [3, 4]. Osteoid osteoma has tendency of a limited growth potential and rarely exceeds 1.5 cm; whereas, osteoblastoma may exceed this range and may tend to have an aggressive clinical course, progress and also malignant transformation [14]. OO may relief from salicylate treatment, although less painful, osteoblastoma does not respond to this therapy.

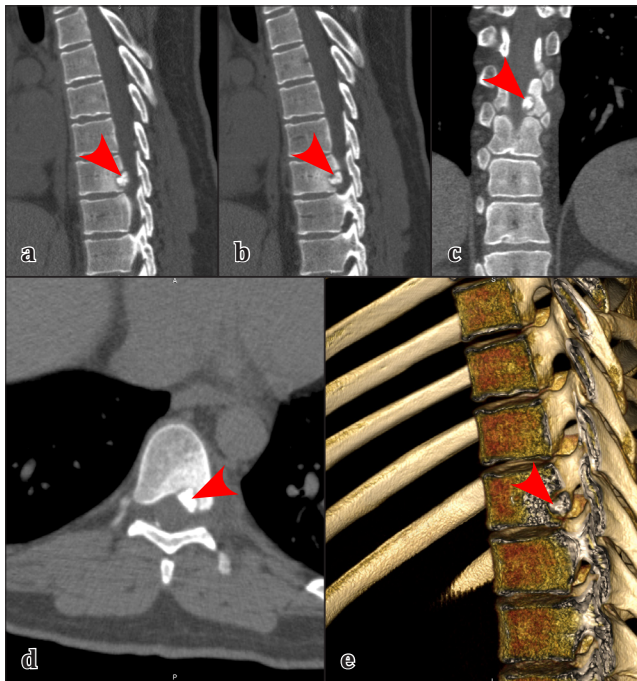


Figure 1. Preoperative CT images. Well-demarcated hyperdense sclerotic nodule (0.7x0.9x1 cm) with its hypodense peripheral rim on the left side of T8th vertebral body, which extended toward to the left neural foramen and partially to the spinal canal in the same vertebral level (A, B, D). The peripheral density of the vertebral body around the lesion was also observed, representative of the medullo-trabecular edema (A, B, C, D). 3D reconstruction image shows the lesion in the sagittal plan. (Arrowheads: lesion)

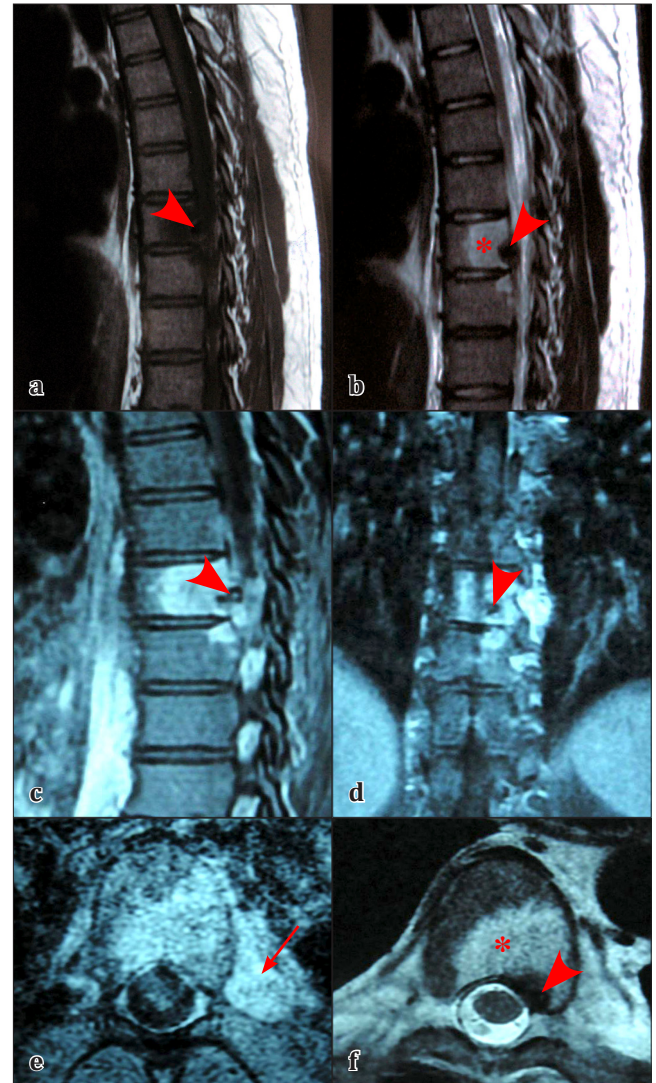


Figure 2. Thoracic magnetic resonance imaging showing a nodular lesion at the posterior portion of T8th vertebral body, hypointense on T1-WI (a), hyperintense on T2-WI (b, f), contrast enhancement on contrasted images (c, d) which extended to the left pedicle of the vertebra and the cortical-subcortical sclerotic lesion with millimetric suspected nidus appearance (arrowhead). Hyperintensity due to medullo-trabecular edema of the vertebral body was seen (asterisks). In this level at the left paravertebral region contrast enhanced soft tissue was observed (arrow) (e).

Degenerative disc, facet joint disease and spondylolysis should be also considered in differential diagnosis [15].

Plain X-ray, CT, MRI, Dynamic F-18 FDG PET/CT can be useful in determining the exact localization site, characterization, other accompanied findings of the lesion (such as edema) and revealing the effects of tumor on the spinal canal and cord, tumor extension, the extensive intra/extravertebral reactive changes and the possible infiltration of adjacent soft tissues [3]. Usually plain x-ray imaging is sufficient in diagnosis although

CT and MRI are valuable for both diagnostic and therapeutic considerations in the spine [3, 4]. CT may show the presence of a low-attenuation nidus, the lesion characteristic finding, with central mineralization and varying degrees of perinidal sclerosis [16]. On MR imaging nidus usually tends to have low-to-intermediate signal intensity on T1-WI and low-to-high

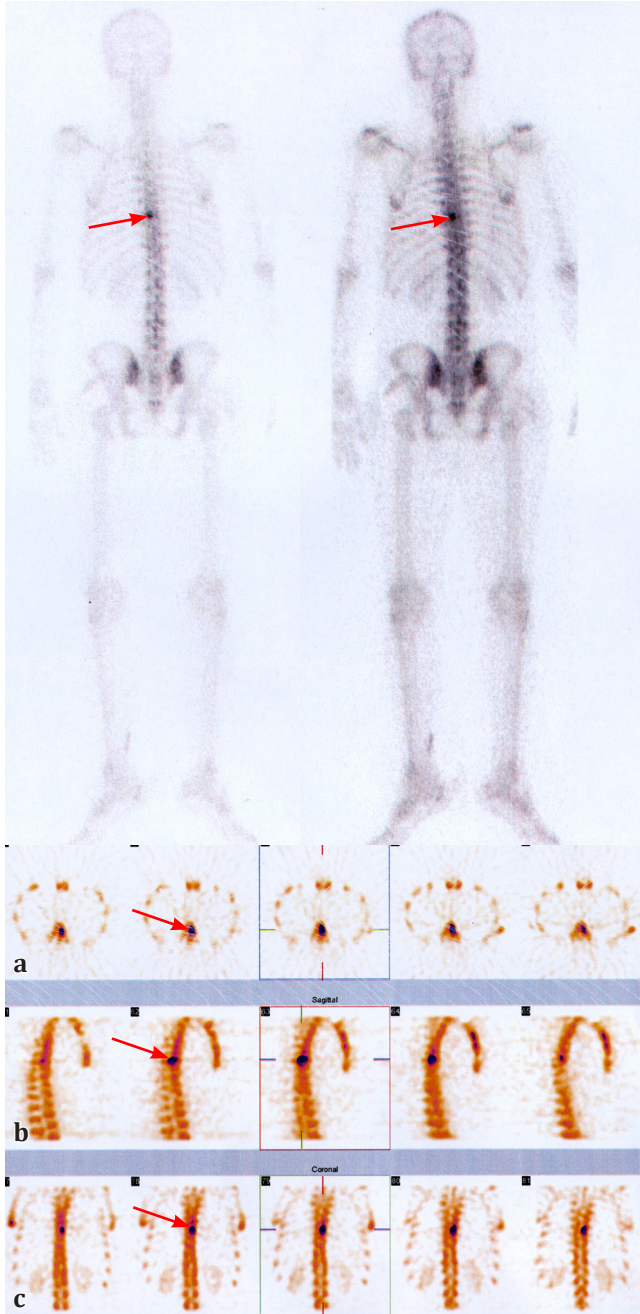


Figure 3. Whole body bone scintigram. a) Transverse, b) sagittal, c) coronal plan imaging. The focal increased enhanced activity on the left portion of T8th vertebral body suggested *osteoid osteoma* (arrow).

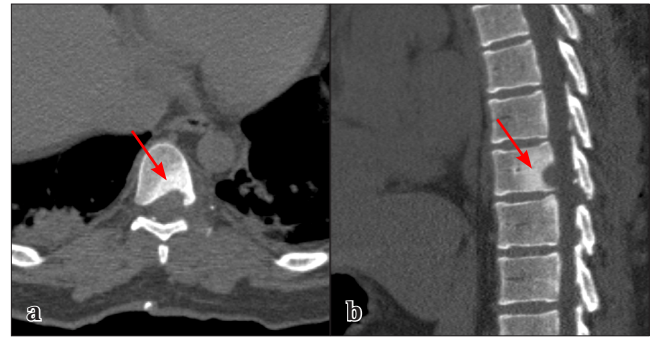


Figure 4. Postoperative CT images show the total removal of the lesion and postoperative changes in the lung and soft tissue. The vertebral body density still exists due to *medullo-trabecular edema* (arrow).

signal intensity on T2-WI [17–19]. Edema is one of the major manifestations of the MRI findings, which is hypointense on T1-WI and hyperintense on T2-WI. Technetium bone scanning is helpful in accurate localizing the tumor in which an intense focal accumulation of the bone-seeking agent is demonstrated [20].

Conclusion

Osteoid osteoma is a painful and salicylate responsive disease, which may present as in different clinical courses and can be confused with other diseases, particularly the osteoblastoma. The correct diagnosis is of great value to reveal the lesion. Imaging modalities (plain x-ray, CT, MRI, scintigraphic bone scanning) are essential in demonstrating the lesion and its exact localization.

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