

# TREATMENT OF OSTEIOD OSTEOMA OF THE LUMBAR SPINE VERTEBRAL BODY WITH RADIOFREQUENCY ABLATION

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## SUMMARY

In this article, we will describe a rare case of an osteoid osteoma of the fourth lumbar vertebra's vertebral body with unusual epidemiology (42 years old), diagnosed through clinical history, physical examination, scintiscan, tomography, and magnetic resonance. Diagnosis was

confirmed by tomography-guided biopsy and minimally invasive therapy successfully provided through tomography-guided radiofrequency ablation.

**Keywords:** Spine; Osteoid osteoma; Bone neoplasms; Radiofrequency, Catheter ablation.

## INTRODUCTION

The osteoid osteoma is a rare bone tumor first described by Jaffe in 1935, featuring a bone-producing tumor, most frequently seen at lower ends of children or young adults (11-22 years old)<sup>(1)</sup>.

The differentiation of osteoid osteoma from osteoblastoma is made according to its size, with osteoid osteoma being smaller than 1.5 cm in diameter<sup>(2)</sup>.

The tumor is seen at vertebral spine in approximately 10% - 25% of the cases<sup>(3-8)</sup>, preferably at posterior elements of vertebrae<sup>(9-11)</sup>.

The osteoid osteoma is found in vertebral body in only 10% of the cases affecting the spine<sup>(12)</sup>.

Spinal involvement is more common at lumbar vertebrae<sup>(12,13)</sup> and is characterized by localized pain at affected vertebra<sup>(14,15)</sup> and occasionally by irradiated pain, simulating a disc herniation<sup>(10,16)</sup>, but with no other findings at physical and neurological examination<sup>(17)</sup>.

Pain usually gets worse at night, and generally improves with the use of non-steroidal anti-inflammatory drugs<sup>(18)</sup>.

Scoliosis secondary to pain and muscular spasm<sup>(19)</sup> is a common finding in adolescents (63% to 70%), constituting a com-

plication of late treated tumor. However, the curve may become structured with the asymmetric inhibition of vertebral epiphysis growth<sup>(13,17,20,21)</sup>. Usually, the tumor is at its deformity peak<sup>(18,19)</sup>, while the fourth or fifth lumbar vertebra is involved, the peak is superior and pelvic obliquity is usually present<sup>(18)</sup>.

The tumor core, even if small, can usually be seen at scintiscan with technetium<sup>(22)</sup>. Computed tomography with sections smaller than 1.5 cm, as well as magnetic resonance (NMR) are able to evidence the injury, which is better seen by T2 sections at the NMR through high signal at the bone around the injury, showing local edema<sup>(22)</sup>.

## CASE REPORT

An adult, 44 year-old woman sought for healthcare with a spine expert. She reported the onset of continuous lumbar pain 2 years before, with slowly progressive worsening, nighttime worsening, but with no worsening to motion or strong pain episodes during daytime. Pain did not irradiate to lower limbs or other regions, being limited only to lumbar region. No history of trauma, fever, weight loss, or sphincter changes. She had previously been treated with non-steroidal anti-inflammatory agents,

Study conducted at the Institute of Orthopaedics and Traumatology, Hospital das Clínicas, Medical College, University of São Paulo – São Paulo, Brazil.

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Received in: 08/26/05; approved in: 12/08/05

showing improvement only during the use of such drugs. At examination, she presented with pain at palpation on the fourth lumbar vertebra, without deformities, and unchanged neurological and vascular tests.

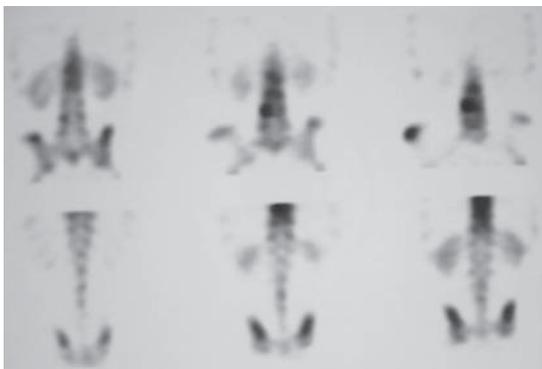
The picture was investigated with X-ray images of the lumbar spine, which did not present changes. Scintiscan study with the use of Tc 99m showed increased uptake on the vertebral body of the fourth lumbar vertebra at the left (Figure 1). Computed tomography studies of the lumbar spine revealed a hypo-attenuation area surrounded by a hyper-attenuation area – bone sclerosis – suggesting an osteogenic tumor (Figures 2 and 3). A supplementary study with magnetic resonance showed a signal change with 1 cm in diameter at the vertebral body of the fourth lumbar vertebra, near left pedicle basis, surrounded by an area of signal compatible with bone edema (Figure 4 and 5).

Data concerning anamnesis, physical examination and additional tests suggested the presence of osteoma osteoid

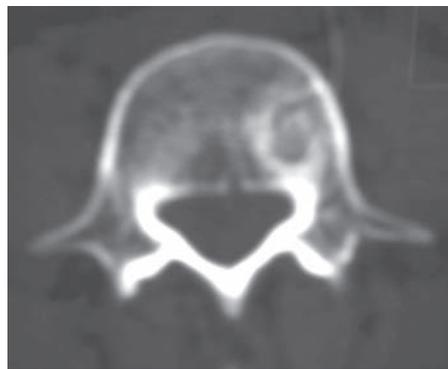
at the vertebral body of the fourth lumbar vertebra.

A tomography-guided biopsy was performed, collecting material for culture, pathologic studies in paraffin and for fast freezing (in print). The freezing-type pathologic study ruled out the presence of neoplastic cells. At the same anesthetic moment, a minimally invasive destruction of the tumor by radiofrequency with the use of Arthrocare tip, guided by computed tomography was performed (Figure 6). The anatomical-pathological test in paraffin confirmed the diagnosis of osteoid osteoma (Figure 7). There was no bacterial growth in collected cultures.

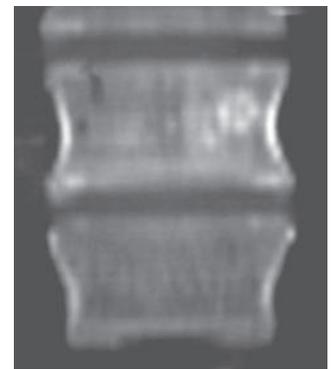
The patient was allowed to walk after the procedure with a Putin's corset, which the patient had to wear for six weeks, showing a progressive improvement of pain. Six months after the procedure, computed tomography studies did not show tumor presence (Figure 8) and the patient was no longer experiencing lumbar pain.



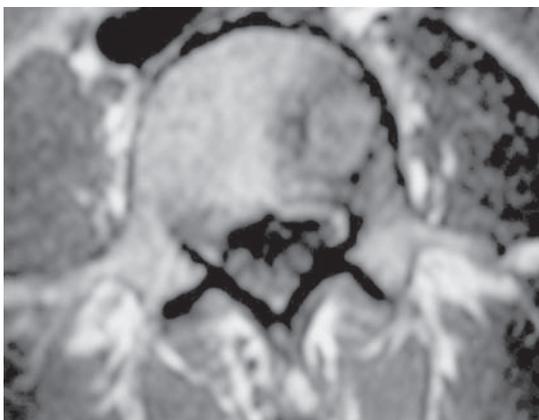
**Figure 1** – Scintiscan study using Tc 99m showed increased uptake at the vertebral body of the fourth lumbar vertebra to the left.



**Figure 2** – Computed tomography image showing hypoattenuation area surrounded by a hyperattenuation area – bone sclerosis.



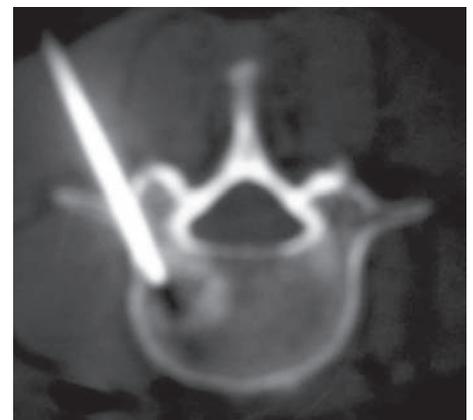
**Figure 3** – Tomographic reconstruction showing tumor core and adjacent bone sclerosis.



**Figure 4** – Magnetic resonance image showing an axial section of the fourth lumbar vertebra in T1 sequence, evidencing vertebral body change, at the left pedicle basis.



**Figure 5** – Magnetic resonance showing a sagittal section of the lumbar spine in T2 sequence, evidencing tumor core and sclerosis halo.



**Figure 6** – Tomography image of a minimally invasive transpedicular procedure at the fourth lumbar vertebra.

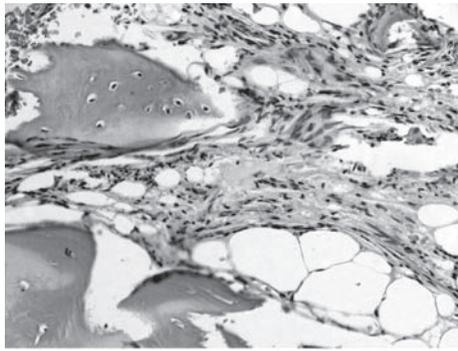
## DISCUSSION

The spinal osteoid osteoma is more frequent in young adults (11-22 years old) <sup>(1)</sup>, being most common to the posterior elements of the vertebra <sup>(11)</sup>. The present case does not present a usual epidemiologic profile.

While the natural

history of osteoid osteoma demonstrates the possibility of spontaneous resolution between two to eight years, strong and frequent pain and the risk of developing secondary scoliosis <sup>(20)</sup> justify surgical resection, which is generally made in blocks, removing sclerosis core and halo <sup>(11,23,24)</sup>.

The radiological aspect of the osteoid osteoma is well-known, however, a definitive diagnosis must be delivered according to anatomical-pathological study <sup>(22)</sup>.



**Figure 7** – Histomorphological aspect of material collected during percutaneous biopsy, processed in paraffin for staining with hematoxylin and eosin. Note the osteoid osteoma core and eosinophil areas of newly formed bone with no trabecular pattern.



**Figure 8** – Tomography study evidencing absence of tumor six months after radiofrequency percutaneous ablation.

Injury biopsy and tumor core resection with the perioperative aid of the computed tomography have been reported by several authors <sup>(25-27)</sup>.

Recently, radiofrequency ablation, first described by Rosenthal et al., has become a valid method in

minimally invasive treatment of osteoid osteoma <sup>(15,28-31)</sup>. An evaluation of the effectiveness of this procedure, however, requires the analysis of a higher number of case series.

## CONCLUSION

This case presented with a good response to minimally invasive treatment of vertebral body osteoid osteoma by using radiofrequency ablation guided by computed tomography.

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