

Ivory Vertebra: case reports

Vértebra de Marfil: relatos de caso

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ABSTRACT

Ivory vertebra is characterized by increased vertebral density without involvement of the adjacent intervertebral disc. The increase in density may be homogeneous or diffuse. It presents a differential diagnosis with other osteoblastic vertebral lesions. Imaging studies reveal both benign and malignant spinal lesions. Three cases of ivory vertebra, caused by endometrial cancer metastasis, tuberculosis, and lymphoma were reported. The ivory vertebra has several etiologies. Early diagnosis had oriented the treatment according to the underlying cause.

Keywords: ivory vertebra; sclerotic vertebra; bone metastasis; lymphoma; computed tomography.

RESUMEN

La vértebra de marfil se caracteriza por hiperdensidad que no afecta el disco intervertebral adyacente. El aumento de densidad puede ser homogéneo o difuso. Presenta diagnóstico diferencial con otras lesiones vertebrales osteoblásticas. Los estudios de imagen muestran lesiones espinales benignas y malignas. Los autores presentan tres casos de vértebras de marfil, uno debido a metástasis de cáncer de endometrio, tuberculosis y linfoma. Las vértebras de marfil tienen diversas etiologías. El diagnóstico precoz ha guiado el tratamiento según la causa.

Palabras clave: vértebra de marfil; vértebra esclerótica; metástasis óseas; linfoma; tomografía computarizada.

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1 INTRODUCTION

The ivory vertebra is characterized by increased density without changes to the adjacent intervertebral disc. The increase in vertebral opacity may be diffuse or homogeneous, usually affecting the entire vertebral body¹. It is sclerotic, thus giving it a hyperdense appearance^{2,3}. It has several etiologies⁴⁻⁷ (Table 1).

The authors described three cases of ivory vertebra: one secondary to endometrial cancer, another due to tuberculosis, and one associated with lymphoma.

2 CASE PRESENTATION

Case 1

M.I.B., a 69-year-old female homemaker, with a past medical history of endometrial carcinoma, presented with lower limb pain for six months. In neurological examination she was alert; crural paraplegia. Magnetic resonance imaging (MRI) of the thoracic spine revealed involvement of the T2 vertebra, without intervertebral disc involvement (Figures 1 and 2). The patient underwent chemotherapy. She died four months after the initiation of treatment.

Case 2

L.S., 36 years old, the patient presented with thoracic pain for eleven months, worsening at movement and palpation of the thoracic spine. He/she reported a daily isolated fever spike. Neurological examination was normal. MRI of the thoracic spine showed a hyperdense lesion in the vertebral bodies of T8–T9, without intervertebral disc involvement (Figures 3 and 4). A CT-guided biopsy of the T9 vertebral body revealed vertebral tuberculosis. The patient was referred for elective treatment with an infectious disease specialist.

Case 3

F.M.G., a 55-year-old male, presented with nonspecific thoracic pain. Neurological examination was normal. MRI of the thoracic spine demonstrated a hyperdense lesion in T2 (Figures 5 and 6). The diagnosis of lymphoma was subsequently confirmed. The patient underwent chemotherapy for the underlying disease but developed infectious complications and died.

Table 1. Etiology of the Ivory Vertebra.

Etiology	Subtypes / Examples
Paget's Bone Disease	
Neoplasms	Metastases: Breast, Prostate, Lung, Hodgkin's Lymphoma, Thyroid, Uterus–Ovary, Kidney, Stomach, Bronchi, Pharynx, Carcinoid tumor Primary tumors: Sarcoma, Hemangioma, Osteoma, Osteoblastoma, Chordoma, Neurinoma, Lipoma, Plasmacytoma
Hematologic Diseases	Multiple Myeloma Malignant Reticulosis Lymphoid Leukemia Myeloid Leukemia Lymphogranulomatosis
Osteomyelitis	Tuberculosis (Pott's Disease) Staphylococcus Syphilis Typhus Brucella
Tuberous Sclerosis	
Enostoses	
Diffuse Condensing Osteitis	
Other Sclerosing Bone Diseases	Renal Osteodystrophy Osteoporosis Osteosclerosis Myelofibrosis Poikilocytosis Fluorosis Hypoparathyroidism Hypothyroidism
Disc Anomalies	
Compression Fractures	
Sarcoidosis	
Mastocytosis	
SAPHO Syndrome	

Adapted from Carpineta and Gagné⁵.



Figure 1. Sagittal T2-weighted MRI showing diffuse and homogeneous T2 hyperintensity. Size and contours are normal.



Figure 3. Sagittal MRI showing hyperdense vertebrae at T8 and T9, without involvement of the adjacent intervertebral disc.

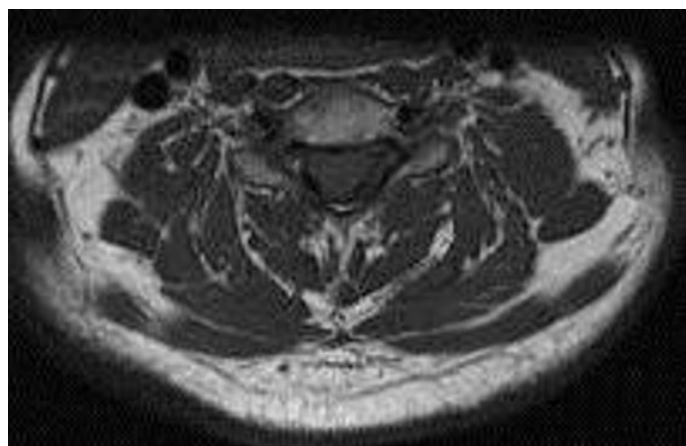


Figure 2. Axial T1-weighted MRI showing a hyperintense lesion in the T2 vertebral body, characterizing the ivory vertebra.

3 DISCUSSION

The ivory vertebra is radiographically characterized by increased vertebral body density while maintaining normal size, contours, and preservation of adjacent intervertebral disc spaces^{3,8}. It occurs slightly more frequently in females and is most commonly observed between the ages of 30 and 50⁹.

This radiological finding may be incidental during the investigation of back pain⁷. However, it can sometimes indicate serious underlying conditions, making it essential to determine the etiology. The differential diagnosis includes lymphoma, chordoma, Paget's disease, infectious processes, and osteoblastic metastases—most notably from prostate, lung, or breast cancer^{2-5,8-17}. In children, the ivory vertebra is usually associated with lymphoma, osteosarcoma, neuroblastoma, or Ewing's sarcoma³ (Table 1).

In a series of 16 cases, Dennis⁶ reported Paget's disease in eight patients, lymphoma in five, and metastases (colon and prostate) in two. Paget's disease can present as an ivory vertebra in its early phase, often without symptoms⁵.

Computed tomography (CT) is useful for determining the extent of bony involvement, whereas MRI is more sensitive in early stages and provides superior assessment of soft tissue involvement. MRI also plays a key role in preoperative planning by delineating resection margins¹⁴.

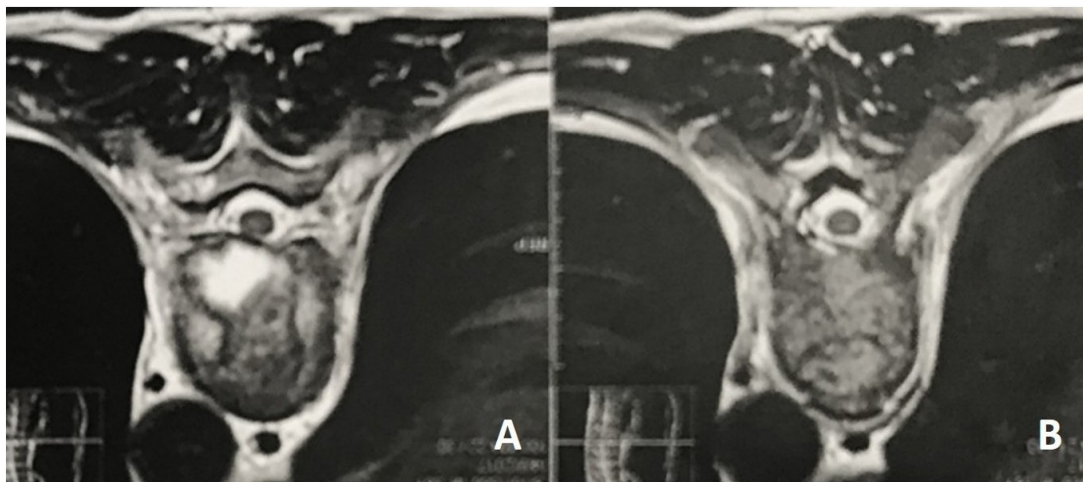


Figure 4. A-B. Axial MRI showing involvement of the T8 vertebral body.



Figure 5. Sagittal MRI showing diffuse increased density of multiple vertebral bodies. Size and contours are normal, with no involvement of adjacent discs.

Among our cases, one was due to metastatic endometrial carcinoma and another to lymphoma. Both patients underwent chemotherapy and had poor outcomes. The third case, caused by vertebral tuberculosis, is showing favorable evolution with targeted therapy.

In conclusion, the ivory vertebra is a radiologic sign with a broad range of potential etiologies. Imaging plays a crucial role not only in its identification but also in guiding further investigation to establish the underlying diagnosis and initiate appropriate treatment.

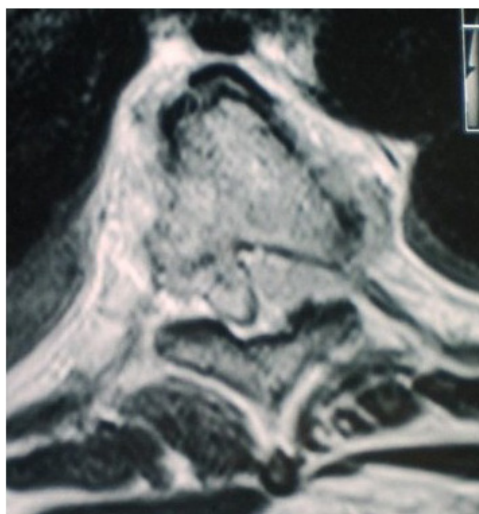


Figure 6. Axial T2-weighted MRI showing a homogeneous hyperintense lesion at T9 with relatively preserved contours, not affecting adjacent tissues.

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