Brown Tumor of the Cervical Spine: Case Report

Néstor R. Davies, Facundo Albuixech Abalos, Luis D. E. Orosco Falcone, Gustavo A. González, Carlos A. Agüero Gioda, Pablo N. Ortiz
Spine Department, Orthopedics and Traumatology Service, Sanatorio Allende, Córdoba, Argentina

ABSTRACT
Brown tumor is a pseudotumoral lesion characterized by cystic fibrous osteitis with hemorrhagic content, most commonly caused by primary hyperparathyroidism or secondary to chronic renal failure. Cervical spine involvement is extremely rare. We report the case of a 27-year-old woman with a history of hemodialysis due to chronic renal failure who presented with neck pain associated with progressive quadriparesis of 24 hours' duration. Imaging studies revealed a lytic lesion with sclerotic margins involving the soft tissues and the posterior arch of C5, with severe spinal cord compression at that level. Tumor resection and decompressive laminectomy at C5 were performed. Postoperative clinical evolution was favorable. Histopathological examination confirmed the diagnosis of a brown tumor of the cervical spine.
Keywords: Spine; brown tumor; hyperparathyroidism.
Level of Evidence: IV

Tumor pardo de columna cervical. Presentación de un caso

RESUMEN
El tumor pardo es una lesión seudotumoral caracterizada por una osteítis fibrosa quística con contenido hemorrágico, habitualmente causado por hiperparatiroidismo primario o secundario a insuficiencia renal crónica. La localización en la columna cervical es sumamente inusual. Presentamos a una mujer de 27 años, con antecedentes de hemodiálisis por insuficiencia renal crónica. Concurrió con cervicalgia asociada a cuadriparesia progresiva de 24 h de evolución. Los estudios por imágenes revelaron una imagen lítica con bordes esclerosos que comprometía partes blandas y el arco posterior de C5 con una compresión medular severa en dicho nivel. Se procedió a la resección tumoral y la laminectomía descompresiva en C5. La evolución clínica posoperatoria fue favorable. El estudio anatomopatológico confirmó el diagnóstico de tumor pardo de columna cervical.
Palabras clave: Columna; tumor pardo; hiperparatiroidismo.
Nivel de Evidencia: IV

INTRODUCTION

A brown tumor is a pseudotumoral lesion characterized by cystic fibrous osteitis with hemorrhagic content, most commonly caused by primary hyperparathyroidism or secondary to chronic renal failure. Although these lesions are histologically benign, intense osteoclastic activity and the resulting metaplasia confer aggressive features due to bone destruction and extension into adjacent tissues.

The estimated incidence ranges from 1.5% to 13% and predominantly involves the long bones, jaws, skull, and pelvis.[1-3] Involvement of the cervical spine is exceedingly rare.

The objective of this article is to report the clinical presentation and surgical management of a patient with acute quadriparesis caused by a brown tumor of the cervical spine.

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CLINICAL CASE

A 27-year-old woman with a history of chronic renal failure requiring hemodialysis presented with nonspecific cervical pain of two months' duration and progressive loss of strength in all four limbs over the preceding 24 hours. Physical examination revealed quadriparesis, with a neurological deficit graded as 4/5 in the upper limbs and 3/5 in the lower limbs on the muscle strength scale, associated with a positive Hoffmann sign and bilateral patellar hyperreflexia.

Relevant laboratory findings included a parathyroid hormone level of 315 pg/mL (normal range, 15 to 70 pg/mL), alkaline phosphatase of 580 IU/L (normal range, 40 to 150 IU/L), and serum calcium of 8 mg/dL (normal range, 8.5 to 10.4 mg/dL).

Plain radiographs and computed tomography of the cervical spine demonstrated a large osteolytic lesion with sclerotic margins involving the posterior arch of the fifth cervical vertebra, with extension into the adjacent soft tissues (Figure 1). Magnetic resonance imaging revealed severe spinal cord compression at the level of the fifth cervical vertebra (Figure 2).

An emergency posterior approach to the cervical spine was performed, consisting of marginal tumor resection and decompressive laminectomy of the fifth cervical vertebra.

The immediate postoperative course was favorable. During this period, the patient initiated an intensive motor rehabilitation program, and complete neurological recovery was documented two months after surgery. Histopathological examination of the surgical specimen confirmed the diagnosis of a brown tumor of the cervical spine.

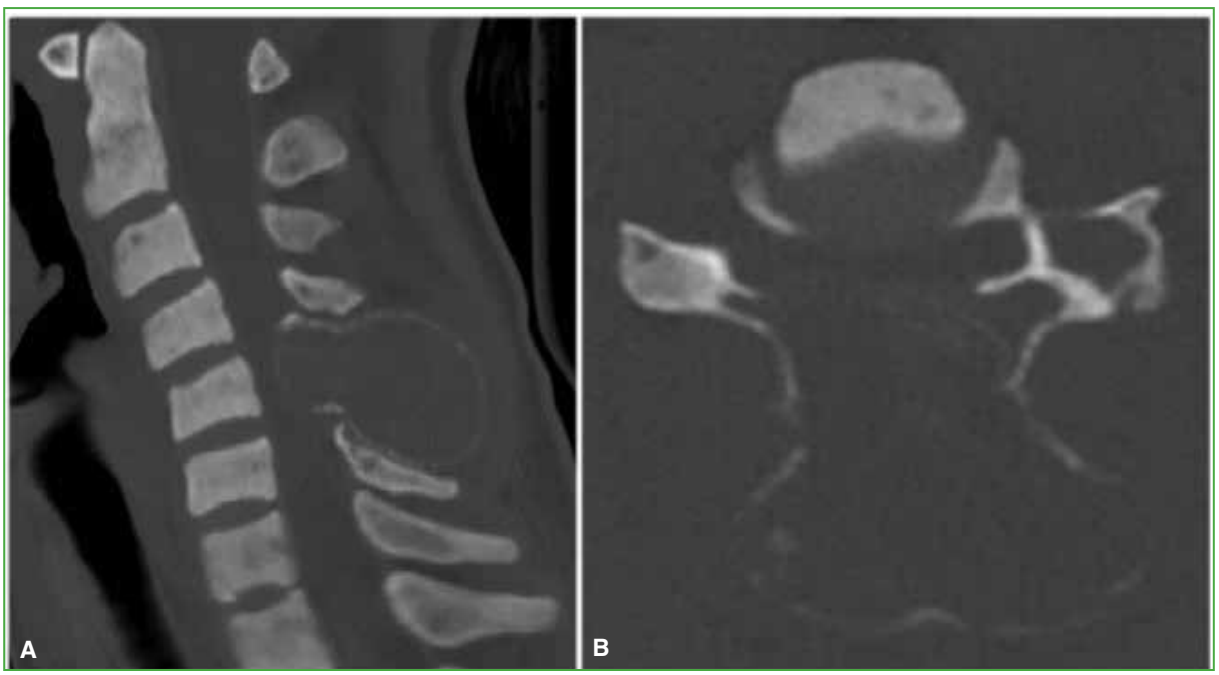

Figure 1. Computed tomography of the cervical spine. **A.** Sagittal section. **B.** Axial section. Involvement of the posterior arch of C5 is observed.

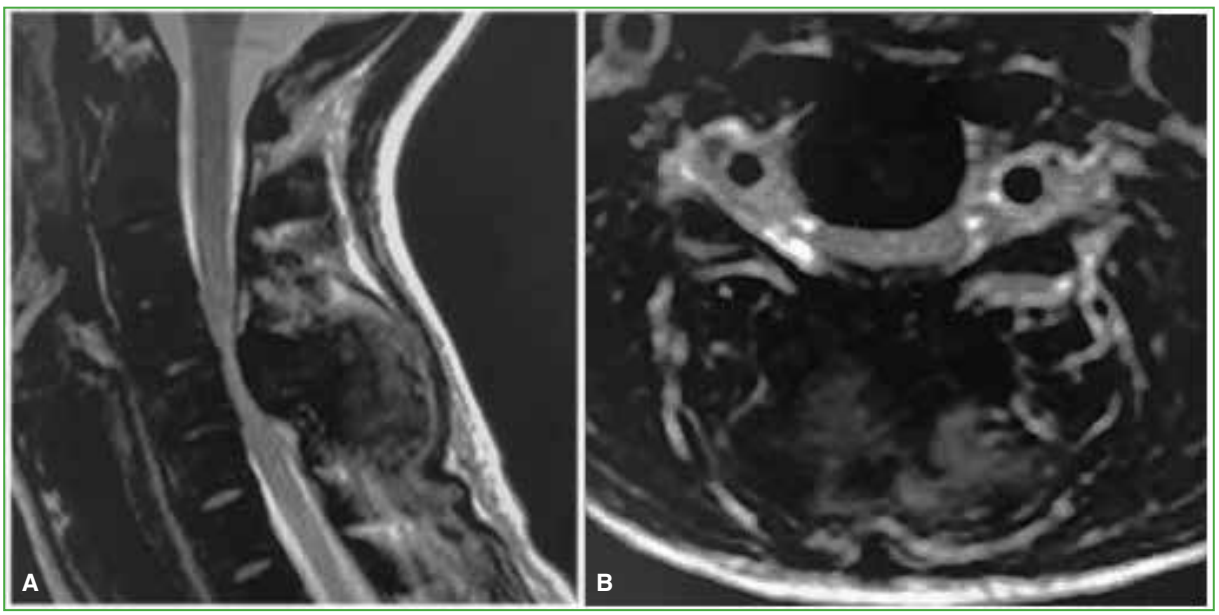

Figure 2. Magnetic resonance imaging of the cervical spine. **A**. Sagittal section. **B**. Axial section. The tumor involves the posterior arch of C5 and the adjacent soft tissues, resulting in spinal cord compression at this level.

DISCUSSION

A history of chronic renal disease is a fundamental element in the clinical suspicion of secondary hyperparathyroidism.[4] In this context, diagnosis is often delayed, as most patients present with progressive, nonspecific cervical pain of weeks to months in duration, with or without associated myeloradicular symptoms.[5-7] In our case, however, the clinical presentation and its course were acute and rapidly progressive.

Laboratory test results represent another key aspect, as they not only guide the diagnostic process but also allow differentiation among the various forms of hyperparathyroidism.[4] The common biochemical pattern is elevation of serum parathyroid hormone levels. In secondary hyperparathyroidism, this elevation is typically associated with normal or decreased serum calcium values, whereas primary and tertiary hyperparathyroidism are usually accompanied by hypercalcemia.

Brown tumors typically appear on plain radiographs or computed tomography as lytic, multilobulated lesions that may or may not present peripheral sclerotic margins. On magnetic resonance imaging, these lesions are hypointense on T1-weighted sequences and hyperintense or isointense on T2-weighted sequences, with a tendency to invade adjacent tissues. Intravenous contrast administration usually results in lesion enhancement.[7,8]

In our patient, the lesion involved the entire posterior arch of C5 and extended not only into the paravertebral soft tissues but also into the posterior epidural space, producing significant spinal cord compression.

Management of brown tumor is multidisciplinary, with treatment of the underlying hyperparathyroidism being the cornerstone. Despite clinical suspicion, the diagnosis must be confirmed by histopathological examination. Computed tomography guided needle biopsy is the most widely accepted method for obtaining tissue samples. However, in patients with progressive neurological deficits, diagnostic confirmation is obtained during emergency surgical intervention.[9,10]

When lesions are mechanically stable and there is no neurological involvement, conservative management is indicated, since optimization of serum parathyroid hormone levels often leads to lesion regression and, in some cases, complete resolution.[8] In contrast, surgical treatment is mandatory in the presence of vertebral segmental instability or spinal cord compression. Sánchez-Calderón et al., in a C4 lesion, and Liu et al., in a C6 lesion, performed decompression and stabilization using a combined approach. The first surgical stage consisted of anterior

corpectomy, followed by posterior cervical fixation in a second stage.[6,11] In our case, because the lesion involved only the posterior arch and affected less than 50 percent of the C5 facet joints, marginal tumor resection and decompressive laminectomy of C5 were sufficient, without the need for cervical spine stabilization.

CONCLUSIONS

Brown tumor involving the cervical spine is exceedingly rare. A history of hyperparathyroidism is a critical element in raising diagnostic suspicion. In the presence of progressive neurological deficits, emergency surgical treatment is indicated, and the surgical strategy depends primarily on the degree of instability generated by the vertebral lesion.

Conflict of interest: The authors declare no conflicts of interest.

F. Albuixech Abalos ORCID ID: https://orcid.org/0009-0001-9582-3354
L. D. E. Orosco Falcone ORCID ID: https://orcid.org/0000-0003-0988-305X
G. A. González ORCID ID: https://orcid.org/0000-0002-3560-108x
C. A. Agüero Gioda ORCID ID: https://orcid.org/0009-0005-2704-1130
P. N. Ortiz ORCID ID: https://orcid.org/0000-0001-7461-3879

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