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Case Report

Low-Grade Cartilaginous Vertebral Tumor: A Rare Cause of Spinal Cord Compression

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Abstract

Introduction: Osteochondroma is the most common benign primary neoplasm, representing up to 36% of benign bone tumors. Its location in the spine is rare, occurring in 4% to 7% of primary tumors in this location, and of these, around one-third present myelopathy secondary to spinal cord compression. Despite its low prevalence described in the literature, in recent years there has been an increase in reported cases. **Objectives**: To present a rare low-grade cartilaginous tumor with intracanal extension as an etiology of spinal cord compression syndrome with myelopathy. Treatment options were discussed. **Material and Method:** Informed consent was approved by the patient. Clinical information and images were obtained from the electronic file. A review of the literature was done for its analysis and discussion. **Results**: 52-year-old man, no medical history. He consulted for a 2-month history of progressive loss of strength on the left lower extremity (LLE). On physical examination, it presents hypoesthesia and 3/5 strength from L2 to S1 myotomes in the LLE. Neurological evaluation, spine CT, and MRI were done. Images show a T7 vertebral body tumor with a large extruded calcified mass occupying 80% of the canal at T6T7 with severe compression of the spinal cord. Surgical management was decided by performing posterior arthrodesis from T4 to T10 with posterolateral tumor resection and spinal cord decompression. The patient woke up with paraplegia after surgery. There was a gradual and significant improvement in the patient's condition over the first four weeks. After a 6-month of following an intensive rehabilitation program, the patient progressed favorably, pain-free, with normal sensitivity, full recovery to 5/5 strength, walking independently, and some degree of spasticity. At 2 years follow up the patient has only mild gait disturbance secondary to spasticity. **Discussion**: A case of solitary osteochondroma as a cause of progressive compressive myelopathy was presented. Surgical options are evaluated depending on the location of the tumor, presence of mechanical pain, radiographic spinal alignment, vertebral collapse, posterolateral involvement, and neurological compromise of the spine. Most of the similar published reports show that this clinical picture is more frequent in the context of multiple hereditary exostoses and 132 new cases have been published from 2004 to 2016, which shows a 2.4-fold increase since 2003, of which, 27.2% presented with myelopathic symptoms.

Conclusion: Osteochondroma is a rare spine tumor that can produce radicular or myelopathic symptoms. Surgery is recommended in spinal cord compression cases. Surgical options are evaluated depending on the location, morbidity, and complications.

Keywords: spine, bone, cartilaginous, tumor, neoplasm, exostosis, vertebra, benign, osteochondroma, cord compression, myelopathy, paraparesis, decompression, fusion, and arthrodesis.

Introduction

Osteochondroma is the most common benign primary neoplasm, representing up to 36% of benign bone tumors.[1] Its location in the spine is rare, occurring in 4% to 7% of primary tumors in this location [2], and of these, around one-third present myelopathy. In cases where the spine is involved, compression of the spinal cord or cauda equina may occur. To prevent this, decompression surgery is necessary. [3] Also, to make a tissue diagnosis and exclude malignancy, an excisional biopsy is necessary.[4]

Despite of its low prevalence described in the literature, in recent years there has been an increase in reported cases [5, 6].

This case report aims to present a rare case of low-grade cartilaginous neoplasm with intracanal extension as an etiology of spinal cord compression syndrome with myelopathic symptoms, managed surgically with tumor resection and postero-lateral arthrodesis.

Material and Methods

The patient approved the publication of his case, signed the authorization form of the Informed Consent, and sent it to us through email. Confidentiality was fully protected. Clinical and radiological patient information is presented in an anonymized form.

Results

This case report presents a Latin 52-year-old man, with no prior medical history. He consulted for a 2-month history of progressive loss of strength in the left lower extremity (LLE) without pain. The physical examination revealed 3/5 strength in the LLE from L2 to S1, bilateral extensor plantar reflex, bilateral clonus, and hypoesthesia of the entire LLE. The patient was evaluated by a neurologist and by a spine surgeon due to the aggravation of symptoms. A full-spine X-rays, a computed tomography (CT) and resonance imaging (MRI) of the cervical and dorsal spine were requested, showing a T7 vertebral body tumor with a large extruded calcified mass occupying 80% of the canal at T6T7 with severe compression of the spinal cord (Figures 1,2 and 3). Lumbar MRI and CT ruled out pathology of lumbar origin.

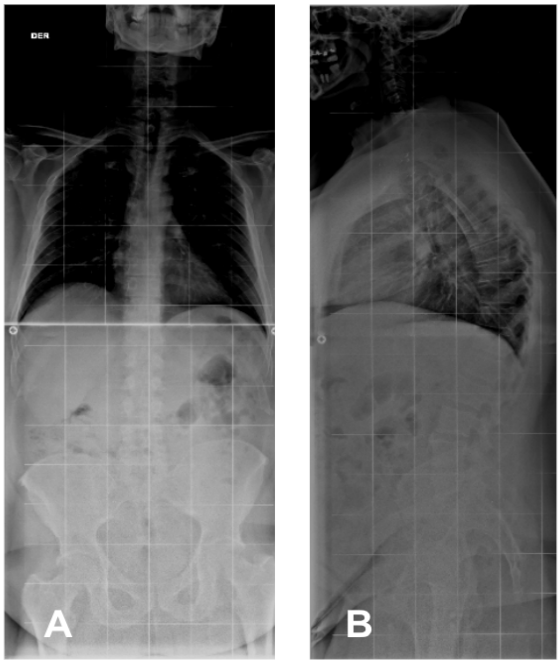

Figure 1: Full spine X-rays, anteroposterior (A), and lateral (B) views.

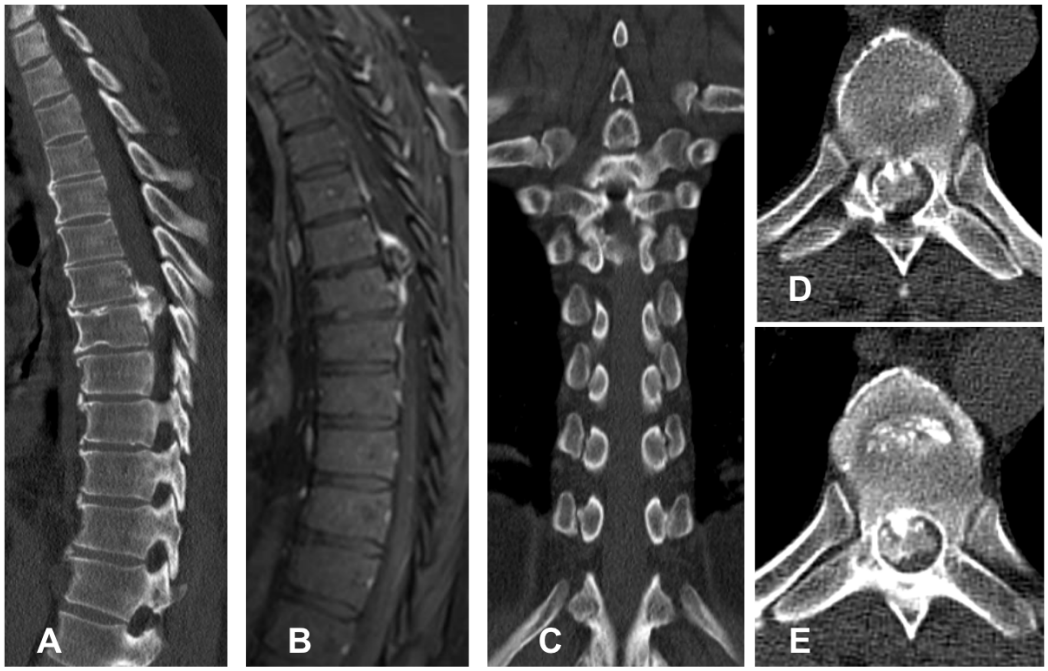

Figure 2: CT scan of the dorsal spine, with sagittal (A and B), coronal (C), and axial (D and E) section: osteochondroma in the spinal canal at the level of T7.

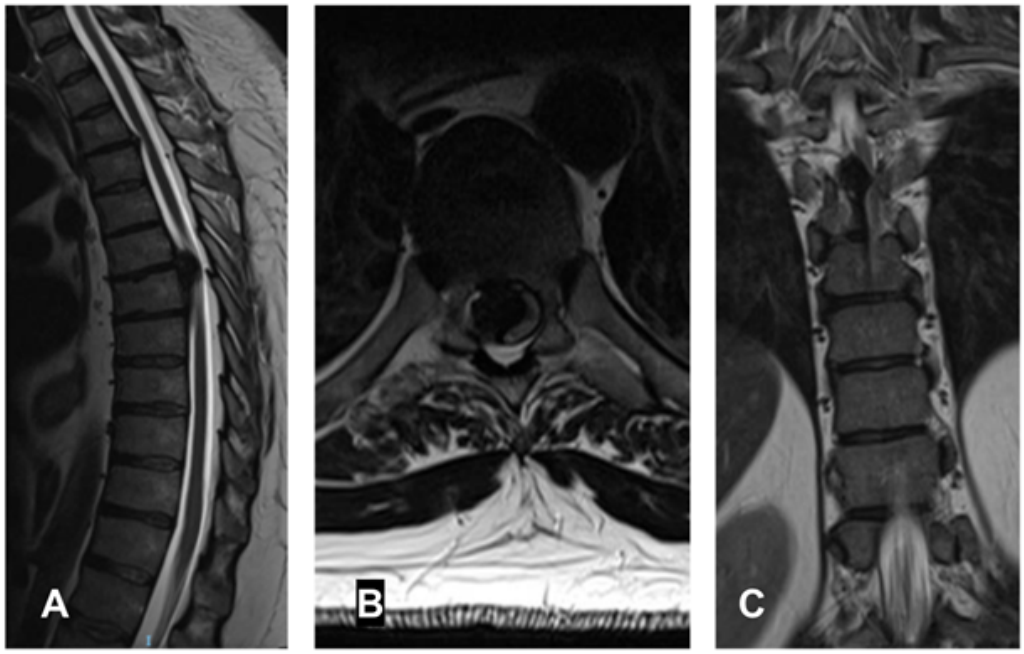

Figure 3: Magnetic resonance imaging of the spine, T2-weighted sequence, sagittal (A), axial (B), and coronal (C) section: osteochondroma in the spinal canal at the level of T6–T7, with spinal cord indicating compression.

Surgical management was decided. A posterolateral arthrodesis from T4 to T10 was done. Posterior surgical decompression of the spinal cord was performed with complete laminectomies from T5 to T8 and vertebral tumor resection with partial corpectomy at T7 through a costo-transversectomy approach (Figure 4). It was a demanding surgery due to the significant adhesions between the dural sac and the tumor that made its resection difficult, in addition to the severe spinal cord compression. It was observed intraoperatively that the tumor had originated from the posterior wall of the T7 vertebra with extrusion towards the spinal canal, which occupied most of it.

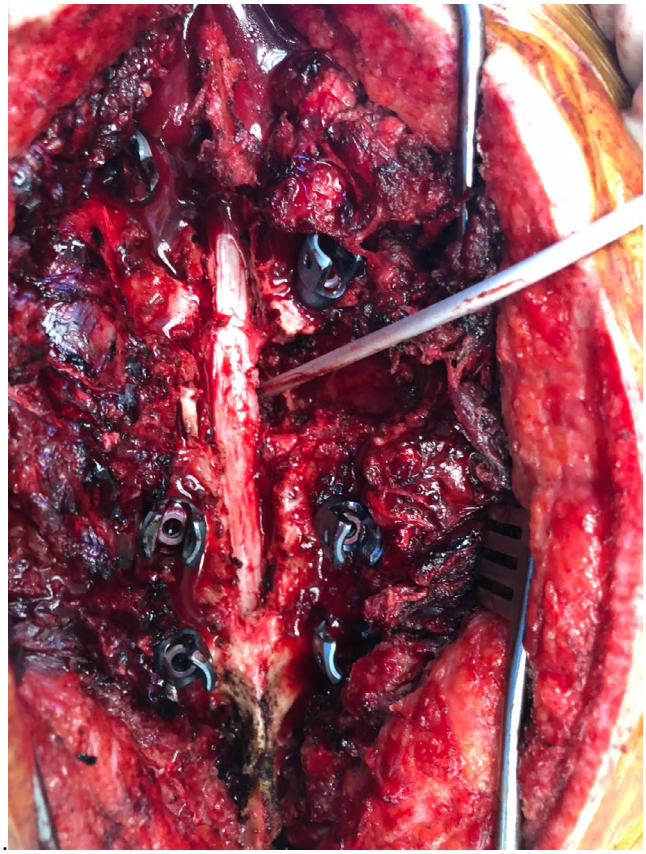

Figure 4: Intraoperative image: Complete laminectomies are observed from T5 to T8 with total decompression of the spinal cord with tumor resection and partial corpectomy through a right transversectomy.

The subsequent result of the intraoperative biopsy demonstrated the presence of low-grade chondroid neoplasia, consisting of moderately cellular proliferation of chondrocytes with a monotonous appearance, uniform nuclei, and a clear perinuclear halo, with increased cellularity, compatible with low-grade cartilaginous neoplasm. In the immediate postoperative period, the patient woke up paraplegic and persisted in that condition for the first hour. The patient showed slow improvement to a paraparesis, worst on the right side. It was also observed that the patient had difficulty controlling their trunk while standing and had a neurogenic bladder. Ten days after the surgery, X-rays and a CT scan were taken to check spinal cord decompression and pedicle screw positioning (Figures 5 and 6). During the first four weeks, the patient's condition gradually and significantly improved, allowing him to walk his first steps with assistance. No wound complications or other surgical complications were presented. After a 6-month of following an intensive rehabilitation program, the patient progressed favorably, without pain, ambulates independently without canes with some degree of spasticity, normal strength and sensitivity on both lower extremities and complete sphincter control. After two years of follow-up, the patient walks independently with only mild gait disturbance secondary to spasticity. MRI and CT images demonstrated no evidence of local recurrence and satisfactory spinal cord decompression. The CT scan also did show a solid fusion mass from T4 to T10 (Figures 7 and 8).

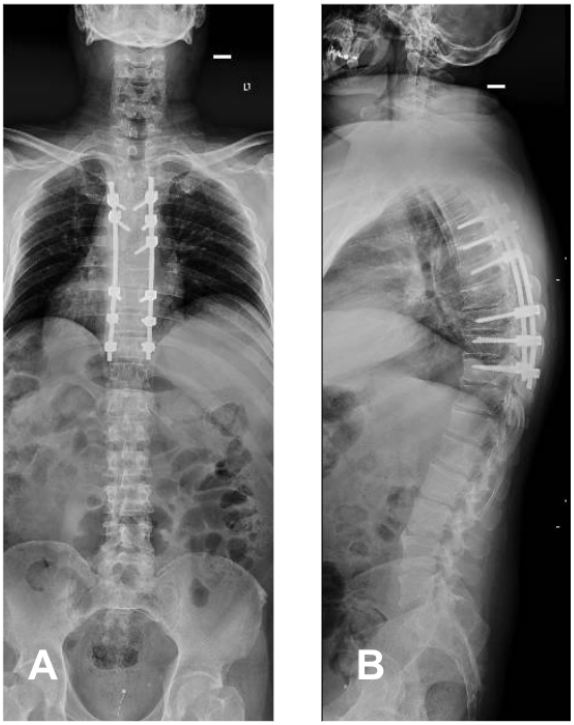

Figure 5: Full spine X-ray at 10 days after surgery: Anteroposterior (A) and lateral (B) views.

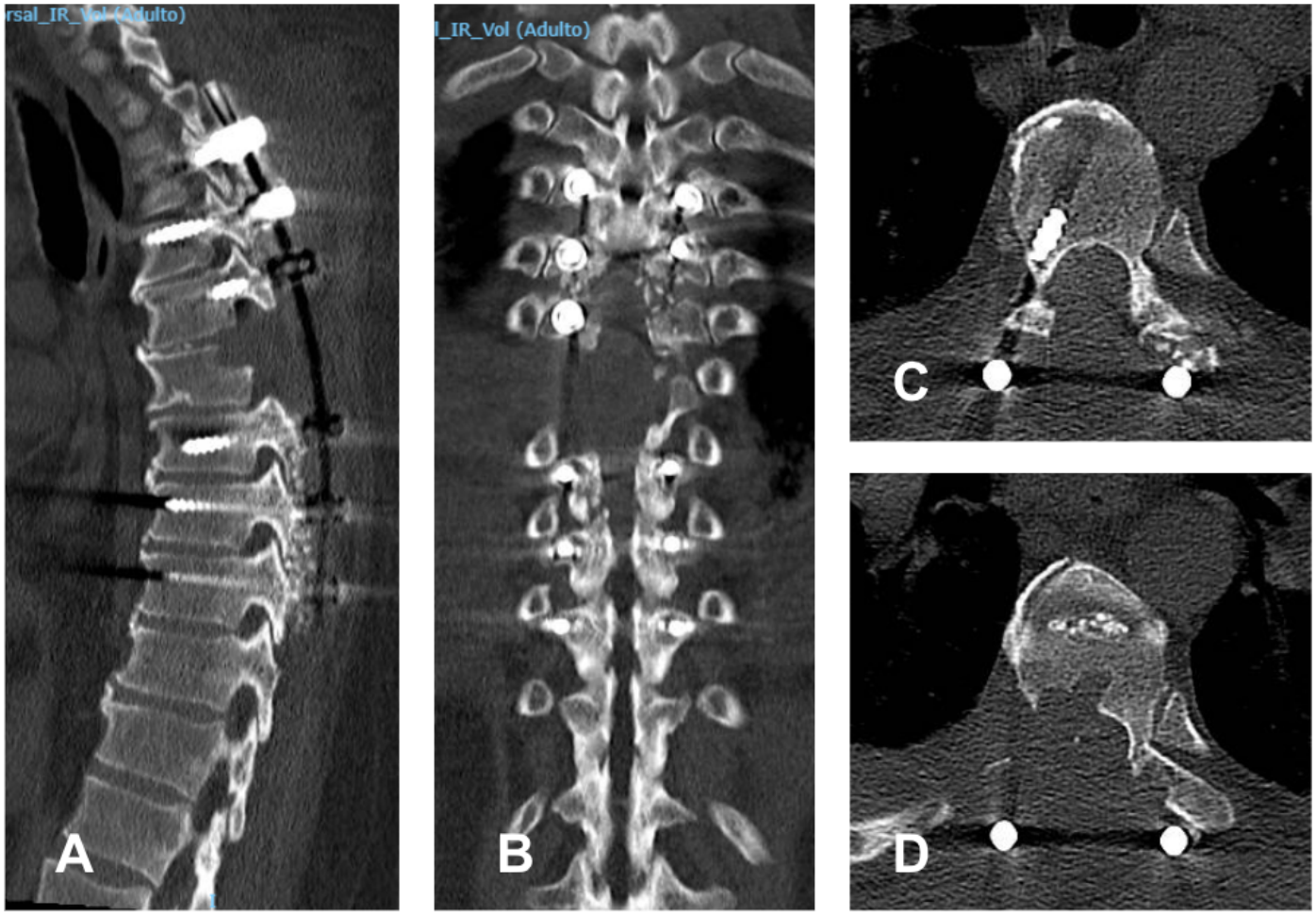

Figure 6: CT of the dorsal spine, sagittal (A), coronal (B), and axial (C and D) section 10 days after surgery. Spinal cord decompression and pedicle screw positioning were observed.

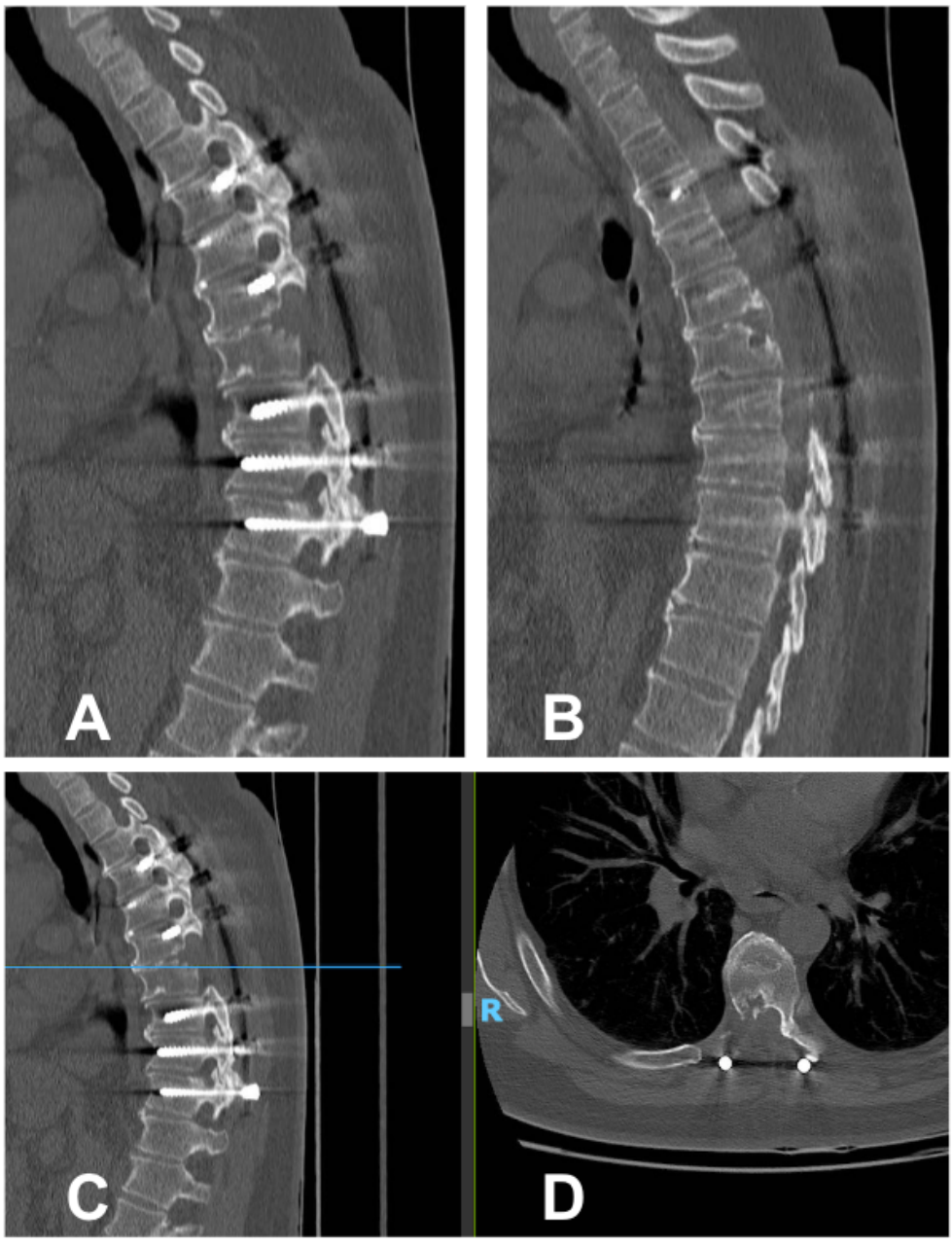

Figure 7: CT of the dorsal spine, sagittal (A, B, and C), and axial (D) section. Two years follow-up shows postoperative changes without evidence of local recurrence, satisfactory spinal cord decompression, and a solid fusion mass from T4 to T10.

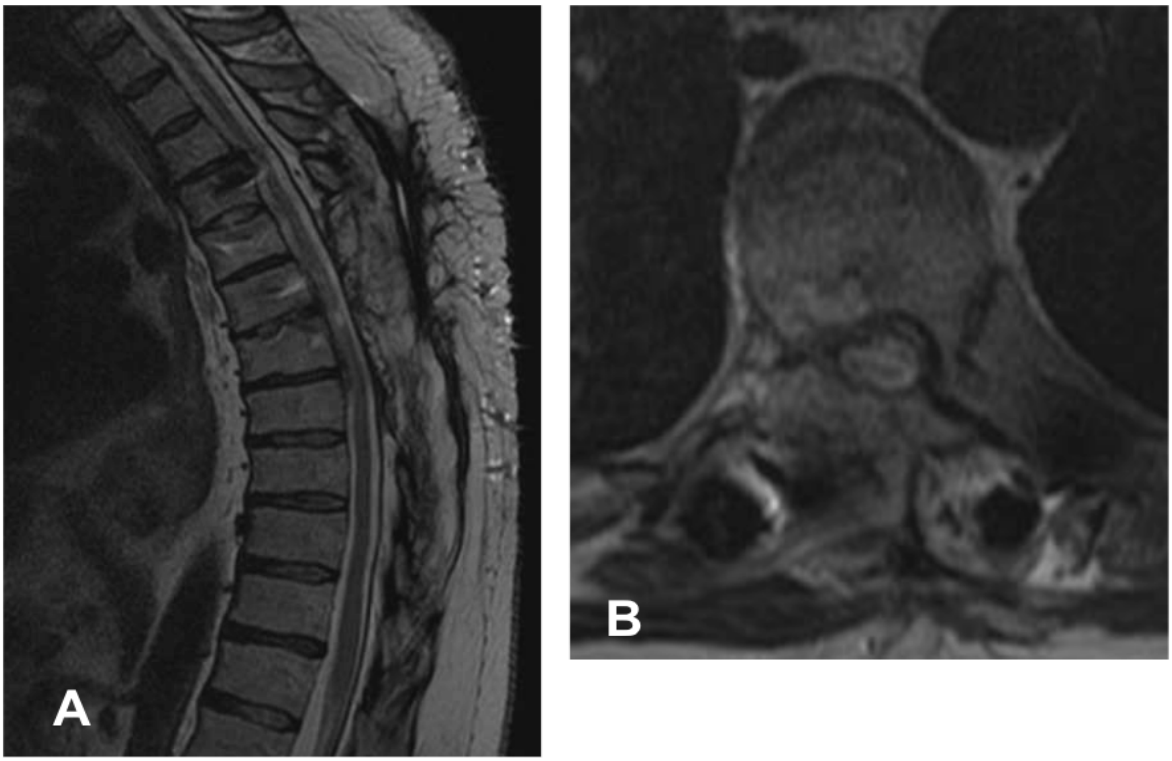

Figure 8: MRI of the spine, sagittal (A), and axial (B) section. Two years follow-up shows no evidence of local recurrence and satisfactory spinal cord decompression.

The literature was reviewed by use of the following pertinent keywords- spine, bone, cartilaginous, tumor, neoplasm, exostosis, vertebra, benign, osteochondroma, cord compression, myelopathy, paraparesis, decompression, and arthrodesis using a PubMed search of English Literature and bibliographies of published manuscripts. Abstracts of interest were screened, and full articles were selected that were pertinent to the literature search. References of articles selected were further explored for additional relevant references. The selection of articles was not restricted because of study design or level of evidence.

Discussion

A case of solitary osteochondroma as a cause of progressive compressive myelopathy was presented. Osteochondroma is a rare tumor in the spine that can produce radicular and/or myelopathic symptoms. When present in the spine, they have a special predilection for the cervical or thoracic spine.[7] The etiology of osteochondromas includes congenital, trauma, and post-radiation therapy.[8] They have been attributed to significant radiation exposure in 12–15% of osteochondroma cases [9].

The case presentation highlights the potentially devastating consequences of spinal osteochondroma, leading to myelopathy and neurological deficits.[10] Clinicians must be vigilant in recognizing the clinical signs and symptoms of myelopathy, such as hypoesthesia and muscle weakness, to facilitate early diagnosis and prompt intervention. [3]

The utilization of advanced imaging modalities, including CT and MRI, played a pivotal role in the timely diagnosis of the intracanal calcified mass in this case. These imaging techniques are invaluable in characterizing the tumor's location, size, extent of spinal canal invasion, and relationship with surrounding structures, thus guiding surgical planning. [11] Magnetic resonance imaging represents the most valuable imaging modality in symptomatic cases because it can demonstrate typical features of associated soft tissue pathology, which can be differentiated from malignant transformation. [12]

Given the risk of spinal cord injury and the risk of malignant transformation, surgery is recommended in all osteochondromas causing spinal cord compression. [13] Surgical options are evaluated depending on the location of the tumor, presence of mechanical pain, radiographic spinal alignment, vertebral collapse, posterolateral involvement, and spinal cord compression with neurological compromise. [3]

The decision to perform posterolateral arthrodesis and tumor resection was based on a multidisciplinary approach involving an orthopedic surgeon, neurologist, and neurosurgeon, ensuring the best possible outcome for the patient.

Hansberry et al.presented a similar case of a patient with a facet joint osteochondroma extending from the bottom of the thoracic spine (T11–T12) into the spinal canal. [14] In this case, a posterolateral approach was used to resect the lesion and decompress the neural foramen and spinal canal from a single vantage point in an attempt to minimize postoperative complications. The successful recovery of the patient underscores the importance of comprehensive postoperative rehabilitation. A well-structured rehabilitation program helps restore neurological function, improve muscle strength, and enhance the patient's overall quality of life. [10]

Most of the similar published reports show that this clinical picture is more frequent in the context of multiple hereditary exostoses [2, 15] and 132 new cases have been published from 2004 to 2016, which shows a 2.4-fold increase since 2003 [5], of which, 27.2% presented with myopathic symptoms. Spinal cord compression is the second most common complication of vertebral osteochondroma, after sarcomatous transformation. [10]

The rarity of osteochondroma in the spine is noteworthy, as it comprises only 4% to 7% of primary tumors in this location.[2,5] This discrepancy in prevalence compared to other bone tumors warrants investigation into the specific factors that might contribute to its occurrence in the spine.

While the patient showed favorable progress at the six-month and two-year follow-up, the long-term prognosis of spinal osteochondroma patients remains an essential aspect for consideration. Monitoring the patient's recovery and neurological status over an extended period will provide valuable insights into the potential risks of recurrence and the need for regular follow-up assessments. Long-term studies involving a larger patient cohort are necessary to better understand the natural course of spinal osteochondromas and their potential implications for patients in the long term.

Conclusion

Spinal osteochondroma is a rare condition that can have significant clinical implications when it leads to myelopathy and neurological deficits. This case presentation emphasizes the importance of early recognition and diagnosis, supported by advanced imaging techniques like CT and MRI.

Surgical options are evaluated depending on the location of the tumor, presence of mechanical pain, radiographic spinal alignment, vertebral collapse, posterolateral involvement, and spinal cord compression with neurological compromise.

A posterolateral approach with arthrodesis and tumor resection, coupled with a well-structured postoperative rehabilitation program, can yield positive outcomes, as demonstrated by the favorable progress of our patient.

Despite its low prevalence, the recent increase in reported cases of spinal osteochondroma suggests the need for continued research and awareness of this condition. Furthermore, long-term monitoring and larger-scale studies are warranted to gain deeper insights into the prognosis, recurrence rates, and potential long-term implications for patients with spinal osteochondroma.

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