Intraosseous schwannoma of D12 thoracic vertebra: diagnosis and surgical management with 5-year follow-up

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Abstract Intraosseous schwannomas or neurilemmomas are rare benign neoplasms that account for less than 0.2% of primary bone tumours. Very rarely they have been observed in lumbar vertebrae. We report a neurilemoma involving the lower thoracic spine and present the clinical, radiological and histological findings with surgical management and 5-year follow-up. An 18-year-old-male presented with back pain and deteriorating locomotor function. Neurological examination revealed wasting of both calves and weakness in plantar flexion and dorsiflexion bilaterally. X-rays showed a D12 vertebral body abnormality with cystic changes and collapse of the body and pedicle. MRI showed a tumor occupying the D12 vertebrae with perivertibral protrusion compressing the thecal sac. Surgical decompression, excision and stabilisation with an extendable cage, bone graft and anterior rod system were achieved through a thoracolumbar approach. Histology results confirmed an intraosseous schwannoma with no remnants of an originating nerve. These tumors are rare but can be successfully treated with surgical excision and maintenance of spinal stability with recovery of neurological and functional change. Recurrence is uncommon.

Keywords Intraosseous schwannoma · Thoracic vertebrae · Spinal reconstruction · Spinal stability

Introduction

Intraosseous schwannomas or neurilemmomas are rare benign neoplasms that account for less than 0.2% of primary bone tumours [7]. The most common site of involvement is the mandible and has been observed very rarely in vertebrae with a few cases reported involving the lumbar spine [2, 6]. We report a neurilemoma involving the lower thoracic spine and present the clinical, radiological and histological findings with surgical management and 5-year follow-up.

Case

An 18-year-old male student and keen athlete was referred by his general practitioner to the department with a history of back pain for approximately year duration. Over the recent few weeks the patient noticed deteriorating locomotor function, thinning of his legs and that his sprint times had decreased progressively. He had no previous medical problems or traumatic history.

On examination he had a normal posture but was found to have wasting of both calves, with weak plantar flexion and dorsiflexion bilaterally. Knee reflexes were present but ankle reflexes were reduced. Plantars were normal. There was an isolated sensory disturbance at D12. He could forward flex to reach his ankles, SLR was 60° bilaterally restricted by pain. Femoral stretch tests were negative.

Haematological and biochemistry profiles were all normal.

Thoracolumbar X-rays showed a D12 vertebral body abnormality, with gross cystic changes and partial collapse of the body and pedicle (Fig. 1).

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Fig. 1 Thoracolumbar X-ray showing a D12 vertebral body abnormality, with gross cystic changes and collapse of the body and pedicle

Fig. 2 T1 weighted MRI. Sagittal section showing (a) tumour mass occupying the D12 vertebra with spinal cord compression (b) post contrast T2 weighted image showing an axial section of D12. The tumour is occupying the D12 vertebra with perivertebral protrusion compressing the thecal sac and neural foramina

Magnetic resonance imaging of the region showed a tumour mass occupying the D12 vertebra with peri-vertebral protrusion compressing the thecal sac and extending into the neural foramina (Fig. 2).

The findings were presented to the patient and a surgical strategy planned.

The patient underwent a thoracolumbar surgical approach through the bed of the 10th rib, which was harvested, the diaphragm incised and a large dumbbell tumour in chest cavity was found and exposed extra-

pleurally. The tumour was excised from the vertebral body leaving a shell and dissected from the cord 'en bloc' (Fig. 3).

The discs were excised and segmental vessels from D11 to L1 ligated. The spine was reconstructed using the Synex extendable cage placed between the prepared endplates of D11 and L1 and secured with Ventrofix the anterior rod system (Fig. 4).

Bone graft from the harvested 10th rib was also used. A closure in layers was performed with a chest drain left in situ.

The histological features showed Antoni A and B areas with hypercellular, palisaded cells alternating with hypocellular stroma. Within the matrix micro cystic areas, inflammatory cells and delicate collagen fibre were seen. These appearances confirmed schwannoma (neurilemoma). No remnants of an originating nerve were noted (Fig. 5).

Post operatively the patient made an uneventful recovery, regaining full power in his lower limbs. At 5-year follow-up the patient is well with no pain, has full limb power and no neurological deficit. X-rays show a sound fusion and appearance (Fig. 6).

Discussion

Intraosseous schwannomas or neurilemmomas are rare benign neoplasms that account for less than 0.2% of primary bone tumours [7]. Schwannomas involve bone through three possible mechanisms: an extraosseous tumor causing erosion of the bone, a tumor arising within the nutrient canal and growing in a dumbbell shaped configuration producing enlargement of the canal, or a tumor arising centrally within the bone [4, 8, 14]. The intra osseous origin of schwannoma is established on the existence of nerves within bones. Variot and Remy [17] described both myelinated and non-myelinated fibers usually associated with vessels in bone marrow from several animals and also a human fetus. Sherman [15] observed nerves within the marrow of the vertebral bodies in two adults. Pederson et al. found nerve filaments arising from the recurrent branch of each spinal nerve root with their accompanying blood vessels entering the vertebral body [11]. Schwannomas are most commonly seen in the mandible [1, 14, 16] possibly due to the long course of the nerves within this bone. Other reported sites have included the humerus [9], ulna [5, 12], tibia [3, 8] femur [10] vertebral bodies [2, 6] rib [7, 16] and sacrum [4, 7, 13]. Dickson et al. [6] in 1971 first reported a case of intraosseous schwannoma involving a lumbar vertebral body. Our case involving the D12 vertebrae is a rare

Fig. 3 The well-encapsulated tumour is removed whole from the vertebra and adjacent neurovascular structures

Fig. 4 The cavity of D12 is stabilized with synex extendable cage, prior to bone grafting and application of the ventrofix

finding, the diagnosis confirmed histologically by the presence of Antoni type A tissue consisting of compact cellular areas with spindle shaped cells arranged in bundles or fascicles with palisading nuclei, alternating with Antoni type B tissues consisting of less cellular areas of myxoid connective tissue with haphazardly arranged spindle cells. The tumour was well encapsulated, occupying the vertebral body and free from adjacent neural tissue. The tumour was removed whole and the spine stabilized with rod, screws and bone graft. Our patient has made an uneventful recovery and at 5-year-follow-up has no neurological deficit and has sound fusion between D12 and L1 vertebral bodies.

Conclusion

These tumours are successfully treated using surgical excision or thorough curettage and recurrence is

Fig. 5 Histological slide showing Antoni A and B areas with hypercellular, palisaded cells alternating with hypocellular stroma. Within the matrix micro cystic areas, inflammatory cells and delicate collagen fibres

Fig. 6 Plain AP X-ray at 5-year follow-up showing sound fixation and fusion

uncommon. Intraosseous schwannomas are very rare tumors, but as is demonstrated here can be completely removed with the maintenance of spinal stability and recovery of neurological and functional change.

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