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Case report

Lumbar radiculopathy associated radicular schwannoma: A case report and literature review[☆]

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ABSTRACT

Lumbar radiculopathy is a clinical condition defined by symptoms of pain, weakness, numbness, or tingling due to lumbar nerve root compression in levels L1-L4. Typically, it is characterized by a narrowing near the nerve root possibly caused by stenosis, bone osteophytes, disc herniation, and similar conditions. Reports of lumbar radiculopathy brought about by the presence of a radicular schwannoma are exceedingly rare. In this paper, we discuss the case of a 67-year-old female patient, presenting with complaints of low back pain, numbness, and antalgic gait for the past eight months. Her physical examination revealed motor and sensor neurological deficits affecting the left lower limb. The electromyoneurography

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evaluation showed neurogenic atrophy of the left radicular area, while the MRI revealed the presence of a giant, radicular schwannoma at L4-L5 level. This case report aims to underscore the clinical course and management of lumbar radiculopathy caused by a rare L4-L5 radicular schwannoma. Our patient had no significant risk factors or previous spinal pathology.

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Introduction

Schwannomas originate from Schwann cells and are benign nerve sheath tumors. Nerve sheath tumors comprise 8.6% of all central nervous system tumors, yet only 0.7 % are malignant. [1] Spinal schwannomas usually present as extramedullary intradural lesions. They can affect virtually any spinal segment and mostly arise from the posterior nerve roots. In one series, occurrence in the lumbosacral region was reported to be 48.6% [2]. The annual incidence of spinal schwannomas has been reported to be 0.3-0.4 per 100,000 people and they present mostly around the fourth or fifth decade with equal sex distribution [2]. Although they are most frequently observed as sporadic solitary lesions, they can sometimes be associated with other genetic disorders such as neurofibromatosis type II (NF2). Fortunately, most schwannomas are benign, and malignant transformation is extremely rare, occurring almost exclusively in the context of neurofibromatosis [3]. Because of their slow-growing nature, spinal schwannomas present with vague, nonspecific symptoms and are often diagnosed incidentally [4]. They commonly emerge with local pain, weakness, numbness in extremities, and bowel or bladder function loss [4]. Acute neurologic decline is a rare complication that may be encountered in the case of a large mobile tumor [4]. Surgical resection to relieve the compression alleviates pain and other symptoms and is the mainstay of treatment. Instrumentation may be required to establish spine stability, depending on the extent of bone erosion [3].

Case presentation

A 67-year-old female, presented to the Neurology Department with an 8 month-history of low back pain, radiating to her left leg with associated numbness and antalgic gait, that had progressively worsened in the span of two weeks prior to admission, forcing the patient to seek specialized medical attention. Past medical history was significant for arterial hypertension and achalasia, having undergone a successful Heller myotomy. She was on an anti-hypertensive medication regimen and presented with optimal blood pressure values. No other comorbidities were reported. She was a non-smoker, and her family history was unremarkable.

On physical examination, a firm, non-tender, mobile mass was visible on the lumbar region. Examination of the cardiovascular, respiratory and the rest of the musculoskeletal system was within normal limits. Neurological examination re-

vealed motor and sensory deficits affecting the left lower limb [Figs. 1-8]. Decreased strength on the left leg with Quadriceps 4/5 and ankle dorsiflexion 4/5 was evident, as well as a reduced left femoral reflex and a positive Lasegue's sign. No pathological reflexes were noted. Sensory disturbances, including paraesthesia and hypoesthesia involving primarily the left leg, were also present.

Electroneuromyography evaluation of the lower limbs, showed neurogenic atrophy predominant on the left radicular territory, affecting muscles innervated by the left L3-L4-L5 roots (left vastus medialis, left vastus lateralis and left tibial anterior muscles). A subsequent MRI of the lumbar spine revealed the presence of a giant, well-encapsulated, solid mass with cystic components, at the left L4-L5 level.

The patient underwent a complete surgical excision of the tumor and made a full recovery, after an uneventful postoperative period. Following histopathological examinations of the excised tumor, the patient received a formal diagnosis of compressive lumbar radiculopathy, precipitated by a giant radicular left L4-L5 schwannoma. Post-operatively the pain, along with the motor and sensory disturbances disappeared completely, with no residual deficits in follow-up.

Discussion

Schwannomas are the most frequent peripheral nerve sheath tumors, representing one of the primary benign spinal tumors [5–8]. Generally, they are diagnosed in the fourth or fifth decade of life and affect males and females equally [4,6,7]. However, a few studies have recently suggested a slight male predilection [4,6]. Spinal schwannomas typically present as solitary masses, with a higher prevalence in the cervical and lumbar regions, and less commonly in the thoracic region [6,7]. The longer distance between the conus and the foramina of the lumbar nerve roots, has been proposed as a possible explanation for the higher frequency with which schwannomas develop in the lumbar spine, as opposed to other segments [6]. Peripheral schwannomas may also present as multiple lesions, usually in the setting of underlying conditions such as Neurofibromatosis type II (NF2), Schwannomatosis or Carney's complex [5–7]. These tumors are classified as syndromic schwannomas, their pathogenesis, treatment and prognosis differ from sporadic, non-syndromic schwannomas [5–7].

Schwannomas derive from a clonal population of Schwann cells of a sensory nerve root and appear as well-defined, encapsulated masses with hemorrhage, calcified or cystic components [5–7]. Spinal schwannomas arise sporadically as benign, solitary masses or within the framework of a predispos-

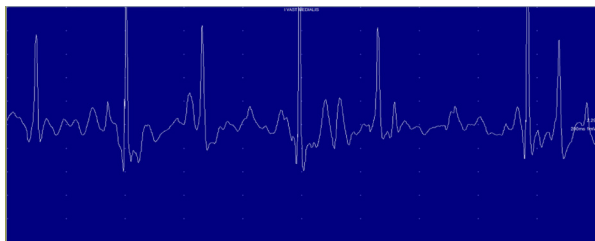


Fig. 1 – Neurogenic Atrophy changes in Left Vastus medialis muscle.

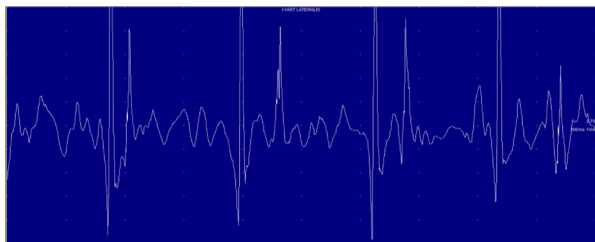


Fig. 2 – Neurogenic Atrophy changes in Left Vastus lateralis muscle.

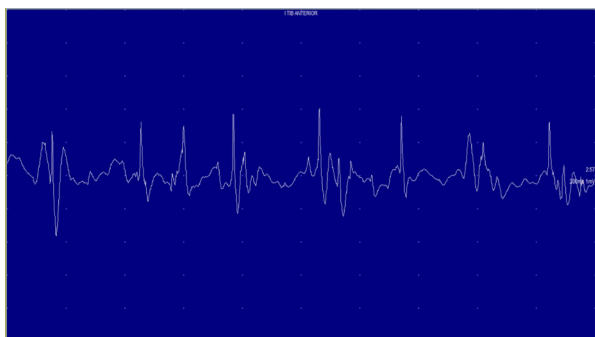


Fig. 3 – Neurogenic Atrophy changes in Left Tibial anterior muscle.

ing condition [5–7]. Mutations in *NF2*, *LZTR1*, or *SMARCB1* genes have been implicated in the development of syndromic, as well as sporadic, non-syndromic schwannomas [8]. Notably, mutations in the *NF2* gene have been identified as one of the main drivers of schwannoma development both in sporadic and familial cases [8]. Spinal schwannomas rarely undergo malignant transformation, but it can occur in the context of both sporadic and syndromic tumors and is typically associated with an epithelioid or primitive neuroectodermal pattern [5].

Imaging modalities, particularly MRI, is highly sensitive, allowing a straightforward differentiation of extradural, intradural-extramedullary and intramedullary schwannomas [6,7]. Of these types of schwannomas, intradural-extramedullary constitute the most common ones, whereas the latter represent the rarest in neurosurgical practice [7]. On MRI, they emerge as rounded, well-defined masses that show enhancement after gadolinium administration [6,7]. There-

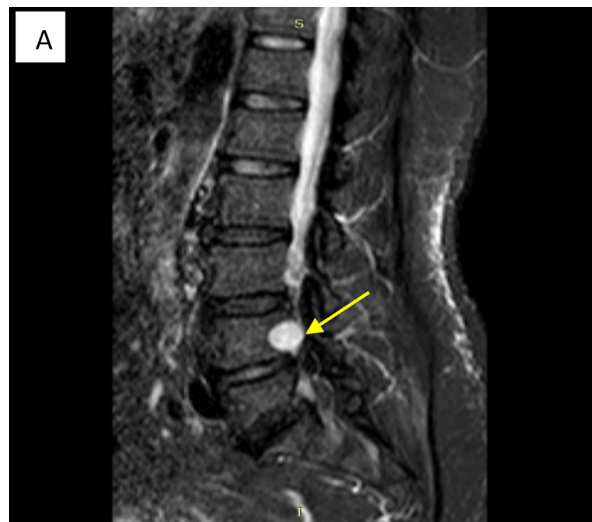


Fig. 4 – MRI imaging Sagittal STIR long TE shows a high signal intensity, well-encapsulated, solid mass with cystic components at the left L4-L5 level (A, yellow arrow).



Fig. 5 – T1 W_TSE showing well defined hypointense mass at the level of L4-L5 (B, blue arrow).

fore, MRI guides the diagnosis, enabling the evaluation of the tumor, its location, relationship with adjacent neurovascular structures and pre-operative surgical planning. It also allows the detection of micro-schwannomas and residual or recurrent tumors, thus modifying the prognosis and the quality of life of these patients [6]. CT scans can aid in assessing potential associated bone erosion [6].



Fig. 6 – T2 sagittal presents a well-defined isointense left solid mass at the level of L4-L5 (C, green arrow).

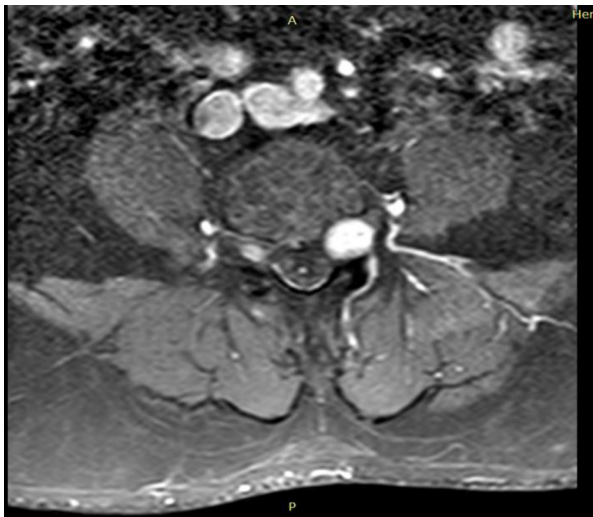


Fig. 7 – T1 W_TSE – GAD coronal MR imaging demonstrating well-encapsulated mass compressing the left L5 nerve root (D, red arrow).

Surgical resection remains the gold standard of treatment, despite its possible neurological complications, as the only feasible way of ensuring a resolution of symptoms, as well as preventing future recurrences, as was the case of our patient.

Conclusion

Lumbar radiculopathy generally occurs in elderly patients due to progressive degenerative pathologies of the lumbar spinal



Fig. 8 – T1 SPIR/ GAD shows a paravertebral solid mass that infiltrates the left spinal nerve foramen. The mass shows a homogenous and intense enhancement (E, white arrow).

cord. Radicular schwannomas represent a rare, but potential source of nerve root pathology manifested with radiculopathy. Thereby, through this case report we hope to emphasize the importance of including spinal schwannomas in the differential diagnosis of radiculopathies, in particular lumbar radiculopathy, in common neurological practice. By raising awareness of the prevalence of this condition, we aim to prompt a more timely diagnosis that ultimately leads to a better quality of life for these patients. Surgical removal of the tumor has shown an optimal recovery of the motoric and sensory deficits of the schwannoma-associated lumbar radiculopathy with positive outcomes in the follow-up.

Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, Figure 6, Figure 7, Figure 8

Patient consent

Patient consent has been obtained.

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