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Case Report

Extramedullary Intradural Spinal Schwannoma: A Case Report and Successful Treatment Approach

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Abstract

Studies have shown that extramedullary intradural tumors (EIDTs) can develop from various tissues and structures surrounding the spinal cord, including nerve roots, meninges, or vertebral bodies. Nerve sheath tumors account for approximately 30% of EIDTs in adult, while meningeal tumors account for approximately 25%. The prevailing types of tumors are Schwannomas, accounting for 29% of cases, and gliomas at 22%. We present our 46-year-old female who visited the clinic reporting a persistent upper back pain in the thoracic region for one year. The MRI revealed an EIDT on the right side of the spinal canal at the T6-T7 level which was consistent with a possible diagnosis of schwannoma. This case report highlights the diagnosis, management, and outcome of a patient with schwannoma. Following removal of the extradural portion of the mass, the dura defect was closed by duraplasty. Fortunately, there was no observed loss of function after surgery. This favorable result underscores the critical role of timely and precise diagnosis, meticulous preoperative assessment, and appropriate surgical methods in managing such tumors. This case report on Schwannomas can contribute to our understanding of the disease and help in developing better treatment and management strategies compared to the literature which is still unclear.

Keywords: *thoracic schwannomas; intradural extramedullary spine tumors; management; spinal cord; tumors.*

Introduction

Extramedullary intradural tumors (EIDTs) located in the spine are the primary form of spinal neoplasms, representing approximately two-thirds of cases. However, EIDTs are not very common and have an incidence rate of 3-10 per 100,000 people. [1] Nerve sheath tumors account for approximately 30% of EIDTs in adult, while meningeal tumors account for approximately 25%. [2] The prevailing types of tumors are Schwannomas, accounting for 29% of cases, and gliomas at 22%. [3] Although there has been no significant change in the clinical symptoms and pathology of EIDTs over time, there have been considerable improvements in the diagnosis and treatment of these tumors, thanks to advances in radiological and surgical techniques. Despite these advances, the removal of EIDTs is still associated with significant morbidity. [4]

The most frequently occurring type of nerve sheath tumor of the spine is the solitary spinal schwannoma. [5] Schwannomas are typically characterized by both extradural and intradural involvement, which often gives them a distinctive "dumbbell-shaped" appearance due to constriction by the dura mater in the middle. In the pediatric population, these tumors are most commonly found in the thoracic spine, with a particular predilection for the posterior and posterolateral regions. [6] The preferred method for treating symptomatic spinal schwannomas is complete surgical removal, which has been established as the gold standard. This approach can effectively halt the progression of symptoms, promote recovery in the majority of patients, and reduce the likelihood of tumor recurrence. [5]

In this case report, we present the diagnosis, management, and outcome of a patient EIDT schwannoma. Despite the rarity of this condition, early recognition and appropriate management of EIDTs, such as schwannomas, are crucial for minimizing morbidity and ensuring optimal outcomes. This case report highlights the importance of a thorough diagnostic evaluation and a multidisciplinary approach in the management of EIDTs.

Case Report

A 46-year-old female patient visited the clinic reporting a persistent upper back pain in the thoracic region for one year, which had not responded to analgesic medications. Upon examination, there was no evidence of abnormal gait, loss of proprioception, numbness, weakness, tingling, difficulty walking, or nocturnal pain. Furthermore, there was no history of any trauma. The patient had previously received treatment from a general practitioner in the form of several physiotherapy sessions, painkillers, and NSAIDs, but did not experience any relief.

Diagnostic evaluations

The MRI revealed an EIDT on the right side of the spinal canal at the T6-T7 level. The tumor exhibited low signal intensity in both T1 and T2 sequences, with marginal enhancement visible after contrast administration. The lesion was approximately 1.5 cm in size and was causing significant compression over the spinal cord, leading to deviation and compression towards the left side. At this level, it occupied approximately up to 75% of the spinal canal dimension [Figure 1]. The radiological pattern of this lesion was consistent with a possible diagnosis of either a meningioma or schwannoma, with a less likely differential diagnosis of neurofibroma. The vertebral outline and alignment of the dorsal spine were normal, and the intervertebral discs exhibited normal height and signal without any herniation. The spinal cord and neural foramina nerves, as well as the paravertebral soft tissue structures, appeared normal on imaging.

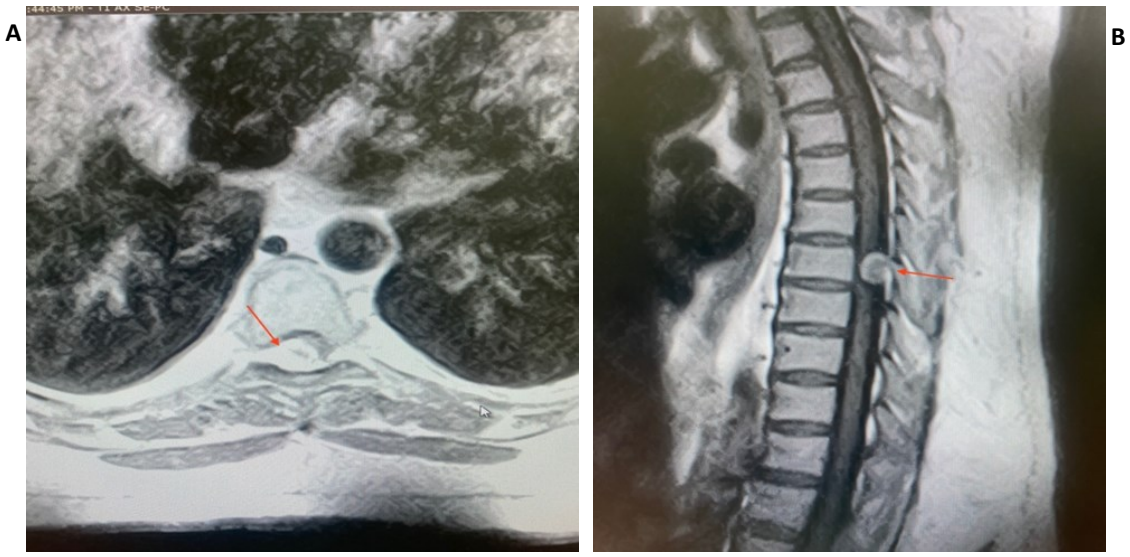

Figure 1: *T2 axial (A) and sagittal (B) sequences and post contrast showed the lesion measures approximately 1.5 cm and causes significant compression over the spinal cord, which is pushed and compressed to the left side.*

Treatment

The root was dissected under microsurgery and the mass was totally removed after laminectomy and midline dural opening. Following removal of the extradural portion of the mass, the dura defect was closed by duraplasty. Fortunately, there was no observed loss of function after surgery. Additionally, neurophysiologic monitoring was employed at these levels. Postoperative monitoring included serial MRI scans to track patient progress.

Outcome

The patient, who underwent surgical removal of the schwannoma, had a favorable outcome and did not display any signs of neurological deficit, fully recovering. The patient showed a smooth postoperative recovery, demonstrated by her ability to mobilize the next day after surgery, drain removal on the second postoperative day, and discharge on the fourth day. The patient's physical condition and symptoms were closely monitored, and the success of the surgical excision was evaluated. The long-term prognosis and potential for future tumor recurrence were also discussed and assessed. This positive outcome highlights the effectiveness of the surgical procedure in removing the tumor while preserving the patient's neurological function.

Discussion

The patient's case of EIDT Schwannoma is significant in the context of the literature as it highlights the importance of a thorough and accurate diagnostic evaluation. The patient's diagnostic evaluations, such as physical exams, imaging studies, and biopsy results, provided critical information that was used to develop an effective treatment plan. Diagnostic imaging, including magnetic resonance imaging (MRI) and computed tomography (CT) scans, is the mainstay of diagnosis for EIDTs. A biopsy may also be necessary to determine the type of tumor and guide treatment decisions.

The preferred method for managing EIDTs is surgical removal, which is often accomplished through either a laminectomy or spinal cord tethering procedure. A laminectomy involves removing a section of the vertebral bone to access the tumor, while spinal cord tethering involves detaching the tumor from the spinal cord and stretching the cord to alleviate pressure. Following surgery, spinal cord stimulation or other types of nerve stimulation may be employed in some cases to alleviate symptoms. [7] The surgical excision of the tumor was successful in removing the entire tumor and preserving the patient's neurological function.

This outcome is consistent with previous studies that have reported favorable outcomes for patients undergoing surgical excision of EIDTs. [8] The positive outcome of the patient's treatment has implications for future treatment of EIDTs. The success of the surgical excision in removing the entire tumor and preserving the patient's neurological function highlights the importance of utilizing a multidisciplinary approach to the treatment of these tumors. This approach involves collaboration between surgeons, radiologists, and pathologists to ensure accurate diagnosis and effective treatment. Radiosurgery may be considered as an alternative therapeutic approach, particularly for recurrent or residual lesions or in cases where surgery is not feasible. Although prior research has demonstrated short-term clinical benefits for EIDTs with radiosurgery, the long-term efficacy of this modality remains unclear. [9–11] The most frequently observed postoperative complications after EIDT resection are CSF leak, pseudomeningocele, and wound infection. Spinal instability and neurological deficits are fewer common complications. The recurrence of EIDTs after complete excision is common and dependent on the extent of surgical resection, as well as the type and histological characteristics of the lesions. [9–11]

Additionally, the patient's rapid recovery and discharge within four days postoperative highlights the importance of careful postoperative monitoring and management to minimize the risk of adverse events and complications. There is a widely held belief, supported by evidence, that patients with spinal cord tumors generally experience improved clinical outcomes when treated with early surgery. Early identification of symptoms and signs of the disease enables diagnosis in the early stages, before the spinal cord is damaged, thereby reducing the risk of postoperative complications and enhancing surgical outcomes. [12–14] A recent 12 years study showed that minimally invasive techniques, such as monolateral laminectomy, are effective for treating certain spinal conditions and are not linked with inferior outcomes or higher rates of complications in comparison to traditional bilateral laminectomy procedures. [15]

Overall, the patient's case serves as a valuable example of the effectiveness of a multidisciplinary approach to the treatment of EIDTs and highlights the importance of accurate diagnosis, effective treatment, and careful postoperative management for optimal patient outcomes.

Conclusion

This patient's case serves as a compelling illustration of the importance of early identification and tailored treatment for extramedullary intradural spinal tumors. Through successful surgical removal of the Schwannoma, the patient experienced a complete recovery with no neurological deficits. This favorable outcome underscores the critical role of prompt and accurate diagnosis, meticulous preoperative assessment, and appropriate surgical methods in managing such tumors. Additionally, this case contributes valuable insights to the existing literature, underscoring the need for further research and analysis of personalized treatment options for extramedullary intradural spinal tumors. Ultimately, an interdisciplinary approach to the management of these tumors is essential to achieving the best possible clinical outcomes for patients.

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None

Conflict of Interest

The authors have declared that no competing interests exist.

Ethical Approval

Consent was obtained by the participant in this study for publication of images and data.

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