Schwannomas are the most common extramedullary spinal tumors, with chronic progressive symptoms being the most common presenting features. The acute hemorrhagic onset of a spinal schwannoma is a rare occurrence. Here, we report the case of a 37-year-old male who presented with complaint of neck pain and an acute onset of quadriparesis. MRI of his cervical spine revealed an intradural extramedullary lesion in the C2 to C3 cervical segment, with features of acute hemorrhage but mild enhancement. He was operated in emergency and complete microsurgical resection of tumor was achieved. Histopathology revealed features of an ancient schwannoma with hemorrhage. Postoperatively, the patient showed significant improvement.

Key Words: Hemorrhage; Schwannoma; Intradural extramedullary; Cervical.

INTRODUCTION

Schwannomas are the most common primary intraspinal tumor, accounting for 30% of primary spinal neoplasm [1]. They are commonly intradural extramedullary in location. These tumors may be incidentally diagnosed on imaging, and delayed diagnosis is common because of slow growth [2]. Symptoms are related to the radicular and/or spinal cord levels affected by the tumor [3]. The acute hemorrhagic onset of a spinal schwannoma is a rare occurrence and intratumoral hemorrhage may result in rapid neurological deterioration. An MRI scan is useful for detecting hemorrhagic changes associated with intraspinal tumors. Total surgical resection is the goal of treatment to relieve symptoms and prevent recurrence.

We report a case of cervical schwannoma with acute intratumoral hemorrhage, presenting with an acute onset of quadriparesis.
imaging (WI) showed complete excision of the tumor (Fig. 4). The postoperative period was uneventful. The motor and sensory functions of the patient had gradually improved. At postoperative 3 weeks, there were grade 4/5 and 5/5 powers in right and left side limbs, respectively, and patient was ambulant without support.

This presenting case report was conducted according to guidelines of the Declaration of Helsinki for biomedical research. Informed consent was waived due to its retrospective nature.

**DISCUSSION**

Schwannomas account for around one-third of all primary spinal tumors, occurring equally in both sexes [4-6]. Their common locations include intradural extramedullary sites.
Spinal Schwannoma with Intratumoral Hemorrhage

(58%), followed by extradural (27%), dumbbell shaped tumors with both an extradural and an intradural component (15%), and rarely intramedullary (less than 1%) [7]. Delayed diagnosis is common because spinal schwannoma usually has a low growth rate. The symptoms depend on the size and location of the tumor and are related to a slowly enlarging mass with pressure effects or sensory changes in the distributing area of the affected nerve [8].

The most frequent symptom related to intradural schwannoma is pain [9]. The intradural schwannoma with acute intratumoral hemorrhage is a very rare occurrence and presents early due to the rapid onset of neurological deficit [10]. The exact mechanism of acute intratumoral hemorrhage in schwannomas is not known. There are 2 possible underlying conditions that can be considered: the first theory suggests that hyalinized ectatic vessels inside the schwannoma undergo spontaneous thrombosis resulting in distal necrosis and hemorrhage; and the second theory supports the traction of tumor vasculature during movement [11]. A history of anticoagulant/antiplatelet therapy or trauma may cause acute intratumoral hemorrhage.

An MRI scan is the preferred imaging modality for detecting hemorrhages associated with spinal tumors. The signal intensities of hemorrhagic spinal tumor can be influenced by the stages of hemorrhage. Schwannomas usually present with an intense, homogenous enhancement with gadolinium contrast. However, those with tumoral hemorrhage usually show irregular enhancement due to concomitant presence of blood products [12].

The definite diagnosis of spinal schwannoma depends on the histopathological examination. The histological stains show a mixture of 2 growth patterns such as the Antoni A and Antoni B. In the Antoni A pattern, nuclear palisading and associated Verocay bodies with a prominent extracellular matrix and secretion of laminin are the dominant characteristics; whereas, a loose organization with myxomatous and cystic changes are the main features of Antoni B [13]. The major histopathological characteristics of the ancient schwannoma, a rare sub-type of schwannomas, are degenerative changes such as cyst formation, calcification with occasional sites of hemorrhage, and...
sparse mitotic hyperchromatic nuclei [14].

The complete excision of the tumor, along with its capsule, is the gold standard in the treatment of cervical schwannomas. Early diagnosis and emergency operation are factors responsible for successful outcome in the case of hemorrhagic schwannoma [15]. The prognosis is good, and tumors do not typically recur [8].

In conclusion, spinal schwannomas presenting with intratumoral hemorrhage is a rare event. Early diagnosis and emergency management should be considered in cervical pathologies with rapid progression of neurological symptoms. A contrast enhanced MRI is the gold standard diagnostic modality for intraspinal tumors. The complete excision of hemorrhagic tumor is the goal of treatment to prevent recurrence.

Conflicts of Interest

The authors have no potential conflicts of interest.

REFERENCES

1. Cohen ZR, Knoller N, Hadani M, Davidson B, Nass D, Ram Z. Traumatic intratumoral hemorrhage as the presenting symptom of a spinal neurinoma. Case report. J Neurosurg 2000;93(2 Suppl):327-9.
2. Sharifi G, Mortaz M, Parsaei B. Multiple intradural extramedullary tumours presenting with paraplegia after trauma. Acta Neurochir (Wien) 2009;151:697-8.
3. Raysi Dehcondi S, Marzi S, Ricci A, Di Cola F, Galzio RJ. Less invasive approaches for the treatment of cervical schwannomas: our experience. Eur Spine J 2012;21:887-96.
4. Ciappetta P, D’Urso PI, Colamaria A. Giant craniovertebral junction hemorrhagic schwannoma: case report. Neurosurgery 2006;62:E1166; discussion E1166.
5. George B, Lot G. Neurinomas of the first two cervical nerve roots: a series of 42 cases. J Neurosurg 1995;82:917-23.
6. Zhang HZ, Li Y, Han Y, et al. Spontaneous acute hemorrhage of intraspinal canal cellular schwannoma with paraplegia: a case report. Br J Neurosurg 2015;29:425-7.
7. Pawha P, Sax G. Neoplastic disease of the spine and spinal cord. In: Atlas SW, editor. Magnetic resonance imaging of the brain and spine. 4th ed. Vol. 2. Philadelphia: Lippincott Williams & Wilkins; 2009. p.1538.
8. Mwaka ES, Senyonjo P, Kakyama M, Nyati M, Orwotho N, Lukande R. Giant solitary ancient schwannoma of the cervico-thoracic spine: a case report and review of the literature. OA Case Rep 2013;2:2.
9. Jinna T, Koyama T. Clinical characteristics of spinal nerve sheath tumors: analysis of 149 cases. Neurosurgery 2005;56:510-5.
10. Tanaka H, Kondo E, Kawato H, Kikukawa T, Ishihara A, Toyoda N. Spinal intradural hemorrhage due to a neurinoma in an early puerperal woman. Clin Neurol Neurosurg 2002;104:303-5.
11. Ng PT. Schwannoma of the cervical spine presenting with acute haemorrhage. J Clin Neurosci 2001;8:277-8.
12. Uemura K, Matsumura A, Kobayashi E, Tomono Y, Nose T. CT and MR presentation of acute hemorrhage in a spinal schwannoma. Surg Neurol 1998;50:219-20.
13. Wippold FJ 2nd, Lubner M, Perrin RJ, Lämmle M, Perry A. Neuropathology for the neuroradiologist: Antoni A and Antoni B tissue patterns. AJNR Am J Neuroradiol 2007;28:1633-8.
14. Liu YW, Chiu HH, Huang CC, Tu CA. Retroperitoneal schwannoma mimicking a psoas abscess. Clin Gastroenterol Hepatol 2007;5:A32.
15. Jaiswal A, Shetty AP, Rajasekaran S. Giant cystic intradural schwannoma in the lumbosacral region: a case report. J Orthop Surg (Hong Kong) 2008;16:102-6.