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10.2478/AMB-2025-0026

CASE REPORT

FORAMEN MAGNUM MENINGIOMA WITH ATYPICAL CLINICAL PRESENTATION: A CASE REPORT

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Abstract. *Meningiomas at the craniovertebral junction most commonly occur in the region of the foramen magnum, at the junction of the skull and the first cervical vertebra. This anatomical localization makes meningiomas in this region challenging for diagnosis and treatment, especially due to the proximity of vital structures such as the brainstem, spinal cord, and cranial nerves. This case report describes a middle-aged patient with a foramen magnum meningioma, initially presenting with unilateral headache and neck pain. One month before surgery, the patient experienced multiple sudden and brief falls without loss of consciousness. The clinical presentation lasted 6-7 months before the diagnosis. Neurological examination revealed subtle torticollis and symmetrical hyperreflexia in the lower extremities. Magnetic resonance imaging of the brain and cervical spine revealed the presence of a well-defined intradural mass with homogeneous contrast enhancement at the level of the craniovertebral junction. Following the Cavitron Ultrasonic Surgical Aspirator technique, a transitional meningioma of the foramen magnum, gradus I, was pathophysiologically confirmed. Our case highlights the importance of clinical suspicion in recognizing these tumors and underscores the significance of using neuroimaging for early diagnosis and planning surgical treatment.*

Key words: *foramen magnum meningioma, torticollis, drop attacks, surgical treatment*

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Received: *24 August 2024;* ***Revised/Accepted:*** *30 September 2024*

INTRODUCTION

Meningiomas localized in the region of the foramen magnum are rare but clinically significant intracranial tumors that occur at the junction of the skull and the spinal canal [1]. Because of their location, these tumors can cause compression of vital structures, including the lower cranial nerves, the medulla oblongata, and the upper segments of the spinal cord. Clinical manifestations include headache, dizziness, cranial nerve dysfunction, limb weakness, and sensory disturbances [2]. The diagnosis of meningioma in this region often requires the use of modern neuroimaging techniques, such as magnetic resonance imaging (MRI), which enables precise localization of the tumor and planning of surgical intervention [3]. Surgical treatment remains the main therapeutic approach, but due to the proximity of critical neurovascular structures, operations are technically

challenging and carry a high risk of postoperative complications [4].

This case report aims to present the rare localization of meningioma in the region of the foramen magnum, emphasize the importance of neurological examination in recognizing the subtle signs of this serious pathology, and highlight the importance of modern diagnostic and therapeutic modalities.

CASE PRESENTATION

A 40-year-old man first sought medical attention in January due to pain in the occiput and neck area on the left side. The pain initially appeared after waking up in the morning, but gradually, it became constant, of moderate intensity, and increased during extension or lateral neck flexion. After an examination by an orthopedist and a physiatrist, he was diagnosed with discarthrosis at the C5-C6 level. A month before his hospitalization, he noticed that during a sudden throw of the head, there was a short-term weakness in the legs, which resulted in numerous falls, but without loss of consciousness. He denies chronic neurological or cardiovascular diseases, as well as the use of drugs that could cause muscle weakness or a drop in blood pressure. A neurological examination revealed mild symmetrical hyperreflexia on the lower extremities, while the head was slightly tilted to the right side with limited mobility (Figure 1). Cardiac examination and other diagnostic tests revealed no pathology, including electroencephalography, electrocardiography, transthoracic echocardiography, and extracranial Doppler of the carotid and vertebral arteries. All laboratory findings were normal. MRI examination of the brain and cervical spine revealed an expansive lesion located anterolaterally on the left side of the craniovertebral junction, showing homogeneous postcontrast imbibition. The tumor compresses and dislocates the medulla oblongata and spinal cord dorsally and to the right. The maximum dimensions of the lesion were 15 mm anteroposteriorly, 20 mm transversely, and 30 mm vertically (Figure 2). The patient underwent a suboccipital craniectomy with removal of lamina C1. Intraoperatively, the tumor was pale pink, well vascularized, clearly respecting the arachnoid plane and the lateral dural attachment. Maximal tumor resection was performed using a Cavitron ultrasonic surgical aspirator, respecting the arachnoid plane and addressing the lateral dural attachment, with a resection grade of Simpson classification II. During the operation, intraoperative neuromonitoring was used, and all potentials remained at the preoperative level. Histological findings confirmed a transitional meningioma, WHO grade I, with rare psammoma bodies, without histological atypia and mitotic activity (Figure 3). The postoperative course was normal, without neurological deficit. Episodes of transient leg weakness have completely disappeared. At follow-up examinations after 3, 6, and 12 months, the patient reported no headaches or episodes of falls, and follow-up MRI showed no residual tumor or recurrence (Figure 4).

DISCUSSION

Foramen magnum meningiomas develop slowly, leading to a gradual progression of symptoms. The clinical presentation of these tumors can be

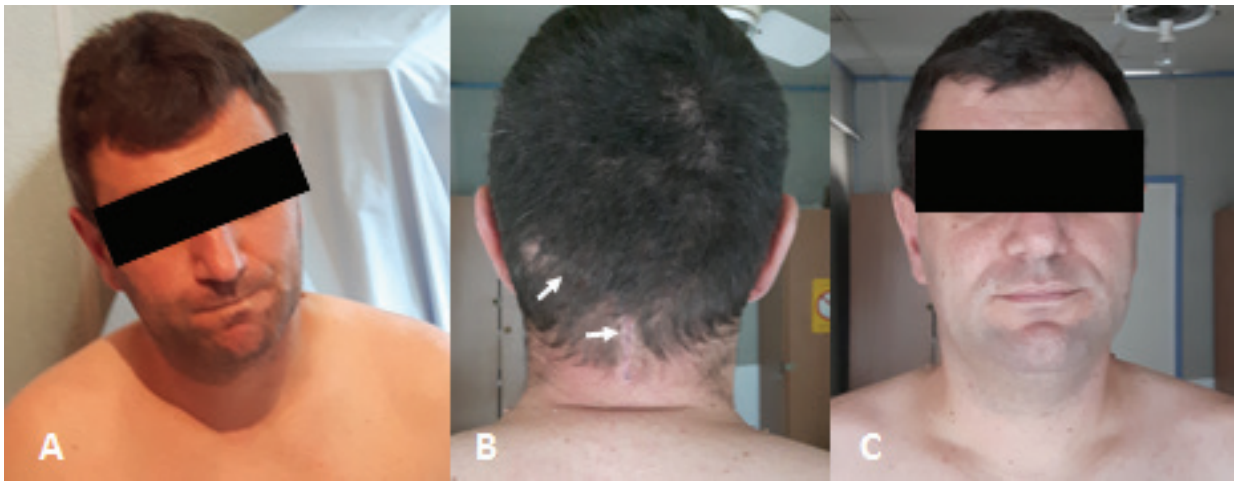

Fig. 1. Forced head position (acquired torticollis) before surgery (A), semicircular postoperative scar suboccipital on the left side towards the midline (B), normal head position after tumor removal (C)

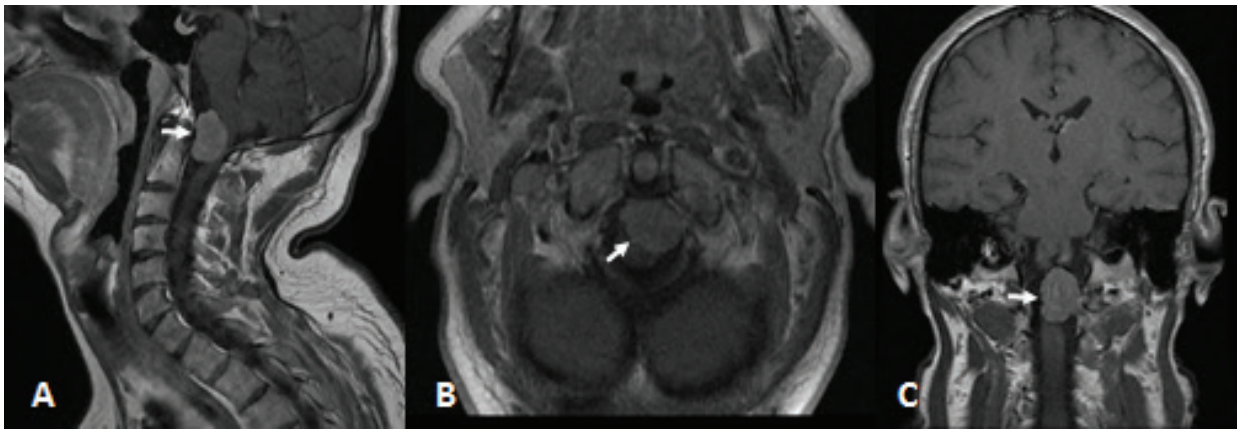

Fig. 2. Brain and cervical spine MRI: sagittal TW1 (A), axial TW1 (B), and coronary T1W (C) show a meningioma – a well-defined intradural mass that almost fills the craniovertebral junction with homogeneous contrast enhancement

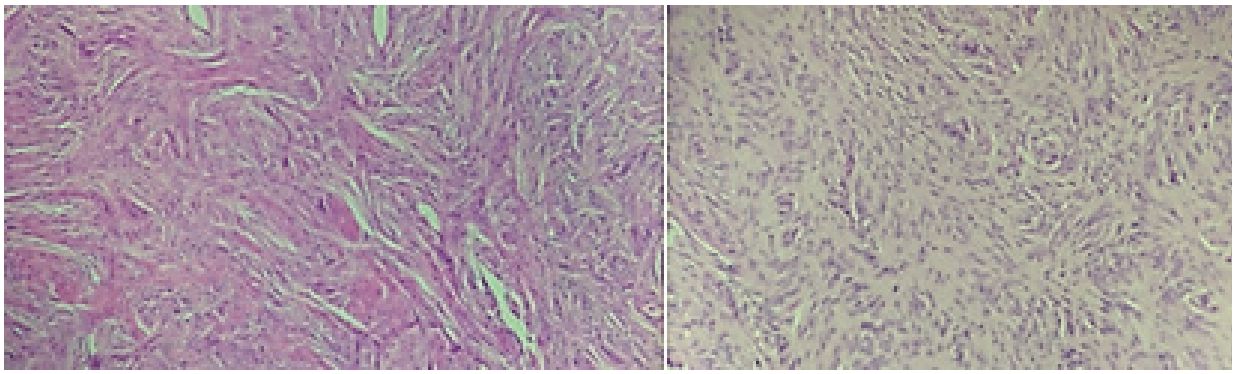

Fig. 3. Pathohistological picture: Histological findings confirmed a transitional meningioma, WHO grade I, with rare psammoma bodies, without histological atypia and mitotic activity

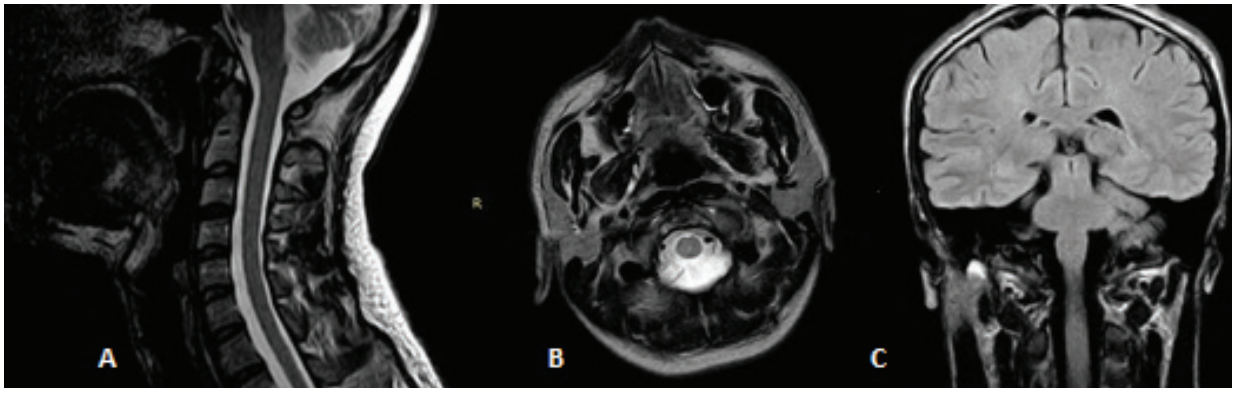

Fig. 4. Postoperative MRI of the brain and cervical spine: TW2 sagittal (A), axial TW2 (B), coronal T2W FLAIR (C) show the condition after complete extirpation of the meningioma of the foramen magnum, whereby the CSF spaces in the craniovertebral junction are free

nonspecific, including neck pain, headaches, neurological deficits such as limb weakness, gait disturbances, and cranial neuropathy [5]. Such nonspecific symptoms often delay diagnosis, which can result in serious complications such as myelopathy or quadriplegia. In this case, the clinical presentation of left-sided cervicocephalic syndrome with frequent falls without loss of consciousness, known as drop attacks, is an atypical manifestation of foramen magnum meningioma. Drop attacks, although rarely described in meningiomas, may be associated with tumors in the cervico-medullary region [6, 7]. This finding emphasizes the need to consider this diagnosis in patients with similar symptoms. The patient was not aware of the forced position of the head (torticollis), which was revealed during the neurological examination. The mechanism of torticollis, in this case, is most likely

a consequence of compression of the accessory nerve (n. accessorius, XI cranial nerve), which innervates the sternocleidomastoid and trapezius muscles and whose dysfunction leads to tilting of the head towards the affected side.

Additionally, compression of the cervical roots, particularly C1-C2, irritates the neck muscles, leading to painful spasms and further muscle imbalance. This finding can be a significant indicator of compression of the spinal cord or cranial nerves, which is often overlooked in the early stages of the disease. Neurologic examination was instrumental in revealing discrete torticollis and symmetrical lower extremity hyperreflexia, subtly suggesting serious pathology. MRI is considered the gold standard in diagnosing craniovertebral junction pathologies due to its superior ability to show the anatomical structure of this complex area [8]. Computed tomography is often a supplement to MRI, especially when there is suspicion of bone changes in the craniovertebral region. In our case report, MRI showed a well-defined intradural mass with homogeneous contrast enhancement, which is characteristic of foramen magnum meningiomas. These findings allowed precise tumor localization and differentiation from other lesions, such as neurinomas or metastases, which was crucial for planning a further therapeutic approach [9]. Surgical removal of foramen magnum meningiomas is challenging due to the proximity of vital structures such as the lower cranial nerves and vertebral arteries. Successful resection of the tumor, as in this case, significantly reduces symptoms, which is consistent with the findings of other studies showing a high success rate in reducing recurrence and relieving symptoms after meningioma resection in this region [10, 11]. Intraoperative neurophysiological monitoring (IONM) was used as an additional measure to reduce the risk of damage to vital structures during surgery. Studies have confirmed the importance of IONM in foramen magnum meningioma operations, showing that its use reduces postoperative complications and improves functional outcomes [12, 13]. Histological analysis in our case confirmed a benign meningioma, WHO grade I, which requires long-term follow-up due to the potential risk of recurrence. Although surgical interventions in the region of the foramen magnum are technically demanding, with appropriate expertise and technical equipment, complications can be negligibly low [14]. Intraoperative monitoring and advanced techniques, such as neuronavigation, further contribute to reducing risk and improving outcomes.

CONCLUSION

This case report provides valuable insights into the rare localization of meningioma in the region of the foramen magnum, as well as the complex clinical presentation, diagnostic challenges, and therapeutic options that this type of tumor carries. It should be emphasized the need for a high degree of clinical suspicion in patients with atypical neurological symptoms, such as drop attacks and torticollis, which, although rare, may be indicative of serious pathology in the craniovertebral junction. Further diagnostic approach includes a complete neurological examination, and timely radiological diagnostics, primarily MRI, for precise localization of the lesion, which is crucial for successful surgical treatment planning and reducing the risk of postoperative complications.

Informed consent: *Informed consent for publication was obtained from the patient.*

Declaration of conflicting interests: *The authors declared no conflicts of interest concerning the authorship and/or publication of this article.*

Ethical statement: *This study has been performed in accordance with the ethical standards as laid down in the Declaration of Helsinki.*

Funding: *This research received no specific grant from funding agencies in the public, commercial, or non-profit sectors.*

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