

## CASE REPORT

**Foramen Magnum Meningioma Misdiagnosed as Cervical Spondylosis**

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**ABSTRACT**

Anterior foramen magnum (FM) meningiomas are uncommon tumours. The diagnosis may be missed if not properly investigated. We report a 54-year old female referred for decompressive surgery following cervical spine MRI report of degenerative spine disease. She presented with an 18-month history of neck pain, a 12-month history of quadriparesis and dysphagia. Examination revealed multiple lower cranial nerve palsies, grade 2/5 quadriparesis, C3 sensory level and upper motor neuron signs. Plain cervical spine radiography done before presentation showed degenerative changes. The FM lesion was also missed on non-contrast cervical spine magnetic resonance imaging (MRI) done prior to presentation. Post-contrast enhanced brain MRI done at admission, however, revealed uniformly enhancing tumour located anterior to the ponto-medullary junction and extending through the foramen magnum to the atlas, on the midline. Post-excision histopathological studies confirmed fibroblastic meningioma. This case highlights the importance of proper matching of clinical history, neurological evaluation, anatomical localization of lesions and appropriate neuro-radiological investigations to aid diagnosis.

**Keywords:** Cervical degenerative disease, contrast MRI, misdiagnosis, quadriparesis, rare

**INTRODUCTION**

Meningiomas in the region of the foramen magnum, though rare (1.8% to 3.2%), represent the most common benign tumors in this region (70%).<sup>1,2</sup> They arise from the inferior third of the clivus to the superior edge of C2 body anteriorly, the jugular tubercle of the C2 lamina laterally and anterior border of the squamous part of the occipital bone, to the spinous process of C2 posteriorly.<sup>3,4</sup> Mean age of patients at diagnosis is about 55years, but they can present at any age.<sup>5,6</sup> History is usually typical of a lesion involving the lower brain stem and

upper cervical spine. Their indolent nature may lead to a prolonged interval between the onset of symptoms and diagnosis and because of these reasons, misdiagnosis is possible.

We report a case where several factors especially exclusive reliance on inadequate radiological reporting, led to a misdiagnosis.

**CASE REPORT**

A 54-year old known hypertensive female was referred to Memfys Hospital for Neurosurgery (MHN) Enugu, for cervical

spine decompression surgery following an MRI-diagnosed cervical degenerative disease. She had an 18-month history of neck pain and weakness of all four limbs of 12-month duration. Neck pain was dull, radiating down both hands and fingers, with associated paraesthesia, aggravated by flexing the neck and temporarily relieved by analgesia. Weakness started with the right upper limb, progressed to involve the right lower limb, left lower limb and finally the left upper limb. There was an associated bi-sphincteric dysfunction and difficulty with swallowing, especially solid meals.

There was no history of trauma or infective processes prior to the onset of symptoms. She was initially managed at a peripheral hospital following a cervical MRI-diagnosis (*Figure 1*) of cervical spondylosis with canal stenosis, for which she was referred to MHN for cervical decompressive surgery.

At presentation, Glasgow Coma Score was 15/15 and higher cerebral functions were intact. Cranial nerves VI, IX to XII were impaired on the right. She had reduced muscle bulk and increased tone globally. Power was grossly 1-2/5 in both upper and lower limb muscle groups. Deep tendon reflexes were exaggerated globally and sensory level was C3 bilaterally.

Brain MRI done following admission, revealed a right antero-lateral extra-axial homogeneously contrast-enhancing foramen magnum tumour, extending from the clivus to C2, encasing the right vertebral artery and displacing the medulla and upper spinal cord posteriorly (*Figure 1*).

A diagnosis of foramen magnum meningioma was made and she was worked up for surgery.

She had a right lateral retrosigmoid craniectomy, C1 with partial C2 laminectomy and microsurgical subtotal tumour resection in a piece-meal fashion. Tumour was intradural and seen to arise from the anterolateral dura of the foramen magnum, it was fibrous, vascular and could not be

suctioned. It was adherent to the vertebral and basilar arteries and this bit was left behind (*Figure 2*). Dura was closed primarily without tension. She was managed post-operatively in the intensive care unit. Despite respiratory and haemodynamic challenges, she continued to make slow but steady clinical improvement with power in the upper limbs improving to 3/5 and that in the lower limbs to 4/5.

Figure 1. a) Sagittal view of a non-contrast enhanced T1wi of the cervical spine (left). There was an isointense lesion at the foramen magnum area, anterior to the spinal cord with compression of the spinal cord(\*). b) Sagittal view of a post-contrast enhanced T1Wi brain scan of same patient (right) showing homogeneously brilliant contrast enhancement of the foramen magnum tumour (\*).

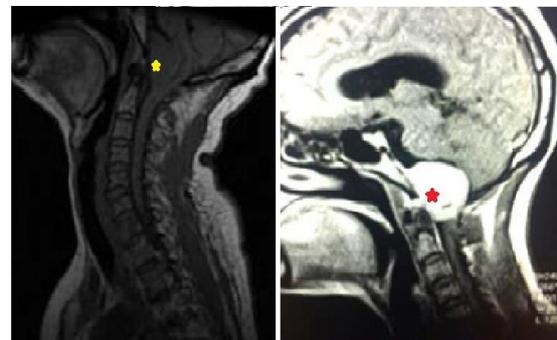
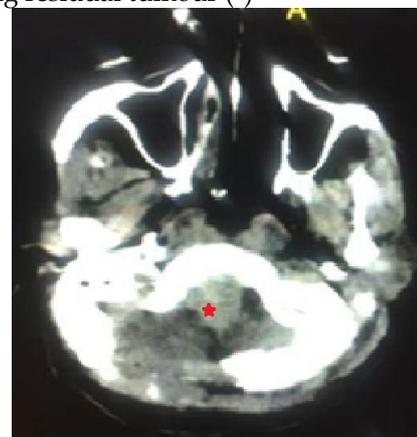


Figure 2. Post-operative non-contrast enhanced brain computed tomography scan of the patient showing residual tumour (\*)



Pre-operative paralysis of the lower cranial nerves persisted in the post-operative period, and feeding with a nasogastric tube was commenced until she was discharged to a recovery facility closer to her home on the 17<sup>th</sup>

day post-surgery, to continue physiotherapy and mobilization exercises. Histopathological examination of the tumour confirmed a fibroblastic meningioma.

## DISCUSSION

Foramen magnum meningiomas are challenging tumours due to their location close to the medulla oblongata, lower cranial nerves and vertebral arteries. The diagnosis is often challenging because of their indolent nature. When finally diagnosed, these tumours may have attained a large size due to the wide subarachnoid space at this level, and as such, there is often a prolonged interval between the onset of symptoms and diagnosis of the pathology.<sup>7</sup> If clinical evaluation is not thorough, foramen magnum meningioma can be missed and the patient may present with advanced disease, with severe and sometimes permanent neurological deficits.

Magnetic resonance imaging (MRI) is the investigative modality of choice, but must be interpreted carefully. In our patient, a cervical MRI had already been performed at another centre, but the upper cervical lesion was missed, possibly because it was a non-contrast study. This omission calls for a paradigm shift back to the basic principles of radiological investigations instead of over-confident presumptuousness.

Early symptoms often include occipital and upper cervical pains which are worsened by neck movement. This is due to pressure effect on the upper cervical nerves which innervate the infra-tentorial dura mater.<sup>7-9</sup> This symptom may easily be attributed to degenerative spine disease. As the lesion progresses, motor and sensory deficits present in the ipsilateral upper and lower limbs and then, the contralateral lower limb and upper limb. This progresses to a spastic quadriplegia and then, lower cranial nerve deficits.<sup>7,8</sup> This patient presented with lower

cranial nerve palsies which did not immediately abate post-operatively. At the terminal stages, such patients become quadriplegic, develop respiratory insufficiency, aspiration pneumonitis and finally, respiratory arrest.

Adequate knowledge of the surgical anatomy of the area and minimal or no retraction on the lower cranial nerves are important for keeping the post-operative morbidity low.<sup>9</sup> Several factors may contribute to making surgical excision of the tumours more difficult, including anterior tumour location and encasement of the vertebral artery. In our case, the vertebral and basilar arteries were encased intimately by the tumour, making a total resection difficult. Based on a multi-centre study from 21 hospitals, George, *et al* reported 77% of complete resection, 16% of subtotal resection and 7% of partial resections.<sup>10</sup> Radiosurgery with Gamma knife is a possible treatment modality for small tumours without mass effect at presentation and can be an adjuvant treatment modality for cases with residual tumour.<sup>9</sup>

## CONCLUSION

Foramen magnum meningiomas are rare intracranial tumours but nevertheless, misdiagnosis can occur because of their rarity and inadequate imaging. Neurosurgeons should, thus, have a high index of suspicion for this, especially in the elderly female presenting with features of degenerative spine disease. The importance of a thorough clinical history, physical examination and compulsory correlation of these with neuroimaging findings before decision for surgery should not be overlooked.

This case emphasizes the long held tradition of Neurosurgeons being able to interpret their patient's imaging and correlating it with the clinical findings.

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