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Case Report

Trigeminal neuralgia secondary to basilar impression: A case report

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Abstract

We report a rare case of trigeminal neuralgia. A 23-year-old woman with a history of 1 year of typical trigeminal neuralgia manifested the characteristics of basilar impression. Magnetic resonance imaging (MRI) demonstrated basilar impression, deformity of the posterior fossa with asymmetry of petrous bone, and compression of medulla oblongata in the topography of the odontoid apophysis. The operation was performed through a suboccipital craniectomy. The neuralgia disappeared after surgery and remains completely resolved until today. This is the second reported case of trigeminal neuralgia in a patient with basilar impression in Brazil.

Key words: Basilar impression, subocciptal decompression, trigeminal neuralgia

INTRODUCTION

Vascular compression of the trigeminal nerve in the cerebellopontine angle is generally accepted as the primary source causing trigeminal neuralgia (TN).[1] In spite of being the most common cause, some data demonstrated that craniocervical abnormalities, like basilar impression and platybasia, affect the bony walls of the posterior fossa, and even Chiari malformation may play an important role in the pathogenesis of vascular abnormalities causing TN.[2-5] Our research, which was carried out from 1995 to 2014, presents 60 cases of basilar impression, enabling us to observe only one case (1,7%) with TN. The deformity of the skull base was the noteworthy aspect that influenced the development of the trigeminal neuralgia resulting in the publication of the present case.

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CASE REPORT

A 23-year-old woman with a history of 1 year of typical trigeminal neuralgia with left-sided lancinating facial pain in the V2 distribution of the trigeminal nerve. The pain was triggered by certain movements, tactile stimulation, or a cold shower. She also complained of neck pain and facial numbness. Physical examination findings are shown in Figure 1. (Figure 1 Low-set hairline and brevicollis [shortened neck] presenting as clinical features of craniocervical junction malformations).

The neurologic exam shows decreased left corneal reflex, nystagmus, hyperreflexia, and presence of bilateral Hoffmann's sign. Magnetic resonance imaging (MRI) demonstrated basilar impression. (Figure 2 Preoperative sagittal T2-weighted magnetic resonance imaging [MRI] showing basilar impression with compression of pons by the tip in the topography of the odontoid apophysis located 12 mm above the Chamberline line and deformity of the posterior fossa with asymmetry of petrous bone).

The operation was performed through a osteodural decompression with large inferior suboccipital craniectomy. After dural opening shaped in "Y," the arachnoid adhesions between the cerebellar tonsils, medulla oblongata, and spinal

Figure 1: Low-set hairline and brevicollis (shortened neck) presenting as clinical features of craniocervical junction malformations

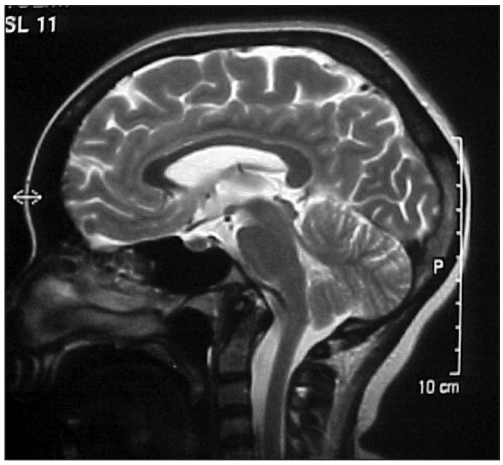

Figure 2: Preoperative sagittal T2-weighted MRI showing basilar impression with compression of pons by the tip in the topography of the odontoid apophysis located 12 mm above the Chamberline line and deformity of the posterior fossa with asymmetry of petrous bone

cord were dissected. A large opening of the fourth ventricle was obtained and dura was grafted with bovine pericardium. The neuralgia disappeared after surgery and remains completely resolved 1 year later.

DISCUSSION

The term platybasia, coined by Virchow, in 1857, describes an abnormal flattening of the skull base, a defect which he attributed to abnormal bone development, is thought to be a trivial bone deformity and usually has no neurological consequences.[6,7] Basilar impression, another abnormality termed by Virchow, was occasionally seen in association with platybasia. This shows upward displacement of the basilar and condylar portions of the occipital bone in association with flattening of the skull base. This may cause narrowing of the posterior fossa and may compress its contents, like neurovascular structures, resulting in many kinds of neurological symptoms.[3,6]

Basilar impression is usually due to congenital developmental anomalies, but generalized bone diseases (Paget's disease, osteogenesis imperfecta, rheumatoid arthritis, etc.) can also be its primary cause.[6] Except for vascular loops, a large number of posterior fossa pathologies have been reported in association with TN.

Various neurological deficits have been reported in patients with skull base deformity like basilar impression and Chiari malformation.[2,4,6] These are commonly associated with a clinical picture of pain, headache (characteristically located in the neck and occipital region), dizziness, loss of thermal sensitivity, and changes in strength in the limbs due to the involvement of the anatomical structures that are present in the occipitocervical region, highlighting the lower cranial nerves, the cerebellum, and the major ascending and descending pathways. Among these nerves, the trigeminal nerve is commonly involved.[2,4,5,8,9] Sensory symptoms of the trigeminal nerve were reported in 30-50% of patients with basilar impression[2] but incidence of TN was less than 1% in 200 reported cases of basilar impression and other occipitocervical malformations in the cases of Obrador *et al.*,[5] and 0.7% in 139 cases of basilar impression operated on the da Silva and Silvas casuistry.[3,9] The same author reported a 46-year-old man with a history of TN associated with skull base deformity, and attributed the TN was secondary to asymmetry of the petrous bone.[3] There is also a single report of TN and ipsilateral hemifacial spasm secondary to Chiari's I malformation with hydrocephalus.[10]

Since the introduction of MRI imaging, the reference landmarks used to measure and evaluate the structures of the posterior fossa became more clearly identifiable and consistent.

During our surgery, we found that the posterior fossa was extremely narrow; the trigeminal nerve was compressed and stretched by the deformity of the posterior fossa with asymmetry of petrous bone and compression of medulla oblongata in the topography of the odontoid apophysis.

Rosetti *et al.*, hypothesized that the TN in craniovertebral junction malformations could be attributable to a compression of the trigeminal nucleus, explaining both the pain and the regression after surgery[8], while others[11,12,13] believe that trigeminal nerve involvement is related to the compression of the nerve root entry zone. Other hypothesis for explaining TN, such as modifications in vertebrobasilar vascularization causing microischemic disorder of extra-axial nerves[4] or demyelinating and remyelinating of nerve fibers[12] could not explain the immediate response to surgical treatment.

Basilar impression and Chiari malformation have been found to be associated with TN in only two cases reported in the Northeast of Brazil, and another four cases reported by Hayes *et al.*, Reilly *et al.*, Hajioff *et al.*, and Goel.[6,13-15] It is important to be considered as a rare cause of TN that responds to surgical therapy in patients who are refractory to medical treatment and present with other symptoms. Suboccipital decompression leads to resolution of pain, but if the patient has only typical TN, without

other symptoms, microvascular decompression of the trigeminal nerve in the cerebellopontine angle is generally indicated.

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