Neurovascular Decompression for Trigeminal Neuralgia in 17-year-old Girl: A Case Report

ABSTRACT

Trigeminal neuralgia in general is a disease of the elderly. Rarely, the disease presents during childhood. Therefore we sought to explore the role of vascular compression in pediatric patients with medically refractory trigeminal neuralgia. A case of venous compression related to trigeminal neuralgia is presented in a 17-year-old girl. Upper petrous vein was found to be related to a neurovascular conflict with unusual response to neurovascular decompression with complete resolution of symptoms in post-operative period.

Key words: Trigeminal neuralgia; Facial pain; Microvascular decompression

INTRODUCTION

Trigeminal neuralgia in general is a disease of the elderly. The most common symptoms are characterized by intermittent lancinating pain confined to the distribution of the trigeminal nerve, usually unilateral on the face. This condition originates as the result of vascular compression, most commonly by the superior cerebellar artery or a dolichoectatic basilar artery. Other causes can be demyelinating diseases and tumors. It can also be associated with multiple sclerosis and sometimes is the first manifestation of the disease. However, multiple sclerosis is rare in children under the age of 10 years and uncommon in adolescents. Vascular compression, the causative agent in the majority of cases, is thought to be a result from atherosclerotic changes within the vessels of the posterior fossa. Rarely, the disease presents during childhood, with less than 1.5% of patients experiencing their first symptoms under the age of 18, before the onset of severe atherosclerotic changes.

This article presents a case of trigeminal neurovascular compression with higher petrous vein, who underwent a surgical treatment of microvascular decompression.

CASE REPORT

A 17-year-old girl presented symptoms of shock-like paroxysmal pain increasing to the sensitive branch of the right trigeminal V3 allodynia associated with six months of evolution. There was no history of infection or other previous...
illness. During investigation, MRI with emphasis in the posterior fossa was conducted, a 1.5 tesla Magnetic Resonance with FIESTA sequence depicting a vascular contact between right upper petrous vein with ipsilateral trigeminal nerve at its entry zone portion (Figure 1). Trigeminal distortion was observed at this point. No abnormalities were observed after gadolinium injection, and no signs of demyelination were found.

Drug treatment with carbamazepine was initiated, but the patient could not bear the side effects of medication including dizziness, drowsiness and difficulty concentrating. Therefore, surgical treatment of microvascular decompression was proposed.

Facing with refractory symptoms surgical management raised as the main treatment option for this case.

Surgical treatment was explained along with the risks and results. After extensive explanation microvascular decompression of right trigeminal nerve was chosen.

**Surgical Treatment**

With the patient on general anaesthesia and continuous neuromonitoring, a classic suboccipital retromastoid (retrossigmoid) approach was performed; we use a prone position with the head turned to the opposite side for more than 20 years9. Opening the cisterna magna and relaxing the cerebellum was done, as usual, and the trigeminal nerve was exposed at the entry zone portion. There was no artery touching the nerve, but the upper petrous vein was identified as a possible conflict with the nerve. An impression on trigeminal nerve was seen after vein displacement. A Teflon patch was placed between the trigeminal nerve and right upper petrous vein (Figures 2, 3).

**Outcome**

The postoperative course was uneventful, and after surgery the patient had complete resolution of pain. During three weeks some facial hypoesthesia was seen in V2 and V3 distribution, with complete resolution therefore. Postoperative follow-up was conducted for five months without recurrence algic. Normal activity was achieved after all medications used prior to surgery were withdrawn. She was discharged asymptomatic on the sixth postoperative month.
Rarely the Trigeminal neuralgia presents during childhood, and there are few reports in the literature. First description was in a 10-year-old boy in 1921. Most of the so-called idiopathic trigeminal neuralgias are caused by neurovascular compression. This pathology can be associated with multiple sclerosis which is also rare in children under the age of 10 years and uncommon in adolescents and affects the nerve bilaterally. Other causes can be tumors.

Recently, it was proposed that the cause of trigeminal neuralgia is herpes simplex. Solth et al. described a case during the intraoperative period with severely thickened fibrous tissue in the pontomesencephalic cistern which attached the deviating blood vessel to the trigeminal nerve. This tissue, which was neither of arachnoidal nor of neuro-ectodermal origin, could be scar tissue from the severe Epstein–Barr virus infection which this child had contracted at the age of 3 years.

Rasche et al. concluded that the smaller cistern may be correlated with the occurrence of a neurovascular compression, and these findings support the neurovascular compression theory in idiopathic trigeminal neuralgia. In 25 patients with unilateral idiopathic trigeminal neuralgia and 17 healthy participants, high-resolution magnetic resonance imaging scans of the parapontine region and the trigeminal nerve were performed. The mean difference of the volume of the affected and opposite side was 13% in patients with trigeminal neuralgia. In all patients, a significantly smaller volume of the cistern was found on the affected side (p < 0.01) and healthy controls showed no statistical significance.

Resnick et al. described an increased incidence of venous compression of the nerve in this population, as a longer duration of symptoms before microvascular decompression. These factors may be responsible for the decreased efficacy of surgical procedure in this patient population.

The authors present in the pediatric population that venous compression is more often related to trigeminal neuralgia, otherwise poorer outcomes after microvascular decompression is commonly seen.

In the present case, as seen in literature, a venous compression was related to trigeminal neuralgia, and the upper petrous vein was found to be related to neurovascular conflict. Based on that, we presented an unusual response to neurovascular decompression with complete resolution of symptoms in postoperative period.

The diagnosis is based on clinical symptoms of unilateral pain in the distribution of the trigeminal nerve, intermittent, paroxysmal course, shock-like, lancinating character and triggers with light touch. The magnetic resonance is essential to demonstrate neurovascular conflict or to the differential diagnosis. Initial management of trigeminal neuralgia is medicated. Carbamazepine is the best drug in the initial drug therapy followed by other second-line drugs, including Oxcarbazepine, Lamotrigine, Phenytoin, Gabapentin, and Baclofen. In the case presented in this article the patient did not improve pain, and the side effects of carbamazepine further worsened the quality of life. There are multiple surgical interventions that can be used to treat trigeminal neuralgia including microvascular decompression, percutaneous rhizotomy, and stereotactic radiosurgery. However surgical treatment is considered when patients are refractory to medical therapy at maximal medication doses or cannot tolerate.

Figure 3: Postoperative view with Teflon patch.
pharmacologic side effects.

The surgical treatment of microvascular decompression may be performed with good pain relief and minimal side effects in the pediatric population. Despite the proven safety and efficacy of surgical therapies for trigeminal neuralgia in adults, literature that addresses this subject is still very limited, both in number of publications and in the monitoring of pediatric patients treated surgically in the long-term.

In the case described, pain relief was the immediate cause for patient satisfaction, even with paresthesia on the face after the procedure. Therefore, we believe that the procedure for neurovascular decompression is the best therapy to be offered to patients who do not tolerate or are refractory to drug treatment.

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