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# TRIPLE MICRO VASCULAR DECOMPRESSION FOR A PATIENT WITH TRIGEMINAL NEURALGIA, TINNITUS AND HEMIFACIAL SPASM CAUSED BY A ABERRANT SUPERIOR CEREBELLAR ARTERY - A CASE REPORT

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## ABSTRACT

Trigeminal neuralgia (TN) is a painful neurological condition often described as a "lightning bolt" to the face. Hemifacial spasm (HFS), a neurological disorder characterized by paroxysmal, involuntary twitching of facial muscles on one side of the face, primarily innervated by the ipsilateral facial nerve (seventh cranial nerve).We report a case suffered from Trigeminal neuralgia, tinnitus and hemifacial spasm diagnosed with neurovascular conflict caused by aberrant superior cerebellar artery(SCA) underwent Triple micro vascular decompression.

## KEYWORDS

Microvascular Decompression, Trigeminal Neuralgia, Hemifacial Spasm, Tinnitus

## INTRODUCTION

Trigeminal neuralgia, previously known as tic douloureux, is a chronic pain condition characterized by recurrent brief episodes of electric shock-like pains affecting the structures innervated by the fifth cranial nerve (CN). CN V, the trigeminal nerve, innervates the forehead, cheek, and lower jaw. Trigeminal neuralgia is most frequently unilateral but can involve one or more divisions of the trigeminal nerve.(1) Hemifacial spasm (HFS) is characterized by paroxysmal, involuntary twitching of facial muscles on one side of the face innervated by the ipsilateral facial nerve (seventh cranial nerve). The abnormal involuntary firing of the peripheral facial nerve triggers short or longer contractions of muscles of facial expression.(2) Tinnitus is most often described as a ringing in the ears, even though no external sound is present.(3)

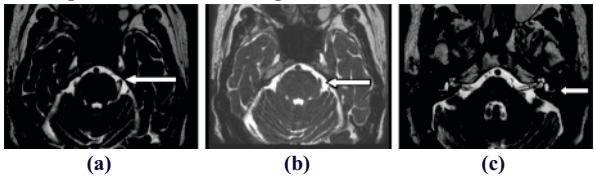
### Case Report

A 40 years old male presented with left sided facial pain, tinnitus and of left side facial twitching for 1 year duration. Provisional diagnosis of Trigeminal neuralgia was made and planned for MRI brain with CISS imaging (Constructive Interference in Steady State). Imaging showed a aberrant course of Superior cerebellar artery crosses perpendicular to the exit zone of the trigeminal nerve on the left side and indents the nerve, also crossing in between Facial and vestibulocochlear nerve - suggestive of Neurovascular conflict. Patient underwent Left suboccipital craniotomy and Triple microvascular decompression under Intra operative neuro monitoring(IONM). We used Teflon sponge in-between the nerve and vessels. Post operatively patient improved clinically, relieved of facial pain, tinnitus and twitching. Patient was discharged in a stable condition.

## DISCUSSION

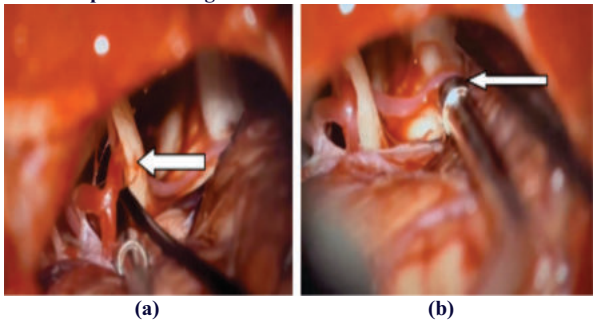
Most cases of trigeminal neuralgia are secondary to compression of the trigeminal nerve root within a few millimetres of its entry into the pons. In 80% to 90% of these cases, the nerve root is compressed by an adjacent artery or a vein; the superior cerebellar artery is implicated in 75% to 80% of these circumstances.(4) Chronic irritation of the facial nerve fascicle and proximal nerve segment at the root-exit zone is the primary pathophysiologic mechanism of HFS. The root-exit zone, where the facial nerve exits the brainstem, is only covered with the arachnoid membrane without the epineurium. Compression of the facial nerve root at the junction of the central (point of exit from brainstem) and peripheral segment (root exit/entry zone) by aberrant/ectatic blood vessels is the most common cause of HFS.(5) Trigeminal neuralgia is usually suspected through historical and physical examination findings. Patients with a clinical diagnosis of trigeminal neuralgia and HFS should undergo neuroimaging with magnetic resonance imaging (MRI) and magnetic resonance angiography (MRA) whenever possible. In some machines, a targeted or high-resolution MRI, called FIESTA (Fast Imaging Employing Steady-state Acquisition) sequencing, can be performed with or without gadolinium contrast to obtain detailed images of the blood vessels and the brain.(6) Other causes for causing HFS should be ruled out like benign tumour at the brainstem nerve root exit zone or near the cerebellopontine angle.(7) Medical therapy is the preferred initial therapeutic intervention for patients with classic trigeminal neuralgia. The antiepileptics carbamazepine or oxcarbazepine are the preferred initial therapeutic agents. These antiepileptic agents may control pain by binding to voltage-gated sodium channels. Surgical intervention is recommended for patients with classic trigeminal neuralgia who have failed maximal medical therapy. Some interventions include microvascular decompression, rhizotomy, and peripheral nerve block.(8) Microvascular decompression is performed via craniotomy and posterior fossa exploration to identify and relocate the compressing blood vessel. A soft cushion is placed between the nerve and the offending vessel to allow the nerve to recover and the pain to abate. The primary treatment goal for HFS is to reduce the muscle contractions resulting from abnormal impulse transmissions to adjacent neurons (ephaptic transmission). This treatment can be approached medically or surgically based on the underlying aetiology and severity of the disorder. Injecting Botox has become a first choice among clinicians and patients due to its efficacy and few adverse events. Botox treatment has achieved notable symptomatic improvements in 85% to 95% of patients in various clinical trials.(9) The pain associated with trigeminal neuralgia can be chronic and lead to depression in the absence of adequate therapy. Associated facial muscle spasms may cause social withdrawal and isolation. Anticonvulsant therapy, while effective, may have adverse effects. Surgical and salvage therapies also carry risks. Despite multiple therapeutic options, some patients may develop facial numbness, corneal anaesthesia, jaw weakness, or the intractable facial dysesthesia known as anaesthesia dolorosa. Although hemifacial spasm is known for a chronically progressive course, rare spontaneous resolution can be seen in up to 10% of cases. The patient needs to be counselled about this relatively benign but persistent condition.(10) Facilitating patient understanding that the most effective and straightforward therapy involves repeated Botox injections every 3 to 6 months. Microvascular surgery may be considered only when the HFS is not responding well to Botox injections or the patient no longer prefers repeated injections.

**1. Pre op MRI Brain CISS Image**



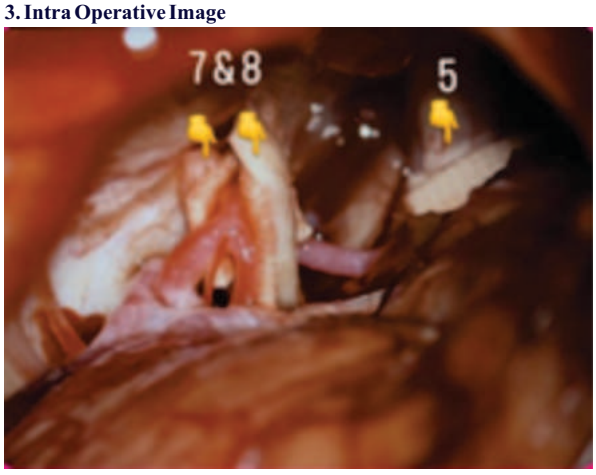
(a) (b) (c)

**2. Intra Operative Image**



(a) (b)

**3. Intra Operative Image**




1. (a)(b) Superior cerebellar artery crosses perpendicular to the exit zone of the trigeminal nerve on the left side and indents the nerve
1. (c) Superior cerebellar artery crossing in between 7th & 8th nerve
2. (a)Intra op image showing SCA crossing in-between 7th &8th Nerve
2. (b)SCA indenting the 5th Nerve
3. Intra op image showing Teflon patch placement at the areas of neuro vascular conflicts

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