ORIGINAL ARTICLE

Operative Findings during Microvascular Decompression in Patients with Idiopathic Trigeminal Neuralgia

NAEEM-UL-HAQ, MUHAMMAD ISHFAQ, BAKHT ZAR KHAN
Mumtaz Ali
Neurosurgery Unit, Lady Reading Hospital, Peshawar

ABSTRACT

Objective: *To know about operative findings during microvascular decompression for idiopathic trigeminal neuralgia.*

Material and Methods: *This prospective observational study was carried out on 108 patients who had idiopathic trigeminal neuralgia at Neurosurgery Department of PGMI, Lady Reading Hospital Peshawar from Jan 2010 to dec 2012 with total 2 year duration. All patients who underwent micro vascular decompression for idiopathic trigeminal neuralgia with both gender and having age from 2^{nd} – 8^{th} decades were included in the study. Patients' operative findings were noted during MVD and were documented on predesigned Proforma. Data was analyzed by SPSS version 17 and represented in the form of graphs and charts.*

Results: *108 patients were operated for trigeminal neuralgia. Males were 64 (59.25%) and females were 44 (40.74%). Age ranged from 18 – 70 years, mean age was 44 ± 5 years. Right side was involved in 75 (70%) cases. In 106 patients (98%), a neurovascular conflict was found, the superior cerebellar artery (SCA) being the most common cause of compression in 86 (80%) patients. Regarding branches mandibular division (V_3) was most commonly involved having 64 (59.25%) patients followed by maxillary (V_2) 32 (29.62%) and ophthalmic (V_1) division 8 (7.40%). After surgery complete pain relief was noted in 97 (90%) patients. Post operatively, nausea, vomiting and dizziness was noted in 18 (16.66%) cases, diplopia in 5 (4.62%), slight deafness in 4 (3.70%) cerebellum infarct 2 (1.85%), CSF leakage in 6 (5.55%), facial palsy in 8 (7.40%), and wound infection in 5 (4.62%) one of which subsequently died.*

Conclusion: *Vascular compression of trigeminal nerve is most common cause of Idiopathic neuralgia. Superior cerebellar artery is the most common compressing vessel, found during Microvascular decompression.*

Key Words: *Idiopathic trigeminal neuralgia, microvascular decompression, Operative findings.*

INTRODUCTION

Trigeminal neuralgia (TGN), also known as tic douloureux or Fothergill's disease, is a clinical syndrome characterized by brief paroxysms of unilateral, lancinating facial pain that is characteristically triggered by cutaneous stimuli, such as a breeze on the face, chewing, talking, or brushing the teeth. Dandy in 1934 was the first to implicate compression of the trigeminal sensory root by aberrant arteries and or veins as the cause of trigeminal neuralgia.[1] Although rare, affecting approximately 4 per 100,000 persons per year, this severe chronic pain syndrome can greatly compromise patient quality of life and disrupt daily functioning.[2] Traditionally trigeminal neuralgia was known as tic douloureux or idiopathic neuralgia because of its unknown causes. There are two types of TN, namely primary and secondary. **Primary TN** is a genuine TN that occurs in the absence of visible organic lesions while **secondary TN** is a complication of such lesions like acoustic neuroma, petrosal meningioma or AVM etc. **Primary TN** is also referred to as typical TN or essential TN and sometimes is loosely referred to as **idiopathic TN**.

Primary TN occurs when the trigeminal nerve is

compressed by a vascular loop (which may not always be visible) at the sensory root entry zone of the nerve which can subsequently result in damage to the nerve's myelin sheath.[3] The clinical association of TN with MS is established in large series.[4-6] These studies revealed an average TN incidence of 1% to 2% in MS patients. **Pharmacotherapy** is generally the mainstay of treatment of TN with carbamazepine affording a satisfactory initial effect in approximately 70% of patients. Other medications such as gabapentin, baclofen, oxcarbazepine, and lamotrigine have also been used as primary treatments or as adjuvants to carbamazepine as well.[7]

Surgical Procedures

Various surgical procedures for treatment of TN have been applied, such as Percutanous balloon micro compression (PBC),[8,9] radiofrequency thermorhizotomy (RTR),[10,11] partial sensory rhizotomy (PSR),[12,13] and microvascular decompression (MVD),[14,15] Microvascular decompression is treatment of choice. Purpose of our study is to assess operative findings in patients with idiopathic trigeminal neuralgia.

Rationale

Rationale of the current study is to know about operative findings during microvascular decompression for idiopathic trigeminal neuralgia. This study is important because it will create local statistic of the diseases burden and the causes of idiopathic trigemiinal neuralgia based on operative findings which will open a gateway for future researchers on this topic.

MATERIAL AND METHODS

This prospective observational study was carried out on 108 patients who had idiopathic trigeminal neuralgia, conducted in Neurosurgery Department of PGMI, Lady Reading Hospital Peshawar from Jan 2010 to dec 2012 with total 2 year duration.

Inclusion Criteria

1. Patients with clinical diagnosis of TN based on presentation symptoms similar to those described by the International Headache Society's Classification.[16]
2. Failure of conservative and medical management despite multiple antiepileptic drugs in high enough doses to cause medication side effects.
3. Pain reported as severe and significantly interfering with their activities of daily living, despite maximum medical and nonsurgical treatments.
4. Patients with preference to undergo MVD.
5. Good candidacy for general anesthesia and sub occipital craniotomy.

Exclusion Criteria

Patients of trigeminal neuralgia due to space occupying lesion at CP angle, multiple sclerosis, iatrogenic or traumatic lesion to trigeminal nerve and those responding to medical treatment or patients unfit for G.A or surgery were excluded.

Study Protocol

All the data was collected and analyzed by descriptive statistics using software SPSS version 17 and represented in the form of graphs and charts.

All the patients were undergone through thorough history, detailed clinical examination and relevant investigations including MRI of the Brain. MRI brain was done to exclude structural lesions at CP angle like acoustic neuroma etc. Before surgical intervention patients were subjected to pre-operative preparation, like complete blood count (CBC) and viral serology (HbsAg and Anti-HCV Ab) was done. Blood and surgical disposables were arranged accordingly. An informed consent was taken, explaining the prognosis. The ethical approval was taken from the hospital ethical committee, "Postgraduate Medical Institute, Institutional Research and Ethics board". Then operative findings during surgery noted for all patients. Patients were kept in ICU for 24 hours and then shifted to ward. All patients were discharged from hospital on 5th post-operative day.

RESULTS

Sex Incidence

58 patients were operated for trigeminal neuralgia. Males were 64 (59.25%) and females were 44 (40.74%).

Age Incidence

Age ranged from 18-70 years, mean age was 44 years.

Clinical Features

Right side was involved in 75 (70%) cases.

Operative Findings

In 106 patients (98%), a neurovascular conflict was found, the superior cerebellar artery (SCA) being the cause of compression in 86 (80%) patients, anterior inferior cerebellar artery (AICA) in 11 (10%) patients, posterior inferior cerebellar artery (PICA) in 2 (1.85%), basilar artery in 2 (1.85%), petrosal vein in 2 (1.85%), SCA + petrosal vein in 1 (0.92%), AICA + petrosal vein in 1 (0.92%), arachnoid thickening in 2 (1.85%), and unnamed artery in 1 (0.92%) (Table 2).

Division Involved

The mandibular division (V_3) was most commonly involved in this study i.e. 64 (59.25%) patients followed by maxillary (V_2) 32 (29.62%) and ophthalmic (V_1) division 8 (7.40%). The combination of V_2 and V_3 were seen in only 4 (3.70%) patients. Distortion of the nerve was noticed in 54 (50%) patients followed by marked indentation i.e. 45 (41.66%) (Table 1). Simple indentation of the nerve root was present only in 9 (8.33%) patients.

Outcome

Complete pain relief was noted (free of medication) in 97 (90%) patients.

Complications

Post operatively, nausea, vomiting and dizziness was

Table 1:

Involved Nerve	No of Patients	Percentage
Ophthalmic (V_1)	08	7.40%
Mandibular(V_2)	32	29.62%
Maxillary(V_3)	64	59.25%
Both V2 and V_3	04	3.70%

Table 2: *Distribution of neurovascular compression.*

	No. of cases	Percentage
Total	108	
SCA	86	80
AICA	11	10
PICA	02	1.85
Basilar artery	02	1.85
Petrosal vein	02	1.85
SCA and Petrosal vein	01	0.92
AICA and Petrosal vein	01	0.92
Arachnoid thickening	02	1.85
Unnamed artery	01	0.92

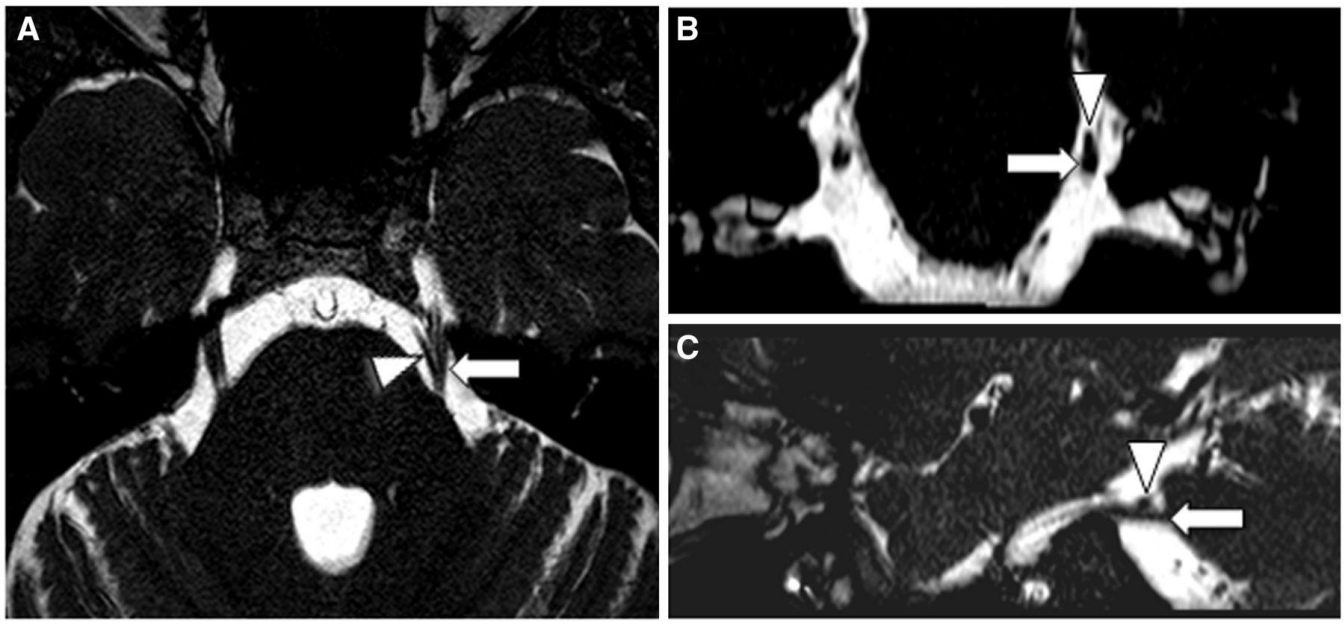

Fig. 1: *MRI brain of patient showing left superior cerebellor artery compressing left trigeminal nerve.*

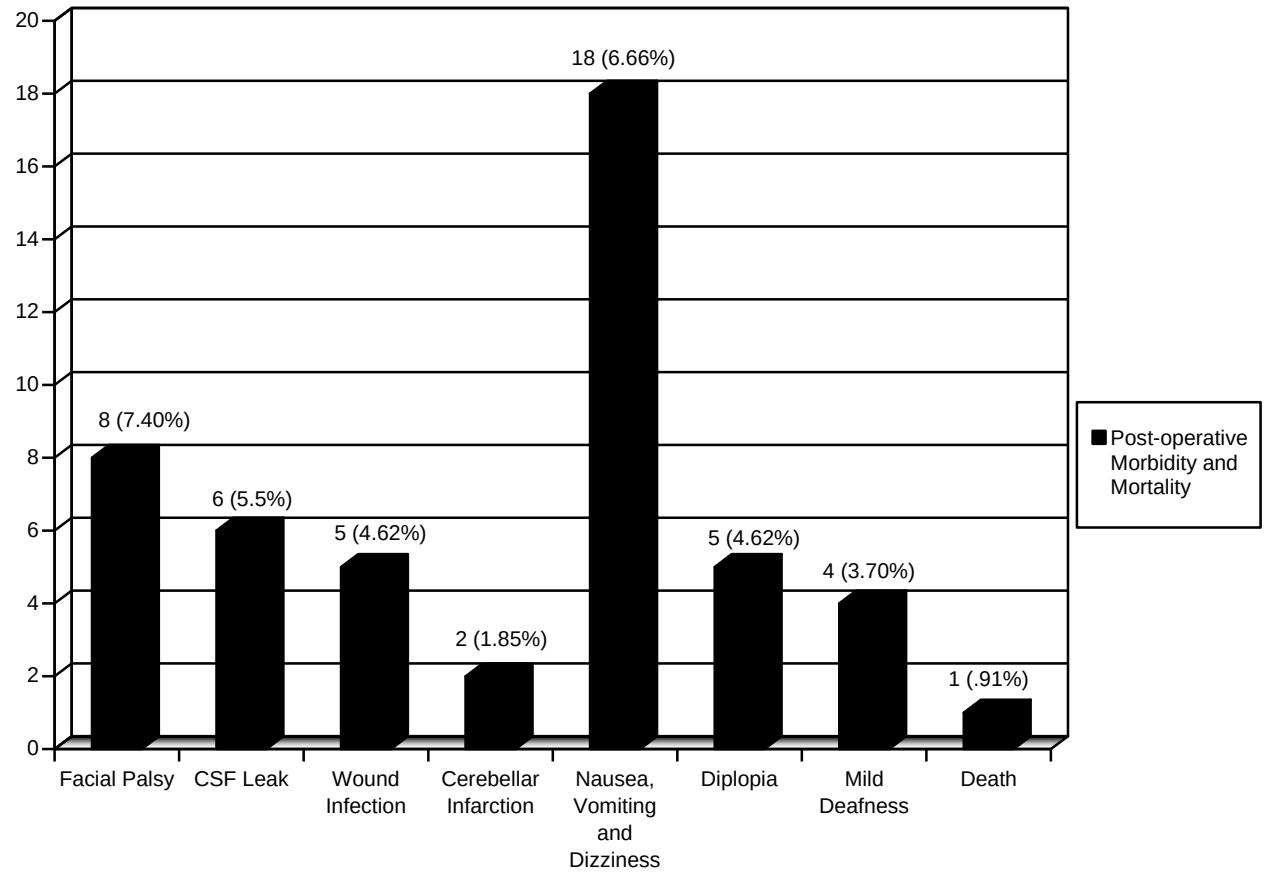

Fig. 2: *Post-operative complications of MVD for idiopathic TGN (N = 108).*

noted in 18 (16.66%) cases, diplopia in 5 (4.62%), slight deafness in 4 (3.70%) cerebellum infarct 2 (1.85%), CSF leakage in 6 (5.55%), facial palsy in 8 (7.40%), and wound infection in 5 (4.62%) one of which subsequently died (Fig. 2).

DISCUSSION

Idiopathic trigeminal neuralgia is one of the most unbearable condition. Currently, many kinds of Percutanous surgical modalities, such as thermo coagulation, balloon compression, and glycerol gangliolysis, as well as radio surgical techniques are recommended to patients with ITN refractory to anticonvulsant medications. But neurovascular compression at CP angle is common cause, so microvascular decompression is treatment of choice. Microvascular decompression was first performed by Gardner[17]. Then, Jannetta[18] using microsurgical techniques, popularized the procedure. That is why we did microvascular decompression for all patients. The pathophysiology of TN is thought to be related to a compression of the nerve root, usually by a blood vessel, at or near the trigeminal root entry zone (TREZ).[19] During MVD the offending vessel is dissected and displaced from the trigeminal nerve. Female sex has been reported as risk factors by some authors for recurrence after microvascular decompression.[20] In our study male was the predominant sex 64 (59.25%).

Per-operatively offending vessel was found compressing the trigeminal nerve in 106 (98%) patients. superior cerebellar artery was most common artery compressing the nerve in 86 (80%) patients. which is comparable with other local studies conducted on trigeminal neuralgia. study conducted by Mumtaz Ali, et al,[21] 98% cases a neurovascular conflict was found, the superior cerebellar artery (SCA) being the cause of compression in 94 cases (85.4%). while in other international study conducted by Fred G, et al,[22] at Presbyterian university hospital in Pittsburg superior cerebellar artery was offending artery in 75% cases. while anterior inferior cerebellar artery in 10% cases. Anterior inferior cerebellar artery was found compressing vessel on trigeminal neuralgia in 11 (10%) cases.

which is comparable with local study.[23] Segment of superior cerebellar artery on the superior and superomedial aspect of nerve in the form of loop is the most common findings in 80 – 88% of cases.[24] No vascular compression found in 2 cases, where arachnoid thickening was the causative agent for trigeminal neuralgias. It is also case in many international studies.[25]

Address for Correspondence:
Dr. Naeem-ul-Haq
Neurosurgery Unit, Lady Reading Hospital, Peshawar
E-mail: Naeem_gmc@yahoo.com
Cell: 0344-8928366

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AUTHORS DATA

Name	Post	Institution	E-mail
Dr. Naeem-ul-Haq		Neurosurgery Unit, Lady Reading Hospital, Peshawar	naeem_gmc@yahoo.com
Dr. Muhammad Ishfaq			
Dr. Bakht Zar Khan			
Dr. Mumtaz Ali			