Microvascular Decompression in Patients with Intractable Idiopathic Trigeminal Neuralgia

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ABSTRACT

Objective — *To evaluate etiology and implications of microvascular decompression (MVD) in patients with intractable idiopathic trigeminal neuralgia.*

Study design — *Descriptive case series.*

Place & Duration of study — *Neurosurgery department of Hayatabad Medical Complex, Peshawar from January 2007 to December 2009.*

Methodology — *Patients with idiopathic trigeminal neuralgia (ITN) irrespective of age and sex, were included in the study. Patients responding to medical treatment were excluded. MRI brain was done for all patients to exclude secondary causes. Microvascular decompression was performed in all patients under general anesthesia. Patients were examined on seventh postoperative day and the clinical findings were documented. Outcome of surgery was declared as successful when there was a commensurate relief of neuralgia paroxysms and deep background pain along with total withdrawal of medications.*

Results — *Fifty two patients were operated for trigeminal neuralgia. There were 23(44%) males and 29 (56%) females (M:F 1:1.26). Age ranged between 20-70 years (Mean 56 years). Right sided neuralgia was present in 34(65%) cases. In 50 cases(96 %) a neurovascular conflict was found. The superior cerebellar artery (SCA) was the cause of compression in 45 (86.53%) patients, anterior inferior cerebellar artery (AICA) in two patients, and one patient each, the vessel involved was posterior inferior cerebellar artery (PICA), basilar artery, and petrosal vein. In 2 patients trigeminal nerve was found encased by tight arachnid adhesions. Trigeminal nerve entry zone was the point of conflict in 38 cases (73.07%). The mandibular division (V3) was involved in 30 cases (57.70%) followed by maxillary division (V2) in 18 cases (34.61%) and ophthalmic division (V1) in 4 cases (7.69%). Distortion of the nerve was noticed in 25 cases (48.07%) followed by marked indentation in 22 cases (42.31%). Complete pain relief was noted (free of medication) in 49 cases (94.23%). Cerebrospinal fluid (CSF) leakage occurred in 3 cases (5.76%). One patient developed wound infection. One patient (1.92%) expired in the postoperative period due to mid brain stroke.*

Conclusions — *The main etiological factor of trigeminal neuralgia was vascular compression, especially by SCA, of the 5th nerve roots at brain stem. Microvascular decompression is safe and effective therapy for all ages.*

Key words — *Idiopathic trigeminal neuralgia, Microvascular decompression, Outcome.*

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INTRODUCTION:

ITN is one of the most distressing pain syndromes and characterized by stabbing or shock like paroxysmal pain in the distribution of one or more branches of the trigeminal nerve.[1] Light touch and

vibration are the most provocative stimuli.[2] SCA is the commonest cause of trigeminal neuralgia.[3, 4] The pulsatile compressions of the offending vessel lead to focal demyelination of the nerve which results in short circuiting of neuronal flow and hence trigeminal neuralgia.[5] Diagnosis is based on detailed history and thorough clinical examination.[5] MRI brain differentiates between ITN and secondary causes of trigeminal neuralgia such as space occupying lesions in cerebellopontine (CP) angle and multiple sclerosis (MS).[3,6]

In the beginning the pain can be relieved by carbamazapine therapy which is also a diagnostic feature of the disease, [3,7] however, MVD has been recommended for definitive pain relief.[4,8,9] Jannetta strongly supported the hypothesis of microvascular compression and popularized the microvascular decompression for the treatment.[10] Barker et al found 70% cure rate with microvascular decompression in their series.[1] The purpose of this study was to give an insight about the implications of MVD in our region. The other objectives were to reaffirm the etiology and to share our experience of MVD in these patients.

METHODOLOGY:

This descriptive study was carried out in Neurosurgery Department of Hayatabad Medical complex, Peshawar from January 2007 to December 2009. Permission was taken for this study from the ethical committee of Hayatabad Medical Complex, Peshawar. Informed written consent was taken from all patients. Patients with idiopathic trigeminal neuralgia of any age and gender were included. However 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 were excluded. MRI brain was done for all patients to rule out secondary causes.

Microvascular decompression was performed in all patients under general anesthesia. In the contralateral decubitus position, a retromastoid incision was made one cm behind the hairline, and a keyhole craniectomy at the asterion was performed. The intersection of the transverse and sigmoid sinuses was exposed and the dura matter was opened along the line bisecting their angle. The cerebellum was gently elevated, and the trigeminal nerve was identified and examined for vascular contact at the nerve root entry zone. The offending arteries were decompressed away from the fifth cranial nerve and its root entry zone in the pons with spongeston.

Patients were re-examined on seventh post operative day and clinical findings were documented. Outcome of surgery was declared as successful when there was complete relief of both paroxysms and deep background pain and total withdrawal of medications. The collected data were then entered in statistical package of social sciences (SPSS) version 10 and analyzed.

RESULTS:

Fifty two patients were operated for trigeminal neuralgia. There were 23(44%) males and 29 (56%) females (M:F 1:1.26). Age ranged between 20-70 years (Mean 56 years). Right sided neuralgia was present in 34(65%) cases. In 50 cases(96 %) a neurovascular conflict was found; the superior cerebellar artery (SCA) being the cause of compression in 45 (86.53%) patients, anterior inferior cerebellar artery (AICA) in two patients, and in one patient in each the vessel involved was posterior inferior cerebellar artery (PICA), basilar artery, and petrosal vein. In 2 cases (4%), no vascular loop was found. In these patients the trigeminal nerve was found encased by tight arachnoid adhesions.

Trigeminal nerve entry zone was the point of conflict in 38 cases (73.07%). Other locations of neurovascular conflict are shown in table I. The mandibular division (V3) was involved in 30 cases (57.70%) followed by maxillary division (V2) in 18 cases (34.61%) and ophthalmic division (V1) in 4 cases (7.69%). The combination of V2 and V3 were seen in only 6 cases (11.53%). Distortion of the nerve was noticed in 25 cases (48.07%) followed by marked indentation in 22 cases (42.31%). Simple indentation of the nerve root was present in 5(9.61%) patients. Surgical implications of MVD are shown in table II.

DISCUSSION:

Various treatment options for idiopathic trigeminal neuralgia have been described. Medical treatment works in the beginning. Microvascular decompression directly addresses the etiology of ITN i.e. vascular compression.[1] In this study female patients were predominant, which is similar to previous studies.[4] In Pollack and Jannetta series it was 1.4: 1.[12] Female sex has been reported as a risk factor by some authors for recurrence after microvascular decompression.[14] The elderly population is commonly affected probably due to age related changes in the blood vessels.[4] In this study, the mean age was 56 years.

In the index study, SCA was the causative factor of trigeminal neuralgia in 86.5% cases which is comparable to 87% reported by Shams S et al.[8]

Table I: Location of Neurovascular Conflict		
Location of conflict	**No. of patients**	**%**
Trigeminal Nerve Entry Zone	38	73.07%
Mid third of Nerve	12	23.07%
Exit at Meckel's Cave	2	3.84%

Table II: Surgical Outcome After One Week		
Feature	**No. of patients**	**%**
Pain relief	49	94.23%
CSF leakage	3	5.76%
Transient Vertigo	2	3.85%
Wound infection	1	1.92%
Facial Nerve Palsy	1	1.92%
Mortality	1	1.92%

In the present study trigeminal nerve entry zone was the commonest point of neurovascular conflict which is in line with the reports of previous series.[8] Thus trigeminal root entry zone should be explored in all cases as the probability of finding the cause is higher at the site.

The current study revealed pain relief in 94.23 % patients. This figure is quite close to the work done in Lady Reading hospital, Peshawar,[4] and other renowned national and international hospitals. CSF leakage is the frequently observed (0.9-12%) complication after microvascular decompression as in our study, where 5.7% patients had it. The overall complications profile is close to the findings of other studies.[4,8,15] Some critics presume that MVD has got high mortality and morbidity. In our series only one patient died of midbrain stroke postoperatively. There was no permanent morbidity. CSF leak, vertigo and facial nerve palsy were transient and recovered without further intervention.

This study however has got certain limitations as well. It was confined to limited number of patients with a short fallow up period. The operations were performed by different surgeons. Randomized clinical trials are needed to provide evidence based findings.

CONCLUSIONS:

The main etiological factor of trigeminal neuralgia was vascular compression of the 5th nerve roots at brain stem. The most common vessel involved was superior cerebellar artery. The patients in whom medical treatment fails to respond, microvascular decompression should be the treatment of choice. It is safe, effective and can be employed in all age groups.

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