

Surgical Outcome of Microvascular Decompression for Trigeminal Neuralgia in Terms of Pain Control Using Visual Analogue Scale

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ABSTRACT

Objective: The aim of conducting this study was to evaluate the outcome of a Micro vascular Decompression procedure for the definitive treatment of Trigeminal Neuralgia in our setup.

Material and Methods: This observational prospective study was carried out in Neurosurgery unit Hayatabad Medical Complex, Peshawar. A total of 50 patients operated for micro vascular decompression surgeries were enrolled in the study, both genders and any age were in inclusion criteria. Patients previously operated for trigeminal neuralgia were excluded from the study. Post operatively all patients were followed for 1 year to calculate the outcome in terms of pain control using visual analogue score (VAS). Immediate pain relief during the first post-operative week and trigeminal neuralgia pain at 1 year post op were recorded and graded into three categories based on Visual Analogue Scale (VAS) such as Excellent: 0-2, Good: 3-6, Fail/Poor: 7 – 10.

Results: 50 patients fulfilled the inclusion criteria. 22 were male & 28 were female with an age range from 42-78 years. Average duration of disease was 5 years. In 30 patients, clinically v2-v3 were predominantly involved, in remaining 14 patient v1-v2 were involved & only in 6 patients all three branches were involved. Among all operated 50 patients 18(36%) had excellent pain relief, 26 (52%) had good pain relief & 6 (12%) had fail/poor pain relief.

Conclusion: From this data it was concluded that micro vascular decompression is an effective surgical procedure in relieving pain of trigeminal neuralgia in patients who are refractive to medical treatment.

Keywords: MVD, Micro Vascular, Decompression, Trigeminal Neuralgia.

Abbreviations: TN: Trigeminal Neuralgia. VAS: Visual Analogue Scale. MVD: Microvascular Decompression. MRI: Magnetic Resonance Imaging.

INTRODUCTION

Trigeminal Neuralgia (TN) is a facial pain syndrome characterized by recurrent, brief episodes of pain on one side of face (commonly) along distribution of trigeminal nerve in single or multiple branches.

The exact cause of trigeminal neuralgia is not known. However, the most supported theory is that it is caused by compression of the trigeminal nerve at root entry zone by a vessel. Dandy was the first person

who in 1934 presented the hypothesis that neurovascular compression may be the cause of trigeminal neuralgia.² However, James Gardner performed first decompression of trigeminal root surgery in 1959 and separated trigeminal nerve from its offending vessel.³

The main objective of trigeminal neuralgia treatment was to relieve the pain. Antiepileptics like carbamazepine helps in relieving pain in early stages.

However, in about 50% cases, medical treatment fails, and these patients requiring some of surgical procedure.²

Various surgical options exist these days, but micro vascular decompression (MVD) procedure is considered one of the most effective treatments for trigeminal neuralgia.⁴

The present study was being conducted to assess MVD as the treatment of choice in patients with idiopathic TN that is resistant to conservative treatment.

MATERIAL & METHODS

Study Type and Setting

Subsequent to approval from ethical committee this descriptive study was conducted in the Neurosurgery department of Hayatabad Medical Complex during the time period extending from 1st Jan 2016 to 31st Jan 2019. All patients' consents were taken prior to enrollment.

Inclusion Criteria

All patients included in the study were having idiopathic trigeminal neuralgia and had failed to respond to the medical treatment.

Exclusion Criteria

Patients with secondary trigeminal neuralgia or those in whom prior MVD was performed were excluded from the study to minimize the study bias.

Data Collection

The diagnostic work-up included clinical history, physical examination preoperative visual analogue score and MRI Brain.

Sample Size Calculation

The sample size was calculated using calculated through Raosoft®, an online sample size calculator, with a margin of error of 1.81%. The anticipated proportion of the cure rate (Pain relief) in MVD in cases of trigeminal neuralgia from the study of was 4.5%. Absolute precision was 6%, the Confidence level was 95% and the Sample size was 46.

Surgical Technique

All patients underwent retro mastoid sub occipital

craniectomy in parkbench position. Dural opening was followed by CSF aspiration to get the brain relax and approach is made easy to the trigeminal nerve. Vessel loop identified and dissected away from nerve and a patch of fascia or spongostan was placed between the nerve and the offending vessel. Meticulous dissection of arachnoid bands across the nerve was done if required.

Assessment of Pain Relief

Pain relief was assessed before discharge of the patient from the department and at 1 year follow-up, used a visual analogue scale (VAS). Pain relief was graded into three categories based on Visual Analogue Scale: Excellent VAS 0 – 2, Good 3 – 6, Fail/Poor: 7 – 10.

Data Analysis

All data was documented in structured proforma & secured in computer database. Data was analyzed in SPSS version 22.

RESULTS

Gender Distribution

Total 50 patients fulfilled the inclusion criteria. Out of these, 22 were male & 28 were female.

Age Distribution

Age distribution with an age range was from 42 – 78 years with average of 55 ± 2.23 .

Clinical Presentation

Average duration of disease was 5 years. In 30 patients, clinically v2-v3 was predominantly involved, in remaining 14 patient v1-v2 were involved & only in 6 patients all three branches were involved.

Preoperatively MRI revealed vascular compression in 16 (32%) patients only & in remaining 34 (68%) patients no offending vessel was found. Peroperatively we detected arterial compression in 28 patients, 16 had venous & in 6 cases arachnoids adhesions were noted. No pathology was found in 2 cases in which we gently stroked nerve on both sides with bayonet forceps. The operative findings were recorded & analyzed (Table 1).

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Table 1: Base line Characters of the Patients.

Characteristic	Value
Age at surgery	
Median	60
Range	42 – 78
Gender	
Male	22 (44%)
Female	28 (56%)
Operation Site	
Right side of face	22 (44%)
Left side of face	26 (52%)
Bilateral	2 (4%)
Distribution of Pain Clinically	
V1 only	0
V1 – V2	14 (28%)
V2 – V3	30 (60%)
V1, V2, V3	6 (12%)
Intraoperative Findings	
Arterial compression	28 (56%)
Venous compression	16 (32%)
Idiopathic	6 (12%)

6 (12%) had fail/poor pain relief. All patients were followed-up for an average period of 12 months. Post-op pain relief recorded & analyzed in (Table 2).

Table 2: Post-operative Pain Analysis.

Pain Relief Grade	Number of Patients
Excellent (VAS 0-2)	18 (36%)
Good (VAS 3-6)	26 (52%)
Fail or poor (VAS 7-10)	6 (12%)

Table 3: Post-operative Pain Analysis with Age Stratification.

Pain Relief	Male	Female	Total
Excellent (VAS 0 – 2)	7	11	18 (36%)
Good (VAS 3 – 6)	15	11	26 (52%)
Fail/Poor (VAS 7 – 10)	3	3	6 (12%)
Total	22	28	50 (100%)

Among all operated 50 patients, 18 (36%) had excellent pain relief, 26 (52%) had good pain relief &

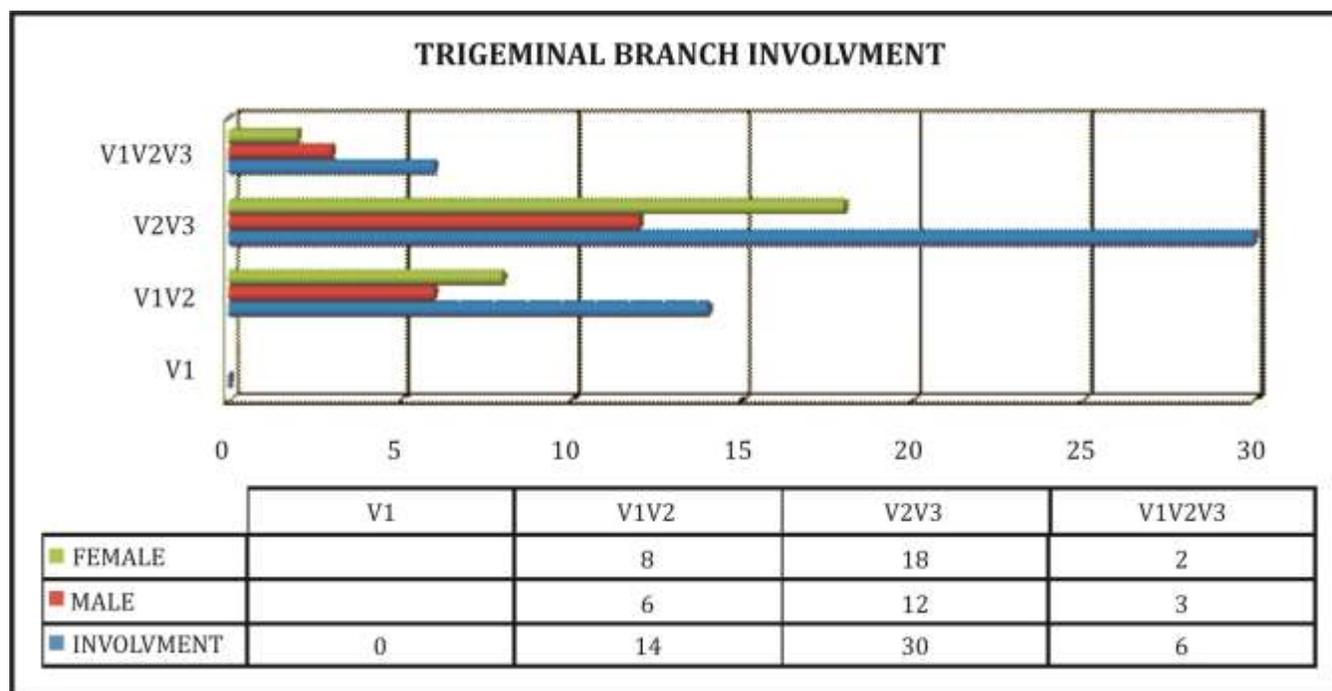


Fig. 1: Graphical Representation of Trigeminal Branch Involvement.

DISCUSSION

At present, several theories exist regarding the cause of trigeminal neuralgia but none is acceptable universally. Yet micro vascular decompression has been the most effective and widely accepted method of treatment for trigeminal Neuralgia.

There have been various reports regarding gender preponderance. In the present study, female patients were more affected than male in a ratio of 1:1.27. Jagannath⁵ reported 1.6:1 male to female ratio. However, other studies^{6,7,8,9} results are in line with our study.

Microvascular decompression can be performed in all ages and unless comorbid stops you from surgery, it can be performed in all patients of all ages. The oldest patient operated was 78 years old with good outcome. Similar findings were noted in previous researchers¹⁰ work as well.

Right side is involved in 11 (44%) patients, while left in 13 (56%) patients in the present study. This is contrary to the study of Ali et al¹¹ where the right side was predominant. However, some other studies give a picture similar to ours.

The distribution of pain along V2 and V3 is the commonest as compare to other areas. It is 60 percent. In previous studies, somewhat similar pattern of pain distribution was documented.

We noted arterial compression of a nerve root in the majority of cases i.e., in 56%. Various studies give various reports, but in almost all of them arterial compression predominates other causes.

Baker et al noticed 70% cure rate in 10 year follow-up study.¹³ One of the most important prognostic factors in the outcome of MVD as effective treatment in pain relief is a type of trigeminal neuralgia. Pain relief by MVD is higher (80%) in patients with typical trigeminal neuralgia compared to those with atypical (56%).¹⁴ We noticed the similar result as 75% patients showed pain relief in typical during 12 month follow-up period.

The present study results show that pain relief during the first post-operative week has been achieved in the majority of patients, i.e., more than 90%. Wu A et al¹² also achieved the similar results, i.e., more than 90% of his study population after same procedure in idiopathic trigeminal neuralgia patients.

Most of the patients made an excellent recovery after MVD without life threatening complications. Major complication noted in this study was temporary facial paraesthesia in 3 patients, which improved later

with facial exercise & medication. One patient had a CSF leak which improved over a period with conservative treatment. Our data is in accordance with other reported series. However, the disparity in percentages might be due to non-availability of latest high resolution microscope, which is sometime required in certain cases of complicated anatomy. This suggested that micro vascular decompression is the effective treatment option.

CONCLUSION

Micro vascular decompression is a safe & an effective procedure in relieving pain of trigeminal neuralgia in patients refractive to medical treatment.

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Additional Information

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Human Subjects: Consent was obtained by all patients/participants in this study.

Conflicts of Interest:

In compliance with the ICMJE uniform disclosure form, all authors declare the following:

Financial Relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.

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AUTHORS CONTRIBUTIONS

Sr.#	Author's Full Name	Intellectual Contribution to Paper in Terms of:
1.	Riaz-ur-Rehman	Study design and methodology.
2.	M. Nawaz	Paper writing, referencing, data calculations and
3.	Attiya Nasir	Data collection and calculations
4.	Akbar Jamal	Analysis of data and interpretation of results etc.
5.	Shahid Ayub	Literature review and manuscript writing
6.	Majid Nawaz	Analysis of data and quality insurer

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