ORIGINAL ARTICLE

# Microvascular Decompression for Trigeminal Neuralgia

**MANZOOR AHMAD, AHSAN NUMAN, M. ASHRAF SHAHEEN**
*M. Anwar Ch., Rizwan Butt*
*Department of Neurosurgery, Services Institute of Medical Sciences (SIMS)/ S ervices Hospital, Lahore*

## *ABSTRACT*

***Background:*** *The majority of patients with trigeminal neuralgia can be managed by medical treatment. Those patients who are not relieved with medicines can be offered some surgical treatment. Microvascular decompression (MVD) of the trigeminal nerve in the root entry zone is the most suitable surgical procedure.*

***Methods:*** *This study included 80 patients who underwent MVD for trigeminal neuralgia from January 2002 to December 2005.*

***Results:*** *Out of the total 80 patients, 48 (60%) were males and 32 (40%) were females with male: female ratio of 3:2. The maximum number of patients was in the 6$^{th}$ decade of life (30%) followed by 7$^{th}$ and 5$^{th}$ decades (over 18%). Peroperatively, an arterial loop was found compressing the 5$^{th}$ nerve in the root entry zone in 60 (75%) patients, only veins in 10 (12.5%) and an artery and a vein (combined) in 6 (7.5%) patients.*

***Conclusion:*** *An arterial loop compressing the trigeminal nerve at root entry zone is the commonest finding at microvascular decompression (75%), followed by veins (12.5%).*

***Keywords:*** *Trigeminal neuralgia, Microvascular decompression, Root entry zone.*

## INTRODUCTION

Trigeminal neuralgia is perhaps the worst pain known to human beings. It is mainly treated by medicines. Those patients who are not relieved by medical treatment can be offered some kind of surgical treatment. Surgical procedures include peripheral neurectomy, percutaneous rhizotomy and microvascular decompression of the nerve in the root entry zone.[1-6]

## MATERIAL AND METHODS

This study was conducted at the department of neurosurgery unit-I, Lahore General Hospital, Lahore. The study period was four years, from January 2002 to December 2005. The study included all patients with trigeminal neuralgia who underwent surgery for microvascular decompression. The total number of patients was 80. It included patients of all ages and both sexes.

## RESULTS

### Sex Incidence

Total patients included in the study were 80. Among these patients, males were 48 (60%) and females were 32 (40%) with male:female ratio of 3:2 (table 1).

### Age Incidence

The youngest patient was of 20 years and the oldest was 74 years of age. The mean age was 45 years. The maximum number of patients were in the 6$^{th}$ decade of life (30%) followed by 7$^{th}$ and 5$^{th}$ decades (table 2).

### Clinical Presentation

The pain was on the right side in 42 (52.5%) patients and on the left side in 38 (47.5%) patients (table 3).

## Peroperative Findings

Peroperatively, an arterial loop was found compressing the 5th nerve in the root entry zone in 60 (75%) patients, only veins in 10 (12.5%) and an artery and a vein (combined) in 6 (7.5%) patients (table 2).

**Table 1:** *Gender.*

| Gender | No. of Patients | Percentage |
|---|---|---|
| Male | 48 | 60% |
| Female | 32 | 40% |
| Total | 80 | 100% |

**Table 2:** *Age distribution.*

| Age Group (Years) | No. of Patients | Percentage |
|---|---|---|
| 11 – 20 | 2 | 2.5% |
| 21 – 30 | 2 | 2.5% |
| 31 – 40 | 8 | 10% |
| 41 – 50 | 15 | 18.7% |
| 51 – 60 | 24 | 30% |
| 61 – 70 | 15 | 18.8% |
| 71 – 80 | 14 | 17.5% |
| Total | 80 | 100% |

**Table 3:** *Side of pain on the face.*

| Side | No. of Patients | Percentage |
|---|---|---|
| Right | 42 | 52.5% |
| Left | 38 | 47.5% |
| Total | 80 | 100% |

**Table 4:** *Offending vessel / pathology found pre-operatively.*

| Offending Vessel / Pathology | No. of Patients | Percentage |
|---|---|---|
| Arterial loop | 60 | 75% |
| Veins | 10 | 12.5% |
| Artery + Vein | 6 | 7.5% |
| Arachnoid adhesions | 2 | 2.5% |
| Tumor + Arterial loop | 2 | 2.5% |
| Total | 80 | 100% |

## DISCUSSION

Trigeminal neuralgia is the paroxysmal pain in the distribution of trigeminal nerve. Its age of onset is usually over 50 years although it may start in the younger age as well. It is more common in women. The younger age of presentation may be associated with multiple sclerosis or a lesion in the cerebellopontine angle. In our study, the mean age of presentation was 45 years while in a study in China, it was 60.3 years.[1,3-5]

In the majority of patients, the pain is caused by compression of the trigeminal nerve in the root entry zone by an adjacent artery or vein. In about 1 – 2% of cases, the pain results from a benign tumor in the cerebellopontine angle such as an epidermoid cyst or acoustic neuroma. Up to 6% of patients may have multiple sclerosis.[2,4,5]

The main clinical feature of trigeminal neuralgia is sudden, severe pain in one or more divisions of trigeminal nerve. Shaving, talking, washing or even a cold wind may trigger an attack of pain which is so severe that the patient is immobilized in agony. Bilateral trigeminal neuralgia is a feature of multiple sclerosis.[1,2,4-6]

There are almost no physical signs. The patient may be weak, wasted and dehydrated due to poor intake, afraid to talk, and having a dirty face from not washing or shaving, all due to the fear of precipitating an attack of pain.[1,2,4,6]

MRI or a good quality CT scan is essential before proceeding for any intervention like MVD.[2]

The mainstay of treatment is medical and over 90% of patients are relieved of pain by medicines. Carbamazepine is the drug of choice and almost all patients respond to it. Other drugs which can be used are baclofen, phenytoin, gabapentin and topiramate.[1,2]

Patients in whom neuralgia becomes medically intractable, a surgical procedure can be offered. It includes peripheral neurectomy, percutaneous rhizotomy and microvascular decompression of the nerve in the root entry zone.[1,2,4,5]

The choice of operative procedure depends on the age and general condition of the patient and the experience and preference of the surgeon.[2]

Percutaneous glycerol injection into the trigeminal ganglion has a success rate of 70 – 80%. Thermocoagulation of the rootlets or the ganglion has a success rate of above 70%.[1,2,4-8]

Microvascular decompression (MVD) involves direct exposure of the trigeminal nerve rootlets in the

cerebellopontine angle. In the majority of patients, an artery is seen to compress the nerve adjacent to the root entry zone. The offending vessel is dissected away from the nerve and a small piece of gelfoam, surgical, muscle or prolene mesh is interposed between the artery and the nerve. It gives pain relief in over 80% of patients. It has a mortality risk of 1% and a threat of serious morbidity.[1,2,4-7]

In recent years, Gamma knife radiosurgery has emerged as another treatment option for patients who are not relieved by medicines. Success rates are good, having minimal complications. It is now being used as a safe alternative to surgery for trigeminal neuralgia.[2,9]

Literature review showed that trigeminal neuralgia is more common in females while in our study it was found to be more common in males (60% versus 40%). In our study the maximum number of patients was in the 6th decade of life (30%). It is the same as in other studies.[1,2,5,7,10,11]

In our study, 75% patients were found to have an arterial loop compressing the nerve in the root entry zone. It is in the same range as found in the literature.[1-6] In another study, arterial compression was found in 86.7% patients.[12] In our study, an artery and a vein were found in 7.5% of patients while in a study in China this was in 13.3% patients.[13]

A study on 1185 patients who underwent MVD showed that immediate post operative relief of pain was complete in 82% of patients, partial in 16% and absent in 2%. One year after MVD, 75% of the patients had excellent outcome and 9% had good outcome. Ten years after the procedure, 64% had excellent results and 4% had partial relief.[3]

In the same study, the trigeminal nerve root was found compressed by the superior cerebellar artery in 75% of patients, a vein contributed to the compression in 68% of patients and was the only compressing vessel in 12%.[3]

Complications of MVD include severe facial numbness, burning sensation, temporary facial weakness, ipsilateral hearing loss, stroke, and brainstem and cerebellar infarction. Recurrence rate is around 15%.[3,7]

Endoscopic visualization helps to identify the offending vessel and consequently of achieving satisfactory decompression of the nerve. The minimally invasive retrosigmoid endoscope – assisted MVD has better results. Furthermore, completely endoscopic vascular decompression represents the next step forward in the safe and effective surgical treatment of trigeminal neuralgia.[13-15]

## CONCLUSION

An arterial loop compressing the trigeminal nerve at root entry zone is the commonest finding at microvascular decompression (75%), followed by a vein (12.5%).

Address for Correspondence:
Dr. Manzoor Ahmad
Assistant Professor Neurosurgery
Services Institute of Medical Sciences (SIMS)/
Services Hospital, Lahore
Email; manzoor63@gmail.com

## REFERENCES

1. Jennett B, Lindsay KW, editors. In: An introduction to neurosurgery. Butterworth – Heinemann Ltd. 5th ed; 1994: 310-11.
2. Grant GA, Loeser JD. Trigeminal Neuralgia. In: Rengachary SS and Ellenbogen RG, editors. Principals of Neurosurgery. 2nd ed. Elsevier Mosby (UK); 2005: 777-84.
3. Barker FG, Jennetta PJ, Bissonette DJ, Larkins MV, Jho HD. The long – term outcome of microvascular decompression for trigeminal neuralgia. The New England Journal of Medicine 1996; 334 (17): 1077-84.
4. Wilkins RH. Trigeminal Neuralgia: Introduction. In: Wilkins RH and Rengachary SS, editors. Neurosurgery. McGraw – Hill Book Company (USA); 1985: 2337-44.
5. Apfelbaum RI. Surgical Management of Disorders of the Lower Cranial Nerves. In: Schmidek HH and Sweet WH, editors. Operative Neurosurgical Techniques. WB. Saunders Company (USA); 1988: 1097-1109.
6. Miles JB. Surgical Treatment of Pain. In: Miller JB, editor. North – field's Surgery of the Central Nervous System. Blackwell Scientific Publications (UK); 1987: 667-77.
7. Jannetta PJ. Trigeminal Neuralgia: Treatment by Microvascular Decompression. In: Wilkins RH and Rengachary SS, editors. Neurosurgery. McGraw – Hill Book Company (USA); 1985: 2357-63.
8. Lunsford LD. Trigeminal Neuralgia: Treatment by Glycerol Rhizotomy. In: Wilkins RH and Rengachary SS, editors. Neurosurgery. McGraw – Hill Book Company (USA); 1985: 2351-56.
9. Nugent GR. Trigeminal Neuralgia: Treatment by Percutaneous Electro-coagulation. In: Wilkins RH and Rengachary SS, editors. Neurosurgery. McGraw – Hill Book Company (USA); 1985: 2345-50.
10. Pollock BE, Brown PD. Stereotactic Radiosurgery. In: Rengachary SS and Ellenbogen RG, editors. Principles of Neurosurgery, 2nd ed. Elsevier Mosby (UK); 2005: 732-37.

11. Li ST, Wang X, Pan Q, Hai J, Liu N, Shen F et al. Studies on the operative outcomes and mechanisms of micro-vascular decompression in treating typical and atypical trigeminal neuralgia. Clin J Pain 2005; 21 (4): 311-6.
12. Broggi G, Ferroli P, Franzini A et al. Microvascular decompression for trigeminal neuralgia: Comments on a series of 250 cases, including 10 patients with multiple sclerosis. J Neurol Neurosurg Psychiatry 2000; 68 (1): 59-64.
13. Toe C, Nakaji P, Mobbs RJ. Endoscope – assisted microvascular decompression for trigeminal neuralgia: technical case report. Neurosurgery 2006; 59 (4-2): 489-90.
14. El-Garem HF, Badr-El-Dine M, Talaat AM, Magnan J. Endoscopy as a tool in minimally invasive trigeminal neuralgia surgery. Otol Neurotol. 2002; 23 (2): 132-5.
15. Jarrahy R, Eby JB, Cha ST, Shahinian HK. Fully Endoscopic vascular decompression of the trigeminal nerve. Minim Invasive Neurosurg. 2002; 45 (1): 32-5.