ORIGINAL ARTICLE

Effectiveness of Microvascular Decompression for the Treatment of Idiopathic Trigeminal Neuralgia

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ABSTRACT

Objective: *To review the efficacy and safety of microvascular decompression for idiopathic trigeminal neuralgia.*

Materials and Methods: *This descriptive cross sectional study was conducted at Neurosurgery Department of Naseer teaching Hospital, Peshawar from 1st January 2016 to 31st December2017. All patients fulfilling the inclusion criteria undergo micro vascular decompression (MVD). MRI brain was done in all patient to exclude the secondary cause. Patients were examined on 5th post operative day and clinical finding documented. Outcome of surgery is determined by visual analogue scale in which Pain was graded as no pain (0 score), mild (1 – 3), moderate (4 – 7), severe (8 – 10) to see the pain relief.*

Results: *Forty four patients were operated for trigeminal neuralgia (TN). There were 18 (41%) males and 26 (59%) females. Mean age was 33 years. Entry zone of trigeminal nerve was point of conflict in 33 (75%) patients. The mandibular division (V2) was involved in 26 (59%) patients, followed by maxillary division (V3) in 13 (29.54%) patients and ophthalmic division (V1) in 5 (11.36%) cases. At fifth postoperative day, status of pain relief was analyzed amongst 44 patients and it was observed that 37 (84.09%) patients had no pain, 5 (11.36%) had mild pain and 1 (2.27%) had severe pain. Postoperative complications were observed as nausea and vomiting in 15 (34.09%) patients, Diplopia in 6 (13.63%), facial palsy in 6 (13.63%), CSF leak in 5 (11.36%), mild deafness in 5 (11.36%), wound infection in 4 (9.09%) and cerebellar infarction in 3 (6.81%) patients.*

Conclusion: *Microvascular decompression is an effective surgical option for trigeminal neuralgia refractory to medical treatment.*

Key words: *Microvascular decompression, Trigeminal neuralgia, Efficacy.*

Abbreviations: *MVD: Microvascular Decompression. TN: Trigeminal Neuralgia.*

INTRODUCTION

Trigeminal neuralgia is characterized by paroxysmal shock like pain localized to the innervated area of one or more branches of trigeminal nerve and is due to vascular compression of the trigeminal nerve at the root entry zone.[1-6] The condition manifests as shooting pain in oral and maxillofacial regions. The sudden shock like pain starts by mild stimuli such as tooth brushing, shaving or washing of face. Its incidence is 3 – 5 per 100,000.[7-11] Although neurovascular compression and global atrophy of the root, a focal arachnoid thickening and angulated root on responsible as the main etiological factor.[12] This lead to focal demyelination of nerve root due to its pulsatile compression. Demyelination result in short circuiting of neuronal flow and hence trigeminal neuralgia.[13]

The trigeminal neuralgia is usually unilateral and follows the distribution of sensory innervations of the fifth cranial nerve (V), typically radiating to maxillary (V2) and mandibular division (V3).[14] From the symptomatic point of view, Trigeminal neuralgia (TN) is classified into typical and atypical TN. Typical TN

includes paroxysmal pain alone while atypical TN includes paroxysmal and constant pain.[15,16] Aetiologically, TN is classified into primary or idiopathic and secondary TN.[17] Idiopathic one has no clear cause. Secondary TN has a known cause like a tumor, multiple sclerosis or neurovascular compression.[18] Various surgical methods have been proposed including microvascular decompression (MVD) of trigeminal ganglion,[19] gamma knife neurosurgery,[20] surgery of trigeminal ganglion without decompression[21] and peripheral injection of alcohol.[22]

Microvascular decompression (MVD) was first performed by Gardner.[23] Then, Jannnetta,[24] using microsurgical technique, popularized the procedure. It can provide long lasting pain relief and lowest rate of facial dysesthesia and corneal reflex dysfunction. The patients always acquire immediate pain improvement after MVD, an occurrence as high as 95% to 97%.[25,26] The purpose of this study was to give an insight about the implications of MVD and to reaffirm the etiology and to share our experience of MVD in these patients.

MATERIALS AND METHODS

This cross sectional study was conducted at Neurosurgery Department of Naseer teaching hospital, Peshawar from 1st January 2016 to 31st December 2017. Sample size was forty four Permission was taken from ethical committee of Hospital. Patients were admitted through Outpatient department and written informed consent was taken from all patients. Inclusion criteria was all patients of any age or gender with clinical diagnosis of trigeminal neuralgia based on presentation symptoms similar to those described by the international headache society classification, and in whom conservative and medical management have failed and reporting pain as severe and interfering with their daily activities. Exclusion criteria was patients with trigeminal neuralgia due to space occupying lesions at cerebellopontine angle, multiple sclerosis, iatrogenic or traumatic lesion to trigeminal and those responding to medical treatment.MRI brain was done in all patients to exclude all these disorders.

Patients were admitted through Outpatient department. Detailed history, clinical examination and relevant investigations including MRI brain to exclude structural lesions were done. Pain grading was done before surgery and patients were subjected to preoperative preparation, like complete blood count and viral serology was done. MVD was done in all patients under general anesthesia. In contralateral decubitus position, a retromastoid incision was made 1cm behind the hairline, and a keyhole craniectomy was performed at the asterion. The intersection of the transverse and sigmoid sinuses was exposed and dura matter was open along the line bisecting their angle. The cerebellum was gently elevated, trigeminal nerve identified and examined for vascular contact at the nerve root entry zone. The offending arteries were decompressed away from the trigeminal nerve and its root entry zone in the Pons with spongeston. Other operative findings noted and documented. Patients were kept in ICU for 24hours and then shifted to ward. Patients were re examined on the fifth postoperative day and clinical findings noted. Pain was graded as no pain (0 score), mild (1 – 3), moderate (4 – 7), severe (8 – 10) to see the pain relief.

All the data was collected and analyzed by descriptive statistics using software version 17.0 and represented in the form of tables.

RESULTS

Forty four patients were operated for trigeminal neuralgia. There were 18 (41%) males and 26 (59%) females. Age distribution was 9 (20.45%) were in age range of 20 – 30 years. 10 (22.7%) were in age range of 31 – 40 years. 17 (38.6%) patients were in age range of 41 – 50 years and 8 (18.18%) were in age range of 51 – 60 years. Mean age was 33 years.

On admission, pain was analyzed as severe in 39 (88.6%) and moderate in 5 (11.4%) patients. At fifth postoperative day, status of pain relief was analyzed amongst 44 patients and it was observed that 37 (84.09%) patients had no pain, 5 (11.36%) had mild pain and 1 (2.27%) had severe pain. 30 (68%) patients had right sided neuralgia. 41 (93%) cases revealed a neurovascular conflict. Superior cerebellar Artery being the cause of compression in 39 (88.63%) patients, Anterior Inferior cerebellar Artery was the culprit in 2 (4.54%) patients and in one patient each the cause was Posterior Inferior Cerebellar artery, basilar artery and Petrosal vein.

Entry zone of trigeminal nerve was point of conflict in 33 (75%) patients. The mandibular division (V2) was involved in 26 (59%) patients, followed by maxillary division (V3) in 13 (29.54%) patients and ophthalmic division (V1) in 5 (11.36%) cases. Distortion of nerve was observed in 20 (45.45%) patients followed by marked indentation in 17 (38.6%) cases. Simple indentation was seen in 7 (5.9%) cases.

Postoperative complications were observed as

nausea and vomiting in 15 (34.09%) patients, Diplopia in 6 (13.63%), facial palsy in 6 (13.63%), CSF leak in 5 (11.36%), mild deafness in 5 (11.36%), wound infection in 4 (9.09%) and cerebellar infarction in 3 (6.81%) patients.

Table 1: *Frequency of Involvement of Divisions of Trigeminal Nerve.*

Involved Nerve	No. of Patients	Percentage
Ophthalmic (V1)	5	11.36%
Mandibular (V2)	26	59%
Maxillary (V3)	13	29.54%

Table 2: *Distribution of Neurovascular Compression.*

Location	No. of Cases	Percentage
Superior Cerebellar Artery	39	88.63%
Anterior Inferior Cerebellar Artery	2	4.54%
Posterior inferior Cerebellar Artery	1	2.27%
Basilar artery	1	2.27%
Petrosal Vein	1	2.27%
Total	44	100%

Table 3: *Frequency of Postoperative Complications.*

Complication	No. of Cases	Percentage
Nausea and vomiting	15	34.09%
Facial palsy	6	13.63%
Diplopia	6	13.63%
Mild deafness	5	11.36%
CSF leak	5	11.36%
Wound infection	4	9.09%
Cerebellar infarction	4	6.81%

DISCUSSION

Microvascular decompression is the surgical procedure of choice for the treatment of medically refractory trigeminal neuralgia, due to the fact that it addresses the main etiology of TN. It has been accepted that MVD can provide the highest rate of long term patient satisfaction with the lowest rate of pain recurrence.[27]

Looking at the gender distribution, it is observed that in our study there was female preponderance, 59% of the patients being female. Close results were observed by Nawaz et al. where 54% patients were females and 46% were males.[28] Rehman et al in their study found almost same results as ours with 56% females and 44% males.[29] Female sex has been declared as risk factor for recurrence after MVD by some authors.[30]

It has been noted that elderly population is more commonly effected with this disorder. We have observed that in our study the common effected age group is 41 – 50 years. 38.6% patients effected were in this age range. Similar results were seen by Ali et al in their study conducted at Peshawar where most of the effected patients were in age range of 41 – 60 years.[31]

Status of pain at admission was analyzed as 39 (88.6%) had severe and 5 (11.36%) had moderate pain. Same findings were recorded in a study at Lady Reading Hospital, Peshawar where 88% patients had severe and 12% had moderate pain.[28] Close results were seen by Shams et al, where severe pain was observed in 90% and moderate pain in 10% patients.[32] Postoperative pain at fifth postoperative pain was analyzed in our study as no pain in 84%, mild pain in 11.36% and severe pain in 2.27% patients. Close findings were recorded by Nawaz et al, where 85% had relief from pain postoperatively whereas 15% had mild and moderate pain.[28] Shams et al concluded that after MVD, no pain was felt by 80%, mild pain by 17% and moderate pain was observed by 3% patients.[32]

Trigeminal nerve was the point of conflict in 73.07% cases in a study done by Rehman et al. close to our results.[29] In our study, 68% patients had right sided neuralgia, similar to results of Haq et al [33].In the same study, superior cerebellar artery was the culprit vessel in 80% cases, as opposed to 88% cases in our study. Frequency of involvement of other vessels was also very close[33] to our analysis. The mandibular division involvement was seen in 59%, maxillary in 29.54% and ophthalmic in 2.2% cases, close results were observed by another author in 2011 at Peshawar where same divisions involvement was seen in 57.50%, 34.61% and 7.69% cases.[29]

Limitations of our study were small sample size, performance of surgeries by different surgeons and short follow up period. Randomized clinical trials are needed to provide evidence base finding.

CONCLUSION

Microvascular decompression is an effective surgical option for idiopathic trigeminal neuralgia refractory to medical treatment and can be performed with low risk of complications and high success rates. It directly treats the presumed etiology and can achieve best immediate and long term relief.

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