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Microvascular Decompression in Patients with Intractable Idiopathic Trigeminal Neuralgia

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ABSTRACT: OBJECTIVE: To know the surgical findings and post-operative outcome of microvascular decompression (MVD) for trigeminal neuralgia in intractable idiopathic trigeminal neuralgia. PATIENTS AND METHODS: This descriptive study was conducted in Neurosurgery department of Hayatabad Medical Complex, Peshawar from January 2007 to December 2009. Patients with idiopathic trigeminal neuralgia from all ages and both sexes were included. 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 post operative day and the 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. Results were presented as graphs and tables. RESULTS: Fifty two patients were operated for trigeminal neuralgia. Males were 23 (44%) and females were 29 (56%). Age ranged from 20-70 years, mean age was 56 years. Right side was involved 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, posterior inferior cerebellar artery (PICA) in one, basilar artery in one and in one patient petrosal vein was implicated. In 2 patients trigeminal nerve was found encased by tight arachnoid adhesions. Trigeminal Nerve Entry Zone was the commonest point of conflict i.e. 38 cases (73.07% cases). The mandibular division(V3) was most commonly involved i.e. 30 (57.70%) patients followed by maxillary (V2) 18 (34.61%) and ophthalmic division (V1) 4 (7.69%). The combination of V2 and V3 were seen in only 6 (11.53%) patients. Distortion of the nerve was noticed in 25 (48.07%) patients followed by marked indentation i.e. 22 (42.31%). Simple indentation of the nerve root was present only in 5 (9.61%) patients.Complete pain relief was noted (free of medication) in 49 (94.23%) patients. Cerebrospinal Fluid (CSF) leakage occurred in 3 (5.76%) patients. One (1.92%) patient developed wound infection. There was one (1.92%) post-operative mid brain stroke and this patient died. Two (3.85%) patients had transient vertigo after surgery. CONCLUSION: The main etiological factor of trigeminal neuralgia is vascular compression of the 5th nerve roots at brain stem. The most common vessel is superior cerebellar artery. The patients in whom medical treatment fails to respond, microvascular decompression should be the treatment of choice in trigeminal neuralgia. Microvascular decompression is safe, effective and recommended for all ages.

Key Words: Idiopathic trigeminal neuralgia, Microvascular decompression, Outcome.

INTRODUCTION: Idiopathic trigeminal neuralgia is one of the most distressing pain syndromes. It is characterized by stabbing or shock like paroxysmal pain in the distribution of one or more branches of the trigeminal nerve[1]. Various triggers may commonly precipitate a pain attack. Light touch or vibration is the most provocative maneuver[2]. Superior cerebellar artery is the commonest cause of 5th nerve root compression[3,4].This lead to focal demylination of the nerve due to its pulsatile compression. Demylination 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 idiopathic from trigeminal neuralgia secondary to space occupying lesions in cerebellopontine (CP) angle and multiple sclerosis (MS)[3,6]. Usually the pain responds to carbamazipine therapy, at least in the initial days of treatment[3,7]. Microvascular decompression is safe, effective and treatment of choice for intractable pain[4,8,9]. Jannetta worked on trigeminal neuralgia and strongly supported the hypothesis of microvascular compression and popularized the microvascular decompression for the treatment of trigeminal neuralgia[10]. Barker et al showed in a study that microvascular decompression has got 70% cure rate[11]. It is important to ascertain which artery, vertebral or basilar, is compressing the nerve, as the risk of operating in these patients is higher than in patients where the superior cerebellar artery is the trigger[12,13]. The purpose of this study was to bring new insight about this topic. The results of this study will help neurosurgeons in opting microvascular decompression as the treatment of choice in case of intractable idiopathic trigeminal neuralgia.

MATERIAL AND METHODS: 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

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S. No.	Location of Conflict	No. of Patients	Percentage
1	Trigeminal Nerve Entry Zone	38	73.07%
2	Mid third of nerve	12	23.07%
3	Exit at Meckle's Cave	2	3.84%

Table 1: Location of Neurovascular Conflict.

S. No	Feature	No of Patients	Percentage
1	Pain relief	49	94.23%
2	CSF leakage	3	5.76%
3	Transient Vertigo	2	3.85%
4	Wound infection	1	1.92%
5	Facial Nerve Palsy	1	1.92%
6	Mortality	1	1.92%

Table 2: Surgical Outcome after one week.

trigeminal neuralgia from all ages and both sexes were included. However patients of trigeminal neuralgia due to space occupying lesion at CP angle, multiple sclerosis, iatrogenic or traumatic lesion to trigeminal nerve were not considered as these confounders would bias our results. Patients responding to medical treatment were also avoided to be operated. Complete history was taken and thorough physical examination was done at the time of admission. MRI brain was done for all patients to rule out secondary causes. Microvascular decompression was performed in all patients under general anaesthesia and in the contra lateral decubitus position. A retromastoid incision was made 1 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 mater 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. All compressive arteries were decompressed away from the fifth cranial nerve and its root entry zone in the Pons with spongeston. Pre-operative, per-operative and post-operative findings were documented in semi structured performa. Patients were 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. Qualitative data expressed in percentages while quantitative date in means. Results were presented as graphs and tables. RESULTS: Fifty two patients were operated for trigeminal neuralgia. Males were 23 (44%) and females were 29 (56%). Age ranged from 20-70 years, mean age was 56 years. Right side was involved in 34 (65%) cases. In 50 patients (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, posterior inferior cerebellar artery (PICA) in one, basilar artery in one and in one patient petrosal vein was implicated. 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 commonest point i.e. 38 cases (73.07% cases). Other locations of neurovascular conflict are shown in table 1. The mandibular division (V3) was most commonly involved in this study i.e. 30 (57.70%) patients followed by maxillary (V2) 18 (34.61%) and ophthalmic (V1) division 4 (7.69%). The combination of V2 and V3 were seen in only 6 (11.53%) patients. Distortion of the nerve was noticed in 25 (48.07%) patients followed by marked indentation i.e. 22 (42.31%). Simple indentation of the nerve root was present only in 5 (9.61%) patients, complete pain relief was noted (free of medication) in 49 (94.23%) patients as shown in table 2. Cerebrospinal fluid (CSF) leakage occurred in 3 (5.76%) patients. One (1.92%) patient developed wound infection. There was one (1.92%) post-operative mid brain stroke and this patient died. Two (3.85%) patients had transient vertigo after surgery. DISCUSSION: Various treatment options for idiopathic trigeminal neuralgia have been described. Medical treatment rely on damage of the trigeminal nerve to relieve pain. Surgical options are based on the neurovascular conflict. Microvascular decompression directly modifies the well known etiology of vascular compression[1]. So keeping the above facts in mind; we opted for microvascular decompression rather than any other form of surgical treatment. In this study female patients are predominant with female to male ratio of 1.27:1, which is similar to previous 4 studies. In Pollack and Jannetta series it was 1.4:1[12]. Female sex has been reported as risk factors by some authors for recurrence after microvascular decompression[14]. The elderly population is commonly affected probably due to age related changes in blood vessels. In this study, the mean age was 56 years. These findings are pretty close to the findings of other researchers[4]. Per operatively we found that superior cerebellar artery was involved as the causative factor of trigeminal neuralgia i.e. 45 cases (86.53%) which is comparable to 87% reported by Shams S et al[8]. In the present study trigeminal nerve entry zone is the commonest point of neurovascular conflict i.e.38 cases (73.07%) which is in line with the reports of previous series[8]. So trigeminal root entry zone should be explored in all cases peroperatively. The current study reveals 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 hospital. CSF leak is the most frequent complication after microvascular decompression. The incidence of CSF leak following microvascular decompression is in the range of 0.9-12%[15].CSF leakage is the commonest complication in our study as well i.e. 5.76%. One patient (1.92%) died during post operative period . The overall complications profile is pretty 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 but it was not because of surgical procedure. This patient

suffered midbrain stroke post operatively. 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 follow up period. The operations were performed by different surgeons. Randomized clinical trials are needed to provide evidence based findings.

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

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