

**Original Article**

**Comparative Study on Cryosurgery with Carbamazepine and Alcohol injection in Trigeminal Neuralgia**

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**Abstract:**

**Objectives:** To assess the efficacy of Cryosurgery for the treatment of Trigeminal neuralgia and to compare this procedure with Carbamazepine and alcohol block. Materials and method-A prospective study with 75 cases of Trigeminal neuralgia was carried out in the Department of Oral and Maxillofacial Surgery, Bangabandhu Sheikh Mujib Medical University from January 2006 to December 2007. Out of 75 cases 25 treated with Carbamazepine only, starting dose 100 mg b.d. with incremental dose up to 800 mg, 25 received alcohol block with maintenance dose of Carbamazepine 200 mg b.d. over the study period and 25 received Cryosurgery with initial maintenance dose of Carbamazepine 100 mg b.d. then tapered on 1st follow up visits and withdrawn on the 2nd follow up visits. Visual linear analogue scale (VAS) was used to measure pain intensity in different groups. **Results:** Out of different treatment modalities on follow up onwards pain control was better in Cryosurgery than Carbamazepine and alcohol block. **Conclusion:** This study reveals that the efficacy of Cryosurgery is better than Carbamazepine and alcohol block to eliminate the pain intensity in Trigeminal neuralgia.

**Key words:** Trigeminal Neuralgia, Cryosurgery, Alcohol block, Carbamazepine.

**Introduction**

Trigeminal Neuralgia, often called "tic douloureux," is one of the most painful and debilitating pain disorders<sup>1</sup>. The diagnosis of trigeminal neuralgia is based primarily on a clinical history with some relevant general, physical and neurological examinations<sup>2</sup>.

At present it is a standard practice to use carbamazepine as the first line of treatment, sometimes with addition of phenytoin. Even though many patients can be managed in the long term by carbamazepine, side effects become intolerant and quite a number of patients become failure and resistant to the drug and required a variety of surgical procedures. In order to avoid major surgery, numerous peripheral techniques have been used. None of the technique appears to be curative and some may cause complications such as neuromas, anaesthesia dolorosa and neurological deficits<sup>3</sup>.

The use of cryotherapy was first reported in 1976 with encouraging results. They treated 64 patients suffering from intractable pain, six of whom had "facial pain" cyrotherapy was used in variety of facial pains, including post herpetic neuralgia atypical pain and paroxysmal trigeminal neuralgia. They found that only the last named group really benefited from cryotherapy<sup>3</sup>.

Cryosurgery is a method of local destruction of tissue by freezing in situ.<sup>4</sup>

A cryolesion will produce a second-degree nerve injury (Degeneration of axon, but endoneurium, perineurium and epineurium remains intact) with complete degeneration distal to the lesion (wallerian degeneration). The effect is reversible however, and recovery occurs in 42 days with a remarkable absence of fibrosis and scar formation. The cryolesion will result in selective nerve-fiber destruction;

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the fibers that are most vulnerable are pain fibers, since they are of a smaller diameter than the majority of fibers on a mixed peripheral nerve<sup>5</sup>.

Many clinically diagnosed patients with trigeminal neuralgia visit our Hospital who was resistant to carbamazepine or alcohol therapy. Among the different treatment modalities Cryosurgery may be one of the good options of peripheral surgical technique for the treatment of trigeminal neuralgia. Thus this study is conducted to evaluate the real efficacy of cryosurgery in the treatment of trigeminal neuralgia.

### **Materials And Methods**

A prospective study with 75 cases of trigeminal neuralgia was carried out in the Department of Oral and Maxillofacial Surgery, Bangabandhu Sheikh Mujib Medical University from January 2006 to December 2007. Out of 75 cases 25 received Carbamazepine, 25 received alcohol block and 25 received Cryosurgery. Visual linear analogue scale (VAS) was used to measure the pain intensity in different groups.

### **Patients selection**

Patients were selected irrespective of age and sex with considering diagnostic criteria.

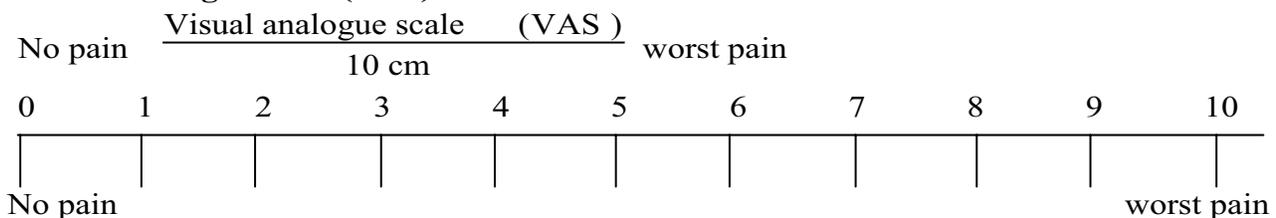
### **Grouping of the patients-**

Group-I (n=25): The group treated by pharmacological therapy (Carbamazepine)

The starting dose was usually 100mg twice a day with increment of 100mg daily every third day up to 800 mg/day and continued upto the study period.

### **Pain assessment**

#### **Visual analogue scale (VAS)**



Group-II (n=25): The group treated by alcohol nerve block. (95% ethyl alcohol)

After standard preparation with povidone iodine at first 1ml of lignocaine with 1: 80,000 adrenaline was given into the trigger area and the pain relief was monitored. If the pain was abolished, 0.5ml-1ml of

absolute alcohol was injected using an aspiration technique into the peripheral branch of trigeminal nerve. Another cycle of alcohol nerve block was given at 15-30 days interval. The date of first injection and last date to follow up were noted. Maintenance dose of carbamazepine 200 mg bd was continued upto the study period.

Group-III (n=25) : The group treated by cryosurgery. Identification of the affected branch or branches was achieved prior to cryotherapy by local anesthesia. Pain abolition by this procedure was the criterion for the cryotherapy. With all aseptic preparation under LA, the affected nerve was exposed under local anesthesia with IV sedation (Midazolam).

### **Surgical technique:**

The infraorbital nerve was exposed by an intraoral Cald-well-luc incision.

The mental nerve was exposed by intraoral low buccal incision in the premolar region.

The inferior alveolar nerve was exposed by intraoral Dr. Ginwalla incision.

The surgically exposed nerve was frozen by using nitrous oxide with a cryoprobe which achieved a temperature of -700 C. A cycle of 2 minutes freezing followed by 5 minutes thawing which is performed three times in a single visit. If two branches were affected both were treated simultaneously.

Maintenance dose of carbamazepine intially 100 mg b.d. then tapered on 1st follow up visits and withdrawn on 2nd follow up visits.

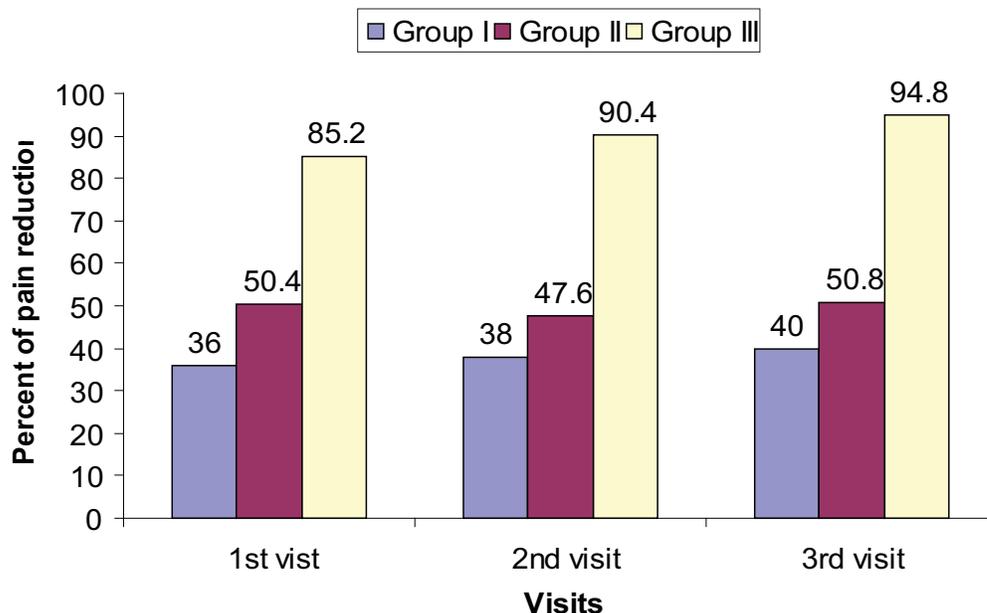
### **Results**

A total of 75 patients involving 20% Inferior alveolar nerve alone, 22.7% Inferior alveolar and Mental, 42.7% Infraorbital, 13.3% Mental 1.3% Infraorbital and Mental nerve were divided in three equal groups and pain Intensity in different visits were measured by visual linear analogue scale (VAS).

**Table I** Distribution of the patients according to intensity of pain in different visits

Characteristics	Treatment					
	Group I (n=25)		Group II (n=25)		Group III (n=25)	
	No.	%	No.	%	No.	%
<b>1<sup>st</sup> visit</b>						
Pain free	0	.0	0	.0	11	44.0
Mild	1	4.0	4	16.0	9	36.0
Moderate	13	52.0	17	68.0	5	20.0
Severe	11	44.0	4	16.0	0	.0
<b>2<sup>nd</sup> visit</b>						
Pain free	0	.0	0	.0	15	60.0
Mild	0	.0	1	4.0	9	36.0
Moderate	16	64.0	22	88.0	1	4.0
Severe	9	36.0	2	8.0	0	.0
<b>3<sup>rd</sup> visit</b>						
Pain free	0	.0	0	.0	16	64.0
Mild	0	.0	2	8.0	9	36.0
Moderate	17	68.0	22	88.0	0	.0
Severe	8	32.0	1	4.0	0	.0

**Figure I** Bar diagram showing the percent reduction of pain in different visits



**Discussion**

The mean age of the patient was 51.6±8.8 years in group I, 47.8±12.4 years in group II and 51.3±11.7 years III and M:F = 1:1.08. The mean year of duration of pain was 3.6±2.7 years ranging from 1-15 years. In this study the type of nerve involvement was limited to maxillary and mandibular division but there is no involvement of ophthalmic division of trigeminal nerve.

In this study baseline statistics like age, sex, duration of pain, nature of pain, site and type of nerve involvement was more or less similar with the previous studies.<sup>2,5,7,8</sup>

Studies conducted by Blom, 1962, Al-Ubaidy and Nally 1976 and Tailor et al. 1981 was found that carbamazepine has become the most acceptable first line treatment option for trigeminal neuralgia. It

reduces pain intensity ranges from 56-84%.<sup>9, 10,11</sup> In this study in different follow up visits intensity of pain reduction ranges from 36-40% and most of the patients in this study were taken carbamazepine previously.

In this study pain reduction by alcohol block in different follow up visit ranges from 47.6-50.8% with some negligible complication like trismus and swelling and there is no evidence of complete pain remission within this study period. This study differed from the study conducted by, Fardy, Zakrzewska and Patton 1944, Maleod and Patton 2007 where pain control period ranges from 1months - 3 years with some variation in different peripheral branches. Most of the patients in the previous studies were used repeated alcohol block.<sup>5,11</sup>

In cryosurgery pain control in different follow up visits ranges from 85.2- 94.8% with some negligible complications like swelling, trismus and paresthesia for transient periods. This study was supported by Zakrzewska, Nully & Flint 1996 and Zakrzewska 1987. Most of the patients in previous studies were used repeated cryotherapy.<sup>3,12</sup>

In group I and group II patient in different follow up visits there is no evidence of complete pain relieve from 1st to subsequent visits. On the contrary in group III, 11(44%) patient on the 1st follow up vis-

its 15( 60%) patient on 2nd follow up visits and 16(64%) patients on 3rd follow up visits were totally pain free. The percent reduction of pain on 3rd follow up visit was 40% in group I, 50.1% in group II and 94.8% in the patients treated with cryosurgery (group III). This indicated that cryosurgery is the most effective treatment modalities to control the pain intensity in trigeminal neuralgia.

Numbers of studies at different institute in western countries have demonstrated effectiveness of cryosurgery in the treatment of trigeminal neuralgia to other conventional technique intrens of cost, prevention of relapse, but no study has ever been under taken in our country to compare the efficacy of cryosurgical technique with other therapeutic modalities for treating patients with Trigeminal Neuralgia. Cryosurgery may prove to be an effective therapeutic alternative for these patients.

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