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A Clinical Study of Trigeminal Neuralgia with Incredible Pain, Satisfaction with Quality Pain Management

Shohda Khatun[1]*, Mozammal Hossain[2], Rajan Karmakar[3], M Assaduzzaman[4] and Al Mamoon Ferdousi[5]

[1]*Senior Consultant, Faculty of Dentistry, Department of Oral & Maxillofacial Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh*
[2]*Assistant Professor, Faculty of Dentistry, Department of Conservative Dentistry & Endodontics, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh*
[3]*Assistant Professor, Oral and Maxillofacial Surgery, Bangladesh Dental College, Dhaka, Bangladesh*
[4]*Research Assistant, Faculty of Dentistry, Department of Oral & Maxillofacial Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh*
[5]*Faculty of Dentistry, Formerly Professor of Oral and Maxillofacial Surgery, Bangabandhu Sheikh mujib Medical University, Dhaka, Bangladesh*

Abstract

This is a prospective analytical study of 164 trigeminal neuralgic pain patients. The study was undertaken in order to determine whether bupivacaine hydrochloride prevent TN pain and reduce the relapse of trigeminal neuralgic pain.

The patient was selected who were previously received alcohol block, Carbamazepine, Cryosurgery, or Peripheral Neurectomy in different clinics, after relapse in 6-8 months with same intensity of pain. Those patients were referred to department of oral and maxillofacial surgery, Bangabandu Sheikh Mujib medical university Shahabag Dhaka Bangladesh between the years 2008-2010 were included in this study.

The affected nerve was blocked with 1.5 ml to 10 ml of 0.5% bupivacaine HCl according to severity of pain. Patient's visual analogue scores (VAS) Verbal rating scale (VRS) were recorded on 1st day 3rd day, 7th day, 15th day. There was a significant difference between 1st day medicament and 15th day medicament of value VAS. 1st day value was 83.10 ± 6.06, at 3rd days was 39.60 ± 7.86, at 7th days was 16.25 ± 6.46 and at 15th days was 3.30 ± 3.19. It can be concluded that administration of 0.5% bupivacaine HCl nerve block at regular interval in different dose can be considered as alternative method to prevent TN pain and frequent relapse in treatment of Trigeminal neuralgia.

Keywords: Trigeminal neuralgia; Bupivacaine; Visual analogue score; Verbal rating score

Introduction

Trigeminal neuralgia (TN) is a disease characterized by paroxysmal and refractory severe pain occurring along the trigeminal nerve. The pain is strictly limited to the distribution of the fifth cranial nerve and can involve one, two or even three branches. Bilateral cases are very rare [1]. The management of trigeminal neuralgia continues to be a major therapeutic challenge. Current treatments are mainly divided into medical treatments and surgery and medication is often the first-line treatment. Traditionally, patients are offered surgical options only when medications fail or severe side effects develop [2]. Although current treatment is initially medical, medical treatment fails in 30% of cases because of inadequate pain control or side effects of the drugs used [3]. Surgery can alleviate the pain, but is associated with morbidity and mortality and is not always effective [4]. Phenytoin, carbamazepine, clonazepam, gabapentin, and baclofen have also been used as anti neuralgic drugs [5,6]. Medical management with anticonvulsant (antiepileptic) drugs has debilitating side effects and the drugs eventually lose effectiveness [7]. The medical treatments (anticonvulsant medications) eliminate or significantly reduce the pain in approximately 75% of patients and are considered the treatment of choice for incident cases of TN [8]. Unfortunately, the relief provided by medical therapy generally decreases over time. When medications fail to relieve TN pain attacks, it is important to reduce the risk of severe side effects of surgery and surgical squeals seen in cranial surgery considering the mean age of TN patients. Nerve block with local anesthetics is appropriate in such cases because this treatment is reversible and non traumatic and can be effectively used.

In this study nerve block with a 0.5% Bupivacaine hydrochloride for treating TN as a minor intervention to decrease the risk of intracranial neurosurgical complications, eliminate the disadvantages of carbamazepine or on whom carbamazepine is no longer effective or relapse from different moralities of treatment. 0.5% Bupivacaine hydrochloride presenting a solution for patients suffering from such a difficult situation.

Materials and Methods

Subjects

A total of 164 patients (Male: 62, Female: 102, age: ranged from 55 to 70 years), who were attended Oral & Maxillofacial Department, Faculty of Dentistry, Bangabandhu Sheikh Mujib Medical University Bangladesh were included for this study. Among the 164 patients, 30 patients received alcohol, 25 patients received cryosurgery, 102 patients were treated with Carbamazepine, and 7 patients treated with peripheral neurectomy. The patients were divided into 4 study group according to their nerve involvement:

Group I: (n=70): Inferior alveolar nerve

Group II: (n=30): Inferior alveolar nerve, anterior/middle/posterior superior alveolar nerve

Group III: (n=55): Infra orbital nerve/zygomatico facial nerve, anterior/middle/posterior superior alveolar nerve.

Group IV: (n=6): Infra orbital nerve / zygomatico facial nerve, zygomatico temporal anterior/middle/posterior superior alveolar nerve

***Corresponding author:** Shohda Khatun, Senior Consultant, Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh, E-mail: nazmus_sakib70@yahoo.com

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Clinical diagnosis

Clinical diagnosis of TN was performed by the history and clinical evaluation according to age, sex, and duration of pain, nature of pain, initiating factor and associated sign and symptom. Furthermore, the severity of pain was assessed by Patient's visual analogue scores (VAS), Verbal Rating Scale (VRS). As the patient was previously diagnosed and treated as TN from other clinics and our center also for better evaluation we performed the following investigation presence of any intracranial cause, TMJ, salivary gland, sinus pathology were excluded by using X-ray, Sialogram, MRI, CT scan and known allergy to Bupivacaine hydrochloride, were excluded from the study. Physiological factor was excluded by injecting affected trigger zone area by normal saline.

Therapeutic procedure

Prior to treatment, oral cavity was washed with 1% cholorhexidene solution, surface anesthesia (Zylocane USA) with cotton pellets was applied to the surface of infiltrated area. Then patients were infiltrated by using 0.5% Bupivacaine Hydrocloride Needle size: 27G (0.1×38 mm) for inferior alveolar nerve block and 25G (0.4×25 mm) for all other nerves to the trigger zone of affected nerve as shown in the Table 2. Among the study population, 70 patients were suffering from pain at inferior alveolar nerve. These patients were treated with 0.5% of Bupivacaine at 1.5 ml, 3 ml, and 4.5 ml at 0 day, 7 days and 15 days, respectively. Pain observed after one month and up to 2 years follow-up.

In 30 patients, the affected nerve was Inferior alveolar, anterior / middle/posterior superior alveolar nerve (Table 3). These patients were treated according to the given dose of 1.5 ml of Bupivacaine 0.5% followed by 3 ml at 7 days, 4.5 ml at 15 days and 6 ml at 30 days. There was no pain afterwards, up to 2 years follow up.

55 patients were sufferings from Infra orbital nerve/zygomatico facial nerve, anterior/middle/posterior superior alveolar nerve TN pain. The highest dose of 10 ml of 0.5% of bupivacaine was used at 60 days to relief of pain. The remaining 6 patients who were suffering from Infra orbital nerve/zygomatico facial nerve, anterior ,middle, and posterior superior alveolar nerve were treated with 1.8 ml, 3.6 ml, 7.2 ml and 10 ml at 0 day, 7 days, 15 days, 30 days and 60 days. The dose and schedule was determined according to non responsive and involvement of nerve.

6 patients were sufferings from Infra orbital nerve/zygomatico facial nerve, zygomatico temporal anterior/middle/posterior superior alveolar nerve. These patients were treated with 5% Bupivacaine hydrochloride mixed with 10% lidocaine for 12 days. Among them 3 patients were cured and rest of 3 patients did not respond to the above treatment, they were referred to pain clinic for further management.

Post operative evaluation

Post operative evaluation was performed at 1, 2, 4, 8, 12, 24 months, to determine any TN pain or relapse (Table 1).

Data collection technique and data analysis

After the completion of the procedure, a standardized structured data collection sheet was used to collect necessary information of the study subject. Patients were stratified by gender and affected branch. Clinical characteristics of the samples, and pre-emptive and post therapeutic VAS and VRS scores (Table 4) were evaluated by the two-sample paired t test. The data were analyzed using version SPSS 10.0.

Result

There was a significant difference between mean preoperative and postoperative VAS value at day 3, 7 days, and 15 days (Table 3 and Graph 1). Preoperative score was 83.10 ± 6.06, at postoperative 3 days score was 39.60 ± 7.86, at postoperative 7 days was 16.25 ± 6.46 and at postoperative 15 days was 3.30 ± 3.19. From paired sample test (t test) it was found that the VAS score was highly significant when comparison was done between preoperative scores with postoperative 3 days, 7days, and 15 days individually. Furthermore neither relapses nor were any postoperative complications recognized throughout the entire observation period.

Follow up assessment

In group I, at 1 month observation period, neither pain nor any relapse was recorded in any patient. These patients were free from pain throughout the 2 years observation period.

In group II, at 1st follow up pain was present but at 2 months follow up observation period pain was disappear. Furthermore, they are free from pain as like group I in 2 year observation period.

In group III, pain was subsided after treatment at 2 months observation period. These patients were free from pain in 2 years observation period.

In group IV, among 6 patients, 3 patients were not cured throughout the 2 years observation period. They were referred to pain clinic for further management.

Discussion

In this study, 0.5% Bupivacaine hydrochloride proved to be

Treatment	Alcohol	Cryosurgery	Carbamazepine	Peripheral Neurectomy	Total
No. of Patient	30	25	102	7	164
Time of relapse	(6 -8 months)	(3-9 months)	(8-12 months)	(6-8 months)	

Table 1: Patient status and previously received treatments.

No of patient	Affected nerve treated	First visit (0 day)	2nd visit (7 days)	3rd visit (15 days)	4th visit (30 days)	5th visit (60 days)
70	Inferior alveolar nerve	1.5 ml	3 ml	4.5 ml	(no dose)	no dose)
30	Inferior alveolar nerve, anterior/ middle/ posterior superior alveolar nerve	1.5 ml	3 ml	4.5 ml	6 ml	No dose
55	Infra orbital nerve / zygomatico facial nerve, anterior / middle/ posterior superior alveolar nerve	1.5 ml	3 ml	4.5 ml	6 ml	10 ml
6	Infra orbital nerve / zygomatico facial nerve, zygomatico temporal anterior /middle/ posterior superior alveolar nerve 5% Bupivacaine hydrochloride mixed with 10% lidocaine for 12 days	1.8	3.6	7.2	10 ml	10 ml

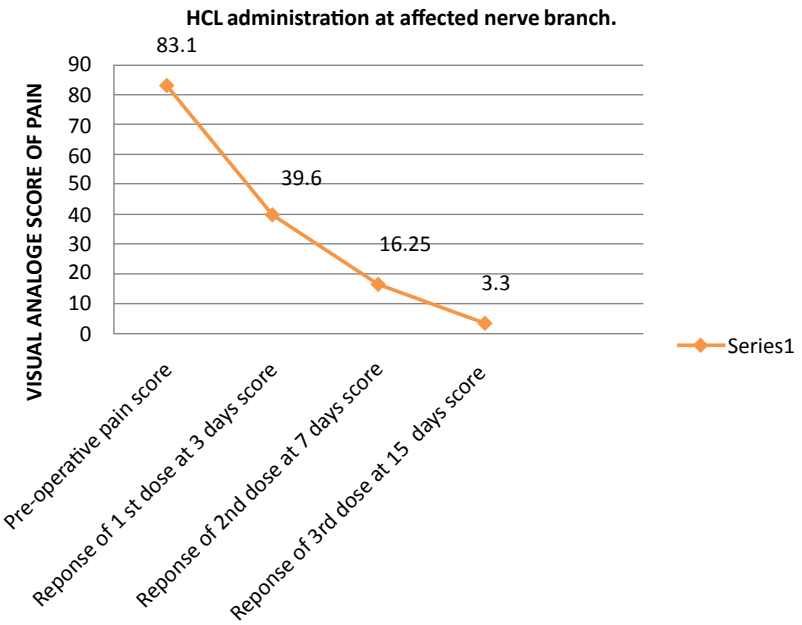
Table 2: Dose given according to affected nerve treated with 0.5% Bupivacaine hydrochloride.

VAS Score Mean ± SD		p value
Response VAS 1st dose at 3 days	83.10 ± 6.06 VAS 39.60 ± 7.86	0.001*
Response VAS 2nd dose at 7 days	83.10 ± 6.06 VAS 16.25 ± 6.46	0.001*
Response VAS 3rd dose at 15 days	83.10 ± 6.06 VAS 3.30 ± 3.19	0.001*
Response of 1st dose at 3 days VAS 2nd dose at 7 days	39.60 ± 7.86 VAS 16.25 ± 6.46	0.001*
Response of 1st dose at 3 days VAS 2nd dose at 15 days	39.60 ± 7.86 VAS 3.30 ± 3.19	0.001*
Response of 2nd dose at 7 days VAS 3rd dose at 15 days	16.25 ± 6.46 VAS 3.30 ± 3.19	0.001*
p value <0.05 is significant.		

Table 3: Mean VAS with at pre-emptive and therapeutic, 3 days, 7days, 15 days.

VRS Score Mean ± SD		p value
Response VRS 1st dose at 3 days	8.4 ± 1.06 VRS 3.2. ± 1.86	0.001*
Response VRS 2nd dose at 7 days	8.4 ± 1.06 VRS 1.7 ± 0.46	0.001*
Response VRS 3rd dose at 15 days	8.4 ± 1.06 VRS 0.13 ± 0.05	0.001*
Response of 1st dose at 3 days VRS 2nd dose at 7 days	3.2. ± 1.86 VRS 1.7 ± 0.46	0.001*
Response of 1st dose at 3 days VRS 3rd dose at 15 days	3.2. ± 1.86 VRS 0.13 ± 0.05	0.001*
Response of 2nd dose at 7 days VRS 3rd dose at 15 days	1.7 ± 0.46 VRS 0.13 ± 0.05	0.001*
p value <0.05 is significant.		

Table 4: Mean VRS with at pre-emptive and therapeutic, 3 days, 7days, 15 days.



Graph 1: Change of patient VAS means after bupivacaine HCL administration at affected never branch.

effective for the treatment TN. Except in 3 patients, all patients showed complete relief of pain following treatment; Furthermore, endocrine response to pain was seemed to be associated with alteration of blood pressure, respiratory rate and blood glucose level, but in the present study, pre-emptive blood pressure, respiratory rate and blood glucose level was static in pre-emptive and in relation with post-therapeutic and post therapeutic parameter level. There were no unusual side effects.

The results found in the present study were corresponded to that of previous studies. Goto et al. [9] and Radwan et al. [10] found peripheral nerve block using high concentrations of local anesthetics prolongs the analgesic effect in patients with TN, without adverse effects. Umino et al. [1] reported that TN block with local anesthetics is reversible and non traumatic and is appropriate for further surgical interventions such as microvascular decompression.

The mechanism of long time relief of TN by Bupavacaine Hydrocloride in the present study has not been clarified. However, Amir et al. [11] Clinical and experimental data indicate that changes in the expression of voltage-gated sodium channels play a key role in the pathogenesis of neuropathic pain and that drugs that block these channels are potentially therapeutic in TN. In addition, recent data show that local anesthetics may have pain-relieving actions at targets other than sodium channels; these targets include neuronaln G protein-coupled receptors and binding sites on immune cells. One postulated mechanism for the long-term effect of local anesthetics on the trigeminal nerve is Wallerian degeneration. Histologically, the extrafascicular administration of local anesthetics at clinical concentrations can alter perineural permeability, causing endoneurial oedema, increased endoneurial fluid pressure, and Wallerian degeneration with Schwann cell injury and axonal dystrophy [12-14] which may reduce allodynia, hyperalgesia, and trigger point hypersensitivity. Further research should be done before drawing any conclusions from these observations.

In the present study, 3 patients did not cure with 0.5% Bupavacaine Hydrocloride and were referred to pain clinic for further management. The reason of continuing pain is not identified in the present study. However, we considered the following: since low concentration of Bupavacaine Hydrocloride was used in the present study, an increase concentration of Bupavacaine Hydrocloride could be more effective. A similar results of continued pain were reported by Goto et al. [9] used an infraorbital nerve block with 4% tetracaine dissolved in 0.5% bupivacaine to treat older TN patients who did not wish to have a neurolytic block or surgical treatment, and reported that the analgesic effects continued for more than 3 months.TN. Sato et al. reported two cases of idiopathic superior laryngeal neuralgia treated with a superior laryngeal nerve block using a high concentration of lidocaine; the pain was alleviated for 1 year without the need to continue block therapy after 10 treatments using 1 mL of 10% lidocaine over 12 days. They postulated that the effective period in previous cases was shorter because the injected local anesthetic remained in the trigger zone for a shorter time [15]. Change of patient VAS means 0.5% bupivacaine HCL administration at specific nerve branch, goal of managing TN is to achieve long-term total analgesia, while preserving the sensory functions of the trigeminal nerve [16,17].

The reason of recurrence of pain following medical and surgical treatment may be due to repair of nerve of proximal segment; this growth occurs as a rate of about 1 mm per day. Therefore, after treatment with the previous methods, pain recurrence after a certain period along with nerve cell repair could be happen for these methods. However, when we treated these patients with 0.5% Bupivacaine hydrochloride, there were no recurrence of TN pain during the 2 years follow up period. Therefore, we considered that 0.5% Bupivacaine could be an alternative & effective method of treatment and prevention of relapsing TN pain.

Conclusion

Those patients who are unable to tolerate dose dependent side effect of antiepileptic drugs or recurrence of pain after different modalities of treatment. We observed by nerve blocking with of 0.5% bupivacaine hydrochloride was effective measure for relief of pain in TN patient. However, the reason of successful treatment with 0.5% bupivacaine hydrochloride is not clarified in this study. Further research is needed to know the mechanism of action of 0.5% bupivacaine hydrochloride on long term pain relief and relapse.

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References

1. Umino M, Kohase H, Ideguchi S, Sakurai N (2002) Long-term pain control in trigeminal neuralgia with local anesthetics using an indwelling catheter in the mandibular nerve. Clin J Pain 18: 196-199.
2. Nurmikko TJ, Eldridge PR (2001) Trigeminal neuralgia--pathophysiology, diagnosis and current treatment. Br J Anaesth 87: 117-132.
3. Sillanpaa M (1981) Carbamazepine pharmacology and clinical use. Acta Neurol Scand 88: 1-202.
4. Patsalos PN (1995) Medical management. In: Zakrzewska JM (ed.) Trigeminal neuralgia: a practical approach to management, major problems in neurology series, London: WB Saunders.
5. Zakrzewska JM, Patsalos PN (1992) Drugs used in the management of trigeminal neuralgia. Oral Surg Oral Med Oral Pathol 74: 439-450.
6. Umino M, Ohwatari T, Shimoyama K, Nagao M (1993) Long-term observation of the relation between pain intensity and serum carbamazepine concentration in elderly patients with trigeminal neuralgia. J Oral Maxillofac Surg 51: 1338-1344.
7. Taylor JC, Brauer S, Espir ML (1981) Long-term treatment of trigeminal neuralgia with carbamazepine. Postgrad Med J 57: 16-18.
8. Fields HL (1996) Treatment of trigeminal neuralgia. N Engl J Med 334: 1125-1126.
9. Goto F, Ishizaki K, Yoshikawa D, Obata H, Arii H, et al. (1999) The long lasting effects of peripheral nerve blocks for trigeminal neuralgia using high concentration of tetracaine dissolved in bupivacaine. Pain 79: 101-103.
10. Radwan IA, Saito S, Goto F (2001) High-concentration tetracaine for the management of trigeminal neuralgia: quantitative assessment of sensory function after peripheral nerve block. Clin J Pain 17: 323-326.
11. Amir R, Argoff CE, Bennett GJ, Cummins TR, Durieux ME, et al. (2006) The role of sodium channels in chronic inflammatory and neuropathic pain. J Pain 7: S1-29.
12. Myers RR, Kalichman MW, Reisner LS, Powell HC (1986) Neurotoxicity of local anesthetics: altered perineurial permeability, edema, and nerve fiber injury. Anesthesiology 64: 29-35.
13. Stajcic Z, Juniper RP, Todorovic L (1990) Peripheral streptomycin/lidocaine injections versus lidocaine alone in the treatment of idiopathic trigeminal neuralgia. A double blind controlled trial. J Craniomaxillofac Surg 18: 243-246.
14. Symreng T, Gomez MN, Johnson B, Rossi NP, Chiang CK (1989) Intrapleural bupivacaine--technical considerations and intraoperative use. J Cardiothorac Anesth 3: 139-143.
15. Takahashi Sato K, Suzuki M, Izuha A, Hayashi S, Isosu T, et al. (2007) Two cases of idiopathic superior laryngeal neuralgia treated by superior laryngeal nerve block with a high concentration of lidocaine. J Clin Anesth 19: 237-238.
16. Khatun S, Molla MR, Zaman AKM, Rahman S (2008) Effectiveness of multimodal preemptive and anal jesic therapy in maxillofacial surgery. Bangladesh J Physiol Pharmacol 24: 17-23.
17. Khatun S, Bishwash AK, Karmakar R, Dhar S, Parvin MK (2010) Study to assess the status of bupivacaine hydrochloride in management of essential trigeminal neuralgia. Bangladesh J Physiol Pharmacol 26: 17-23.

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