How to Cite:
Adnan, K., Tariq, N., Khan, S. S., Shaikh, A. A., Moosa, Y., Maqsood, A., & Ullah, A. (2023). Effect of triamcinolone acetonide in trigeminal neuralgia (TN) pain. *International Journal of Health Sciences*, *7*(S1), 1760–1767. https://doi.org/10.53730/ijhs.v7nS1.14409

Effect of triamcinolone acetonide in trigeminal neuralgia (TN) pain

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***Abstract*---**Background: Trigeminal neuralgia is a form of neuropathic pain caused by trigeminal nerve. Anticonvulsants are primary class of pharmaceuticals used to treat pain in trigeminal neuralgia patients. Another conservative treatment option for controlling this pain includes blocking of nerve. Objectives: To determine how trigeminal neuralgia patients respond to triamcinolone acetonide. Methods: The

department of oral and maxillofacial surgery at de'Montmorency College of Dentistry/Punjab dental hospital conducted a cross-sectional study over a six-month period. 35 study participants underwent a clinical examination along with a history-taking process. Written consent was obtained. After gathering the necessary information, the affected nerve was identified followed by the administration of local anesthesia. The most painful area was identified and 5 mL of bupivacaine and 40 mg of triamcinolone acetonide was administered at that side. After five minutes, the participant's level of pain was assessed, and they were contacted back for follow-up after seven days. Every item on the post-op list of targeted goals was checked off in the participant's questionnaire at the follow-up day. With SPSS version 24, the statistical analysis was completed. Results: There were 35 participants in the study overall, with the majority of them being in their 40s or 50s. Overall, there were more women participants, and most of them were employed. Prior to receiving triamcinolone acetonide, study participants had difficulty eating, sleeping, and touching their faces. Five minutes after the medication was administered, the pain went from being severe to mild, and after seven days of observation, there was no discomfort at all. The post-operative follow-up revealed a considerable decrease in daily and face activity. However, a mean comparison did not produce any results that were statistically significant. Conclusion: The results of this study showed that patients with trigeminal neuralgia experienced a decrease in pain intensity after receiving triamcinolone acetonide.

***Keywords*---**Triamcinolone acetonide, Trigeminal neuralgia, Trigeminal nerve block.

Introduction

Trigeminal Neuralgia (TN) is the pain usually describe as burning or electric shock like, stabbing and limited to areas that is supplied by trigeminal nerve. The occurrence of this pain is 13 people in 100,000 per year (Gambeta, Chichorro, & Zamponi, 2020) with 0.03% to 0.3% incidence rate. Since trigeminal neuralgia is caused by neural compression of trigeminal nerve, having three branches: the ophthalmic (V1), the maxillary (V2) and the mandibular (V3) (Araya, Claudino, Piovesan, & Chichorro, 2020). These three branches of trigeminal nerves exists the brainstem through trigeminal ganglion. The V1 and V2 are purely sensory in nature whereas V3 is motor in nature. The fibers that forms this nerve are low-threshold mechanoreceptor (Aα and Aβ) and nociceptive (Aδ and C) fibers. Both fibers activates by noxious stimulus. The cell bodies of these fibers are situated in trigeminal ganglion having trigeminal nucleus which carries stimulus from ipsilateral side of face to contralateral thalamus by trigeminothalamic tract (Gambeta et al., 2020). The maxillary and mandibular branches of trigeminal nerve has higher incidence rate compared to ophthalmic division of trigeminal nerve The pain that occurs due to trigeminal neuralgia can be distinguish with other type of orofacial pain due to its short duration of time. The duration of pain

during trigeminal neuralgia lasts from 1 to 2 seconds to 1 to 2 minutes. Some clinicians reported 10 to 50 pain attacks during a day (Araya et al., 2020).
There are a lot of treatment options for treating trigeminal neuralgia pain. First line of treatment is the use of carbamazepine or oxacarbazepine alone or in combination with pimozide, baclofen, and lamotrigine (Yameen, Shahbaz, Hasan, Fauz, & Abdullah, 2011). The long term use of these drugs induced certain side effects in patients including ataxia, renal and hepatic toxicity, vomiting, nausea, dizziness, allergic reaction, and at times relapse of symptoms of TN due to resistance of the drug. Apart from drug related treatment option, many studies showed the application of agents applied locally in region of trigeminal neuralgia. These includes peripheral nerve block with local anesthetic agent, and injection of botulinum toxin at trigger zone (Obermann, 2019). Like pharmaceutical approach, surgical treatment options also presents certain risks and side effects. The most common reported side effects of surgical treatment include face numbness and paresthesia (Araya et al., 2020).

All pharmaceutical and surgical options have advantages and disadvantages, as well as various success rates and patient indications (Araya et al., 2020). Symptoms in some patients reoccurs after certain interval of time, treatment options for those includes the surgical intervention. These intervention includes microvascular decompression, gamma knife radiosurgery, and percutaneous methods directly at site of trigeminal ganglion. Since each patient's disease progresses differently, the majority of doctors choose a step-by-step strategy starting with medical treatment trial and ending with surgical intervention. These treatment options were according to unique patient's demand. Those who are not suitable for surgery and required less invasive treatment option, nerve block can be treatment of choice for them. This nerve block injections can calm and relax the nerve compression (Wasim et al., 2022). It is evident from literature that the surgical procedures can only treat pain sensations, but they do not stimulate the blocking of injured nerves, therefore, it is necessary to develop effective and efficient nerve blocking therapeutic approaches. However no such study was reported including trigeminal neuralgia patients, therefore, we aimed to conduct this study to see the effect of triamcinolone acetonide in trigeminal neuralgia pain.

Objectives

The objective of this study is to determine how trigeminal neuralgia patients respond to triamcinolone acetonide.

Methodology

This cross-sectional investigation was carried out over a period of six months. The study was conducted in oral and maxillofacial surgery at de'Montmorency College of Dentistry/Punjab dental hospital. Thirty-five volunteers with history of trigeminal neuralgia pain made up this study. Prior to administering the medication, the patient's consent was acquired. A clinical examination was conducted along with transcription of the patient's history of trigeminal neuralgia. The study questionnaire contained a record of the finding. Once all the data was gathered, the pyodine was used to disinfect the affected area (either right or left).

After gathering the necessary information, the affected side was observed and palpated. The most painful area was identified and 5 mL of bupivacaine and 40 mg of triamcinolone acetonide was administered at that side. After 5 mins intensity of pain were asked and participant were recalled after 7 days for follow up. All the post op list of intended objectives was marked accordingly in questionnaire of each participant at follow up day. The statistical analysis was done with SPSS version 24. There was a descriptive analysis and mean comparison. When the data's normality was checked, it became clear that they follow the normal distribution. A p-value of less than 0.05 was used to establish the statistical significance.

Results

Table 1 summarizes the demographic distribution of the 35 participants. In this study, the age group 40–50 years old has the highest prevalence, at 57.1%. In the study, there were 51.4% more women than men participants. The majority of participants (37.1%) had employment. Nearly all participants displayed the same values with the affected side while giving their histories. Participants were experiencing significant pain while falling asleep (28.6%). Both eating (25.7%) and touching one's face (25.7%) might cause pain. Table 2 provides a summary of the pain characteristics following the administration of triamcinolone acetonide. The effectiveness of the medication at the affected side was demonstrated five minutes after delivery when the pain decreased from severe to mild (37.1%). After seven days, the subject was contacted for a follow-up visit, during which the severity of the pain, any general activity disruptions, and facial activity disruptions were tracked. The individuals' increased incidence of no discomfort (28.6%) started with mild pain. The number of individuals who had problems going asleep decreased, and they demonstrated a higher value in regular working (60%). Having no facial interferences lowered the difficulty of eating and touching the face by 60%. Using Pearson chi-square, the relationship between demographics and pain severity (pre- and post-op) and daily activity interferences (pre- and post-op) was examined. Only the gender was associated with pre- and post-operative pain intensity and post-operative general activity inferences that were statistically significant. The association's details were displayed in Table 3. Table 4 shows a mean comparison of pre- and post-operative pain intensity and daily activity interferences, although the results were not statistically significant.

Table 1: Demographic Characteristics of Participants-Preop (n=35)

Variable	Classification	n (%)
Age	20-30 years	05 (14.3)
	40-50 years	20 (57.1)
	60-70 years	10 (28.6)
Gender	Female	18 (51.4)
	Male	17 (48.6)
Occupation	Student	04 (11.4)
	Employed	13 (37.1)
	House Wife	10 (28.6)
	Retried	08 (22.9)
Affected side of Pain	Right	17 (48.5)

	Leftc	18 (51.5)
Pain Intensity	Mild Moderate Severe Extreme	02 (5.7) 11 (31.4) 12 (34.3) 10 (28.6)
Interference in General Activity	Normal work Walking ability Relationship with people Sleep Mood Swings Enjoyment in Life	02 (5.7) 06 (17.1) 09 (25.7) 10 (28.6) 03 (8.6) 05 (14.3)
Interference in Facial Activity	None Eating Touching face Brushing/Flossing Smiling/Laughing Talking Opening of Mouth Widely	02 (5.7) 09 (25.7) 09 (25.7) 05 (14.3) 03 (8.6) 04 (11.4) 03 (8.6)

Table 2: Post Op Pain Characteristics (n=35)

Variable	Classification	n (%)
Pain Intensity After 5 mins	No pain Mild Moderate Severe	11 (31.4) 13 (37.1) 09 (25.7) 02 (5.7)
Pain Intensity after 7 days	No pain Mild Moderate Severe	10 (28.6) 15 (42.9) 08 (22.9) 02 (5.7)
Interference in General Activity after 7 days	Normal work Walking ability Relationship with people Sleep Mood Swings Enjoyment in Life	21 (60) 03 (8.6) 03 (8.6) 03 (8.6) 03 (8.6) 02 (5.7)
Interference in Facial Activity after 7 days	None Eating Touching face Brushing/Flossing Smiling/Laughing Talking Opening of Mouth Widely	21 (60) 03 (8.6) 01 (2.9) 02 (5.7) 03 (8.6) 02 (5.7) 03 (8.6)

Table 3: Association of Demographic Data with pain intensity (pre-op, after 5 min and post-op) and interference in daily activity (Pre-op and post-op) (n=35)

Variable	Association Variable	p-value[a]
Age	Pre-op pain intensity	0.130
	After 5 mins pain intensity	0.909
	Post-op intensity	0.169
	Pre-op general activity interference	0.393
	Post-op general activity interference	0.079
	Pre-op facial activity interference	0.664
	Post-op facial activity interference	0.273
Gender	**Pre-op pain intensity**	**0.000064***
	After 5 mins pain intensity	0.806
	Post-op intensity	**0.004***
	Pre-op general activity interference	0.596
	Post-op general activity interference	**0.018***
	Pre-op facial activity interference	0.983
	Post-op facial activity interference	0.918
Occupation	Pre-op pain intensity	0.515
	After 5 mins pain intensity	0.811
	Post-op intensity	0.386
	Pre-op general activity interference	0.686
	Post-op general activity interference	0.090
	Pre-op facial activity interference	0.569
	Post-op facial activity interference	0.139
Affected side	Pre-op pain intensity	0.880
	After 5 mins pain intensity	0.672
	Post-op intensity	0.463
	Pre-op general activity interference	0.874
	Post-op general activity interference	1.00
	Pre-op facial activity interference	0.816
	Post-op facial activity interference	0.701

ap-value was calculated from Pearson chi-square

*p-value <0.05 considered statistically significant

Table 4: Mean comparison of pre-op and post-op factors (n=35)

Variable	Mean±SD	p-value
Pain Intensity After 5 mins	2.31±1.27	0.218
Pain Intensity after 7 days	2.20±1.27	0.120
Interference in General Activity after 7 days	2.66±1.34	0.653
Interference in Facial Activity after 7 days	5.66±2.02	0.978

Discussion

Trigeminal neuralgia is a debilitating form of neuropathic pain that arises from any branch of the trigeminal nerve. This excruciating pain tends to intensify as individuals age, often becoming more prevalent after the age of 40, which aligns with the conclusions drawn from our comprehensive study (Gambeta et al., 2020). Consistent with our research, it has been observed that females exhibit a higher susceptibility to this condition compared to males (Xu, Xie, & Jackson, 2021). The pain experienced during trigeminal neuralgia is characterized by sudden, brief, and intense electric-shock-like sensations. It is typically localized to one side of the face and can be triggered by seemingly innocuous stimuli such as washing one's face, talking, brushing teeth, eating, or even gentle touch. Notably, our investigation into preoperative history mirrored these findings (Araya et al., 2020). Studies have indicated that the primary site of nerve compression responsible for trigeminal neuralgia is the nerve root entry area in the brainstem. However, some instances of nerve compression have also been identified in the mid-zone and exit area of the nerve. Consequently, interventions aimed at blocking the nerve root entry zone have shown promise in alleviating the associated pain. In a noteworthy case series presented by Nader et al. in 2013, it was reported that 87% of patients experienced relief from trigeminal pain following the administration of triamcinolone acetonide (Nader et al., 2013). Remarkably, our study yielded similar results, demonstrating a decrease in pain severity from severe to mild within five minutes of administration, and further reduction from mild to complete absence of discomfort after a follow-up period of seven days. Expanding upon these findings and further exploring the intricate mechanisms underlying trigeminal neuralgia may pave the way for enhanced treatment modalities and improved quality of life for those affected by this debilitating condition.

Conclusion

The neuropathic pain known as trigeminal neuralgia is triggered on by a simple stimulation. Many of the patients are unhealthy to have surgical intervention, so a conservative treatment should be used to lessen the intensity of the pain. Triamcinolone acetonide and bupivacaine were administered in our study in an effort to reduce pain intensity utilizing a nerve block approach. Our findings indicate that even five minutes after delivery, this non-invasive therapy option lowers trigeminal neuralgia discomfort.

Recommendation

Further research should be conducted with a larger sample size because the sample size of this study was small. Further studies should be conducted with the neurological department as well as many tertiary care hospitals in the city since it is a single-centered study with only one department included. One may also do a comparison study within the cities.

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