

Neuropathic Pain Management in a Tertiary Care Oral Medicine Unit

Research Article

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Abstract

Neuropathic pain is initiated by a primary lesion or dysfunction of the nervous system and can be triggered by local trauma or systemic disorders. Neuropathic pain has a complex presentation which is often a diagnostic challenge and requires a multi-disciplinary approach in management. Neuropathic pain prevalence is estimated between 1 and 10%, with few studies reporting that neuropathic components can be found in 35% of all painful syndromes. Our aim of the study was to evaluate the most effective treatment modality in management of neuropathic pain. Retrospective analysis was done at the Department of Oral Medicine and Radiology of Saveetha University hospital from June 2019 - March 2020. A total of 32 patients who were diagnosed clinically as Trigeminal neuralgia (TN) and Post herpetic neuralgia (PHN) cases were included in the study. Out of the 32 patients, females (56.2%) were predominant than males (43.7%). Majority of the study patients age group were 60-70 years (37.5%) followed by 50-60 years (31.25%). The study cases consisted of about 96.8% of TN followed by 3.1% of PHN cases. The left trigeminal nerve (53.13%) was more commonly affected when compared to the right trigeminal (46.88%). The branches of the trigeminal nerve affected were higher in V3 (62.5%) and V2 (18.75%). The common medical management of TN involved Carbamazepine (56.25%), combination of Carbamazepine, Gabapentin and Methylcobalamin (28.13%). Only three patients had undergone surgical management for TN (3.13%). Comparison of medical management in the study group using VAS pain scores was done. Neuropathic pain requires a proper evidence based management of pain either medically or surgically. Our study has shown a significant reduction in pain in patients under medical treatment. Clinicians hence must use a systematic approach in management of neuropathic pain with regular follow up.

Keywords: Neuropathic Pain; Post Herpetic Neuralgia; Trigeminal Neuralgia; Vas Pain Scale.

Introduction

Neuropathic pain is defined as pain arising as a direct consequence of a lesion or a disease affecting the somatosensory system-The international association for the study of pain (IASP) special interest group on neuropathic pain [22]. Neuropathic pain possesses a significant challenge to diagnosticians due to the complexity involved and managing the condition appropriately [49]. Neuropathic pain is frequently seen with other conditions like diabetes [20], carpal tunnel syndrome, Guillain-Barre syndrome, cancer [23, 58] multiple sclerosis and kidney disorders [48].

Neuropathic pain presents as a chronic pain condition often

impacting the quality of life in patients suffering from it. Neuropathic pain is classified into a number of clinical entities, the most common are Trigeminal neuralgia, Glossopharyngeal neuralgia, Post herpetic neuropathies and Burning mouth syndrome. Trigeminal neuralgia is an excruciating short lasting, unilateral facial pain [37] that may be spontaneous or triggered by gentle [47], innocuous stimuli and separated by pain free intervals of varying duration [19]. Diagnostic criteria recognize two subsets of TN: a classical (previously idiopathic or primary) type and a symptomatic (secondary) TN by the International Headache Society (IHS) [14]. Classical TN may be related to neurovascular compression but may be unrelated to recognizable pathology whereas symptomatic TN that is related to a variety of symptoms

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and pathologies such as trauma, CNS tumors and systemic disease [19]. Unrecognized [7] by classification is Atypical TN cases (30%) that present with most but not all diagnostic criteria and are often refractory to treatment [26, 41, 51]. Post herpetic neuralgia is a complication of acute herpes zoster (HZ) or shingles. Acute HZ is a reactivation of latent varicella virus infection [54] and may occur decades after primary infection [43]. Trigeminal and cervical nerves are affected in 8% to 28% and 13% to 23% of acute herpes zoster infection cases, respectively [42].

Management of TN includes non-surgical [46] and surgical management. In standard practice, the first line of treatment [4] is carbamazepine, which relieves most of the symptoms followed by other drugs such as oxcarbazepine, phenytoin, baclofen, lamotrigine, gabapentin and sodium valproate [1]. When medication [25] no longer provide relief, surgical management plays a role. Various surgical techniques used for management include percutaneous radiofrequency thermal rhizotomy, physical compression, trigeminal ganglion balloon decompression, botulinum injections, gamma-knife radiosurgery and cryosurgery. All these techniques are aimed at relieving the nerve compression. Research has indicated that there is no influence of age, sex ethnicity or side of face on the management therapy of TN [9].

Management of PHN include tricyclic antidepressants, gabapentin, pregabalin, opioid and topical [8] lidocaine patches as the first line drugs which was proposed by the American Academy of Neurology evidence based guidelines. Therefore, an effective evidence based management with prior sequential clinical examination and accurate diagnosis [31] are essential for the proper management for neuropathic pain. Previously our team has a rich experience in working on various research projects across multiple discipline [15-40]. Now the growing trend in this area motivated us to pursue this project.

Aim of the study was to evaluate the most effective treatment modality in management of neuropathic pain.

Materials and Methods

A retrospective study was conducted in the Department of Oral Medicine of Saveetha University hospital from June 2019 to March 2020. The study was approved by the scientific review board (SRB) and institutional ethical committee (Approval number SDC/SIHEC/2020/DIASDATA /0619-0320). The study consisted of two reviewers - one primary researcher and one department faculty who reviewed the study patients who were diagnosed with Trigeminal neuralgia and Post herpetic neuralgia cases after cross verifying the patient's medical records and clinical photographs.

The retrieved data was then formulated on an excel sheet then later transferred to SPSS software. IBM SPSS 20 was used in the study for statistical analysis. The qualitative variables in the study were sex and age of the patients. The quantitative variables were VAS scores (1-10) which was grouped into Mild(1-4); Moderate (4-7) and Severe (7-10).

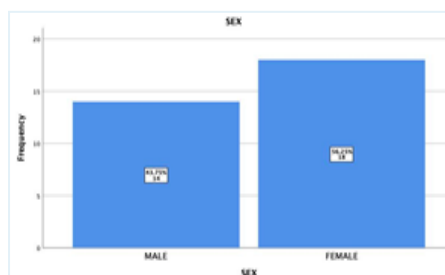
Frequency distribution tests and descriptive analysis was done using chi-square tests in SPSS IBM20.

Results & Discussion

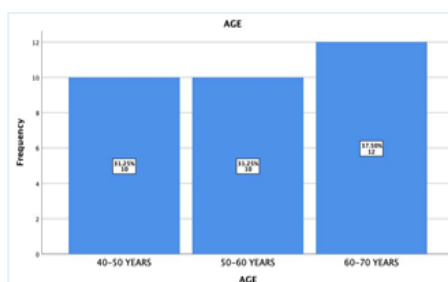
In this study a total of 32 patients were included who were diagnosed under Trigeminal neuralgia (TN), and Post herpetic neuralgia (PHN) categories. These included 18 female patients (56.2%) and 14 male patients (43.7%) [Graph 1].

The age of the patients were grouped and frequency distribution of patients were higher in the age group of 60-70 years(37.5%) followed by 40-50 years (31.25%) and 50-60 years (31.25%) [Graph 2].

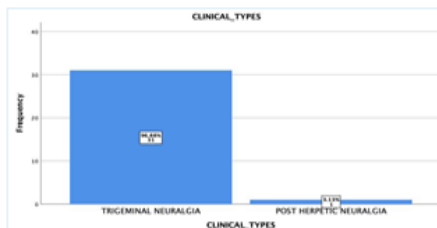
GRAPH 1: This graph depicts the frequency distribution of gender in the study population. X-axis depicts the gender of patients and Y-axis depicts the number of patients in the study population. The number of female participants were 18 (56.2%) and 14 male participants in the study (43.7%).



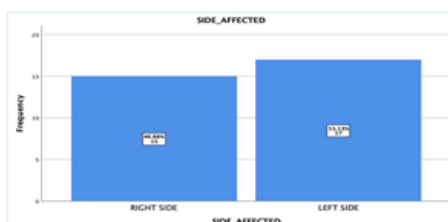
GRAPH 2: This graph depicts frequency distribution of patients in different age groups. X-axis depicts the age groups among the study population and Y-axis depicts the number of patients. There were 12 patients in the age group of 60-70 years(37.5%) followed by 10 patients in each 40-50 years (31.25%) and 50-60 years (31.25%).



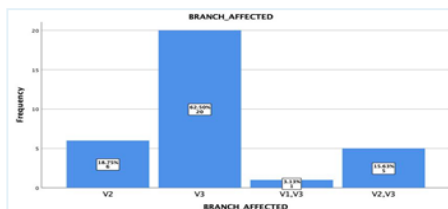
GRAPH 3: This graph represents the clinical types of neuropathic pain seen in the study population. X-axis depicts the type of neuropathic pain-Trigeminal and Post herpetic neuralgia and Y-axis depicts the number of patients in the study population. 31 patients from the study population had Trigeminal neuralgia (96.88%) and one patient with post herpetic neuralgia (3.13%).



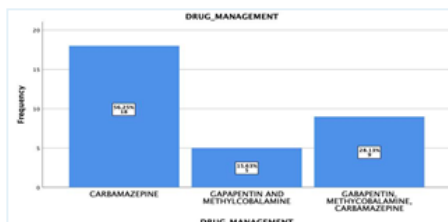
GRAPH 4: This graph depicts the side affected by the trigeminal nerve. X-axis depicts the side affected and Y-axis depicts the number of patients. 17 patients (53.13%) were affected by the left trigeminal nerve followed by 15 patients (46.88%) affected by left trigeminal nerve.



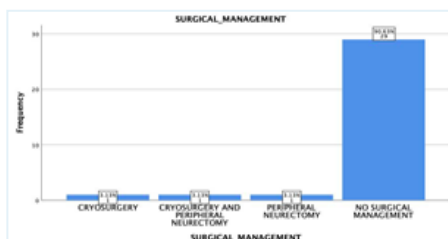
GRAPH 5: This graph depicts the branches of the trigeminal nerve affected in the study population. X-axis depicts the different branches involved and Y-axis depicts the number of patients. The branches of the trigeminal nerve affected were higher in V3 (62.5%) in 20 patients, V2 (18.75%) in 6 patients, V2,V3 (15.63%) in 5 patients and V1,V3 (3.13%) in one patient.



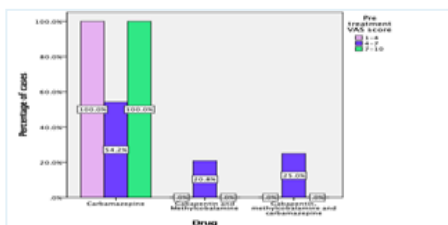
GRAPH 6: This graph represents the medical management of trigeminal neuralgia cases. X-axis depicts the varied drugs prescribed and Y-axis depicts the number of patients in the study population. 16 patients were prescribed on Carbamazepine (56.25%), 9 patients on combination of Carbamazepine, Gabapentin and Methylcobalamin (28.13%) and 5 patients on Gabapentin and Methylcobalamin (15.63%).



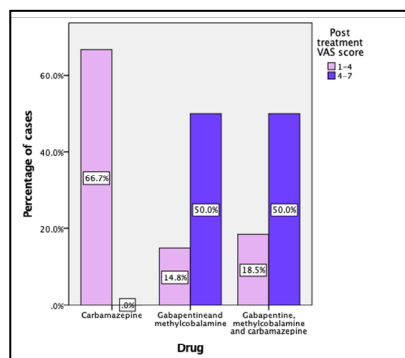
GRAPH 7: This graph depicts the surgical management of trigeminal neuralgia cases. X-axis depicts the varied surgical modalities and Y-axis depicts the number of patients in the study population. Only three patients had undergone surgical management for trigeminal neuralgia (3.13%) using cryosurgery, peripheral neurectomy and combination of both.



GRAPH 8: Bar chart comparing the pretreatment VAS pain score assessment for medical management of neuropathic pain. X-axis depicts the different treatments used and Y-axis depicts the percentage for cases. Pretreatment VAS score was Mild (pink); moderate (blue) and severe (green). In the Carbamazepine group, VAS varied from mild to severe. The pretreatment VAS score was moderate in the other 2 groups, Gabapentin + Methylcobalamin (20.8%) and Gabapentin+Methylcobalamin Carbamazepine (25.0%). The chi square analysis [chi-square-3.692;df-4;p-.449(p>0.05)] is statistically not significant. There was no statistical significance on comparison of pretreatment VAS score with different medications used for management of neuropathic pain.



Graph 9 : Bar chart comparing the post treatment VAS pain score assessment for medical management of neuropathic pain. X-axis depicts the different medications used for neuropathic pain and Y-axis depicts the percentage of cases. Post treatment, no patients were in the severe VAS category. In the Carbamazepine group all patients from severe and moderate VAS in pretreatment improved and presented with mild VAS (66.7%). The post treatment VAS score varied from moderate to mild in the other 2 groups, Gabapentin + Methylcobalamin and Gabapentin+Methylcobalamin Carbamazepine. The chi square analysis [chi-square-3.562;df-2;p-.016 ($p < 0.05$)] is statistically significant. Carbamazepine shows a statistically significant decrease in the VAS score levels when compared to that of the other groups.



The study cases consisted of about 96.8% of Trigeminal neuralgia patients (TN) followed by 3.1% of Post herpetic neuralgia cases [Graph 3].

Frequency distribution of the commonly affected side by the trigeminal nerve in the study population was the left side (53.13%) and right side of the face (46.87%) [Graph 4].

The branches of the trigeminal nerve affected were higher in V3 (62.5%), V2 (18.75%) followed by V2, V3 (15.63%) and V1, V3 (3.13%) [Graph 5].

The common medical management of trigeminal neuralgia involved Carbamazepine (56.25%), combination of Carbamazepine, Gabapentin and Methylcobalamin (28.13%) and Gabapentin and Methylcobalamin (15.63%) [Graph 6].

Only three patients had undergone surgical management for trigeminal neuralgia (3.13%) using cryosurgery, peripheral neurectomy and combination of both [Graph 7].

Descriptive analysis was done using the chi-square test with a p value ($p < 0.05$).

Cross tabulation between pretreatment VAS pain score was statistically not significant ($p > 0.05$) [Graph 8] but there was a significant correlation seen in VAS score following post medical management ($p < 0.05$) [Graph 9].

The International Association for the study of pain (IASP) defines pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage. Comparison of nociceptive pain and neuropathic pain, neuropathic pain is persistent for longer duration, not responsive to pain [5] medications, often debilitating and difficult to treat. Neuropathic pain was commonly seen in females and in the 60-70 years age group which was similar to the study done by Korczeniewska et al., [17], Siqueira et al., [44] whose mean age was 62.5 years whereas a study done by Bangash et al., [3] showed the mean age to be 54 years.

According to Veerapaneni et al., [53] Trigeminal Neuralgia, was one of the most commonly observed type of neuropathic pain which is similar to our study. The most commonly presented side

of pain was left side in our study which was contradicting to the studies done by Bangash et al., [3] who had reported right side being the commonly affected in his study from 2011. Bangash et al had also reported that the commonly affected branch of the trigeminal nerve was the mandibular branch, maxillary and combination of both maxillary and mandibular branch being affected which was similar to our study where 62.5% of cases were affected by the mandibular branch, 18.75% by maxillary and 15.63% were affected by both maxillary and mandibular branch.

Post herpetic neuralgia is a neuropathic pain syndrome which is characterized by pain that persists for years after resolution of the herpes zoster infection. Management of PHN is prevention using the zoster vaccine and in the later stages through antiviral medication and subsequent pain management.

According to the European Federation of Neurological Societies and the Quality Standards Subcommittee of the American Academy of Neurology, the first line of drugs is Carbamazepine (56.25%) which is similar to the drug management provided to our patients in the study. Study done by Zakrewska et al., [59] showed that carbamazepine, carbamazepine with gabapentin proved effective which was in concordance to our study. Singh et al., [43] study revealed that PHN are treated commonly using the first line of drugs such as carbamazepine and lidocaine patches which was in concordance to our study.

There were very limited data on studies who have compared the VAS scores [24] to that of the management given for Trigeminal neuralgia which is the foreground of our study. The most commonly used surgical management was peripheral neurectomy followed by cryosurgery which was in concordance to our study. Our study though had a significant correlation between medical management and VAS score, Salama et al., [38] study showed poor response with pharmacotherapy and patients experienced drug intolerance. A study done by Turton et al., [50] revealed that there was an ineffectiveness in symptom reduction under medical management and underwent surgical management through microvascular decompression. The drawbacks of our study were that of limited sample size, with shorter period of follow up duration and only VAS pain scale was assessed and the future scope lies in analysing more patients, initiate multicentric study with proper drug regimen and standardization, monitoring of the adverse effects and attempt usage of alternative drugs such as Cannabis

for neuropathic pain management. Our institution is passionate about high quality evidence based research and has excelled in various fields [32-39]. We hope this study adds to this rich legacy.

Conclusion

Our study results show that there was a significant reduction in the pain symptoms in patients treated with Carbamazepine as the first line of drug for medical management which is a positive outcome. There were only three studies which had undergone surgical management post ineffectiveness under drug therapy. This presents as a strong evidence that maximum number of patients can be treated under medications and have a significant reduction in pain. Only the cases which are proven ineffective under anticonvulsants, relapse cases or patients under medications for a longer duration and have not shown significant reduction in pain can be advised with surgical management. Hence, proper diagnosis followed by relevant medications and follow up can be sufficient in management of majority of neuropathic pain cases.

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