Original Article

Prevalence of trigeminal neuralgia in Indian population visiting a higher dental care center in North India

ABSTRACT

Objectives: The present study aims to determine the incidence and prevalence of trigeminal neuralgia (TN) in study population and difference in prevalence of TN in urban and rural population.

Materials and Methods: This retrospective study includes 1215 study participants with typical idiopathic TN. Data regarding the age of onset, gender, site of involvement, and clinical presentations were retrieved from clinical records of patients reported from January 2011 to January 2018.

Results: The study population consists of 1215 study participants aged between 21 and 87 years, with a mean age of 50.62 ± 15.872 years. The mandibular nerve is involved in most of the cases (56.9%), followed by maxillary nerve (42%). The right side of the face (57.1%) is more involved than the left side (38.8%). TN was more prevalent (52.4%) in rural population than urban population (47.6%).

Conclusion: TN is more common in females than males, the right side of the face is more involved than the left side, and it is more commonly found in rural population than urban population.

Keywords: Nerve disorders, neuralgia, neuropathies, trigeminal neuralgia

INTRODUCTION

Trigeminal neuralgia (TN) is as a chronic, debilitating condition resulting in brief and intense episodes of facial pain in the distribution of one or more branches of the fifth cranial nerve.[1-3] The episodes of facial pain are sporadic, sudden, and often like "electric shocks" lasting from a few seconds to several minutes. Etiology may be either idiopathic or secondary to intracranial lesions such as tumor, infarction, and multiple sclerosis. Among neuropathic pains, TN has a peculiar profile. Spontaneous remissions are not unusual. With the exception of a few identified organic causes, its etiology for long remained uncertain, so it was called "idiopathic" neuralgia. Even now with the sound hypothesis of neurovascular conflict, the pathophysiology of this disease still has obscure corners.[4] The International Headache Society differentiates between classical TN and atypical facial pain. Classical TN is often caused by microvascular compression at the trigeminal root entry zone of the brain stem and symptomatic TN is caused by a structural lesion other than vascular compression. Persistent idiopathic facial pain previously termed atypical facial pain is a persistent, dull, poorly localizable, facial pain without sensory or other neurological deficits which cannot be attributed to a different disorder. Therefore, investigations such as X-ray of the face and jaws, cranial computed tomography, or magnetic resonance imaging are necessary to exclude any relevant abnormality.[5] TN is sometimes misdiagnosed due to

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nonavailability of clear physical or laboratory diagnosis, and many a times, patients seek the help of numerous clinicians before a confirmed diagnosis is made. Although a benign disorder, it can have a major impact on the quality of life and even gets refractory to various treatment modalities after some time.[6]

TN is a rare nerve disorder having limited statistical data. The estimated annual incidence of TN is 12.6/100,000 persons/year[7] and its incidence increases with age. Although the peak onset of TN occurs between 50 and 70 years, it can also occur in children. Early literature suggested a strong preponderance in women; however, current data indicate that only approximately 60% of patients with TN are female.[8] The annual incidence for women is approximately 5.9 cases/100,000 women. For men, it is approximately 3.4 cases/100,000 men.[9] TN has a higher incidence in women than men.[9-12] The onset of pain occurs most frequently in patients aged 50 years and older.[11-13] In most of the patients, TN affects only one side of the face, and the right side is affected more frequently than the left.[10,14]

MATERIALS AND METHODS

The present retrospective study involves 1215 patients with typical idiopathic TN reported in the Department of Oral Medicine and Radiology at King George's Medical University, Lucknow, India. Data regarding age of onset, gender, site of involvement, and clinical presentations were retrieved from clinical records of patients reported from January 2011 to January 2018. The inclusion criteria involve typical TN cases without any organic/primary etiology; however, the exclusion criteria involve brain tumors, any neurosurgical history, and trauma. The data were recorded and analyzed using the Statistical Package for the Social Sciences SPSS V.21, (IBM Corporation, Armonk, New York ,USA).

Statistical tools

Categorical variables will be presented in number and percentage. Qualitative variables will be compared using Chi-square test/Fisher's exact test as appropriate. $P < 0.05$ will be considered statistically significant. The data will be entered into Microsoft Excel spreadsheet, and analysis will be done using SPSS version 21.

RESULTS

The study population consists of 1215 study participants aged between 21 and 87 years, with a mean age of 50.62 ± 15.872 years. Majority of the study participants were in the age group of 41–60 years (34.9%). Females (59.2%) dominated the study population than males (40.8%).

The mandibular nerve is involved in most of the cases (56.9%), followed by maxillary nerve (42%); however, in 1.2% of cases, both the maxillary and mandibular nerves are involved [Table 1]. The right side of the face (57.1%) is more involved than the left side (38.8%). However, in 4.1% of cases, both the right and left sides of the face are involved [Table 2]. Depending on the type of population involved, TN was more prevalent (52.4%) in rural population than urban population (47.6%) [Table 3]. The association between the nerve involved in males and females of study population has been evaluated by one-way analysis of variance, and it was found that the mandibular nerve is involved in 56.7% of males and 57% of females. However, the maxillary nerve is involved in 41.3% of males and 42.4% of females of study population. In 2% of males and 6% of females of study population, both the maxillary and mandibular nerves are involved. However, this association was statistically not significant ($P > 0.05$) [Table 4]. In the right side of the face, females (59.8%) have a higher prevalence of TN than males (53.2%), whereas in the left side, males have a higher prevalence (42.3%) than females (36.3%). However, in 4.4% of males and 3.9% of females, both (right and left) sides are

Table 1: Frequency of involvement of the maxillary and mandibular nerves in study population

Nerve involved	Frequency (%)
Mandibular nerve	691 (56.9)
Maxillary nerve	510 (42.0)
Both	14 (1.2)
Total	1215 (100.0)

Table 2: Side of the face involved by trigeminal neuralgia in study population

Side of the face	Frequency (%)
Left side	471 (38.8)
Right side	694 (57.1)
Both	50 (4.1)
Total	1215 (100.0)

Table 3: Prevalence of trigeminal nerve in urban and rural population

Location	Frequency (%)
Urban	578 (47.6)
Rural	637 (52.4)
Total	1215 (100.0)

Table 4: The type of nerve involved and prevalence gender-wise

Nerve involved	Gender (%)		Total (%)
	Male	Female	
Mandibular nerve	281 (56.7)	410 (57.0)	691 (56.9)
Maxillary nerve	205 (41.3)	305 (42.4)	510 (42.0)
Both	10 (2.0)	4 (0.6)	14 (1.2)
Total	496 (100.0)	719 (100.0)	1215 (100.0)

involved [Table 5], and this association was statistically not significant ($P > 0.05$).

The association between age groups and type of nerve involvement shows that the age group of 41–60 years has the highest prevalence of mandibular nerve involvement (60.1%), whereas the maxillary nerve has the highest predilection for the age group of 20–40 years. However, both the maxillary and mandibular nerves are involved in 2% of study population in the age group of 20–40 years, followed by 1.7% in the age group of 41–60 years and 1.6% in the age group of >60 years. This association was statistically not significant ($P > 0.05$) [Table 6]. The side of nerve involvement is compared in age groups. It was found that the right side nerve is more commonly involved (60.4%) in the age group of 41–60 years, whereas the left side nerve involvement is most prevalent in the age group of 20–40 years. However, in the age group of 20–40 years, 5% of study population has both side involvements, followed by 6.4% in the age group of 41–60 years and 5.6% in the age group of >60 years [Table 7]. However, this association was strongly significant ($P = <0.001$). The prevalence of nerve involvement in rural and urban population has been evaluated. It was found that the mandibular nerve involvement in TN is more common in urban population (57.4%) than rural population (56.4%), whereas the maxillary nerve involvement is also more common in urban population (42.0%) than rural population (41.9%). However, in 0.5% of urban population and 1.7% of rural population, both side nerve involvements are prevalent [Table 8]. The right side involvement is more prevalent in urban population (58.7%) than rural population (55.7%), whereas the left side involvement is more common in rural population (39.4%) than urban population (38.1%). However, in 3.3% of urban population and 4.9% of rural population, both the sides are involved. However, this association was statistically not significant ($P > 0.05$) [Table 9]. The male population is more affected by TN in urban population (41.7%) than rural population (40.8%). However, females are more affected in rural population (60.0%) than urban population (58.3%) [Table 10].

DISCUSSION

TN is an uncommon disorder presenting with brief lancinating pain in the facial region in the area distributed by the trigeminal nerve. The disease is also known as "Fothergill's disease" or "tic douloureux." TN can be classified based on etiology as primary or idiopathic and secondary or symptomatic. The reported peak age of onset of TN is in the 5th–8th decades of life.[9,11,15] The younger age group has been found to be associated with symptomatic TN. However, considerable overlap in age ranges of patients with classical TN and symptomatic TN has been reported.[16,17] A similar trend was also observed in our study, with the peak age of onset between the 5th and the 6th decades of life. TN has a

Table 5: The gender-wise distribution in the right and left sides of the face

Side of the face involved	Gender (%)		Total (%)
	Male	Female	
Left side	210 (42.3)	261 (36.3)	471 (38.8)
Right side	264 (53.2)	430 (59.8)	694 (57.1)
Both	22 (4.4)	28 (3.9)	50 (4.1)
Total	496 (100.0)	719 (100.0)	1215 (100.0)

Table 6: The type of nerve group involvement in age groups

Nerve involved	Age intervals (years) (%)			Total (%)
	20-40	41-60	>60	
Mandibular nerve	223 (53.9)	255 (60.1)	213 (56.5)	691 (56.9)
Maxillary nerve	190 (45.9)	162 (38.2)	158 (41.9)	510 (42.0)
Both	1 (0.2)	7 (1.7)	6 (1.6)	14 (1.2)
Total	414 (100.0)	424 (100.0)	377 (100.0)	1215 (100.0)

Table 7: The side of the face involvement in age groups

Side	Age intervals (years) (%)			Total (%)
	20-40	41-60	>60	
Left side	197 (47.6)	141 (33.3)	133 (35.3)	471 (38.8)
Right side	215 (51.9)	256 (60.4)	223 (59.2)	694 (57.1)
Both	2 (0.5)	27 (6.4)	21 (5.6)	50 (4.1)
Total	414 (100.0)	424 (100.0)	377 (100.0)	1215 (100.0)

Table 8: The type of nerve involvement in urban and rural population

Nerve involved	Location (%)		Total (%)
	Urban	Rural	
Mandibular nerve	332 (57.4)	359 (56.4)	691 (56.9)
Maxillary nerve	243 (42.0)	267 (41.9)	510 (42.0)
Both	3 (0.5)	11 (1.7)	14 (1.2)
Total	578 (100.0)	637 (100.0)	1215 (100.0)

Table 9: Side-wise prevalence trigeminal neuralgia in urban and rural population

Side	Location (%)		Total (%)
	Urban	Rural	
Left side	220 (38.1)	251 (39.4)	471 (38.8)
Right side	339 (58.7)	355 (55.7)	694 (57.1)
Both	19 (3.3)	31 (4.9)	50 (4.1)
Total	578 (100.0)	637 (100.0)	1215 (100.0)

Table 10: Gender-wise prevalence of trigeminal neuralgia in urban and rural population

Gender	Location (%)		Total (%)
	Urban	Rural	
Male	241 (41.7)	255 (40.0)	496 (40.8)
Female	337 (58.3)	382 (60.0)	719 (59.2)
Total	578 (100.0)	637 (100.0)	1215 (100.0)

gender inclination. In literature, female predominance has been reported in the ratio of 5.9:3.4.[9,11,15] Conversely, a male predominance has been reported in three reports from India.[15] Zakrzewska[18] observed an equal representation of male-to-female incidence in study population. TN has an incidence of 4–5/100,000 of the population. It is nearly twice as common in women, and the incidence increases with age to around 1 in 1000 patients older than 75 years.[19] It is interesting to note that three reports from India demonstrated a male predominance.[15,20,21] Other studies have reported similar findings.[22-24] Bangash[25] reported that the peak age of onset of TN is between the 6th and the 7th decades of life; however, he also concluded that pain presentation was higher on the right side (64%) than on the left side (36%). He also showed that the ratio of males to females, suffering from TN, was 1:2. Rabinovich *et al*.[26] and Neto *et al*.[27] stated that the right side of the face is more commonly affected than the left (ratio of 1.5:1) possibly because of the narrower foramen rotundum and foramen ovale on the right side. Shankland[28] reported that one-third of the patients in their study presented with neuralgic pain involving both the second and third divisions of the fifth nerve, whereas in our study, we observed that the mandibular nerve (56.9%) is more predilected for TN than the maxillary nerve, whereas females (59.2%) were more predilected for TN than males (40.8%).

On evaluating the gender with nerve involved, we observed that a higher percentage of TN was obtained in the mandibular nerve in both males and females, but statistically, this association was not significant ($P > 0.05$). On evaluating the gender with side of the face involved, we observed that a higher percentage was obtained in the right side in both males and females, but statistically, this association was not significant ($P > 0.05$). Irrespective of the gender and age, we found that the right side of the face (57.1%) is more involved with TN. It was also observed that patients living in rural areas are more affected by TN (52.4%) than people who are living in urban areas.

CONCLUSION

Trigeminal neuralgia is a rare nerve benign disorder that can have a major impact on the quality of life. Only few studies have estimated the incidence and prevalence of TN till Date. Our study has been conducted on a large sample size and successful in establishing the prevalence and incidence of TN i.e it is more common in females than males, the right side of the face is more involved than the left side, and it is more commonly found in rural population than urban population.

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Conflicts of interest

There are no conflicts of interest.

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