Original Article

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Dentistry Section

Prevalence of Osteosclerosis Among Patients Visiting Dental Institute in Rural Area of Western India

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ABSTRACT

Background: Idiopathic osteosclerosis (IO) is a benign lesion of unknown aetiology and is not attributed to any dysplastic, inflammatory, neoplasia, or systemic disorder.

Aims and Objectives: To assess the prevalence and distribution of IO according to its location and to patients' age and gender, among rural population of western India.

Materials and Methods: Seven hundred and fifty patients were examined for the presence of IO in the jaw bone. After a thorough clinical examination, radiographic examination was done using OPG. Age specified by WHO were used 5, 12, 15, 35-44 and 65-74. The data collected was than tabulated and subjected to descriptive statistics and chi square test.

Results: Among the total study population 89 (11.8%) were found to be suffering from IO out of which 27 (7.2%) were males and 62 (16.53%) were females. The maximum number of IO cases cases was seen among the age group of 35-44 y, 33 (22.0%) and minimum in 5 y 9 (6%)

Conclusion: IO is higher among the females as compared to males and mostly seen among the 3rd and 4th decade individuals.

Keywords: Idiopathic osteosclerosis, Jaw bone, Oral health, Radio opacity

INTRODUCTION

Idiopathic osteosclerosis (IO) is a benign lesion which is mostly asymptomatic and come into limelight only when the radiographs are taken. Dental literature describes this lesion with various names dense bone island, idiopathic osteosclerosis, enostosis and focal periapical osteopetrosis [1]. It can also be observed at various other sites in the skeleton such as pelvis, femur and other long bones [2]. These are areas with increased radio density of unknown aetiology and is not attributed to any dysplastic, inflammatory, neoplasia, or systemic disorder, it is not to be associated with detectable cortical expansion [3].

There is a need to differentiate IO from various other lesions that are observed by the dentists such as periapical cemental dysplasia, submandibular calculus, torus, exostosis, osteoma, odontoma, and condensing osteitis (CO) of dental origin associated with low-grade, chronic inflammation of the bone around the tooth apex as well as from soft-tissue lesions such as tonsilloliths, phleboliths, and sialoliths that may project as radiopacities in panoramic radiographs [4].

Although the aetiology of IO is unclear, but it may involve internal stress and sufficient blood supply to form bone masses in the mandible. Araki M et al., stated that although IO lesions are both asymptomatic and harmless, and their treatment is not necessary [5].

Since no such study has been carried out in western population of India, especially among the rural people, this developed a curiosity to carry out a study with to assess the prevalence and distribution of IO according to its location and to patients' age and gender, among rural population of western India.

MATERIALS AND METHODS

The present study was carried out on the patients visiting the Department of Oral Medicine and Radiology, Vyas Dental College and Hospital. The study was carried out during the span of 6 months from June 2013 to December 2013. Patient who were willing to participate in the study and were falling in the age specified by WHO (5, 12, 15, 35-44 and 65-74) [6] were included in the study as per selective sampling. Patients who had any source of pulpal infection, any known systemic illness, radiographic evidence of developmental anomalies or pathologies of the teeth and jaws were excluded from the study. Based on these criteria 750 patients were examined (150 in each age with equal number of males and females to standardize the comparison) for the presence of IO in the jaw bone.

After carrying out complete clinical examination, a digital panoramic radiographic was taken for each patient [Table/Fig-1]. Kodak 8000C extraoral imaging system was used for digital OPG. This digital X-ray machine was operated at 8-12mA, the peak kilovoltage was ranging from 70-80 depending on the estimate of subject's jaw size. The digital images were then saved and interpreted.

The lesions which did not show any signs of inflammation, that were well demarcated, were identified as IO.

The presence or absence of IO was then entered in the study performa which consisted of data pertaining to date, patient name, age, gender, jaw involved, and area in the jaws involved.

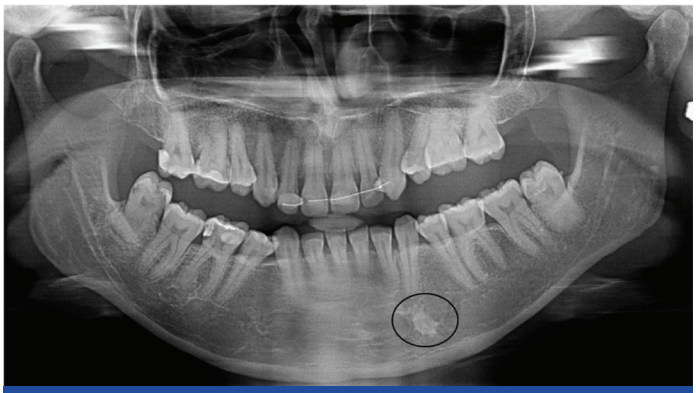
Two examiners interpreted the radiographs. Training of the examiners was done by a staff member. Each examiner viewed the radiograph twice for the presence of IO in a time interval of four days. When both intra and inter examiner results matched its presence was conformed. In case when the result did not matched, a mutual decision was obtained by both the examiners. Inter examiner reliability test was done by using kappa statistics and score was found to be.90 (Excellent).

STATISTICAL ANALYSIS

The data obtained was then tabulated and subjected to statistical analysis using SPSS version 18. Chi-square was used to find relation between the jaws and the various areas of the jaws.

RESULTS

OPGs of 750 study subjects of the age of 5, 12, 15, 35-44 and 65-74 (150 each) were examined, among them there were equal number of males and females 375 each [Table/Fig-2].



[Table/Fig-1]: OPG of an adult female revealing Idiopathic Osteosclerosis on left body of mandible in the region of 33

Age	Gender		Total
	Male	Female	
5 years	75	75	150
12 years	75	75	150
15 years	75	75	150
35-44 years	75	75	150
65 and above	75	75	150
Total	375	375	750

[Table/Fig-2]: Gender and age wise distribution of the study population

Gender	Idiopathic osteosclerosis
Male (375)	27 (7.2%)
Female (375)	62 (16.53%)
Total (750)	89 (11.8%)

[Table/Fig-3]: Gender wise distribution of Idiopathic Osteosclerosis among the study population

Age	Total
5 years (150)	9 (6%)
12 years (150)	17 (11.3%)
15 years (150)	23 (15.3%)
35-44 years (150)	33 (22.0%)
65 and above (150)	7 (11.8%)
Total (750)	89 (4.6%)

[Table/Fig-4]: Age wise distribution of idiopathic osteosclerosis among the study population

Among the total study population 89 (11.8%) were found to be suffering from IO out of which 27 (7.2%) were males and 62 (16.53%) were females [Table/Fig-3].

It was observed that maximum number of IO cases was seen among the age group of 35-44 y 33 (22.0%) and minimum in 5 y 9 (6%) [Table/Fig-4].

When chi-square test was used to find association between maxillary and mandible jaws IO, a significant association was observed (p=0.001) [Table/Fig-5].

Similarly when chi-square test was used to find association between areas in maxillary and mandible jaws IO, it was found that a significant association was both in the areas in maxillary and mandibular arches [Table/Fig-6].

Jaws	Idiopathic Osteosclerosis	df	p-value
Maxillary (375)	8 (2.1%)	13.231	p=0.001 (S)*
Mandible (375)	81(21.6%)		
Total (750)	89 (11.8%)		

[Table/Fig-5]: Association between maxillary and mandible jaws Idiopathic Osteosclerosis (chi-square test)
S statistically significant value (p<0.05)*

Jaws	Areas in jaws	Idiopathic osteosclerosis	df	p-value
Maxillary (375)	Anterior	3 (0.8%)	12.435	p=0.001 (S)*
	Canine	3 (0.8%)		
	Posterior	2 (0.5%)		
Mandible (375)	Anterior	7 (1.8%)	13.675	p=0.02 (S)*
	Canine	31 (8.2%)		
	Posterior	43 (11.4%)		
Total (750)		89 (11.8%)		

[Table/Fig-6]: Association between areas in maxillary and mandible jaws Idiopathic Osteosclerosis (chi-square test)
S statistically significant value (p<0.05)*

DISCUSSION

The prevalence of IO varies from 3.3% to 31% among various populations worldwide [7]. Various theories such as developmental aetiology, reactive response of the bone to inflammation and trauma have been reported in various studies [4,8]. A study done in China stated that Chinese and Japanese populations have greater chances of developing IO as compared to the western population [9]. To the best of our knowledge, this is the first study carried out among the rural population of Western India. In the present study the prevalence of IO was found to be 11.8%, which is much higher than that observed by Geist and Katz [10] 5.4% and Yonetsu et al., [11] 6.1%. The prevalence of IO among several countries was found to range from 2.3% to 9.7 % [1,4,12]. In the present study the prevalence of IO was higher among women 62 (16.53%) as compared to that in men 27 (7.2%), similar results were observed in the study done by Miloglu et al., [8], McDonnell [9] and Geist and Katz [10]. In the present study it was found out that with the advancing age the prevalence of IO decreases and this finding is supported by the Kawai et al., [7]. In the present study, both IO was found in the 3rd and 4th decades of life. A possible explanation might be increased tooth caries and pulpal infections with increased age. The high prevalence of IO lesions in the 3rd and 4th decades coincides with the maximum bone mass acquisition in these periods.

Idiopathic Osteosclerosis is most commonly observed in the mandibular jaw 81 (21.6%) as compared to maxillary jaw 8 (2.1%). In the mandibular jaw IO was mostly seen in the posterior region 43 (11.4%) followed by canine region 31 (8.2%), Meryem toraman alkurt et al., [13] also observed similar results in his study. Garau V et al., [12] and Sisman Y et al., [14] also observed similar results in their studies. Since IO lesions are most frequently found located in the premolar and molar areas, they might represent residual roots from deciduous molars, resorbed and replaced by sclerotic bone [15]. These findings could be explained by the fact that the common superposition of anatomic structures makes maxillary lesions harder to detect from panoramic radiographs when compared to mandibular lesions [15]. The premolar region in the mandible may experience concentrated inner distortion, and areas of the mandible near the mental foramen receive sufficient blood supply to easily form bone masses [5].

CONCLUSION

In the present study it was observed that the prevalence of Idiopathic Osteosclerosis is higher among the females as compared to males and mostly seen among the 3rd and 4th decade individuals. The dentist can help to identify these lesions and in turn help patients from developing any complication.

REFERENCES

[1] Nakano K, Ogawa T, Sobue S, Ooshima T. Dense bone island: clinical features and possible complications. *Int J Paediatr Dent.* 2002;12(6):433-37.
[2] Greenspan A. Bone island (enostosis): Current concept-a review. *Skeletal Radiol.* 1995;24(2):111-15.
[3] Williams TP, Brooks SL. A longitudinal study of idiopathic osteosclerosis and condensing osteitis. *Dentomaxillofac Radiol.* 1998;27:275-78.

[4] Halse A, Molven O. Idiopathic osteosclerosis of the jaws followed through a period of 20-27 years. I*nt Endod J.* 2002;35:747-51.
[5] Araki M, Hasimoto K, Kawashima S, Matsumoto K, Akiyama Y. Radiographic features of enostosis determined with limited cone beam computed tomography in comparison with rotational panoramic radiography. *Oral Radiol.* 2006;22:27-33.
[6] WHO. *Oral Health Survey Basic Methods.* Geneva. Edi 4. 1997.
[7] Kawai T, Hirakuma H, Murakami S, Fuchihata H. Radiographic investigation of idiopathic osteosclerosis of the jaws in Japanese dental outpatients. *Oral Surg Oral Med Oral Pathol*. 1992;74(2):237-42.
[8] Miloglu O, Yalcin E, Buyukkurt MC, Acemoglu H. The frequency and characteristics of idiopathic osteosclerosis and condensing osteitis lesions in a Turkish patient population. *Med Oral Patol Oral Cir Bucal.* 2009;14(12):e640-45.
[9] MacDonald-Jankowski DS. Idiopathic osteosclerosis in the jaws of Britons and of the Hong Kong Chinese: radiology and systematic review. *DentomaxillofacRadiol.* 1999;28(6):357-63.
[10] Geist JR, Katz JO. The frequency and distribution of idiopathic osteosclerosis. *Oral Surg Oral Med Oral Pathol.* 1990;69(3):388-93.
[11] Yonetsu K, Yuasa K, Kanda S. Idiopathic osteosclerosis of the jaws: panoramic radiographic and computed tomographic findings. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1997;83(4):517-21.
[12] Garau V, Deschino A, Piras D, Cotti E. Idiopathic osteosclerosis in jaw bones. Clinical statistic study on a population of sardinian origin. *Minerva Stomatol.* 2002;51(9):377-83.
[13] Toraman Alkurt M., Sadık E., Peker I. Prevalence and distribution of idiopathic osteosclerosis on patients attending a dental school. *Istanbul Universitesi Dis Hekimligi Fakultesi Dergisi*.2014;48,2:29-34.
[14] Sisman Y, Ertas ET, Ertas H, Sekerci AE. The frequency and distribution of idiopathic osteosclerosis of the jaw. *Eur J Dent* 2011;5(4):409-14.
[15] Avramidou FM, Markou E, Lambrianidis T. Cross-sectional study of the radiographic appearance of radiopaque lesions of the jawbones in a sample of Greek dental patients. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2008;106:e38-43.

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