Original Study

EXAMINING THE PREVALENCE OF MUCOSAL RETINAL CYST OF THE MAXILLARY SINUS AND ITS RELATED FACTORS IN PANORAMIC RADIOGRAPH OF PATIENTS REFERRED TO DENTAL UNIT OF ISLAMIC AZAD UNIVERSITY, TEHRAN

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ABSTRACT

Aim: The mucosal retinal cyst of the maxillary sinus (false cyst of sinus or benign mucosal cyst) is one of the random finding in panoramic plates in the maxilla. Considering the increasing pollution of Tehran and the increase of dust and contaminants, the aim of this study was to investigate the frequency of mucosal retinal cyst of the maxillary sinus and its related factors in panoramic radiograph of patients referred to oral and maxillofacial radiology department of faculty of dentistry, Islamic Azad University, Tehran in years 2015-2016.

Materials & Method: This descriptive study was conducted on 1,494 digital panoramic plates of patients referred to oral and maxillofacial radiology department of Islamic Azad University of Tehran during one year. The prevalence of this lesion, its location and some factors such as age, gender, allergies, visitation time and smoking were analyzed by Chi-square test.

Results: The prevalence of MRC was 9.4% (Cl 95% 7.9% -10.9%). There was no significant relationship between gender, age, allergies, months of the year and the use of cigarettes with the prevalence of this cyst. The location of the cyst was 40.7% in the right sinus, 35.7% in the left sinus and 23.6% in both sides.

Conclusion: The prevalence of MRC has increased compare to the previous decade, and its differential diagnosis from other similar pathologic lesions is essential for dentists.

Key words: : Cysts, Maxillary sinus, Panoramic.

Introduction

The mucosal retinal cyst of the maxillary sinus (false cyst of sinus or benign mucosal cyst) is one of the random finding in panoramic plates in the maxilla.[1,2] This lesion is mainly located in the maxillary sinus and is asymptomatic. It is therefore accidentally found in sinus radiographs. In the radiographic images, this lesion appears as a flat radiopaque and dome-shaped mass with certain precincts and without a cortical margin on the floor or in the wall of maxillary sinus.[2] Its size varies from 1 cm to the entire sinus. When it surrounds the entire sinus, its complications include feeling of fullness in the sinuses, nasal congestion, headache, facial pain, pain around the eyes, repeated infections,[3,4] and evacuation from the back of the nose. In cases where it is accompanied with clinical signs, this cyst needs treatment.[2,5] Therefore, due to the high incidence of mucosal retinal cyst of the maxillary sinus, one of the concerns of dentists was the correct diagnosis of cysts, because in the case of lack of accurate identification and unawareness of dentist from differential diagnosis of this lesion, there was a possibility of confusion with cysts and other tumors inside the sinus.[6,9]

In the study by Vieira *et al*, with the aim of examining the frequency of mucosal retinal cyst of the maxilla in the Brazilian society, panoramic radiographs were prepared from 631 patients (346 females and 285 males) with an average age of 34.65 years, who referred to the private maxillofacial radiology clinic. The results of this study showed that the prevalence of MRC was low and 6.89%, and the highest incidence was reported among women and patients aged 18 to 35 years old in August, and the lowest frequency of cyst was reported in February, therefore, based on statistical calculations, there is a relationship between the frequency of MRC and temperature. 20.22% of the cases were seen on the right side, 11.49% on the left, and 29.28% of the cases were seen as bilateral.[9]

In the study by Absey *et al*, with the aim of evaluating the prevalence of cyst of maxillary sinus in panoramic radiograph, 700 panoramic radiographic plates of patients (295 males and 404 females) referred to oral and maxillofacial radiology faculty of dentistry of Babol University of Medical Sciences were studied. This study showed that there was a significant relationship between cigarette smoking and having allergies and retinal pseudocysts.[7] Although a similar study was conducted at the Faculty of Dentistry, Islamic Azad University, Tehran, in 2006,[10] however, due to the increasing pollution of Tehran and the increase of dust and contaminants,[11] the aim of this study was to investigate the frequency of mucosal retinal cyst of the maxillary sinus and its related factors in panoramic radiograph of patients referred to oral and maxillofacial radiology department of faculty of dentistry, Islamic Azad University, Tehran in years 2015 – 2016.

Materials & Method

This is a descriptive study. Sampling was done by census. The data were collected by observation method in the case of diagnosis, observation and interpretation of panoramic radiographic plates in the archives. In this study, 1,494 eligible digital panoramic radiographs were collected from an archive of panoramic plates of patients aged 6 years and older, who referred to the Oral and Maxillofacial Radiology Department of the Faculty of Dentistry, Islamic Azad

University, Tehran, in 2015-2016. All the radiographic plates that were prepared in a specific period of time and by using Villa Evo panoramic machine made by Italy (radiation time of 7.3 to 13.8 seconds, the image range of 14.6 in 30 cm, CCD sensor with high resolution and pixel size of 48 µm and resolution of 5.2 IP/mm and image dimension of 1536/2800), and the image of maxillary sinus was well-defined were included in the study. Also, by using the software, radiographic plates that lacked the interpretative value and the contrast and had inappropriate resolution and density were excluded. Then, the age, sex, month of referral and medical history (the patients' health status in terms of underlying diseases, as well as the history of allergies and smoking) and the time of radiographic preparation from radiographic plates of patients were extracted from the diagnostic record and were recorded in the information form. All radiographs were examined in terms of presence or absence of lesion and number of lesions by a trained dentistry student who had the necessary reliability to diagnose, and if this lesion was present, its exact location was recorded. It should be noted that the criteria for the diagnosis of mucosal retinal cyst were based on its radiographic presentation which is a dome view without cortical opaque margin. Finally, the prevalence of mucosal retinal cyst of the maxillary sinus in the samples was determined and their actual rate in the population was estimated. Also, the role of age, gender, allergies and cigarettes were determined and finally statistically analyzed by Chi-square test and SPSS ver.21.

Results

Cautious Mucus Sinus Maxilla / Related Factors	Does Not Have N1 = 1354	Has It N2 = 140	Test Result
Gender			
• Man	57 (40.7)	636 (47)	p < 0.2
• Female	83 (59.3)	718 (53)	
Age			
• Less than average	72 (51.4)	739 (54.5)	p < 0.5
• More than average	68 (48.6)	615 (45.5)	
Allergy			
• Does not have	127 (90.7)	1258 (92.9)	p < 0.9
• Has it	12 (9.3)	96 (7.1)	
By months of the year			
April	14 (10)	82 (6.1)	p < 0.9
May	11 (7.9)	84 (7)	
June	12 (8.6)	129 (9.5)	
July	1 (0.7)	25 (1.8)	
August	2 (1.4)	37 (2.7)	
September	2 (1.4)	62 (4.6)	
October	21 (15)	168 (12.4)	
November	22 (15.7)	180 (13.3)	
December	18 (12.9)	153 (11.3)	
January	14 (10)	125 (9.2)	
February	8 (5.7)	183 (13.5)	
March	15 (10.7)	116 (8.6)	
Smoking Cigarettes			
• Does not have	121 (86.4)	1231 (91)	p < 0.7
• Has it	19 (13.6)	122 (9)	

Table 1: The distribution of the subjects in terms of mucosal retinal cyst of the maxillary sinus distinguished by its relative factors

Sixty smokers and fifty non-smokers entered the study, the This study was conducted on 1,494 eligible individuals. 693 of the subjects were males (46.4%) and 801 were females (53.6%). Their average age was 38.6 ± 14.8 years, and the minimum age was 7 years old and the maximum was 99 years old. 9.4% of patients were smokers. 140 of subjects had mucosal retinal cyst of the maxillary sinus, in which the prevalence was 9.4% and 1,354 of subjects (90.6%) did not have the cyst. According to the prevalence of cyst in the samples, its true level (CI) with 95% confidence is estimated ranging from 7.9% to 10.9% ($CI_{95} = 7.9\ to\ 10.9$).

The distribution of the subjects in terms of mucosal retinal cyst of the maxillary sinus distinguished by its relative factors are presented in Table 1, which suggest that subjects who had the cyst were not more exposed in terms of gender, age, allergies, the incidence of disease in different months of the year or the use of cigarettes, and their difference was not statistically significant.

According to the results, 40.7% cases were in the right maxillary sinus and 35.7% in the left maxillary sinus and 23.6% in both sides.

Discussion

In the present study, digital panoramic radiograph was used as a tool for the diagnosis of mucosal retinal cyst of maxillary sinus (MRC) in patients referred to maxillofacial radiology department of Islamic Azad University, Tehran (2015 – 2016), in which the prevalence of this cyst (MRC) was 9.4%, that its true level with 95% confidence is estimated ranging from a minimum of 7.9% up to 10.9%. The prevalence of mucosal retinal cyst of the maxillary sinus (MRC) in a similar study by CaSamassimio and Lillv in the US (1980) was reported as 1.6%.[12] In the research by Dr. Nemati *et al*. on digital panoramic radiographs of patients referred to Faculty of Dentistry, Rasht, for a period of one year (2012-2013), they reported a prevalence of 4%.[13]

The average age of participants in the present study was 38.14 ± 6.8 years. There was no significant relationship between the average age and incidence of the cyst, which was similar to the study by Vieria *et al*.[9] In the present study, the prevalence mucosal retinal cyst of maxillary sinus (MRC) was 8.2% among males and 10.4% in females, however, there was no statistically significant relationship between gender and this cyst, which its result is similar to the results of the studies by Moghadam *et al*[8] and Nemati *et al*[13] In the present study, no statistically significant relationship was obtained between having allergies and mucosal retinal cyst of maxillary sinus (MRC), although the incidence of allergies in individuals with this cyst was higher than those without mucosal retinal cyst of maxillary sinus (MRC). The result of this study was statistically similar to the study Parastoo *et al*[10] and differed from the results of the studies by Moghadam *et al*[8] and Abbassi *et al*[7] Although the rate of cigarette smoking in people with mucosal retinal cyst of maxillary sinus was higher than those without cysts, there was no statistically significant relationship between cigarette smoking and MRC of maxilla sinus, which its result is similar to the

results of the studies by Parastoo *et al*[10] and Moghadam *et al*[8], and differed from the result of the study by Abbassi *et al*[7] In the present study, no statistically significant relationship was found between the months of the year and mucosal retinal cyst of maxillary sinus, although, a higher prevalence of this cyst was found in the Autumn months of the year (October, November and December), but in the study by Nemati *et al*[13] The highest prevalence was in the spring and then autumn, and in the study by Dr. Ghaffari *et al,*[6] January and August were reported. In the present study, the location of mucosal retinal cyst of maxillary sinus (MRC) was 40.7% in the right maxillary sinus, 35.7% in the left sinus and 23.6% in both sides, which in terms of the most common location of involvement is similar to the studies by Viria *et al,*[9] Parastoo *et al*[10] and Nemati *et al*,[13] and differed from the result of the study by Abassi *et al*,[7] in which bilateral involvement of maxillary sinus was the most common location.

Although, mucosal retinal cyst of maxillary sinus is developed following the obstruction of seromucous glands channels of sinus mucous membrane, and leads to pathological accumulation of mucosal membrane secretions and swelling, and it is even associated with the occurrence of sinusitis,[1,2] but why and what causes this obstruction is not clear.[8] Factors such as age, gender, smoking, temperature, months of the year and etc. were examined and obtained different results.

It seems that known and unknown factors are involved in the development of this cyst, such as air pollution, genetic backgrounds and factors that directly and indirectly relate to oral and dental health.

Conclusion

In general, this study concluded that dentists' familiarity with the image of this cyst, which is often without clinical signs and sometimes have clinical symptoms such as pain in the face, around the eyes and head, or nasal congestion and infections, is essential, also, their ability in differential diagnosis of this cyst, which its incidence is increasing, from the other similar lesions in maxillary sinus is important.

Reference

1. Bohay RN, Gordon SC. The maxillary mucous retention cyst: a common incidental panoramic finding. Oral Health 1997;87(7):7-8,10.
2. White SC, Pharoah MJ. Oral radiology: Principles and interpretation. 2000. 4th ed. St. Louis, MosbyCo.
3. Koki S, Kiyoshi Y, Yutaka S, Tooru I. Three cases of sphenoid sinus retention cyst of the headache-including a discussion of surgical approaches to the sphenoid sinus. Otolaryngol Head Neck Surg 2005;48(3):174-181.
4. Bhattacharyya N. Do Maxillary sinus retention cysts reflect obstructive sinus phenomena? Arch Otolaryngol Head Neck Surg 2000;126(11):1369-71.
5. Hadar T, Shvero J, Nageris BI, Yaniv E. Mucus retention cyst of the maxillary sinus: the endoscopic approach. Br J Oral Maxillofac Surg 2000;38(3):227-9.
6. Ghafari R, Dalili Z. Frequensy of retention cyst of maxillary sinus in panoramic radiography. J Guilan Univ Med 2007;15(60):79-83.
7. Abesi F, Mirshekar A, Babaee N, Heidari H, Mohammadzadeh I. Prevalance of mucous retention cysts of maxillary sinus in panoramic radiography. J Babol Univ Med 2013;15(3):103-107.
8. Immani Moghaddam M, Bagherpour A, AhmadianYazdiA,Qmarci N. Prevalance and some associated risk factors of Maxillary sinus mucous retention cyst in panoramic view of patients referred to radiology Department of Mashhad dental school. J Mash Dent 2009;33(2):89-96.
9. Vieria E, Morais S, MusisC , Borges A, Palma V, Basilio L , Guedes O. Frequency of maxillary sinus mucous retention cyst in a central brazilian population. J Dent Shiraz Univ Med 2015;16(3):169-174.
10. Pouria Qalizadeh Parastoo, Taleipour Ahmad Reza. Evaluation of the prevalence of maxillary sinus retention cyst observed in panoramic radiography and its related factors in patients referring to Islamic Azad University of Dentistry. Thesis No. 10-158, 2006. P. 4.
11. Torabinejad M., & Walton R., Endodontics Principles And Practice. 4th ed. Saunders; 2008.
12. Casamassimio PS, Lillv GE. Mucosal cysts of the maxillary sinus: a clinical and radiographic study. Oral Surg1980;50:282-286
13. Nemati S, Mohtavaipour T, Vadiati Saberi B, Mirkhani S, Pourhabibi Z. Frequency of maxillary sinus mucous retention cyst in Digital panoramic Radiographs of the patients attending to Dental faculty of Rasht during 2012-2013. J Mash Dent Sch 2015;38(4):363-74.
14. Jose A, Orland T, Enzio R. Kahn S. The incidence of maxillary sinus Retention cysts orthodontic patients. Word J Orthod 2009;10(2):e7-8
15. Ruprecht A, Batniji S, El-Neweihi E. Mucous retention cyst of the maxillary sinus. Oral Surg Oral Med Oral Pathol 1986;62(6):728-31.
16. Ence BK, Parsons DS. Mucous retention cyst causing pain of the infraorbital nerve. Otolaryngol Head Neck Surg 1990;103(6):1031-4.
17. Wang JH, Jang YJ, Lee BJ. Natural course of retention cysts of the maxillary sinus: long- term follow up results. Laryngoscope 2007;117(2):341-344.

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