Relationship Between Nasal Septum Deviation angle and it is Effect on Maxillary Sinus Volume in Sulaimani Population

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Abstract

Aim of this study: The purpose of this study was to determine the association between nasal septal deviation and the volume of Maxillary sinus in adult population. To analyze the effect of nasal septal deviation on the volume of maxillary sinus. Maxillary sinuses are two spaces, which are filled with air, located in the maxillary bone and can be in various sizes and shapes. Their walls are thin. The apex of the sinuses can extend into the zygomatic process and can occupy the zygomatic bone. We could not demonstrate a statistically significant difference between Groups I–III and Groups II–III, and Group I–II in contra lateral deviation the maxillary sinus volume as the difference were found to be non-significant statistically ($p = 0.965$ and $p = 0.985$, and p=0.994respectively). the mean of (contra lateral side)'s MSV equals to (19.8350) and standard deviation equals to (6.98693) and also the mean of (lateral side)'s MSV equals to (19.5698) and standard deviation equals to (7.69666). Thus, the mean of (contra lateral) for MSV is greater than the mean of (lateral) for MSV. It means that (deviated side) were lower MSV than (contra lateral side) for MSV.

Keywords: *Nasal Septum, Effect, Maxillary Sinus Volume*

Introduction

The floor formed by the alveolar process, the first, the second and the third molars and the roots of the canines may elevate the sinuses or may perforate their floor. [1] The extent of pneumatisation of the maxillary sinus varies from person to person; its volume is influenced by age, residual dental projections, and alveolar bone height [8] .

The nasal septum is a midline support structure of the nasal cavity. [2] Deviation of the nasal septum is a common structural cause of nasal obstruction and can arise from dislocation of the quandriangular cartilage from its bony boundaries, or from an intrinsic deformity affecting the vomer, perpendicular plate of ethmoid and/or the quadrilateral cartilage itself [3]. Nasal septal deviation can occurred by pressure and expansion during the downward growth of the septum from the ethmoid ossification centers, upward growth of the maxillar crest, and the development of the premaxilla and vomer [5]. Trauma, particularly which is occurred by injures in infancy and childhood, is a significant factor in the etiology of septal deformity [5-7] The other important etiological factors are irregularity in the growth of the maxilla, asymmetric development of maxillary sinuses and turbinates, thumb-sucking, tongue-pressure habits which cause shifts in the alveolar ridge, genetic and environmental factors [5].

High resolution CT of the maxillary sinus has become indispensible in the complete evaluation of the maxillary sinus and its lesions [9] and to determine the percentage of pneumatization in the sinus cavity [10].

Materials and Method

All of the PNS CT scans that were taken in the sulaimania teaching hospital during the last 1 years were used in the study. Head CTs of 50 patients (28 females and 22 males) between 25-30 years' age. The continuous non-overlapping sections of PNS CT scans were used with acquisition parameters of 1.0-mm slice thickness. The patients with allergic rhinitis, nasal polyposis, cystic fibrosis, asthma, immune deficiency, malignancy, metabolic disease, and those previous underwent maxillofacial

trauma, sinus surgery were excluded in this study.

Measurement (done by CT scan)

The nasal septal angle (NSA) was measured as the angle between a line drawn from the superior insertion of the nasal septum at the crista galli to the inferior insertion of the septum at the maxillary crest and another line from the superior insertion of the septum at the crista galli to the maximally deviated point of the convex nasal septum. Patients with NSD were grouped into 3 groups according to the measured nasal septal angle as group I (mild, <9°), group II (moderate, ≥9° and <15°), or group III (severe, ≥15°), according to Elahi et al.'s grading system. [5]

Measurement of maxillary sinus volume

Maxillary sinus volume is measure by following equation.

Volume = (height × depth × width × 0.5). [4]

Statistical Analysis

The data were analyzed using IBM SPSS software (version 22, Inter-national Business Machines Corp., Armonk, NY, USA), and p <0.05 was considered statistically significant.

Result and discussion:-

A total of 50 young adult, consisting of 31 right-sided and 29 left-sided

NSDs, were included in the study. There were 22 males and 28 females, whose mean age was 30.38±3.658 years, ranging from 25 to 35 years. Mean NSA was 10.15±4.85 degrees, ranging from 3.8 to 24.5degrees.

The deviation angles varied between 5° and 24°. The mild group had 25 cases, the moderate group had 17 cases, and the severe group had 8 cases.

We could not demonstrate a statistically significant difference between Groups I–III and Groups II–III, and Group I–II in contra lateral deviation the maxillary sinus volume as the difference were found to be non-significant statistically (p = 0.965 and p = 0.985, and p=0.994respectively).

Maxillary sinus volume in deviated side were Groups I and II and Groups I–III and Groups II–III compartments (p = 0.565, p = 0.895 and p = 0.944, respectively). Table 1.(11,12)

Table 1: statistical description of maxillary sinus volume between each groups with (p value) by using T- test.

	groups	**sig**
Contra lateral side	Group I V Group II	0.994
	Group III V Group II	0.985
	Group I V Group III	0.965

	groups	**sig**
deviated side	Group I V Group II	0.565
	Group III V Group II	0.944
	Group I V Group III	0.895

Table 2: : statistical description size of the MSV between (contra lateral and lateral)

MSV		**N**	**Mean**	**Std. Deviation**
Pair	contra lateral side	25	19.835	6.98693
	deviated	25	19.5698	7.69666

It can be indicated in the table (2) that the mean of (contra lateral side)'s MSV equals to (19.8350) and standard deviation equals to (6.98693) and also the mean of (lateral side)'s MSV equals to (19.5698) and standard deviation equals to (7.69666). Thus, the mean of (contra lateral) for MSV is greater than the mean of (lateral) for MSV. It means that (deviated side) were lower MSV than (contra lateral side) for MSV.

Table 3: statistical description a relationship between contra lateral side and deviated side

Paired Samples Correlations			
		contra lateral side	**Deviated side**
contra lateral side	Correlation	1	0.758
	Sig.		0.000
	Sample	50	50
Deviated side	Correlation	0.758	1
	Sig.	0.000	
	Sample	50	50

The level of significance at level 0.05
There is a relationship between the statistical function between the contra latral and latral

It is noted from Table (3) that there is a statistically significant positive correlation between (A relationship between the contra lateral side and deviated side) which is (0.758) and that the significance value is 0.000 and is less than 0.05. This indicates acceptance of the second hypothesis, A positive correlation between the extent of (A relationship between the contra lateral side and deviate side)[13,14,15]

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of dentistry, Iraq and all experiments were carried out in accordance with approved guidelines.

Reference

1- Teke HY, Duran S, Canturk N, Canturk G. Determination of gender by measuring the size of the maxillary sinuses in computerized tomography scans. Surg Radiol Anat 2007;29:9-13.

2- Neskey D, Eloy JA, Casiano RR:Nasal, septal, and turbinate anatomy and embryology.Otolarygngol Clin N Amer 2009;42(2):193–205

3- Gray LP:Deviated nasal septum. Incidence and etiology.Ann Oto Rhinol Larngol Suppl1978,50:1–20.

4- Khatieeb MM. Sexual dimorphism of calvarial thickness parameter in different skeletal patterns. Mustansiria Dent J 2011;8:144-51

5- Elahi MM, Frenkiel S, Fageeh N. Paraseptal structural changes and chron-ic sinus disease in relation to the deviated septum. J Otolaryngol 1997; 26: 236-40

5- Blaugrund SM. The nasal septum and concha bullosa. Otolaryngolologic Clin North Am 1989;22:291-6

6- Ridenour BD. The nasal septum. In Flint PW, Haughey BH, Robbins KT, Thomas JR, eds. Otolaryngology-Head and Neck Surgery (Cummings). Missouri: Mosby-Year Book Press, 1998: 921-48

7- Aktas D, Kalcioglu MT, Kutlu R, et al. The relationship between the concha bullosa, nasal septal deviation and sinusitis. Rhinology 2003;41:103-6

8- Deeb R , Malani PN , Gil B , Jafari-Khouzani K , Soltanian-Zadeh H , Patel S , Zacharek MA. Three-dimensional volumetric measurements and analysis of the maxillary sinus. American Journal of Rhinology Allergy, 2011;25: 152-6.

9- Damman F , Bode A , Heuschmid M et al. Multislice CT of the Paranasal Sinuses: First Experiences Using Parameters of Radiation Dosage. Rofo. 2000;172(8):701-702.

10- Park YB , Jeon HS , Shim JS , Lee KW , Moon H S. Analysis of the anatomyof the maxillary sinus septum using 3-dimensional computed tomography. Journal of Oral Maxillofacial Surgery, 2011;69:1070-1078.

11- Kapusuz GZ[1], Ozkırış M, Okur A, et al.The effect of nasal septal deviation on maxillary sinus volumes and development of maxillary sinusitis. Eur Arch

Otorhinolaryngol. 2013 Nov;270(12):3069-73. Epub 2013 Mar 20.

12- ‹sa Azg›n, Ramazan Ö , Engin U : Volumetric analysis of the maxillary sinus in pediatricpatients with nasal septal deviation ENT Updates 2015;5(3):107–112

13- Zeliha K G , Mahmut Ö ,Aylin O ,etc The effect of nasal septal deviation on maxillary sinus volumes and development of maxillary sinusitis November 2013; 270(Issue 12):3069–3073 .

14. Emrah Sapmaz1, Ahmet Kavaklı, Hilal Irmak Sapmaz, Murat Ögetürk Impact of Hard Palate Angulation Caused by Septal Deviation on Maxillary Sinus Volume Turk Arch Otorhinolaryngol 2018; 56(2): 75-80

15. Firat AK, Miman MC, Firat Y, Karakas HM, Ozturan O, Altinok T. Effect of nasal septal deviation on total ethmoid cell volume. J Laryngol Otol 2006; 120: 200-4.