Volume : 5 | Issue : 5 | May 2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 69.48

Research Paper

Computerized Tomography For Normal Anatomical Variations of Maxillary Sinus Septa in Patients At Department of Radiology, Gujarat Adani Institute of Medical Science, Bhuj, Gujarat, India

Medical Science

KEYWORDS : Computerized Tomography, Gujarat, Films, Maxillary sinus, Radiology

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ABSTRACT

Aim: The maxillary sinus is the largest paranasal sinus and represents a complex anatomical structure with significant inter-individual variation. Computerized Tomography (CT) in the assessment of the maxillary sinus yields much more information. The aim of this study is to determine the prevalence, number and location of maxillary sinus septa using CT.

Materials and Methods: One hundred and Twenty eight (78 males and 50 females), between 1877 years, with normal maxillary sinus CT anatomy, from head CT scans carried out at the Radiology Department Gujarat Adani Institute of Medical science, Bhuj, Kutch, Gujarat, India. over a period of 6 years, were studied. Head CT scans were obtained from the local data base of the CT machine and back up compact disc from the CT library. Films were viewed on the computer monitor. Septa were identified as bony projections from the sinus walls into its cavity on axial and coronal slides.

Results: In this study, septa were present in 14.59% males sinuses, while in females, 11.22% had septa. The overall prevalence of maxillary sinus septa was 25.5%.

Conclusion: Maxillary sinus septa appear common and are capable of complicating sinus membrane surgeries. CT may be useful in surgical evaluation and planning.

Introduction

Maxillary sinus septa are bony crests surrounded by the sinuses and are referred to as Underwood's septa, because they were first described in detailed anatomy of the maxillary sinus by Underwood in 19101 They may give rise to multiple posterior recesses or extend from the base to the roof, producing two separate sinuses1-3 Etiologically, according to Unsderwood, they arise from an area between two adjacent teeth and are usually found in three specific sections (anterior, middle, or posterior) that correspond to the three defined periods of tooth activity, separated by intervals of time. However, Neivert 4 proposed that septa were derived from finger-like projections produced by the embryonic out-pouching of the ethmoidal infundibulum.

Krenmair 5 classified sinus septa into primary and secondary; the primary septa happen along with the development of the maxilla, while the secondary arises as a effect of irregular pneumatization of the sinus floor after tooth loss. The occurrence of anatomic variations within the maxillary sinus, such as septa, may boost the risk of schneiderian membrane perforation during sinus operations and this represents the most common complication6-8 It may also limit the creation of a window in the anterior-lateral wall and the reflection of a hinged door when elevating the sinus membrane from an alveolar recess9 As such, a detailed knowledge of the anatomy of the sinuses is critical in performing procedures such as functional endoscopic sinus surgery.10

According to Donal,11 from the University of British Columbia, Vancouver, Canada, 50% of cadaveric models had septa, whose position, number, and depth were extremely variable. Ulm reported 18.3% prevalence from School of Dentistry, University of Vienna, Austria, while in two separate studies, Krenmair 12 reported a prevalence of 26.8% and 14.3%, and respectively using sinus computerized tomographys (CTs) of Austrians in Wels. There is shortage of data on the prevalence, and locations of maxillary sinus septa using CT among Population in Gujarat, India, therefore, the aim of this study is therefore to compliment their findings and to establish a baseline data for values in our environment In Subjects attending Department of Radiology at Gujarat Adani Institute of Medical science, Bhuj, Kutch, Gujarat, India.

Materials and Methods

This study involved 128 subjects (78 males and 50 females), between 18–77 years, with normal maxillary sinus CT anatomy, from head CT scans carried out at the Radiology Department at Gujarat Adani Institute of Medical science, Bhuj, Kutch, Gujarat, India. over a period of 6 years. Head CT scans were obtained from the local data base of the CT machine and back up compact disc from the CT library. Films were viewed on the computer monitor. Septa were identified as bony projections from the sinus walls into its cavity on axial and coronal slides while the number and location of septa per sinus was noted. Data was physically sorted out, tabulated, entered into computer using Microsoft word, and Excel, and comparison was done using Chi-square with test. Data were analyzed with SPSS version 15.

Results

All experiential septa were positioned on the anterior and anterolateral walls of the maxillary sinus. Among males, septa was present in 14.59% of maxillary sinus, [Table 1] while of the 19 male right maxillary septa, had each maxillary sinus being completely divided into two halves and the other had a doubled septum. Double septa were not present in any left maxillary sinus of either males or females in the studied population. However, in females, 11.22% had sinus septa. Two of the 13 right septa were doubled. The overall prevalence of maxillary sinus septa was 24.62%.

Table 1: The frequency of maxillary sinus septa in the studied population

Maxillary Sinus	Males		Females	
	Septa present	Septa absent	Septa present	Septa absent
Right maxillary sinus	19	61	13	38
Left maxillary sinus	18	61	14	37
Total	37 (14.59)	121 (46.53)	27 (10.34)	75 (28.84)
Prevalence in total Population	Overall prevalence of sinus septa = 25.5 65 septa in 260 sinuses			

Discussion

Maxillary sinus septa come out common, they are able of precipitating and complicating sinus membrane perforation during sinus operations, and this may be minimized by complete CT evaluation and sufficient pre-operative planning for sinus surgery. The range of normal anatomical variations of the maxillary sinus in different studies is a reflection of the influential effects of human variability and the different degrees of pneumatisation.13, 14 In this study, the prevalence of maxillary sinus septa was 25.5%; of these, 1.15% were doubled septa, and all septa were located on the anterior and anterolateral walls of the max-

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illary sinus. The incidence of septa from this study was lower than the estimated prevalence of antral septa among Canadians by Donal, where 50% of cadaveric models had septa, by Ella,15 in France with 38.6% prevalence of the maxillary sinus septa.

Our results were basically the same with the report of Velasquez-Plata,13 from the University of Detroit, Michigan, USA, who found 24% prevalence of antral septa on CT scan analysis of maxillary sinuses, and Won-Jin,16 who reported a prevalence of 24.6%, among Koreans in Jeonju. However, our results were higher than the septal prevalence reported by Ulm, (18.3%), from the University of Vienna, Austria, and Krenmair, (14.3%), from the University of Vienna, Austria, while Amusa,19 who worked on south-western Nigerians at the Obafemi Awolowo University Teaching Hospital, Ile Ife, recorded no antral septa in 24 dried human skulls.

Concerning double septa, results of the present study were lesser and dissimilar from the findings by Won-Jin, from Chonbuk National University School of Dentistry, Jeonju, Korea, that, 8 out of 236 sinuses had twice septa, and that no sinus had septa totally separating it into two or more compartments. In agreement with most studies on the location of sinus septa, this study found that, the maxillary sinus septa were located on the anterior and anterolateral walls of the maxillary sinus.

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