Maxillary Sinus Polyp: An Analysis on Computed Tomography

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Abstract

Background: Polyposis is an inflammatory condition of paranasal sinus mucosa that leads to a typical polypoid appearance. It is seen in all the sinuses, but most frequently in maxillary antrum and is usually associated with allergic conditions. Radiographically, polyp appears as a well-defined, non-corticated, circular or globular radiopaque area within the sinus.

Objective: To analyze the data of maxillary sinus polyps on Computed Tomography.

Material & Method: The study was conducted by assessing the radiographic records of year 2012 to 2014, available in the archives of department. One Hundred and Sixteen patients were analyzed. The statistical analysis was performed by using one way ANOVA and independent 't' test.

Results: Maxillary sinus polyps were seen in the age group of 11-79 years with mean age of 38.55±13.44 years. The male to female participant ratio was 2.74:1. The unilateral and bilateral polyps were 93.10% and 06.90% respectively, wherein 54.31% were on right side and 38.79% on left side. The overall mean length and breadth of polyp was 18.20+5.386 mm and 16.62+3.898 mm respectively. The overall mean length and breadth in males and females were statistically not significant ($p > 0.05$).

The obtained p value for mean length of right polyp was statistically significant ($p<0.05$) but for mean length of left polyp, mean breadth of left and right polyp, the p values were statistically not significant ($p>0.05$).

Conclusion: Imaging plays a significant role in diagnosing maxillary sinus polyp and hence should be used regularly to prevent complications.

Keywords: Antral polyp, Computed tomography, Maxillary sinus polyp, Maxillary sinus disorders, Orthopantomogram.

Introduction

Paranasal sinuses are pneumatic spaces in cranio-facial complex. They are intricate anatomical structures and are named from the bones as per the location: maxillary, frontal, sphenoid and ethmoid sinuses. They are in pair and present on each side of the skull, with a significant inter-individual variation.[1,2] Maxillary sinus is the first to develop and the largest bilateral air sinus located in the body of maxilla, which opens in the middle nasal meatus of the nasal cavity with single or multiple openings. The shape is pyramidal with apex located near the zygomatic bone.[1-3] The paranasal sinuses undergo various pathological changes and polyp is one of them. Polyposis is an inflammatory condition of mucosa, with a characteristic polypoid appearance and is commonly seen in maxillary antrum.[3,4] Conventional and advanced imaging is an important diagnostic aid for sinus polyp.[5]

Radiographically, sinus polyp appears as a well-defined, non-corticated, circular or globular, faintly radiopaque lesion (Fig. 1). The lack of peripheral cortex surrounding the polyp signifies its origin from mucosa. The polyps may show high density centrally and have a peripheral rim of low attenuation on computed tomography (CT) scan, an important feature for differentiating it from tumours.[5,6] With the limitations of conventional radiographs, CT scan is highly advisable due to its high specificity and sensitivity, essential for diagnosis, planning and treatment of maxillary sinus disorders, measurement of anatomical dimensions, minimal superimposition of structures, revelation of small differences of density and minimal radiation dose. The craniometric points are precisely located and measurements are more accurately achieved on CT scan than on conventional radiographs.[5-7]

After careful evaluation of various databases and to the best of our knowledge, we did not come across any study on morphology of maxillary sinus polyp. Hence, the present study was designed to analyze maxillary sinus polyp on computed tomography.

Material & Method

The present hospital based retrospective study was conducted by assessing the radiographic records from year 2012 to 2014, available in the archives of department. The permission was obtained from Institutional Ethics Committee of Sumandeep Vidyapeeth University with protocol number SVIEC/ON/DENT/RP/1518 dated 28/11/2014. The data of total one hundred and sixteen patients with CT scan of head and neck region were included in the study. Only those images showing maxillary sinus polyp, either unilaterally or bilaterally (Fig. 2 & 3) were included whereas images with developmental anomalies, magnification, distortion or any positional error were excluded from the study.

The CT scan images were taken on Siemens Somatom Emotion 16 slices Computed Tomography System. The morphological study was performed by conducting the measurements using Syngo CT 2009E software (Fig. 4). The statistical analysis was performed

by using SPSS software version 16. The tests applied were one way ANOVA and independent 't' test.

Fig. 1: Orthopantomogram presenting a faint radiopaque, polypoid mass in left maxillary sinus (Fig. 1A) and in both right & left maxillary sinus (Fig. 1B) (white arrow)

Fig. 2: Computed Tomography scan - axial view (Fig. 2A) and coronal view (Fig. 2B) shows unilateral presentation of polyp in maxillary sinus (yellow arrow)

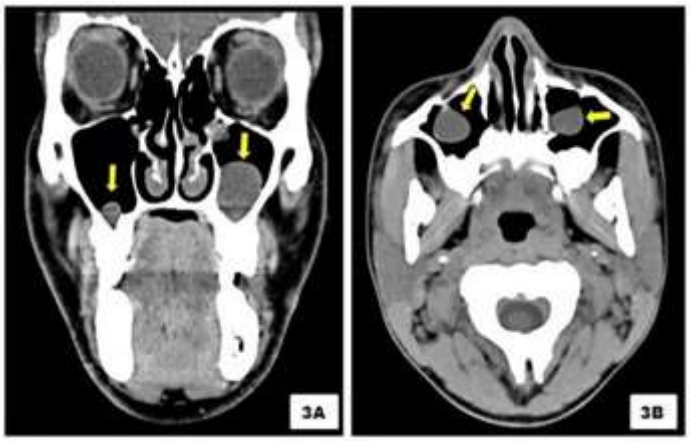

Fig. 3: Computed Tomography scan - coronal view (Fig. 3A) and axial view (Fig. 3B) shows bilateral presentation of polyp in maxillary sinus (yellow arrow)

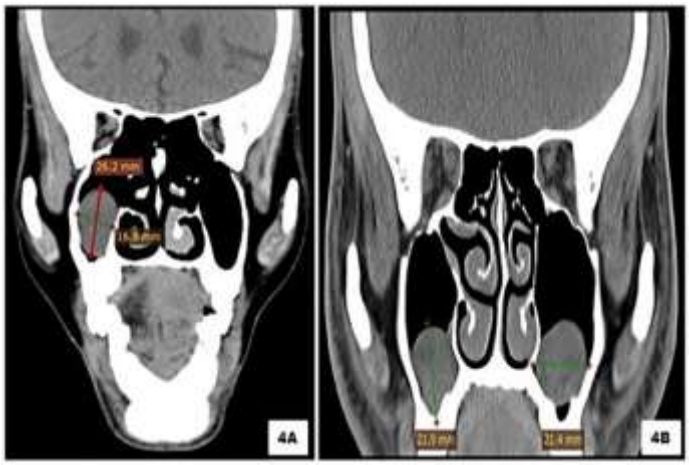

Fig. 4: Morphological measurements (length and breadth) of maxillary sinus polyp on Computed Tomography scan - coronal view (Fig. 4A & 4B)

Results

The present study had 73.27% males and 26.73% of females, with a ratio of 2.74:1. The maxillary sinus polyps were seen in the age group of 11-79 years with mean age of 38.55 ± 13.44 years (Table 1). Unilateral and bilateral maxillary sinus polyps were noted in 93.10% and 6.90% of patients respectively. 54.31% of patients had polyps on right side and 38.79% on left side (Graph 1).

The overall mean length and breadth of polyp in all the participants was 18.20±5.386 mm and 16.62±3.898 mm respectively (Table 2). In males, the total mean length and breadth was 18.37±4.516 mm and 16.09±3.882 mm respectively whereas in females, it was 17.16±5.646 mm and 14.88±3.166 mm respectively. The obtained p value in male and female were statistically not significant (p>0.05) (Table 3).

On right side, the mean length and breadth in males was 18.20±5.386 mm and 16.62±3.898 mm respectively, whereas in females it was 15.52±4.951 mm and 13.94±2.909 mm respectively. The obtained p value for length of right polyp was statistically significant (p<0.05) whereas for breadth it was not significant (p>0.05). On left side, the mean length and breadth in males was 18.16±3.997 mm and 15.89±4.199 mm respectively, whereas in females it was 19.42±5.950 mm and 16.19±3.144 mm respectively. The obtained p value for both length and breadth of left polyp was statistically not significant (p>0.05) (Table 4).

Graph 1: Distribution of maxillary sinus polyp according to location

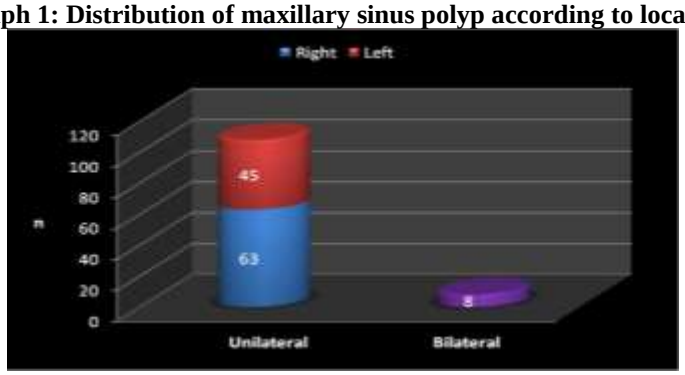

Table 1: Distribution of participants in relation to age and gender

Gender	n	Mean age ± Std. devt (in years)	Std. Error	95% Confidence Interval for mean	
				Lower Bound	Upper Bound
Male	85	36.83±13.90	1.50785	33.837	39.834
Female	31	43.26±10.95	1.96637	39.242	47.274
Total	116	38.55±13.44	1.24769	36.080	41.023

(n = number, Std= Standard, devt= deviation)

Table 2: Distribution of maxillary sinus polyp according to total dimension

Parameters	n	Mean (mm) ± Std. devt.	Minimum (mm)	Maximum (mm)
Length	116	18.20±5.386	6.70	29.90
Breadth	116	16.62±3.898	8.50	28.70

(n = number, Std= Standard, devt = deviation, mm= millimeter)

Table 3: Correlation of dimensions of sinus polyp with gender

Parameters	Gender	n	Mean (mm) ± Std. devt.	Obtained p value	Significance (p<0.05)
Length	Male	85	18.37 ± 4.516	0.236	Not Significant
	Female	31	17.16 ± 5.646	0.288	Not Significant
Breadth	Male	85	16.09 ± 3.882	0.123	Not Significant
	Female	31	14.88 ± 3.166	0.092	Not Significant

(n = number, Std= Standard, devt = deviation, mm= millimeter, p= probability)

Table 4: Correlation of dimensions of sinus polyp in relation to site and gender

Parameters	Site	Gender	n	Mean (mm) ± Std. devt.	Std. Error Mean	t	Obtained p value	Significance (p<0.05)
Length	Right	Male	53	18.20±5.386	0.740	2.412	0.019	Significant
		Female	18	15.52±4.951	1.167			
	Left	Male	40	18.16±3.997	0.632	-0.873	0.387	Not Significant
		Female	13	19.42±5.950	1.650			
Breadth	Right	Male	53	16.62±3.898	0.535	2.670	0.009	Significant
		Female	18	13.94±2.909	0.686			
	Left	Male	40	15.89±4.199	0.664	-0.240	0.811	Not Significant
		Female	13	16.19±3.144	0.872			

(n = number, Std= Standard, devt = deviation, mm= millimeter, p= probability)

Discussions

Maxillary sinus polyps are created secondary to folding and hypertrophy of the mucosa, with accumulation of fluid in the submucosal space. They are frequently associated with allergic conditions, although may be seen with inflammation, infection and vasomotor rhinitis.[3,4] Antral polyps are asymptomatic and can lead to displacement, expansion or destruction of surrounding bone.[5] Sinus polyps are commonly seen in adults. In children, Cystic fibrosis and Kartagener's syndrome predispose the polyp formation.[8]

In the Present study, the participant's age ranged from 11-79 years with mean age of 38.55±13.44 years and with 73.27% of males and 26.73% of females. In our study, 93.10% of participants had unilateral polyp and 06.90% had bilateral polyp. In 54.31% of the participants had polyps on right side and 38.79% had on left side. This shows that unilateral polyps were more common and right side was the most prevalent site.

Through our study, an attempt was made to measure the dimensions of maxillary sinus polyp and to correlate the same with gender. It was distinctly noted that the mean length and breadth of maxillary polyp were more in males (18.37±4.516 mm and 16.09±3.882 mm) than the females (17.16±5.646 mm and 14.88±3.166 mm), but the values were statistically not significant (p>0.05). Similarly, the mean dimensions of right and left polyp were more in males and females respectively. The obtained p value for mean length of right polyp was statistically significant (p<0.05) but the p value for mean length of left polyp and mean breadth of left & right polyp were statistically not significant (p>0.05). It was distinctly noted that the overall mean length (18.20±5.386 mm) was more than the overall mean breadth (16.62±3.898 mm). Thus it can be stated that the sinus polyp is not circular or oval in shape.

Conclusion

Any abnormality of maxillary sinus will hamper the function. The role of radiographs in diagnosing maxillary sinus disorders is significant and should be routinely used for early diagnosis to avoid further complications.

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