Original Research Article

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Demographic profile of subjects currently undergoing middle meatus antrostomy for maxillary sinusitis, in a tertiary care centre of Punjab: analysis of 64 subjects

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ABSTRACT

Background: The demographic profile of patients with Maxillary sinusitis undergoing surgical intervention in the state of Punjab was analyzed. The emphasis was on the age, gender and clinical presentation in this prospective study. **Methods:** In this prospective study 64 patients with maxillary sinusitis, were randomly selected from the Rhinology clinics of Oto-rhino-laryngology services, Dayanand Medical College and Hospital, Ludhiana in a period of one and a half years (June 2008 to December 2009). All patients were taken up for Functional endoscopic sinus surgery with middle meatus antrostomy.

Results: Only 7 (10.94%) patients, with maxillary sinusitis were in the pediatric age group. 40(62.5%) were males and 24 (37.5%) females. Males outnumbered females in the ratio of 1.67:1. Clinical findings were nasal polyp in 33 (51.56%), middle meatus discharge in 10 (15.63%) and septal deviation was seen in 36 (56.25%) patients. Polypoidal mass was seen in the posterior choana in 24 (37.5%) patients followed by discharge inferior to the Eustachian tube orifice in 7 (10.94%). Recurrence of polypoidal change or frank polyposis occurred in 7 patients (10.94%). Post nasal drip persisted in 15/49 cases, while 54 (84.38%) were completely relieved of their symptoms. Recurrence was noticed more commonly in the region of ethmoid air cells.

Conclusions: Patients with maxillary sinusitis were seen in the broad age range from 11 to 66 years with a male predominance. Nasal blockage rather than cheek ache was the primary complaint followed by polyp in the middle meatus and post nasal drip inferior to the Eustachian tube.

Keywords: Demography, Endoscopic sinus surgery, Middle meatus antrostomy, Maxillary sinusitis

INTRODUCTION

The paranasal sinuses are air filled cavities on either side of the nasal cavity, in close proximity to the orbit and the dura of the anterior cranial fossa. Conventionally paranasal sinuses, minus any anatomical partitions were considered to be a continuous system of "hollow spaces", through which mucus produced by the brain eventually

drained. The existence of the paranasal sinuses in humans was documented by Berenger del Carpi in the early 16th century. Leonardo da Vinci in 1489 prepared meticulous anatomical illustrations of the paranasal sinuses, that were accessible for scientific evaluation only in the 20th century. A precise diagrammatic anatomy of the maxillary sinus was presented by Nathaniel Highmore in 1651, and hence it is named as the "Highmore's

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Antrum".³ Conventionally, maxillary sinus is described as "pyramidal shaped", though Anon et al considered a "tetrahedral shape" to represent its morphology in a three dimensional space.⁴ The paired maxillary sinuses are situated beneath the cheeks, above the teeth and on either side of the nose. These drain into the nose through the ostea present in the infundibulum. Narrowing of the mucociliary pathways of the drainage of the maxillary sinus occurs at its ostium and its vicinity due to mucosal edema, polyposis, synechiae and scarring, secondary to infection, trauma or previous surgery respectively. All these may lead to obstruction of the maxillary sinus, with its squeal.

Hirschman (1901) was the first to use the cystoscope, developed in 1879 by Nitze, to enter the maxillary sinus through a tooth socket.⁵ Messerklinger, under endoscopic visualization observed the role of ventilatory disturbances of the middle meatus, anterior and middle ethmoidal regions (ostiomeatal complex) in the pathogenesis of maxillary, ethmoid and frontal sinusitis.6 Anterior rhinoscopy provides minimal information of the infundibular area and the maxillary sinus orifice. Nasal endoscopy precisely assesses this area for localized disease or for anatomic defects that compromise ventilation and mucociliary clearance. Instead of creating unnatural and temporary sites of dependent or gravity assisted drainage, such as naso-antral windows, it is intended to reestablish ventilation of the sinus through the existing natural ostium, called a 'middle meatus antrostomy". Maxillary sinus surgery is underestimated because it is the easiest to imagine. The management of natural maxillary ostium should follow the physiological principles shown by the m ucociliary clearance patterns.⁷

In the present era the complications arising from sinusitis are rare since the introduction of broad spectrum oral and intravenous antibiotics. However sinusitis and its complications are still life-threatening and if neglected may result in high morbidity and mortality. Endoscopic middle meatus antrostomy has become the mainstay of treatment when an infected maxillary sinus is refractory to medical treatment and requires surgical drainage

Aim of the study was to determine the common clinical presentations and demographic profile of patients taken up for functional endoscopic surgery of the Maxillary sinus.

METHODS

In this prospective study 64 patients of maxillary sinusitis were randomly selected from the Rhinology clinics of Oto-rhino-laryngology services. Dayanand Medical College and Hospital, Ludhiana in a period of one and a half years. (June 2009 to December 2010). All patients were taken up for Functional endoscopic sinus surgery of the maxillary sinus with a middle meatus antrostomy.

The study included 40 men, 24 women and 7 children (less than 14 year). They were all worked up and their height and weight was recorded.

Inclusion criteria

Endoscopic middle meatus antrostomy was undertaken in cases of Computed tomographic evidence of maxillary sinus disease (opacification/air fluid level/mucosal hypertrophy), endoscopic evidence of middle meatus pathology, (Oedematoustissue/polyps/mucopurulent discharge/fungal debris), intractable cheek or hemi facial aches in the presence of computed tomographic evidence of maxillary sinus disease.

Exclusion criteria

The surgery was performed under local or general anesthesia as per fitness of the patient. Endoscopy was performed with a 4.0 mm 00, 300, 450 and 700 endoscope. It was first passed along the floor of the nose, while the septum, inferior meatus, inferior turbinate, middle turbinate and nasopharynx were inspected. The telescope was then rotated laterally to expose the middle meatus, uncinate process and the maxillary sinus ostium.

In cases with associated pathology of other paranasal sinuses pathology, e.g., polyps were removed and after performing anterior and posterior ethmoidectomy, sinus. Some of the cases eg. Sino nasal polyposis was operated with help of a microdebrider.

Statistics

All statistical calculations were done using Statistical Package of Social Sciences (SPSS) 17 Version statistical program for Microsoft windows (SPSS Inc. released 2008. SPSS statistics for windows, version 17.0, Chicago). Ethical approval of the study was taken from the Institutional Ethics Committee.

RESULTS

The analysis of our study on the maxillary sinus is discussed below 64 cases were examined clinically by anterior rhinoscopy, posterior rhinoscopy and nasal endoscopy under local anesthesia. After radiological assessment, they were taken up for functional endoscopic sinus surgery of the maxillary sinus, i.e., a middle meatus antrostomy. Only 7 (10.94%) patients, with maxillary sinusitis were in the pediatric age group, i.e., children below the age of 14 years. Maximum patients, 17 (26.56%) were in the age group of 31-40 years. Out of these, 11 (64.70%) were males, while 6 (35.30%) were females the age range varied from a minimum of 11 years to a maximum of 66 years. 40 (62.5%) subjects were males and there were 24 (37.5%) females. Males outnumbered females by a ratio of 1.67:1

Table 1: Age and gender distribution (n=64).

Age	Male		Female		Total	
(years)	N	%	N	%	N	%
11-12	3	7.50	4	16.67	7	10.94
21-30	8	2.00	6	25.00	14	21.88
31-40	11	27.50	6	25.00	17	26.56
41-50	4	10.00	2	8.33	6	9.38
51-60	8	20.00	5	20.83	13	20.31
61-70	6	15.00	1	4.17	7	10.94
Total	40	100.00	24	100.00	64	100.00

n = total number of subjects.

Table 2: Height and gender distribution (n=64)

Height	Male	e	Fem	ale	Tota	al
(cm)	N	%	N	%	N	%
115-135	1	2.50	0	0.00	1	1.56
145-155	1	2.50	6	25.00	7	10.94
155-165	13	32.50	16	66.67	29	45.31
165-175	11	27.50	1	4.17	12	18.75
175-185	14	35.00	1	4.17	15	23.44
Total	40	100	24	100	64	100.0

 $\overline{n = total}$ number of subjects

62.5% of the subjects were males and 37.5% were females. Males outnumbered females by a ratio of 1.67:1. The height range varied from a minimum of 115 cms to a maximum of 182.5 cm. 14 males (35%) had a height from 175-185 cm, while 16 females (66.67%) had a height ranging 155 to 165 cm. The mean height of presentation was 165.82 cm.

Table 3: Weight and gender distribution (n=64).

Weight	Male		Female		Total	
(cm)	N	%	N	%	N	%
25-35	1	2.50	0	0.00	1	1.56
35-45	0	0.00	5	20.83	5	7.81
45-55	2	5.00	6	25.00	8	12.50
55-65	11	27.50	8	33.33	19	29.69
65-75	15	37.50	4	16.67	19	29.69
>75	11	27.50	1	4.17	12	18.75
Total	40	100.00	24	100.00	64	100.00

n = total number of subjects.

62.5% of the subjects were males and 37.5% were females. Males outnumbered females by a ratio of 1.67:1. The weight range varied from a minimum of 25 kg to a maximum of 87 kg. Maximum males i.e. 15 (3 7.50%) had a weight in the range between 65-75 kg while females 8 (33.33%) had a weight in the range of 55-65 kg. The mean weight was 65.03 kg.

The chief complaint that the patients of maxillary sinusitis presented with, prior to surgery was nasal blockage in 59 (92.19%) cases followed by post nasal drip (76.56%), and anterior nasal discharge (60.94%).

Table 4: Chief complaint of the patients (n=64).

Complaints	N	0/0
Nasal obstruction	59	92.19
Post nasal drip	49	76.56
Anterior nasal discharge	39	60.94
Headache /cheek ache	18	28.13
Diplopia	1	1.56

n = total no. of subjects.

Table 5: Clinical findings on anterior rhinoscopy (n=64).

Anterior rhinos copy	N	%			
Discharge in Middle meatus					
Right Side	6	9.38			
Left side	3	4.69			
Bilateral	1	1.56			
Polyps					
Right Side	6	9.38			
Left side	6	9.38			
Bilateral	21	32.81			
Deviated nasal septum					
Right side	17	26.56			
Left side	19	29.69			

n= total no. of subjects.

On anterior rhinoscopy, the most common clinical finding was polyps in nasal cavity noted in 33 (51.56%) cases. Discharge in middle meatus was found in 10 (15.63%) cases. Deviated nasal septum was found in 36 (56.25%) cases.

Table 6: Clinical findings on posterior rhinoscopy (n=64).

Posterior rhinoscopy	No.	%
Discharge	·	•
Above eustachian tube	2	3.13
Below eustachian tube	7	10.94
Polyps		
Right side	5	7.81
Left side	3	4.69
Bilateral	16	25.00

n = total no. of subjects.

On posterior rhinoscopy, polypoidal mass was seen in the posterior choana in 24 (37.5%) patients. Discharge was seen inferior to the Eustachian tube orifice in 7 (10.94%) cases. Recurrence of polypoidal changes / polyposis occurred in 7/64 cases (10.94%). Post nasal drip persisted in 15/49 cases, while 54 cases i.e., 84.38% were completely relieved of their symptoms. Recurrence was noticed commonly in the region of ethmoid air cells. The maxillary sinus ostium was wide and patent in 57 (89.06%) cases. Recurrence of polyposis was noted in 7 (10.94%) cases, but not significantly affecting the patency of maxillary sinus ostium.

Table 7: Distribution of subjects according to post op complaints (n=64).

Complaints	No. of patients	%
No complaints	54	84.38
Postnasal drip.	10	20.40
Nasal blockade	9	14.06
Recurrence of polyposis	7	10.94

n = total no. of subjects.

Table 8: Post-operative status of maxillary sinus ostium (n=64).

Status of maxillary sinus ostium	No. of patients	%
Wide and patent	57	89.06
Stenosed	-	0
Mucosal edema	-	0
Polyp	7	10.94

n = total no. of subjects.

DISCUSSION

In the present study Maxillary sinusitis was seen in only 7 (10.94%) children though the age range varied from 11 to 66 years. The mean age of presentation was 35.53 years. Schaefer et al, 1989 in their study on 100 patients found the mean age of presentation to be 39 years and the range to be 6-83 years.⁸

Wald et al 1981 study correlated the clinical, radiographic, and bacteriologic findings in maxillary sinusitis in the pediatric age with upper-respiratory-tract symptoms and abnormal maxillary radiographs. Cough, nasal discharge, and fetid breath, with inconsistent fever was the common presentation. Facial pain, facial swelling and headache were noted more so in elder children. Bacterial colony counts of ≥104 colony-forming units per milliliter were seen in the secretions from the sinuses. On culture Streptococcus pneumonia, Haemophilus influenza, and Branhamella catarrhalis were isolated. No anaerobic bacteria were not cultured. Viruses were isolated from only two sinus aspirates. There was a poor correlation between the predominant species of bacteria recovered from either the nasopharyngeal or throat culture and the bacteria isolated from the sinus aspirate. Thus children with both upper-respiratory-tract symptoms and abnormal sinus radiographs are likely to harbor bacteria in their sinuses, suggesting that such children have bacterial sinusitis.9

Functional endoscopic sinus surgery (FESS) has become the primary surgical modality for treatment of chronic sinusitis in children who have not responded to optimal medical management. A retrospective study was conducted in patients from 7 months to 17 years of age, treated with FESS for chronic sinusitis refractory to medical therapy. Using a comprehensive parental questionnaire and a review of the medical charts, results were analyzed from these post-FESS children with a mean follow-up time of 21.8 months postoperatively. Factors studied included chronic nasal obstruction, purulent nasal discharge, postnasal drip, chronic cough, halitosis, headaches, behavioral problems, allergies, and asthma symptoms. This preliminary investigation suggests that FESS is effective in treating medically recalcitrant severe chronic sinusitis in children. ¹⁰

In our series males presenting with maxillary sinusitis and opting for surgery out-numbered females by a ratio of 1.67:1, 40 (62.5%) subjects were males and there were 24 (37.5%) females. Venkatchalam et al too documented that male patients outnumbered the females in the Indian population. The age of patients varied from 7-66 years with the majority being in the 31-40 years age group. Similar results were found in the study by Gandotra et al, 2000 who reported that males outnumbered the females in the ratio of 2:1. The age group was 14-66 years.

Maxillary sinusitis was studied as an indicator of poor air quality. The effect of urban and rural environment on sinusitis occurrence, and also subsistence economy, biological sex, and social status were explored, and comparative sites also considered; urban agricultural sites had a mean frequency of 48.5%, rural agricultural sites had a mean frequency of 45.0%, and hunter-gatherer sites had a mean frequency of 40.0%. In the urban sites male and female frequencies were near equal, but in the rural agricultural and hunter-gatherer sites female frequencies exceeded male frequencies. Dental disease was not found to have much impact on frequency of sinusitis The importance of the link between poor air quality and respiratory health is highlighted in clinical studies in both developed and developing countries, but also in bioarcheological studies.13

In our series the height range varied from a minimum of 115 cms to a maximum of 182.5 cms. 14 males (35%) had a height from 175-185 cm, while 16 females (66.67%) had a height from 155-165 cm. The mean height of presentation was 165.82 cm. The weight range varied from a minimum of 25 kg to a maximum of 87 kg. Maximum males i.e. 15 (37.50%) had a weight in the range between 65-75 kg while females 8 (33.33%) had a weight in the range of 55-65 kg. The mean weight was 65.03 kg. No published literature is available stating the relation between height/weight and sex distribution.

The chief complaint that the patients of maxillary sinusitis presented to us, prior to surgery was nasal blockage in 59 (92.19%) cases followed by post nasal drip 49 (76.56%) patients, and anterior nasal discharge in 39 (60.94%). Cheek-ache and headache was not a frequent complaint, seen only in 18 (28.13%) cases. Smith et al, reported nasal obstruction as the most common complaint 142 (71%), followed by headache 130 (65%) and post nasal drip 121 (60.5%). Venkatchalam et al reported nasal obstruction as the most common symptom 183 (87%) followed by nasal discharge in 147

(70%) Indian subjects.¹¹ On anterior rhinoscopy, the most common clinical finding was polyps in nasal cavity noted in 33 (51.56%) cases. Discharge in middle meatus was found in 10 (15.63%) cases. Deviated nasal septum was found in 36 (56.25%) cases. On posterior rhinoscopy polypoidal mass was seen in the posterior choana in 24 (37.5%) patients. Discharge was seen inferior to the Eustachian tube orifice in 7 (10.94%) cases.

Recurrence of polypoidal changes/polyposis occurred in 7/64 cases (10.94%). Post nasal drip persisted in 15/49 cases, while 54 cases i.e. 84.38% were completely relieved of their symptoms. Recurrence was noticed more commonly in the region of ethmoid air cells. Similar findings have been reported by Levine, 1990 who reported nasal polypi in 52% patients. Incidence of nasal discharge was higher i.e. in 31% patients as compared to 15.63% patients in our study, and that of deviated nasal septum was lower i.e. in 30% patients as compared to 56.25% patients in our study.

Huang et al 200, 84 maxillary antrum analysis documented that maxillary antral mucosa in children with chronic maxillary sinusitis was predominantly of the edematous type. In 64 (76.2%) subjects the edematous mucosa , returned to normal within 8 weeks in 48 (73.4%) of cases. The polypoid antral mucosa exhibited a slower recovery with 80% (16/20) returning to normal within 4 months. The preoperative saccharine transit time significantly correlated with recovery of the antral mucosa (p<0.05), but allergy did not (p>0.05). The prolonged saccharine transit time and polypoid type antral mucosa were associated with delayed mucosal recovery, warranting follow-up of more than 4 months. 16

Functional endoscopic sinus surgery (FESS) has almost completely replaced the radical Caldwell-Luc approach. A prospective randomized comparative study based on the analysis of eighty patients who were diagnosed to have chronic, unilateral, maxillary sinusitis and underwent surgery, after a failed trial of conservative management was undertaken. One year after surgery 44% of the Cald well Luc patients and 89% of the FESS patients reported distinct improvement of their symptoms. Both are effective in the management of chronic sinusitis. Endoscopic middle meatal antrostomy is superior to Caldwell-Luc in intraoperative and postoperative parameters.¹⁷

Limitation

Patients with maxillary sinusitis with renal, cardiac, chest ailments or bleeding diathesis could not be taken up for surgery.

CONCLUSION

Patients with Maxillary sinusitis were seen in the broad age range from 11 to 66 years with a male predominance. Nasal blockage rather than cheek ache was the primary

complaint. Polyp in the middle meatus and inferior to the Eustachian tube. Post-operative recurrence at end of the study period was noted in 10% individuals. There was no correlation of Maxillary sinusitis with the weight and height of the subjects.

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