

Original Research Article

Incidence of accessory ostia in patients with chronic maxillary sinusitis

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ABSTRACT

Background: Chronic maxillary sinusitis is one of the most frequent diseases presenting in ENT out patient department seeking medical attention. Defects in the fontanelle region of the lateral nasal wall have been described as accessory ostia. The presence of AMO in both pre and post operated cases of chronic maxillary sinusitis can cause recirculation of mucus leading to recurrences. In the present study we will investigate the incidence of accessory ostia in patients with clinical and radiological signs of chronic maxillary sinusitis.

Methods: The study included 100 patients visiting the out patient department of Shri Sathya Sai Medical College and Research Institute selected according to inclusion criteria with a clinical diagnosis of chronic rhino sinusitis which was confirmed by high resolution CT scan and those patients were subjected to diagnostic nasal endoscopy under local anesthesia.

Results: The study group consisted of total 100 patients among whom 56 were male patients and 44 were female patients. Accessory maxillary ostia were detected in 23% of the cases and in rest of the 77% cases it was absent. Among the 23 cases in 35% cases accessory ostia were found to be bilateral and in 65% cases it was found to be unilateral. Among the cases where accessory ostia were seen, in 39% cases only accessory ostia were found. Where as in 17.39% cases it was associated with concha bullosa, in 65.2% cases there was deviated nasal septum and in 8.7% cases paradoxical middle turbinate were found to be present.

Conclusions: To conclude, the present study revealed close association of accessory ostia with chronic maxillary rhino sinusitis. It was also found that majority of the cases accessory ostia were found to be unilateral and were frequently found in the posterior fontanelle region.

Keywords: Accessory maxillary ostia, Chronic maxillary sinusitis

INTRODUCTION

Chronic maxillary sinusitis is one of the most frequent diseases presenting in ear nose throat (ENT) out patient department seeking medical attention.¹ Chronic rhinosinusitis is defined as a group of disorders characterized by inflammation of the mucosa of the nose and paranasal sinuses of at least 12 consecutive weeks' duration.² An inflammatory response is an expected sequelae of an infectious process.³⁻⁵ Inflammation in the nose and sinuses from a variety of causes can result in

maxillary sinus ostia obstruction and can predispose to the development of an infection.

Being a multi factorial disease factors contributing can be: bacterial infection, allergy or different anatomical variations of the nose. Defects in the fontanelle region of the lateral nasal wall have been described as accessory or secondary ostia (Stan and Hank).³ It is not clearly known whether accessory ostium is a congenital anatomical variation or it is acquired. Along the course of evolution man attended an erect posture due to which the principal

maxillary ostium came to be located at a higher level and the drainage was no longer due to gravity.⁶

Hirschmann in 1901 performed endoscopy using a cystoscope which was a forerunner of modern day nasal endoscope and the lateral nasal wall was studied in details and the principal drainage pathway was named as ostio-meatal complex.⁶ He also described that the ostio-meatal complex area of the middle meatus has not only the primary maxillary ostium opening in hiatus semilunaris but also at times multiple openings are seen. In Latin it was named as ostium maxillare accessorium.⁶

Rationale for the study

The presence of accessory maxillary ostia (AMO) in both pre and post operated cases of chronic maxillary sinusitis can cause recirculation of mucus leading to recurrences. Though there are some anatomical cadaver dissection studies which show the presence of AMO at different anatomical locations but it cannot be clinically correlated.^{6,7} Similarly animal studies using rabbits where sinusitis was clinically manifested and the lateral nasal wall was studied for the presence of AMO.⁸ There are only a few studies in the literature that investigated the incidence of AMO in patients with chronic maxillary sinusitis. In the present study we will investigate the incidence of accessory ostia in patients with clinical and radiological signs of chronic maxillary sinusitis.

Aim

There is a controversy among investigators and surgeons in regard to the possible role of accessory ostia in the pathophysiology of chronic rhinosinusitis. We aimed to investigate the incidence and relationship between the accessory maxillary ostia and chronic maxillary sinusitis in the present study.

METHODS

The study included 100 patients visiting the outpatient department of Shri Sathya Sai Medical College and Research Institute selected according to inclusion criteria with a clinical diagnosis of chronic rhino sinusitis which was confirmed by high resolution computed tomography (HRCT) scan of paranasal sinuses (PNS) and those patients were subjected to diagnostic nasal endoscopy. Patients were diagnosed with symptoms of chronic rhino sinusitis following Rhinosinusitis Task Force of the American Academy of Otolaryngology–Head and Neck Surgery which has developed a now well-accepted classification of rhinosinusitis, which was reported by Lanza and Kennedy.^{3,9} This classification relies on two major criteria that help to identify whether or not a patient has rhinosinusitis primarily on the basis of symptoms.

Major factors being facial pain on pressure, nasal blockage, nasal discharge or purulence or discolored post

nasal discharge, hyposmia, anosmia. Minor symptoms/signs being headache, fever (non acute rhino sinusitis), halitosis, fatigue, dental pain, cough, ear pain/pressure/fullness. Patients having these symptoms more than consecutive 12 weeks were diagnosed to be suffering from chronic rhino sinusitis and were taken as study material.

Study period: September 2016 – September 2017.

Inclusion criteria

Patient aged between 15–45 years with symptoms of chronic rhino sinusitis more than 12 weeks confirmed by HRCT PNS.

Exclusion criteria

Patients with history of allergic rhinosinusitis, asthma, systemic diseases like cystic fibrosis and tuberculosis, acute maxillary sinusitis, sinusitis of dental origin, fungal sinusitis, nasal polyposis, previous h/o surgeries like Functional Endoscopic Sinus Surgery (FESS) and intranasal antrostomy and h/o facial fractures were excluded.

All the patients were then subjected to high resolution computed tomography scan to reconfirm the clinical diagnosis of chronic maxillary sinusitis radiologically. All patients were investigated under local anesthesia. Topical anesthetic with decongestant were used to anesthetize the nasal cavity before endoscopy. Cotton pledgets are dipped in this solution, squeezed dry, and used to pack the nasal cavity at different sites: Inferior Meatus, Middle Meatus and on the septum. Packs are left in place for 5 minutes.

All patients were investigated using 0 degree endoscope by the same surgeon.

The endoscopic examination of the nasal cavity and the lateral nasal wall was done in 3 steps:

1. Inspection of the nasal vestibule, inferior meatus and nasopharynx
2. Examination of sphenoid-ethmoidal recess
3. Examination of the middle meatus after medialising the middle turbinate gently with a septal elevator. A detailed examination of the lateral wall was done and structures like uncinat process, bulla ethmoidalis, hiatus semilunaris, infundibulum, anterior and posterior fontanelles.

Examination of the anterior and posterior fontanelle was done carefully to identify the presence or absence of circulating mucus, and whether the defect is anterior and posterior in relation to the uncinat process. Endoscopic examination was done on both sides of the nasal cavities.

Informed written consent was obtained from each subject following a detailed explanation of the objectives and the protocols of the study, which was conducted in accordance with the ethical principles stated and approved by the institutional ethical committee.

Statistical analysis was done using SPSS version 23. Data collected were subjected to frequency and percentage calculation.

RESULTS

The study group consisted of total 100 patients among whom 56 were male patients and 44 were female patients. Ages of the study group ranges from 15 to 45 years.

Table 1: Age and sex distribution.

	Frequency (n=100)	Percentage (%)
Gender		
Male	56	56
Female	44	44
Age (in yrs)		
15-25	13	13
26-35	30	30
36-45	57	57

Accessory maxillary ostia were detected in 23 cases and in rest of the 77 cases it was absent. Among the 23 cases in 8 cases accessory ostia were found to be bilateral and in 15 cases it was found to be unilateral.

Table 2: Incidence of AMO.

Accessory maxillary ostia (AMO)	Frequency (n=100)	Percentage (%)
Present	23	23
Absent	77	77

Among the unilateral cases 5 were in the right nasal cavity and 3 were found to be in the left nasal cavity. Out of these cases 2 were in only anterior fontanelle and majority that is 19 were in posterior fontanelle and in 2 cases accessory ostia were present in both anterior and posterior fontanelle.

Table 3: Accessory maxillary ostia (AMO).

	Frequency (n=23)	Percentage (%)
Bilateral	8	35
Unilateral	15	65
Location of AMO		
Anterior fontanelle	2	8.6
Posterior fontanelle	19	82.8
Both	2	8.6

Among the 23 cases where accessory ostia were seen, in 9 cases only accessory ostia were found. Where as in 4 cases it was associated with concha bullosa, in 15 cases there was deviated nasal septum and in 2 cases paradoxical middle turbinate were found to be present.

Table 4: Accessory maxillary ostia with anatomical variations.

	Frequency	Percentage (%)
Only AMO	9	39.13
AMO with concha bullosa	4	17.39
AMO with DNS*	15	65.22
AMO with paradoxical middle turbinate	2	8.7

*DNS- Deviated nasal septum.

DISCUSSION

Chronic rhinosinusitis is a common disorder of otorhinolaryngology clinic. Impaired drainage and reduced ventilation of the paranasal sinuses are known to increase the risk of a more long standing inflammatory process. According to Joe et al since the beginning of the endoscopic era in the field of rhinology, the term “accessory ostium” of the maxillary sinus have been frequently emphasized.¹⁰ These defects have been categorized as iatrogenic (surgically created) or accessory ostium (presumed to be physiological). However, they have been clinically related to chronic inflammation of the maxillary sinus by few authors, Gutman and Houser et al.¹¹

In our study 100 patients having symptoms of chronic rhino sinusitis for more than 12 weeks were included as study material which included both the sexes and age group ranging from 15 to 45 years. Patients with allergic rhinosinusitis, post sinus surgery patients and sinusitis due to dental infections were excluded from our study.

Mladina R et al, in their study have taken 723 patients visiting the outpatient department with the chief complaint of post nasal drip as leading symptom as the study group and 312 patients without any nasal complaints have been included in the control group.¹²

Albu et al conducted a prospective randomized study in which 133 patients with chronic rhinogenic sinusitis were taken as the study group and were subjected to intra operative endoscopic examination while undergoing ethmoidal surgery and middle meatal antrostomy.¹³

In a study conducted by Sahin et al a total of 100 patients who had endoscopic sinus surgery for chronic rhinosinusitis constituted the study group while 100 patients who had septoplasty were taken as the control group.¹

In our study 56% patients were male and 44% were female. In a study conducted by Hussein et al the study group comprises of 44% males and 56% female patients; whereas the control group comprises of 51% males and 49% female patients.¹⁴

Our study included age group between 15-45 years of age group. In their study Hussein et al had taken 13-47 years of age group as the study group the mean age being 26.92.¹⁴ Sahin et al in their study has taken the age group between 16 to 65 years as the study group the mean age being 38 years.¹

In our study 100 patient visiting ENT outpatient department following the inclusion criteria were taken as the study material after they underwent high resolution CT scan of paranasal sinuses to confirm the diagnosis of chronic maxillary sinusitis. Then they were examined under local anesthesia using 0 degree endoscope by the same investigator. Presence or absence of accessory maxillary ostia was noted along with other anatomical variations.

In a study done by Hussein et al 54 patients having chronic rhinological symptoms were investigated radiologically and were classified into 2 groups according to the radiological findings.¹⁴ Among these 25 patients with the radiological evidence of isolated chronic maxillary sinusitis were taken as group A (case) and rest 29 patients without any radiological signs of maxillary sinusitis were taken as group B (control). Both the groups were subjected to diagnostic nasal endoscopy using 0 degree endoscope and findings were recorded. Group A patients were reexamined following FESS after 1 week, 1 month, 3 months, 6 months using 0 degree endoscope and also via canine fossa approach using 30 degree endoscope.

In a study done by Sahin et al, 100 patients posted for FESS were taken as the study group and 100 patients undergoing septoplasty surgery were taken as the control group and were all subjected to endoscopic examination of the lateral nasal wall intra operatively and the findings were noted.¹

In the present study we found out 23 out of 100 patients having clinical as well as radiological signs of chronic rhino sinusitis presented with accessory maxillary ostia; among them 35% were bilateral and 65% were unilateral. Among these ostia 8.6% were found to be in the anterior fontanelle and 82.8% that is the majority in the posterior fontanelle. In the rest 8.6% of the cases accessory ostia were found in both the anterior and posterior fontanelle region.

Mladina et al used a fiber optic endoscope to investigate accessory ostia in patients with chronic rhinosinusitis.¹⁵ They reported the prevalence of accessory maxillary ostia

as 19.3% in patients suffering from chronic rhino sinusitis. According to their study 68% were bilateral and only 0.61% were only in the anterior fontanelle.

Our results are supported by a study done by Hussein et al which shows the overall prevalence of accessory ostia is 16.67%.¹⁴ The study also states that double accessory ostia i.e., both the anterior fontanelle and posterior fontanelle were found in 11.11% of the cases.

In support of these data, Jog and McGarry et al in their study investigated the association and prevalence of accessory ostia and reported that 8% of patients suffering from rhinosinusitis had accessory ostia.¹⁶

Sahin et al in their study found the prevalence of accessory ostia in the chronic rhino sinusitis group to be 14%.¹ Among these cases 92.8% were in the posterior fontanelle and 7.2% were in the anterior fontanelle. Their study also supports our result which shows 65% of the accessory ostia were unilateral and only 35% were bilateral.

Our study also shows among the 23 cases where accessory ostia were seen, in 39.13% of the cases only accessory ostia were seen, in 17.39% cases it was associated with concha bullosa, in 65.22% of cases deviated nasal septum was seen and in 8.7% of the cases paradoxical middle turbinate were seen. A study conducted by Joe et al also supports our data, where 15% of the cases with accessory ostia also had concha bullosa and 2% had paradoxical middle turbinate.⁷

CONCLUSION

To conclude, the present study revealed close association of accessory ostia with chronic maxillary rhino sinusitis. It was also found that majority of the cases accessory ostia were found to be unilateral and were frequently found in the posterior fontanelle region. A possible mechanism of formation of accessory ostium is obstruction of the main ostium by mucosal edema caused by chronic sinusitis or due to anatomical or pathological factors in middle meatus resulting in rupture of membranous part of the lateral nasal wall.² Recirculation of mucus between the adjacent openings into the maxillary antrum is relatively common cause for persistent sinusitis in either pre or postsurgical patients and fontanelle defects could also serve as maintainers of a chronic inflammation of the maxillary sinus. So we conclude that the anatomical knowledge about the presence of accessory ostia is important while treating chronic maxillary sinusitis surgically. The surgeon should be aware of the accessory ostia while performing middle meatal antrostomy and should include the posterior or anterior fontanelle into the surgical antrostomy to reduce the chances of recirculation of mucus in postoperative period which may lead to recurrence of sinusitis.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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