Original Article

Endoscopic Sinus Surgery in the Management of Inflammatory Sinonasal Disease

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Abstract

Background: *Inflammation of the nose and paranasal sinus is a clinical problem frequently encountered in the practice of otolaryngology in our country. Endoscopic sinus surgery is a minimally invasive technique for the evaluation and treatment of inflammatory sinonasal disease. Endoscopic sinus surgery is used to restore sinus ventilation and normal function of sinuses.*

Objectives: *To see the outcome of endoscopic sinus surgery associated with inflammatory sinonasal diseases.*

Materials and Methods: *It is a prospective observational study carried out in ENT &Head Neck surgery of Shaheed Suhrawardy Medical College Hospital Dhaka from April 2016 to September 2016.Fifty(50) patients were enrolled in this study. Data was collected by Structural Questionnaire.*

Results: *The majority of patients were 21-30years age group. The mean age group was 35.32 years, Male: male-to-female ratio was 1.3:1. The Majority of cases were antrochoanal polyps followed by an ethmoidal polyp, chronic maxillary sinusitis, and fungal rhinosinusitis. The majority of patients came with nasal obstruction and nasal discharge. Polyp was found in the majority of cases. A major complication was found in hemorrhage. Symptomatic improvement was found following endoscopic sinus surgery.*

Key words: *Endoscopic Sinus Surgery, Sinusoidal Disease, Complications.*

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Introduction

Inflammatory sinonasal disease is a clinical problem frequently encountered in the practice of otolaryngology department.[1] The most common of these inflammatory illnesses are allergic rhinitis, nasal polyposis, acute and chronic rhinosinusitis.[2] Endoscopic sinus surgery is now a days regarded as the gold standard for treatment of chronic rhinosinusitis with or without nasal polyposis refractory to optimal medical treatment. This surgery is based on the principles of improved function and patency of the stomatal complex through interventions in the sidewall of the nose.[3] Endoscopic sinus surgery involves improvement of ventilation and drainage of maxillary sinus in chronic sinusitis with return to normal sinus mucosa.[4]

Nasal polyposis consisting of multiple, bilateral polyps, is part of inflammatory reaction involving the mucous membrane of nose and paranasal sinuses. Endoscopic sinus surgery is added to medical treatment in order to reduce the amount of inflammatory tissue, open up the nasal airway and improve ventilation of the paranasal sinus.[5] Fungal rhinosinusitis encompassess a wide varity of fungal infections that range from merely irritating to rapidly fatal. Fungal rhinosinusitis is the most appropriate to describe the fungal infection in the paranasal sinuses since concomitant involvement in nasal cavity is seen in most cases.[6] Noninvasive fungal rhinosinusitis includes fungal ball and allergic fungal rhinisinusitis.Treatment consist of surgical removal of fungus ball by an endonasal approach under endoscopic guidance after enlargement of the natural ostium of the infected sinuses.[7]

Endoscopic sinus surgery provides an excellent and safe method for treating sinonasal disease. ESS has proven to be a better surgical and therapeutical technique means over the conventional methods. The success rates are encouraging but because of the nature and chronicity of the disease, longer follow-up may be necessary to truely assess the surgical effectiveness of the procedure.[8]

There are so many patients with inflammatory sinonasal disease existing in our country. But only a few study was done. The aim of this study is to see the outcome of endoscopic sinus surgery in the management of inflammatory sinonasal disease by completely removing the disease along with symptomatic improvement of the patient by keeping regular follow up.

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Materials and Methods

It was a prospective observational study that was carried out in the Department of ENT & Head-Neck Surgery of Shaheed Suhrawardy Medical College Hospital, Dhaka, within the period of six months (April 2016 to September 2016). Selected 50 (fifty) patients were included in this study. Data was collected by structured questionnaire and analysis was done with the help of SPSS (Statistical Package for Social Science) version-17. Patients were diagnosed clinically and radiologically as inflammatory sinonasal disease such as chronic rhinosinusitis, fungal rhinosinusitis, and nasal polyposis (antrochoanal polyp, ethmoidal polyp). Each of the patients admitted to the hospital for ESS and per operative findings was recorded. After the operation patient was followed up at 7th postoperative day(1st week) and subsequently patient was followed up at 1st month and 3rd month. During each visit, they were subjected to routine ENT examinations such as intranasal examinations. But special attention was given on important symptoms like hemorrhage, blood clot, nasal block, crust, synechia and CSF leakage, etc. The subjective and objective evaluations were carried out by asking the patients whether the symptoms were present or not.

Results

Total 50 cases ,20% of the patients were in the age group of less than 20 years, 24% of the patients were in 21 – 30 years of age group, 22% of the patients were in the age group of 31 – 40 years and mean age was 35.32 years (table-I) , there was male predominance and male female ratio was 1.38:1 (figure-I) . 54% patients were operated for antrochoanal polyp, 24% for ethmoidal polyp, 16% for chronic maxillary rhinosinusitis and 6% for chronic fungal rhinosinusitis (figure-II). Presenting symptoms were nasal obstruction 84%, nasal discharge 80%, headache 60%, smell disturbance 56% (table-II) . Preoperative findings was summarized in table-III, where nasal polyp were present by both anterior and posterior rhinoscopy in 100% and 30% cases respectively. 78% patients showed reduced patency by nasal patency test and reduced smell in 44% respondents by smell test. In this study Computed tomography (CT) findings shows mucosal thickening (100%), blocked osteomeatal complex (44%), septal deviation (12%), paradoxical middle turbinate (12%) and concha bullosa (6%) [table-IV]. In this study per operative endoscope showed that all the respondents had polyp, 26% had septal deviation, inflammatory exudate were present in 48% respondents, 22% had marked enlargement of bullae, 14% had concha bullosa & 12% had abnormal uncinate process (table-V). In 1st Post operative follow up showed blood clot, nasal block, crust formation and haemorrhage 96%, 94%, 12% & 8% respectively. In 2nd post operative follow up crust formation and nasal block were 42% & 8%. In 3rd follow up only 2% respondents had synechia (table-VI). In this study, minor complication like hemorrhage were present 88% and 10% in the study population as per operative and post operative complications respectively. Only 6% respondents had periorbital ecchymosis and 4% developed synechia as post operative complication (table-VII). In this study, relation of indication of endoscopic sinus surgery with age group of the respondents summarized in table-VIII. Result showed that 20% antrochoanal polyp were operated in age group of less than 21 years, 14% antrochoanal polyp were operated in age group 31-40 years and 12% ethmoidal polyp were operated in age group 21-30 years. In this study, symptomatic improvement of nasal obstruction, nasal discharge, headache and nasal voice were summarized in table–IX. The results is statistically significant (P< 0.05). Improvement of symptoms like nasal obstruction, nasal discharge, headache and nasal voice following operation were observed in 70%, 64%, 34% and 12% patients respectively.

Table I: Age distribution of the respondents (n=50)

Age group (in years)	Frequency	Percentage (%)	Mean±SD
20 and below	10	20	
21 -30	12	24	35.32±14.61
31 -40	11	22	
41 -50	11	22	
51 -60	02	04	
61 and above	04	08	
Total	50	100	

Age distribution of the respondents is summarized in Table I. Results showed that the majority of the respondents were 21-30 years age group (24%). Only 04% of respondents were 51-60 years age group. The mean age of the respondents was 35.32 (±14.61) years.

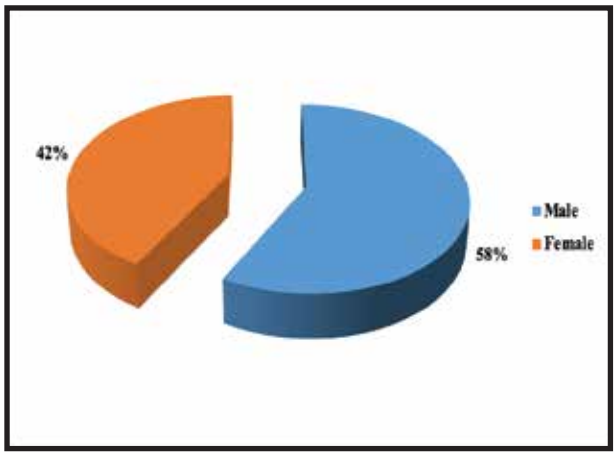

Figure 1: Gender distribution of the respondents (n=50)

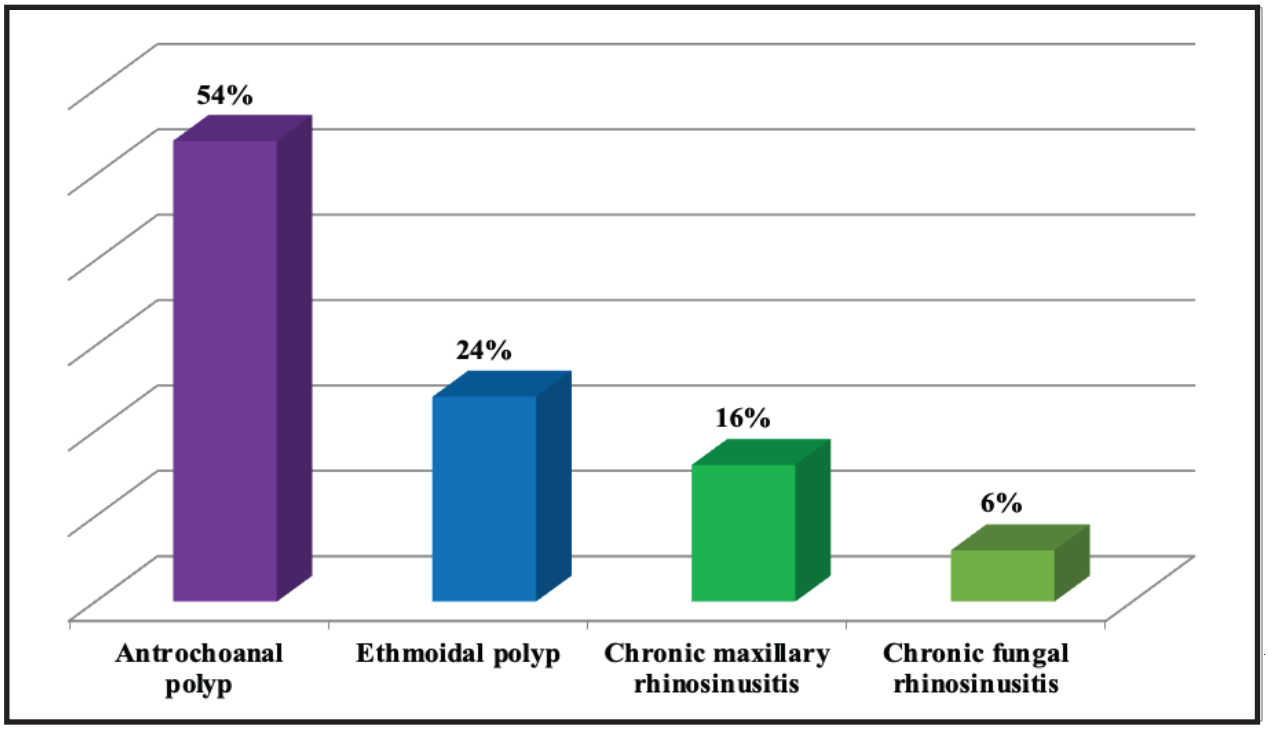

Figure 2: Distribution of the respondents by Indication for ESS (n=50)

In Figure II, the indication for endoscopic sinus surgery is summarized. Results showed that major indications of ESS were Antrochoanal polyp (54%) followed by Ethmoidal polyp (24%), Chronic maxillary rhinosinusitis (16%) and Chronic fungal rhinosinusitis (6%).

Table II: Distribution of the respondents by Presenting complaints (n=50)

Symptoms	**Frequency**	**Percentage**(%)
Nasal obstruction	42	84
Nasal discharge	40	80
Nasal voice	08	16
Headache	30	60
Hyposmia or Anosmia	28	56
Others(nasal bleeding, foul breath)	06	12

Presenting complaints of the respondents are presented in Table II. Results showed that 84% of the respondents came with nasal obstruction followed by nasal discharge 80% and 12% of respondents came with other complaints like nasal bleeding & foul breath.

Table III: Distribution of the respondents by pre-operative findings (n=50)

Pre -operative findings	Frequency	Percentage (%)
Anterior Rhinoscopy		
Polyp	50	100
Septal deviation	15	30
Posterior Rhinoscopy		
Polyp	15	30
Nasal patency test		
Present	05	10
Reduced	39	78
Absent	06	12
Smell test		
Present	15	30
Reduced	22	44
Absent	13	26

Pre-operative findings of the respondents were summarized in the Table III. Results showed that polyp was present in both anterior and posterior rhinoscopy in 100% cases and 30% cases respectively. Majority of the respondents showed reduced patency in nasal Patency test (78%). In Smell test 44% respondents showed reduced smell ability.

Table IV: Distribution of the respondents by Radiological findings (CT Scan) (n=50)

Radiological findings	**Frequency**	**Percentage (%)**
Mucosal thickening	50	100
Blocked OMC (Osteometal complex)	22	44
Septal deviation	06	12
Paradoxical middle turbinate	06	12
Agar nasi pneumatisation	00	00
Concha bullosa	03	06
Others (dilatation of middle meatus)	01	02

Table IV shows Radiological (CT scan) findings of the respondents. Findings of CT scan revealed that all of the respondents had mucosal thickening (100%). Blocked OMC was in 44% respondents. Only 02% respondents had other finding like dilatation of middle meatus.

Table V: Distribution of the respondents by Per-operative findings (n=50)

Per - operative findings	Frequency	Percentage (%)
Polyp	50	100
Septal deviation	13	26
Marked enlargement of bullae	11	22
Concha bullosa	07	14
Abnormal uncinate process	06	12
Accessory ostium	03	06
Paradoxical middle turbinate	03	06
Agar nasi pneumatisation	02	04
Inflammatory exudates	24	48

Table V reports the per-operative findings of the respondents were presented. Results showed that all of the respondents had polyp 100%. Inflammatory exudates were present in 48% of respondents. Only 04% of respondents had agar nasi pneumatisation.

Table VI: Distribution of the respondents by post-operative follow-up (n=50)

Follow up	Haemorrhage	Blood clot	Nasal block	Crust	Synechia	CSF Leakage
1 st week	04 (08%)	48 (96%)	47 (94%)	06 (12%)	_	_
1 st month	_	_	04 (08%)	21 (42%)	01 (02%)	_
3 rd month	_	_	_	_	01 (02%)	_

The postoperative follow-up of the respondents was summarized in Table VI. Results showed that the highest 96% of respondents had blood clots in 1st week of follow-up. In 1st month follow up 42% of respondents had crust. Only 02% of respondents had synechia in 3rd month follow-up.

Table VII: Distribution of Respondents by Complications (n=50)

Complications	Per- operative	Post- operative
Haemorrhage	44 (88%)	05 (10%)
Periorbital ecchymosis	-	03 (06%)
Synechia/Adhesion	-	02 (04%)
CSF leakage	-	-

Per-operative and post-operative complications of the patients were observed in Table VII. Results showed that haemorrhages were present in 88% and 10% of respondents as per-operative and post-operative complications respectively. Only 06% patients developed periorbital ecchymosis and 4% respondents had synechia formation as a post-operative complication.

Table VIII: Relation of Indication of operation with Age group of the respondents (n=50)

The age group of respondents (in years)	Indication of operation			
	Antrochoanal polyp	Ethmoidal polyp	Chronic maxillary rhinosinusitis	Chronic fungal rhinosinusitis
Less than 21	10 (20%)	0 (0%)	0 (0%)	0 (0%)
21 -30	6 (12%)	6 (12%)	0 (0%)	0 (0%)
31 -40	7 (14%)	1 (2%)	0 (0%)	3 (6%)
41 -50	2 (4%)	5 (10%)	4 (8%)	0 (0%)
51 -60	2 (4%)	0 (0%)	0 (0%)	0 (0%)
More than 61	0 (0%)	0 (0%)	4 (8%)	0 (0%)

The relation of indication of Endoscopic Sinus Surgery with the age group of the respondents were summarized in Table VIII. Results showed that 20% antrochoanal polyps were operated in age group of less than 21 years. 14% antrochoanal polyp were operated in age group 31-40 years. 12% ethmoidal polyps were operated in age group 21-30 years.

Table IX: Symptomatic improvement of patients undergone Endoscopic sinus surgery (n=50)

Symptoms	Improvement of symptoms		Chi - square test
	Improved	Not - Improved	x^2 =11.84
Nasal obstruction	35 (70%)	07 (14%)	p = 0.0185
Nasal Discharge	32 (64%)	08 (16%)	
Nasal voice	06 (12%)	02 (04%)	The result is
Headache	17 (34%)	13 (26%)	significant at p <0.05
Smell sensitivity	15 (30%)	13 (26%)	

Symptomatic improvement of patients who undergone Endoscopic Sinus Surgery were summarized in the Table IX. Results showed that improvement of nasal obstruction, nasal discharge, headache & nasal voice were observed in 70%, 64%, 34% and 12% patients respectively. Results showed that improvement of symptoms following operation were significant at $p < 0.05$.

Discussion

Endoscopic sinus surgery have recently become a popular technique among otolaryngologist of Bangladesh. Endoscopic sinus surgery undoubtedly offer excellent visualization and the opportunity for precious surgery and is the favoured technique of many.[1,3] Endoscopic sinus surgery is now a days a common and excellent method for the treatment of sinonasal diseases. A significant component in the success of endoscopic sinus surgery is the meticulous clearing of surgical cavity.[2-4,7]

In this series, 20% of the patients were in the age group of less than 20 years, 24% of the patients were in 21 – 30 years of age group, 22% of the patients were in the age group of 31–40 years and mean age was 35.32 years. It is consistent with the findings of Rahman MZ et al[10] and Saha Lk et al.[11] As both the study were conducted in a tertiary hospital in same demographic population, so is the explanation of such consistency of both study. Srivastab M et al[12] mentioned in his study that 27.5% were in age group of less than 20 years, 32.5% were in the age group of 21–30 years, 18.7% were in the age group of 31–40 years and 7.5% were in the age group of 41–50 years.

In this study, there is a male predominance and male female ratio was 1.38:1 which is nearly similar to some other series[10,13]. Male gender are socially and financially more privileged in Bangladesh. Women in Bangladesh have limited access to health care facility, so this explains the male predominance in this study. This study is dissimilar with Venkatachalam[14] because this study was conducted in different geographic population and different setting.

In this study, 54% patients were operated for antrochoanal polyp, 24% for ethmoidal polyp, 16% for chronic maxillary rhinosinusitis and 6% for chronic fungal rhinosinusitis . It is almost similar to Mustofa G et al.[15] Several diseases entitles including inflamatory sinonasal diseases were treated endoscopically by Alam MM et al, James A et al and Kennedy D et al. Their study findings simulates with the findings of this study.[16-18]

The presenting symptoms of the patients in this study were nasal obstruction. The presenting symptoms of the patients in this study were nasal obstruction 84%, nasal discharge 80%, headache 60%, smell disturbance 56% which is consistent with findings of Saha Lk et al11 and Mostofa G et al.[15] Shahbaz MG et al[16] mentioned in his study that main presenting symptoms were nasal discharge 50%, nasal obstruction 96%, post nasal drip 36%, nasal mass 46%, headache 22%. The presenting symptoms of the study population of their study is also similar to this study. This result is more or less similar with Gross et al.[17]

Preoperative findings of inflammatory sinonasal diseases where nasal polyp which were present by both anterior and posterior rhinoscopy in 100% and 30% cases respectively. 78% patients showed reduced patency by nasal patency test and reduced smell in 44% respondents by smell test. Kamel et al[18] mentioned in his study that 76% patient had ethmoidal polyp, 8% had antrochoanal polyp and 14% had non-specific polypoidal nasal mass as preoperative findings.

Computed tomographic scan of paranasal sinuses is the radiological procedure of choice.[19] A CT scan will show the extent of sinonasal polyp, anatomical variations and is essential if surgical treatment is to be implemented.[20] In this study Computed tomography (CT) findings shows mucosal thickening (100%), blocked osteomeatal complex (44%), septal deviation (12%), paradoxical middle turbinate (12%) and concha bullosa (6%) . The CT findings of this study are nearly similar to other study[21] CT findings of PNS were also similar to Saha KL et al19 .Bajuliya S et al[22] mentioned in his study that mucosal thickening, blocked osteomeatal complex, septal deviation and paradoxical middle turbinate were present in 76.25%, 45%, 62.5% & 28.7% patients respectively. Nasal endoscopy with rigid endoscopes is the preferred examination procedure. It is useful for the diagnosis, assessment of the extent of disease and anatomical abnormality and for the staging of diseases.[23] Endoscopic sinus surgery was performed using Messerklinger technique according to need and minimal surgery was done to preserve the normal physiology and anatomy of sinus as much as possible. Endoscopic sinus surgery was performed under general anaesthesia. In this study per operative endoscope showed that all the respondents had polyp, 26% had septal deviation, inflammatory exudate were present in 48% respondents, 22% had marked enlargement of bullae, 14% had concha bullosa & 12% had abnormal uncinate process . This is consistant with other study.[24]

In this study, 1st Post operative follow up showed blood clot, nasal block, crust formation and haemorrhage 96%, 94%, 12% & 8% respectively. In 2nd post operative follow up crust formation and nasal block were 42% & 8%. In 3rd follow up only 2% respondents had synechia. This result is consistent with Shaifuddin AKM et al[24] where 80% patient reported pain in 1st post operative follow up which sharply decline subsequently. Blood clot and nasal block were minimal in 1st post operative follow up. Blood clot and nasal block were disappeared in 2nd post operative follow up. In this series, minor complication like hemorrhage were present 88% and 10% in the study population as per operative and post operative complications respectively. Only 6% respondents had periorbital ecchymosis and 4% developed synechia as post operative complication. This result is similar to Saha KL et al[11] and Gross et al.[17] In past studies, life threatening complications like CSF leakage, meningitis or blindness were encountered. No life threatening complications like CSF leakage or periorbital harmorhage or blindness were observed in this study. In course of time, there has been improvement in the ESS technique, advancement in powered instruments, advanced in imaging technology and improvement in surgical skills. This may explain reduction of life al threatening complication in this study and recent study of Saha KL et al and Shaifuddin AKM et al as well. Srivastab M et al[12] mentioned in his study that 2.5% patient had hemorrhage and synechia formation as post operative complication. 1.25% patient had diplopia and blurring of vision as post operative complication. So similar complication were also seen in this study which is nearly similar in frequency with other studies.[11,17]

In this study, relation of indication of endoscopic sinus surgery with age group of the respondents has showned. Result showed

that 20% antrochoanal polyp were operated in age group of less than 21 years, 14% antrochoanal polyp were operated in age group 31-40 years and 12% ethmoidal polyp were operated in age group 21-30 years. This study is similar to Saha KL et al.[11] The result differ from a study of Smith LF et al[25] where ethmoidal polyp were 52.4% and chronic sinusitis 47%. Over all frequency of antrochoanal polyp was described in this text were 20% in less than 21 years of age. Different text also support that antrochoanal polyp presents in younger age population.

In this study, symptomatic improvement of nasal obstruction, nasal discharge, headache and nasal voice were summarized. The results is statistically significant ($P< 0.05$). Improvement of symptoms like nasal obstruction, nasal discharge, headache and nasal voice following operation were observed in 70%, 64%, 34% and 12% patients respectively. Improvement of symptoms were nearly similar in a study by Shah KL et al. In a study Smith et al[26] mentioned that improvement of symptoms following operation were more that 80% cases. Mostofa G et al[15] mentioned in his study that over all 85% patient had improved and 8.33% had no improvement following. Their study revealed major improvement of symptoms following endoscopic sinus surgery though no statistical test were done.

In this study patients who were diagnosed having inflammatory sinonasal disease undergone endoscopic sinus surgery and result shows significant improvement of symptoms following surgery.

Conclusion

Endoscopic sinus surgery provides an excellent and safe method for treating inflammatory sino nasal diseases. The success rates are encouraging but because of nature and chronicity of the disease, longer follow up may be necessary to truly assess the surgical effectiveness of the procedure. Endoscopic sinus surgery has proven to be a better surgical and therapeutic technique means over the conventional methods and has opened a new horizon for possibilities of positive results in further studies and more complicated cases work to be performed in the hands of further inquisitive workers.

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