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Original Research Article

Comparative evaluation of FESS and septoplasty with FESS in cases of DNS with chronic maxillary sinusitis

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ABSTRACT

Background: Present study compares basic FESS and septoplasty with FESS alone in DNS with maxillary sinusitis.
Methods: Sixty patients of DNS with chronic maxillary sinusitis were divided into two groups alternatively. After pre-operative symptoms score and computerized tomography (CT scan), twenty patients underwent FESS with septoplasty (group A) and other 20 underwent FESS alone (group B) under local anaesthesia and topical 4% lignocaine with 1:1000 adrenaline. At 6 weeks, post-operative symptom score and CT scan findings were documented and compared statistically by using unpaired student t-test.
Results: Ninety six percent of patients in group A and 87.6% in group B have shown complete improvement in facial pain/pressure. Ninety three percent of patients in group A and 83.3% in group B have shown complete improvement in headache. Ninety percent patients in group A and 63.3% in group B has shown complete improvement in nasal obstruction. Seventy six percent of patients in group A and 63.3% of patients in group B have shown complete improvement in nasal discharge. Eighty six percent and 63.3% of patients in group A and group B respectively were satisfied from the surgery. Ninety three percent of patients in group A and 70% in group B were found to have normal maxillary sinus mucosa on HRCT nose and PNS after 6 weeks following surgical treatment. Hundred percent patients in group A and 96.7% of patients in group B were found to have normal OMC on HRCT nose and PNS 6 weeks after surgery.
Conclusions: It was observed that FESS with septoplasty is effective for the treatment of chronic rhinosinusitis with deviated nasal septum on VAS as well as radiologically (the Lund and Mackay staging system: radiologic staging) than FESS alone.

Keywords: Deviated nasal septum, MMA, Sinusitis

INTRODUCTION

The term sinusitis refers to a group of disorders characterized by inflammation of the mucosa of paranasal sinuses (PNS). The inflammation nearly always involves the nose, therefore, the term rhinosinusitis (CRS) is used. Chronic rhinosinusitis is defined as two major symptoms/signs (facial pain/pressure, facial congestion/fullness, nasal blockage, nasal discharge, hyposmia/anosmia, purulence on nasal examination) or one major and two minor symptoms/signs (headache, fever, halitosis, fatigue, dental pain, cough, ear pain/pressure/fullness) for more than 12 weeks duration.[1]

Although multiple causes of CRS exist, following are the common anatomical causes that can interfere with the mucociliary drainage of osteomeatal complex apart from the infective, allergic, environmental and genetic factors: deviated nasal septum (DNS), concha bullosa, paradoxical middle turbinate, haller cells, agger nasi cells, ethmoidal bulla variants.[2] The nasal septum though primarily a support structure of the nose is also important

in the nasal physiology.[3] DNS leads to increased chance of impaired mucociliary clearance, ostiomeatal complex obstruction and development of rhinosinusitis.[4] Sinusitis is usually more severe on opposite side of deviated nasal septum.[5] During the first part of the twentieth century, treatment of chronic maxillary sinusitis refractory to medical treatment has been open surgical procedures like inferior meatal enterostomy, antral wash and Caldwell Luc approach.[6] In these procedures, the disease process was primarily addressed and not the underlying cause and physiology of sinuses which leads to recurrence of the disease process. Functional endoscopic sinus surgery (FESS) was introduced to USA in 1985 by David Kennedy and years before in Europe by Messenklinger and Stammberger.[7-9] With this technique, the narrow anatomical region of the ostiomeatal complex can be visualized and accurately approached surgically and focuses on treating the underlying cause.

Coronal computerized tomography (CT) has become investigation of choice to diagnose CRS as it simulates endoscopist's view of sinonasal cavity. As functional endoscopic sinus surgery has become a more widespread technique, coronal computed tomography has become the primary imaging modality, replacing plain radiography.[10] CT scan is also mandatory prior to FESS to know the anatomy of sinonasal cavity, the extent of the disease as well as any underlying anatomic abnormalities that may predispose a patient to rhinosinusitis and provides precise guidance for therapeutic endoscopic instrumentation.[11] The association between DNS and CRS is well reported, septoplasty was therefore considered in the surgical management of rhinosinusitis apart from functional endoscopic sinus surgery or sometimes together. Lately, studies have revealed the role of septoplasty in curing CRS in patients with significant septal deviation. The success rate was higher in patients with septoplasty alone as compared to those in FESS with septoplasty suggesting adequacy of septoplasty alone in management of DNS with chronic maxillary sinusitis.[12,13] However, the adequacy of FESS alone in management of DNS with chronic maxillary sinusitis is not well documented.

The present study compares FESS and septoplasty with FESS alone in cases of DNS with chronic maxillary sinusitis.

METHODS

The present study involves 60 patients suffering from DNS with chronic maxillary sinusitis after medical treatment failure (patients being involved of only one maxillary sinus, visible anterior end of middle turbinate and OMC on nasal endoscopy after adequate decongestion). Patients of sinusitis with nasal polyps (on rhinoscopy), mass, revision surgery, bilateral sinusitis, impacted DNS were excluded from the study. It is a prospective study and patients were divided into two groups:

- Group A: Patients undergoing FESS (inferior uncinectomy with MMA) and Septoplasty
- Group B: Patients undergoing FESS (inferior uncinectomy with MMA) alone.

The enrolled patients after fulfilling all the inclusion criteria were worked up by detailed history about the symptoms (facial pain/pressure, headache, nasal blockage/congestion, nasal discharge and overall discomfort). The patients were asked to mark on a visual analog score their symptoms severity, for each named symptom, on a score of 0-10 (0 being no symptoms and 10 maximum). Their symptoms were classified in to mild (1-4), moderate (5-7) and severe symptoms (8-10). Detailed clinical examination (nasal endoscopy, throat and ear examination) was done along with general body examination. The patients were subjected to HRCT Nose and PNS (coronal and axial views) for anatomy and disease of sinuses (Lund and Mackey radiological staging system was applied) with thin 1 mm axial sections with both coronal and sagittal sections reconstruction. Only OMC and maxillary sinus were taken in to account for analysis purpose and grading were given according to opacification on CT scans. Patients were subjected for surgery after relevant investigations.

After PAC clearance for procedure under LA (pterigopalatine block)/GA, operative procedure was explained to the patients. Nasal mucosa is decongested with topical adrenaline diluted in 4% lignocaine solution. In LA cases, transoral pterigopalatine block was given apart from topical anaesthesia and decongestion.

Figure 1: Osteomeatal complex on right side.

Endoscopic septoplasty was performed in a traditional way. After septoplasty, nasal endoscopy was performed to visualize nasal cavity and lateral nasal wall (Figure 1). The middle meatus is visualized, free edge of the uncinate process is palpated and inferior uncinectomy done with back biting forceps (Figure 2). The natural sinus ostium of the maxillary sinus is next identified and widened postero-inferiorly towards accessory ostium (Figure 3).

Figure 2: Right inferior uncinectomy.

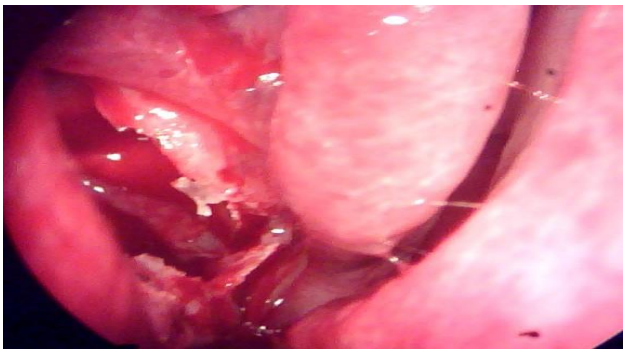

Figure 3: Right inferior uncinectomy and middle meatal enterostomy.

The pack is placed to provide light pressure on the septum to optimize healing and to prevent bleeding. Patients were instructed to put saline nasal spray hourly. Follow up visits were arranged at 1st, 4th and 6th weeks after surgery. Patients were reviewed at 6th week post op, for their symptoms relief subjectively using visual analog scale (the Lund and Mackay staging system: symptom score) and objectively by HRCT (PNS) scans (Lund and Mackey radiological staging system). Post-operative improvement at 6th week in both the groups was compared statistically by using unpaired student t-test.

RESULTS

There were 47% (78.3%) males and 13 (21.7%) female patients. Majority of patients (65%) were in the age group of 15-25 years. Twenty eight percent (17/60) of patients were having chronic maxillary sinusitis on same side to that of deviated nasal septum whereas 72% (43/60) were having chronic maxillary sinusitis on opposite side to that of deviated nasal septum. Ninety six percent (29/30) of patients in group A and 87.6% (26/30) in group B have shown complete improvement in facial pain/pressure (p value ›.05). Ninety three percent (28/30) of patients in group A and 83.3% (25/30) in group B have shown complete improvement in headache (p value ›.05). Ninety percent (27/30) patients in group A and 63.3% (29/30) in group B has shown complete improvement in nasal obstruction (p value ‹0.05). Seventy six percent (23/30) of patients in group A and 63.3% (19/30) of patients in group B have shown complete improvement in nasal discharge (p value ›0.05). Eighty six percent (26/30) and 63.3% (19/30) of patients in group A and group B respectively were satisfied from the surgery. Ninety three percent (28/30) of patients in group A and 70% (21/30) in group B were found to have normal maxillary sinus mucosa on HRCT nose and PNS after 6 weeks following surgical treatment (p value ‹0.05). Hundred percent (30/30) patients in group A and 96.7% (29/30) of patients in group B were found to have normal OMC on HRCT nose and PNS 6 weeks after surgery (p value ›0.05) (Table 1-6).

Table 1: Facial pain/pressure.

Groups				Facial pain/pressure - pre-op Pearson chi-square (0.412)			Total
				Normal	Mild	Moderate	
FESS with septoplasty	Facial pain/pressure - post op	Normal	Count	17	8	4	29
			% of total	56.7%	26.7%	13.3%	96.7%
		Mild	Count	0	0	1	1
			% of total	0%	0%	3.3%	3.3%
	Total Pearson chi-square =0.075		Count	17	8	5	30
			% of total	56.7%	26.7%	16.7%	100.0%
FESS	Facial pain/pressure - post op	Normal	Count	21	5	0	26
			% of total	70.0%	16.7%	.0%	86.7%
		Mild	Count	0	2	2	4
			% of total	0%	6.7%	6.7%	13.3%
	Total Pearson chi-square=0.000		Count	21	7	2	30
			% of Total	70.0%	23.3%	6.7%	100.0%

Table 2: Headache.

Groups				Headache - post op		Total
				Normal	Mild	
FESS with septoplasty	Pre-op (Pearson chi-square=0.857)	Normal	Count	14	0	14
			% of total	46.7%	0.0%	46.7%
		Mild	Count	9	1	10
			% of total	30.0%	3.3%	33.3%
		Moderate	Count	5	1	6
			% of total	16.7%	3.3%	20.0%
	Total Pearson chi square=0.343		Count	28	2	30
			% of total	93.3%	6.7%	100.0%
FESS	Headache - pre-op	Normal	Count	13	0	13
			% of total	43.3%	0.0%	43.3%
		Mild	Count	10	2	12
			% of total	33.3%	6.7%	40.0%
		Moderate	Count	2	3	5
			% of total	6.7%	10.0%	16.7%
	Total Pearson chi square=0.009		Count	25	5	30
			% of total	83.3%	16.7%	100.0%

Table 3: Nasal blockage/congestion.

Groups				Nasal blockage/congestion- pre-op Pearson chi-square (0.873)				Total
				Normal	Mild	Moderate	Severe	
FESS with septoplasty	Nasal blockage/congestion- post op	Normal	Count	1	9	16	1	27
			% of total	3.3%	30.0%	53.3%	3.3%	90.0%
		Mild	Count	0	0	2	1	3
			% of total	0.0%	0.0%	6.7%	3.3%	10.0%
	Total Pearson chi-square=0.196		Count	1	9	18	2	30
			% of total	3.3%	30.0%	60.0%	6.7%	100.0%
FESS	Nasal blockage/ congestion- post op	Normal	Count	1	7	11	0	19
			% of total	3.3%	23.3%	36.7%	0.0%	63.3%
		Mild	Count	0	5	4	2	11
			% of total	0.0%	16.7%	13.3%	6.7%	36.7%
	Total Pearson chi-square=0.186		Count	1	12	15	2	30
			% of total	3.3%	40.0%	50.0%	6.7%	100.0%

DISCUSSION

Chronic rhinosinusitis is one of the most common diseases in many parts of the world including India. CRS is a clinical diagnosis and imaging is only indicated after adequate medical treatment; therefore, imaging should be interpreted considering history, examination and response to medical treatment. Although CT provides a roadmap for endoscopic sinus surgery and information about the extent of mucosal disease, several studies have failed to correlate CT findings with symptoms severity at the time of presentation.[14] Examination of these patients may reveal other findings, such as nasal allergy, polyposis and anatomical abnormalities which may predispose to sinusitis.

Most important part of evaluation remains history. This includes nasal obstruction 96.6% (58/60) and nasal discharge 96.6% (58/60) which were the commonest symptoms in our patients, followed by headache 55% (33/60), facial pressure/pain 36.7% (22/60). Symptomatology in present study is comparable to that in a study conducted by Kennedy.[15] However Nair S et al concluded that headache and facial pains are commonest presenting symptoms in CRS patients as compared to nasal polyposis patients who present with nasal blockage, nasal discharge and reduced sense of smell.[16] Beside the clinical and radiological findings, the duration of symptoms is very important for diagnosis. In the present study, patients suffered from the disease for a much longer time, i.e. more than three years and none less than 6 months. CT scan, with its excellent capability for

displaying bone and soft tissue, is the current diagnostic modality of choice for evaluating OMC, extent of the disease. In present study, partial haziness in maxillary antrum was present in 76.6% (46/60) patients, complete haziness or partial haziness with maxillary antrum polypoidal mucosa in 23.3% (14/60) patients and OMC obstruction 33.3% (20/60). In the present study, FESS with septoplasty was done in 30 patients of group A. The patient symptomatic improvement as assessed with VAS at 6 weeks was found satisfactory. Ninety percent of patients were free of symptomatic nasal obstruction. Nasal discharge, headache and facial pain were relieved in 76%, 93.3% and 96.7% respectively. Overall 86.7% of patients were satisfied from the surgery. Postoperative assessment by HRCT (PNS) at 6 weeks revealed 93.3% patients had normal maxillary antrum and 6.7% had mucosal hypertrophy. Osteomeatal complex was free of disease in all cases.

Table 4: Nasal discharge.

Groups				Nasal discharge - pre-op Pearson chi-square (0.760)				Total
				Normal	Mild	Moderate	Severe	
FESS with septoplasty	Nasal discharge - post op	Normal	Count	0	7	13	3	23
			% of total	0.0%	23.3%	43.3%	10.0%	76.7%
		Mild	Count	1	1	4	1	7
			% of total	3.3%	3.3%	13.3%	3.3%	23.3%
	Total Pearson chi-square =0.282		Count	1	8	17	4	30
			% of total	3.3%	26.7%	56.7%	13.3%	100.0%
FESS	Nasal discharge - post op	Normal	Count	1	9	9	0	19
			% of total	3.3%	30.0%	30.0%	0.0%	63.3%
		Mild	Count	0	2	7	2	11
			% of total	0.0%	6.7%	23.3%	6.7%	36.7%
	Total Pearson chi-square =0.112		Count	1	11	16	2	30
			% of total	3.3%	36.7%	53.3%	6.7%	100.0%

Table 5: Maxillary sinus.

Groups				Maxillary sinus - post op		Total
				Normal	Partially opacified	
FESS with septoplasty	Maxillary sinus - pre-op Pearson chi-square (3.354)	Partially opacified	Count	20	0	20
			% of total	66.7%	0.0%	66.7%
		Partially opacified +antral polyp	Count	8	2	10
			% of total	26.7%	6.7%	33.3%
	Total Pearson chi-square =0.038		Count	28	2	30
			% of total	93.3%	6.7%	100.0%
FESS	Maxillary sinus - pre-op	Partially opacified	Count	21	5	26
			% of total	70.0%	16.7%	86.7%
		Partially opacified+ antral polyp	Count	0	4	4
			% of total	0.0%	13.3%	13.3%
	Total Pearson chi-square =0.001		Count	21	9	30
			% of total	70.0%	30.0%	100.0%

In group B, FESS alone was done in 30 patients. Sixty three percent of patients were free of symptomatic nasal obstruction postoperatively. Nasal discharge, headache and facial pain were relieved in 63.3%, 83.3% and 86.7% respectively. Overall 63.3% of patients were satisfied from the surgical treatment. Postoperative assessment by CT scan at 6 weeks revealed 70% patients had normal maxillary antrum and 30% had mucosal hypertrophy. Osteomeatal complex was free of disease in 96.7% cases. However statistical difference in two groups was found significant only in nasal blockage, overall discomfort on VAS and chronic maxillary sinusitis on CT scan (p value ‹0.05). Statistical difference was not found significant in nasal discharge, headache and facial pain on VAS and OMC on CT of nose and PNS (p value ›0.05).

Table 6: Osteomeatal complex.

Groups				Osteomeatal- complex - pre-op Pearson chi-square= 0.313		Total
				Normal	Opacified	
FESS with septoplasty	Osteomeatal complex- post op	Normal	Count	18	12	30
			% of total	60.0%	40.0%	100.0%
	Total Pearson chi-square		Count	18	12	30
			% of total	60.0%	40.0%	100.0%
FESS	Osteomeatal complex - post op	Normal	Count	21	8	29
			% of total	70.0%	26.7%	96.7%
		Opacified	Count	1	0	1
			% of total	3.3%	0.0%	3.3%
	Total Pearson chi-square= 0.540		Count	22	8	30
			% of total	73.3%	26.7%	100.0%

FESS is an effective and safe procedure when performed by experienced surgeon. In inexperienced hands, the major complications associated with FESS including CSF leak, diplopia, blindness, intracranial penetration, meningitis and severe nasal hemorrhage can occur. In present study, there were no major complications recorded as we were performing mini FESS in the form of inferior uncinectomy and middle meatal enterostomy. The average post-operative healing time was 4-6 weeks which is consistent with other authors.[17]

In the present study, patients who underwent septoplasty with FESS have shown improvement both on VAS as well as radiologically as compared to patients who underwent FESS alone. The present study concluded DNS as a major etiological factor in CRS and highlights the importance of septoplasty on the outcome of CRS in cases of DNS with CRS. Some studies have shown that septoplasty alone can be adequate for the treatment of DNS with CRS however, when polyps are present in maxillary sinus, then septoplasty with FESS was found to be better.[12,13]

DNS causes different airflow dynamics in the nasal cavities which leads to development of compensatory hypertrophy of nasal mucosa of the opposite side of the deviated nasal septum.[18] DNS leads to increased chance of impaired mucocilliary clearance, OMC and development of sinusitis and sinusitis is more severe on opposite side of deviated nasal septum.[6] There are several studies related to correlation of septal deviation to sinusitis. Yousem et al evaluated the morphologic features that predispose to sinusitis, and concluded that patients with evidence of sinusitis on CT scanning had more septal deviation. They observed that nasal septal deviation affects both ipsilateral and contralateral sinuses.[19] Calhoun et al examined the paranasal sinus CT images of both symptomatic and asymptomatic patients and found a strong correlation between septal deviation and sinus diseases.[20] Elahi et al studied OMC region in 122 patients with DNS and correlated the data with paranasal sinus disease, lateral nasal wall findings and middle turbinate abnormalities. They observed that OMC obstruction in the direction of septal angulations was due to nasal septal deformity while contralateral OMC obstruction was related to middle turbinate and lateral wall abnormalities which appeared with increased frequency on the side opposite of septal deviation.[3]

In the present study, it was observed that FESS with septoplasty is effective for the treatment of chronic rhinosinusitis with deviated nasal septum on VAS as well as radiologically (The Lund and Mackay Staging system: Radiologic Staging) than FESS alone. However statistical difference in two groups was found significant only in nasal blockage and overall discomfort on VAS and chronic maxillary sinusitis on HRCT Nose and PNS (p value ‹0.05).

Statistical difference was not found significant in nasal discharge, headache, facial pain and olfactory disturbance on VAS and OMC on CT of nose and PNS (p value ›0.05).

CONCLUSION

It was observed that FESS with septoplasty is effective for the treatment of chronic rhinosinusitis with deviated nasal septum on VAS as well as radiologically (the Lund and Mackay staging system: radiologic staging) than FESS alone. However statistical difference in two groups was found significant only in nasal blockage and overall discomfort on VAS and chronic maxillary sinusitis on HRCT nose and PNS (p value ‹0.05). Statistical difference was not found significant in nasal discharge, headache, facial pain and olfactory disturbance on VAS and OMC on CT of nose and PNS (p value ›0.05).

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