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Septoplasty techniques- conventional versus endoscopic: our experience

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ABSTRACT

Background: Deviated nasal septum is one of the most common disorders in human beings, which may lead to symptoms of nasal obstruction, headache, epistaxis, hyposmia, and post nasal drip. DNS correction may also be required to gain access during intranasal procedures like endoscopic sinus surgery, endoscopic dacryocystor-hinostomy and skull base surgery. The technique of septoplasty has evolved over the decades with a tendency towards more conservative and precise surgery. Over the last few decades endoscopic septoplasty has become increasingly popular.

Methods: It was a cross-sectional comparative study done to compare the efficacy of endoscopic septoplasty with conventional septoplasty, conducted at a tertiary care centre over a period of 3 years. Records of 100 patients of nose and PNS disorders with DNS who were operated either by conventional or by endoscopic technique were studied. The patients were studied for the improvement in their symptoms, anatomical correction and intra-operative/post-operative complications.

Results: Endoscopic septoplasty group patients showed better symptomatic relief, lesser incidence of residual anterior /posterior deviation and persistent spur and less complications as compared to the conventional septoplasty group.

Conclusions: In our study we found more clientele satisfaction and lesser rate of complications in endoscopic septoplasty group. We recommend all ENT specialists to be trained in nasal endoscopic septoplasty technique as it offers many advantages such as more precision in post nasal spurs with less flap tears, it can be tailor made according to the disease and can be combined with various endoscopic surgeries.

Keywords: Deviated nasal septum, Conventional septoplasty, Endoscopic septoplasty

INTRODUCTION

Our nose, being the most prominent part of the face, is vulnerable to trauma right from intra-uterine life. Nasal trauma usually also involves the septum, thus it is unusual to find a straight septum in an adult. The nasal septum helps to maintain normal aerodynamics of the internal nose, so that the main functions of the nose of olfaction, heating, humidification and defence, which require good interaction between the inspired air and the nasal mucosa or neuroepithelium, can be carried out optimally. Nasal septum also plays an important role in the development of nose, midface and maxilla. Deviated

nasal septum (DNS) is one of the most common disorders in human beings, which may lead to symptoms of nasal obstruction, headache, epistaxis, hyposmia, and post nasal drip. DNS correction may also be required to gain access during intranasal procedures like endoscopic sinus surgery, endoscopic dacryocystorhinostomy and skull base surgery.

The technique of septoplasty has evolved over the decades, from forcible fractures and splinting to submucous resection, classical septoplasty done via Cottle's premaxilla-maxilla approach and in the last two decades, the endoscopic septoplasty. Since the

evolution of endoscopic sinus surgery, nasal endoscopic septal surgeries, as a primary procedure or as an adjunct procedure, have become popular among endoscopic surgeons. Endoscopic technique for the correction of septal deformity was initially described by Lanza et al in 1991.² Lanza et al later described a detailed endoscopic approach for the treatment of isolated septal spurs.³ Durr et al conducted a study on technique and outcomes of endoscopic septoplasty. They chose 47 patients of DNS and concluded that the approach is very good in providing a direct-targeted route to the anatomic deformity, better visualization, and magnification of the surgical field. Posterior nasal septal deformities are better evaluated by this technique. It also allows objective documentation of the cause of nasal obstruction with possible use in outcome assessment.⁴

Bothra et al compared conventional versus endoscopic septoplasty for limited deviations and spur on 80 patients and found no statistically significant difference in surgical outcomes in the conventional and endoscopic surgery groups. However, post-operative complications such as hemorrhage, infraorbital edema and nasal pain were slightly more in the conventional septoplasty group.⁵

We conducted the current study to compare the usefulness and outcomes of endoscopic septoplasty with conventional septoplasty in terms of relief of symptoms, anatomical correction and complications in patients with DNS who had undergone septoplasty by conventional or endoscopic technique at our tertiary care centre.

METHODS

It was a cross-sectional comparative study done to compare the efficacy of endoscopic septoplasty with conventional septoplasty, conducted at a tertiary care centre over a period of 3 years, from January 2014 to January 2017. Records of 100 patients of nose and PNS disorders with DNS who were admitted in our tertiary care center from Jan 2014 to Jan 2017 and were operated either by conventional or by endoscopic technique were studied. Patients with symptomatic nasal obstruction and patients who required septoplasty as an approach to other nasal and paranasal or skull base surgeries were included in the study. We excluded the patients with upper respiratory tract infection and revision surgeries. All cases were operated by two surgeons who had expertise in both the techniques.

The patients were divided into two groups, A and B, with 50 patients in each Group.

Group A patients had conventional septoplasty done while group B patients had undergone endoscopic septoplasty. Of the 50 patients in group B who underwent endoscopic septoplasty, it was done as a part of surgical approach in 25 patients (50%) in combination with functional endoscopic sinus surgery (FESS), 5 (10%) in

combination with endoscopic dacryocystorhinostomy (EDCR) and 3 (6%) in combination with adenoidectomy (Figure 1). In both the groups, compensatory hypertrophy of the turbinates was addressed with bipolar diathermy assisted turbinoplasty as required.

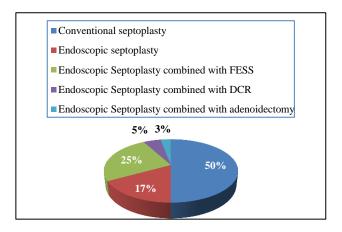


Figure 1: Types of surgeries done among study subjects.

The patients were studied for the improvement in their symptoms of nasal obstruction, nasal discharge, hyposmia, headache, epistaxis and snoring six months after the surgery. The patients' symptoms were recorded preoperatively and postoperatively and were compared by studying their surgical records. The outcomes were measured in terms of residual septal deviation, spurs and the occurrence of complications in the intra op and post op period.

Written informed consent was obtained from all the patients. A detailed proforma was used to collect information which included patient's name, sex, age, occupation, presenting complaints, past history, complete ear, nose and throat examination including nasal endoscopy and radiological examination.

Statistical analysis was carried out using Chi Square test and Fisher's exact test.

Technique of endoscopic septoplasty

The surgery was performed under local or general anesthesia, depending on whether it was being done for nasal obstruction alone or in conjunction with other endonasal endoscopic procedures. The septum was infiltrated with 2% xylocaine with 1:80,000 adrenaline under direct visualization using 0^0 4mm rigid endoscope. Caudal hemitransfixion incision was made with the help of monopolar electrocautery to have a bloodless field (Figure 2).

The mucoperichondrial flap was elevated using a Freer's elevator under endoscopic visualization and anterior tunnel was made. A cotton nasal pack was introduced in the anterior tunnel working as a retractor (Figure 3).

Following this inferior tunnel was made along the nasal floor. The entire cartilaginous and bony septum, including the maxillary crest, was exposed and the bonycartilaginous junction dislocated (Figure 4).



Figure 2: Caudal incision.



Figure 3: Cotton pack in situ.



Figure 4: Bony cartilagenous junction dislocation.

A meticulous dissection was carried out ensuring removal of the most deviated part of the septum including both the bony and cartilaginous septum. The spurs were gently negotiated to keep the flap intact (Figure 5). The inferior strip of cartilage was excised and maxillary crest was removed in a customized fashion depending upon the case to case (Figure 6).



Figure 5: Posterior spur negotiation.

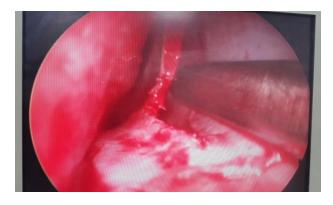


Figure 6: Inferior strip removal.

The flaps were repositioned and haemostasis was ensured. The edges of the incision were closed with absorbable sutures. In case of isolated septal spurs, an ipsilateral incision was placed parallel to the floor of the nose on the apex of the spur. Superior and inferior flaps were elevated to expose the underlying septal spur, which was then removed. The patients who had a significant turbinate hypertrophy were also taken for turbinoplasty or submucous diathermy. The nasal cavities were packed with PVA Nasal pack for obtaining uniform pressure over the contact areas.

The conventional approach on the other hand was done using standard Cottle's approach with a headlight illumination and a nasal speculum as a retractor. The surgical steps were similar to endoscopic septoplasty, except in isolated spurs the procedure was not limited to the spurs and involved the entire procedure.

Postoperative care

All patients were given antibiotics for 24 hrs till the nasal pack was in place and analgesics postoperatively for about five days. Nasal pack was removed the next day and the patients were then discharged. After discharge, oxymetazoline and normal saline nasal drops was administered three times a day for 5 days followed by hypertonic nasal douches for next 03 weeks. Any strenuous exercise was avoided for a period of 2 weeks postoperatively. All patients were followed up at 3rd day, 7th day, 3 weeks and monthly thereafter till 6 months. The

objective assessment of immediate as well as delayed results was done with endoscopic examination.

RESULTS

The male to female distribution was 5:3. The most commonly affected age group was in 2^{nd} and 3^{rd} decade of their life, including both the sexes (Table 1).

The most common presenting complaint in the patients of deviated nasal septum among the study population was nasal obstruction (76%) followed by nasal discharge (38%), headache (18%), epistaxis (5%), hyposmia (3%) and snoring (3%).

The DNS was commonly associated with other lateral wall pathology, commonest of which was inferior turbinate hypertrophy (78%) followed by concha bullosa (21%), variations of uncinate process (17%) and others (Table 2).

Table 1: Age and sex distribution of subjects.

Gender	10-20 yrs	21-30 yrs	31-40 yrs	41-50 yrs	Total
Male	19	20	13	10	62
Female	14	11	8	5	38
Total	33	31	21	15	100

Table 2: Associated lateral wall pathology prevalence.

A	Conventiona Group A (N=		Endoscopic se Group B (N=5		Total (N=100)	
Associated pathology	Number of cases	Percentage (%)	Number of cases	Percentage (%)	Number of cases	Percentage (%)
Concha bullosa	10	20	11	22	21	21
Inferior turbinate hypertrophy	35	70	43	86	78	78
Variation of uncinate process	7	14	10	20	17	17
Paradoxical middle turbinate	5	10	8	16	13	13
Polyps	4	8	5	10	9	9
Enlarged bulla	1	2	3	6	4	4

Table 3: Symptom relief postoperatively in the two groups.

	Conventional sep	ptoplasty		Endoscopic septo	oplasty		P
	Group A			Group B			value
Symptom	(N=50)			(N=50)			value
	No of patients with symptoms	No of patients with relief	% relieved	No of patients with symptoms	No of patients with relief	% relieved	
Nasal obstruction	37	30	81.0	39	38	97.0	0.0256
Nasal discharge	10	8	80.0	28	28	100.0	0.0164
Hyposmia	0	0	0.0	10	10	100.0	-
Headache	15	10	66.6	25	23	92.0	0.0434
Epistaxis	3	3	100.0	2	2	100.0	1
Snoring	10	4	40.0	14	12	85.7	0.0219

The patients were followed up to a period of 6 months which included initial endoscopic nasal toilet for all cases. The patients were followed up in different groups in a similar fashion and protocol without any bias. The cases with additional lateral wall pathology, like those with nasal polyps who had undergone FESS along with endoscopic septoplasty, were managed with prescribed standard drug therapy in the postoperative period. All the

patients were followed up till 6 months postoperatively and there were no lost to follow up cases.

The patients were assessed objectively at 6 months postoperatively to look for any difference in outcomes between the two groups. The follow up showed that 81% patients of group A and 97% of patients of group B were relieved of their nasal obstruction complaint

postoperatively. There was statistically significant improvement in the nasal obstruction, nasal discharge and

headache (p<0.05) postoperatively in group B as compared to group A (Table 3).

Table 4: Objective assessment at 6 months postoperatively.

Conventional septoplasty Group A (N=50)			Endoscopic septoplasty Group B (N= 50)			Total (N=100)			
Parameter	No of patients with pre op finding	No of patients with residual finding	%	No of patients with pre op finding	No of patients with residual finding	%	No of patients with pre op finding	No of patients with residual finding	%
Anterior deviation	25	1	4	24	0	0	49	1	2
Posterior deviation	20	2	10	19	0	0	39	2	5
Persistent spur	34	2	6	30	0	0	64	2	3

Table 5: Complications.

Complications	Group A (N=50) (%)	Group B (N=50) (%)	P value
Hemorrhage	07 (14)	01 (2)	0.0278
Mucosal tear	09 (18)	02 (4)	0.026
Hematoma	02 (4)	00 (0)	-
Synechiae	10 (20)	01 (2)	0.0042
Septal perforation	02 (4)	00 (0)	-

In Group A, 4% patients had persistent anterior deviation, 10% had persistent posterior deviation and 6% patients had persistent spur, whereas in Group B no patient had persistent anterior/posterior deviation or persistent spur. Incidence of complications (haemorrhage, mucosal tear, haematoma, synechia and septal perforation) was found to be higher in Group A (Table 4).

Analysis of data shows statistically significant reduction in occurrence of hemorrhage and mucosal tear intra operatively and synechiae post operatively in endoscopic septoplasty as compared to conventional septoplasty.

DISCUSSION

Endoscopic septoplasty has emerged as a very useful and attractive alternative to conventional septoplasty. Introduction of endoscopes have allowed for a better illumination, visualization and accuracy of surgery. Endoscopic septoplasty, initially described by Lanza and collegues, enables the surgeon to precisely localize the posteroinferior spurs and remove them under direct visualization with minimal surgical trauma. Thus there is better symptomatic relief and significant reduction in patient's morbidity in postoperative period due to limited manipulation in terms of flap elevation and resection of septal framework.

A deviated nasal septum is usually associated with other lateral nasal wall pathologies as reported by various studies. In our study we found lateral nasal wall pathologies like inferior turbinate hypertrophy in 78% patients, concha bullosa in 21%, paradoxical middle

turbinate in 13% and uncinate process abnormality in 17% patients with DNS. Nayak et al and Jain et al also reported similar incidence of lateral nasal wall pathologies in their respective studies.^{6,7}

The chief complaint of the patients in our study was nasal obstruction reported by 76 (76%) patients, followed by headache in 40%, nasal discharge in 38%, snoring in 24%, hyposmia in 10% and epistaxis in 5%. Other studies have also reported similar symptoms.^{7,8}

In our study 69 patients (91%) were relieved of nasal obstruction after septoplasty. Of these 32 out of 37 patients (86%) got relief by conventional septoplasty, whereas 37 out of 39 patients (95%) patients got relief by endoscopic septoplasty. In a similar study done by Sathyaki et al in 2014 conducted on 50 patients with nasal obstruction, 46 of the 50 patients were relieved of nasal obstruction of which 22 of the 25 patients belonged to conventional and 24 of the 25 patients belonged to endoscopic septoplasty group.⁹

Various studies suggest that headache is one of the common symptoms in patients with nasal anatomical abnormalities such as septal deviation and usually responds well to surgical treatment. A study done by Ghazipour et al on 98 patients with nasal septal deviation who underwent septoplasty surgery revealed partial or complete recovery of headache in 82% patients at the end of two year follow up period. In a study by Sindwani and Wright 54% patients with complaints of nasal obstruction and facial pain were cured and 38% showed improvement and 8% were not benefited. Harley et al.

observed significant improvement in patients with nasal obstruction and headache in endoscopic group as compared to conventional group. ¹² In a study by Sathyaki et al, headache persisted in 2 of the 10 patients in conventional septoplasty group while none of the patients in the endoscopic septoplasty group complained of headache. ⁹ In our study headache persisted in 3 (20%) of the 15 patients' with conventional septoplasty and in 2(8%) of the 25 patients with endoscopic septoplasty.

Nasal discharge did not persist in patients belonging to either of the groups in our study. Khan et al have reported better control of nasal discharge in endoscopic group as compared to conventional septoplasty.⁸

Epistaxis may also be one of the presenting symptoms in patients with DNS as reported in various studies. In our study 5 patients had presented with epistaxis. Conventional septoplasty was done for three patients and endoscopic septoplasty was done for 2 patients. All patients in both the groups were cured of epistaxis. Similar results were reported by Sathyaki et al wherein they had performed conventional septoplasty for patients with epistaxis with complete relief.⁹

In either of the groups we did not get good relief of snoring following septoplasty as only 60% patients were relieved by conventional septoplasty and only 64% patients were relieved by endoscopic septoplasty. The literature regarding relief of snoring by septoplasty is controversial. Virkkula et al in their study observed that operative treatment of mainly structural nasal obstruction did not seem to decrease snoring intensity, snoring time, or sleep-disordered breathing. ¹³ In contrast to this study, studies by Kim et al and Nakata et al while assessing a different ethnic group showed a significant improvement in sleep parameters. ^{14,15}

In our study all 10 patients who had hyposmia were managed with endoscopic septoplasty as they also had other pathologies for which FESS was done. Six patients were cured after the procedure. Khan et al have reported similar results wherein hyposmia was relieved in 87.5% of the cases in the endoscopic group but there was no relief of hyposmia in conventional septoplasty group.⁸

Success of septoplasty depends to a great extent on anatomical correction of the deviation. In our study we found better anatomical correction of the DNS in Group B patients who had undergone endoscopic septoplasty. None of the Group B patients who had undergone endoscopic septoplasty had residual deviation or spur, whereas in Group A we observed residual anterior/posterior deviation and spur in some patients. Jain et al in their study also found less persistence of anterior and posterior deviation and spur in endoscopic septoplasty as compared to conventional septoplasty.⁷

We also observed the rate of complications (haemorrhage, mucosal tear, perforation and synechia) to

be much less in the endoscopic group as compared to the conventional septoplasy group. Similar results were reported by Sathyaki et al and Khan et al in their study. Two (4%) patients in Group A had septal perforation whereas no patient in Group B had septal perforation. Other studies have reported significantly less number of septal perforations in the endoscopic group as compared to the conventional septoplasty group. 7-9

Park et al. in their study conducted in 1998 observed that the synechiae formation was significantly less in patients of endoscopic septoplasty group as compared to conventional group; similar results were found in the study conducted by Jain et al. and Gulati et al. 7.16.17 This is in agreement with our study where the synechia formation was observed in 20% patients with conventional septoplasty and only in 2% patients with endoscopic septoplasty.

The conventional septoplasty technique with the use of headlight and nasal speculum may be challenging in case of posterior deviations, postero-inferior spurs, especially in patients with a narrow nose. This may account for persisting anatomical deviations and consequently persisting symptoms and a higher rate of complications like mucosal tears, synechia and septal perforation. Endoscopic septoplasty has emerged as a safe, effective and conservative approach with better patient compliance, shorter recovery time and greater stability of remaining septum¹⁴. We have found it to be an effective teaching tool for demonstrating the anatomy, pathology and surgical techniques to assisting surgeons.

The disadvantage may be the longer surgery time which can be overcome by experience. Another disadvantage we found when working anteriorly and caudally where there is a minimal support for the endoscope especially in anteriorinferior septal and anterior most maxillary crest deviations. This problem can be overcome by mixing the conventional technique steps by using the headlight in such areas.

CONCLUSION

In our study we found more clientele satisfaction and lesser rate of complications in endoscopic septoplasty group. The endoscopic septoplasty group of patients had less intraoperative and postoperative complications such as nasal synechae, or residual deviation. This may be attributable to lesser tissue retraction and manipulation in endoscopic septoplasty cases.

We recommend all ENT specialists to be trained in nasal endoscopic septoplasty technique as it offers many advantages such as more precision in post nasal spurs with less flap tears, it can be tailor made according to the disease and can be combined with conventional technique in a few critical steps. Endoscopic septoplasty surgery can be combined safely with various surgeries like adenoidectomy, septal perforation repair,

septorhinoplasty, endoscopic skull base procedures, endoscopic DCR and endoscopic sinonasal surgery for the optimal results.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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