

Endoscopic Verses Conventional Septoplasty in the Treatment of Deviated Nasal Septum

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ABSTRACT

Background: Septum deviation is the major cause of nasal obstruction, which is the most common symptom in ENT practice. Surgical correction of the deviated nasal septum has been advanced over the years, from the radical removal of both mucosa and cartilage to submucous cartilage resection with preservation of the mucosa.

Objective: To compare the efficacy of the conventional and the endoscopic septoplasty in the management of patients with symptomatic nasal deviation.

Patients and methods: This study included 40 patients presented to the Otorhinolaryngology outpatient clinic at Assiut University Hospitals between May 2018 and December 2019, suffering from nasal obstruction due to a significant septal deviation, randomly divided into two groups: Group A: 20 patients underwent endoscopic septoplasty and Group B: 20 patients underwent conventional septoplasty.

Results: In this study, no significant difference was detected in the preoperative results of both groups regarding the age, sex and types of septal deformities. So, the preoperative circumstances were similar between both groups. Hence, results of this study showed that these two procedures were suitable to correct septal deformities but the endoscopic septoplasty was superior to the traditional septoplasty in cases with isolated septal spur. Also, it was associated with the minimal re-occurrence rate.

Conclusion: Endoscopic septoplasty is a valuable teaching tool, which is efficient in the management of different types of septal deformities.

Keywords: Endoscopic, Conventional septoplasty, Deviated nasal septum.

INTRODUCTION

A straight septum is found to be the exception rather than the rule ⁽¹⁾. Only 15% of females and 7.5% of males worldwide have a non-deviated septum ⁽²⁾.

A deviated septum can be asymptomatic or can cause functional and cosmetic abnormality .it can become symptomatic at any age. Deviated nasal septum (DNS) not only causes breathing difficulties but also causes improper aeration of para nasal sinuses leading to infection. So any functional or cosmetic disturbance caused by a deviated septum should be treated ⁽³⁾.

Septoplasty is a well-established procedure in nasal obstruction caused by nasal septum deviation resistant to medical management. It also improves access to the medial meatus in sinus surgery and other nasal and sinus procedures, such as cosmetic rhinoplasty and functional endoscopic sinus surgery (FESS) ⁽⁴⁾. It is conventionally performed under direct visualization using a headlight and nasal speculum. However, this method has the drawbacks of relatively poor illumination and accessibility and no magnification, calling for a larger incision and elevation of larger flaps often on both sides of the septum. As a result, there are higher chances of over-resection and over manipulation ⁽⁵⁾.

Modern septoplasty techniques were in the first place described by Killian and Freer ⁽⁶⁾.

Endoscopic septoplasty has been commonly performed since the development of endonasal surgery and as an alternative to the traditional technique⁽⁴⁾.

The aim of this work was to compare the efficacy of the conventional and the endoscopic septoplasty in the management of patients with symptomatic nasal deviation.

PATIENTS AND METHOD

This study included 40 patients presented to the Otorhinolaryngology outpatient clinic at Assiut University Hospitals between May 2018 and December 2019, suffering from nasal obstruction due to a significant septal deviation.

Ethical approval: An approval of the study was obtained from Assiut University Academic and Ethical Committee. Every patient signed an informed written consent for acceptance of the operation.

Inclusion criteria: Male and female patients older than 16 years with severe symptomatic deviated nasal septum (complaining mainly of nasal obstruction, headache, post-nasal discharge and/or hyposmia).

Exclusion criteria: Patients aged less than 16 years or more than 60 years. Patients with nasal polyposis or nasal tumors. Patients with sinusitis not responding to medical treatment. Patients with craniofacial alterations or congenital malformation. Patients with associated co-morbidity (diabetes mellitus, hepatitis, renal disorders, hypertension, cardiac diseases,



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bleeding disorder, anemia (Hb less than 10 gm %), malnutrition).

All included patients were subjected to: Detailed history taking, meticulous preoperative examination, thorough preoperative preparation, preoperative acoustic nasometric assessment, surgery, attentive post-operative care and evaluation, postoperative acoustic nasometric assessment and thorough Post-operative evaluation.

The patients were randomly divided into two equal groups: **Group A** 20 patients underwent endoscopic septoplasty and **Group B** 20 patients underwent traditional septoplasty.

Both techniques were performed under general anesthesia with cuffed endotracheal tube to prevent blood aspiration or swallowing. A pack soaked with adrenaline in saline solution (1: 200,000) was inserted into the nose at the beginning of the operation for five minutes.

Postoperative care: Patients were kept under observation in the hospital for 24 for any sign of nasal bleeding. Antibiotics and oral anti-inflammatory were prescribed for all cases. After removal of nasal packs, patients were discharged and were kept on a regimen of alkaline nasal douche for one month. The nasal splint, if used, was removed after one week.

Postoperative evaluation: All patients were evaluated, once weekly for the first month then every 2 weeks for 3 months, then monthly till 6 months, regarding the nasal obstruction whether improved or not, and the degree of the improvement (no, mild, moderate, severe), also, the accompanying symptoms

as a headache, snoring, postnasal discharge, epistaxis and hyposmia, whether disappeared or still persistent.

Patients were checked out for any complications such as pain, discomfort, smelling a bad odour, epistaxis, or any new symptoms that were not present preoperatively. They were also examined using nasal endoscopy for any residual deformity of nasal septum or spurs, septal perforation, septal hematoma, nasal adhesions. In cases complicated with adhesions they were managed by cutting the adhesions and insertion of a corticosteroid pack for few days. Both groups were compared objectively using the nasal endoscope regarding the healing process and the incidence of complications. All patients were subjected to a subjective evaluation of life quality and effectiveness of the treatment of nasal obstruction using the NOSE scale before and 3 months after surgery.

Statistical analysis

The data were tested for normality using the Kolmogorov-Smirnov test prior to further statistical analysis. Categorical variables were described by number and percent (N, %), where continuous variables described by range, mean and standard deviation (SD). Chi-square test and Fisher exact test were used to compare between categorical variables while comparing between continuous variables was done by t-test. A two-tailed $p < 0.05$ was considered statistically significant. All analyses were performed with the IBM SPSS 20.0 software.

RESULTS

According to table (1), there was no statistically significant difference in age and sex of both groups.

Table (1): Age and sex distribution of the study cases.

Age (years)		Endoscopic Septoplasty Group A (n=20)	Conventional Septoplasty Group B (n=20)	
Range		17-41	16-38	
Mean ±SD		28.6 ± 7.6	28.4±6.8	
t- test		0.087		
P-value		0.931		
Sex distribution		Endoscopic Septoplasty Group A (n=20)	Conventional Septoplasty Group B (n=20)	Total
Male	N	11	8	19
	%	55.0%	40.0%	47.5%
Female	N	9	12	21
	%	45.0%	60.0%	52.5%
Total	N	20	20	40
	%	100.0%	100.0%	100.0%
Chi-square	X²	0.401		
	P-value	0.527		

Types of the septal deformity showed no statistically significant difference between both groups (Table 2).

Table (2): Types of the septal deformity at presentation in both groups identified by the endoscopic examination.

Types of septal deformity		Endoscopic Septoplasty Group A (n=20)	Conventional Septoplasty Group B (n=20)	Total
Septal spur	N	8	7	15
	%	40.0%	35.00%	%
Broadly deviated septum	N	6	8	14
	%	30.0%	40.0%	35.0%
Multi-septal deformities	N	6	5	11
	%	30.0%	25.0%	%
Total	N	20	20	40
	%	100.0%	100.0%	100.0%
Chi-square	X ²	0.443		
	P-value	0.801		

Regarding intraoperative blood loss, there was a high statistically significant difference between both groups (Table 3).

Table (3): Comparison between the study groups regarding operative details.

Operative details		Endoscopic Septoplasty Group A (n=20)	Conventional Septoplasty Group B (n=20)	T-test	P-value
Duration	Range	20-50	35-65	5.645	<0.001**
	Mean±SD	34.6±9.23	50.9±9.03		
Blood loss	Range	25-65	45-90	5.096	<0.001**
	Mean±SD	44.5±12.5	66.4±14.6		
Nasal packing	Yes	20 (100.0%)	20 (100.0%)		-
Intraoperative flap tear	Yes	4 (20%)	6 (30%)	0.133	0.715
Septal splinting	Yes	4 (20%)	6 (30%)	0.133	0.715

Regarding postoperative complications; the difference between both groups was statistically insignificant (Table 4).

Table (4): Early postoperative complications in both groups.

Complications		Endoscopic Septoplasty Group A (n=20)		Conventional Septoplasty Group B (n=20)		Chi-square	P-value
		No.	%	No.	%		
Mild epistaxis	Yes	2	10.0	5	25.0	0.693	0.405
Synechiae	Yes	1	5.0	3	15.0	0.278	0.598
Mild pain and discomfort	Yes	2	10.0	5	25.0	0.693	0.405
Smell of bad odour	Yes	1	5.0	3	15.0	0.278	0.598
Septal hematoma	Yes	0	0.0	1	5.0	1.026	0.311
Perforation	Yes	0	0.0	1	5.0	1.026	0.311

There were no statistically significant differences between both groups regarding nasal endoscopic findings after 6 months (Table 5).

Table (5): Nasal endoscopic findings 6 months postoperatively.

Complications		Endoscopic Septoplasty Group A (n=20)		Conventional Septoplasty Group B (n=20)		Chi-square	P-value
		No.	%	No.	%		
Posterior deviation	Yes	1	5.0	7	35.0	3.906	0.048*
Spur	Yes	0	0.0	6	30.0	4.902	0.027*
Synechia	Yes	0	0.0	1	5.0	1.026	0.311
Persistent contact with turbinate	Yes	0	0.0	7	35.0	6.234	0.013*
Perforation	Yes	0	0.0	1	5.0	1.026	0.311
Crustations	Yes	1	5.0	3	15.0	0.278	0.598

DISCUSSION

In this study, there were no significant differences detected between both groups regarding demographic data such as age and sex. Also, both groups showed insignificant differences regarding types of septal deformities. **Vanclooster and Jorissen**⁽⁷⁾, **Christmas and Yanagisawa**⁽⁸⁾ and **Rao**⁽⁹⁾ performed the endoscopic septoplasty under local anesthesia. However in this study, the operation was performed under general anesthesia as the absolute comfort of patients was considered, which wouldn't be achieved if local anesthesia was used. This decision was based on the report published by **Vanclooster and Jorissen**⁽⁷⁾ stating that the procedure is not totally painless under local anesthesia.

Regarding the duration of conventional versus endoscopic septoplasty. Using the endoscope, the incision was made on the spur itself, which markedly reduced the extent of subperichondrial dissection. This resulted in an apparent reduction in the duration of the procedure compared to the conventional septoplasty with a statistically significant difference.

Supporting this study results, **Vanclooster and Jorissen**⁽⁷⁾, who operated on 40 cases, reported that the average duration of the endoscopic septoplasty in cases of posterior septal spur was less than 5 minutes. Also, **Aiyer et al.**⁽¹⁰⁾ reported that, regarding cases of isolated spur or limited deviation in the nasal septum, the duration of endoscopic septoplasty was relatively shorter than that of the traditional septoplasty. On the other hand, **Richtsmeier et al.**⁽¹¹⁾ reported that the average time of limited endoscopic septoplasty was 12 min. Comparatively, the time required for a traditional septoplasty was nearly threefold (35 min). **Bothra and Mathur**⁽¹²⁾ performed 12 combined conventional septoplasties and functional endoscopic sinus surgeries, and reported that these combined procedures required an extra 10 minutes for the transition between the headlight and the nasal endoscope, which took 2 minutes/each and was done 4-5 times during the operation. The septoplasty was not combined with other surgical procedures, such as FESS, in this study, as all included cases did not suffer from any concomitant disorders. Accordingly results were only accredited to

the two performed surgical techniques; conventional and endoscopic septoplasty.

The Killian incision was the standard incision performed in this study except for cases with caudal dislocation of the septum associated with another septal deformity in which a hemi-transfixation incision was performed and also in cases with an isolated septal spur in which the incision was done on the spur itself to avoid unnecessary dissection.

This was unlike the study done by **Nayak et al.**⁽¹³⁾, who performed the incision on the convex side for cases with anterior deviation, and on the concave side for cases with subluxation, spur or posterior deviation to expose the abnormality at the bony-cartilaginous junction. Also, **Hwang et al.**⁽¹⁴⁾ made the incision on the contralateral side of the maximal deviation, **Getz and Hwang**⁽¹⁵⁾ and **Trimarchi et al.**⁽¹⁶⁾ made a hemitransfixion incision also on the side of maximal deviation.

The intraoperative flap tear was encountered in 4 cases (20%) in group A and 6 cases (30%) in group B with an insignificant difference between both groups. Similar to these results were the results of **Kaushik et al.**⁽¹⁷⁾ who reported an intraoperative flap tear in 3 cases (10%) in the conventional group and 2 cases (6.67%) in the endoscopic group with an insignificant difference between both groups.

On the contrary, **Suligavi et al.**⁽¹⁸⁾ reported flap tear in 18 out of 50 cases (36%) in the conventional group and 10 out of 50 cases (20%) in the endoscopic group with a significant difference between both groups. Also, **Jain et al.**⁽²⁾ reported flap tear in 15 patients (68%) during conventional septoplasty and only one patient (5%) during endoscopic septoplasty, which was a statistically insignificant difference.

To avoid synechia formation following the intraoperative flap tears, septal splints were used in this study. **Trimarchi et al.**⁽¹⁶⁾ and **Nayak et al.**⁽¹³⁾ also used splints. **Nayak et al.**, used splints prefashioned from dental wax plates (base plate, wax), sterilized in cidex solution and anchored by catgut sutures.

On the contrary, **Hwang et al.**⁽¹⁴⁾ and **Getz and Hwang**⁽¹⁵⁾ reported that placement of splints is unnecessary and should not be considered as a rule

neither should be packing. **Tang and Kacker** ⁽¹⁹⁾ adopted that same conclusion as there was no evidence supporting the rule of splints in the prevention of intranasal adhesions. However, **Jung et al.** ⁽²⁰⁾ supported this study regarding that splints should be a routine step in septal surgery.

In this study, following surgery, the nose was packed with a small pack of merocel for one day to avoid the postoperative bleeding. **Kaushik et al.** ⁽¹⁷⁾ and **Suligavi et al.** ⁽¹⁸⁾ did the same in their studies. **Beule et al.** ⁽²¹⁾, reported that nasal packing after septoplasty improved postoperative outcomes regarding nasal breathing, recurrence rate, adhesions, and wound healing as it prevented mucosal dryness.

Regarding early postoperative complications, 2 cases (10%) in group A experienced a mild epistaxis after removal of the nasal packing. One of them had a history of non-steroidal anti-inflammatory drugs intake for a long period to relive a chronic back pain while the other patient was a chronic hypertensive patient. While in group B, 5 cases (25%) experienced a mild epistaxis. All epistaxis cases were controlled by insertion of ephedrine packs for few minutes. The difference of the endoscopic group as compared to the conventional group was statistically insignificant.

Similar results were obtained by **Kaushik et al.** ⁽¹⁷⁾ and **Bothra and Mathur** ⁽¹²⁾, who reported more epistaxis cases in the conventional group than the endoscopic group with a statistically insignificant difference. On the other hand, **Suligavi et al.** ⁽¹⁸⁾ reported a statistically significant difference between the conventional group [13 cases (26%)] and the endoscopic group [7 cases (14%)].

In this study, 2 patients (10%) of group A and 5 patients (25%) of Group B manifested nasal synechiae and were managed in the outpatient clinic. The differences were statistically insignificant. **Kaushik et al.** ⁽¹⁷⁾ reported that the rate of synechiae formation was insignificantly higher in the conventional group. **Suligavi et al.** ⁽¹⁸⁾ also reported 5 out of 38 patients, who underwent functional surgery with endoscopic septoplasty, developed small synechiae to the lateral nasal wall which were lysed in the clinic and healed with no septal perforations.

Unlike **Suligavi et al.** ⁽¹⁸⁾ who reported a statistically significant difference between both groups, as 10 cases (20%) of the conventional group developed synechiae compared to only 3 cases (6%) of the endoscopic group. **Giles et al.** ⁽²²⁾ found that 9 (36%) patients of the conventional group developed synechiae while only 2 (8%) patients of the endoscopic group developed synechiae (P-value <0.01). Also, **Park et al.** ⁽²³⁾ reported a significantly less rate of synechiae formation in the endoscopic septoplasty group compared to the conventional septoplasty group.

In this study, 2 patients (10%) in group A and in 5 patients (25%) in group B experienced mild pain and discomfort. one patient (5%) in group A complained of bad odour smelling versus 3 patients (15%) in group B.

No septal hematoma, septal perforation, or CSF leakage were reported in group A, but in group B, one case (5%) was reported with septal hematoma and managed by incision and drainage. Also, one case (5%) developed septal perforation without CSF leakage. Difference between both groups was statistically insignificant. **Kaushik et al.** ⁽¹⁷⁾ published similar results of 4 cases (13.33%) with septal hematoma and 2 cases (6.67%) with a perforated septum in the conventional group and no complicated cases in the endoscopic group. Also, **Raynor** ⁽²⁴⁾ reported no septal hematomas or perforations in all endoscopic septoplasty patients. Also, all patients experienced a significant symptoms improvement. However, no clarification of symptoms and the used methods for the improvement assessment was offered.

Results of this study agree with **Bothra and Mathur** ⁽¹²⁾ who did not detect statistically significant differences in the reported immediate postoperative complications although, there was an obvious clinical difference between the two groups in favour of the endoscopic group. While **Sindwani and Wright** ⁽²⁵⁾ reported a zero incidence of complications in their series of limited endoscopic approach for contact point lesions, however, their population size was only 13. Regarding this study, 6 months postoperative, one patient (5%) of group A had a persistent posterior deviation, but neither persistent anterior nor spur deviations were present. On the contrary, 7 patients (35%) of group B suffered a persistent posterior deviation, 6 patients had a persistent spur deviation (30%), but no patients had a persistent anterior deviation.

A statistically significant difference was reported regarding the residual contact between the septum and the turbinate. No patients were reported with this issue in group A compared to 7 patients (35%) reported in group B. These results were owed to the better illumination, magnification, and accessibility offered by the endoscope over the conventional technique.

Also, no patients had nasal crustations in group A and 3 patients (15%) in group B. They were treated with alkaline nasal lotion. No nasal synechiae, septal hematoma nor perforation was recorded in group A while, one patient (5%) of group B had nasal synechiae, and one patient (5%) had a septal perforation, but no patient had a septal hematoma. According to the study of **Jain et al.** ⁽²⁾ complications detected in the conventional septoplasty group were as follow; 12 patients (23%) had a persistent posterior deviation, 7 patients (13%) had a persistent anterior deviation, 7 patients (13%) had a persistent spur deviation, 10 patients (20%) experienced synechiae formation, and 19 patients (37%) had a persistent septal turbinate contact. While, complications detected in the endoscopic septoplasty group included; 2 patients (3%) had a persistent posterior deviation, 5 patients (10%) had a persistent anterior deviation, and 10 patients

(20%) had a persistent septal turbinate. Neither spur deviation nor synechia was detected in this group.

The results of this study agree with the results of **Jain et al.** ⁽²⁾ regarding persistent posterior and spur deviations and synechia formation who reported statistically significant differences between both groups. While, the differences in the persistent septal turbinate contact were statistically insignificant.

Regarding the results of this study; there was no statistically significant difference in values of nasal score of both groups and there was no statistically significant difference in nasal score of both times preoperatively and postoperatively. Similar to these results were the results **Liapi et al.** ⁽²⁶⁾ and **Ziade et al.** ⁽²⁷⁾ reported limited value in the objective assessment of nasal obstruction by acoustic nasometer.

CONCLUSION

In conclusion, endoscopic septoplasty is a valuable teaching tool which is efficient in the management of different types of septal deformities. It is superior to the traditional septoplasty in cases of posterior deviations and septal spurs. It requires shorter time than the conventional method with less blood loss, less incidence of complications and recurrence.

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