

Endoscopic Septoplasty Versus to Conventional Septoplasty

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Abstract

Septoplasty is a standard surgical procedure to correct nasal septum deviation, there were two major techniques performed conventional and endoscopic procedures, aim was to investigate patient's nasal symptoms, surgical outcome, post-operative complications, and nasal endoscopic findings, in endoscopic septoplasty in comparison to conventional septoplasty. A comparative interventional study, where 60 eligible adult's patients for septoplasty lead to nasal obstruction, were divided into 2 groups; Group (A) where endoscopic septoplasty was performed, and Group (B) were conventional technique. The patient's nasal symptoms by subjective Nasal Obstruction Symptom Evaluation scale, and Visual Analogue Score, and nasal endoscopic examination, were analyzed before septoplasty, and compared between them. So, statistically significant difference in endoscopic septoplasty procedure as, the better clinical results of patient's symptomology, minimum intra-operative blood loss, shorter operative time, and no post-operative synechiae, as well as, faster healing process, and lesser post-operative complications, when compared to conventional septoplasty technique.

Keywords: nasal obstruction; nasal septal deviation; endoscopic septoplasty; conventional septoplasty

Introduction

Nasal obstruction is main frequent complaint in day Ear, Nose, and Throat field (ENT), the majority of them were due to nasal septum deviation, it in addition to, causes some difficulty in breathing, but leads to improper aeration of sinus, that's results to sinusitis, so, different surgical techniques had been presented for rectification of nasal septum deviation, first of all was nasal septal submucous resection, which considered a radical technique, and its linked with many morbidities, then septoplasty procedure was evolute, as it had less resection of nasal septum, and fewer complications^[1]. With the commencement of endoscope into ENT field, there were attempt to perform it, into surgical rectification of nasal septum deviation planning to, elimination just the deviated part, spur and maxillary crest, so, is higher efficient, associated with less surgical manipulation, also it had the privilege of performing functional endoscopic sinus surgery at same sitting^[2]. Several surgical techniques to correct a deviated nasal septum, is associated with a restriction and usability to handle the whole different deformities of nasal septum, the optimal surgical rectification of septum of the nose should verify the following criteria: (a) relief of nasal obstruction. (b) conservative. (c) Non give rise to iatrogenic deformity. (d) Osteomeatal complex (OMC) exposure. (e) Ability to perform a revision surgery, whoever, the conventional approaches usually not attained the previous mentioned criteria in most cases, the excuses for that, is poor visualization, relative non-approachability, hardness in estimation of precise pathology, nasal packing requirement, removal also excessive exposure of nasal septum, and lowering field for a revision operation, while, the nasal endoscope permits exact pre-operative recognition of the pathology of nasal septum, an associated abnormalities of the lateral nasal wall, and aids for superior designing of endoscope assisted septal operation, therefore, early data's of endoscopic

septoplasty observed many usefulness factors related to this approach, as, it makes surgeons more conveniences to view the nasal tissue levels of tissue, in addition, it allows the possibility to see the surgical technique on a monitor, making it beneficial in a teaching hospital, nasal endoscopy is also, an eligible instrument in judgment primarily to detect the correlation of the nasal septum to the middle turbinate, which allows the surgeon to decide, if the deviation of the septum restrict the entrance during endoscopic sinus surgery, even in the absence of subjective nasal obstruction, therefore in this condition septoplasty may be necessary to increase the access to the middle meatus during endoscopic sinus surgery, also in a narrow nasal cavity situation, as for outpatient setting, as well as, following septoplasty during postoperative follow up^[3]. The objective of this study was to compare the patient's nasal symptoms, surgical outcome, post-operative complications, between endoscopic septoplasty technique to conventional septoplasty.

Patients and methods

This comparative interventional study, where all recruited patients' data was collected in an outpatient otorhinolaryngology setting, whom 60 adults' patients complaining of nasal obstruction due to impacted septal deviation.

Data were gathered from all recruited 60 participants, where the whole eligible patients were divided into two groups; Group (A) were 30 patients treated with conventional septoplasty procedure, and Group (B) were 30 patients treated with endoscopic septoplasty technique.

Ethical approval was obtained from the Institutional Ethic committee, and the consents were obtained from all participant patients. The protocol number of ethics committee approval was 215 at 07-01-2024.

Exclusion criteria:

Age less than 18 years, mild to moderate septal deviation, unfitness for general anesthesia, allergic or vasomotor rhinitis, acute and / or chronic rhinosinusitis (with or without polyposis), previous nasal surgery, Sino-nasal tumor, systemic medical diseases, and those whom not attended regular follow-up.

A detailed clinical precise medical concentrated ENT history was taken, and thorough ENT examination including nasal endoscopic examination and radiologic investigation as CT scan of nose and sinuses, in addition, it was used to detect the degree of septal deviation, “though, identification of osteomeatal complex, which was used as a key point for measurement of direction and degree of septal deviation, accordingly, the severity of septal deviation, by measurement the angle between the crista Galli and the most prominent point of septal deviation, in the coronal plane, as: 1. Mild: 0°–9° degree 2. Moderate: 10°–15° degree 3. Severe: >15°degree”, also, the CT scanning of the nose and sinuses was used to detect any other Sino-nasal problems.

In addition, pre-operative investigations for surgical investigations were done; as complete blood count (CBC), bleeding profile, and virology screen.

In the current study, a classification of nasal septal deviation degree depends on Cottle's classification [4] into; I: degree: simple nasal septal deviation (simple), degree II: moderate nasal septal deviation (obstructed), degree III: severe nasal septal deviation in contact with the lateral nasal wall, IV: degree: impacted (septal deviation impacted to lateral nasal wall). So, only (impacted) nasal was involved in this study, which means that, the nasal mucosa dose not shrink by nasal decongestant drug application (no improvement in nasal obstruction symptom).

The 0-degree 2.7 mm rigid Karl Storz endoscope: nasal endoscopy performed via the following steps; First a cotton-wool soaked with nasal decongestant inserted, then kept for 10 minutes, followed by local anesthetic gel cotton-wool, and removed after 5 minutes to allows anesthetize both turbinate, and septum to minimize the pain during procedure. The nasal endoscopy was performed on regular basis, pre-operatively and at 3 months follow-up after each surgical procedure.

Septoplasty surgical techniques: “Both procedures were done under general anesthesia, by the same the surgical team”

Endoscopic septoplasty:

The nasal septum was infiltrated with 1% xylocaine in 1: 200,000 adrenalines on the convex side of the deviated part of nasal septum using Karl-Storz 0°-4 mm rigid nasal endoscope, then a hemitransfixation incision was performed, followed with continuous sub-mucoperichondrial flap elevation, the septal cartilage was incised just behind the mucosal incision. Also, contralateral mucoperichondrial flap elevation was done, so, flap elevation was continued on both nasal septum sides, and then, the most deviated nasal septal part was excised, and any exposing the maxillary crest or vomer deviation was resected too, just keeping caudal and dorsal struts were left in situ, to preserve the nasal dorsum and columella support.

At the end of this procedure, the flaps were sutured with 3-0 vicryl sutures, and packing the nasal cavities with Merocel packs “hydroxylated polyvinyl acetate” (Medtronic, Minnesota, USA).

Conventional septoplasty

This technique involves visualization through headlight illumination and nasal speculum. After nasal decongested/anesthetic infiltration, the

procedure starts with Killian incision, followed by mucoperichondrial flap elevation, and tunnels creation, then removal of the most deviated septal cartilage or bone, lastly suturing with same nasal packing (Merocel packs) “hydroxylated polyvinyl acetate”.

All patients were hospitalized for 1 week, and kept on oral antibiotic as: (Amoxicillin/clavulanic acid 1 g) two times daily, for 7 days if allergy to penicillin, they were given Azithromycin 500 mg capsule once daily for 3 days, also, non-steroidal anti-inflammatory medications as: (Diclofenac 50 mg) three times daily. The removal of nasal packs was done on 2nd post-operative day.

Assessment was made subjectively depending on patients’ response, since the objective tools for the assessment such as; rhinomanometry, but unfortunately it was not available in the current study center.

Evaluation of clinical parameters for comparison between the two procedures, via regular nasal endoscopic examination for septal condition, bleeding during and post-operative, post-operative crustation and synechiae, and healing process rapidity, in addition to, the patient’s nasal symptoms as; nasal obstruction, headache, nasal discharge, post-nasal drip, sneezing, epistaxis, smell dysfunction, and snoring, were analysis through Visual Analogue Scale (VAS), and Nasal Obstruction Symptom Evaluation (NOSE) Scale subjectively.

VAS in which the patient rate nasal symptoms from a score of (0–10); score (0) as, asymptomatic and (10), as most severe symptom.

NOSE score [5] ; it’s subjective and clinical validated tool, it has been translated into many languages, patients were provided this questionnaire in their native language, first ask them to fill out the questionnaire 2-3 days before surgery, then, were asked them to fill in the sheet, and tick the severity of each nasal symptom, it consisting of 5 elements: nasal obstruction (0–4), nasal breathing troubledness (0–4), difficult sleeping (0–4), not-possible to have adequate air in exertion (0–4). The final score levels were graded as 0 (no problem), 1 (very mild), 2 (moderate), 3(fairly bad), and 4 (very severe). The score was rated valuable if it’s more than 20, so, NOSE score, multiply patient’s total score x 5. Nasal obstruction severity classification: 5-25(mild), 30-50(moderate), 55-75(severe), 80-100 (extreme) [4]. NOSE score system (it’s subjective and clinical validated tool), used to evaluate the severity of nasal symptoms.

Statistical analysis

The analysis and storage of the collected clinical, and demographic information was performed in an Excel database, using SPSS-29 (IBM Statistical Packages for version 29 social sciences, Chicago, IL, USA). Data were reported in measures of, percentage, standard deviation, mean levels, frequency, and values (minimum-maximum), a special corrected version of the chi 2 test was used.

Statistical significance was considered to be significant, if the P value was less or equal to 0.05.

Results

In the current study, the male to female ratio was 2.4:1, with 37 males (61.7%) and 23 females (38.3%). Age ranges from 18 – 60 years, with mean age was 31.741 ± 1.32 SD year. Table 1 elicited the age and gender distribution among the studied groups, with no significant statistically difference as the P value was 0.537.

Age	Group A	Group B	Total
18-29	6 Males= 4, females= 2	6 Males= 4, females= 2	12 Males=8, females=4
30-39	12 Males= 7, females= 5	14 Males= 9, females= 5	26 Males=16, females=10

40-49	6 Males= 3, females= 3	8 Males= 5, females= 3	14 Males=8, females=6
50-60	3 Males= 2, females= 1	5 Males= 3, females= 2	8 Males=5, females=3
No significant statistically difference as the P value was 0.537			

Table 1: Age and gender distribution among studied sample VAS and NOSE assessment:

Clinical profile (symptomology)

The whole 60 adults' patients (100%) had presented with nasal obstruction in both groups. These patient`s nasal symptoms were illustrated in table 2.

Symptomatology	Group A	%	Group B	%
Nasal obstruction	30	100	30	100
Headache	17	53.125	15	46.875
Nasal discharge	11	45.83	13	54.16
Postnasal drip	11	52.38	10	47.62
Sneezing	5	41.66	7	58.34
Nasal bleeding	1	33.33	2	66.67
Reduced smell sense	1	50	1	50

Table 2: Symptomatology distribution among studied groups

It reported better clinical results in relief from nasal symptoms in group (B), than those detected in group (A), with a significant statistically difference, as shown in table 3.

Nasal symptom obstruction scale	Group A	Group B
	Mean ±SD	Mean ± SD
Pre-operative	9.8±2.34	10.3±1.3
Post-operative	4.1±5.6	3.7±4.2
P- value	0.012*	0.001*
*Significant results		

Table 3: Nasal obstruction symptom scale (NOSE) in both groups

In endoscopic septoplasty group (B) had lesser intra-operative blood loss, and shorter operative time, compared to those in conventional septoplasty group (A), with a significant statistically difference, as the P values=0.0012, and 0,0011 respectively, as seen in table 4.

Clinical parameters	Group A	Group B	P value
Blood loss (ml)	33.76± 1.245 SD	18.82± 4.367 SD	0.0012*
Operative time (minutes)	41.621±2.657	19.483±3.216 SD	0,0011*
*Significant results			

Table 4: Amount of blood loss and operative time in both groups

Nasal septum deviation was found in whole 60 patients (100%); being right sided were detected in 31 patients (51.6%), as 14 patients (45.2%) were seen in group (A), and 17 patients (54.8%) in group (B). while, left sided were seen in 29 patients (48.4%), being 13 patients (44.8%) in group (A), and 16 patients (55.2%) in group (B), this non-statically significant difference, as, the P value=0.683.

Posterior septal deviation (35%) was not possible to be both seen by anterior rhinoscopy with nasal speculum, and when treated surgically by conventional septoplasty technique, so it corrected by endoscopic technique, while, the endoscopic approach had also some limitations, such as, lack of binocular vision, inability to performed it bi-manually.

Other associated sino-nasal pathologies

Hypertrophied inferior turbinate was detected in 42 patients, being 23 patients in group (A), and 19 patients in group (B), and concha bullosa was seen in 24 patients, being 11 in group (A), and 13 patients in group (B).

Regarding the comparison before and after the operations between the two groups; the observation of the patient's nasal symptoms were in the endoscopic septoplasty group (B), revealed a significant improvement inpatient`s nasal symptoms post-operatively; as nasal obstruction, headache, nasal discharge, post-nasal drip sneezing, and decrease in smell sense; than those who underwent conventional septoplasty group (A), with P value= 0.001. Please see table 5

Symptomology	Group (B)			Group (A)		
	Complete relief	No change	Worse	Complete relief	No change	Worse
Nasal obstruction	(91%)	(9%)	(0%)	(72%)	(28%)	(0%)

Headache	(100%)	(0%)	(0%)	(89%)	(11%)	(0%)
Nasal discharge	(86%)	(14%)	(0%)	(67%)	(33%)	(0%)
Post nasal drip	(85%)	(15%)	(0%)	(68%)	(32%)	(0%)
Sneezing	(75%)	(25%)	(0%)	(56%)	(44%)	(0%)
Hyposmia	(72%)	(28%)	(0%)	(48%)	(52%)	(0%)

significant result as the P value was 0.001

Table 5: Pre- and post-operatively in both groups

Significant differences were found between the two studied groups, as, crusting seen in (1 patient) was detected lower with endoscopic septoplasty approach group, than those (5 patients) in conventional septoplasty approach group, at first week of follow up, with P value= 0.0012, and, faster healing process time was detected in endoscopic septoplasty approach group, when those compared to conventional septoplasty approach group (4.67 ± 1.35 SD days versus 8.52 ± 3.67 SD days), with P value= 0.0023, and, also, no post-operative synechiae were found in endoscopic septoplasty group.

While, in whom those who underwent conventional septoplasty technique, there were 2 patients, who had been developed post-operative synechiae, at 3 months follow-up period.

Most common complications seen were; unilateral mucosal flap tear (25%), followed with septal perforation (19%), recurrence/residual of deviation (17%), then post-operative bleeding (13%), in those patients whom underwent conventional septoplasty, while, in endoscopic septoplasty group, they were (1%) for mucosal tear, none for septal perforation, recurrence/residual of deviation and post-operative epistaxis, with P values = 0.0023, 0.0001, 0.0002, and 0.0012, respectively.

Discussion

The initial notion of septoplasty was disseminated by Killian (1904) and Freer (1902), for more than 100 years, then in 1947, Cottle clarify surgical septoplasty procedure as managing for rectify obstructing nasal airway, and systematized the technique, while, the introduction of endoscopic techniques to correct the deformities of the nasal septum were earliest demonstrated in 1991 by Stammberger, then, from that date, the endoscopic septoplasty had been used, in addition to treat symptomatic nasal obstruction, but also to enhance surgical ingress to the nasal middle meatus, as in functional sinus surgery [6].

In the current study; there were male predominance, and male to female ratio was 2.4:1, with mean age was 31.741 ± 1.32 SD year, almost the same findings were seen in other studies, as, in Nassrallah S et al study [7], whom reported that, nasal septum deviation is main structural reason for obstructing the nose, and it could be detected at every age mainly in 3th year decay, also, in Kour et al study [8], where they reported the male-to-female ratio was 3:1, and the most common age group involved belonged to the second and third decade of life in both sexes, also in Khadgi S et al, study [9], concluded that, out of 70 patients, 57(81.43%) were males and 13(18.57%) females, and, the age group mostly affected was in the third and fourth decades with total 47 patients (67.14%), again in, Suraneni VR et al, study [10], they concluded that, in the conventional septoplasty group, 26 (52%) were males and 24 (48%) were females. In the endoscopic septoplasty group, 21 (42%) were males and 29 (58%) were females.

Also, in the current study, the whole 60 adults' patients (100%) had presented with nasal obstruction in both groups, as the main chief complaint, also, reported better clinical results in relief from nasal symptoms in group (B), than those detected in group (A), these findings were in same lines with other studies, as, in Suraneni et al study [10], reported that, in all the 100 patients presented with nasal obstruction, the next common symptom was headache present in 50 patients, out of which 22 (44%) belonged to conventional septoplasty group and 28 (56%) belonged to endoscopic septoplasty group, this was followed by post nasal discharge, so, post-

operatively, the relief of nasal obstruction was 92% in conventional septoplasty, and, 96% in endoscopic technique, in headache it was 86.37%

in conventional septoplasty, and, 96.42% in endoscopic septoplasty, while regarding post nasal drip in conventional group, the relief was 66.67%, and in endoscopic group it was 100%. Also, in Singh et al [11] study concluded, that, there were less pain and morbidities in the post-operative period in the endoscopic group as compared to conventional group.

In this study, right sided septal deviation observed to be a little bit more than left sided, in all study participants, as well as, in the endoscopic septoplasty group, although this non-statically significant difference, the same observation was seen by a study done by Tukaram KV, et al [12].

The nasal endoscopic assessment permits estimation of the nasal septum morphologically, and the inferior nasal turbinate. In current study, detect the hypertrophied inferior turbinate was (70%), and concha bullosa was (40%), these findings were agreed by study done by Nassrallah S, et al [7] whom reported the presence of hypertrophy of the inferior nasal turbinate (83.33%) and the hyper-pneumatization of the middle nasal turbinate was (51.67%).

Most common complication found in the current study was mucosal tear more in patients underwent conventional septoplasty. Similarly, Kour B, et al [8], Suraneni VR, et al [10], Singh A, et al [11], and Rambabu P, et al [13] studies, they found that these complications were seen more in conventional septoplasty as compared to endoscopic septoplasty.

Also, in the current study posterior septal deviation was not possible to be both seen by anterior rhinoscopy with nasal speculum, and when treated surgically by conventional septoplasty technique, so it corrected by endoscopic technique, this detection was similar finding to following studies [13-16].

Endoscopy produces fewer postoperative complications; as less mucosal damage and perfect positioning of the Silastic ® sheet may decrease the rate of synechiae in endoscopic septoplasty technique, with better visualization during flap dissection and the separation may reduce the rate of these complications [16-18].

In the study done by Mandal S, et al [19] concluded that, the endoscopic approach showed greater inclusive clinical profile with lesser complication, and finer enlightenment, ameliorate approachability to distant places was reported, as well as, lesser blood loss and shorter operative time, than that of conventional method. Also, Bhandary R, and Shetty R, [20] concluded that, endoscopic septoplasty allows perfect and conservative reconstruct of obstructive deviated nasal septum, with lesser complications and better functional results compared to conventional technique.

Study performed by Haque et al. [21] reported that, the reparatory ability of endoscopic septoplasty varies according to different sorts of deviated nasal septum, assessed subjectively and objectively, therefore, good patient counseling and pre-operative evaluation is fundamental for utmost post-operative outcome and conformity.

Alsehli A et al [22] in their research, found that; in comparing endoscopic and traditional septoplasty in terms of operating time, functional efficacy, and perioperative morbidity, via using the PubMed database, Google, and Google Scholar, a systematic assessment of the scientific literature was conducted; a randomized prospective trial was done, where endoscopic septoplasty technique was associated with less mucosal damage ($p < 0.01$), less synechia ($p < 0.01$), less residual deformity ($p < 0.05$), and less pain following surgery, also, the operating duration was also shorter ($p < 0.001$), as well as, shorter surgical duration and fewer postoperative problems,

nonetheless, the functional outcome remained identical to that of conventional septoplasty.

Yet, a study done by Na'ara S, et al [23], concluded that, endoscopic septoplasty and traditional trans-nasal trans-speculum septoplasty shows similar results in treatment of deviated nasal septum.

Limitations of the current study

1. Relatively small study size.
2. Single center.
3. Absence of objective tools as rhinomanometry.

Conclusions

A slight male predominance, main age in 3rd decade of life, although, both techniques were used in the surgical practice for correction of nasal septum deviation, but the current study analysis shows a statistically significant results; goes in favor to endoscopic approach, since, it associated with best overall clinical results in patient's symptomology, minimum blood loss and short operative time, and less post-operative complications, also, gain access to posterior septal deviation, and middle meatus which it could be combined with functional sinus surgery.

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