

Research Article

Endoscopic septoplasty versus conventional septoplasty

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Abstract: Background: Septoplasty is a standard surgical procedure to correct nasal septum deviation, which is consider the main reason for nasal obstruction, there are two major techniques performed conventional and endoscopic procedure. **Objective:** To investigate patient`s nasal symptoms, surgical outcome, post-operative complications, and nasal endoscopic findings, in endoscopic septoplasty in comparison to conventional septoplasty. **Patients and methods:** Prospective observational study, where 60 eligible adult`s patients for septoplasty because of their nasal obstruction results from severe septal deviation were divided equally into 2 groups; Group (A) where endoscopic septoplasty was performed, and Group (B) where conventional technique was used. The patient`s nasal symptoms by subjective Nasal Obstruction Symptom Evaluation (NOSE) scale, and Visual Analogue Score (VAS), and nasal endoscopic examination, were analyzed before septoplasty and at 3 months after, and compared between two methods. **Results:** A significant difference in endoscopic septoplasty procedure were reported; as, for clinical results of symptomology in from relief of patient`s nasal symptoms, 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. **Conclusions:** Two techniques were suitable to correct septal deformities, with better option for endoscope septoplasty procedure, as it was with higher clinical results and lesser complications.

1. Introduction

Nasal obstruction is main frequent complaint in day ENT field, 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 evoluted, as it had less resection of nasal septum, and fewer complications [1].

Nasal septum deviation is main structural reason for obstructing the nose, and it's could be detected at every age mainly in 3th year decay, with a predominance of 1.45 -to 6.3% [2].

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 [3].

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 [4].

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 [4].

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 [4].

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 [5].

The aim of this study was to compare the patient's nasal symptoms, surgical outcome, post-operative complications, between endoscopic septoplasty technique to conventional septoplasty.

2. Patients and methods

This prospective observational study, where all recruited patients' data was collected in an outpatient otorhinolaryngology clinic, whom 60 adults` patients complaining of nasal obstruction due to severe septal deviation.

Data were gathered from all recruited patients, where the whole eligible patients were eventually 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 = 265 at 02-01-2024.

3. Exclusion criteria

Children, 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, it used to detect in addition to the degree of septal deviation, any other problems as; inferior turbinate hypertrophy, and, middle turbinate pneumatization. Also, 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 [6] 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 (impacted). So, only severe (impacted) nasal was involved in this study.

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.

4. Septoplasty surgical techniques

Both procedures were done under general anesthesia, by the same surgical team.

Endoscopic septoplasty: The nasal septum was infiltrated with 1% xylocaine in 1: 200,000 adrenelines 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 (Medtronic, Minnesota, USA).

4.1. 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 nasal packing.

All patients were hospitalized, and kept on oral antibiotic as: (Amoxicillin/clavulanic acid 1 g) two times daily, 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 analyzed through Visual Analogue Scale (VAS), and Nasal Obstruction Symptom Evaluation (NOSE) Scale subjectively.

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

NOSE [7] score was performed to evaluate the severity of nasal symptoms, 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).

4.2. 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 (SD), mean levels, frequency, and values (minimum-maximum). Statistical significance was considered to be significant, if the P value was ≤ 0.05 .

5. Results

In the current study, the male to female ratio was 2.4:1, with 37 males (61.7%) and 23 females (38.3%), with male to female ratio was 2.4:1. Age ranges from 18 – 60 years, with mean age was 31.741 ± 1.32 SD year. Table 1 revealed the age and gender distribution among the studied groups, with no significant statistically difference as the P values were > 0.05 .

5.1. 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.

In group A; NOSE scale was 7.8 ± 2.34 SD pre-operatively, then became 3.1 ± 5.6 SD post-operatively, and in group B; it was 11.3 ± 1.3 SD pre-operatively, then became 2.7 ± 4.2 SD post-operatively, with a significant statistically difference, as the p values were 0.012 and 0.001 respectively.

It reported better clinical results in relief from nasal symptoms in group (B), than those detected in group (A), with a significant statistically difference, with P value=0.032.

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 3.

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 4.

Significant differences were found between the two studied groups, as, the post-operative crustation (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 endoscopy 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.

Table 1. Age and gender distribution among studied sample

Age	Group A	Group B	Total	P value
18-29	6 Males= 4, females= 2	6 Males= 4, females= 2	12 Males=8, females=4	0.561
30-39	12 Males= 7, females= 5	14 Males= 9, females= 5	26 Males=16, females=10	0.687
40-49	6 Males= 3, females= 3	8 Males= 5, females= 3	14 Males=8, females=6	0.694
50-60	3 Males= 2, females= 1	5 Males= 3, females= 2	8 Males=5, females=3	0.687

Table 2. Pre-operative symptomatology distribution among studied groups

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 3. Amount of blood loss and operative time in both groups

Clinical parameters	Group A	Group B	P value
Blood loss (ml)	33.76± 1.245	18.82± 4.367	0.0012
Operative time (minutes)	41.621±2.657	19.483±3.216	0.0011

Table 4. Pre- and post-operatively in both groups

Symptomology	Group (B)			Group (A)		
Main symptom	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

6. Discussion

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 [8-10].

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 [9-11].

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 [6] 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] 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 [16-19].

In the study done by Mandal S, et al [20] 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 [21] 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 [22] 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.

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

Relatively small study size, single study center, and unviability of objective tools of nasal obstruction; as rhinomanometry.

7. Conclusions

Endoscopic approach is 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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