

Endoscopic Assisted Septoplasty Versus Conventional Septoplasty; a Prospective Study

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Abstract

Background and objectives: Correction of deviated nasal septum underwent many modifications. Traditionally, it has been performed by using a headlight and nasal speculum and recently, endoscopic techniques have been used for septal surgery. As a consequence, the present study aimed to compare the efficacy of conventional and endoscopic septoplasty in treating septal deformity. **Methods:** the study was conducted on fifty patients planned for septoplasty; they were randomly selected and divided into two groups; Group I undertaken conventional septoplasty and Group II via endoscopic septoplasty with twenty-five patients in each group. Postoperative symptom analysis and complications with objective anatomical evaluation by endoscopic examination were explained in this study. **Results:** Septal deviation was commoner in males than females in a ratio of 1.4: 1. Age ranged from 18 to 58 years with mean age \pm SD (standard deviation) 33.42 ± 10.42 . Nasal septum deformity commonly associated with inferior turbinate hypertrophy (76%), concha bullosa (24%) and mucosal disease (26%). Postoperatively, subjective assessment of relieving symptoms was noticed in endoscopic septoplasty including nasal obstruction (96%), nasal discharge (88%), post nasal drip (92%) and headache (80%). Endoscopic septoplasty was superior in correction of posterior deflections in comparison to conventional technique while there was no significant difference regarding anterior deviations. Eventually lesser complication rates were observed in endoscopic technique. **Conclusions:** Endoscopic septoplasty is a viable alternative method for correcting septal deviation, and is more effective in relieving symptoms. It can be performed in conjunction with endoscopic sinus surgery.

Keywords: Endoscopic septoplasty, Conventional Septoplasty, Septal Deviation.

Introduction

Deviation of the nasal septum is the most structural cause of nasal obstruction despite the use of medical therapy¹. Septoplasty for correction of septal deflection is among the most frequently surgical procedures done nowadays in otolaryngology². It has many indications including deviation of the nasal septum results in partial or complete nasal obstruction, anatomic obstruction that obscures endoscopic sinus procedures, recurrent or continuous epistaxis and to improve continuous positive airway pressure therapy efficacy in patients with obstructive sleep apnea, lastly as an approach for trans-septal trans-sphenoidal skull base procedures³.

Septal deviation was classified as C or S shaped depending on the appearance of deviation, according to its severity as mild, moderate and severe with involvement of cartilaginous or bony parts of septum, they will be classi-

fied into anterior, posterior or both⁴. Also, Mladina divided nasal septal deformities into seven types according to the level and location of the deflection and observed the relationship between deviated nasal septum and maxillary irregularities⁵.

Surgical interventions for the deviated nasal septum have progressed over time starting from submucous resection which was described by Ingals in 1882 for removal of the septal cartilage, then Freer in 1902 and Killian in 1904 who invented resection of both bony and cartilaginous parts of the septum³. Later on, it underwent many changes toward conservative operation in 1946 by Cottle and Loring, it meant removal of deflected parts and replacement of bone and cartilage in the intramucosal space to avoid postoperative complications, for example: saddle nose and retracted columella⁶.

Newly, endoscopic techniques have been introduced for

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septal surgery by Lanza et al and Stammberger in 1991, the former made more advancement which was endoscopic application in treatment of isolated septal spurs⁷. The advantages of this method include the enhanced magnification and illumination provided by the endoscope with definitive correction of septal deflections and reducing complications^{2, 8}.

This technique has the benefit to get better visualization especially for high septal deformities. It permits minimal access dissection toward isolated deviated parts of the septum and more applicable in revision cases. Endoscope, helps limited removal and thus more preservation by guiding accurate resection of the deformed septal cartilage and bone⁹, it can be used to make an easier access to the middle meatus and paranasal sinuses along with sinus surgery in the same session¹⁰. The endoscopic approach makes it possible for many trainees to observe the procedure on a monitor and stay engaged in the case, making it useful for teaching purposes^{2, 11}.

The aim of the study is to compare the outcome of the two techniques- "Endoscope assisted Septoplasty" and "Conventional Septoplasty" in correction of the deviated nasal septum.

Patients and methods

A prospective, analytical study was carried out on fifty patients who presented with nasal obstruction and they underwent septoplasty at Otolaryngology and head and neck surgery – Sulaimany teaching center and Azmer ENT Head and Neck private center from November 2016 to December 2017. Inclusion criteria; were all patients with nasal obstruction due to deviated nasal septum. Exclusion criteria; age less than 18 years, allergic rhinitis, vasomotor rhinitis and acute infection.

After obtaining the agreement of the ethics and scientific committee of Kurdistan Board for Medical Specialties, data was collected from patients who had symptomatic septal deviations willing to undergo surgical correction, they were randomly selected from different ages, sex and type of deformity. They were divided equally into two groups; Group I submitted to conventional septoplasty and Group II via endoscopic septoplasty by simple random selection. These patients were assessed by history taking and clinical

examination after informed consent. Nasal patency test was done using Lack's tongue depressor followed by anterior and posterior rhinoscopies to assess the state of the septum and rule out other pathologies. Nasal endoscopic examination was performed thoroughly (with or without using nasal decongestant to enable precise identification of septal and turbinate pathology) and all the findings were recorded. Carl Storz Rigid fiberoptic nasal endoscope of 0 and 30 degrees with Carl Storz light source were used for diagnostic nasal endoscopy and endoscope aided operations.

Radiological imaging in the form of computed tomography CT scans was conducted in selected cases to know the detail of the anatomical deformities and mucosal conditions of the nose and paranasal sinuses. Later on, pre-operatively the patients were evaluated and they were subjected to surgical intervention in either traditional or endoscopic assisted septoplasty.

By endoscopic visualization of the nasal cavity with a 0-degree 4 mm Carl Storz rigid endoscope, infiltration was performed by subperichondrial injection of 1% lidocaine with 1: 100,000 epinephrine in the convex side over the deflected part of septum. A vertical incision was made caudal to the deformity. The incision was not elongated from dorsum to the floor as in traditional incision, but was extended both superiorly and inferiorly just accordingly to uncover the most deviated part. Once the submucoperichondrial plane is identified anteriorly to make a large pocket enough to permit for introduction of the endoscope in order to elevate the mucoperichondrial flap with Cottle and suction elevators, the septal bone and cartilages were exposed through an incision which was made caudal to the most deviated area and it was excised. Raising of the flap was restricted to the area of greatest deflection and care was taken whenever dissection of the mucosa over the spurs was done in order to avoid tears due to thinning of the mucosa. The endoscope was introduced between the mucosal flaps or within the nasal cavity to check correction of all septal deviations. Finally, the edges of the incision were approximated to lie closely then the mucosal flap was repositioned and the incision was sutured by a 4-0 Vicryl suture material, later on nasal splints and packing were used in many cases of the study. The nasal

cavities were packed with Vaseline pack soaked with antibiotics stayed for 48 hours.

The traditional approach was performed through headlight illumination and visualization with nasal speculum.

Antibiotic were prescribed for the patients for one week in addition with analgesics and nasal douching with saline solution after pack removal. Patients who underwent septoplasty were on a day-case surgery basis and were discharged home in the same day after full recovery from anesthesia. Postoperatively, the severity of the symptoms was recorded and compared to estimate the effectiveness of each method subjectively. Objective assessment was performed by examination of the nose via endoscopy. It was performed through a disease-specific outcome instrument to assess interventions in patients with nasal obstruction which was developed by Stewart et al. The nasal obstruction symptom evaluation (NOSE) scale became a useful mechanism to show that patients undergoing primary or revision septoplasty manifest with statistically significant improvements in nasal obstruction and corresponding NOSE scores postoperatively, with high degrees of patient satisfaction¹².

All the patients were followed frequently as outpatients for a period of three months (48 hours, 7-10days, 1 month and 3 months) to assess the outcome of surgery and postoperative complications plus endoscopic examination of the nose to check the correction of the deviated septum.

Data was analyzed by using "IBM SPSS (International Business Machines Statistical Package for the Social Sciences) version 22" and P value of ≤ 0.05 was accepted as statistically significant.

Results

In the current study, fifty patients underwent septoplasty, 29 (58%) of them were male and 21(42%) were female, in a ratio of 1.4: 1. Age ranged from 18 to 58 years with a mean age of standard deviation SD 33.42 ± 10.42 . The most commonly affected patients were amongst 3rd and 4th decades of life (21-30 was 36% and 31-40 was 28 %). Nasal obstruction was the major complaint (90%) followed by headache (60%), nasal discharge (54%), postnasal drip (42%), smell abnormalities including anosmia and hyposmia (18%) and epistaxis (6%), they were shown in both

groups in, Figure 1.

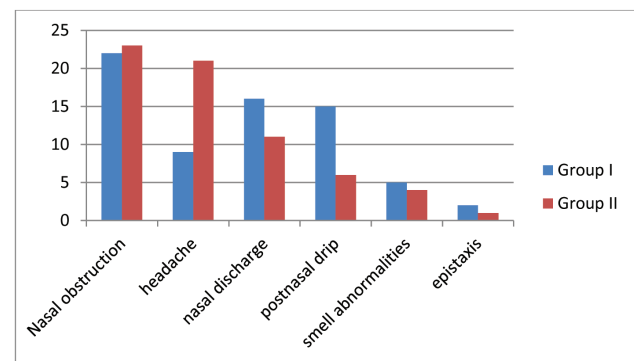


Figure (1):Preoperative symptoms in both groups

By endoscopic examination we found 30(60%) patients with C- shaped deviation of the nasal septum and 13(26%) patients had S-shaped deviation, with 7(14%) patients having impacted septum. They were divided into mild 9(18%), moderate 30(60%) and severe in 11(22 %) of them, according to the severity of the nasal septum deformity. The prevalence of lateral nasal pathologies in association with deviated nasal septum were explained in, Table 1.

Table (1):Prevalence of lateral nasal wall pathology.

| Pathology of lateral nasal wall | No. | % |
|-----------------------------------|-----|-----|
| Hypertrophy of inferior turbinate | 38 | 76% |
| Cocha-bullosa | 12 | 24% |
| Paradoxical middle turbinate | 11 | 22% |
| Uncinate process abnormality | 9 | 18% |
| Polypoid middle turbinate | 10 | 20% |
| Mucosal disease | 13 | 26% |

The postoperative follow up of the patients reported that nasal obstruction in 96 % cases of endoscopic septoplasty and 88% of conventional septoplasty were relieved, however headache was alleviated somehow better by conventional septoplasty in 84% and in 80% of endoscopic septoplasty, then nasal discharge was resolved in 88% of endoscopic septoplasty, while it was treated in 80% of those who underwent conventional septoplasty. Also, postnasal drip was treated in 92% of endoscopic septoplasty and it was relieved in 80% of patients with conventional technique. Smell abnormalities were better in 96%

of those underwent endoscopic septoplasty and 92% of those patients managed by conventional technique, lastly all cases who have undergone operation for controlling epistaxis were treated in both groups as shown in Figure 2 and the results were insignificant.

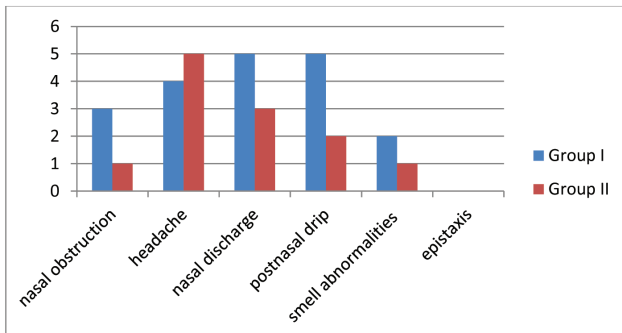


Figure (2): Post-operative symptoms remaining in both groups

Regarding objective assessment of the outcome of the operation after three months, follow up showed that eight patients of traditional septoplasty had residual septal deformity, while in two of those managed by endoscopic septoplasty the septal deflection remained and that was significant (p-value=0.037). Table 2 reveals the postoperative complications which include crustation as a result mucoperichondrial tear and healing process, synechia with turbinates and lateral wall of the nose and septal perforation which were fewer in Group II (2 patient 8%) than in Group I (8 patients 32 %), these differences were statistically significant (p-value= 0.044). One of the patients who have undergone conventional septoplasty, experienced epistaxis after nasal pack removal and brought back to operation theatre for controlling the bleeding, while no such complication was found in Group II. Also, we did not observe; neither nasal hematoma nor cerebrospinal fluid CSF leak postoperatively in both groups.

Table (2): Postoperative complications in both groups.

| Complications | Group I | Group II |
|---------------|----------------|-----------------|
| | No. (%) | No. (%) |
| Crustation | 5 (20.0%) | 0 (0.0%) |
| Synechia | 1 (4.0%) | 1 (4.0%) |
| Perforation | 2 (8.0%) | 1 (4.0%) |
| Total | 8 (32%) | 2 (8.0%) |

p-value Fisher's Exact test = 0.044 (significant)

Objective assessments of the nasal cavity through endoscopic examination were carried out until three months postoperatively, the results and their significance were shown in Table 3.

Table (3): Objective assessments at last follow up among patients.

| Objective assessment | Group I | Group II | p-value |
|----------------------------|---------|----------|---------|
| | No. (%) | No. (%) | |
| Anterior deviation | 3(12%) | 2(8%) | 0.5 |
| Posterior deviation | 5(20%) | 1(4%) | 0.07 |
| Synechia | 1(4%) | 1(4%) | 0.7 |
| Spur | 4(16%) | 0(0%) | 0.04 |
| Discharge in middle meatus | 11(44%) | 7(28%) | 0.1 |

Finally, we concluded that, the endoscope has restrictions regarding its use which includes price of the device and instruments, and multiple cleaning of the endoscope tip is needed during the procedure especially when there is more bleeding which is not considered significant regarding lengthening operative time compared with conventional septoplasty.

Discussions

Septoplasty, is correction of the deflected nasal septum and it is one of the most common undertaken operations in otolaryngology¹³. Approximately, 80% of humans have some sort of septal deviation and could be asymptomatic⁵. A straight septum is the exception rather than the rule and surgical correction of the deviated septum is necessary according to its impact on function and cosmetic appearance of the nose^{5, 14}.

Endoscopic septoplasty has the advantage of using video monitors and recording techniques in conjunction with endoscopes, this promoted the ability to its use as a teaching tool for septal surgeries^{2, 9}. However, the endoscope has its own limitation, including cost of the device and instruments with their establishment, and frequent cleaning of the endoscope tip is necessary particularly when there is more bleeding which does not considerably lengthen the operative time compared with conventional septoplasty. Finally, during endoscopic septoplasty we may face com-

plex deformities such as caudal deviation which is difficult to be corrected. This study, was carried out on limited number of patients, therefore further serial extensive evaluation to statistically establish the results in future is needed.

We also found that nasal septal deviation was commoner in males than females, in a ratio of 1.4:1, the most commonly affected age groups were of the 3rd and 4th decades of life, it was believed to be due to the fact that people of these age groups were more prone to external injuries. This was in accordance with the study of Jain et al¹⁵ and Salama¹⁶. Patients with nasal septal deviation most commonly were complaining of nasal obstruction (90%), headache (60%), and nasal discharge (54%), nasal bleeding (6%) and smell abnormalities in (18%) of subjects. The frequency of complaints of nasal blockage and anterior nasal discharge were close to the study findings of Gupta and Motwani, and the headache was the second major complaint in their study⁹.

Nayak et al noticed that several lateral nasal wall pathologies were related to the deviated septum, commonest of them being the inferior turbinate hypertrophy (75%) followed by concha bullosa (26.6), paradoxical middle turbinate (25%), mucosal disease (21%), overpneumatized bulla (13%), polypoidal middle turbinate (19%) and uncinate process abnormality (21%). In the present study, we found almost similar incidence, commonest being, inferior turbinate hypertrophy (76%) followed by mucosal disease (26%) and concha bullosa (24%), Polypoid middle turbinate (20%), paradoxical middle turbinate (22%) and uncinate process abnormality (18%)¹⁷.

This study concluded better symptom improvement and fewer complications among those patients experiencing endoscopic septoplasty in comparison to conventional technique (p-value= 0.044) because it showed preferable vision, the ability to gain access for high deviations and less mucosal dissection with minimal resection of the deformed septum as reported by Gupta¹⁸ and Hwang¹⁹.

Group II had better results in correction of anterior and posterior deviation with spurs in comparison to Group I, in endoscopic septoplasty 4% had persistent posterior deviations and in 8% anterior deviations remained with no spurs as shown in (Table 3), which was similar to study

of Nayak et al²⁰ and near to the study of Salama¹⁸ and Shretha et al¹³. Endoscopic aided septoplasty was more effective in relieving almost all symptoms, for example nasal obstruction was treated in 96% of patients and 80% of them were relieved from headache that was in accordance to the study of Kaushik et al⁷ and Nayak et al²⁰.

Conclusions

Endoscopic septoplasty is an attractive technique for correction of septal deformity with improved visualization and better illumination and magnification of the surgical field, particularly cephalic and inferior deviations. It can be performed in conjunction with endoscopic sinus surgery and treating lateral nasal pathology. It is useful and applicable in subjects who need revision operation after septoplasty or submucosal resection. Finally, endoscopic septoplasty is an effective teaching tool to others with the use video monitors.

Conflict of interest

Nothing to declare.

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