A Comparative Study of Conventional versus Endoscopic Septoplasty

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ABSTRACT

Introduction

The standard surgical treatment for symptomatic deviated septum is septoplasty. This is usually done conventionally using the headlight. However, in recent years the endoscopic method has emerged as an alternative technique. This study aims to compare results of conventional and endoscopic septoplasty

Materials and Methods

A study comprising of 44 patients, randomly divided in two groups, was undertaken to compare the efficacy of both the techniques. This study evaluated parameters like postoperative subjective improvement in symptoms, using the NOSE questionnaire, intra-operative blood loss, duration of surgery, post-operative pain and complications across the two groups.

Further, cases were subgrouped according to the site of deviation as anterior, posterior or combined and the efficacy of these two methods for correcting different sites of deviation was assessed, using the same parameters.

Results

The endoscopic approach showed better overall clinical results, irrespective of the site of deviation. It was noted that correcting posterior deviations required shorter time and had lesser blood loss when operated using the endoscope whereas anterior deviations were dealt faster and had lesser bleeding by the conventional method. There was less pain and morbidity in the postoperative period in the endoscopic group as compared to conventional group.

Discussion

Historical perspective of the conventional and endoscopic septal surgery is mentioned. In review of literature on the four parameters of this study – Symptomatic improvement, intra-operative blood loss, post-operative pain and surgical complications, were compared with published reports.

Conclusion

Endoscopic septoplasty was found to have distinct advantages over the conventional method, more so for posterior septal deviations. It should be an option offered to all patients requiring septoplasty.

Keywords

Nasal Septum; Septoplasty; Endoscopy; Symptom Assessment; Nasal Obstruction; Pain, Postoperative; Operative Time

Septoplasty is the standard treatment offered for symptomatic deviated nasal septum. 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.[1]

Endoscopic septal surgery is a promising alternative, with several advantages over the conventional headlight method, preoperatively, intra operatively as well postoperatively. Though endoscopic nasal surgery is widely used to treat sinus pathologies and other related conditions, it has not yet gained enough popularity for correction of deviated septum.

The present study aims to compare results of conventional and endoscopic septoplasty.

Materials and Methods

This was a prospective study carried out over 2 years (June 2013 to June 2015). It was approved by the hospital scientific and ethical committee. Adult patients

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with a symptomatic deviated nasal septum, who visited the ENT department and who were willing and fit to undergo septal surgery were included in this study. These patients had symptoms for at least 3 months and had not responded to maximal medical management.

Patients undergoing septal surgery along with other nasal pathologies were excluded from the study. Other exclusion criteria were, patients with head and neck malignancy, patients who had received radiotherapy of head and neck region or a maxillofacial trauma in the preceding 1 year, had a history of previous nasal surgery or had an existingexternal nasal deformity. Also excluded were patients undergoing septoplasty for reasons such as access to anatomical areas in close proximity or obtaining graft etc.

44 patients were enrolled into this study after taking informed consent.

A detailed history was taken and clinical examination was done for all patients, which included a diagnostic nasal endoscopy and details of the deviated septum were recorded in terms of site i.e. anterior (localised to anterior quadrilateral cartilage) / posterior (bony deviations) or combined deviations. Caudal deviations were grouped as anterior deviations unless there was also a significant bony deviation, in which case it was grouped as combined. Similarly, significant spurs were grouped as per their location. The more detailed Mladina classification was not used as the sample size in the study was not large enough to have enough cases in each subgroup.

Patients symptoms were assessed and recorded using a validated NOSE (Nasal Obstruction Symptom Evaluation) scale. The patients were randomly assigned into either of two groups viz the conventional septoplasty(CS) group and the Endoscopic septoplasty (ES) group.

The randomisation was done on day of surgery. Equal number of chits for conventional and endoscopic surgery were prepared. The operating nurse was asked to draw a chit for the patient.Septoplasty was performed by either of the techniques, as per the allotted group, under general anaesthesia.

All surgeries were performed by either of the two senior consultant surgeons.

Data of the two groups were collected and analysed on the following parameters:

a) Subjective improvement using the NOSE scale, pre and post operatively 3 months after surgery.

b) Intraoperative time taken and blood loss during surgery

c) Post-operative pain using the visual analogue scale and

d) Complications, if any.

Analysis on the parameters (a) & (b) was also extended to the subgroups of anterior, posterior and combined deviations to compare the results of both the techniques.

Results obtained were analysed using the student Paired 't' test and Chi square test.

Technique for Conventional Septoplasty:

Bilateral nasal decongestion was done using 4% lignocaine with adrenaline 10 minutes prior to surgery. Under headlight vision, after infiltration with 2% lignocaine with adrenaline (1:200000) into the septum, a vertical hemitransfixion incision was made 2-3 mm from the caudal end of septum on concave side along the entire height of the septum.Anterior tunnel was created by raising the mucoperichondrial flap, posterior tunnel by raising mucoperiosteal flap, and inferior tunnel created by raising flap over the maxillary crest.

Bony-Cartilaginous junction was dislocated, and periosteal flap was raised on opposite side. Part of perpendicular plate of ethmoid and vomerine spur were removed to correct the bony deformity. Inferiorly a small cartilaginous strip was removed. Any further cartilage was removed as per requirement of the particular case, in which case muco-perichondrial flap on opposite site was also raised. Incision was sutured with catgut and nasal cavities packed with polyvinyl alcohol nasal pack.

In case of caudal dislocation needing correction, a complete transfixion incision was made. Here the mucoperichondrial flaps were elevated on both sides of the caudal septum. If the deviation appeared to be due to be excessively long, it was accordingly shortened in the most caudal aspect of the caudal strut. In case the

caudal strut was malpositioned, but not long , it was separated from the bony nasal spine and repositioned appropriately. The caudal strut was then secured to the columela(where a small tunnel was created by sharp dissection) with 4-0 vicryl sutures and the transfixion incision was closed meticulously

Technique for Endoscopic septoplasty:

Infiltration was done using 0° 4mm endoscope. A vertical incision was made anterior to the deviation. Incision was not usually extended from dorsum to the floor but was extended both superiorly and inferiorly just as needed to expose the most deviated part. For more posterior isolated deformities or spur, the incision was placed posteriorly in the immediate vicinity of the deformity.

The mucoperichondrial-periosteal flap elevation done was often limited over the most deviated portion of the nasal septum. After exposing the deformity bilaterally, only the most deviated part of septum, either bony or cartilaginous, was resected. Flap was reposited and a check endoscopy was performed in the end. Nasal packing was done.

For correcting caudal dislocations endoscopically, the two surgeon technique was used where an assistant held the scope while the surgeon made a complete transfixion incision and followed the same procedure as in conventional method.

Blood loss was recorded as per the readings marked on the suction bottle.A fixed amount of saline was taken before the surgery for cleaning and flushing the suction canulas.At the end of the surgery the amount of saline was deducted from the total collection in the suction bottle.Also the number of blood soaked gauze pieces were counted and added to the total value(1soaked gauze piece approximately 3ml).

All patients were given perioperative surgical prophylaxis as per hospital policy (intravenous cefuroxime), and postoperative oral analgesics, nasal decongestant drops and steam inhalation after nasal pack removal (24 hours after surgery).Thereafter, patients were followed up in the outpatient department after 1 week for nasal cleaning and complications if any were noted. Post-operative NOSE scores were taken at end of 3 months.

Results

Mean age of study population was 33.92 years. The

Table I: Conventional septoplasty (CS) group. Pre operative and post operative NOSE scores.

	PRE-OP.MEAN (S.D)	POST-OP.MEAN (S.D)	DECLINE IN MEAN
Nasal blockage	**3.86 (.351)**	**1.55 (.510)**	**2.31**
Trouble breathing through my nose	**3.36 (.658)**	**1.00 (.309)**	**2.36**
Trouble Sleeping	**2.77 (.752)**	**0.27 (.456)**	**2.5**
Nasal Stuffiness	**3.64 (.492)**	**1.18 (501)**	**2.46**
Unable to breathe air during exertion	**2.91 (.684)**	**0.23 (0.429)**	**2.68**
Total score	**16.36 (1.560)**	**4.18 (1.181)**	**12.18**

Table II: Endoscopic Septoplasty (ES) group.Pre operative and post operative NOSE scores

	PRE-OP. MEAN (S.D)	POST-OP. MEAN (S.D)	DECLINE IN MEAN
Nasal blockage	3.73(.456)	0.41(0.503)	3.32
Trouble breathing through my nose	3.64(0.492)	0.27(0.456)	3.37
Trouble Sleeping	3.18(0.733)	0.05(0.213)	3.13
Nasal Stuffiness	3.77(0.429)	0.45(0.510)	3.32
Unable to breathe air during exertion	2.68(0.716)	0.05(0.213)	2.63
Total score	17.00(1.447)	1.23(1.020)	15.77

study included 34 males and 10 females. Number of patients with anterior, posterior and combined deviation were 15, 10 and 19 respectively.

Subjective Improvement after Surgery: The mean preoperative and post-operative NOSE score in conventional (CS) group were 16.36 and 4.18 respectively. The mean decline in the score was 12.18 (Table I).

In the endoscopic (ES) group the average preoperative and postoperative scores were 17.0 and 1.23.The average reduction in score was 15.77 (Table II).

There was significant subjective improvement in NOSE scores among participants in both the groups as found using Paired 't' test (TableIII).

The subjective improvement was further assessed based on site of deviation and found to be significant as shown in Fig. 1.

In cases with anterior deviations, the mean preoperative and post-operativeNOSE scores in CS group was 16.29 and 3.57 respectively; ES group was17.25 and 1.88 respectively. The mean decline in CS group was 12.74 (78%) and ES group was 15.37 (89%). ($p<0.05$)

In cases with posterior deviations, the mean preoperative and postoperative scores in CS group was 16.00 and 4.80 respectively; ES group was 16.80 and 0.4 respectively. The mean decline in CS group was 11.20 (70%) and ES group was 16.40 (98%).This difference was found statistically significant.

In cases with combined deviations, the mean

Table III: Pre and postoperative mean NOSE scores of the Conventional and Endoscopic groups

GROUP	PREOP MEAN NOSE SCORE	POSTOP MEAN NOSE SCORE	DROP IN MEAN NOSE SCORES	PERCENTAGE OF FALL IN MEAN NOSE SCORES
CONVENTIONAL (CS)	16.36	4.18	12.82	74%
ENDOSCOPIC (ES)	17.00	1.23	15.77	92.76%

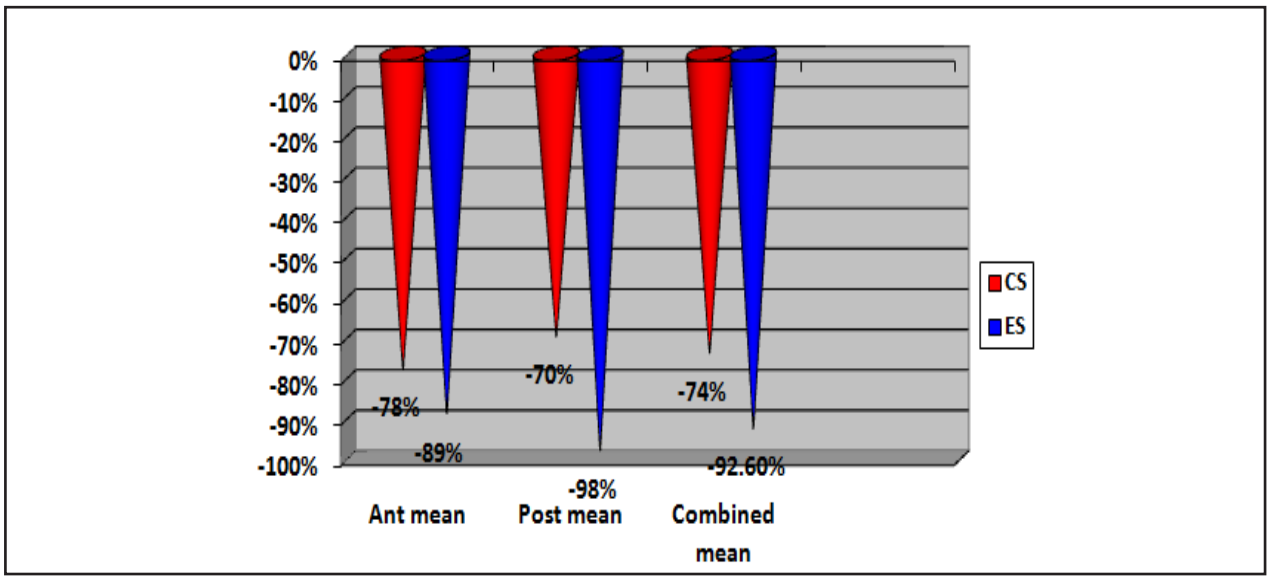

Fig. 1. Comparison between the % of fall in NOSE scores amongst 3 types of deviations. (Ant – Anterior, Post – Posterior) in both Conventional and Endoscopic groups.

preoperative and post-operative scores in CS group was 16.60and 4.30 respectively; ES group was 16.89 and 1.11 respectively. The mean fall in CS group was 12.30 (74%) and ES group was 15.77 (93%). This difference in decline of symptoms was found to be statistically significant.

The decline in mean NOSE scores (indicating improvement in symptoms) was significantly more in the Endoscope group ($p<0.05$) thus indicating that the endoscopic group had better relief of symptoms than the conventional septoplasty group, irrespective of the site of deviation.

Time taken during Surgery: The mean time taken (in minutes) for conventional septoplasty was 68.18

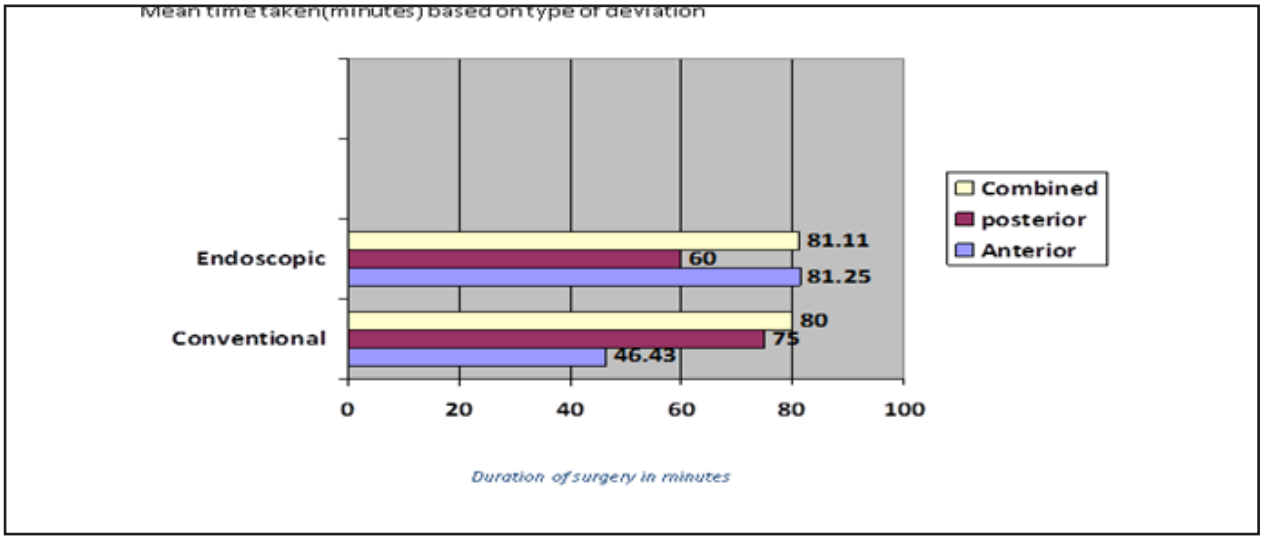

Fig. 2. Mean time taken for surgery (in minutes) based on type of deviations in both the Conventional and Endoscopic groups

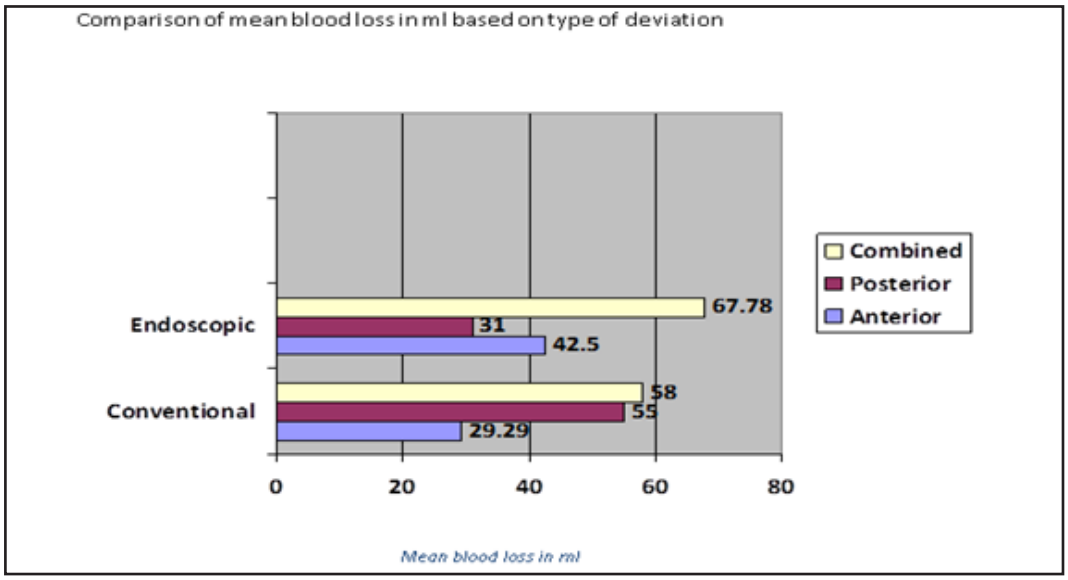

Fig. 3. Intraoperative blood loss in ml

and endoscopic septoplasty was 76.36 and this was not statistically significant.

As shown in Fig.2, mean time taken for surgery (in min) was significantly less for anterior deviations corrected by conventional method (46.42), as compared to the endoscopic method (81.25) ($p<0.001$).Similarly, the mean time for posterior deviations was significantly more in CS group (75) as compared to ES group (60). ($p=0.05$)

In the combined subgroup time taken for CS and ES were 80 and 81.11 respectively ($p=0.4$)

Intra Operative Blood loss: Average blood loss (in ml) in the CS group was 48.18 while that in ES group was 50.23 ($p=0.6$). No statistically significant difference was noted.

On assessing for blood loss depending on site of deviation, intraoperative bleeding was significantly less for the cases having anterior deviation undergoing conventional septoplatsy (29.29) as compared to those undergoing endoscopic correction (42.50)($p=0.00$). Average blood loss for posterior deviations in CS group was 55 while it was 31 in ES group.($p=0.05$)

In the combined subgroup the mean blood loss recorded in CS group was 67.78 while it was 58 for cases in ES group ($p=0.010$). (Fig. 3)

Postoperative Pain: Post-operative assessment of pain, using the visual analogue scale showed, majority of patients (77.3%) who underwent endoscopic

Table IV: Comparison of post-operative pain in the Conventional and Endoscopic groups

PAIN	CONVENTIONAL(CS)	ENDOSCOPIC (ES)	TOTAL
MILD	9 (40.9%)	17(77.33%)	26
MODERATE	13(59.1%)	5(22.77%)	18
TOTAL	22(100%)	22(100%)	44

septoplasty had mild pain, whereas moderate pain was reported by 22.7% cases in the same group. In CS group majority of cases (59.1%) experienced moderate pain, while mild pain was noticed among 40.9% patients. In our study patients undergoing endoscopic septoplasty had significantly less postoperative pain as calculated by the chi-square test (p=0.04). (Table IV)

Complications:In conventional group, total of 4 patients had complications (18.2%) - 2 had synechiae, 1 patient had infection and 1 patient had delayed hemorrhage.

In endoscopic group, complications were seen in 3 patients (13.6%) 2 cases of synechiae, and 1 of septal perforation (Table V)

Though the incidence of complications was slightly more in conventional group this was not statistically significant.

The numbers being small we could not assess the rate of complications across the subgroups of deviations based on their location.

Discussion

Deviation of the nasal septum is very common, but not always symptomatic. Septal surgery is the treatment for symptomatic deviated nasal septum. Surgical techniques to correct deviated nasal septum date back to ancient Egyptian medical texts dated around 3500 BC and over time many techniques had evolved but most were short lived and fell out of favour till the early 1900 when the sub mucous resection was described and popularized by Freer [1902] and Killian [1904] separately. These too underwent modifications to evolve into the more conservative septoplasty notably by Metzenbaum [1929], Galloway [1946] and Cottle [1958].

With advent of nasal endoscopic surgery in 1978 it was not long before Lanza et al and Stammberger initially described the application of endoscopic techniques to the correction of septal deformity in 1991.[2]

Our study aimed at comparing the results of endoscopic septal surgery versus conventional septal surgery using 4 parameters – subjective improvement in symptoms 3 months after surgery using validated NOSE scores, intra operative blood loss, post-operative pain and incidence of complications. We further tried to compare whether the site of deviation had any effect on our results.

We inferred that the conventional and endoscopic techniques were both effective in relieving symptoms of a deviated nasal septum, but endoscopic septoplasty was significantly better than the conventional method of surgery. This is probably because the endoscopic technique provides a direct – targeted approach to the septal anatomic deformity, allowing a minimally

Table V: Numberof complications in the Conventional and Endoscopic septoplasty group

COMPLICATION	CONVENTIONAL(CS)	ENDOSCOPIC (ES)
Synechiae	2	2
Post Op infection	1	0
Post op bleeding	1	0
Septal perforation	0	1
Total	4	3

invasive procedure with limited septal mucosal flap dissection and removal of a small cartilaginous and/or bony deformity.[3]

Our observations were in consensus with other similar studies. Gulati et al, in their comparative study enrolling 50 cases stated that 90.5% cases reported improvement of their obstruction by the endoscopic method while 80% cases of conventional got relief.[4]

Paradise et al performed a similar study on 63 patients, using NOSE scores and reported both endoscopic and conventional septoplasty to be effective in improving the mean scores of the patients. But no statistical difference was found between the groups.[5]

We further observed that septoplasty done by endoscopic approach has showed significantly better results when compared to conventional approach irrespective of the site of deviation (anterior, posterior or combined) and this improvement was most marked in posterior deviations.

A similar experience was obtained Gupta et al. They found that 80% had subjective improvement in conventional group while 96% in endoscopic group in patients with posterior septal deviations.[1]

Our study showed that overall the average time taken for endoscopic septoplasty was more as compared to conventional method, but the difference was not statistically significant. But on assessing the surgical time for the various sub groups, we found that for predominantly anterior deviations the time taken was significantly less by conventional method and for posterior deviations the endoscopic surgical time was significantly shorter, it being almost same for combined deviations.

It is possible that as surgeons gain more experience with endoscopic septoplasty this difference will reduce or maybe even reverse.

On assessing the blood loss during surgery, we found there was no significant difference in blood loss during surgery by either of the methods. This was different from the results of the study by Aiyer,who stated that majority of patients (82%) who underwent endoscopic septoplasty had minimal (< 50 ml blood loss) while 18% had bleeding (>50ml), as compared to 45% in conventional group.[6]

On further assessing blood loss based on site of deviation, we observed that blood loss was significantly less in anterior deviation correction by conventional surgery and predominantly posterior deviation corrections that were performed by endoscopic septoplasty. Thus, an important observation in our study was that the surgical time and blood loss during correction of anterior deviation with endoscopic approach was more and it was significantly less for predominantly posterior deviations. This could probably be because stabilizing the endoscopes and instrument in the anterior nose is difficult for the surgeons requiring more time and manipulation and consequently more bleeding.

The posterior deviations and spurs which were relatively inaccessible by the conventional method, due to tunnel vision and narrow space for manipulation, were better dealt endoscopically. Nayak et al had found the endoscopic septoplasty to have distinct advantages in correcting posterior deviations and have advocated an endoscopic approach for inaccessible posterior deviation and a conservative traditional technique for accessible anterior segment.[7]

We found that the patients undergoing endoscopic septoplasty had significantly less postoperative pain (p=0.04). Our observation was in agreement with the study done by Aiyer who found that 64% cases of endoscopic group experienced mild pain while 9% cases had moderate pain, while 59% patients in conventional group noted moderate pain and 23% had mild pain.[6]

Gulati also, in his study, concluded that postoperative perception of pain was higher in conventional category as compared to endoscopic group. This is probably because endoscopic septoplasty requires less dissection and resection of tissues as compared to the conventional method.[4]

There were slightly more complications in the conventional group (18.2%) than the endoscopic group (13.6%) in our study, but the difference was not statistically significant. Similar observations have been reported in studies done by Jain et al,[8] Talluri et al.[9]

Prakash et al reported a statistically significant higher incidence of complications in the conventional

group(35%) as against the endoscopic group(15%).[10]

Conclusion

Both the conventional and endoscopic septoplasty techniques were found to be very effective in relieving nasal obstruction, but endoscopic method was found to have a significant edge over the conventional technique, irrespective of the site of deviation.

Though there was no statistical difference in the time taken and blood loss during surgery between the endoscopic septoplasty and the conventional group, the anterior deviations could be corrected significantly faster and with lesser bleeding using the conventional method while posterior deviations had significantly lesser bleeding and operating time when corrected endoscopically.

There is significantly less postoperative pain in endoscopic group as compared to conventional group.

Considering the distinct advantages of endoscopic septoplasty over the conventional technique, we recommend that all surgeons be well versed with the endoscopic technique.

Further surgical experience and larger similar studies will help in coming to a greater consensus. Till then we strongly suggest that at least the posterior deviations are approached by the endoscope.

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