International Journal of Otorhinolaryngology and Head and Neck Surgery
Gayen B et al. Int J Otorhinolaryngol Head Neck Surg. 2026 Oct;12(5):754-759
https://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937
DOI: https://dx.doi.org/10.18203/issn.2454-5929.ijohns20263383

Original Research Article

A study comparing conventional septoplasty with endoscopic septoplasty

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Received: 09 February 2026
Revised: 08 September 2026
Accepted: 10 September 2026

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ABSTRACT

Background: Endoscopic septoplasty provides direct visualization of septal pathology and may be particularly useful for posterior deviations and as an adjunct to endoscopic sinus surgery. This prospective comparative study evaluated the technical and post-operative outcomes of endoscopic and conventional septoplasty.
Methods: Fifty patients with significant symptomatic deviated nasal septum were studied prospectively at the Department of ENT, Head and Neck Surgery, Command Hospital (Eastern Command), Kolkata. Twenty-five patients underwent endoscopic septoplasty and 25 underwent conventional septoplasty. Patient symptoms, intraoperative visualization, operative time, blood loss, flap injury, early postoperative bleeding, nasal toilet, pain, postoperative complications and relief of nasal obstruction were assessed. Comparisons were performed using the Chi-square test, with $p<0.05$ considered statistically significant.
Results: Endoscopic septoplasty provided better visualization of the posterior septum (100% versus 72%; p=0.0312) and superior septum (100% versus 68%; p=0.0188). Mean operative time was 52 versus 48 minutes (p=0.777), and intraoperative blood-loss categories did not differ significantly (p=0.230). No flap tear occurred in 80% of endoscopic cases versus 44% of conventional cases (p=0.009 for absence of tears). Early postoperative pack-change requirement (p=0.439), nasal toilet (p=0.315), pain (p=0.697), synechiae (p=0.427) and relief of nasal obstruction (76% complete versus 68%; p=0.325) were not significantly different. Septal haematoma occurred in one conventional case and in none of the endoscopic cases; no septal abscess or perforation occurred.
Conclusions: Endoscopic septoplasty demonstrated technical advantages in visualization and flap preservation, particularly for posterior or limited septal pathology. Overall postoperative symptom relief and complications were broadly comparable between techniques. Conventional septoplasty remains useful for large, caudal and complex deviations.

Keywords: Deviated nasal septum, Endoscopic septoplasty, Conventional septoplasty, Nasal obstruction

INTRODUCTION

Deviated nasal septum (DNS) is a common cause of nasal airway obstruction and may be associated with other sino-nasal symptoms. Septal surgery aims to restore the nasal airway while preserving adequate structural support. Conventional septoplasty has traditionally been performed using headlight illumination and a nasal speculum with wider muco-perichondrial dissection and exposure. Although effective, visualization of posterior and superior septal pathology may be limited.

Endoscopic techniques were introduced to improve illumination and magnified visualization of the septal

framework. The endoscopic approach permits a more targeted incision and flap elevation over the site of deviation and has been described as particularly useful for isolated spurs, posterior deviations and when septoplasty is required to facilitate endoscopic sinus surgery.[1-3] Endoscopic visualization may also reduce unnecessary dissection and permit the operative field to be viewed simultaneously on a monitor, which can be useful in teaching settings.[3-6]

Comparative studies have reported technical and morbidity advantages of endoscopic septoplasty, while also recognizing limitations in severe, large or caudal deformities.[6-9] Symptomatic improvement after septal surgery is generally substantial, but whether the endoscopic technique provides superior post-operative outcomes over conventional septoplasty remains uncertain.[10-12]

The present study was undertaken with an aim to compare the peri-operative technical advantages and post-operative outcomes of endoscopic and conventional septoplasty.

The objectives were to assess presenting symptoms, compare intra-operative technical parameters, evaluate post-operative relief of nasal obstruction, and document post-operative complications during follow-up.

METHODS

Study design and setting

This was a prospective comparative study conducted in the Department of ENT, Head and Neck Surgery, Command Hospital (Eastern Command), Kolkata, from September 2011 to August 2013. The study recorded a sample of 50 patients selected by simple random sampling with 25 undergoing endoscopic septoplasty and 25 undergoing conventional septoplasty.

Eligibility (selection) criteria

Patients aged >17 years with symptomatic DNS causing nasal obstruction and requiring surgical correction were included. Patients with acute rhinosinusitis, complex DNS associated with external nasal deformity, maxillofacial anomalies, revision cases and traumatic DNS were excluded.

Pre-operative assessment

All patients underwent detailed history, clinical examination and relevant investigations for symptomatic DNS and associated nasal or paranasal sinus pathology. Recorded variables included presenting nasal symptoms, side of septal deviation, inferior turbinate hypertrophy and nasal polyps.

Surgical techniques

Endoscopic septoplasty was performed under local or general anaesthesia. The septum was infiltrated with 2% lignocaine with adrenaline 1:80,000 on the convex side of the most deviated portion. A 0° rigid 4-mm endoscope was used. Depending on the site of pathology, a Killian incision or a targeted incision proximal to the deviation, above/below an isolated spur, or parallel to the floor at the apex of a spur was used. The mucoperichondrial flap was elevated under direct visualization, the deviated cartilage or bone was removed, and the flap was repositioned. Conventional nasal packing was retained for 24–48 hours.

Conventional septoplasty used headlight illumination and a nasal speculum. Following local infiltration, a Freer or Killian-type approach was used with elevation of mucoperichondrial and mucoperiosteal flaps, disarticulation at the bony-cartilaginous junction and removal of deviated septal components. Remaining cartilage was cross-hatched, followed by closure and nasal packing.

Outcome assessment

Intra-operative variables included visualization of the bony-cartilaginous junction, posterior septum and superior septum; operative time; estimated intraoperative blood loss; and mucoperichondrial/mucoperiosteal flap tears. Early postoperative assessment included external bolster-pack changes during 48 hours, nasal toilet during first 07 days and pain using the recorded visual analogue scale (VAS).

Follow-up was performed through 90 days (days 2, 7, 15, 30, and 90) and included pain, secretions/ crusting/pseudo-membrane formation, synechiae, relief of nasal obstruction, septal haematoma, septal abscess and septal perforation.

Statistical analysis

Statistical analysis was performed using statistical package for the social sciences (SPSS) version 11.5 (SPSS Inc., Chicago, IL, USA). Categorical variables were compared using the Chi-square test, and a $p<0.05$ was considered statistically significant.

Ethical approval

The study protocol was reviewed and approved by the Institutional Ethics Committee, Command Hospital (Eastern Command), Kolkata, vide approval/reference No. 100039/Academic/Ethical/2012 dated 14 January 2012. The study was conducted in accordance with the approved protocol.

RESULTS

Fifty patients were included, with 25 in each group. The overall mean age was 32.54 years; mean age was 30.28 years in the endoscopic group and 34.80 years in the conventional group. The largest age groups were 18–25 years (36%) and 26–35 years (32%). Overall, 58% of patients were male.

Table 1: Baseline demographic characteristics.

Characteristics	Endoscopic, N (%)	Conventional, N (%)	P value
Age 18–25 years	10 (40)	8 (32)	0.831
Age 26–35 years	8 (32)	8 (32)	
Male sex	—	—	0.775

Presenting symptoms and preoperative findings

Unilateral nasal obstruction was present in 64% of endoscopic and 72% of conventional cases; bilateral obstruction occurred in 36% and 28%, respectively. Associated recurrent sneezing, watery rhinorrhoea and itching were present in 44% of patients in each group when unilateral and bilateral obstruction categories were considered as recorded in the study. Otorrhoea was present in 12% and 8%, respectively. The distribution of presenting symptoms did not differ significantly between groups. Septal deviation was left-sided in 56% and 52% of endoscopic and conventional cases, respectively (p=0.777). Inferior turbinate hypertrophy was present in 40% of each group (p=0.606).

Table 2: Presenting symptoms and preoperative findings.

Pre-operative variables	Endoscopic, N (%)	Conventional, N (%)	P value
Left-sided DNS	14 (56)	13 (52)	0.777
Right-sided DNS	11 (44)	12 (48)	
Inferior turbinate hypertrophy, unilateral	7 (28)	8 (32)	0.606
Inferior turbinate hypertrophy, bilateral	3 (12)	2 (8)	
Any inferior turbinate hypertrophy	10 (40)	10 (40)	
Polyps, unilateral	5 (20)	4 (16)	
Polyps, bilateral	2 (8)	2 (8)	

Intraoperative findings

The bony-cartilaginous junction was visualized in all patients. The posterior septum was visualized in all endoscopic cases compared with 72% of conventional cases (p=0.0312); the superior septum was visualized in 100% and 68%, respectively (p=0.0188). Mean operative time was 52 minutes for endoscopic septoplasty and 48 minutes for conventional septoplasty (p=0.777).

Intraoperative blood loss was 0–30 ml in 88% versus 76% and 30–60 ml in 12% versus 24% of endoscopic and conventional cases, respectively (p=0.230).

Table 3: Intraoperative outcomes.

Intraoperative outcomes	Endoscopic, N (%)	Conventional, N (%)	P value
Posterior septum visualized	25 (100)	18 (72)	0.0312
Superior septum visualized	25 (100)	17 (68)	0.0188
Operative time, mean (min)	52	48	0.777
Blood loss 0–30 ml	22 (88)	19 (76)	0.230
Blood loss 30–60 ml	3 (12)	6 (24)	
No flap tear	20 (80)	11 (44)	0.009
Single flap tear	4 (16)	10 (40)	
Multiple flap tears	1 (4)	4 (16)	

Early postoperative outcomes

During the first 48 hours, one bolster-pack change was required in 80% of endoscopic and 64% of conventional cases; the distribution did not differ significantly (p=0.439). During the first seven days, fewer than two nasal-toilet procedures were required in 84% and 68%, respectively (p=0.315).

Pain assessment showed VAS 2 in 56% versus 44%, VAS 4 in 28% versus 36%, and VAS 6 in 16% versus 20% of endoscopic and conventional cases, respectively; the difference was not statistically significant (p=0.697).

Follow-up outcomes

At follow-up, pain had resolved by day 7 in all patients. On day 2, VAS 2 pain was recorded in 68% of endoscopic and 60% of conventional cases; VAS 4 in 24% and 32%; and VAS 6 in 8% and 8%, respectively (p=0.729). Secretions/crusting/pseudo-membrane scores improved by day 7 and no such complication persisted beyond day 7. Nasal synechiae occurred in 24% of endoscopic and 32% of conventional cases, with no statistically significant difference (p=0.427).

Complete relief of nasal obstruction was achieved in 76% and 68%, respectively (p=0.325). One conventional case (4%) developed septal haematoma; none occurred after endoscopic septoplasty (p=0.321). No septal abscess or perforation occurred in either group.

Table 4: Early postoperative outcomes.

Early postoperative outcomes	Endosc-opic, N (%)	Conven-tional, N (%)	P value
1 bolster-pack change in 48 hours	20 (80)	16 (64)	0.439
2 bolster-pack changes in 48 hours	3 (12)	6 (24)	
>2 bolster-pack changes in 48 hours	2 (8)	3 (12)	
<2 nasal toilets in 7 days	21 (84)	17 (68)	0.315
3–5 nasal toilets in 7 days	3 (12)	6 (24)	
>5 nasal toilets in 7 days	1 (4)	2 (8)	
VAS 2	14 (56)	11 (44)	0.697
VAS 4	7 (28)	9 (36)	
VAS 6	4 (16)	5 (20)	

Table 5: Follow-up outcomes.

Follow-up outcomes	Endosc-opic, N (%)	Conven-tional, N (%)	P value
Pain VAS 2 on day 2	17 (68)	15 (60)	0.729
Pain VAS 4 on day 2	6 (24)	8 (32)	
Pain VAS 6 on day 2	2 (8)	2 (8)	
Synechiae at one site	3 (12)	5 (20)	0.427
Synechiae at two sites	3 (12)	2 (8)	
Synechiae at >2 sites	0	1 (4)	
Complete relief of nasal obstruction	19 (76)	17 (68)	0.325
Partial relief	6 (24)	8 (32)	
Septal haematoma	0	1 (4)	0.321
Septal abscess	0	0	—

Additional surgeries/procedures

Functional endoscopic sinus surgery (FESS) was performed in 13 (52%) endoscopic cases and 4 (16%) conventional cases (p=0.0072). Submucous diathermy (SMD) of the inferior turbinate was performed in 7 (28%) and 10 (40%), respectively (p=0.3705). The higher frequency of FESS in the endoscopic group is interpreted as reflecting the use of endoscopic septoplasty to facilitate access for concomitant endo-nasal surgery rather than as an outcome caused by the septoplasty technique.

Table 6: Additional surgeries/procedures.

Additional procedures	Endoscopic, N (%)	Convention-al, N (%)	P value
FESS	13 (52)	4 (16)	0.0072
SMD	7 (28)	10 (40)	0.3705

DISCUSSION

The principal finding of this prospective comparative study was a technical advantage of endoscopic septoplasty in visualization of the posterior and superior septum, without a statistically significant difference in operative time or intra-operative blood loss. The endoscopic approach also had a higher proportion of cases without mucosal flap tears. In contrast, post-operative pain, early nasal-pack change requirement, nasal toilet, synechiae and relief of nasal obstruction did not differ significantly between techniques.

The demographic distribution was broadly similar between groups. The predominance of younger adults and the male preponderance are comparable with patterns reported in earlier septal-surgery series.[12,13] The presenting symptom profile was also similar between the two groups, supporting reasonable baseline comparability within the limits of this small study.

Visualization was the clearest technical advantage. The posterior septum was visualized in all endoscopic cases compared with 72% of conventional cases, while the superior septum was visualized in 100% versus 68%. These findings are consistent with previous descriptions of endoscopic septoplasty emphasizing improved illumination, magnification and access to posterior septal pathology.[3,5,6,14] The findings are also concordant with comparative work reporting better identification of remote septal deviations using the endoscope.[8,15]

Mean operative time was 52 minutes for endoscopic and 48 minutes for conventional septoplasty, without a statistically significant difference. This suggests that the additional equipment and visualization steps did not translate into a demonstrable increase in operative duration in this series. The thesis also recorded faculty and resident-assisted procedures, indicating that the study was conducted in a teaching environment. Endoscopic visualization may provide an additional educational advantage because the operative field can be displayed on a monitor.[3,6]

Intra-operative blood loss categories did not differ significantly. The study recorded 0–30 ml blood loss in 88% of endoscopic and 76% of conventional cases. Similar observations have been reported in comparative endoscopic series, although estimates vary with operative technique and the definition of blood loss.[8,15] The present sample is too small to support a conclusion that either approach reduces blood loss.

Mucosal flap preservation was better in the endoscopic group: 80% had no flap tear compared with 44% in the conventional group. This finding is consistent with the proposed advantage of targeted endoscopic dissection directly over the deformity, thereby reducing unnecessary elevation of mucosal flap.[6,8,15] The result should nevertheless be interpreted cautiously because the study

was small and the thesis analysis used categorical comparisons rather than a pre-specified primary outcome.

Early post-operative bleeding, represented by the number of external bolster pack changes during the first 48 hours, did not differ significantly. Similarly, nasal toilet requirements during the first week were not significantly different. The study used these pragmatic post-operative measures rather than a standardized quantitative measurement of post-operative blood loss. Therefore, they should be regarded as clinical indicators of post-operative bleeding/cleaning requirement rather than direct measurements of blood loss.

Post-operative pain was numerically lower in the endoscopic group but did not reach statistical significance. This contrasts with some earlier comparative reports that found lower post-operative morbidity with endoscopic septoplasty, while other literature has reported broadly comparable outcomes.[8,15,16] The present data therefore support a cautious interpretation: endoscopic visualization may facilitate less traumatic dissection, but the study was not powered to establish a definitive difference in post-operative pain.

At follow-up, synechiae were observed in 24% of endoscopic and 32% of conventional cases, without a significant difference. Other series have reported lower synechiae rates with endoscopic techniques, although rates vary according to surgical extent, post-operative debridement and packing practices.[8,15] The absence of septal abscess and perforation in both groups is reassuring, while the single septal haematoma in the conventional group is consistent with the low frequency of this complication reported in previous studies.[2,17]

Complete relief of nasal obstruction was achieved in 76% of endoscopic and 68% of conventional cases. The difference was not statistically significant, and both techniques therefore produced substantial symptomatic improvement. Previous reports have also demonstrated meaningful improvement after septal surgery, although the magnitude of improvement varies with patient selection and outcome measures.[10-12,18]

FESS was performed considerably more frequently in the endoscopic group (52% versus 16%). This difference should not be interpreted as evidence that endoscopic septoplasty causes a higher need for FESS. Rather, the study describes endoscopic septoplasty as an adjunct to improve access before FESS, consistent with the established role of limited septoplasty in facilitating endoscopic sinus surgery.[3,5,6,19] The submucous diathermy (SMD) rate did not differ significantly between groups.

Overall, the findings support the role of endoscopic septoplasty as a useful technique for selected deviations, particularly posterior deviations and isolated spurs, and when access for concomitant endoscopic sinus surgery is required. Conventional septoplasty remains valuable for large, caudal and complex deformities in which broad exposure and structural correction are required.[6,8,15]

Limitations

The principal limitations are the small sample size of 50 patients, single-center design, and relatively short follow-up of three months. Several post-operative outcomes were recorded using categorical clinical scores, and the study was not designed with a single prespecified primary endpoint.

The greater frequency of FESS in the endoscopic group also indicates that concomitant procedures may have influenced some peri-operative outcomes. These limitations restrict the ability to generalize the findings or infer superiority of one technique for all forms of DNS.

CONCLUSION

Endoscopic septoplasty demonstrated clear technical advantages in visualization of the posterior and superior septum and was associated with fewer observed mucosal flap tears in this prospective series. However, operative time, blood loss categories, early post-operative bleeding/nasal pack changes, nasal toilet, pain, synechiae and relief of nasal obstruction were broadly comparable between techniques. Endoscopic septoplasty appears particularly useful for selected posterior or limited deviations and when septal correction is required to facilitate endoscopic sinus surgery, whereas conventional septoplasty remains an appropriate approach for large, caudal or complex septal deformities.

ACKNOWLEDGEMENTS

The authors acknowledge the Department of ENT, Head and Neck Surgery, Command Hospital (Eastern Command), Kolkata, for support during the study period and the clinical staff who assisted with peri-operative care and follow-up.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Gayen B, Das A, Dubey R. A study comparing conventional septoplasty with endoscopic septoplasty. Int J Otorhinolaryngol Head Neck Surg 2026;12:754-9.