

ORIGINAL RESEARCH

To compare the effectiveness of endoscopic septoplasty and Conventional septoplasty in the treatment of deviated nasal septum at a tertiary care centre

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ABSTRACT

Background: To compare the effectiveness of endoscopic septoplasty and conventional septoplasty in the treatment of deviated nasal septa.

Materials and methods: The research comprised 100 patients, of either gender, between the ages of 18 and 65, who had symptomatic deviated nasal septum (DNS). Patients experiencing symptoms from a deviated nasal septum do not respond to non-invasive medical therapy. This research covered five symptoms for consideration: nasal obstruction, postnasal discharge, headache, epistaxis, and hyposmia. The research excluded individuals with allergic or vasomotor rhinitis, nasal masses, nasal polyps, and revision patients. Group A consisted of 50 patients who received endoscopic septoplasty (ES), whereas Group B consisted of another 50 instances that underwent conventional septoplasty (CS) under local anaesthesia.

Results: The current investigation revealed that the most common symptom before surgery was nasal blockage, affecting 91% of the participants. This was followed by headache (55%), postnasal drip (50%), hyposmia (48%), and epistaxis (31%). Haemorrhage occurring during a surgical procedure: The mean blood loss in millilitres (ml) for the conventional septoplasty (CS) group was 88.67 ± 6.78 , while the endoscopic septoplasty (ES) group had a mean blood loss of 54.35 ± 4.37 ml. The amount of blood loss was greater in the CS group. The present study find out, 93.02% reduction in nasal blockage, 81.48% improvement in nasal headache, and a 72% improvement in postnasal drip. The occurrence of hyposmia was seen in 84.61% of patients in the endoscopic septoplasty (ES) group. Epistaxis was reported in 76.92% of patients in the same group. In contrast, the traditional septoplasty group showed improvements in nasal obstruction (60.41%), headache (53.57%), post-nasal drip (PND) (32%), hyposmia (63.63%), and epistaxis (61.11%).

Conclusion: Both conventional and endoscopic septoplasty were found to be highly effective in alleviating symptoms. However, endoscopic septoplasty demonstrated significantly superior results due to its precise identification of pathology, improved illumination, enhanced accessibility to remote areas, and magnification. ES is linked to a significant decrease in post-operative morbidity because it limits the occurrence of flap dehiscence.

Keywords: Nasal septum, Endoscopic, Conventional, Septoplasty

Introduction

The nasal septum is the bony and cartilaginous structure inside the nose that divides the nasal cavity into two distinct nostrils. Typically, the septum is positioned in the centre, resulting in symmetrical

nasal passage ways. A deviated septum is a pathological disease characterized by the lateral deviation of the cartilaginous ridge, resulting in the blockage of the corresponding nasal canal. An undiagnosed deviated septum may remain uncorrected for an extended period of time. This problem may lead to inadequate sinus drainage and consequent sinusitis, breathing difficulties, headaches, nose bleeds, and sleep abnormalities such as snoring or sleep apnea.^{1,2} In 1991, Lanza et al. and Stammberger were the first to report the use of endoscopic methods for correcting septal deformities.^{3,4}

Lanza et al. provided a comprehensive endoscopic method for treating isolated septal spurs.³

In rhinologic practice, nasal obstruction is the most common complaint, and its most common cause is a deviated nasal septum. Epistaxis, sinusitis, obstructive sleep apnea, and headaches related to contact points with lateral nasal wall structures have all been attributed to a significantly deviated nasal septum.⁵ Compared to patients undergoing endoscopic septoplasty, those undergoing traditional septoplasty need to stay longer because of bleeding or lip oedema. By precisely guiding the shaving of septal cartilage, the endoscope also helped with limited resection and thus better conservation.⁶ Giles et al. assessed the function of endoscopic septoplasty as a supplementary procedure to functional endoscopic sinus surgery. With the increasing popularity of endoscopic procedures, endoscopic septoplasty is a rapidly developing concept that is becoming more and more popular.⁷ The use of endoscopic procedures during septoplasty significantly improves visualisation. It is possible to focus on specific septal pathologies like contact points, spurs, perforations, and isolated deflections.⁸

Aims and Objectives

- To compare the effectiveness of endoscopic septoplasty and traditional septoplasty in the treatment of deviated nasal septum
- To evaluate the advantages, disadvantages, and complications of both endoscopic and traditional septoplasty.

Materials and methods

The research design was a prospective, randomized one. The research comprised 100 patients, of either gender, between the ages of 18 and 65, who had symptomatic deviated nasal septum (DNS) admitted to the ENT emergency/OPD, Department of Otorhinolaryngology (ENT), Gouri Devi Institute of Medical Sciences and Hospital, Durgapur, West Bengal, Kolkata, India. Written consent from parents was obtained in order to take part in the study. The study was conducted from August 8, 2019 to March 30, 2021. Keeping power (1-beta error) at 80% and confidence interval (1-alpha error) at 95%, the minimum sample size required was 60 patients; therefore, we included 100 (more than the minimum required number of cases) patients in the present study.

Inclusion criteria

- Age between 18 and 65 years;
- Patient with symptomatic deviated nasal septum, nasal obstruction, chronic rhino sinusitis,
- Patient suffering from complications like epistaxis and snoring.

Exclusion criteria

- Age less than 18 years and more than 65 years;
- External deviation with a deviated nasal septum.

Patients experiencing symptoms from a deviated nasal septum do not respond to non-invasive medical therapy. This research covered five symptoms for consideration: nasal obstruction, postnasal discharge, headache, epistaxis, and hyposmia. The research excluded individuals with allergic or vasomotor rhinitis, nasal masses, nasal polyps, and revision patients. The study received approval from the Institutional Review Board. All individual subjects participating in the research provided informed, signed consents. Each patient had a comprehensive clinical assessment, which included an inquiry into their symptoms (namely, nasal blockage, headache, postnasal drip, hyposmia, and epistaxis) as well as thorough ear, nose, and throat (ENT) tests. The individuals had radiographic

examinations, namely an X-ray of the para-nasal sinus (PNS) and a non-contrast computerised tomogram of the nose and PNS, in order to exclude any nasal abnormalities. A thorough examination of the nasal passages was performed using rigid 0 and 30 degree 4 mm Hopkins rod endoscopes, while the patient was under local anaesthesia with 4% xylocaine without the use of vasoconstrictors. Observations were made about the presence of DNS (deviated nasal septum), nasal polyps, turbinate hypertrophy, and chronic sinusitis. The information was meticulously documented in a tailored proforma. The patients were allocated into two groups using a simple randomization process with single blinding, depending on the surgical treatment they underwent. Group A consisted of 50 patients who received endoscopic septoplasty (ES), whereas Group B consisted of another 50 instances that underwent conventional septoplasty (CS) under local anaesthesia.

Methodology

Endoscopic septoplasty: The operation used rigid endoscopes with a diameter of 4 mm, available in both 0° and 30° angles. An infiltration of Xylocaine 2% with adrenaline was administered bilaterally immediately anterior to the deviation. A cut was made below the deviation on the outer side, running approximately parallel but towards the head of the traditionally described incision used for hemitransfixation. The surgeon elevated mucoperichondrial and mucoperiosteal flaps to expose any deviation, whether it was caused by bone, cartilage, or a mix of both. The cartilage was cut in a parallel manner, positioned below the flap incision, and located towards the tail end of the deviation. If the deviation was osseous, the incision was performed at the intersection between the bone and cartilage. A mucoperichondrial elevator was introduced through the incision in the cartilage, and a flap of mucoperichondrial/mucoperiosteal tissue was elevated on the other side. The deviance was removed. Efforts were made to ensure that enough dorsal cartilage was preserved in order to maintain the form of the nasal dorsum. The flaps were repositioned in their anatomical places. To address septal spurs, a surgical cut was made on the same side as the spur, running parallel to the nasal floor, at the highest point of the spur. The flaps were raised in a superior and inferior direction using an elevator in order to reveal the underlying bony or cartilaginous spur. A surgical instrument called an osteotome was placed against the bottom of the bony growth and used to eliminate it. The remaining fragments of the spur were removed using endoscopic forceps by making precise cuts. Then the flaps were returned to their original places. The nasal cavity was packed with merocele.

Conventional septoplasty: Following the administration of a 2% solution of xylocaine with adrenaline into the columella and septum under a spotlight, an incision was made at the caudal boundary using a hemi transfixion technique. The flaps of the mucoperichondrium and mucoperiosteum were raised until they reached the perpendicular plate of the ethmoid bone. The Osseo cartilaginous junction was displaced. A section measuring 0.5 cm from the front edge of the perpendicular plate of the ethmoid bone was extracted using Luc's forceps. If needed, a substandard cartilaginous strip of 0.5 cm was excised. The surgical cut was sealed with chromic catgut (3-0), and the nasal cavity was filled with packing material. Intra-operatively, the following parameters were noted:

- Surgical duration,
- Intraoperative blood loss.

Patients received oral antibiotics, analgesics, and antihistamines. They were discharged from the hospital after the removal of the pack 48 hours later. After the operation, all patients were monitored as outpatients at 7, 14, 28, and 90 days. During these follow-up visits, their pre-operative symptoms, including nasal blockage, headache, postnasal drip, hyposmia, and epistaxis, were evaluated for any subjective improvement. Following that, a nasal endoscopic examination was conducted to provide an objective evaluation within the same session. The following observations were made during the endoscopy:

- Continuation of the deviation,
- Presence of a spur,
- Development of synechia,
- Occurrence of septal perforation.

Statistical analysis

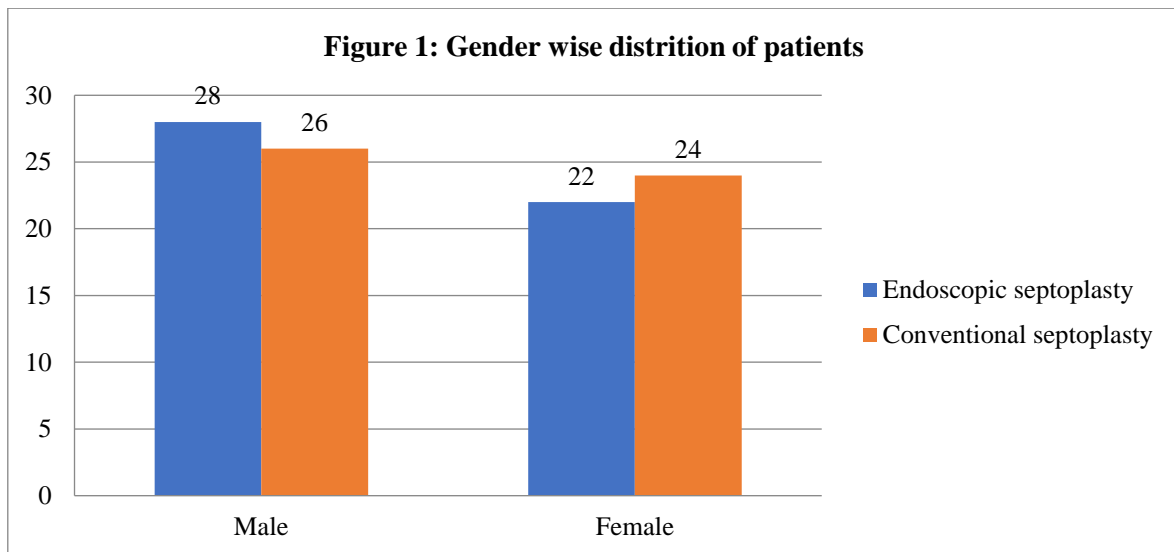
The collected data was analysed using Microsoft Excel 16 and SPSS version 21. The study's statistical analysis used the Chi square test, with a p-value of 0.05 being deemed statistically significant.

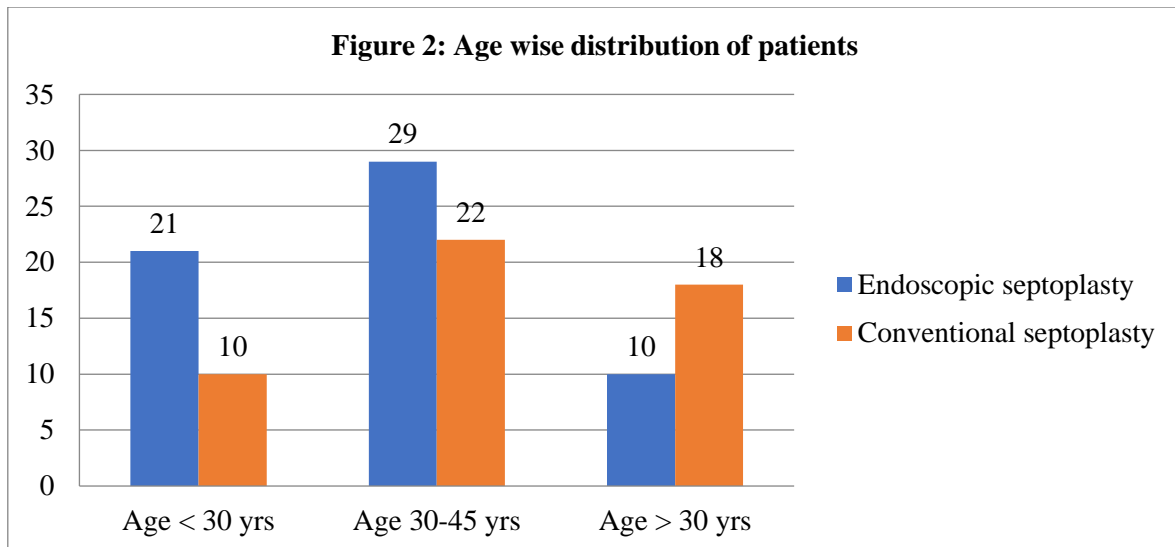
Results

The research included a total of 100 patients. Among the 100 patients, 46 were females, accounting for 46% of the total, while 54 were males, making up 54%. Out of a total of 46 females, 22 patients opted for endoscopic septoplasty, whereas 24 patients chose traditional septoplasty. In Table 1, it is shown that out of a total of 54 men, 28 patients opted for endoscopic septoplasty, whereas 26 patients chose traditional septoplasty. The findings revealed a predominance of male patients over their female counterparts. The patients' ages varied between 18 and 65 years. The age range was between 18 and 65 years, with a mean age of 39.57±3.45 years. The bulk of our patients were between the ages of 20 and 39 years old (Table 1, Figure 1).

Table1: Gender and Age wise distribution of the Patients

Parameters	Endoscopic septoplasty		Conventional septoplasty	
	Number (n=50)	Percentage	Number (n=50)	Percentage
Gender				
Male	28	56%	26	52%
Female	22	44%	24	48%
Age in years				
Below 30	21	42%	10	20%
30-45 years	29	56%	22	44%
Above 45	10	20%	18	36%





The current investigation revealed that the most common symptom before surgery was nasal blockage, affecting 91% of the participants. This was followed by headache (55%), postnasal drip (50%), hyposmia (48%), and epistaxis (31%), as shown in Table 2.

Table 2: Pre-operative symptoms among two groups

Symptoms	Endoscopic septoplasty (n=50)		Conventional septoplasty (n=50)		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Nasal obstruction	43	86%	48	96%	91	91%
Headache	27	54%	28	56%	55	55%
Postnasal drip	25	50%	25	50%	50	50%
Hyposmia	26	52%	22	44%	48	48%
Epistaxis	13	26%	18	36%	31	31%

The study found that the average duration for traditional septoplasty was 33.89 minutes, with a standard variation of 5.85. However, it is worth noting that endoscopic septoplasty took an average of 25.12 minutes, with a standard deviation of 4.38 minutes, as shown in Table 3. The difference between the two groups was not statistically significant. Hemorrhage occurring during a surgical procedure: The mean blood loss in milliliters (ml) for the conventional septoplasty (CS) group was 88.67 ± 6.78 ml, while the endoscopic septoplasty (ES) group had a mean blood loss of 54.35 ± 4.37 ml (Table 3). The amount of blood loss was greater in the CS group.

Table 3: Duration and volume of blood loss during surgery

Parameter	Endoscopic septoplasty		Conventional septoplasty	
	Mean	SD	Mean	SD
Duration of surgery (minute)	25.12	4.38	33.89	5.85
Volume of blood loss (ml)	54.35	4.37	88.67	6.78

The post-operative outcome was evaluated by categorising it into subjective and objective assessments on the 90th day. Both groups of patients had a significant increase in their subjective well-being. The study saw a 93.02% reduction in nasal blockage, an 81.48% improvement in nasal headache, and a 72% improvement in postnasal drip. The occurrence of hyposmia was seen in 84.61% of patients in the endoscopic septoplasty (ES) group. Epistaxis was reported in 76.92% of patients in the same group. In contrast, the traditional septoplasty group showed improvements in nasal obstruction (60.41%), headache (53.57%), post-nasal drip (PND) (32%), hyposmia (63.63%), and epistaxis (61.11%), as seen in Table 4. The disparity in the alleviation of symptoms was shown to be quite substantial.

Table 4: Comparison of relief in symptoms in both groups at the end of 90th day

Symptoms	Endoscopic group			Conventional group		
	Total number	Number of patients after relief	Percentage (%)	Total number	Number of patients after relief	Percentage (%)
Nasal obstruction	43	40	93.02%	48	29	60.41%
Headache	27	22	81.48%	28	15	53.57%
Postnasal drip	25	18	72%	25	8	32%
Hyposmia	26	22	84.61%	22	14	63.63%
Epistaxis	13	10	76.92%	18	11	61.11%

During the 90-day follow-up visit, residual deviation was seen in 42% of patients in the conventional group, compared to just 8% of patients in the endoscopic group ($P = 0.005$). In the conventional group, 19 out of 50 patients (38%) acquired synechiae, whereas in the endoscopic group, only 5 out of 50 patients (10%) got synechiae. The difference in the incidence of synechiae between the two groups was statistically significant ($P = 0.030$). The results were statistically significant, as shown in Table 5.

Table 5: Objective assessment in both groups at the end of 90th day

Parameter	Endoscopic group		Conventional group		P value
	Number of patients (n=50)	Percentage	Number of patients (n=50)	Percentage	
Persistence of deviation	4	8%	21	42%	0.005
Persistence of spur	2	4%	10	20%	0.13
Formation of synechiae	5	10%	19	38%	0.04
Septal perforation	1	2%	7	14%	0.16

Discussion

The present study aimed to compare the outcomes of conventional septoplasty with endoscopic septoplasty in patients with nasal septal abnormalities. A total of 100 patients were included in the study and were followed up for at least 3 months after the surgery. The outcomes were evaluated based on subjective symptomatic improvement, objective endoscopic findings, and the occurrence of post-operative complications. In this research, we aimed to assess the benefits and drawbacks of both

endoscopic and traditional septoplasty. The predominant manifestation seen in patients with septal deviation in this research was nasal obstruction, reported by 91% of the participants. Headache was the second most prevalent symptom, reported by 55% of the patients, followed by post-nasal drip (PND) in 50% of the cases. Hyposmia was reported by 48% of the patients, and epistaxis by 31%. The current results were comparable to the findings of Nayak DR et al.⁹, in which 78.3% of patients reported nasal blockage as a complaint. Headache was reported by 76.66% of the participants, rhinorrhoea by 45%, post-nasal drip by 58.33%, and hyposmia by 8.33%. In separate research done by Gulati et al.¹⁰, 92% of patients reported nasal blockage, 58% reported headache, 50% reported catarrh, and 30% reported post-nasal discharge. The average time required for ES was found to be 25.12 minutes shorter compared to the usual approach, although this difference was not statistically significant. Upon evaluating the amount of blood lost during surgery, it was shown that ES had significantly lower blood loss (mean 54.35) compared to CS (mean 88.67). Aiyer et al.¹¹ found a similar result, stating that the majority of patients (82%) who had endoscopic septoplasty experienced low blood loss (<50 ml), compared to just 45% in the traditional septoplasty group. After the 90-day follow-up, there was a substantial disparity in symptom alleviation between the ES and CS groups. The study saw a 93.02% reduction in nasal blockage, an 81.48% improvement in nasal headache, and a 72% improvement in post-nasal drip. The occurrence of hyposmia was seen in 84.61% of patients in the endoscopic septoplasty (ES) group. Epistaxis was reported in 76.92% of patients in the same group. In contrast, the traditional septoplasty group saw improvements in nasal obstruction (60.41%), headache (53.57%), post-nasal drip (PND) (32%), hyposmia (63.63%), and epistaxis (61.11%). The findings from our observations aligned with the results of previous comparable investigations. Harley et al.¹² conducted a study where patients with nasal blockage and headaches were chosen. The researchers found that there was a substantial improvement in the group that had endoscopic procedures compared to the group that underwent traditional septoplasty. In comparison research conducted by Gulati et al.¹⁰, including 50 patients, it was shown that 90.5% of the cases reported improvement in their blockage using the endoscopic procedure, whereas 80% of the cases using the traditional way had alleviation. This further supports our results. Research conducted by Sindhwani et al.¹³ found that 54% of patients who reported nasal blockage and face discomfort were healed, 38% exhibited improvement, and 8% did not experience any benefits.

Harley et al.¹² conducted a study in which individuals with nasal blockage and headaches were chosen. The researchers found that the endoscopic group showed a substantial improvement compared to the conventional group. These discoveries bear a striking resemblance to our own. Park et al.⁷ did research on 44 patients to evaluate the use of endoscopic-assisted repair of deviated noses with standard septorhinoplasty. Out of the total of 44 patients, 16 had endoscopic-assisted septoplasty, whereas the other patients got traditional septorhinoplasty. The endoscopic method resulted in a patient satisfaction rate of 87.5% and a complication rate of 0%. In contrast, the conventional approach had a patient satisfaction rate of 71.4% and a problem rate of 14.3%. The current investigation found that the ES group of patients showed a statistically significant improvement in correcting septal deviation and spur compared to the CS group. During the 90-day follow-up visit, it was observed that 42% of the patients in the conventional group had residual deviation, while 20% had a spur. In comparison, the endoscopic group had a lower percentage of patients with residual deviation (8%) and a spur (4%). This result is comparable to the findings of Nayak et al.⁹ The study showed that only 10% of patients with anterior deviation had a chronic septal deformity. However, most instances of posterior deviations or spurs were adequately treated in the group that underwent endoscopic septoplasty. Additionally, they noted that endoscopic septoplasty has shown greater efficacy in alleviating symptoms such as nasal blockage and headaches, which aligns with the current findings. In the research conducted by Park et al.⁷, it was shown that the formation of synechiae occurred much less often in the ES group compared to the CS group. This aligns with the present

research. In the current research, 19 patients (38%) in the conventional group had synechiae, whereas only 5 patients (10%) in the endoscopic group acquired synechiae. In the current research, the conventional group had a higher level of complications (44%), compared to the endoscopic group (10%). The findings of Prakash et al.¹⁴ showed a statistically significant increased occurrence of complications in the conventional group (35%) compared to the endoscopic group (15%), which is comparable to our results. This finding exhibited some resemblance to the research conducted by Gupta et al.¹⁵, Jain et al.¹⁶, and Talluri et al.¹⁷. Both conventional and endoscopic techniques were shown to be helpful in reducing symptoms. However, endoscopic septoplasty was superior to the traditional procedure due to the use of an endoscope, which provides greater lighting, magnification, and improved access to areas with a high deviated nasal septum (DNS). This technique permits a restricted cut and lifting of tissue, resulting in minimal removal and achieving repair with the least amount of tissue resection. This approach minimises stress on the septum, resulting in a decrease in post-operative complications. By enabling intraoperative examination, it efficiently alleviates the headache caused by touch in the region of contact. In research done by Sousa et al.¹⁸, it was shown that endoscopic nasal septal surgery offers a straightforward, efficient, and expedient alternative to traditional septoplasty.

Nevertheless, the endoscope has inherent limitations, such as the absence of binocular vision and the need for periodic cleaning of the endoscope tip, particularly in cases of excessive bleeding.¹⁰

Limitation of study: The small sample size and short duration of the study.

Conclusion

Both conventional and endoscopic septoplasty were found to be highly effective in alleviating symptoms. However, endoscopic septoplasty demonstrated significantly superior results due to its precise identification of pathology, improved illumination, enhanced accessibility to remote areas, and magnification. ES is linked to a significant decrease in post-operative morbidity because it limits the occurrence of flap dehiscence. Nevertheless, endoscopy is not without its limitations, such as the absence of binocular vision, the need for repeated cleaning of the tip in the presence of excessive bleeding, and the inability to rectify complicated deformities. Additional surgical expertise and more extensive comparable research will aid in resolving the challenge.

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