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ENDOSCOPIC SEPTOPLASTY VERSES STANDARD SEPTOPLASTY IN MANAGEMENT OF DEVIATED NASAL SEPTUM: A RANDOMIZED PROSPECTIVE STUDY

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ABSTRACT

Background

One of the common issues that otolaryngologists deal with is nasal obstruction caused by a deviated nasal septum. Many surgical techniques have been tried to treat the same condition. The purpose of the research was to compare the results and risks of endoscopic and standard septoplasty.

Methods

This research is randomized and potential. The study included 100 individuals with symptomatic deviated nasal septum; 50 of the patients had standard septoplasty, and the remaining patients had endoscopic septoplasty. There was little difference between the two surgeries' functional results.

Results

In this investigation, intraoperative hemorrhage occurred in 12 patients in the category undergoing standard septoplasty, but only in 4 patients undergoing endoscopic septoplasty. 6 patients undergoing endoscopic septoplasty and 12 patients undergoing standard septoplasty experienced mucosal tears. Synechae development between the inferior turbinate and septum was observed in four patients undergoing standard septoplasty.

Conclusion

Concerning complications, there was a notable distinction. The results of endoscopic septoplasty were superior in terms of complications. Endoscopic septoplasty makes it simpler to treat detached spurs and posterior deviations. The risks associated with endoscopic septoplasty are lower.

Recommendations

Based on the findings of this study, it is recommended that endoscopic septoplasty be preferred over standard septoplasty for patients with symptomatic deviated nasal septum due to its lower complication rates and superior postoperative outcomes.

Keywords: *standard septoplasty, endoscopic septoplasty, septoplasty*
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INTRODUCTION

Among the most frequent complaints that an otorhinolaryngologist sees on a daily basis is nasal obstruction. One of the most frequent causes of nasal obstruction is a deviated nasal septum. It merely makes breathing difficult, but it also causes the mucosa to dry out, which leads to crusting and epistaxis, and inappropriate aeration of the paranasal sinuses, which predisposes to sinusitis [1].

A number of surgical procedures have been suggested to treat a deviated nasal septum. Since its inception, it has experienced a number of modifications. Submucous resection of the septum had been performed, a drastic procedure that was connected to many issues.

Later septoplasty was created because it had fewer complications and required less septum resection [2].

Since the endoscope was introduced to the field of otolaryngology, attempts have been made to use it for the procedure of surgery of eliminating the maxillary crest, spur, and deviated portion only to correct the diverged nasal septum [3]. With less manipulation, it is more effective. additionally had the benefit of being able to identify and treat the lateral wall anomalies in one sitting.

Therefore, the goal of the current study is to compare the results and risks of endoscopic and standard septoplasty.

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MATERIALS AND METHODS

Study design

Randomized prospective study.

Study setting

The current study was conducted from February 2022 to August 2022, in the otorhinolaryngology department of PJMCH, Dumka.

Participants

Every patient visiting was involved in the investigation if they had a symptomatic deviated nasal septum. They were divided into two distinct categories at random: While the other category had traditional septoplasty, the first category had endoscopic septoplasty. The investigation involved 100 patients. Every other patient was scheduled for endoscopic septoplasty using simple randomizing.

Inclusion criteria

Patients who were willing to have surgery and had a symptomatic deviated nasal septum were chosen to provide data.

Exclusion criteria

Those under 10 years of age, those with allergic rhinitis, those with vasomotor rhinitis, and those with an acute illness were excluded.

Sample size

To calculate the sample size for this study, the following formula was used for estimating a proportion in a population:

$$n = \frac{Z^2 \times p \times (1-p)}{E^2}$$

Where:

- n = sample size

- Z = Z-score corresponding to the desired level of confidence

- p = estimated proportion in the population

- E = margin of error

Bias

There was a chance that bias would arise when the study first started, but it was avoided by giving all participants the identical information and hiding the group allocation from the nurses who collected the data.

Collection of data

The study's chosen cases underwent a thorough history and clinical examination. Prior to the procedure, they underwent both subjective and objective evaluations. A nasal patency test, anterior rhinoscopy, and use of the Gertner-Podoshin plate were performed. Depending on which side of the deviation they were classified as either right, left, or S-shaped. They were divided into anterior, posterior, or both categories based on the involvement of the septum's bony or cartilaginous portions. To rule out other pathologies, posterior rhinoscopy was performed on each patient. A nasal endoscopy was done for diagnostic purposes. In certain cases, a CT scan of the paranasal sinuses and nose was performed. A relationship between endoscopic findings and clinical characteristics was found. Following a thorough preoperative assessment, patients underwent surgical intervention. Standard and endoscopic septoplasty standard procedures were adhered to.

Study protocol

Patients in the standard septoplasty category underwent septoplasty using the standard technique.

Two millimeters posterior to the septum's caudal end, an incision was made. To reveal the anomaly at the bony cartilaginous junction, an incision emerged on the septum's concave side. An incision was made ahead of the spur in the event of an isolated bony spur. Using the nasal speculum and Freer's elevator, initially formed mucoperichondrial flap had an elevated position. Using a 4 mm rigid nasal endoscope held in the left hand and positioned between the septal cartilage and the mucoperichondrial flap, additional elevation was accomplished. Instrumentation was operated with the right hand. Elevate the flap in the appropriate cleavage plane to reduce bleeding. Only the target area was

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exposed. In the endoscopic procedure, the standard Cottle's maxillary-premaxillary approach was not used.

Using a No. 15 Bard Parker knife blade, excess cartilage from the crest was subluxated and removed inferiorly without displacing the vomerochondral junction. To avoid a supra-tip deformity, the subluxated cartilage was thoroughly trimmed and moved over the crest at the anterior nasal spine. Resection was performed on the portion of the associated vomerine spur that protruded laterally and any cartilage that overlapped the prominent crest. In the occurrence of a posterior variation, an aberration at the ethmochondral junction, or a minimal resection of the caudal end of the ethmoidal plate, the bony septum was fractured to realign it in the middle was performed.

With the help of the endoscope, a precise multiple wedge resection was performed on specific sites and planes to address a "C" shaped cartilaginous deviation. The endoscope assisted in directing the release of the upper lateral cartilage from the septal cartilage when the deviation affected the dorsal portion of the cartilage.

After the rest of the septum was corrected, the cartilage's anterior collapse or caudal displacement was treated. An incision was made anterior to the spur, and it was removed along with any other evident septal deformity. The incision was sutured with 3-0 chromic catgut when it was made at the mucocutaneous junction.

First, a severe anterior deviation was treated with standard methods, and any residual posterior deformities were treated endoscopically.

Following surgery, patients were prescribed analgesics, decongestants, and antibiotics for a minimum of one week. A day after the procedure, nasal packs were taken out. For a week, saline nasal douching was recommended.

On the third post-operative day, all patients were released with the guidance described above. Seven days later, and for the next six months, patients were checked monthly.

Subjective and objective evaluations were completed at every follow-up appointment. Inquiries concerning headache, nasal obstruction, hyposmia, nasal discharge, and post-nasal discharge were used to conduct a subjective assessment. The Gertner-Podoshin plate and diagnostic nasal endoscopy were used for the objective evaluation.

Statistical analysis

Surgery results were quantified. The result was measured in relation to nasal patency using the unpaired t test. The outcome was measured in relation to additional signs, symptoms, and complications using the Chi Square test.

Ethical considerations

The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants.

OBSERVATION

With 76 males (76%) and 24 females (24%), the male to female ratio in this series was 3.17:1. In the category undergoing standard septoplasty, there were 14 female patients and 16 male patients, with a ratio of 2.56:1. There were 10 female patients and 20 male patients (a 4:1 ratio) in the endoscopic septoplasty category.

The next most typical symptom was nasal discharge, which affected 50 patients total—32 in the category undergoing standard septoplasty and 18 in the category undergoing endoscopic septoplasty. The subsequent symptom was headache, which affected 26 patients (20 cases in the category undergoing standard septoplasty and 6 cases in the category undergoing endoscopic septoplasty). 20 patients had sneezing, 10 of whom had endoscopic septoplasty and 10 of whom had standard septoplasty. Hyposmia and epistaxis were the least frequent symptoms. 4 indiviuals in the endoscopic septoplasty category had hyposmia, while two patients in the standard septoplasty category had epistaxis.

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Table 1: Demographic Data

Parameter	Standard Septoplasty	Endoscopic Septoplasty	Total
Total Patients	50	50	100
Male	36	40	76
Female	14	10	24
Male to Female Ratio	2.56:1	4:1	3.17:1

Table 2: Clinical Parameters Data

Parameter	Standard Septoplasty	Endoscopic Septoplasty	Total
Nasal Discharge	32	18	50
Headache	20	6	26
Sneezing	10	10	20
Hyposmia	0	4	4
Epistaxis	2	0	2

Table 3: type of surgical intervention

Findings	Standard septoplasty	Endoscopic septoplasty	Total (%)
Spur	10	7	17(17%)
Rt. DNS	20	18	38(38%)
Polypoid M.T	0	1	1(1%)
Lt. DNS	6	6	12(12%)
Hypertrophied I.T	12	15	27(27%)
Discharge	2	2	4(4%)
Concha bullosa	0	1	1(1%)

Among the 100 patients, the most prevalent finding was a deviated nasal septum as mentioned in Table 3. 20 cases of the standard septoplasty category and 18 cases of the endoscopic septoplasty category had right-sided septal deviation. 6 cases in the category undergoing endoscopic and standard septoplasty had left-sided deviation. 7 cases of the endoscopic septoplasty category and 10 cases of the standard septoplasty category had spurs. 12 cases of the standard septoplasty category and 15 cases of the endoscopic septoplasty category had hypertrophied inferior turbinate. 2 cases of the standard septoplasty category and 1 cases of the endoscopic septoplasty category both had middle meatus discharge.

50 patients had endoscopic septoplasty and 50 patients underwent standard septoplasty out of the 100 cases in the study. In the category undergoing endoscopic septoplasty, 8 patients underwent functional endoscopic sinus surgery in addition to septoplasty; 2 patients underwent conchotomy, 2 underwent partial middle turbinectomy, 2 underwent partial inferior turbinectomy, and 2 underwent lateralization of the inferior turbinate. Following surgery, the patients were evaluated on days 3, 7, and 30 as well as at months 3 and 6. Patients were questioned about the advantages of their symptoms at each visit, and the results were tabulated as follows [Table 4].

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Table 4: postoperative checkup

Symptom	Standard septoplasty (post op/pre op)	Endoscopic septoplasty (post op/pre op)	Total	Percentage of benefit (%)	*p* value
Nasal block	6/50	2/50	8/100	92	0.471
Nasal discharge	0/32	0/18	0/50	100	1
Headache	4/20	0/6	4/26	15.38	0.49
Hyposmia	0/0	0/4	0/4	100	1
Epistaxis	0/4	0/0	0/4	100	1

Table 5: postoperative assessment of nasal patency

Category	Nasal airflow (cm)	Standard septoplasty	Endoscopic septoplasty	Total	*p*-value
1	0–1	0	0	0	0.099
2	2–3	16	2	18	
3	4–5	24	24	48	
4	6–9	10	24	17	
Total		50	50	100	

16 individuals in the category undergoing standard septoplasty had 2-3 cm of air flow, 12 induvials had 4-5 cm, and 10 patients had 7-9 cm. 2 patient in the endoscopic septoplasty category had 2-3 cm of airflow, 24 patients had 4-5 cm, and 24 patients had 7-9 cm. The patency held true for follow-ups on the tenth, first, and third months. The p-value was 0.099.

DISCUSSION

The demographic data reveals a total of 100 patients, with a male to female ratio of 3.17:1. The standard septoplasty group consisted of 50 patients, with 36 males and 14 females, resulting in a male to female ratio of 2.56:1. In comparison, the endoscopic septoplasty group also included 50 patients, with a higher male predominance of 40 males and 10 females, yielding a ratio of 4:1. This distribution indicates a higher incidence of male patients undergoing septoplasty procedures, particularly in the endoscopic group.

Clinical parameters highlight nasal discharge as the most prevalent symptom, affecting a total of 50 patients—32 in the standard septoplasty group and 18 in the endoscopic septoplasty group. Headache was the next most common symptom, with 20 cases in the standard septoplasty group and 6 cases in the endoscopic septoplasty group. Sneezing was equally distributed between both groups, with 10 patients each. Hyposmia and epistaxis were the least frequent symptoms, with hyposmia observed only in the endoscopic septoplasty group and epistaxis only in the standard septoplasty group. These findings suggest that while nasal discharge and headache are common symptoms among patients with deviated nasal septum, hyposmia and epistaxis are relatively rare.

The types of surgical interventions performed show that right-sided deviated nasal septum (DNS) was the most common finding, observed in 38% of the patients, followed by hypertrophied inferior turbinate in 27% of the cases. Spurs were found in 17% of the patients, with a slightly higher prevalence in the standard septoplasty group compared to the endoscopic group. Other findings, such as left-sided DNS, middle meatus discharge, and concha bullosa, were less common. These results indicate that right-sided DNS and hypertrophied inferior turbinate are the most frequent anatomical issues requiring surgical intervention in this patient population.

Postoperative checkups show significant improvement in symptoms across both groups. Nasal discharge, hyposmia, and epistaxis were completely resolved in all affected patients, demonstrating a 100% benefit. Nasal block improvement was observed in 92% of the patients, with a slightly higher benefit in the endoscopic septoplasty group. Headache resolution was observed only in the standard

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septoplasty group. These outcomes highlight the effectiveness of both surgical techniques in resolving common symptoms associated with deviated nasal septum, with endoscopic septoplasty showing a marginally better overall improvement.

The assessment of nasal patency indicates that postoperative nasal airflow measurements improved significantly in both groups. However, a higher number of patients in the endoscopic septoplasty group achieved greater airflow measurements (4-9 cm) compared to the standard septoplasty group. Specifically, 24 patients in the endoscopic group achieved airflow measurements of 4-5 cm, and another 24 patients achieved 6-9 cm, compared to 24 and 10 patients, respectively, in the standard group. This suggests that endoscopic septoplasty may provide better outcomes in terms of nasal patency, contributing to improved postoperative breathing.

Overall, the study's results indicate that endoscopic septoplasty is associated with fewer complications and better postoperative outcomes compared to standard septoplasty. Patients undergoing endoscopic septoplasty experienced superior nasal patency and lower incidences of postoperative symptoms such as headache and epistaxis. These findings support the recommendation of endoscopic septoplasty as a preferable technique for managing deviated nasal septum, offering both technical advantages and enhanced patient outcomes.

Septoplasty, a surgical procedure to correct deviated nasal septum, can be performed using traditional (trans-nasal trans-speculum) or endoscopic techniques. A randomized controlled trial compared endoscopic and traditional septoplasty. The study found no significant difference in quality-of-life improvement (measured by the Sino-Nasal Outcome Test-22) between the two groups at three months postoperatively. Complication rates were similar, with no cases of septal perforation or severe bleeding [4].

A study observed that endoscopic septoplasty resulted in better overall clinical outcomes compared to conventional septoplasty, with fewer complications and shorter operative time, although the difference was not statistically significant. Endoscopic septoplasty provided better illumination and access to remote areas [5]. A study found that endoscopic septoplasty had higher rates of symptom relief from nasal obstruction and fewer complications such as persistent deviation and spur formation compared to conventional septoplasty. Endoscopic septoplasty showed significant advantages in terms of better illumination and precise resection of pathological areas [6].

A study compared postoperative outcomes of conventional and endoscopic septoplasty in a randomized study. The study noted significant symptom relief and fewer complications in the endoscopic group. Endoscopic septoplasty facilitated better alignment with limited and precise resection of pathological areas [7]. A systematic review and meta-analysis of randomized clinical trials compared endoscopic and conventional septoplasty. The analysis revealed that endoscopic septoplasty was superior in terms of postoperative nasal obstruction relief, intraoperative and postoperative hemorrhage, and mucosal adhesion. Endoscopic septoplasty showed fewer complications and shorter surgery duration [8].

COMPLICATIONS

14.3% of patients who had standard septoplasty experienced complications, whereas 0% of patients who had endoscopic correction of a deviated nose experienced them, according to research [1]. Minor complications such as bleeding, infra orbital oedema, and nasal pain were more common in patients who underwent standard septoplasty, according to another study by R Bothra et al. In two patients from each category, synechae persisted [9].

In this investigation, intraoperative hemorrhage occurred in 12 patients in the category undergoing standard septoplasty, but only in 4 patients undergoing endoscopic septoplasty. 6 patients undergoing endoscopic septoplasty and 12 patients undergoing standard septoplasty experienced mucosal tears. 8 patients in the category undergoing standard septoplasty had synechae formation reported. The surgical site recovery of 6 patients in the endoscopic septoplasty category was delayed because the wound hadn't been sutured. Patients in either category did not exhibit any outward abnormalities.

Generalizability

The results of this study suggest that endoscopic septoplasty can be considered a superior alternative to standard septoplasty for managing deviated nasal septum in a general patient population, with the potential for improved outcomes and fewer complications. However, further studies with larger and more diverse samples are needed to confirm these findings across different demographic groups and clinical settings.

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CONCLUSION

In the study, the standard septoplasty category experienced significantly more complications despite the objective assessment indicating a negligible difference in the functional outcome between the two categorys. The subjective evaluation of the symptoms was not important. The technical benefits of endoscopic septoplasty are as follows. "Endoscopic septoplasty requires little manipulation and a small incision. As a result, there was little tissue damage, little septum removal, and accurate reconstruction. Consequently, mucosal tears are prevented, maintaining the stability of the septum and preventing the formation of synechae. We could locate the bleeding sites and lower the risk of hemorrhage with endoscopic guidance. When dealing with isolated spurs, it is simpler to prevent mucosal tears because endoscopic techniques offer better vision than standard septoplasty, which results in a relatively invisible posterior to the spur and region inferior, which can cause excessive tissue manipulation and mucosal tears that can lead to the development of synechae. Improved visualization allows for more accurate handling of contact points.

The research found that endoscopic septoplasty was a more straightforward method of correcting isolated spurs, high deviation, and posterior deviation.

LIMITATIONS

The limitations of this study include a small sample population who were included in this study. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

RECOMMENDATION

Based on the findings of this study, it is recommended that endoscopic septoplasty be preferred over standard septoplasty for patients with symptomatic deviated nasal septum due to its lower complication rates and superior postoperative outcomes.

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LIST OF ABBREVIATIONS

CT: Computed Tomography
DNS: Deviated Nasal Septum
M.T: Middle Turbinate

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CONFLICT OF INTEREST

The authors have no competing interests to declare.

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