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Septoplasty in Focus: Clinical Outcomes and Complication Patterns in A Pakistani Cohort

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ABSTRACT

Septal deviation is a common cause of nasal obstruction, and septoplasty is the preferred corrective procedure. Despite its widespread use, septoplasty is associated with several intraoperative and postoperative complications, which remain underreported in the Pakistani population. **Objectives:** To determine the frequency and nature of complications following septal surgery at a tertiary care setting. **Methods:** An observational cohort study was conducted at the Department of Otorhinolaryngology, Civil Hospital Hyderabad and LUMHS Jamshoro from March 2020 to February 2021. A total of 174 patients undergoing septal surgery were enrolled using non-probability consecutive sampling. Data on demographics, presenting complaints, surgical procedures, and postoperative complications were collected using structured questionnaires. All patients were followed monthly for six months postoperatively. Data were analyzed using SPSS version 21.0. **Results:** The mean age of participants was 27.5 ± 5.2 years, with 62.1% being male. The most common intraoperative complication was hemorrhage, observed in 49 patients (28.2%). Postoperative complications included septal hematoma in 18 patients (10.3%), infection in 17 patients (9.8%), and septal perforation in 12 patients (6.9%). A statistically significant association was observed between resection of the deviated septum and both immediate and delayed complications (p=0.035), indicating that this procedure carried a higher risk compared to others. **Conclusions:** Septoplasty, particularly when involving resection of the deviated septum, was associated with a higher rate of both immediate and delayed complications. These findings highlight the need for careful surgical technique selection and structured postoperative monitoring to minimize morbidity and improve patient outcomes in clinical ENT practice.

INTRODUCTION

Nasal septal deviation (NSD) represents a displacement of the nasal septum affecting approximately 80% of the global population, although symptomatic cases are fewer [1]. This anatomical deformity often leads to chronic nasal obstruction, compromised ventilation, and reduced quality of life [2, 3]. When medical management such as nasal steroids or decongestants, fails, Septoplasty becomes the treatment of choice [4]. Despite its frequent application, septoplasty is associated with known complications, including hemorrhage, hematoma, perforation, infection, and adhesions [5, 6]. Recent refinements such as endoscopic techniques and quilting sutures have been introduced to reduce these risks and enhance recovery [7, 8]. However, in Pakistan, systematic data on complication patterns following septoplasty remain limited. A few single-center studies have explored surgical approaches and postoperative outcomes, such as a comparative study from Lahore showing shorter operative times for endonasal septoplasty compared to external approaches [9], and the use of nasal splints significantly reducing adhesions [10-14]. Another evaluation from Jinnah Hospital endorsed endoscopic techniques for enhanced safety [11]. Yet, these findings remain fragmented, and standardized outcome monitoring across institutions is

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lacking. Given this context, there is a clear need to generate robust, locally relevant data on the complications of septal surgery.

This study aims to determine the frequency and types of complications associated with septoplasty at a tertiary care center in Hyderabad, with the goal of informing surgical practice and optimizing patient care.

METHODS

This observational cohort study was conducted in the Department of Otorhinolaryngology (ENT) at Liaquat University Hospital, Hyderabad, from March 2020 to February 2021. The hospital was a tertiary care teaching facility affiliated with Liaquat University of Medical and Health Sciences (LUMHS), Jamshoro. A total of 174 patients undergoing septal surgery were included. The sample size was calculated using the OpenEpi sample size calculator, based on a hypothesized complication rate of 13% [6], with a 5% margin of error and a 95% confidence level. The study was approved by the Ethical Review Committee of LUMHS, Jamshoro (Approval Letter No. LUMHS/REC/-791). Informed written consent was obtained from all participants in Urdu or a local regional language, ensuring full comprehension of the study's nature, risks, and benefits. Patient confidentiality was maintained throughout the research process. Participants were enrolled through a non-probability consecutive sampling technique. The inclusion criteria comprised all patients of any age and gender who presented with nasal airway obstruction due to septal deviation and were scheduled for corrective septal surgery (septoplasty). Patients were excluded if they had a history of previous septal surgery, external nasal deformities, associated nasal pathologies such as nasal polyps or rhinoliths, or known hemostatic disorders. Data on demographic and clinical variables were collected using a structured, pre-tested questionnaire administered at the time of patient admission. Demographic data included age and gender. Clinical data included the primary presenting complaint, physical findings, the type of surgical procedure performed, and complications encountered. All surgical procedures including Septoplasty, septal scoring, partial inferior turbinectomy, and combined techniques were performed by ENT surgeons with experience at least of 5 years, using standardized operative protocols. Septoplasty involved Killian's incision, elevation of mucoperichondrial flaps, resection or repositioning of deviated segments, and suturing with absorbable material. Scoring was performed in mild deviations without cartilage removal. Partial inferior turbinectomy was done using turbinate scissors or micro-debriders to reduce turbinate size. All patients received preoperative antibiotics, and hemostasis was achieved using cautery or Gelfoam. Postoperative care followed a uniform regimen, and postoperative complications were documented using a standardized follow-up proforma. Patients were followed for six months postoperatively, with clinical evaluations scheduled monthly at the ENT outpatient department. Assessments were conducted monthly up to 6 months after surgery, during which each patient underwent anterior rhinoscopy and nasal endoscopy to identify potential complications. Immediate complications were defined as those occurring intraoperatively or within 48 hours' post-surgery (e.g., hemorrhage, septal perforation), while delayed complications included those identified during any of the subsequent follow-up visits (e.g., hematoma, abscess, adhesions, anosmia, infection, or structural deformities). Data analysis was performed using SPSS version 21.0. Quantitative variables such as age were expressed as mean and standard deviation (Mean ± SD), while qualitative variables such as gender, surgical procedure type, and complications were summarized as frequencies and percentages (n, %). The Chi-square test was applied to determine the association between the type of surgical procedure and the incidence of complications. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 174 patients undergoing septal surgery were included in the study. The mean age of the participants was 27.54 ± 5.21 years, indicating a predominantly young adult population. There was a clear male predominance (62.1%) and a higher proportion of patients from urban areas (73%). Most patients belonged to the lower socioeconomic class, and nasal obstruction, either unilateral or bilateral, was the most common clinical presentation, followed by facial discomfort and headache (Table 1).

Table 1: Demographics and Clinical Profile of Patients Undergoing Septal Surgery (n=174)

Variable	Frequency (%), Mean ± SD
Mean Age (yrs)	27.54 ± 5.21
Gender	
Male	108 (62.1%)
Female	66 (37.9%)
Residence	
Urban	127 (73%)
Rural	47 (27%)
Presenting Complaint	
Facial Discomfort	18 (10.3%)
Unilateral Nasal Obstruction	51 (29.3%)
Bilateral Nasal Obstruction	66 (37.9%)
Frontal Headache	19 (10.9%)
Nose Bleeds	11 (6.3%)
Snoring	9 (5.2%)

With regard to postoperative outcomes, complications were stratified by type and time of onset. The most

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common intraoperative complication was hemorrhage, reported in 28.2% of patients. Among early postoperative complications, septal hematoma was most frequent in the first month (10.3%), with rates decreasing in subsequent months. Septal perforation was reported in 6.9% intraoperatively, with a small number of new cases (1.1%) emerging within the first postoperative month. Structural deformities, anosmia/hyposmia, and infections were distributed across the follow-up period, while adhesions and septal abscesses tended to occur later, though at lower frequencies overall (Table 2).

Table 2: Incidence of Complications by Time of Onset (n=174)

Complications	During Surgery	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Hemorrhage	49 (28.2%)	–	–	–	–	–	–
Septal Hematoma	–	18 (10.3%)	11 (6.3%)	4 (2.3%)	1 (0.6%)	–	–
Adhesion	–	–	–	–	1 (0.6%)	3 (1.7%)	5 (2.9%)
Septal Perforation	12 (6.9%)	2 (1.1%)	–	–	–	–	–
Structural Deformity	–	9 (5.2%)	2 (1.1%)	–	–	–	–
Anosmia / Hyposmia	–	2 (1.1%)	1 (0.6%)	1 (0.6%)	1 (0.6%)	–	1 (0.6%)
Infection	–	17 (9.8%)	12 (6.9%)	9 (5.2%)	–	–	–
Septal Abscess	–	1 (0.6%)	1 (0.6%)	2 (1.1%)	–	–	–

A comparative analysis of complication rates by type of surgical procedure revealed a statistically significant association between resection of the deviated septum and both immediate (9.8%) and delayed complications (16.7%) (p=0.035). In contrast, scoring of the septum, combined resection and scoring, and partial inferior turbinectomy were not significantly associated with complication frequency, despite having comparatively higher percentages in some cases (p=0.41, 0.27, and 0.19 respectively). These findings suggest that resection alone may carry a higher risk of adverse outcomes compared to other techniques (Table 3).

Table 3: Type of Procedure Vs. Incidence of Complications (n=174)

Procedures	Immediate Complications (%)	Immediate CI (95%)	Delayed Complications (%)	Delayed CI (95%)	p-value
Resection of Deviated Septum					
Present	17 (9.8%)	6.2%–15.1%	29 (16.7%)	11.9%–22.9%	0.035
Absent	157 (90.2%)		145 (83.3%)		
Scoring of Septum					
Present	5 (2.9%)	1.2%–6.5%	9 (5.2%)	2.7%–9.5%	0.41
Absent	169 (97.1%)		165 (94.8%)		
Resection & Scoring of Nasal Septum					
Present	18 (10.3%)	6.6%–15.8%	31 (17.8%)	12.8%–24.2%	0.27
Absent	156 (89.7%)		143 (82.2%)		
Partial Inferior Turbinectomy					
Present	21 (12.1%)	8.0%–17.7%	35 (20.1%)	14.8%–26.7%	0.19
Absent	153 (87.9%)		139 (79.9%)		

DISCUSSION

This study evaluated 174 patients undergoing septal surgery and found that hemorrhage was the most frequent intraoperative complication (28.2%), while septal hematoma (10.3%), infection (9.8%), and septal perforation (6.9%) were the most commonly observed postoperative complications over six months of follow-up. Resection of the deviated septum was significantly associated with higher complication rates (p=0.035), whereas other procedures, such as scoring or turbinectomy, did not show statistically significant associations. The mean age of the study cohort was 27.54±5.21 years, with a male predominance (62.1%). The most common presenting complaint was nasal obstruction (56.3%), followed by frontal headache (24.7%) and facial discomfort (19.0%). These symptoms, which collectively affect patients' quality of life, have been consistently reported as the primary indications for septal surgery in both regional and international literature [15]. Analysis of septal deviation revealed varied presentations: unilateral nasal obstruction was noted in 29.3%, bilateral nasal obstruction in 37.9%, with lesser frequencies of other complaints such as facial discomfort (10.3%), frontal headache (10.9%), nosebleeds (6.3%), and snoring (5.2%). These clinical patterns support the necessity for individualized surgical approaches based on patient symptomatology and anatomical variations [6]. The incidence of complications following septal surgery was meticulously documented over a six-month follow-up period. Hemorrhage was the most common intraoperative

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event, comparable to previous Pakistani studies reporting similar rates between 25–30% [16]. Septal hematoma and infection were also frequent, particularly during the first month. Although complications such as adhesions, perforations, and anosmia were less prevalent, their potential impact on long-term surgical success underscores the importance of meticulous technique and postoperative care [17]. Current finding that resection of the deviated septum was significantly associated with complications aligns with studies suggesting that more invasive techniques increase tissue trauma and thus complication risk. For instance, similar associations have been reported in international literature, linking extensive resection with mucosal disruption and delayed healing [18, 19]. Moreover, current results concur with a recent European multicenter study, which emphasized that complication rates can be minimized through careful case selection and preference for minimally invasive techniques [20].

CONCLUSIONS

Septoplasty is effective for nasal obstruction but carries a risk of complications, especially with resection techniques. Hemorrhage, hematoma, and infection were common. Findings support careful surgical selection and structured follow-up to improve outcomes and guide clinical practice.

Authors Contribution

Conceptualization: NY
Methodology: NY, SY, AAL, AA, FK
Formal analysis: AK, FK
Writing review and editing: SY, AAL

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

All the authors declare no conflict of interest.

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