Comparison of Endonasal and External Septoplasty for Treatment of Buckled Caudal Septal Deviation

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ABSTRACT

Objective: To compare endonasal and external septoplasty for type 2 caudal septal deviations in terms of operative time, aesthetic and functional outcome.

Study Design: Descriptive Analysis.

Place and Duration of Study: ENT Department, Mayo Hospital/ K.E.M.U, Lahore, from October 2019 to October 2020.

Methodology: Record of patients operated for septal deviations in 2019 were retrospectively reviewed. All patients, diagnosed with type 2 caudal septal deviations, were included; while those with marked inferior turbinate hypertrophy, deviated nasal septum after trauma, and those who could not be followed-up, were excluded. Twenty-eight patients, operated by external approach, were placed in group A; and 32 patients, who had endonasal surgery, were placed in group B. Functional outcome was assessed by nasal obstruction symptom evaluation (NOSE) scale; and cosmetic deformity was assessed by visual analog scale (VAS) pre- and postoperatively at six months. Operative time was measured for both the groups.

Results: Sixty patients were included. Mean preoperative NOSE scale score for group A was 67.36 ± 8.07 and postoperative was 15.82 ± 3.62 ($p<0.001$). Mean preoperative NOSE score for group B was 69.40 ± 5.80 and postoperative it was 18.00 ± 3.75 ($p<0.001$). Mean VAS score for group A preoperative and postoperative was 18.93 ± 7.86 and 76.07 ± 6.85 ($p<0.001$), respectively. Mean VAS score for group B preoperative and postoperative was 19.69 ± 7.82 and 71.56 ± 8.84, respectively ($p<0.001$). Mean operative time for group B was 52.25 ± 3.37 minutes, and for group A 115.00 ± 9.91 minutes ($p<0.001$). The difference in preoperative and postoperative NOSE and VAS scores compared for both groups revealed p-value of 0.952 and 0.044, respectively.

Conclusion: Extracorporeal septoplasty resulted in better aesthetic outcome; though endonasal septoplasty had shorter operative time. Both surgical techniques resulted in good functional outcome.

Key Words: *Nasal septum, Nasal surgical procedures, Deviated nasal septum, Caudal deviation septum, Septoplasty, Septorhinoplasty, Nasal obstruction symptoms evaluation (NOSE) score, Visual analogue scale* (VAS).

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INTRODUCTION

Caudal septal deviations are frequently encountered in routine otolaryngological practice.[1] Caudal nasal septum is the anterior--most segment of the septum, which supports medial crura of the alar cartilages and determines the position of the nasal tip.[2] Deformities of the caudal end lead to drooping of the nasal tip, disfigurement, and significant nasal obstruction.[3]

Caudal septal deformities can be classified into three types. In the first type, caudal end of the septum is dislocated and protrudes into either nasal cavity, resulting in mild to moderate nasal obstruction. In second type, caudal end becomes flat or cup-shaped in axial plane or caudal end is buckled.

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In third type, caudal end is deficient along with deficient septal cartilaginous vault or associated with alar cartilaginous deformities, leading to moderate to severe nasal obstruction and cosmetic disfigurement.[1,4]

Type 1 caudal deformities are usually managed by endonasal septoplasty, but management of type 2 and type 3 caudal deviations is more challenging. In literature, both endonasal and open approaches are reported.[5-7] Open septoplasty by external approach is the preferred technique for severe caudal dislocations of septum, though whenever possible minimal invasive procedures are favoured to save time, and provide earlier recovery to routine life.[8,9] Gap is especially noted, while addressing type 2 caudal nasal deformity locally; and preferred approach is still debatable.

This study was conducted to compare endonasal and external septoplasty for type 2 caudal septal deviations to establish a technique, which is time saving and has better aesthetic and functional outcome.

Table I: Nose scale.

	Not a problem	Very mild problem	Moderate problem	Fairly bad problem	Severe problem
Nasal stuffiness	0	1	2	3	4
Nasal blockage or obstruction	0	1	2	3	4
Trouble breathing through my nose	0	1	2	3	4
Trouble sleeping	0	1	2	3	4
Unable to get enough air through my nose during exercise or exertion	0	1	2	3	4

Figure 1: (A) Preoperative caudal septal diviation (B) Postoperative after external septoplasty.

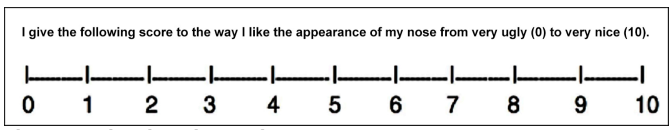

Figure 2: Visual analog scale.

METHODOLOGY

This descriptive analysis was conducted at ENT Department, Mayo Hospital Lahore, from October 2019 to October 2020 (one year), after obtaining ethical approval (IRB No 701/R-C/KEMU dated 06/10/2020). Record of patients operated for type 2 caudal septal deviations in year 2019 were reviewed. Informed telephonic consent was taken from patients regarding sharing of the data and obtaining final scores, if not available in record.

All patients, diagnosed with type 2 caudal septal deviation on anterior rhinoscopy and digital palpation, were included; while those with marked inferior turbinate hypertrophy, deviated nasal septum after trauma, and those who could not be followed-up, were excluded from the study. Twenty-eight patients operated by external approach, were placed in group A, and thirty-two patients who had endonasal surgery were placed in group B.

Endonasal septoplasty was carried out using hemitans-fixion incision. Xylocaine and adrenaline (diluted in 1:100,000) was injected into sides of septum, along floor of nose and on both sides of deviated caudal septum. After infiltration, incision was made at caudal end of septum; and bilateral mucoperichondrial flaps were elevated. Twisted caudal end of septum was delivered and excised vertically from anterior to posterior septal angle, along with a horizontal strip of cartilage, leaving about 6-8 mm of cartilage along the dorsum. Harvested cartilage was straightened. Reshaped cartilage was placed in the columellar pocket and stitched. Nasal packing was done with merocel nasal pack and patient was shifted to the ward. Nasal packing was removed after 24 hours and patient was discharged. Nasal toilet was done postoperatively at 7^{th} and 15^{th} day.

External (extracorporeal) septoplasty was done using an open approach. Before incision Xylocaine and adrenaline solution (diluted in 1:100,000) was infiltrated in columella, both sides of septum and along the lower lateral cartilages. Inverted V-shaped incision was made and dorsal nasal flap was elevated in sub-superficial musculoaponeurotic system (sub SMAS) plane. Cartilaginous septum was separated from upper and lowers lateral nasal cartilages and degloved from both sides by raising mucoperichondrial flaps. Septal cartilage graft was harvested by leaving L-strut part of septum for dorsal and columellar support. Septum was straightened and secured with upper and lower lateral cartilages and anterior nasal spine with polypropylene 5/0 and 4/0, respectively. Columellar strut was placed and secured by septocrural sutures with polypropylene 5/0. Interdomal sutures were placed. Incision was closed with polypropylene 4/0. Nasal cavities were packed with polymyxin ribbon gauze. Steristrips and aluminum dorsal splint were applied. Nasal packing was removed after 24 hours and patient was discharged. Splint was removed after 10 days.

Demographic information of patients (age, gender), operative time, cosmetic deformity and functional impairment (nasal obstruction) were noted from medical records.

Nasal obstruction was assessed by NOSE scale (Table I) and cosmetic deformity was assessed by VAS (Figure 2) pre- and postoperatively at 6 months. Final NOSE score was obtained by multiplying patient's answer on NOSE scale with five. A NOSE score of less than 25 was suggestive of mild obstruction; 25-50 of moderate obstruction, and more than 50 NOSE score was suggestive of severe obstruction. Similarly, VAS score was obtained by multiplying patient's answer on VAS scale with 10. VAS was graded from 0 to 100, where 0 was taken as very ugly, and 100 was taken as very nice. Operative time was measured in minutes, from incision at the start of surgery, upto nasal packing.

Data was entered and analysis was done using SPSS version 22. Frequencies and percentages were calculated for qualitative variables, like gender; and mean ±SD was calculated for quantitative variables; like age, time of procedure, NOSE

and VAS scores. Preoperative and postoperative NOSE scale scores and VAS scores were compared using paired t-test. Operative time of two groups was analysed by independent t-test. The difference in pre- and postoperative NOSE and VAS scores of both groups were compared, using independent t-test. P value less than 0.05 was taken as significant.

RESULTS

Sixty patients were included in the study. Twenty-eight patients were in group A and thirty- two patients were in group B. Mean age of patients in group A was 24.43 ± 5.59 years with age range from 18 to 41 years; and in group B was 24.16 ± 5.09 years with range of 15 to 33 years. Ten (35.7%) patients were males and 18 (64.3%) were females in group A; and in group B, 15 (46.9%) were males and 17 (53.1%) were females.

Mean preoperative NOSE scale score for group A was 67.36 ± 8.07 and postoperative was 15.82 ± 3.62 ($p<0.001$), Mean preoperative NOSE score for group B was 69.40 ± 5.80 and postoperative was 18.00 ± 3.75 ($p<0.001$).

Mean VAS score for group A preoperative and postoperative was 18.93 ± 7.86 and 76.07 ± 6.85 ($p<0.001$), respectively. Figure 1-A shows the preoperative appearance of caudal nasal septal deviation and Figure 1-B shows marked cosmetic improvement after external septoplasty in the same patient.

Mean VAS score for group B was 19.69 ± 7.82 and 71.56 ± 8.84, preoperative and postoperative, respectively ($p<0.001$).

Mean operative time for endonasal approach was 52.25 ± 3.37 minutes and for external technique was 115.00 ± 9.91 minutes, with a mean difference of 62.75 minutes ($p<0.001$). The difference in preoperative and postoperative NOSE (51.54 ± 8.70 *versus* 51.41 ± 7.78) and VAS (57.14 ± 10.13 *versus* 51.88 ± 9.65) scores compared for both groups, revealed p values of 0.952 and 0.044, respectively.

DISCUSSION

Severe caudal septal deviations are commonly encountered in otorhinolaryngology and are reported in 5 to 8 % of patients suffering from septal deviations.[10] Caudal septal deviations lead to moderate or severe obstruction and often surgical techniques other than traditional endonasal septoplasty are needed to address the problem.[11] Metzenbaum was the first to describe treatment of caudal deviation by swinging-door technique; and since then many surgical techniques, such as batten-graft, and tongue- in-groove method have been used to correct different caudal septal deviations.[12] Extracorporeal septoplasty by open approach has been advocated by many in recent era for correction of severe caudal deformities of septum, done either traditionally or by modified technique of anterior reconstruction to reduce dorsal deviation, stating better functional and aesthetic outcomes.[8, 13-15]

Nasal obstruction was the primary presenting symptom in this study and preoperative mean NOSE scale scores were 67.36 ± 8.07 in group A and 69.40 ± 5.80 in group B, suggesting severe nasal obstruction. The findings of this study are comparable to the study conducted at Brazil in 2011, where mean NOSE score was 82.39 ± 7.23.[16] Postoperative mean NOSE scores in this study were 15.82 ± 3.62 in group A and 18.00 ± 3.75 in group B, reflecting marked improvement in symptoms of nasal obstruction. These findings are comparable to study of Haq and colleagues, who reported a fall of 15 points in NOSE score postoperatively.[17] Surgical interventions result in significant improvement in nasal obstruction; and hence, improve quality of life.

This study showed preoperative VAS score of 18.93 ± 7.86 in group A and 19.69 ± 7.82 in group B, which improved to 76.07 ± 6.85 in group A and 71.56 ± 8.84 in group B postoperatively. These findings are comparable to study of Surowitz *et al*. conducted in 2015, who reported statistically significant improvement in both functional and aesthetic outcome ($p<0.001$).[15] In this study, VAS scores for external approach were comparatively high as compared to postoperative VAS score for endonasal septoplasty. This reflects improvement in VAS score in both groups; however, aesthetic outcome was better in external approach ($p = 0.004$). Likewise Tian *et al*. reported better outcomes with extracorporeal approach than endonasal septoplasty.[18]

This study showed the mean age of patients was 24.43 ± 5.59 years in group A and 24.16 ± 5.09 years in group B. Mean age reported by Gandomi and co-authors was 22.4 years.[19] Age of patients undergoing septoplasty has been related to outcome and it is postulated that younger patients undergoing septoplasty have better outcome. This study cannot establish an association between age and outcome as all patients were relatively young.

Time duration of surgery for endonasal technique was less than with extracorporeal approach ($p<0.001$). Mean difference in operative time for both techniques was 62.75 minutes. These findings are comparable to study of Kayabasoglu *et al*.[20] This decrease in operative time for endonasal technique has advantage of decreased exposure to anesthetic agents and early recovery.

This study may help in establishing future guidelines for management of these deformities. Though relatively small sample size, failure of randomisation, and conduction at a single centre may not allow the results to be generalised. This is a retrospective analysis of record of patients, so results cannot be compared. Thus further randomised controlled trials are needed to generalise the results.

CONCLUSION

Extracorporeal septoplasty resulted in better aesthetic outcome though endonasal septoplasty had shorter opera-

tive time. Both surgical techniques improved nasal obstruction and resulted in good functional outcome.

ETHICAL APPROVAL:
Institutional Review Board, King Edward Medical University wide letter number 701/RC/KEMU. Ethical Approval was obtained prior to initiation of research work.

PATIENT'S CONSENT:
Informed consent was obtained from the patient both verbally and telephonically to publish the data of this research work.

CONFLICT OF INTEREST:
The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:
NUA: Data acquisition, drafting and final approval of the manuscript.
MA: Data acquisition, article review and final approval of the manuscript.
KMC: Study design, critical review and final approval of the manuscript.

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