SEPTOPLASTY VERSUS SEPTOPLASTY WITH MINIMAL NASAL VALVE REPAIR

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ABSTRACT

Background

Nasal obstruction is a highly prevalent problem in that can negatively affect quality of life. One of the common causes of nasal obstructions a deviated septum. In the presence of such nasal obstruction, nasal septoplasty and Minimal Nasal Valve Surgery procedures can improve the nasal airway and nasal scale score. Septoplasty procedure alone use commonly to overcome this nasal obstruction.

Objective

To compare the effectiveness of combination of septoplasty with minimal nasal valve surgery versus the septoplasty alone in the treatment of nasal obstruction and improving the nasal scale score.

Patients and Methods

This is a comparative prospective study conducted at tertiary center and private hospital from Nov. 2014 to June 2016. The study included 60 patients suffering from nasal obstruction for more than 6 months. The patients were selected for the type of surgery randomly. Following rigid nasal endoscopy of the nose and valve area to exclude other pathologies, assessment of nasal obstruction 1 week before surgery was done according to Nasal Obstruction Symptoms Evaluation (NOSE) Scale. The patients were divided into two groups according to the type of surgery. Group A: Septoplasty with minimal nasal valve repair. Group B: Septoplasty alone.

Results

Significant improvement in the treatment of nasal obstruction was achieved in group A with mean Nasal scores of [14.43] preoperatively and [4.20] 3 months postoperatively.No significant difference in the nasal score in early post-operative time in both groups. P value found significant in both group regarding the improvement in the airway breathing and overcoming the nasal obstructions in mean of nasal score in both groups A and B in two main period. There was no significant difference between the two groups regarding local nasal pain by VAS , P value were non-significant. here was no significant differenc regarding the bleeding in both groups A and B after removal of the silastic intranasal splintafter oneweek. No significant difference regarding crustation in both Groups.

Conclusion

Both groups in this study had good outcome in treating nasal obstruction and nasal scale with the superiority of the group A in long term after 3 months.

Keyword: *Septoplasty, Minimal nasal valve repair, Nasal obstruction.*

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INTRODUCTION

Sptum proper which is covered with mucous membrane and consists of osteocartilaginous framework containing perpendicular plate of ethmoid, the vomer and a large quadrilateral septal cartilage, which is 3-4 mm thick in its centre but increases to 4-8 mm anteroinferiorly, wedged between vomer and ethmoid plate. In addition there is a very small contribution from other bones including palatine, maxilla, rostrum of sphenoid, nasal bones, and frontal bone [1, 2].

The nasal septum has an important position functionally and cosmetically, in addition to separation of the nasal airway into two separate cavities, it supports the nasal dorsum, and maintains the shape of the columella and tip. Anatomic septal deviation can also lead to chronic sinus disease and can sometimes be reflected as an external nasal deformity affecting the overall appearance of the face [3]. The narrowest portion of the nasal cavity is the internal nasal valve and may lead to symptoms of nasal obstruction. This valve area widens and narrows with nasal muscular contraction and relaxation on inspiration and expiration. The nasal valve is normally 10 to 15 degrees in white patients and wider in nonwhite and Asian patients [4, 5]. Obstruction as a result of external valve compromise may be a postrhinoplasty phenomenon, a result of the aging process, [6] or a result of caudal septal dislocation or trauma.Septoplasty corrects structural deformities of the nasal septum to relieve nasal obstruction. But approximately 20% to 30% of patients who undergo Septoplasty find that their symptoms are not corrected adequately [3]. This is may be the result of the cartilage inherent memory or the end septal correction surgery which compromised the support of the nose, but most importantly the cause may be other contributors to the nasal obstruction complaint such as obstruction as a result of internal nasal valve compromise in the patient with a narrow middle third of the nose with the typical tension septum [7] or with valve compromise due to high septal bowing into this area, so identification of patient with internal nasal valve collapse must be done preoperatively so that the operation can include enlarging this angle The compliance of the lateral wall of the valve area, on the other hand, depends on four different factors. First the dimensions and thickness of the ULC cartilage Secondly, the interrelationship of the lower margin of the ULC cartilage with the LLC cartilage. The third factor is the rigidity of the overlying connective- tissue layers, skin, and the lateral soft-tissue area (hinge area) with its sesamoid cartilages. Finally, contraction of the nasal musculature (in particular the dilator, nasalis, and apicis nasi muscles) contributes to compliance of the lateral wall of the valve area (figure 1).

Upper lateral cartilage surgery

Internal nasal-valve abnormalities can be corrected with a number of surgical techniques. One may choose to perform these maneuvers with an open or endonasal approach, depending on surgeon preference. In this study we chose to perform Minimally Invasive Nasal Valve Repair (fig, 2)

Minimally invasive NV surgery that targets the composite tissues in the lateral nasal wall is a safe and reliable method of relieving nasal obstruction from NV stenosis

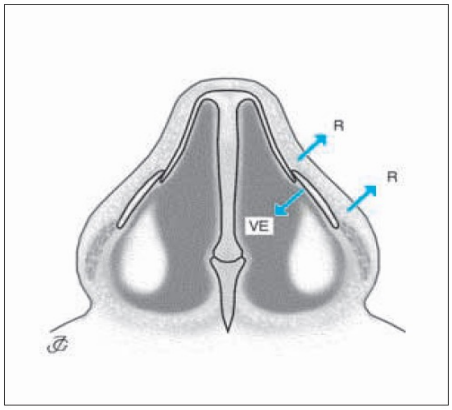

Figure 1. Forces acting on the valve area during inspiration. VE = Venturi effect: the negative intra-valvular pressure caused by the increased air velocity. R = rigidity of the various anatomical components of the lateral nasal wall [10].

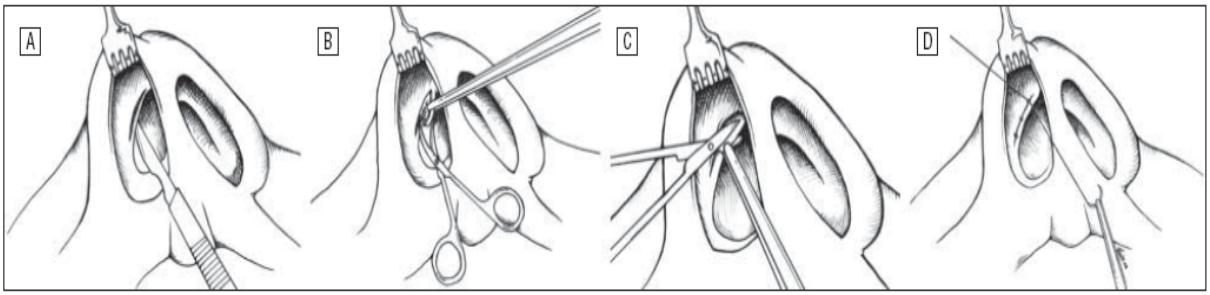

Figure 2. Minimal nasal valve surgery.

The closed septal surgical methods by fracturing and splinting of the septum described and advocated by Adams [8] and Asch [9] in the late 1800s relied on blunt force and attempts to disrupt cartilage attachments and inherent properties. The initial submucosal resection of the septum was described by Ingals [10] in 1882 when he introduced en bloc resection of small sections of septal cartilage and because of this innovation; he is credited as the father of modern septal surgery. In 1899, Asch [10] was the first to suggest altering the tensile curve of septal cartilage instead of resecting it. He proposed the use of full-thickness cruciate incisions. Freer described resection of both the bony and cartilaginous portions of the deviated septum in 1902. Killian further modified the procedure in 1904; however both Freer and Killian advocated not addressing deflections of the dorsal and caudal portions of the septum to prevent postoperative nasal deformities [11] In 1929, Metzenbaum [12] and Peer [13] were the first to manipulate the caudal septum, using a variety of techniques. The classic SMR was less effective in correcting this area of deviation. In addition, Metzenbaum advocated the use of the swinging door technique, and in 1937, Peer recommended removing the caudal septum, straightening it, and then replacing it in the midline position. In 1946, Cottle and Loring [14] described removal of all deviated portions of the septum and replacement of bone and cartilage in the intramucosal space to prevent postoperative saddle nose deformities and a retracted columella. In 1947 [15], Cottle introduced the hemi transfixion incision and the practice of conservative septal resections to avoid the submucosal septal resection complications.

Until the 1960s, submucous septal resection as promoted by Freer [16] and Killian [17] was standard practice in Western Europe. In 1963, Cottle and van Dishoeck gave a course on nasal surgery in Leiden that laid the foundations for contemporary nasal surgery in Western Europe. The basic concepts were to reconstruct instead of resect and to deal with function and cosmetics in one procedure [18] Furthermore, the open approach, as promoted by Sercer [19 and Padovan [20].

In literature, the term of nasal valve had been coined by Mink 1903[21]and has been characterized in more detail by Bridger in 1970 [22] and the treatment was started by using self-holding dilators made out of wire, rubber, celluloid or other materials for widening of the nasal valve [23]. In 1932, Noltenius [24] described a rubber catheter that was used for the treatment of ozaena and for ensuring good nasal breathing in case of suction of drooping wings of the nose.

After that alar batten grafts had been described for the first time by Toriumi in 1997 [25]. They were used in case of congenital or acquired weakness and/or a subtotal loss of the lateral crus of the alar cartilage. In 1998 upper lateral splay grafts were described for the firsttime by Guyuron [26] for supporting the lateral cartilageand its functional and aesthetic effectiveness has been confirmed by other authors since then [27, 28].Then Akcam et al. [29] (2004) describe a high effectiveness of butterfly grafts for improving nasal breathing and reducing obstruction-related sleep disorders by placing on the septum and under the cranial border of the alar cartilage and expand the nasal valve through a spring effect. In 1996, Paniello [30] introduced the technique of nasal valve suspension, using sutures anchored to the orbital rim.

Since then much use has been made of Sheen's spreader graft, and many authors have described variations on the technique. Ziljker, Constantian, Park. All report results using Sheen's spreader graft with a number of modifications and a success rate ranging between 80-100% [31].

PATIENTS AND METHOD

This is a comparative prospective study conducted at Rizgary Teaching Hospital and private hospital from November 2014 to June 2016. The study included 60 patients suffering from nasal obstruction for more than 6 months. The patients were selected for the type of surgery randomly. Inclusion criteria: Moderate to severe septal deviation with persistent nasal obstruction for more than 6 months with positive cottle test or cotton ball test. Failure of medical and or surgical treatment. Age, above 18 years. Both sexes. Accept healthy volunteers.

Exclusion criteria icluded history of nasal pathology like sinusitis, nasal polyp, tumor, severe disfigured nose needs open rhinoplasty with extracorporeal septorhinoplasty, revision septoplasty and obese patients.

Septal Surgery done when obstruction at the valve area is caused by a deviation, convexity, or thickening of the cartilaginous septum, or deviation in bony part all corrected by classical method of Septoplasty, trying to restore normal alignment and function by septal surgery. Upper lateral cartilage surgery done as it mentioned above. Following routine clinical assessment and routine rigid nasal endoscopy of the nose and valve area to exclude other pathologies, assessment of nasal obstruction 1 week before surgery was done according to Nasal Obstruction Symptoms Evaluation (NOSE) scale. The patients were informed about the details of the selected procedure to achieve the ethical point of view and verbal consents and agreement were taken from all the patients about the type of surgery .The patients were divided into two groups according to the type of surgery:Group A: Septoplasty with minimal nasal valve repair. Group B: Septoplasty alone.

All patients underwent this surgery under general anesthesia in the operation theater. We use silicone plates in both groups to prevent theadhesions, and decrease the pain after septoplasty compared with the conventional gauze packing. All patients discharged same day with cover of oral antibiotic orally), paracetamol 500 mg and topical antibiotic ointment for the next , nasal douche learned to patients for using it up to 14th postoperative day. The patients were instructed to be seen in the 7th, 30th and 90th postoperative days. Contact was easy by mobile phone.

Statistical analysis

Statistical analysis of results was performed using The Wilcoxon signed rank test and Fisher's exact test and Mann Whitney test for nonparametric analysis of the baseline (pre-operative) and 7 day postoperative, 1& 3-month follow-up scores, for each statistical analysis, a P value < 0.05 was considered statistically significant. All analyses were performed by using SPSS version14.0 software. Depending on nasal score scale which was attached with the questioner and after collecting all row data in special excel sheath all analyzed accordingly.

RESULTS

Age and sex Distribution

The average age of the patients was 30 years with a range between 18 years and 52 years.21 patients were below 25 years and 16 patients between 25 and 29 years of age and only 6 patients were above 40 years of age. table1 with P value was non significance regarding the different age groups**.** Sex distribution revealed that 38 patients were males (63%) while 22 patients were females (37%)table1, with Pvalue regarding gender involving in the study were non significance.

Regarding the relation between the gender of the patients andchanges in the mean of total nasal score there were no significant difference in different time of examination peroperativly or postoperatively table 2.

Duration of Obstruction

The duration of the obstruction was between 12 months to 30 months, average of 20months. With chronic, on and off nasal obstruction significantly complaining patients in both groups.

Change in the means of NOSE total score

Significant improvement in the treatment of nasal obstruction was achieved in group A with mean Nasal scores of [14.43] preoperatively and [4.20] 3 months postoperatively. Subjective satisfaction was rated as much improved in mostpatients in both groups. As shown in table 3 & figure 1 there were significant difference in both groups A and B regarding the improvement especially after 3 months postoperatively with significant P value. No significant difference in the nasal score in early post-operative time in both groups. The Mann Whitney test are used for compare the change in the mean of the total NOSE scale scores between the baseline scores and 7 days, 1 & 3 months scores for each group (and then compare between postoperative periods, .Table 3.

Table 1. Distribution of sample by age and gender of the groups.

		Group A		Group B		Total		
		No.	%	No.	%	No.	%	p
Age (yeas)	< 25	10	33.3	11	36.7	21	35.0	0.872*
	25-29	7	23.3	9	30.0	16	26.7	
	30-34	6	20.0	3	10.0	9	15.0	
	35-39	4	13.3	4	13.3	8	13.3	
	≥ 40	3	10.0	3	10.0	6	10.0	
Sex	Male	17	56.6	21	70.0	38	63.3	0.284
	Female	13	43.3	9	30.0	22	36.7	
	Total	30	100.0	30	100.0	60	100.0	

*By Fisher's exact test

Table 2. Relation between gender of the patients and changes in the means of total NOSE scores for the 2 groups.

Group		Pre-op total score	7tPOD total score	30th POD total score	90th POD total score
A	male	30.60	26.18	17.40	9,40
	female	29.50	25.24	18.68	8.88
B	male	29.25	26.50	18.00	8.00
	female	30.20	25.16	19.30	9.30

Table 3. Means of the studied parameters of the two study groups.

	Group A		Group B		
	Mean	SD	Mean	SD	P*
NS Pre-Op	14.43	2.596	14.53	1.655	.881
NS 1 Week post-Op	12.17	1.802	12.43	1.870	.544
NS 1 M. post-Op	9.03	1.474	8.33	1.647	.108
NS 3 M Post Op	4.20	1.095	6.30	1.393	< 0.001
VAS 1 Week post Op	7.47	.776	7.30	.988	.506
VAS 1 M. post Op	.60	.675	.53	.681	.655
Change NS Pre-1 week	2.267	1.230	2.100	.995	.358
Change NS Pre-1 M.	5.400	2.027	6.200	1.495	.073
Change NS Pre-3 M	10.233	2.738	8.233	1.716	.003
Change VAS 1 week-1M	6.867	1.252	6.767	1.331	.675

*By Mann Whitney test

Nasal score in both groups

Wilcox on Signed Ranks Test use to evaluate the significance of the change in nasal score preoperative and three months postoperative, P value found significant in both group regarding the improvement in the airway breathing and overcoming the nasal obstructions in mean of nasal score in both groups A and B in two main period. figure 3.

Postoperative Pain

Postoperative pain in the patients assessed by visual analogue scale (VAS) for the two groups after one week post-operative period just after removing the silastic splint from the nose and one month after the operation in follow up period. There was no significant difference between the two gropes regarding local nasal pain by VAS, P value were non-significant. Table 3.

Bleeding

Bleeding after intranasal pack [the small Sofra-Tullewick]removal in 24 hours of operation was very mild and non-significant in bothgroups patients,P value were non-significant regarding the bleeding in both groups A and B after removal of the silastic intranasal splintafter oneweek. Table 4.

Postoperative crusting

Endoscopic examinations one month postoperatively showed that most of patients had near-complete correction of the septum in both groups. Evaluation of crust formation done on the 1M postoperative day visit by using a 4-point scale (0, absent; 1, mild; 2, moderate; 3, severe). P value were non-significant regarding the difference in both groups in Crustation, Table 4.

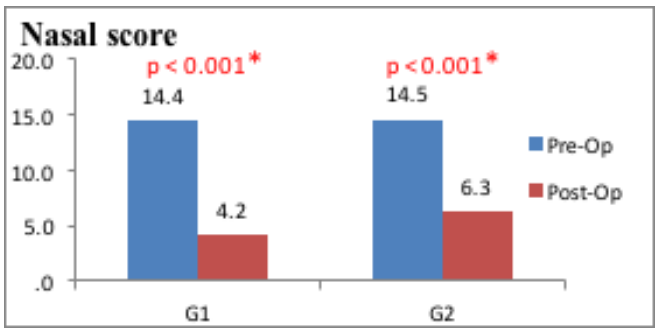

Figure 3. Nasal scores, pre operative and three months post operative.

Table 4. Incidence of bleeding and Crustation in the two study groups.

		Group A		Group B		Total		
Complications		**No.**	**%**	**No.**	**%**	**No.**	**%**	**p**
Bleeding 1 week post-Op.	**Yes**	27	90.0	29	96.7	56	93.3	0.612
	No	3	10.0	1	3.3	4	6.7	
Crustation 1 month post-Op.	**No Crustation**	22	73.3	21	70.0	43	71.7	0.774
	Mild Crustation	8	26.7	9	30.0	17	28.3	
Total		30	100.0	30	100.0	60	100.0	

DISCUSSION

The mean age of the patients involved in this study was 30 years with age range between 18 – 52 years (± 8.665), The study revealed that male patients were 38 (63.6%) and female patients were 22 (37.%) with male to female ratio(1.6:1), with no gross influence on the results of the 2 procedures . gender ratio was similar to that of other studies (2.8:1) [32]; (3.1:1) [33]; (2.2:1) [34] and (5:1) [35]. All these studies did not comment on the gender difference affecting on the results [32, 33, 34, 35]. The duration of nasal obstruction was between 6-30 months with the average 16 months, while noother studies found revealed the duration of obstruction before surgery [32, 33, 34, 35].

Change in the means of NOSE total score

Group A

Means of the studied parameters of the two study groups, highly significant difference between pre- and three months post operatively, total nose scale score was found significant (p=0.001). While the difference between preoperative and 90th days total nasal score was also significant in each group (p=0.001), these results run parallel to the results of Robert W. Dolan study (2010) [33] where he did only minimal invasive nasal valve surgeryalso he compared preoperative scores and 3rd months post-operatively only. the late improvement in the scores was due to scar and fibrosis in the area which led to widening of the valve area. Also the surgical correction performed in this study wasspecifically targeted the uppermost anatomical aspect of the nasal valve NV; as a result, most of the widening occurred near the junction of the ULC with the septum. This result seems to provide the most dramatic relief of obstruction with this minimalist surgical method [33] which was accompanied by septoplasty which improving the breathing more.

Group B

Regarding pre and early postoperative period there was no significant difference in the mean nasal score and these results were similar to the results of C. Cingi study(2010) [34], and this may be explained by the early tissue response to the trauma of surgery, which comprises an inflammatory phase, a lag phase and a proliferative phase, In the nasal mucosa, this characteristically results in edema, rhinorrhoea and crusting during healing[36], so other studies like S E J Farmer, S M Quine and R Eccles study(2009) [32] and NEIL BHATTACHARYYA study (2003) [37] they review there result in 2nd week, 3rd and 6th months.

There was significant change in the pre operative and 3rd months post operative nasal score in this group per say, compatible with other studies [32, 34, 36, 37], septoplasty is seen as an elective surgery, successful -most of the times. As Caldas Neto et al.[38] reported: "it may harm the individuals QL, but in reality he will always have the option of living with the problem...". Previous studies have analyzed and showed the efficacy of septoplasty in improving nasal obstruction and in promoting patient satisfaction [39, 40, 41, 42].

Postoperative morbidity

Bleeding

Reactionary bleeding (less than 24hours) after intranasal pack removal was mild and it was self limited in the all 27 patients(90%) of Group A, and only 3 patient 10% got moderate bleeding which need simple measurement for homeostasis, Robert W. Dolan (2010)[33] had no comment on any significant bleeding postoperatively. While Matteo Cavaliere (2005) revealed that therewas no uncontrolled bleeding observed after surgery [43].

Pain

The Postoperative pain in thet wo groups was mild-moderate according to VAS, this was consistent with results found by others Antonio Celso (2006) [44], Zeynep Kizilkaya (2008) [36] and NEIL BHATTACHARYYA (2003) [37] which show mild pain severity, while the degree of the mean pain severity in the three groups was group A (10.5), group B (28.8) then group C (33.1) this may be related to longer period of silastic splint remaining and it is similar to study of D M Thomas(1996) [45].

Timing of silcon splint removal

All patients in group A& B had their siastic splint removed after 1 week, our results were similar to that of D M Thomas (1996) [45] in decreasing the post-operative pain without increasing in the chance of bleeding.

Postoperative crusting

Only 8 patients in group A had moderate crust formation in the 4th postoperative week, whereas Robert W. Dolan study (2010) [33] not showed any postoperative crusting as he evaluate his results 3 months postoperatively were most of crusts were disappeared by that time.:-nine patients in group B (3.2%) had moderate crustation and

all others 21 patients had either no coruscation or mild non-significantcausation, after one months of surgery, nearly similar to study of NEIL BHATTACHARYYA (2003) [37] he note (16.7%) crust formation in 2 week follow up. While Matteo Cavaliere(2005)no crust formation[43].

Conclusion and recommendations

No sex difference regarding outcome of the surgeries. Both types of surgeries in this study had good outcome in treating nasal obstruction. With the superiority of the group one in long term after 3months.Both groups had the same time of improvement. Both groups has similar postoperative morbidity (postoperative bleeding, pain and crustation) .We recommend the minimal nasal valve repair with septoplasty as it show early improvement of nasal obstruction and nasal scale and less postoperative morbidityin compare with septoplasty alone. This study had been carried out over a limited period of the time comprising a limited number of cases. The facts and figures mentioned here may considerably vary from a large series. So further studies with greater number of patients are necessary to assess long term results.

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