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Original article

Outcome of septoplasty with or without inferior turbinoplasty in Deviated Nasal Septum: A Randomized controlled trial

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Abstract-

Background: Deviated Nasal Septum with Hypertrophy of Inferior turbinate on opposite side is a common finding. There are various objective and subjective tests to assess nasal obstruction.

Materials and Methods: In this Randomized Controlled trail 82 subjects of Deviated Nasal Septum and contralateral hypertrophy of Inferior Turbinate were included. Subjects were randomly divided into two surgical groups, Septoplasty with inferior turbinoplasty and septoplasty alone. Pre and postoperative Subjective assessment of nasal obstruction was done with NOSE scale and Objective assessment by Nasal endoscopy.

Results: Post operative improvement in nasal symptoms on NOSE scale was from 15.83± 1.99 to 7.63 ± 1.34 in septoplasty with turbinoplasty group and that in septoplasty alone group it improved from 15.15 ± 2.14 to 10.05 ± 1.79 which was statistically significant improvement in both the groups. But on comparison amongst to groups postoperative improvement in nasal symptoms was more significant statistically in Septoplasty with inferior turbinoplasty group ($p<0.001$).

Conclusion: In patients with symptomatic nasal septal deviation with hypertrophy of the contralateral inferior turbinate, septoplasty along with inferior turbinoplasty provides better symptomatic relief of nasal symptoms than septoplasty alone.

Key words: Deviated Nasal Septum, Inferior turbinate hypertrophy, NOSE scale, Turbinoplasty

INTRODUCTION-

Obstruction of nose is a common problem affecting 9.5% – 15% of general population[1]. Deviated Nasal Septum with hypertrophy of the inferior turbinate on the opposite side is the commonest cause of obstruction of nose that can considerably compromise the quality of life. Among the available methods available Nasal Obstruction Symptom Evaluation Scale is a simple method to assess the nasal obstruction is its subjective assessment. NOSE scale is a questionnaire based subjective evaluation of nasal obstruction to assess patient's symptom severity and quality of life in a better way[2]. Hypertrophy of the inferior turbinate secondary chronic inflammation like in allergic rhinosinusitis can be controlled by medical management but its osseous hypertrophy needs surgical correction along with septoplasty.[3,4] Reduction of Turbinate can be done by resection and non-resection/ coagulation methods. Even though septoplasty with turbinoplasty is a relatively common surgical procedure, studies comparing its results with septoplasty alone are limited.

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METHODOLOGY:

It was a Randomized Controlled Trial, conducted for 2 years (March 2019- Feb 2021) at Tertiary Care Hospital of India after the approval from Institutional Ethics Committee. The aim of present study was to compare the subjective improvement in obstruction of nose following Septoplasty along with Inferior Turbinoplasty Versus Septoplasty alone using NOSE (Nasal Obstruction Symptom Evaluation) Scale in the patients of Deviated Nasal Septum

Total 82 subjects of either sex, of age 18 years and above presented with nasal obstruction for 4weeks or more secondary to Deviated Nasal Septum with Inferior Turbinate Hypertrophy on the opposite were included in the study. While those who had allergic or Vasomotor rhinitis, Acute and chronic Rhinosinusitis, previous history of septal surgery, associated benign or malignant sinonasal tumours or Granulomatous diseases of nose and sinuses or those having Craniofacial malformations were excluded from the study.

Study participants were randomly divided by 2 block Randomization into two groups- Septoplasty with Turbinoplasty group and Septoplasty alone group. Nasal Obstruction Symptom Evaluation (NOSE) scale was used for Subjective assessment of Nasal Obstruction[4]. The questionnaire based on 5 symptoms was used in this scale. The grading the severity of symptoms was made by the subjects with severity points ranging from 0 to 4. (Table 1). The total score of five questions is 20.

Table 1- Nasal Obstruction Symptom Evaluation (NOSE) scale[5]

	Not a Problem	Mild Problem	Moderate Problem	Fairly Bad problem	Severe Problem
Nasal congestion	0	1	2	3	4
Nasal blockage	0	1	2	3	4
Trouble breathing through nose	0	1	2	3	4
Trouble sleep	0	1	2	3	4
Obstruction during Exertion	0	1	2	3	4

Preoperative Diagnostic Nasal Endoscopy (0^0 Volksmann's endoscope) was done under Local Anaesthesia to assess Septal deviation, Inferior Turbinate Hypertrophy, to know about the adequacy of first pass on both sides and also to rule out sinusitis.

Computed Tomography of Paranasal sinuses was done in all patients to rule out Sinusitis and to identify anatomical variations like Concha Bullosa that can cause nasal obstruction.

Routine blood and urine examination done and Pre-anaesthetic fitness was achieved. After a written and informed consent, procedure was done under Local Anaesthesia with IV sedation or General Anaesthesia. Septoplasty was done by using Killian's incision commonly but in case of caudal dislocation hemi-transfixation incision was used. To straighten the cartilaginous septum, various methods like scoring of Cartilage on concave side, cross hatching, shaving and excision of wedge were used. Mucoperichondrial flaps were approximated with quilting suture[6].

In Septoplasty with Inferior Turbinoplasty group, along with Septoplasty Inferior Turbinoplasty on the contralateral side of septal deviation by using Microdebrider[6]. Infiltration of anterior part of the inferior turbinate was done with 2% lidocaine with adrenaline (1:100 000). Spinal needle was used to infiltrate the posterior and inferior border of the Inferior Turbinate (IT). Microdebrider (Stryker) was used to shave the mucosa of head (anterior end of Inferior Turbinate) and the underlying bone was exposed. The IT was then shaved but stopped 1cm

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from its posterior end to avoid trauma to the arteries. Medial mucosal flap was elevated from the bone using Freer's elevator by keeping dissection in subperiosteal plane. Vertical part of IT was removed by straight Blakesley forceps. Hemostasis was achieved by cauterizing the bleeding vessels. Medial mucosal flap was then rolled upon itself covering the raw area. Merocel nasal pack was kept in both nasal cavities which was removed 48hours postoperatively. Subjects were followed up at 1st, 3rd and 6th month. Relief in obstruction of nose was assessed by means of NOSE scale. Comparison of Pre and post-operative NOSE score in the individual group and between both the study groups was done. Nasal airway was evaluated endoscopically and compared with that of preoperative findings.

Data Analysis-

Data collected was entered into the Excel spread sheet. Epi Info Version 7.0 was used for Statistical analysis. Microsoft Windows. Descriptive statistics included computation of percentages, means and standard deviations. Chi-square test was used for categorical data, Paired T test, to compare pre and post-operative means in the group. Intergroup comparisons of means was done by using Unpaired t test. The level of significance 5% or less ($p \leq 0.05$) was considered as statistically significant.

RESULTS-

In this study, 82 patients were enrolled on the basis of our inclusion criteria. They were randomized into two groups- Septoplasty with inferior Turbinoplasty group and Septoplasty alone group each containing 41 patients. Mean age of Septoplasty with inferior Turbinoplasty group was 28.95 years with Standard Deviation of 9.09. While it was 26.42 years with Standard Deviation of 7.05 for Septoplasty alone group. Males outnumbered than females in both the groups having Male: Female ratio of 2.15:1 and 3.1:1 in Septoplasty with Inferior Turbinoplasty and Septoplasty alone groups respectively. Statistically no difference was found between two groups with respect to age and gender distribution.

Subjective assessment was done pre and 6 months postoperatively by NOSE scale. Mean Pre-operative NOSE score in Septoplasty with Turbinoplasty group was 15.83 ± 1.99 which improved to 7.63 ± 1.34 postoperatively. This was statistically highly significant difference. On assessing change in individual symptoms in the group, there was improvement in each symptom with a statistical significance (Table 2)

Mean NOSE score in Septoplasty alone group was 15.15 ± 2.14 preoperatively. After surgery it was improved to 10.05 ± 1.79. This improvement was found to be statistically highly significant on analysis by using paired t test ($p< 0.001$). Individual symptoms also improved statistically after surgery as compared to that before surgery. (Table 3)

On comparison of both the groups 6 months postoperatively, patients undergoing Septoplasty with Inferior Turbinoplasty had more significant symptomatic relief as compared to patients of septoplasty alone group. (Table 4)

Adequacy of first pass of Diagnostic Nasal Endoscopy (DNE) was checked postoperatively in all patients and comparison was done between these two groups. Amongst 41 patients of septoplasty group, 1st pass was found to be adequate unilaterally in 22 (53.66%) patients and bilaterally in 19 (46.34%) patients. While in Septoplasty with inferior turbinopasty group, all patients (n=41) had adequate space bilaterally for first pass of DNE. (Table 5)

Table 1- Nasal Obstruction Symptom Evaluation (NOSE) scale -

	Not a Problem	Mild Problem	Moderate Problem	Fairly Bad problem	Severe Problem
Nasal congestion	0	1	2	3	4
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Trouble breathing through nose	0	1	2	3	4
Trouble sleep	0	1	2	3	4
Obstruction during Exertion	0	1	2	3	4

Table 2: Comparison of Pre vs postoperative NOSE score in septoplasty with Inferior Turbinoplasty group (n=41)

Variables	NOSE Score		Paired t-test	P value
	Preoperative Mean ± SD	Postoperative Mean ± SD		
Nasal congestion	3.15 ± 0.65	1.29 ± 0.46	17.17	<0.001
Nasal blockage	3.46 ± 0.55	1.44 ± 0.50	17.36	<0.001
Trouble breathing through nose	3.15 ± 0.61	1.41 ± 0,50	14.01	<0.001
Trouble sleep	3.20± 0.60	1.83 ± 0.49	11.23	<0.001
Obstruction during Exertion	2.88 ± 0.60	1.69 ± 0.55	10.2	<0.001
Total Symptom score	15.83± 1.99	7.63 ± 1.34	21.92	<0.001

Table 3: Comparison of Pre vs postoperative NOSE score in Septoplasty alone group (n=41)

Variables	NOSE Score		Paired t-test	P value
	Preoperative Mean ± SD	Postoperative Mean ± SD		
Nasal congestion	2.88± 0.68	1.83 ± 0.44	8.3	<0.001
Nasal blockage	3.39 ± 0.59	1.93 ± 0.61	11.09	<0.001
Trouble breathing through nose	3.02 ± 0.61	2.05 ± 0.63	7.11	<0.001
Trouble sleep	3.15 ± 0.60	2.29 ± 0.64	6.15	<0.001
Obstruction during Exertion	2.71 ± 0.60	1.93 ± 0.63	5.55	<0.001
Total Symptom score	15. 15 ± 2.14	10.05 ± 1.79	11.71	<0.001

Table 4: Comparison of NOSE Score postoperatively (After 6 months) between two groups

Variables	Septoplasty with Inferior Turbinoplasty (n=41) (Mean ± SD)	Septoplasty alone (n=41) (Mean ± SD)	Independent t-test	P value
Nasal congestion	1.29 ± 0.46	1.83 ± 0.44	5.38	<0.001
Nasal blockage	1.44 ± 0.50	1.93 ± 0.61	3.86	<0.001
Trouble breathing through nose	1.41 ± 0.50	2.05 ± 0.63	5.05	<0.001
Trouble sleep	1.83 ± 0.49	2.29 ± 0.64	3.66	<0.05
Obstruction during Exertion	1.69 ± 0.55	1.93 ± 0.63	2.81	<0.05
Mean score	7.63 ± 1.34	10.05 ± 1.79	6.92	<0.001

Table 5: Comparison of Postoperative First pass adequacy on Diagnostic Nasal Endoscopy in both the Groups

Adequacy	Septoplasty with Inferior Turbinoplasty (n=41)	Septoplasty Alone (n=41)
Unilateral	0	22 (53.66%)
Bilateral	41 (100%)	19 (46.34%)
Total	41	41

DISCUSSION-

Deviated Nasal Septum with compensatory Inferior Turbinate Hypertrophy on the opposite side is commonly found etiology for nasal obstruction. According to some authors, after septoplasty, hypertrophied Inferior turbinate reverts back to normal on its own. In contrast, others have an opinion that these are irreversible changes which need to be addressed during nasal septal surgery. If not, nasal obstruction on one side will persist.[7] Hence, we have conducted the study to assess the need of surgery for hypertrophied inferior turbinate in patients of Deviated Nasal Septum. We compared our findings with other similar studies and found our results consistent with those studies.

Shamanna K et al also used NOSE scale to assess the subjective improvement in comparing outcome of Septoplasty with Inferior turbinoplasty (n=30) with septoplasty alone (n=30). They converted NOSE score into percentage. The severity of nasal obstruction was classified into mild, moderate and extreme basis of on the percentage score. Preoperatively, the severity ranged between moderate to extreme, but postoperately after 6

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months, in septoplasty alone group, mild and moderate symptoms were found in 50% of patients each. While in Septoplasty with turbinoplasty group, 97% patients found to have mild and 3% patients had moderate nasal obstruction.[8]

Devseren NO et al study (n=42), had similar findings[9]. In RCT of Sharma AR et al[10] (n=40, preoperative Mean NOSE score in septoplasty alone group was 14.25 ± 3.006 which reduced to 4.16 ± 3.11 postoperatively (after 6 months). While in patients of septoplasty with inferior turbinate reduction group, it was 14.70 ± 2.63 preoperatively that reduced to 0.21± 0.41 postoperatively. On comparing the two groups with NOSE scale, improvement in symptoms in Septoplasty with Inferior Turbinoplasty group was significant. On Diagnostic Nasal Endoscopy after 6 months of surgery, there was no statistically significant difference (p= 0.54) between two groups in the visibility of Osteo-meatal complex.[10]

Dinesh Kumar R et al[11] (n=60) found highly significant (p≤0.001) improvement in NOSE score in both the groups individually. In Septoplasty with partial inferior turbinectomy group, preoperative score was 71.17±10.5 which changed to 1.00 ±0.7 mean score 6 months after surgery. In septoplasty alone group, preoperative score improved from 70.33 ±12.8 to 18.00 ±2.1 mean score 6 months after surgery. On comparing both groups, partial inferior turbinectomy with septoplasty had highly significant surgical outcome (p≤ 0.001) than septoplasty alone group with respect to subjective improvement in symptoms.[11]

In the Randomized Controlled study of Rajshekhar K et al[12] (n=70), improvement in symptoms was evaluated by Sino Nasal Outcome Test-20 (SNOT-20). In Septoplasty with Inferior Turbinoplasty Group, Mean SNOT 20 score was improved from 17.05± 1.45 to 9.65± 1.81 after surgery while in Septoplasty alone Group, it was improved from 16.24± 1.83 to 11.98± 1.65. Reduction in symptom score was statistically significant in Septoplasty with inferior Turbinoplasty group in comparison to Septoplasty alone group (p≤ 0.001). Septoplasty with turbinoplasty group had adequate first pass DNE in all the cases, while in septoplasty alone group, 8 cases had adequate and 10 cases had inadequate first pass DNE on right side and 11 cases had adequate and 7 cases had inadequate first pass DNE on left side.[12] In Choudhary S et al study, patients who had septoplasty with turbinectomy (n=30), 27 patients had adequate space on both the nasal cavities while only 5 out of total 30 patients of septoplasty group had bilateral adequate space postoperatively. Patients who had turbinectomy showed more improvement statistically in NOSE Score and in rhinomanometry findings[13].

Velasco et al[14], in their study (n=72), Septoplasty with bilateral partial inferior turbinectomy was done in 83.3% of patients; unilateral partial turbinectomy in 9.7%; septoplasty alone in 6.9% patients. Improvement in all the symptoms was observed after surgery. Nasal obstruction was the most commonly improved symptom seen in 68 patients (94.4%) [14]. Bandos et al, (n=20) in his study stated that there was improvement in obstruction of nose in 90% cases treated with septoplasty with partial inferior turbinectomy[15]. Stozel et al done the comparison of the outcome of three surgical techniques used to treat the inferior turbinates hyperplasia: turbinectomy with lateralization, submucosal electrocautery and laser cautery additional to septoplasty. Objective improvement was measured by modified SNOT 20 score. There was significant improvement in symptoms with all the methods. He found that septoplasty with turbinectomy has an additional benefit in relief obstruction of nose.[16]

Jun BC et al had done Computed Tomography (CT) scan of the Paranasal sinuses (n=20) to suggest guidelines for septal and turbinate surgery by analyzing the association between a deviated nasal septum and compensatory hypertrophy of inferior turbinate on opposite side. Three-dimensional reconstruction was used to know the volume of inferior turbinate. He found that, the inferior turbinate on the opposite side of septal deviation had a greater volume including more the thickness of medial mucosa and the thickness and projection angle of conchal bone. He concluded that, Septoplasty along with Inferior Turbinate surgery is necessary to manage conchal bone and soft tissues in those patients.[7]

Conclusion-

From this Randomized Controlled Trial, we concluded that in patients having nasal symptoms due to nasal septal deviation with hypertrophy of inferior

turbinate on the opposite side, septoplasty with inferior turbinoplasty gives better symptoms relief than only by septoplasty. Along with the routine clinical examination, NOSE scale is a useful tool for evaluation of subjective improvement of nasal symptoms in these patients.

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