

# Comparison of the Efficacy of Partial Inferior Turbinectomy and Submucosal Diathermy on Nasal Obstruction in Allergic Rhinitis

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## ABSTRACT

**Objective:** The purpose of this study was to compare the effects of bilateral partial inferior turbinectomy and sub-mucosal diathermy of inferior turbinates on nasal obstruction in patients with allergic rhinitis.

**Study Design:** Prospective comparative study

**Place and Duration of Study:** This study was conducted at Departments of ENT, Mufti Mehmood Memorial (MMM) Teaching Hospital and District Headquarter Teaching Hospital (DHQ), Lakki Marwat from January 2009 to June 2013.

**Materials and Methods:** Subjects of either sex, aging more than 10 years with symptomatic bilateral enlarged inferior turbinates due to allergic rhinitis attending ENT OPD were included. They were divided into two groups. An alternate sequential entry was made to group A and group B. Patients in group A were offered bilateral partial inferior turbinectomy (PIT) while those in group B underwent mono-polar sub-mucosal diathermy (SMD) of inferior turbinates. Data was collected at first visit prior to intervention, second at 1 month and third at 3 months after surgery. Anterior rhinoscopy and visual analogue scale were used to assess treatment outcomes.

**Results:** Out of 96 patients with 48 patients in each group, males (58.3%) outnumbered the females (41.7%) in both groups. Mean age of the patients in group 1 was  $21.88 \pm 7.528$  range (10-35) years and in group 2 was  $19.75 \pm 6.525$  range (10-33) year. The mean nasal obstruction score was lower in group 1 than in group 2 at 1 month, and 3 months after surgery suggesting a good outcome, although statistically non-significant ( $p$ -value 0.177, 0.198 respectively).

**Conclusion:** Both bilateral PIT as well as SMD are effective in improving nasal obstruction in patients with hypertrophied inferior turbinates due to allergic rhinitis.

**Key Words:** Hypertrophied inferior turbinate, Sub-mucosal diathermy, Turbinectomy.

## INTRODUCTION

Chronic nasal obstruction due to hypertrophied inferior turbinates is a relatively common occurrence in patients suffering from allergic rhinitis, and when more conservative treatment fails (nasal steroids, antihistamines, etc), turbinate surgery may be indicated.<sup>1</sup> Allergic rhinitis generally leads to increased thickness of the medial mucosal layer which could be attributed to hypertrophy of the lamina propria that houses sub-epithelial inflammatory cells, venous sinusoids and sub-mucosal glands or it could be due to an increase in the size of the bony structure of the inferior turbinate.<sup>2</sup> Various surgical techniques have been tried to reduce the size of the inferior turbinate to improve nasal airways such as turbinectomy, turbinoplasty, extra mucosal or sub mucosal electrocautery, radiofrequency ablation (RFA), laser-assisted resection or ablation, and cryosurgery.<sup>3</sup> Turbinectomy is a partial or complete resection of the inferior turbinate with or without the guidance of an endoscope.<sup>4</sup> The exposed raw mucosal edges and bone from this procedure may lead to nasal crusting with need for postoperative debridement. The most common

complications of bilateral turbinectomy are bleeding and empty nose syndrome.<sup>5</sup>

Sub-mucosal diathermy (SMD) is a very common thermal technique which involves passing a probe just below the mucosal surface lining of the turbinate bones and cauterizing using heat energy to shrink the size of these structures. This preserves most of the mucosal lining and allows for preservation of normal function. This technique has the advantage that it can be done in the office setting under local anesthesia and it has rare and minor complications.<sup>6</sup>

The purpose of this study was to compare the effects of bilateral partial inferior turbinectomy and sub-mucosal diathermy on nasal obstruction in patients with hypertrophied inferior turbinates due to allergic rhinitis.

## MATERIALS AND METHODS

The study was approved by the Ethics and Research Committee of the hospital. Informed consent was obtained from all patients that participated in the study. This prospective comparative study was conducted at Departments of ENT, Mufti Mehmood Memorial (MMM) Teaching Hospital and District Headquarter Teaching Hospital (DHQ), Lakki Marwat from January 2009 to June 2013. Subjects of either sex, aging more

than 10 years with symptomatic enlarged inferior turbinates due to allergic rhinitis attending ENT OPD were included. Criteria for enlarged inferior turbinates due to allergic rhinitis from the history included symptoms of nasal obstruction, rhinorrhoea, sneezing and ocular pruritis. Examination criteria included nasal mucosal oedema, clear nasal discharge, post nasal drip, oedematous and grayish enlarged inferior turbinates. Patients with other nasal pathology, including nasal polyps, septal perforation and gross septal deviations were excluded from the study. Data was collected at first visit prior to intervention. During this time patients were asked about their nasal symptoms on a proforma and they were briefed on how to scale their level of nasal obstruction on a 10-point VAS where 0 represents no pain and 10 represents severe nasal obstruction. Scoring criteria on VAS was as follows: no nasal obstruction-0, mild obstruction-1, moderate obstruction-2, fairly bad obstruction-3 and severe obstruction-4. Patients were divided into two groups. An alternate sequential entry was made to group A and group B. Patients in group A were offered bilateral partial inferior turbinectomy (PIT) while those in group B underwent bilateral mono-polar sub-mucosal diathermy (SMD). A standardized anaesthetic protocol was followed for all patients undergoing partial inferior turbinectomy and patients <15 years undergoing SMD. Partial inferior turbinectomy was performed by sharp dissection. After medializing the inferior turbinate, it was crushed with a straight artery forcep before cutting it down with a sharp turbinectomy scissor all along. After securing haemostasis, both nasal cavities were packed with gauze soaked in Furacin skin ointment for 24 hours. Silastic splints were put in both nasal cavities for one week to prevent nasal synechiae. Sub-mucosal diathermy was performed after injecting a volume of 2.5-5ml of 2% xylocaine with 1:80,000 into muco-cutaneous junction of the inferior turbinate. Turbinates were cauterized at 2-3 spotted areas of the turbinate using a monopolar power with an isolated cautery needle. The needle was inserted deep to the conchal bone and withdrawn gradually while the power on. The strength and length of cauterization is judged by the amount of discolouration of turbinate. No nasal packs or splints were used routinely after SMD and the patients were all discharged the same day from hospital. The evaluation was performed by anterior rhinoscopy at 1 and 3 months after surgery. The symptomatic improvement was rated by the visual analog scale (VAS).

**Data collection:** A Performa was used for each patient having following variables noted and entered into the data sheet of SPSS 17: gender and age as demographic and independent variables and nasal obstruction score

preoperatively, 1 month and 3 months after surgery as study and dependent variables.

**Data analysis:** Age and gender were expressed as frequency and percentage. Nasal obstruction score preoperatively, 1 month and 3 months after surgery were expressed as mean and standard deviation and their differences between the groups were analyzed by Two-Sample Independent T Test. P value of < 0.05 was considered as statistically significant.

## RESULTS

Out of 96 patients with 48 patients in each group, males (58%.3) out-numbered the females (41.7%) in both groups. Mean age of the patients in group 1 was 21.88±7.528 range (10-35) years and in group 2 was a 19.75±6.525 range (10-33) years. The difference in mean age between the two groups was statistically non significant (p= 0.144) as determined by Two-Sample Independent T Test. Further the age was stratified into five categories with maximum number of patients in both the study groups was in the age group 10-15 years (Table-1).

Table-2 shows analysis of research variables. The mean nasal obstruction score was lower in group 1 than in group 2 preoperatively, at 1 month, and 3 months after surgery, although statistically non-significant (p=value 0.203, 0.177, 0.198 respectively) as determined by Two-Sample Independent T Test.

**Table No.1: Age and Gender wise distribution of the patient**

Age (Years)	No. of Patients (%age)	Gender	No. of Patients (%age)
<b>GROUP A (PIT)</b>			
>10-15	12 (25.00%)	Male	29 (60.4%)
16-20	11 (22.90%)		
21-25	09 (18.75%)		
26-30	07 (14.60%)	Female	19 (39.6%)
31-35	09 (18.75%)		
Mean age	21.88±7.528		
<b>Total</b>	<b>48 (100%)</b>		<b>48 (100%)</b>
<b>GROUP B (SMD)</b>			
>10-15	15 (31.25%)	Male	27 (56.2%)
16-20	13 (27.10%)		
21-25	08 (16.65%)		
26-30	09 (18.75%)	Female	21 (43.8%)
31-35	03 (06.25%)		
Mean age	21.88±7.528		
<b>Total</b>	<b>48 (100%)</b>		<b>48 (100%)</b>

**Table No.2: Mean Nasal Obstruction Score preoperatively, at 1 month & 3 months after surgery on VAS (n=48 each group)**

Nasal Obstruction Score	Preoperatively		At 1 month after surgery		At 3 months after surgery	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
MNOS	5.27	6.02	4.81	5.60	4.35	5.08
Std. Deviation	2.811	2.914	2.750	2.944	2.605	2.901
DF	1		1		1	
p-value	0.203		0.177		0.198	

MNOS= Mean Nasal Obstruction Score, DF=Degree of Freedom.

## DISCUSSION

There is currently no consensus on patient selection for hypertrophied inferior turbinates in allergic rhinitis. Furthermore, the long-term effects on nasal airflow dynamics, nasal physiology and long-term complications remain to be studied. The evidence base for turbinate surgery is weak and surgeons empirically offer surgery where the predominant symptom is nasal obstruction. Few authors have utilized objective measurements of nasal airflow such as rhinomanometry to select suitable patients for surgery.<sup>7</sup>

In our study the age range of the patients is almost similar to that reported in literature.<sup>8-10</sup> On the other hand in the studies by Chen et al and Leong and colleagues, all of the patients were from pediatric age group<sup>11,12</sup>. Contrary to our reports in the study by Batra PS et al, all of the patients were from adult group.<sup>13</sup> All of the above studies also had male preponderance like our study but more females had been reported in another study.<sup>14</sup> But contrary to these reports, more than half of the patients i.e 15 out of 18 were male in a study by Ashoor from Bahrain.<sup>5</sup> These differences in gender distribution may be attributed to genetic and geographic differences.

The surgical technique used for turbinate surgery plays an important role in post-operative improvement in nasal airways. Only patients with inferior turbinate hypertrophy due to thickness of the mucosal layer could benefit from SMD. If the hypertrophy is due to an increase in bony structure, only turbinoplasty is the solution to improve the nasal airways.<sup>15</sup> Functional results of SMD were less than partial turbinectomy although statistically non-significant. Mean nasal obstruction was reduced to 4.35 from 5.27 after surgery in group A and to 5.08 from 6.02 after diathermy. Almost similar results have been reported by other two studies as well.<sup>8,15</sup> In one of these studies,<sup>15</sup> the postoperative improvement in nasal breathing after PIT was reported for 96% of patients 2 weeks, and for 88% 2 months after surgery. Similarly diathermy showed good results in 78% of cases 2 weeks, and 76% 2 months after surgery. In our series 15% of the SMD patients were advised to undergo operative revision while only 2% of the PIT patients were advised revision surgery. These results are better than those reported in other study where 20% of PIT patients were advised

revision surgery.<sup>8</sup> In agreement to our reports, significant results were observed at 1 month after turbinectomy in all patients in a study by Cavaliere and colleagues.<sup>16,17,20</sup>

Probably the better results for partial turbinectomy than diathermy on nasal airways could be due to two reasons. First it involves removal of both mucosal as well as bony parts of the inferior turbinate and second there are decreased chances for re-growth of turbinate after the more radical procedure of turbinectomy.<sup>18,19</sup>

## CONCLUSION

In this study we concluded that both bilateral partial inferior turbinectomy as well as sub-mucosal diathermy are effective in improving nasal obstruction in patients with hypertrophied inferior turbinates due to allergic rhinitis.

**Suggestions:** Further multi centre randomized controlled trials are needed to evaluate the role of inferior turbinate surgery for nasal obstruction in allergic rhinitis after failed medical treatment.

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