

## COMPARISON OF POST OPERATIVE NASAL PATENCY FOLLOWING SUBMUCOSAL DIATHERMY OF INFERIOR TURBINATE WITH MICRODEBRIDER-ASSISTED TURBINOPLASTY

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### ABSTRACT

**Objective:** The objective of this study was to compare post-operative nasal patency following microdebrider-assisted turbinoplasty with submucosal diathermy in patients of hypertrophic inferior turbinates.

**Study Design:** Randomized control trial.

**Place and Duration of Study:** ENT Department Combined Military Hospital Lahore from Aug 2013 to Feb 2014.

**Material and Methods:** This randomized control trial was conducted at the ENT Department Combined Military Hospital, Lahore for six months from: 20 Aug 2013 to 20 Feb 2014. After taking permission from hospital ethical committee one hundred and twenty patients of inferior turbinate enlargement fulfilling the inclusion and exclusion criteria were selected through non-probability sampling. Group A underwent submucosal diathermy of inferior turbinate, while group B had microdebrider-assisted turbinoplasty. Patients in both groups were given tab co-amoxiclav 625 mg 8 hourly, tab mefenamic acid 500 mg 8 hourly and tab chlorpheniramine maleate 4 mg 12 hourly for 5 days. Nasal packs were removed after 48 hours. Patients were advised regular nasal toilet.

**Results:** Among 120 cases (60 in each group), mean age was calculated as  $33.38 \pm 10.27$  and  $33.63 \pm 10.78$  in group-A and B respectively. In group-A, 60% (n=36) were males and 40% (n=24) were females while in Group-B 53.33% (n=32) were males and 46.67% (n=28) were females. Comparison of post-operative nasal patency following microdebrider-assisted turbinoplasty was done with that of submucosal diathermy, which showed that 73.33% (n=44) in Group-A and 93.33% (n=56) in Group-B had good nasal obstruction relief while 26.67% (n=16) in group-A and 6.67% (n=4) in Group-B had no good nasal obstruction relief. A p value was calculated as 0.003.

**Conclusion:** Post-operative nasal patency was better outcome following microdebrider-assisted turbinoplasty as compared to submucosal diathermy among two groups of patients.

**Keywords:** Hypertrophic inferior turbinates, Microdebrider-assisted turbinoplasty, Post-operative nasal patency, Submucosal diathermy.

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### INTRODUCTION

The nose acts as an air-conditioning unit and performs humidification and filtration of inhaled air. The turbinates are thin, curved, shelf-like bony projections, covered by respiratory mucosa, in the lateral walls of the nose<sup>1</sup>. There are superior, middle and inferior turbinates in the nose. The inferior turbinates are the largest and they are the main regulators of nasal airflow as they create the high inspiratory resistance necessary for normal breathing. Nasal mucosa is the main effector organ of the nose and is

essential for normal nasal physiology. The mucosa over the turbinates can swell or shrink in response to changes in blood flow that are brought about by various body positions, certain foods, medications, hormones, allergies and infections. As a result of this the turbinates are swollen and become enlarged, a condition referred to as inferior turbinate hypertrophy<sup>2</sup>.

In vast majority of the cases, inferior turbinate hypertrophy is caused by nasal allergies and infections and the resultant hypertrophy is characterized by vascular congestion of mucosa, dilatation of submucosal venous sinusoids, tissue edema and cellular hyperplasia. When the turbinates are enlarged, they cause nasal

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obstruction leading to postnasal drip, headache and anosmia<sup>2</sup>.

Hypertrophic turbinates are treated medically and surgically. Medical treatment is based on intranasal corticosteroids, topical vasoconstrictors, isotonic saline sprays, mast cell stabilizers, antihistamines and immunotherapy. This form of treatment provides symptomatic relief but has a high failure rate and often leads to recurrence when discontinued<sup>3</sup>.

When medical treatment is unsatisfactory in relief of nasal obstruction, the patients with hypertrophic turbinates often benefit from the surgical treatments. The goals of surgical reduction of inferior turbinate hypertrophy are to preserve mucosal functions, maximize the nasal passages and to minimize complication rates with reduction of turbinates' submucosal tissue and bone. There are various surgical techniques available such as electrocautery, submucosal diathermy (SMD), cryosurgery, laser turbinoplasty, radiofrequency ablation, microdebrider-assisted turbinoplasty and Inferior turbinectomy<sup>4</sup>. Most of these techniques destroy or devitalize the surface mucosa thereby interfering with the nasal physiology.

SMD and micro-debrider assisted turbinoplasty are two mucosa-sparing techniques. According to previous studies more than 70% of patients following SMD and 91% of patients undergoing microdebrider-assisted turbinoplasty had good nasal obstruction relief two month postoperatively<sup>5,6</sup>.

SMD is a relatively simple, easier and safer procedure, can be performed under local anesthesia and does not require expensive equipment<sup>7</sup>. However it lacks the precision and causes recurrent nasal obstruction as the turbinate bone remains intact. Microdebrider on the other hand allows precise and incremental tissue removal as well as reduction of turbinatebone with preservation of nasal mucosa<sup>8,9</sup>. Nevertheless, the procedure has to be carried out under GA and requires expensive equipment.

Locally, both SMD and microdebrider-assisted turbinoplasty are increasingly being performed, however, post-operative improvement in nasal patency needs to be compared in both procedures. Rationale of this study was to compare the post-operative improvement in nasal patency after SMD and microdebrider-assisted turbinoplasty procedures.

## **MATERIAL AND METHODS**

This randomized control trial was conducted at the ENT Department Combined Military Hospital, Lahore for six months from: 20 August 2013 to 20 February 2014 Sample size was calculated by using WHO sample size calculator by keeping values of level of significance 5%, power of test 80%, anticipated population proportion P1, 91% anticipated population proportion P2: 70.3%. Among 120 patients sixty patients were included in each group through non-probability consecutive sampling.

The patients of both genders and age 12 years or more with inferior turbinate hypertrophy with nasal obstruction >8 on visual analog scale (VAS) and with no response to medical treatment for six months were included in the study.

Patients with bleeding disorders and who had undergone previous turbinate surgeries were excluded from the study.

After taking permission from hospital ethical committee one hundred and twenty patients of inferior turbinate enlargement fulfilling the inclusion and exclusion criteria were selected through non-probability sampling. After taking an informed written consent to participate in the study; name, age, gender, serial number and hospital record number, address and phone number of each individual were noted. Pre-operative nasal patency of the individuals was noted on visual analogue scale from 1 to 10. The patients with nasal obstruction (VAS value >8) were randomly allocated into two equal groups by using the random numbers table.

Group A underwent submucosal diathermy of inferior turbinate, while Group B had microdebrider-assisted turbinoplasty.

Surgeries in both groups were performed by consultant surgeon under general anesthesia followed by bilateral nasal packing with paraffin gauze.

Patients in both groups were given tab co-amoxiclav 625 mg 8 hourly, tab mefenamic acid

drops, 2 drops 8 hourly for 5 days. Post-operative nasal patency of each patient was noted after 2 months.

### Data Analysis

All the collected data were entered in SPSS version 10 and validated through dual entry. The variables to be analyzed were included numerical data like age and qualitative data like gender, pre-treatment and post-treatment nasal patency

**Table-I: Age distribution among the study groups (n=120).**

Age (in years)	Group-A (n=60)		Group-B (n=60)	
	No. of patients	%	No. of patients	%
12-30	23	38.33	27	45
31-60	37	61.67	33	55
Total	60	100	60	100
Mean $\pm$ SD	33.38 $\pm$ 10.27		33.63 $\pm$ 10.78	

**Table-II: Gender distribution among the study groups (n=120).**

Gender	Group-A (n=60)		Group-B (n=60)	
	No. of patients	%	No. of patients	%
Male	36	60	32	53.33
Female	24	40	28	46.67
Total	60	100	60	100

**Table-III: Pre and post-operative nasal patency among groups (n=120).**

Pre-operative nasal patency	Group-A (n=60)		Group-B (n=60)	
	8.97 $\pm$ 0.86		8.8 $\pm$ 0.84	
Post-operative nasal patency	4.23 $\pm$ 1.11		4.16 $\pm$ 1.27	

**Table-IV: Comparison of post-operative nasal patency following microdebrider-assisted turbinoplasty with submucosal diathermy in patients of hypertrophic inferior turbinates (n=120).**

Good Nasal Obstruction Relief	Group-A (n=60)		Group-B (n=60)	
	No. of patients	%	No. of patients	%
Yes	44	73.33	56	93.33
No	16	26.67	4	6.67
Total	60	100	60	100

*p* value=0.003

500 mg 8 hourly and tab chlorpheniramine maleate 4mg 12 hourly for 5 days. Nasal packs were removed after 48 hours.

Patients were advised regular nasal toilet; oxymetazoline nasal spray and saline nasal

after 02 months. Mean and standard deviation was calculated for numerical data (age). Frequency and percentage were calculated for qualitative data (gender and nasal patency). These groups were compared by Chi-square test. A *p* value <0.05 was significant.

## RESULTS

A total of 120 cases (60 in each group) fulfilling the inclusion/exclusion criteria were enrolled to compare post-operative nasal patency following microdebrider-assisted turbinoplasty with submucosal diathermy in patients of hypertrophic inferior turbinates.

Age distribution of the patients was done which showed that 38.33% (n=23) in Group-A and 45% (n=27) in Group-B were between 12-30 years and 61.67% (n=37) in Group-A and 55% (n=33) in Group-B were between 31-60 years of age, mean  $\pm$  SD was calculated as  $33.38 \pm 10.27$  and  $33.63 \pm 10.78$  respectively (table-I).

Gender distribution of the patients was done which showed that 60% (n=36) in Group-A and 53.33% (n=32) in Group-B were male and 40% (n=24) in Group-A and 46.67% (n=28) in Group-B were females. Pre-operative nasal patency on VAS was calculated as  $8.97 \pm 0.86$  in Group-A and  $8.8 \pm 0.84$  in Group-B (table-II).

Post-operative nasal patency on VAS was calculated as  $4.23 \pm 1.11$  in Group-A and  $4.16 \pm 1.27$  in Group-B (table-III).

Comparison of post-operative nasal patency following microdebrider-assisted turbinoplasty was done with that of submucosal diathermy in patients of hypertrophic inferior turbinates which showed that 73.33% (n=44) in Group-A and 93.33% (n=56) in Group-B had good nasal obstruction relief while 26.67% (n=16) in Group-A and 6.67% (n=4) in Group-B had no good nasal obstruction relief, *p* value was calculated as 0.003 (table-IV).

## DISCUSSION

Nasal and sinus complaints are among the most common reasons for visits to primary care clinicians, otolaryngologists, and allergists. Although some clinicians consider nasal obstruction to imply a blockage within the nasal cavity, nasal obstruction is most commonly defined as a patient symptom manifested as a sensation of insufficient airflow through the nose<sup>10-12</sup>. Nasal obstruction may be the cardinal

presenting symptom of many common disease processes, such as rhinitis, sinusitis, septal deviation, adenoid hypertrophy, and nasal trauma<sup>13-15</sup>.

Inferior turbinate hypertrophy is one of the major causes of nasal obstruction. Reduction of size of the turbinate is important to establish adequate airway with aeration of paranasal sinuses to relieve the symptoms.

The findings of our study are in agreement with other studies, Milo et al. found that 64 out of 91 patients (70.3%) experienced subjective improvement in nasal patency at two month postoperatively following SMD<sup>5</sup>. Lee and Chen carried out microdebrider-assisted turbinoplasty on 29 patients and found that the overall improvement in nasal patency was 91% at two month postoperatively<sup>6</sup>. Joniau et al performed their study on 19 patients through powered turbinoplasty on one side of the nose and submucosal cauterization on the other side and found that powered turbinoplasty was superior to submucosal cauterization. A significant difference ( $p < 0.05$ ) was noted for endoscopic scoring of turbinate size<sup>16</sup>. Hassoun performed a similar study on 25 patients in total; 13 underwent microdebrider-assisted turbinoplasty (MAT) while 12 were treated with SMD. After one month, all the 13 patients in MAT group had complete relief from nasal obstruction whereas 2 out of 12 patients in SMD group were left with mild nasal blockade. He concluded that microdebrider-assisted turbinoplasty (MAT) is a better substitute being effective, mucosa preserving and more controllable during surgery than the SMD<sup>17</sup>.

The result of our study may be applied on the patients having nasal obstruction due to enlarged inferior turbinates presenting in the outpatient departments.

## CONCLUSION

Outcome of post-operative nasal patency was found to be significantly better following microdebrider-assisted turbinoplasty when

compared to submucosal diathermy procedures among the two groups of patients.

### CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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