Original Research Article

Comparison between powered turbinoplasty and submucosal resection of turbinates in treatment of inferior turbinate hypertrophy

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Abstract

Introduction: Hypertrophy of the inferior turbinates is one of the most common causes for nasal obstruction. Although medical treatment is an option a hypertrophied turbinate invariably requires surgical reduction for correction of symptoms. We aim to compare both the short term and long term difference in results between two commonly used methods of turbinate reduction.**Aim:** To compare between both short term and long term differences in results between microdebrider assisted turbinoplasty and submucosal resection of turbinates in surgical treatment of inferior turbinate hypertrophy.**Materials and Methods:** 40 patients between the ages of 18- 55 years of either sex were included in the study. Patients were divided in to two groups randomly (group A & B) of 20 patients each and group A underwent microdebrider assisted turbinopalasty and group B underwent submucosal resection of turbinates. In both groups inferior turbinated were lateralised intraopertively. Patients were assessed for nasal patency using pre and post operative nasal endoscopies, visual analog scale for improvement in symptoms and intra operative duration and mean blood loss were also assessed. Follow up dates were 14thday , 3 months and at 1 year postoperatively. Mean and standard deviations were calculated for quantitative data, for categorical variables frequencies and percentages were calculated.**Results:** Operating time and intra operative blood loss were lower in the powered turbinoplasty group. Also nasal crusting was observed in the submucosal resection group. Both endoscopic and symptomatic assessment of both groups on long term yielded similar results with no statistically significant difference.
Conclusion: Powered turbinoplasty and submucosalresction of turbinates are both effective in relieving nasal obstruction in inferior turbinate hypertrophy. Powered turbinoplasty have an additional advantage of shorter operating time and mucosal preservation in well trained hands.

Keywords: powered turbinoplasty, submucosal resection, inferior turbinate hypertrophy

Introduction

Airflow disturbances of the nasal cavity are seen in around 30% of the population[1] .Most common cause for these disturbances is an enlarged inferior turbinate and invariably it presents as nasal obstruction. Nasal obstruction occurs due to increase in vascularity of turbinates leading to mucosal or submucosal hypertrophy of turbinates.Usually an enlarged turbinate is treated medically with antihistamines, nasal and systemic decongestants and steroids. Surgical reduction of turbinates is considered when medical therapy fails. Many surgical methods are considered for treatment of inferior turbinate hypertrophy[2].Two common methods of surgery for inferior turbinate hypertrophy are being compared in the study.

Materials and Methods

This was a prospective interventional and comparative study conducted between November 2018 and December 2020 in the department of ENT, DMWIMS Medical College Wayanad, Kerala, India. A total of 40 patients were enrolled in the study after acquiring ethical committee clearance and obtaining an informed written consent.22 males and 18 females were included in the study between the age of 18 and 55 years.Patients were randomly divided in to 2 groups.

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Group A underwent powered turbinoplasty with the aid of debrider and zero degree endoscope and group B underwent submucosal resection of the inferior turbinate. In both groups inferior turbinates were lateralised as part of nasal surgery. Patients underwent routine ENT examination and preoperative nasal endoscopy and CT scan of the para nasal sinus. The size of the inferior turbinates were graded based on size as follows: Grade 1 inferior turbinates occupying less than 1/3 rd of nasal cavity, grade 2 – inferior turbinates occupying more than 1/3 but less than 2/3 of nasal cavity, grade 3 – inferior turbinates occupying more than 2/3 of nasal cavity.

Inclusion criteria-

1. patients having bilateral hypertrophy of the turbinates
2. Patients having grade 2 or grade 3 hypertrophy on nasal endoscopy
3. Patients fit for general anaesthesia/surgery

Exclusion criteria-

1. prior history of nasal surgery
2. Associated deviated nasal septum or sinusitis
3. Patients unfit for general anaesthesia/ surgery

Intra operative blood loss and operating time was assessed. Both group of patients were assessed post operatively with nasal endoscopy at 14 th day, 3 rd month and at one year. Symptomatic improvements in nasal obstruction were assessed by visual analog scale in which patient rates his/her symptom severity from a score of 1-10

0- no obstruction· 1-3- mild obstruction· 4-7- moderate obstruction· 8-10- severe obstruction

Statistical Analysis

Mean and standard deviations were calculated for quantitative data, for categorical variables frequencies and percentages were calculated.

Procedure

All procedures were conducted under general anesthesia.

Powered Turbinoplasty (Group A)

All cases were done under zero degree endoscopic guidance under general anesthesia. Using a spinal needle 1 % lidocaine with 1: 100000 adrenaline was infiltrated from anterior end to posterior end. Inferior turbinate was medialised and a vertical incision placed along the anterior aspect of inferior turbinate. Using Freer's elevator soft tissues elevated from the bone of inferior turbinate. A straight blade (4 mm) was used to remove the soft tissue from around the bone of the inferior turbinate taking care not to injure the mucosa of inferior turbinate. If injured the medial surface is rolled upon itself covering the raw area. Bleeding vessels if present are cauterized.

Submucosal resection of turbinate (Group B)

All cases were done under zero degree endoscopic guidance under general anesthesia.Using a spinal needle 1 % lidocaine with 1:100000 adrenaline was infiltrated from anterior end to posterior end. Inferior turbinate was medialised and a vertical incision is placed from anterior to posterior end of turbinate. Soft tissues are dissected from the bone of turbinate and anterior two third of the bone and excess cavernous tissue is removed using turbinectomy scissors. The mucosal flaps of the turbinate are then repositioned. Bleeding vessels if present are cauterized.After the procedure nasal cavity was packed using medicated merocoel pack. Nasal pack was removed after 24 hours followed by examination. Follow up endoscopy was done on 14th day, 3 months and at one year.

Results

Our study included 22 males and 18 females. The mean age of presentation was 32.5 years. The main symptom reported was nasal obstruction and symptom was present in all cases. Intra operatively blood loss and duration of surgery was assessed. The intra operative blood loss was 41.4 ± 7.2 ml in the submucosal resection group where as in the powered turbinoplasty group the blood loss was only 28.2 ± 4.3 ml. Also duration of surgery was significantly higher in the submucosal resection group and operative timings were 12.2 ± 1.4 and 31.2 ± 4.1 minutes respectively in powered turbinoplasty group and submucosal resection group. Post operative nasal obstruction was assessed by visual analog scale and nasal endoscopies were carried out for follow up.

Table 1: Mean nasal obstruction at follow up

Methods	Preoperative	Second week Mean ± SD	Third month Mean ± SD	One year Mean ± SD
Powered turbinoplasty	100 %	81 ± 20.4	76.5 ± 20.3	76.8 ± 20.7
Submucosal resection	100 %	80.2 ± 19.7	77.8 ± 20.4	77.2 ± 20.6

On follow up the mean reduction in post operative nasal obstruction was 81 ± 20.4 at second week, 76.5 ± 20.3 at third month and 76.8 ± 20.7 at one year in powered turbinoplasty group.In submucosal resection group reduction in nasal obstruction was 80.2 ± 19.7 at second week, 77.8 ± 20.4 at third month and 77.2 ± 20.6 at one year.

Only patients with grade 2 and grade 3 turbinate hypertrophy was included in the study and post operative endoscopy showed significant reduction in turbinate size. None of the cases showed grade 3 turbinate hypertrophy post operatively at one year. All cases showed reduction in size of turbinate and more than 75 % of cases had only grade 1 turbinates at all three stages of follow up.

Table 2: Pre operative endoscopy

Inferior turbinate size	Powered turbinoplasty	Submucosal resection
Grade 2	8	7
Grade 3	12	13

Table 3: Post operative endoscopy at 2 weeks

Inferior turbinate size	Powered turbinoplasty	Submucosal resection
Grade 1	18	19
Grade 2	2	1
Grade 3	-	-

Table 4:Post operative endoscopy at 3 months

Inferior turbinate size	Powered turbinoplasty	Submucosal resection
Grade 1	17	17
Grade 2	3	3
Grade 3	-	-

Table 5: Post operative endoscopy at 1 year

Inferior turbinate size	Powered turbinoplasty	Submucosal resection
Grade 1	16	17
Grade 2	4	3
Grade 3	-	-

Patients were also observed for post operative complications like synechiae formaton, crusting and post operative bleeding. In powered turbinoplasty group there was one case of synaechiae and in submucosal resection group had crusting in 8 of the 20 cases. There were no cases of post operative bleeding in both groups.

Discussion

Inferior turbinates arise from the lateral wall of the nasal cavity and play an important role in nasal respiration and nasal cycle. The major role of turbinate surgery is to achieve sufficient space within the nasal cavity for normal nasal cycle regulation[3]. Although many cases of turbinate hypertrophy are reversible some causes persist. These are mostly due to disruption of autonomic regulation of arteriovenous channels within the stroma of the turbinates. The most common causes include allergic rhinitis, vasomotor rhinitis and compensatory hypertrophy due to septaldeviation[4].turbinate reduction is considered in these cases to improve the nasal airway and patients' quality of life.There have been various arguments put against complete removal of turbinates. The risk of patient developing atrophic rhinitis particularly in hot and dry climates is a concern[5].Some patients even though have a capacious nasal airway

post turbinectomy but still have the sensation of nasal obstruction. This may be due to the destruction of airflow receptors on the medial and superior aspect of inferior turbinate[6].The need for mucosa preserving surgeries have been discussed for long time and 2 most prevalent mucosal preserving methods are powered turbinoplasty and submucosal resection of inferior turbinate. Our study was aimed at comparing these 2 techniques for turbinate reduction.In our study the intra operative blood loss was 41.4 ± 7.2 ml in the submucosal resection group where as in the powered turbinoplasty group the blood loss was only 28.2 ± 4.3 ml. Also duration of surgery was significantly higher in the submucosal resection group and operative timings were 12.2 ± 1.4 and 31.2 ± 4.1 minutes respectively in powered turbinoplasty group and submucosal resection group. The reduced operating time and the smaller incision used in powered turbinoplasty group accounted for decreased bleeding in these patients.On follow up the mean reduction in post operative nasal obstruction was 81 ± 20.4 at second week, 76.5 ± 20.3 at third month and 76.8 ± 20.7 at one year in powered turbinoplasty group.In submucosal resection group reduction in nasal obstruction was 80.2 ± 19.7 at second week, 77.8 ± 20.4 at third month and 77.2 ± 20.6 at one year. There was no statistically significant difference in follow up among both groups in terms of improvement in nasal obstruction.Reduction in size of turbinates was achieved in both groups and endoscopic picture at all three stages of follow up showed the same. In terms of complications crusting was a significant problem in submucosal resection of inferior turbinate. The problem may have been exacerbated by the use of cautery to control bleeding in that group[7]. Synachiae formation was seen in one case of powered turbinoplasty and could be attributed to improper handling of debrider.

Limitaton

The limitation of the study is the sample size and long term follow up couldn't be done beyond three years.

Conflict of Interest: Nil

Source of support:Nil

Conclusion

Powered turbinoplasty and submucosal resection of turbinates are both effective in relieving nasal obstruction in inferior turbinate hypertrophy. Powered turbinoplasty have an additional advantage of shorter operating time and mucosal preservation in well trained hands. Also incidence of post operative crusting is found to be significantly reduced in powered turbinoplasty.

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