ORIGINAL ARTICLE

Microdebrider Assisted Turbinoplasty: An Experience at Services Hospital Lahore

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ABSTRACT

Aim: To evaluate the efficacy of turbinoplasty for symptomatic relief in inferior turbinate hypertrophy.
Study design: Prospective study of 50 patients who underwent turbinoplasty with microdebrider.
Place of study: ENT II, Services Institute of Medical Sciences (SIMS) / Services Hospital Lahore.
Duration of study: From January 2008 to January 2012.
Methods: Fifty patients were included in the study who had inferior turbinal hypertrophy. All the patients had history of failed medical treatment. Follow up was carried out for one year for bleeding, synechie formation, nasal crusting and nasal obstruction.
Results: Microdebrider assisted turbinoplasty is more effective than other surgical procedures. It is a safe method of achieving turbinate size reduction with minimal morbidity.
Keywords: Nasal Obstruction, Inferior Turbinal Hypertrophy, Microdebrider, Turbinectomy.

INTRODUCTION

Nasal obstruction is the most common complaint in an average rhinologic practice[1].

It has been estimated that as many as one third of the population has some nasal obstruction and as many as one quarter of these patients pursue surgical treatment[2].

When assessing individual symptoms of chronic rhino-sinusitis, nasal obstruction often ranks highest in patient-reported symptom severity.[3]

The role of inferior turbinate pathology in the reduction of nasal airflow is well known.[4]

The main etiologies for nasal obstruction are septal deviation, hypertrophy of inferior and middle turbinate, nasal polyposis and hypertrophy of pharyngeal tonsils[5].

Among these etiologies, the inferior turbinal hypertrophy is the main cause of nasal obstruction[6].

Allergic rhinitis, vasomotor rhinitis and compensatory hypertrophy of inferior turbinate on the concave side of septal deviation figure as the main causes of inferior turbinate hypertrophy[7].

The nasal passages are complex structures that serve several functions like filtration, humidification, heating, olfaction and voice resonance. Humidification, filtration and heating (air conditioning) are greatly aided by turbinates. The inferior turbinate is a separate bony structure covered with nasal mucosa. Embryologically it develops from an endonasal prominence called maxilloturbinal prominence. Histologically, the inferior turbinate is composed of three layers, medial and lateral mucosal layers and central osseous layer. The thickness of medial layer is more than lateral layer, due to increased thickness of lamina propria. In the lamina propria lie venous sinusoids, seromucinous glands and immunocompetent cells. The venous sinusoids get engorged or constricted according to extent of vasodilatation or vasoconstriction in the veins and arteriovenous anastomosis. These vascular structures are constantly under the influence of autonomic nervous system. Chemical or microbial irritation leads to inflammatory response i.e., activation of mast cells, basophils and other leukocytes, release of cytokines, chemokines and other chemical mediators. This leads to swelling of turbinates, primarily in the lamina propria where venous sinusoids reside. Enlargement of inferior turbinate is mainly due to swelling of the submucosa and rarely due to enlargement of the bone. This hypertrophy of inferior turbinate caused by dilatation of submucosal venous sinusoids is the cause in intrinsic rhinitis and responds to decongestants[8].

Sometimes inferior turbinal enlargement is due to submucosal fibrosis. This does not respond to decongestants[9].

In a few cases of inferior turbinal hypertrophy, the venous sinusoids become atonic and also do not respond to decongestants[10].

Internal nasal valve is the area of greatest nasal resistance. It is formed medially by nasal septum, inferiorly nasal floor and laterally by lower edge of upper lateral cartilage and anterior end of inferior turbinate. This valve is a dynamic valve, as swelling of the venous erectile tissue of the inferior turbinate and nasal septum can cause complete nasal obstruction.

Medical management of inferior turbinal hypertrophy includes antihistamines, sympatho-mimetics, anticholinergics and steroids. These medications provide symptomatic relief but no

permanent cure. When optimal medical management has been unsatisfactory in the relief of nasal obstruction, surgical intervention is warranted. The goals of surgical reduction of inferior turbinal hypertrophy are to maximize the nasal airway, preserve mucosal function and to minimize complications with reduction of submucosal and bony tissue[11].

Inferior turbinate reduction can be performed by various techniques that resect, displace or decrease the volume of the turbinate. Techniques of turbinate reduction include turbinectomy[12], submucous turbinectomy[13], inferior turbinoplasty[14], cryotherapy[15], submucous electrosurgery[16] CO_2 laser turbinplasty[17].

No technique is perfect and each is associated with known short term and long term complications[18]. Inferior turbinate reduction with microdebrider offers advantages over other traditional techniques with regard to mucosal preservation, bleeding, crusting and other complications. We prospectively studied the efficacy of microdebrider assisted turbinoplasty on alleviating nasal obstruction and other complications.

PATIENTS AND METHODS

A prospective study was performed in fifty patients who complained of nasal obstruction due to inferior turbinal hypertrophy. Inferior turbinal hypertrophy was graded I - III.

Grade I: Mild Enlargement, no obvious Nasal Obstruction.

Grade II: Moderate Enlargement, Nasal Obstruction.

Grade III: Complete Occlusion of Nasal Cavity, Severe Nasal Obstruction.

All patients were evaluated before surgery and after surgery. The patients were followed up to 1 year for assessment of symptoms, need for further medical and surgical intervention, post operative complications & influence of symptom relief on quality of life.

Surgical Technique: All cases were operated under general anesthesia with endotracheal intubation and throat pack. First 0.05% xylometazoline spray was done in the nasal cavity and then 0.05% xylometazoline soaked strip gauze was inserted into the nasal cavity. Ten minutes after this inferior turbinate was infractured and 2% xylocaine with 1:200,000 adrenaline was injected in the submucosal plane after diluting it twice with 0.9% normal saline. After 05 minutes with number 15 blade a small incision was given on anterior (head) part of the inferior turbinate and a submucosal tunnel was made with sharp dissection on medial surface of the turbinate under magnification of zero degree 4 mm endoscope, 4mm tip microdebrider was inserted in the submucosal tunnel, oscillating at the rate of 3000 cycles / minute. The direction of the blade of the microdebrider was lateral towards bone. Bony turbinate and some of the submucosal tissue was debrided in anteroposterior direction. No lateral flap was made. Particular attention was paid for safety of mucosal surface. Haemostasis was achieved with suction electro-cautery if necessary. Incision was not stitched. Reduction in size was obvious. After operation nose was packed with glove finger packing which was removed after 24 hours. Post operatively antibiotics, analgesics and saline irrigation was advised for one week. Follow-up was done weekly for four weeks then fortnightly for four weeks then after every two months for one year. Complications like bleeding, crusting, foul odour, nasal obstruction and synechie formation were recorded.

RESULTS

A total of fifty patients, 22 females and 28 males between ages 18-50 with symptoms of moderate and severe nasal obstruction due to inferior turbinal hypertrophy in grade II & grade III were studied. 12 patients had unilateral and 38 patients had bilateral turbinoplasty. If necessary, septoplasty was done too. Follow-up was for 12 months.

The main symptoms before the operation were nasal obstruction in 50 patients (100%),anterior nasal discharge in 30 patients (60%), post nasal drip in 18 patients (36%). 22 patients had history of topical decongestants (44%).After one year of post operative follow up 35 patients (70%) reported satisfactory results regarding nasal obstruction while 15 patients (30%) had mild degree nasal obstruction. 23 patients (46%) had some degree of post operative complications in the form of mild nasal dryness in 13 patients, post nasal drip in 5 patients. Nasal crusting & foul odour was not complained of by any patient. 5 patients had nasal synechia which were lysed.

DISCUSSION

Inferior turbinate hypertrophy is one of the most common causes of nasal obstruction. When proper medical treatment, sympathomimetics (local & systemic), antihistamine (local & systemic), steroids (local & systemic) and saline nasal irrigation for prolonged period have failed in relieving the symptoms then surgical treatment for reduction in size of inferior turbinate is indicated. Numerous reports substantiate the usefulness of inferior turbinate surgery[19].

The ideal turbinal surgery is limited to the erectile submucosal tissue and the bony turbinate. Reduction of bone produces enough space while

removal of submucosal surgery produces scarring and fibrosis which minimizes engorgement of the inferior turbinate in patients of intrinsic rhinitis. Mucosal preservation maintains air conditioning function of the inferior turbinate and also reduces crust formation.

More than ten surgical techniques have been used to treat hypertrophy of the inferior turbinate but there is no completely effective treatment. However all of the techniques performed for turbinate reduction have potential of complications that fall into several categories[20].

Surgical treatment for hypertrophied inferior turbinates includes techniques that resect partially or completely, displace it laterally or reduce its volume. One method is lateral out fracture, involves fracturing the insertion of the inferior turbinate at its attachment to the lateral nasal wall and then forcing it laterally with nasal speculum and nasal packing. This gives temporary relief as turbinate resumes its position eventually[21].

Electrocautery is used in two ways; either we do submucosal diathermy or superficial mucosal diathermy. Each results in fibrosis and reduction in size of the turbinate but significant risk includes necrosis of the turbinate bone, sequestrum formation, crusting and foul odour. More over this method is not effective in managing posterior end of hypertrophied inferior turbinate[22].

Cryosurgery (cryoturbinectomy) can be used easily under local anesthesia in outpatient setting. It involves the application of a cryoprobe to the mucosal surface of the turbinate and freezing at -85 C° for 60–75 seconds[23].This affects more on goblet cells so reduces rhinorrhea, however results are temporary and variable, thus requires repeated applications[24].

Carbon Dioxide (CO_2) Laser turbinate reduction can also be performed under local anesthesia. This procedure results in little blood loss and post operative discomfort[24].

Disadvantage is eschar formation which can cause nasal obstruction or rarely haemorrhage with sloughing of eschar[25]. However this is not effective for bony hypertrophy. Another disadvantage is that equipment is expensive and requires additional expertise, training and safety precautions.

Resection of the inferior turbinate partial or complete, although no longer widely performed, is still considered an option in turbinate reduction surgery. This results in increase in volume of the nasal airway and diameter of the nasal valve. This increase occurs at the expense of nasal physiology with decreased humidifying activity of the nasal mucosa, excess drying of nasal secretions and resultant crusting[26]. Therefore complication rate of bleeding, synechie formation and empty nose syndrome is high[27]. Another technique presently in use is radio frequency volumetric tissue reduction (RFVTR). Radio frequency heat is used to induce submucosal tissue destruction. The device, an electrode probe induces ionic agitation at the cellular level, heats the turbinate tissue with little heat dissipation. Thermal injury only extends 2-4 mm around the active portion of the electrode, thus only within deep mucosa, thus sparing damage to mucosal surface. The area of injury is replaced with scar producing fibroblasts. Scar contraction leads to reduction of turbinate volume and relief of nasal obstruction. The ideal turbinate surgery is limited to the erectile submucosal tissue and to the bony turbinate. The endoscopic approach to inferior turbinectomy provides complete visualization of the operating field, thus reduces risk of excessive or inadequate resection. Preservation of mucosal surface and debulking of the turbinal tissue is the main goal of surgery. Microdebrider only removes thick, erectile, vascular tissue of the turbinate and hypertrophic bony part, in a short time with minimal blood loss. Intra-operative and post-operative blood loss is minimal[28]. Per-operative bleeding site can be visualized and elctrocoagulated with unipolar cautery. Residual erectile tissue can be visualized and debrided. Post-operative packing with glove finger reduces mucosal damage and reduces adhesion formation. Bone exposure leads to crusting, foul odour which is minimal in microdebrider assisted turbinoplasty. Such complication is not seen in this study.

CONCLUSION

- Endoscopic microdebrider assisted turbinoplasty is a very good surgical option for turbinal reduction. Bleeding per-operative and post-operative is less in amount.
- Due to reduced chances of bone exposure bone necrosis, crusting and foul odour are minimal.
- As mucosal injury is not produced neither during surgery nor during packing, so minimal chances of adhesion formation.
- Removal of erectile submucosal tissue is precise and under direct vision so good satisfactory nasal airway patency.
- We recommend use of microdebrider assisted turbinoplasty for relief of nasal obstruction due to hypertrophic inferior turbinate.

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