INFERIOR TURBINECTOMY FOR NASAL OBSTRUCTION-STUDY OF 219 CASES

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ABSTRACT: OBJECTIVE: To determine the success rate of inferior turbinectomy for nasal obstruction. To study complications of inferior turbinectomy. To study the histopathological changes in the inferior turbinate specimens. **METHOD:** A prospective study of 219 consecutive patients in two tertiary level centres who underwent inferior turbinectomy for nasal obstruction and who were refractory to the conservative treatment. Each patient's inferior turbinate's graded for size from I to III. Grade I was defined as mild enlargement with no obvious obstruction. Grade III was complete occlusion of the nasal cavity. The turbinate's in between were graded as II. Grade II and grade III turbinate's were included in the study. Inferior turbinectomy done on both sides and septoplasty if required. The inferior turbinectomy specimen were sent for histopathological examination. Questionnaires were used for subjective assessment of symptoms before and after the procedure. We did follow up 1 week, 1 month and 6 months after surgery. **RESULTS**- 92 % (n=203) of patients relieved of nasal obstruction for which they approached for us. The common complications in our study is postoperative nasal synechiae which occurred in 5% (n=10). Bleeding occurred in 4%(n=8). Dryness and crusting occurred in 2%(n=4) and foul odour in 2% (n=4).It also showed that most common cause for turbinate enlargement is chronic nonspecific inflammatory hypertrophy followed by allergic turbinate hypertrophy. **CONCLUSION**:-The results show that inferior turbinectomy is the good method of achieving relief from the nasal obstruction with minimal morbidity. Histopathological examination showed that most common cause of turbinate enlargement is chronic non specific turbinate hypertrophy.
KEY WORDS: inferior turbinectomy, chronic nonspecific turbinate hypertrophy.

INTRODUCTION: Nasal obstruction is one of the common complaint for which the patient approaches to the ENT surgeon[2,3,7]. Chronic nasal obstruction has many adverse sequelae including mouth breathing, dryness of the oropharynx, nasal speech, disordered sleep, restlessness, malaise, an adverse effect on quality of life and reduced lung volumes [2,5]. Nasal obstruction due to the turbinate enlargement is usually amenable to medical treatment of the underlying inflammatory process [2]. However long standing swelling may become irreversible. This may be due to dilated submucosal venous sinuses becoming varicose and unresponsive to

sympathetic nervous system stimulation or medical treatment or because of fibrosis [2]. In these instances inferior turbinate surgery may be offered [1,2] . Turbinate surgery is common and has been reported as the eighth most common procedure performed by otolaryngologists [2]. Techniques of turbinate reduction include turbinectomy, submucous turbinectomy, inferior turbinoplasty, cryotherapy, submucous electrosurgery, CO_2 laser turbinoplasty and others. No technique is perfect, and each is associated with known short-term and long-term complications such as bleeding and atrophic rhinitis. The variety of surgical techniques available indicates the lack of consensus on the optimal technique[6].

PATHOPHYSIOLOGY OF TURBINATE ENLARGEMENT: The physics established with Poiseuilles law demonstrates that as little as a 10% increase in the cross sectional area of the nasal passage produces a 21% increase in flow[2]. Decongestion of the nose increases the volume of the nasal cavity by 35% [2]. Turbinectomy is a conventional technique for reducing their size to achieve patent nasal airways in situations where an enlarged turbinate contributes to airway obstruction [2,8]. The inferior turbinate reduction with its success and complication rates along with histopathological causes for its enlargement is described.

OBJECTIVE: The main objectives of this study was

To determine the success rate of inferior tubinectomy for nasal obstruction.

To study complications of inferior turbinectomy.

To study the histopathological changes in the inferior turbinate specimens.

MATERIAL AND METHODS: This is a prospective study of 219 consecutive patients who came with main complaint of the nasal obstruction from January 2010 to October 2011 and underwent inferior turbinectomy for nasal obstruction.

INCLUSION CRITERIA:

The patients with the history of

1. Chronic nasal obstruction due in part to inferior turbinate hypertrophy with or without nasal septal deformity.
2. Failure of directed medical management with continued nasal symptoms.
3. Symptoms of obstructive sleep apnea.
4. Failure of medical treatment of rhinitis medicamentosa.

Participants were immunocompetent, generally healthy individuals. Given that allergy tests were not carried out in all cases, no differentiation was made between patients with or without allergy (ie, between patients with perennial allergic rhinitis and perennial nonallergic or vasomotor rhinitis). Inferior turbinate's graded from I to III. Grade I was defined as mild enlargement with no obvious obstruction. Grade III was complete occlusion of the nasal cavity. The turbinate's in between were graded as II. Grade II and grade III turbinate's were included in the study.

EXCLUSION CRITERIA:

Patients with history of crusting in the nose

Patients with dryness in nose

SURGICAL TECHNIQUE: All patients signed an informed consent form after being informed of the known benefits, risks, complications, and alternatives to surgery. All patients underwent turbinectomy of hypertrophied inferior turbinate under general anesthesia with or without septoplasty. The inferior turbinate's were injected with 8 ml of the 2% lidocaine within 1/100,000 epinephrine (astra zenca) solution in a submucosal plane. Inferior turbinate medialized with freers elevator. The straight artery forceps applied and clamped and crushed. The straight artery removed and the inferior turbinate cut with inferior turbinectomy scissors. The central strategy of turbinate surgical procedures is to reduce the volume of the inferior turbinate particularly in its anterior portion, a component of the internal nasal valve, the most resistive segment of the upper airway. The nasal airflow is to be improved without affecting nasal physiology. Turbinectomy included anterior 2/3rd of turbinate and all the layers including the bone were excised during the procedure. Specimen sent for histopathological examination. Hemostasis was achieved under direct vision with suction electrocautery when necessary. Nasal packing was used for 48 hours. Complications of synechiae, bleeding, crusting, foul odor and nasolacrimal duct injury were recorded.

TISSUE PREPARATION: All samples were separately collected, underwent standard processing, and were investigated microscopically. Each sample had a well-defined conchal form with clear inferior, medial, and lateral portions of soft tissue and bony structure. The samples were fixed in buffered formaldehyde, thereafter decalcified with 0.7 M ethylenediamine tetra-acetic acid (EDTA) and dehydrated with increasing concentrations of ethanol. The sections were embedded in paraffin blocks and cut. Section was stained with hematoxylin-eosin and mounted on a glass slide and studied.
Patients were followed up 1week, 1 month and at 6month post operatively. The patients answered questionnaire consisting of the questions regarding subjective improvement of their symptom of nasal obstruction. Minimum follow-up was 6 months, with a range of 6 to 12 months.

RESULTS: A total of 219 cases (148 male and 71 female patients) between the ages of 19 and 60 years with symptom of nasal obstruction were operated.

DISCUSSION: Prolonged perceived nasal obstruction resulting from inferior turbinate ITH) is a common complaint encountered in the practice of rhinology. Several causes may induce significant hypertrophic mucosal changes of the inferior turbinate (IT), including perennial allergic rhinitis and nonallergic (vasomotor) rhinitis. Our patients are usually offered conservative therapy with antihistamines, systemic decongestants, topical nasal steroid sprays, and mast cell stabilizers. When these means did not provide adequate relief for the patient, surgery was suggested[1,4]. Clearly, the decision for surgery should be based not only on the clinical presentation but also on the histopathologic features of the organ. However, data on the latter are scarce[4]. The present study was undertaken to provide information on effectiveness of inferior turbinate and to have qualitative analysis of the hypertrophic inferior turbinate.

NASAL BLOCK IMPROVEMENT: In our study 203 patients were relieved of nasal obstruction. Our patients had significant symptomatic relief after turbinectomy, and our findings are consistent with other studies reported in the literature. However, concomitant nasal septal surgery with the inferior turbinate surgery in some cases limits our ability to attribute the relief

of nasal obstruction merely to the reduction in the size of the inferior turbinate's. 16 patients were not relieved of nasal blockage subjectively. Endoscopic examination in follow up showed that 4 of these patients had enlarged middle turbinate's.

Although nasal obstruction is commonly associated with an increased nasal airway resistance, the objective measurement of nasal airway resistance does not always correlate with subjective degree of nasal obstruction. Damaged, resected or by-passed trigeminal nerve endings can create the sensation of nasal obstruction despite no objective increase of nasal airway resistance. It is possible they have atrophy of the nerve fibres in the nasal lining subserving the sensation of nasal airflow[2]. We believe that turbinate resection should be performed as conservatively as possible, but are willing to do what is necessary to achieve the desired result.

SYNECHIA: 10 patients developed synechia following surgery. Mucosal tears persisted as synechiae to the septum**.** Delicate septal surgery without any mucosal damage also prevents this complication. The incidence of tears decreased significantly during the course of this study owing to the learning curve of a procedure. All the synechia were released endoscopically and gel foam kept.

BLEEDING: 8 patients had post operative bleeding. One case bleeding occurred after emergence from anesthesia. A branch of the sphenopalatine artery at the level of the choana was identified and bleeding was controlled with suction electrocautery. 5 cases had bleeding soon after removal of pack. We did repacking and removed it later after 2 days and bleeding controlled. One patient had bleeding 4 days later, 2days after removing pack. He had 5 pints of beer in post operative period. In this patient repacking did not stop the bleeding. It stopped only after whole blood transfusion. We believe preservation of some of the bony turbinate especially posteriorly prevents bleeding.

DRYNESS AND CRUSTING: None of the patients had crusting or dryness in the nose before surgery, and but 4 developed these symptoms after surgery. This was managed conservatively with saline nasal douche.

FOUL SMELL: 4 patients developed foul smell in the nose 2 months later surgery. Foul odor is a consequence of scabbing and necrosis that is often seen during the postoperative course of inferior turbinectomy due to excessive drying from loss of turbinate mucosa, destruction of cilia secondary to scarring, atrophy and end stage infection. We managed it with saline douche and glucose and glycerin nasal drops.

NASOLACRIMAL DUCT INJURY: -We did not observe any nasolacrimal duct injury complication

HISTOLOGY: Understanding the histology of the hypertrophic inferior turbinate is imperative for the development and management of inferior turbinate reduction surgery. The normal turbinate consists of an outer layer of respiratory mucosa, a submucosal layer, an inner periosteal layer and the turbinate bone. The submucosal layer is largely venous sinusoids, capable of engorgement with blood, causing swelling of the nasal mucosa[3,5]. The present showed that chronic non specific turbinate hypertrophy is most common cause for turbinate hypertrophy (n=203) followed by chronic allergic turbinate hypertrophy (n=5). A case of

adenoid cystic carcinoma and lepromatous leprosy were also found. This shows that every specimen we remove from the nose should be sent for histopathological examination.

CONCLUSION: The study demonstrates that inferior turbinectomy effective surgery in reliving the nasal obstruction. The complications are common but are minimal and can be effectively managed conservatively. However, the relative short follow-up is insufficient to make definitive statements about the long-term outcome. With results of histopathological analysis we conclude that chronic non specific turbinate hypertrophy is the most common cause of turbinate hypertrophy. Sending the inferior turbinate specimen for histopathological examination is justified seeing the rare diagnosis found in the study. Future well designed studies involving prospective data collection, validated outcome measures, statistical analysis, comparison or control groups, and long-term follow-up are required.

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Table I summarizes the subjective data gathered from the questionnaires and comparison with various authors

	Martinez et al 1983	Moore et al 1985	Percadoni etal 1996	Rakover etal 1996	John 2004	Present series
Nasal block improvement	100%	27%	90%	77%	98%	92%
Synechia				2.6%	3%	5%
Bleeding				2.6%	3%	4%
Dryness and crusting	13%	89%	-	-	8%	2%
Foul smell	0	39%	-	-	0	2%
Nasolacrimal duct injury	-	-	-		0	o

TABLE II showing histopathological diagnosis and no of the patients

Histopathological diagnosis	No of patients
Chronic non specific turbinate hypertrophy	203
Allergic turbinate hypertrophy	5
Chronic inflammatory polyp	2
Allergic polyp	1
Rhinoscleroma	1
Adenoid cystic carcinoma	1
Angioma	1
Pyogenic granuloma	1
Myofibroblastic sarcoma	1
Lepromatous leprosy	1
Rhinolith	1
Capillary hemangioma	1