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The Effect of Septoplasty on Inferior Turbinate Size

ARTICLE INFORMATION

ABSTRACT

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Background: Septal deviation is one of the commonest anatomical deformities of the nasal skeleton, this deviation is usually accompanied by compensatory hypertrophy of the inferior turbinate on the concave side that will accentuate the severity of nasal obstruction.
Objectives: To evaluate the effect of septoplasty on the size of the inferior turbinate in patients with nasal septum deviation.
Methods: This is a prospective study of 25 patients attending the otolaryngological department at Al-Jirahat teaching hospital from September 2011 to November 2013, complaining mainly of nasal obstruction. Otolaryngological examination had shown nasal septum deviation. The cross sectional areas of inferior turbinates were measured with computed tomography preoperatively & one year postoperatively. All the patients were treated by septoplasty alone without inferior turbinate surgery.
Results: The cross-sectional areas of inferior turbinates on the concave side were significantly decreased after 1 year of septoplasty, & significantly increased on the convex side.
Conclusions: Septoplasty alone without turbinate surgery in patients with nasal septum deviation & compensatory inferior turbinate hypertrophy may be effective in reversing the size of inferior turbinate.

Introduction: The nose is bounded from above by the cribriform plate of the ethmoid bone and from below by the hard palate.It extends back to the choana which allow it to communicate with the nasopharynx. The medial wall is formed by the nasal septum which is formed by perpendicular plate of the ethmoid ,the vomer bone and quadrilateral cartilage. The lateral wall of the nose has three bony projections(inferior, middle and superior turbinates).[1]The turbinates consist of bone covered by pseudo stratified columnar ciliated epithelium with goblet cells & an underlying vascular plexus, It is attached laterally to the wall of the nasal cavity. [2]The inferior turbinate is the largest one, these turbinates increase the surface area of the nasal mucosa and help to create turbulence in the air flowing through the nose. This allows the nose to humidify and clean the inhaled air and also to change the air to body temperature.[1] The mucous membrane that covers the turbinates can shrink or swell in response to changes in blood flow. Things that alter blood flow such as lying down, certain foods, allergies, medications, hormones, and infections can affect blood flow and therefore cause swelling of the turbinates. [3]

When the turbinates become enlarged, they block breathing and make you feel congested. The inferior turbinates, the largest pair, are often the source of breathing problems. When the inferior turbinates become enlarged it is referred to as inferior turbinate hypertrophy. [3]

Deviation of the nasal septum is one of the most common causes of chronic nasal obstruction. [4] In patients with a septal deviation it is not uncommon for both sides of the nose to be blocked. A common scenario would be that one side of the nose is blocked from the deviated septum and on the other from permanent inferior turbinate hypertrophy. [3]

Nasal septum deviation commonly causes contralateral compensatory inferior turbinate hypertrophy. [5,6,7,8] Mink described the nasal valve in 1903. The nasal valve is formed medially by the septum and laterally by the caudal edge of the upper lateral cartilage and it accounts for approximately 50% of total upper airway resistance. The anterior tip of the inferior turbinate is found in the nasal valve region, and hypertrophy of this structure can cause exponential increases in airway resistance. [9]

Diagnosis of turbinate hypertrophy can usually be made after taking history and performing an

examination and using an endoscope . A CT scan will also show inferior turbinate hypertrophy.[9]

Methods: This is a prospective study of 25 patients attending out patient clinic, department of otolaryngology at Al-Jerahat teaching hospital during the period from September 2011 to November 2013 with chief compliant of nasal obstruction. All the patients included in this study had not received any medical treatment at lest 2 weeks before CT scan. Complete history including age, sex, chief compliant & its duration, headache, post nasal drip, anterior rhinorhea, & history of recent upper respiratory tract infection was taken. Complete ear, nose and throat examination including rigid nasal endoscopy was done, all the patients included in this study were complaining mainly of nasal obstruction, & on examination they had septal deviation. All the patient were send to CT scan of the nose & paranasal sinuses (axial & coronal sections, a section thickness of 5mm) pre operatively, septoplasty was done without turbinate surgery & CT scan was repeated 1 year post operatively. Measurement of the dimensions of the inferior turbinate were done at the anterior, middle, & posterior thirds of the inferior turbinate in coronal sections. For standardization, anterior measurement was performed on the first image in which the entire inferior turbinate bone could be visualized . The middle measurement was performed on the section in which the uncinate process & maxillary sinus ostium were visualized . The posterior measurement was performed on the last image in which the entire inferior turbinate bone could be visualized. The outline of the inferior turbinate was measured using the soft tissue window (width, 150 HU; level, 4 HU), & the corresponding area was measured. The cross-sectional area of the
Entire inferior turbinate on pre operative CT scan images were measured & presented as means (SDs), the same measurements were done on post operative CT scan images & again presented as means. Comparison between pre operative & post operative means was done. Its statistical study was done by using Wilcoxon signed rank test. P value less than 0.05 was considered statistically significant.

Results:
The patients included in this study were 25 patients with age range from 18 to 37 years (mean age =24.88 years), 18 patients (72%) were males & 7 patients (28%) were females. Septal deviation was to the left side in 14 patients (56%) & to the right side in 11 patients (44%). Table 1 shows the clinical characteristics of the study patients.
Septoplasty significantly decreased the mean dimension of the entire inferior turbinate by 18.87 mm2 (P value less than 0.05) on the concave side (Table 2).On the convex side; septoplasty significantly increased the mean dimensions of the entire inferior turbinate by - 14.37 mm2 (P value less than 0.05), (Table 3).

Discussion: One of the commonest diseases encountered in otolaryngological practice is nasal septum deviation. Long standing septal deviation usually results in compensatory inferior turbinate hypertrophy on the concave side. Gray LP [10] mentioned that as much as 75%-80% of population shows some type of anatomical deformity of the nose, usually a deviated nasal septum. This deviation is commonly associated with inferior turbinate hypertrophy, which occupies much of the contralateral nasal cavity.[11,12,13] .Septal deviation is one of common deformities of the nose, one of the commonest causes of inferior turbinate hypertrophy is compensatory hypertrophy due to long duration nasal septal deviation[14,15].
Fairbanks & Kaliner described that in diseases causing compensatory inferior turbinate hypertrophy,there are both mucosal and bony enlargement. [16] Hypertrophy of inferior turbinate usually results in increased nasal resistance & contributes largely to symptoms of nasal obstruction [11,17].
There is no agreement among surgeons about the surgical procedures used to treat patients presented with septal deviation & compensatory inferior turbinate hypertrophy on the concave side. Some surgeons advice to do septoplasty alone, hoping that turbinate hypertrophy will be improved in response to correction of septal deviation, thus avoid turbinate surgery with its complications including primary hemorrhage, atrophic rhinitis & intranasal adhesions. Further, avoid disturbances in normal nasal airflow which occur as a result of turbinate surgery.
This study shows that septoplasty alone without inferior turbinate surgery is effective in decreasing the size of inferior turbinate which is very useful to avoid the morbidity of turbinate surgery.
Uzun L et al [11,12,13] stated that turbinate surgery is routinely performed in association with septoplasty in patients with nasal obstruction & septum deviation.
The literatures report various surgical techniques for treatment of turbinate hypertrophy including total or partial turbinectomy, turbinoplasty, submucous resection, cryosurgery, laser- assisted turbinectomy, injection of corticosteroids or sclerogenic substances , submucosal diathermy , & radiofrequency reduction. [18, 19]
In spite of this large number of surgical techniques, indications for turbinectomy remain unclear. [16, 20]
Some authors advocate inferior turbinate sacrifice as a routine treatment of nasal obstruction; others advice against surgical reduction of inferior turbinate because of the risk of complications. [21]
The treatment of inferior turbinate enlargement is a matter of some controversy. [22,23,24,25,26,27]
However, the present indications for turbinate surgery are based on empirical criteria & have

resulted in extensive, unnecessary, or insufficient surgery without objective evaluation. [28,29,30]

Dong Hyun Kim, MD; et al had shown that after septoplasty, inferior turbinate hypertrophy may reverse without any turbinate surgery. [31]

Beom etal found that turbinate surgery in association with septoplasty is necessary for treatment of those patients with nasal septal deviation & compensatory hypertrophy of the contralateral inferior turbinate. [32]

TABLE 1: Clinical Characteristics of the Study Patients

Number	Age (years)	Sex	Chief complaint	Deviated shape	Deviated side
1-	22	Male	Nasal obstruction	C	Left
2-	23	Male	Nasal obstruction	C	Left
3-	30	Male	Nasal obstruction	C	Left
4-	18	female	Nasal obstruction	C	Right
5-	22	Male	Nasal obstruction	C	Right
6-	21	Male	Nasal obstruction	C	Left
7-	28	Male	Nasal obstruction	C	Left
8-	25	female	Nasal obstruction	C	Left
9-	22	Male	Nasal obstruction	C	Right
10-	19	Male	Nasal obstruction	C	Left
11-	20	Male	Nasal obstruction	C	Right
12-	24	Male	Nasal obstruction	C	Left
13-	21	female	Nasal obstruction	C	Right
14-	32	Male	Nasal obstruction	C	Left
15-	34	Male	Nasal obstruction	C	Left
16-	25	Male	Nasal obstruction	C	Left
17-	25	female	Nasal obstruction	C	Left
18-	30	Male	Nasal obstruction	C	Right
19-	19	female	Nasal obstruction	C	Right
20-	20	female	Nasal obstruction	C	Right
21-	23	Male	Nasal obstruction	C	Left
22-	37	Male	Nasal obstruction	C	Left
23-	26	Male	Nasal obstruction	C	Right
24-	27	Male	Nasal obstruction	C	Right
25-	23	female	Nasal obstruction	C	Right

Table 2: Mean dimensions of the inferior turbinates before & after septoplasty on the concave side.

Area	Preoperative dimension, mean (mm2)	Post operative dimension , mean (mm2)	Paired Difference Mean
Anterior third (n=25)	147.4	126.5	19.49
Middle third (n=25)	162.7	146.3	14.57
Posterior third (n=25)	157.6	138.3	17.83
Total (n=75)	157.66	138.66	18.87

n = (number)

Table 3: Mean dimensions of the inferior turbinates before & after septoplasty on the convex side.

Area	Preoperative dimension, mean (mm2)	Post operative dimension , mean (mm2)	Paired Difference Mean
Anterior third (n=25)	89.5	103.9	-13.43
Middle third (n=25)	95.3	112.2	-15.67
Posterior third (n=25)	105.1	118.9	-13.27
Total (n=75)	97.3	111.67	-14.37

n = (number)

Conclusions: Inferior turbinate hypertrophy on the concave side of septal deviation may be reversed after septoplasty alone without turbinate surgery, accordingly unnecessary turbinate surgery with its complications e.g hemorrhage, intranasal adhesion, atrophic rhinitis …etc may be avoided.

References:

1- ANIL K. Lalwani, MD.Current Diagnosis & Treatment in Otolaryngology - Head & Neck Surgery. Introduction, anatomy of nose & sinuses. 2012;p.3

2- Michael Gleeson, George G Browning, Martin J Burton, et al. Anatomy of the nose and Paranasal sinuses. Scott-Brown's Otorhinolaryngology, Head and Neck Surgery . 2008 vol.2 (1322-1341)

3- WWW.texassinuscenter.com.

4- Neskey D, Eloy JA, Casiano RR. Nasal, septal, and turbinate
anatomy and embryology. Otolaryngol Clin North Am .2009;
42:193-205

5- A Y Korkut , F Islim, S Gulseven Ciftci, et al : Evaluation of inferior turbinate hypertrophy in patients with congenital and traumatic nasal septum deviation. Journal of Laryngology and Otology. (2012), 126, 784-788. (ivestil)

6- Schmidt J, Zalewski P, Olszewski J, et al: Histopathological verifi cation of clinical indications to partial inferior turbinectomy.Rhinology. 2001; 39:147-150.

7- Berger G, Hammel I, Berger R, et al :Histopathology of the inferior turbinate with compensartory hypertrophy in patients with deviated nasal septum. Laryngoscope. 2000; 110: 2100-2105.

8- Nunez DA, Bradley PJ: A randomised clinical trial of turbinectomy for compensatory turbinate hypertrophy in patients with anterior septal deviations. Clin Otolaryngol. 2000; 25: 495-498.

9-emedicine.medscape.com/article/1292809-overview#a0103.

10- Gray LP. Deviated nasal septum: incidence and etiology. Ann Otol Rhinol Laryngol Suppl.1978;87 (3, pt 3) ((suppl 50)) 3- 20

11- Egeli, Edemirci , Lyazycy, et al: Evaluation of the inferior turbinate in patients with deviated nasal septum by using computed tomography. Laryngoscope. 2004;114 (1) 113- 117

12- Courtiss EH, Goldwyn RM, O'Brien JJ. Resection of obstructing
inferior nasal turbinates. Plast Reconstr Surg .1978;62: 249-57

13- Uzun, Lsavranlar, ABeder LB et al. Enlargement of the bone component in different parts of compensatorily hypertrophied inferior turbinate. Am J Rhinol .2004;18 (6) 405- 410

14- Lai VW, Corey JP. The objective assessment of nasal patency.Ear Nose Throat J .1993;72:395-6, 399-400

15 - Li KK, Powell NB, Riley RW, et al: Radiofrequency volumetric reduction of the palate: an extended follow-up study. Otolaryngol Head Neck Surg .2000;122: 410-14

16- Fai banks DNF, Kaliner M. Nonallergic rhinitis and infection.In: Cummings CW, Fredrickson JM, Harker AL, Krause CJ,Richardson MA, Schuller DE, eds. Otolaryngology Head Neck Surgery, 3rd edn. St Louis: Mosby. 1998;2:910-20

r17- Berger G, Gass S, Ophir D. The histopathology of the hypertrophic inferior turbinate. Arch Otolaryngol Head Neck Surg .2006;132:588-94

18- Gupta A, Mercurio E, Bielamowicz S. Endoscopic inferior turbinate reduction: an outcomes analysis. Laryngoscope. 2001; 111:1957-9

19- Rakover Y, Rosen G. A comparison of partial inferior turbinectomy and cryosurgery for hypertrophic inferior turbinates. J Laryngol Otol .1996;110:732-5

20- Jun BC, Kim SW, Kim SW,et al: Is turbinate surgery necessary when performing a septoplasty? Eur Arch Otorhinolaryngol .2009;266:975-80

21- Daniel G.Becker.Septoplasty and Turbinate surgery.Aesthetic Surgery Journal . 2003;23:393-403

22- Cook PR, Begegni A, Bryant C,et al: Effect of partial middle turbinectomy on nasal airflow and resistance. Otolaryngol Head Neck Surg. 1995;113:413-419.

23- Utley DS, Good RL, Hakim I. Radiofrequency energy tissue ablation for the treatment of nasal obstruction secondary to turbinate hypertrophy. Laryngoscope. 1999;109:683-686.

24- Smith TL, Correa AJ, Kuo T, et al. Radiofrequency tissue ablation of the inferior turbinates using a thermocouple feedback electrode. Laryngoscope .1999;109:1760-1765.

25- Jafek BW, Dodson BT. Nasal obstruction. In: Bailey B, ed. Head & neck surgery: otolaryngology. 2nd ed. Philadelphia, PA: Lippincott- Raven.2000;371-397.

26- Lee K, Hwang P, Kingdom. Operative techniques. Otolaryngol Head Neck Surg. 2001;12:107-111.

27- Jackson LE, Koch RJ. Controversy in the management of inferior turbinate hypertrophy: a comprehensive review. Plast Reconstr Surg. 1999;103:300-312.

28-Moore EJKern EB Atrophic rhinitis: a review of 242 cases Am J Rhinol. 2001;15 (6) 355- 361

29- Hilberg, OGrymer, LFPederson,et al: Turbinate hypertrophy. Arch Otolaryngol Head Neck Surg .1990;116 (3) 283- 289

30- Grymer, LFIllum, PHilberg O , Septoplasty and compensatory inferior turbinate hypertrophy: a randomized study evaluated by acoustic rhinometry. J Laryngol Otol.1993;107 (5) 413- 417

31- Dong Hyun Kim, MD; Hun Yipark, MD; Ho Sung Kim, MD; etal.Effect of Septoplasty on inferior turbinate hypertrophy. Arch otolaryngol Head Neck Surgery. Apr 2008 vol.134(No.4)(ivestil)

32- Beom Cho Jun, Sung Won Kim, Soo Whan Kim; etal. Is turbinate surgery necessary when performing a septoplasty. European Archives of Oto-Rhino-Laryngology. July 2009, volume 266,Issue 7, pp 975-980.