

Study of Different Surgical Techniques in the Treatment of Hypertrophied Inferior Turbinate

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Abstract: Hypertrophied inferior turbinate is a common cause of nasal obstruction. It occurs due to a large number of common conditions like allergic rhinitis, intrinsic rhinitis, vasomotor rhinitis, deviated nasal septum etc. Surgical management is opted when it does not respond to medical treatment. There are many surgical techniques to relieve the nasal obstruction caused by the hypertrophied inferior turbinate. In this study three different surgical techniques were compared:

1. Sub mucous resection of the inferior turbinate
2. Partial inferior turbinectomy
3. Degloving of inferior turbinate

Aim of Study: to evaluate the efficacy of these surgical techniques in relieving the obstruction and their complication rate.

The study found best early results in relieving the obstruction by the partial inferior turbinectomy. The submucous resection of inferior turbinate and the degloving technique matched the results after 16 weeks post-operatively.

At the end of the follow up period of 16 weeks post operatively the degloving technique was found to be the most efficacious, also the complication rate was the lowest in it.

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I. Introduction

Enlarged inferior turbinate is one of the commonest causes of nasal obstruction seen in cases of allergic rhinitis, intrinsic rhinitis, deviated nasal septum etc. In most of the patients the enlargement is due to the swelling of the sub mucosa, which occurs due to dilatation of the sub mucosal venous sinusoids (1). Inflammatory nasal conditions may cause turbinate hypertrophy as a result of collagen deposition and mucous gland hyperplasia (2). The swelling at the level of the nasal valve and inferior part of the nose is the main factor contributing to obstruction both at the level of nasal valve and the inferior part of the nose (3). In DNS there is compensatory hypertrophy of the inferior turbinate on the concave side of deviation.

A patient complaining of nasal obstruction due to enlarged inferior turbinate should be assessed for sensitivity to allergens. The first line of treatment is usually systemic antihistamines and topical steroid nasal sprays. Inferior turbinate surgery offers benefit and improves nasal obstruction in patients with hypertrophic inferior turbinate refractory to medical treatment (4). There are many surgical approaches to reduce the obstruction, the commonest being partial inferior turbinectomy, submucous resection of inferior turbinate, radiofrequency ablation, electrocautery, lateral out fracture and degloving of inferior turbinate.

The incidence of complications has been reported to be different in these surgical procedures. Early complications seen are synechiae, infection, crusting and late complications like atrophic rhinitis may occur.

II. Aim And Objective

1. To compare the relative efficacy of three different surgical techniques to reduce the size of inferior turbinate to relieve the obstruction.
2. To observe the complications of each of these procedures.

III. Material And Methods

A prospective study was conducted in the ENT department of a tertiary hospital of Punjab in a period of one year from April 2017 to April 2018.

The sample size was 3 groups of 22 patients each.

Patients with Inferior turbinate hypertrophy complained of unilateral or bilateral hypertrophy. Clinical diagnosis was made on the basis of History and complete ENT examination. The nasal patency was measured by the plate method (5).

Routine investigations and x ray PNS (waters view) were done.

Brief surgical technique:

In submucosal resection the inferior turbinate bone was removed after lifting the mucus membrane and the muco periosteum (6).

In partial inferior turbinectomy, the obstructing end of the inferior turbinate and the covering mucous membrane was removed.

In degloving technique the hypertrophied turbinate tissue along the whole length of the inferior turbinate was removed leaving the bone intact (7).

The nasal patency was evaluated by plate method (5) at follow ups of 4, 8, 12 and 16 weeks post operatively.

The fogged area on the plate was calculated by the formula

$$S = \pi ab \quad a = 1/2 \text{ vertical diameter of fogged area}$$

$$b = 1/2 \text{ transverse diameter of fogged area} \quad S_x = \text{fogged area of both sides}$$

$$\% \text{ age improvement} = \frac{S_n - S_x}{S_x} \times 100$$

S_n = Total fogged area for both sides at each follow up i.e. 4, 8, 12, 16 weeks post operatively.

IV. Observations

66 patients were randomly selected with unilateral / bilateral inferior turbinate hypertrophy.

The majority of the patients were in the age group of 21 to 30 years (42.42%) , 24.24% were in the age group of 11 to 20 years, 18.18% were 31 to 40 years, 13.63% were above the age of 40 years and 1.51% were below the age of 10 years.

Incidence was higher in males (68%) as compared to females (31.82%).

Table 1: Presenting Symptoms

Symptoms	No. Of cases	% age
Nasal		
1. Nasal Obstruction	66	100
unilateral	40	60.60
bilateral	26	39.39
2. Nasal discharge	40	60.60
3. Post nasal discharge	26	39.39
4. Sneezing	20	30.30
5. Hyposmia	6	9.09
6. Irritation in nose	10	15.15
Ear		
1. Blockage of ears	4	6.06
2. Ear discharge	3	4.54
Throat		
Sore throat	5	7.57
Miscellaneous		
Headache	15	22.72

Table 2: Presenting Signs

Signs	No. Of cases	%age
Nasal		
Anterior rhinoscopy		
1. Inferior turbinate hypertrophy	66	100
Unilateral	40	60.60
Bilateral	26	39.39
2. Nasal Discharge	40	60.60
watery	18	27.27
mucoid	9	13.63
mucopurulent	13	19.70
Ears		
1. Ear discharge	3	4.54
Unilateral	2	3.03
Bilateral	1	1.51
2. Tympanic membrane		
Retracted	4	6.06
Perforation	3	4.54
Throat		
1. Congested anterior pillar	5	7.57
2. Tonsillar hypertrophy	4	6.06
3. Granular posterior pharyngeal	8	12.12

wall		
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The patients were randomly divided into three groups of 22 patients each and underwent the following surgical procedures:

Group 1: Submucous resection of inferior turbinate

Group 2: Partial inferior Turbinectomy

Group 3: Degloving of inferior turbinate

Table 3: Pre operative measurement of Nasal Patency

Total area of vapour condensation in Sq.Cm	Group 1		Group2		Group 3	
	No of cases	%age	No. Of cases	%age	No. Of Cases	%age
0-5	5	22.72	4	18.18	2	9.09
5.1-10	12	54.54	8	36.36	14	63.64
10.1-15	4	18.18	10	45.45	6	27.27
15.1-20	1	4.54	-	-	-	-
20.1-25	-	-	-	-	-	-

Table 4: Post operative measurement of nasal patency at 4 weeks, 8 weeks, 12 weeks and 16 weeks

Total are vapour Condensation in sq. Cm	Group 1 No of cases (%age)			
	4 wks (S ₁)	8 wks (S ₂)	12 wks (S ₃)	16 wks (S ₄)
0-5	-	-	-	-
5.1- 10	16(72%)	11(50%)	10(45.45%)	8(36.36%)
10.1 -15	3(13.63%)	7(31.81%)	8(36.36%)	5(22.72%)
15.1 -20	3(13.63%)	3(13.63%)	2(9.09%)	7(31.81%)
20.1-25	-	1(4.54%)	2(9.09%)	2(9.09%)

Total area of vapour Condensation in sq. Cm	Group 2 No of cases (%age)			
	4 wks (S ₁)	8 wks (S ₂)	12 wks (S ₃)	16 wks (S ₄)
0-5	-	-	-	-
5.1- 10	4(18.18%)	4(18.18%)	5(22.72%)	6(27.27%)
10.1 -15	6(27.27%)	7(31.81%)	7(31.81%)	6(27.27%)
15.1 -20	10(45.45%)	9(40.9%)	8(36.36%)	8(36.36%)
20.1-25	2(9.09%)	2(9.09%)	2(9.09%)	2(9.09%)

Total are vapour Condensation in sq. Cm	Group 3 No of cases (%age)			
	4 wks (S ₁)	8 wks (S ₂)	12 wks (S ₃)	16 wks (S ₄)
0-5	-	-	-	-
5.1- 10	9(40.9%)	7 (31.81%)	7(31.81%)	3(13.63%)
10.1 -15	8(36.36%)	9(40.9%)	6(27.27%)	5(22.72%)
15.1 -20	3(13.63%)	4(18.18%)	6(27.27%)	10(45.45%)
20.1-25	2(9.09%)	2(9.09%)	3(13.63%)	4(18.18%)

Table 5: Mean %age improvement in area of vapour condensation at each follow up

Post operative Follow up	Mean %age improvement in area of vapour Condensation		
	Group1	Group2	Group3
4 weeks	17.80	52.02	33.39
8 weeks	33.36	69.90	68.80
12 weeks	37.86	44.27	47.98
16 weeks	53.42	44.26	68.80

In Group 1 (the Sub mucous resection of inferior turbinate) the %age improvement increased gradually post operatively, the response at 4 weeks was average, which improved gradually over further follow up.

In Group 2 (the partial inferior turbinectomy) the patients had improved fairly well at 4 weeks and more improvement was seen in the next follow up, but at 14 and 16 weeks there was a decrease probably due to scarring.

In Group 3 (the degloving technique) the patients had good response at 4 weeks which improved at each follow up, and surpassed the results of other two procedures by 16 weeks.

Table 6: Incidence of complications

Complications	Group 1	Group 2	Group 3
Haemorrhage			
Intraoperative	3	2	1
Post operative	1	1	-
Crusting	1	-	-
Synechia	1	2	-

In all the cases of haemorrhage, tight anterior nasal packing was sufficient to control the bleeding, the packs were removed after 48 hours.

The synechia were excised and gel foam was kept.

Only one patient had minimal crusting at 16 weeks follow up.

V. Discussion

Nasal obstruction is one of the most common chronic presenting symptom encountered by otolaryngologists (8) Most patients with nasal obstruction have either a septal deviation or turbinate hypertrophy due to vasomotor, allergic or perennial rhinitis (9), (10).

Many surgical procedures have been described over time to reduce the enlarged inferior turbinate including cryo turbinectomy (11), laser turbinectomy (10), radiofrequency coblation techniques (12) and degloving of the inferior turbinate (7).

In the present study, three surgical techniques i.e. sub mucous resection of inferior turbinate, partial inferior turbinectomy and degloving of the inferior turbinate was evaluated for efficacy and complications.

All the patients complained of nasal obstruction, nasal discharge was present in 40 (60.60%) cases, out of which 20 (30%) complained of sneezing also. These were the patients suffering from allergic rhinitis.

26 (39.39%) cases complained of post nasal discharge, 10 (15%) cases had irritation in nose and 6(9.09%) patients complained of hyposmia.

3 (4.54%) patients had ear discharge and 4 (6.06%) complained of blockage of ears, this could be due to the Eustachian tube dysfunction.

On Nasal examination, 40 (60%) patients had unilateral hypertrophy of inferior turbinate and 26(39.4%) had bilateral hypertrophy. Nasal discharge was seen in 40 (60%) cases, primarily watery in 18(27.2%), mucoid in 9(13.6%) and mucopurulent in 13(19.7%) cases.

Ear examination revealed ear discharge in 3 (4.54%) cases.

On Throat examination, there was congestion of anterior pillars in 5(7.57%) cases, tonsillar hypertrophy in 4 (6.06%) and granular posterior pharyngeal wall in 8(12.12%) cases.

After detailed examination, nose was decongested with 4% xylocaine with 1:1000 adrenaline. The patients who did not show any decongestion of inferior turbinates were taken up for surgery, as one can predict the outcome of surgery to some extent. The nasal patency was measured by plate method (5) preoperatively, the area of vapour condensation was measured, the patients selected were randomly divided into 3 groups of 22each. These were subjected to submucous resection of inferior turbinate, partial inferior turbinectomy and degloving of inferior turbinate hypertrophy.

The area of vapour condensation was measured post operatively at follow ups of 4 weeks, 8 weeks, 12 weeks and 16 weeks. Percentage improvement was also calculated at these follow ups.

In group 1, the response at 4 weeks was average 17.80%, which improved up to 53.42 % at 16 weeks, the %age improvement increased gradually post operatively with decrease in post operative edema and progressive scarification.

In group 2, the patients had improved fairly well at first follow up (52.02%) and gradually improved in the next follow up, there was a decrease in % improvement at 14 and16 weeks, probably due to scarring or redundant mucosal tags and synechia.

In group 3, the patients had good response at 4 weeks 33.39% and were 68.80 % at 16 weeks.

Regarding complications, intraoperative haemorrhage was seen in 3 cases in group 1, 2 in group 2 and 1 in group 3. Post operative bleeding was seen in one case each in group 1 and 2.

Synechia formation was present in 1 patient in group 1 and 2 in group 2, their formation may be due to redundant mucosal tags.

Crusting was seen in one patient in group 1 at the end of 16 weeks.

No case of atrophic rhinitis was seen.

Table 7: Comparison of various studies with present study for the relief of nasal obstruction.

Surgical technique	Various comparative studies	Improvement of nasal patency (%age of cases)
Group1	Rakover and Rosen(1996)	77%
	Serrano et al (1996)	81.7%
	Present study	80%
Group 2	Riviere et al (1989)	82%
	Present study	80%
Group 3	Chevretton et al (2003)	89.5%
	Present study	86%

VI. Conclusion

In this study, best initial results are seen with partial inferior turbinectomy, submucous resection of inferior turbinate and degloving of the inferior turbinate improve upon the results of partial inferior turbinectomy with passage of time.

Degloving technique was the most well tolerated, had good nasal patency and had least complication rate, hence it was found to be the best surgical procedure for the reduction of hypertrophied inferior turbinate.

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