

## A STUDY OF COMPARISON BETWEEN PARTIAL INFERIOR TURBINECTOMY AND SUBMUCOSAL DIATHERMY IN THE MANAGEMENT OF INFERIOR TURBINATE HYPERTROPHY

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### ABSTRACT

**Introduction:** Inferior turbinate hypertrophy is one of the most common cause for Chronic nasal obstruction, which sometimes do not respond to medical management and needs surgical correction. The basic principle of surgical correction is to reduce the symptoms and preserve the functional anatomy of nasal airway.

**Aim & objectives:** To compare the efficacy of partial inferior turbinectomy (PIT) and submucosal diathermy (SMD) in terms of intra operative and post-operative bleeding, healing, post-operative nasal patency improvement

**Patients and Methods:** Thirty patients with age group between 18-50 years and both sexes were involved in this study. They were divided into two groups (Group I & II), each group included 15 patients. Group I underwent Partial Inferior Turbinectomy and group II underwent Sub Mucosal Diathermy. Patients were followed up and assessed on Day 2, Day 7 and 1 month post operatively.

**Results and conclusion:** The study showed that Partial inferior turbinectomy is better than Sub mucosal diathermy in terms of healing, post-operative improvement in nasal patency on a long term basis although there were some short term complications.

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### INTRODUCTION

Inferior turbinate regulates nasal airflow and thus normal respiration<sup>5</sup>. Inferior turbinate hypertrophy is one of the most common cause for chronic nasal obstruction as there is an exponential increase in airway resistance<sup>7</sup>. The most common causes for inferior turbinate hypertrophy are allergic rhinitis, vasomotor rhinitis, idiopathic rhinitis and compensatory hypertrophy in deviated nasal septum<sup>1,5</sup>.

Enlargement of the inferior turbinate is mainly due to the sub-mucosal swelling and rarely due to bony enlargement itself<sup>1,7</sup>. Inferior turbinate Hypertrophy is caused by dilation of sub-mucosal venous sinusoids which usually responds to medical management<sup>7</sup> such as topical corticosteroids, antihistamines, antibiotics and immunotherapy. But sometimes patients with inferior turbinate enlargement become unresponsive to medical treatment because of sub-mucosal fibrosis<sup>1</sup>. These cases definitely require surgical correction for symptomatic improvement.

The basic principle of surgical management in Hypertrophied turbinates is to reduce the symptoms and preserve the anatomy of nasal airway<sup>1</sup>. Poiseuille's Law states that the Resistance to airflow along a pipe is inversely proportional to the fourth power of the Radius of pipe. A small change in the inferior

turbinate size will dramatically affect nasal airflow<sup>6,9</sup>. This is the physiological basis for Inferior turbinate reduction.

There are many procedures like linear cautery, submucosal diathermy, cryosurgery, antroconchopexy, submucosal resection, radiofrequency ablation, lateral outfracturing, partial turbinectomy, total inferior turbinectomy, mucosal trimming, microdebriding, coblation, laser turbinectomy, degloving & submucosal stroma debriding etc<sup>6</sup>. But none of them are considered as gold standard. The most commonly performed techniques are Submucosal diathermy and Partial inferior turbinectomy.

### MATERIALS AND METHODS

This is a prospective comparative study of 30 patients, who attended the Department of ENT at Rajah Muthiah Medical College Hospital with Symptomatic Inferior turbinate hypertrophy and did not respond to medical management were selected based on inclusion and exclusion criteria. Patients between the age group of 18 to 50 years, both sexes, patients with nasal obstruction due to inferior turbinate hypertrophy because of allergic rhinitis, vasomotor rhinitis, compensatory hypertrophy in minimally deviated nasal septum, unresponsive to medical management, and all grade 3 and symptomatic grade 2 turbinate enlargement were included and patients with abnormal coagulation profile, haemoglobin less than 10mg/dl,

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history of nasal surgeries, patients with nasal polyposis, obstruction of postnasal space, gross septal deviation, patient not willing for surgery were excluded from this study.

The study was conducted over a period of 2 years between October 2016 to August 2018 to evaluate the efficacy and safety of partial inferior turbinectomy and submucosal diathermy in terms of intra operative & post-operative bleeding, healing and nasal patency improvement. Patients were divided into two groups, Group-I and Group-II by random allocation method. Each group had 15 patients, informed consent was taken from each patient. Group-I underwent Partial inferior Turbinectomy and Group-II underwent Submucosal Diathermy.

Detailed history and examination of ear, nose, throat and head and neck, general examination, anterior rhinoscopy and diagnostic nasal endoscopy was done in all patients, and the turbinate enlargement graded according to Friedman classification<sup>2,5,8</sup>.

Grade1- Mild Enlargement with no obvious obstruction  
 Grade2-Moderate sized turbinate not touching the septum  
 Grade3-Large turbinates touching septum and obstruct the nasal passage fully.

Under General Anesthesia, patient kept in supine position, the nasal cavities were packed with cottonoids of oxymetazoline nasal drops and 4% lignocaine for both the surgical procedures<sup>2</sup>.

For partial inferior turbinectomy, turbinate were infiltrated with 2% lignocaine and 1:1,00,000 adrenaline till posterior end. By using turbinectomy scissors, medial one third of anterior end of interior turbinate was resected without any trauma to bony concha<sup>2</sup>.

For submucosal diathermy, diathermic cautery was performed using an insulated needle electrode. The needle was introduced into the sub-mucosa till the posterior end of the turbinate. The mono-polar power diathermy was then turned on whilst the needle was slowly withdrawn and cauterized at a coagulation current of 70W. If the diathermy current is sufficient, the mucosa of the turbinate blanches and shrinks<sup>1</sup>.

Intra operatively, the amount of blood loss during each procedure were noted. Anterior nasal packing was done with Merocel following each procedure and the pack removal was done after 48 hours. Post operatively parenteral antibiotics, analgesics, nasal drops were given for 1 week, Patients were discharged on day 7 with advice of corticosteroid nasal spray along with saline nasal douching for 2- 3weeks. Patients were assessed intra-operatively, on post-operative day 2, day 7 and 30 days after surgery

Tissue healing was assessed according to endoscopic scoring of Lund and Kennedy<sup>1</sup>

**Good healing:** Rapid mucosal re-epithelisation, minimal crustations, no nasal synechiae, patient feel relief of nasal symptoms.

**Moderate healing:** Mucosal re-epithelisation, mild to moderate crustations, with nasal synechiae, patient feel relief of nasal symptoms.

**Poor healing:** Delayed mucosal re-epithelisation, severe crustations and nasal synechiae, persistent inflammations and infection and patient doesn't feel relief of nasal symptoms.

Nasal patency improvement was analysed based VAS (Visual Analogue Scale) system by asking the patients to score relief of nasal obstruction post-operatively from 1-10 and was categorized as, No improvement: VAS (1-3). Partial improvement: VAS (4-7). Complete improvement: VAS (8-10)<sup>1</sup>.

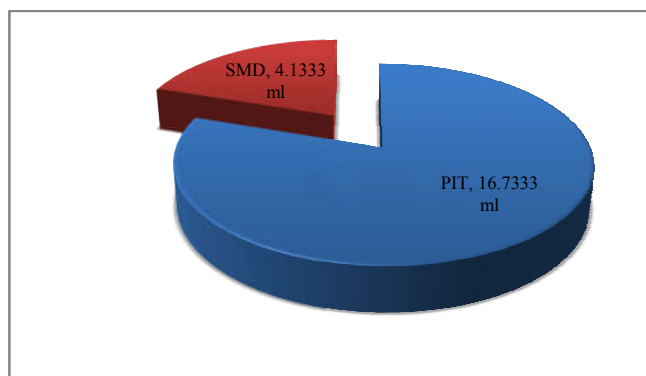
The assessed intra operative, post-operative symptoms and nasal patency improvement between the two procedures were compared and statistically analysed using SPSS 20.0 Software. Chi-square test was used to assess significance and it was set at 5% level of significance ( $P < 0.05$ )<sup>10</sup>.

**RESULTS**

**Table 1** Shows the intra- op Bleeding (ml)

Group	N	Mean	Std. Deviation	t value	P value
PIT	15	16.7333	2.93906	10.682	0.000
SMD	15	4.1333	3.49728		

The average blood loss during partial inferior turbinectomy (16.73ml) was four times higher than during submucosal diathermy (4.13). These results showed a statically significant difference ( $p=0.000$ ).



**Figure 1** Pie diagram showing the intra operative bleeding during each procedure(ml)

**Table 2** Shows the post-operative Bleeding (ml) on Day 2

Bleeding (ml)	Group				Total		P value
	PIT		SMD		N	%	
None	0	.0	8	53.3	8	26.7	0.002
Mild	12	80.0	7	46.7	19	63.3	
Moderate	3	20.0	0	.0	3	10.0	
Total	15	100.0	15	100.0	30	100.0	

All 15 patients who underwent partial inferior turbinectomy had mild (12(80%)) to moderate (3(20%)) bleeding on day 2 whereas in patients who underwent submucosal diathermy, 8 patients (53.3%) did not have any bleeding and 7 patients (46.7%) encountered mild bleeding. This difference in post-operative bleeding between these two groups was found to be statistically very significant ( $p=0.002$ )

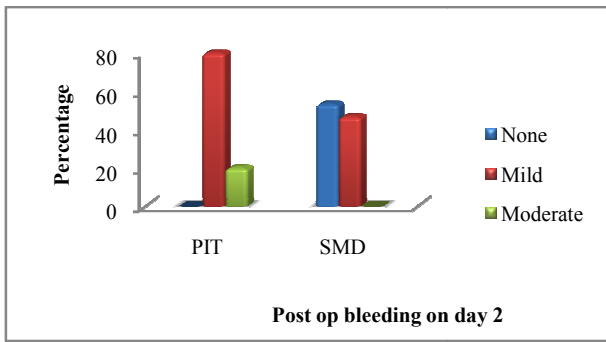


Fig 2 Bar chart showing the post operative bleeding on day 2 (ml)

Table 3 Healing on day 30

Healing	Group				Total		P value
	PIT		SMD		N	%	
Good	15	100.0	10	66.7	25	83.3	0.014
Moderate	0	.0	5	33.3	5	16.7	
Poor	0	0	0	0	0	0	
Total	15	100.0	15	100.0	30	100.0	

All 15 patients who underwent partial inferior turbinectomy showed good healing on day 30 compared to patients who underwent submucosal diathermy where only 10 patients (66.7%) showed good healing (P=0.014)

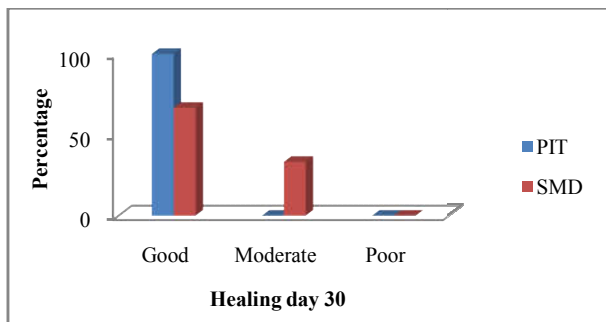


Fig 3 Bar diagram showing the healing on day 30

Table 4 Nasal patency improvement on day 30

Nasal patency improvement (VAS)	Group				Total		P value
	PIT		SMD		N	%	
Complete	13	86.7	8	53.3	21	70.0	0.046
Partial	2	13.3	7	46.7	9	30.0	
No	0	0	0	0	0	0	
Total	15	100.0	15	100.0	30	100.0	

86.7% of patients who underwent partial inferior turbinectomy showed complete improvement in nasal patency at the end of 30 days compared to patients who underwent submucosal diathermy where only 53.3% of patients showed complete improvement and this results were statistically significant between the two groups (P=0.046)

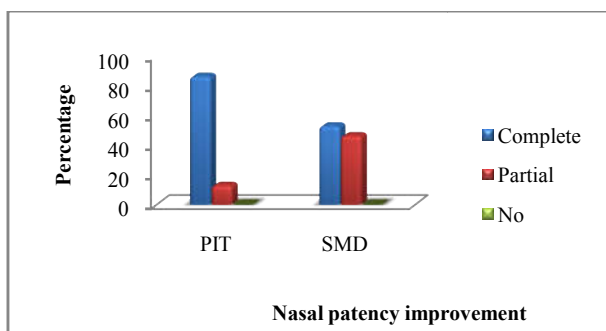


Fig 4 Bar diagram showing the nasal patency improvement between two groups on day 30

## DISCUSSION

Nasal obstruction is one of the most frequent symptom in patients presenting to ENT out patient department. Most commonly the obstruction is due to deviated nasal septum or the inferior turbinate hypertrophy<sup>1</sup>. Intra nasal corticosteroids, antihistaminics, nasal decongestants often yields good results in nasal obstruction due to inferior turbinate hypertrophy<sup>2</sup>. Patients who do not respond will usually be treated by surgical reduction of the turbinate. Although various surgical techniques for reduction of hypertrophied inferior turbinate are in vogue, the partial inferior turbinectomy and submucosal diathermy are the two popular procedure performed in many centre. In our study the group I underwent partial inferior turbinectomy and group II underwent submucosal diathermy. All the patients were assessed pre and post operatively and the results were compared to evaluate the efficacy and safety of both the procedures.

Doreyaware V et al, noticed intraoperative blood loss of 23.29ml in patients who underwent partial inferior turbinectomy which was four times higher than in patients who underwent laser turbinectomy in which the blood loss was 8.03ml<sup>11</sup>. AA khan, observed in his study, the blood loss during surgery in partial inferior turbinectomy only was about 75ml<sup>12</sup>, and the blood loss during partial inferior turbinectomy with clamp was 25 ml. In our study, the average blood loss during partial inferior turbinectomy (16.73ml) was four times higher than during submucosal diathermy (4.13ml) which is consistent with the study done by Doreyaware V et al and AA khan and the results showed a statically significant difference (P= 0.000) in the intraoperative bleeding between two groups.

A study conducted by Imad et al<sup>3</sup>, they noticed on post op day 1 only 3(12%) patients with Submucosal diathermy had mild bleeding while 15(60%) patients had mild and 10(40%) patients with moderate bleeding in patients with partial inferior turbinectomy (P=0.00). Vishnu and rajamma<sup>3</sup>, reported in their study that the reactionary haemorrhage of 43.3% in patients who underwent partial inferior turbinectomy and only 10% of the patients who underwent submucosal diathermy had developed reactionary haemorrhage on first post operative day. Our study showed, in patients who underwent partial inferior turbinectomy, 12(80%) patients were with mild bleeding which stopped by itself and 3(20%) patients were with moderate bleeding required repeat packing for a maximum of 4 hours. But in submucosal diathermy 8 patients (53.3%) had no bleeding and 7 patients (46.7%) with mild bleeding. The difference between these two groups statistically significant (p=0.002) which is consistent with Imad et al, and Vishnu and rajamma.

Gomma et al<sup>1</sup> observed that 60% and 84% of patients who underwent partial inferior turbinectomy and submucosal diathermy respectively showed good healing at the end of one month. Imad et al<sup>3</sup>, observed that 23(92%) patients with submucosal diathermy had good healing, while only 13(52%) patients had good healing in patients with partial inferior turbinectomy after first week. In our study all patients who underwent partial inferior turbinectomy showed good healing compared to patients who underwent submucosal diathermy (only 66.7%) which was statistically significant (P=0.014). This results contradicts the study done by Gomma et al and Imad et al. Mohammad Hassan Al-Baldawi<sup>8</sup>, noticed in his study that the partial inferior turbinectomy(97.5%) was

superior than submucosal diathermy(82.5%) in improving nasal obstruction. *Pakanati SS et al*<sup>4</sup>, also observed that partial inferior turbinectomy (48%) is better than the submucosal diathermy (32%). *Gomma et al*<sup>1</sup>, observed that 88% of patients in both the groups showed improvement in nasal obstruction. Our study is consistent with the results of *Mohammad Hassan Al-Baldawi* and *Pakanati SS et al*. 86.7% of our patients who underwent partial inferior turbinectomy showed complete improvement in nasal patency compared to submucosal diathermy (53.3%). This results was also statistically significant (P=0.046)

## CONCLUSION

This study showed that nasal patency improved well in patients who underwent partial inferior turbinectomy than patients who underwent submucosal diathermy. Although intra- operative and post-operative bleeding was encountered in some patients who underwent partial inferior turbinectomy, it is more effective in the long run as compared to submucosal diathermy. However both the procedures are safe to perform, require less instrumentation and are cost effective.

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