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Management of Inferior Turbinate Hypertrophy: A Comparative Study between Partial Inferior Turbinectomy (PIT) and Submucosal Diathermy (SMD)

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Abstract

Introduction: *Symptomatic hypertrophy of the inferior turbinate is a common complaint in ENT outpatient departments. When medical management fails, surgical intervention becomes necessary. Among the various surgical options, partial inferior turbinectomy (PIT) and submucosal diathermy (SMD) are widely used for managing inferior turbinate hypertrophy.* ***Objectives:*** *To compare the clinical outcomes of PIT and SMD in a tertiary care setting.* ***Materials and Methods:*** *This prospective randomized comparative study was conducted at the Department of Otolaryngology and Head-Neck Surgery, Rajshahi Medical College Hospital, from December 2016 to November 2017. Sixty patients (aged 18–60 years) with bilateral inferior turbinate hypertrophy unresponsive to medical treatment were enrolled. After informed consent, they were randomly assigned to two groups: Group A (n=30) underwent PIT, and Group B (n=30) underwent SMD. Postoperative symptoms such as nasal obstruction, pain, bleeding, and crust formation were assessed at 2 days, 2 weeks, and 2 months. Data were analyzed using SPSS-23.* ***Results: T****here were no significant differences in age, sex, socioeconomic status, or body weight (p>0.05) between groups. Group A showed significantly greater improvement in nasal obstruction at 2 weeks (80.0% vs 53.3%) and 2 months (86.7% vs 63.3%). Mild pain after 2 weeks was more prevalent in Group B (56.7% vs 23.3%). Postoperative bleeding was significantly less in Group B after 2 days (10.0% vs 33.3%), while crust formation was higher in Group A at 2 weeks (73.3% vs 43.3%).* ***Conclusion:*** *PIT was more effective in relieving nasal obstruction, whereas SMD had a better safety profile regarding postoperative bleeding and pain.*

Key words: *Inferior Turbinate Hypertrophy, Partial Inferior Turbinectomy, Submucosal Diathermy.*

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Introduction:

Hypertrophied inferior turbinates are a common cause of nasal obstruction leading to post nasal drip, nasal congesion and headache[1]. Enlargement of inferior turbinate is mainly due to swelling of the submucosa and rarely due to enlargement of bone itself[2]. Hypertrophied turbinates can be treated medically with local and systemic steroids and antihistamines are effective initially but there is

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a high chance of recurrence when the drug is discontinued[3]. The first surgical procedure for the treatment of enlarged inferior turbinate was reported by Heider and Crusel in 1845 when they described surface electrocautery by the using a Galvanic current[4]. Resection of obstructive inferior turbinates was first reported in 1895[5] and 5 years later, Holmes[6] reported his experience with turbinectomy in 500 patients. Unfortunately these procedures are traumatic and are often complicated by post operative bleeding, infection, dryness, crusting and adhesions[7]. Submucosal diathermy of inferior turbinate was popularized in 1989[8] although it was reported in 1907[9]. It is believed that[10] coagulative current produces tissue necrosis and that the ensuing fibrosis causes shrinkage of soft tissues of the turbinates. Today many surgical options exists for the treatment hypertrophied inferior turbinate directed primarily at the underlying nasal obstructive component. Procedures like linear cautery, submucosal diathermy, cryosurgery, lateral out fracturing, antro-chonoplexi, laser turbinectomy, mucosal trimming, microdebriding, coblation, degloving and submucosal stroma debriding etc are the techniques which have been performed[10]. In Bangladesh, the most widely useful surgical procedures to reduce the size of inferior turbinate are partial inferior turbinectomy and submucosal diathermy. In recent past, several studies were carried out to compare PIT with that of SMD in different setting like in allergic rhinitis patients[10], in nasal valve blockage 11 and in different ages[12,13]. These studies suggest better safety and efficacy profile of PIT over SMD. Our current study aims to compare the results in respect of safety and efficacy of Partial Inferior Turbinectomy (PIT) versus Submucosal Diathermy (SMD) in terms of nasal obstruction, nasal bleeding, nasal pain and intranasal crust formation. Hopefully this will add to the foundation for future research with large sample size on this issue in home and abroad.

Materials and Methods:

The prospective randomized comparative study was conducted in the department of Otolaryngology & Head Neck Surgery, Rajshahi Medical College Hospital, Rajshahi from December 2016 to November 2017. Study population was Patient who with admit into ENT ward fulfilling inclusion criteria. Sampling method was Simple random sampling. Sample size was A total number of 60 patients divided in equal two groups within the study period. **Inclusion criteria** were a Bilateral nasal obstruction not responding to medical treatment, Patients having hypertrophied inferior turbinate and Patients with allergic rhinitis. **Exclusion criteria** were Patient with nasal polyp, DNS or concha bullosa, Patient with hemoglobin level less than 10 gm/dl, Patient not willing to participate in the study, Patient younger than 18 years and older than 60 years and IHD, Bleeding disorders, HTN, Pregnancy. Main outcome variables to be studied nasal obstruction, bleeding, pain, crust formation. **The aims and objective** of the study along with its procedure, alternative diagnostic methods, risk and benefits was explained to the patients or attendants in easily understandable local language and then informed consent was taken from each patient. It was assured that all records would be kept confidential and the procedure was helpful for both the physician and patients in making rational approach regarding management of the case.

Ethical implications: The research protocol was approved by the ethical committee of RMCH, Rajshahi.

Observations and Results:

Table I: Improvement of nasal obstruction after 2 weeks of the patients (N=60)

Improvement of nasal obstruction	Group A (n=30)		Group A (n=30)		P value
	n	%	n	%	
No improvement	0	0.0	0	0.0	-
Partial improvement	6	20.0	14	46.7	0.028^{s}
Complete improvement	24	80.0	16	53.3	0.028^{ns}

Group A- Partial Inferior Turbinectomy

Group B- Submucosal Diathermy

s= significant

P value reached from Chi square test

Table I shows improvement of nasal obstruction after 2 weeks of the patients. It was observed partial improvement was found 6(20.0%) in group A and 14(46.7%) in group B, which was significantly higher in group B (p=0.028). Complete improvement was 24(80.0%) in group A and 16(53.3%) in group B, which was significantly higher in group A (p=0.028).

Table II: Improvement of nasal obstruction after 2 months of the patients (N=60)

Improvement of nasal obstruction	Group A (n=30)		Group A (n=30)		P value
	n	%	n	%	
No improvement	0	0.0	0	0.0	-
Partial improvement	4	13.3	11	36.7	0.036^{s}
Complete improvement	26	86.7	19	63.3	0.036^{s}

Group A- Partial Inferior Turbinectomy

Group B- Submucosal Diathermy

s= significant

P value reached from Chi square test

Table II shows improvement of nasal obstruction after 2 months of the patients. It was observed that partial improvement was found 4(13.3%) in group A and 11(36.7%) in group B, which was significantly higher in group B (p=0.036). Complete improvement was 26(86.7%) in group A and 19(63.3%) in group B, which was significantly higher in group A (p=0.036).

Table III: Nasal pain after 2 days of the patients (N=60)

Nasal pain	Group A (n=30)		Group A (n=30)		P value
	n	%	n	%	
Mild	6	20.0	9	30.0	0.371^{ns}
Moderate	14	46.7	17	56.7	0.438^{ns}
Severe	10	33.3	4	13.3	0.067^{ns}

Group A- Partial Inferior Turbinectomy

Group B- Submucosal Diathermy

ns= not significant

P value reached from Chi square test

Table III shows nasal pain after 2 days of the patients. It was observed that majority patients had moderate pain in both groups, which was 14(46.7%) in group A and 17(56.7%) in group B. The difference was not statistically significant (p>0.05) between the groups.

Table IV: Nasal pain after 2 weeks of the patients (N=60)

Nasal pain	Group A (n=30)		Group A (n=30)		P value
	n	%	n	%	
Mild	7	23.3	17	56.7	0.017[s]
Moderate	17	56.7	11	36.7	0.195[ns]
Severe	6	20.0	2	6.6	0.254[ns]

Group A- Partial Inferior Turbinectomy

Group B- Submucosal Diathermy

s=significant; ns= not significant

P value reached from Chi square test

Table IV shows nasal pain after 2 weeks of the patients. It was observed that mild pain was significantly higher in group B (23.3% vs 56.7%). Moderate and severe pain were higher in group A but not statistically significant (p>0.05) between the groups.

Table V: Intranasal bleeding after 2 days of the patients (N=60)

Intranasal bleeding	Group A (n=30)		Group A (n=30)		P value
	n	%	n	%	
Absence	17	56.7	27	90.0	0.003[s]
Mild	10	33.3	3	10.0	0.028[s]
Severe	3	10.0	0	0.0	0.236[ns]

Group A- Partial Inferior Turbinectomy

Group B- Submucosal Diathermy

s=significant; ns= not significant

P value reached from Chi square test

Table V shows intranasal bleeding after 2 days of the patients. It was observed that intranasal bleeding was significantly absent in group B in comparison to group A (56.7% vs 90.0%) after 2 days. Mild bleeding after 2 days was more in group A (33.3% vs 10.0%) was statistically significant.

Table VI: Intranasal bleeding after 2 weeks of the patients (N=60)

Intranasal bleeding	Group A (n=30)		Group A (n=30)		P value
	n	%	n	%	
Absence	27	90.0	30	100.0	0.236[ns]
Mild	3	10.0	0	0.0	0.236[ns]
Moderate	+-	0.0	0	0.0	-

Group A- Partial Inferior Turbinectomy

Group B- Submucosal Diathermy

s=significant; ns= not significant

P value reached from Chi square test

Table VI shows intranasal bleeding after 2 weeks of the patients. It was observed that intranasal bleeding after 2 weeks were statistically significant when compared between the groups.

Table VII: Intranasal crust formation after 2 weeks of the patients (N=60)

Intranasal crust formation	Group A (n=30)		Group A (n=30)		P value
	n	%	n	%	
Absence	2	6.7	0	0.0	0.472[ns]
Mild	13	43.3	22	73.3	0.018[s]
Severe	15	50.0	8	26.7	0.063[ns]

Group A- Partial Inferior Turbinectomy

Group B- Submucosal Diathermy

s=significant; ns= not significant

P value reached from Chi square test

Table VII shows intranasal crust formation after 2 weeks of the patients. It was observed that mild intranasal crust formation was significantly higher in group A after 2 weeks (73.3% vs 43.3%). Absence and severe intranasal crust formation were statistically significant (p>0.05) between the groups.

Table VIII: Intranasal crust formation after 2 months of the patients (N=60)

Intranasal crust formation	Group A (n=30)		Group A (n=30)		P value
	n	%	n	%	
Absence	22	73.3	25	83.3	0.347[ns]
Mild	8	26.7	5	16.7	0.347[s]
Severe	0	0.0	0	0.0	-

Group A- Partial Inferior Turbinectomy

Group B- Submucosal Diathermy

s=significant; ns= not significant

P value reached from Chi square test

Table VIII shows intranasal crust formation after 2 months of the patients. It was observed that intranasal crust formation after 2 months were not statistically significant (p>0.5) between the groups.

Discussion:

Nasal obstruction is one among the most common presenting complaints of patients attending the ENT OPD. One of the most common etiology for nasal obstruction is hypertrophy of the inferior turbinates due to allergic rhinitis or vasomotor rhinitis[17]. The hypertrophy is almost always due to dilatation of the venous sinusoids resulting in swelling of the submucosal layer. The majority of the patients responds to antihistamines or local decongestants. Occasionally submucous fibrosis may render the turbinates incapable of decongestion and in such cases surgical management becomes necessary[18]. Even though multiple treatment options are available, there is considerable controversy over the

merits of the various techniques. In this present study it was observed that majority patients were belonged to age 18-25 years in both groups, which was 13(43.3%) in group A (partial inferior turbinectomy) and 12(40.0%) in group B (submucosal diathermy). The mean age was 31.1±9.9 years in group A and 30.5±9.5 years in group B. The mean age difference was not statistically significant (p>0.05) between the groups. Similarly, Saleem et al.[9] showed their study mean was 28.35±8.12 years in partial inferior turbinectomy group and 30.93±7.72 years in submucosal diathermy group. In another study, Nawaz et al.[15] observed their study mean age group B (PIT group) was 26.5 years (SD=4.38) while in group A (SMD group) it was 27.2 years (S.D=3.55) (p value >0.05). In this study it was observed that male was predominant in both groups, which was 18(60.0%) in group A and 16(53.3%) in group B. The male female difference was not statistically significant (p>0.05) between the groups. Similarly, Nawaz et al.[15] showed there were, 54 (67.5%) males in group B (partial inferior turbinectomy group) while 58 (72.5%) males in group A (submucosal diathermy group) (p value >0.05). Vishnu and Rajamma[14] conducted out of the 60 patients recruited for the study, in Group B (PIT), 20(66.7%) were males and 10 (33.3%) females, in Group A (SMD) 12(40.0%) were males and 18(60.0%) were females. In my study it was observed that improvement of nasal obstruction after 2 days, partial improvement was found 10(33.3%) in group A and 22(73.3%) in group B, which was significantly higher in group B (p=0.001). Complete improvement was 20(66.7%) and 8(26.7%) in group A and group B respectively, which was significantly higher in group A (p=0.001). In this study it was observed that improvement of nasal obstruction after 2 weeks, partial improvement was found 6(20.0%) in group A and 14(46.7%) in group B, which was significantly higher in group B (p=0.028). Complete improvement was 24(80.0%) in group A and 16(53.3%) in group B, which was significantly higher in group A (p=0.028). Similarly, Gomaa et al.[13] compared between the 2 groups (PIT and SMD groups) regarding the improvement of nasal obstruction with no statistically significant difference between the two groups at 2 weeks of postoperatively. In another study Saleem et al.[9] observed firstly 48 hrs after surgery and then two weeks post-operatively and compared the results in overall improvement in nasal obstruction after two weeks. Two weeks after the surgery the success of the operation for nasal obstruction was 91.3% for turbinectomy and 78.3% for the S.M.D patients (p value is > 0.05). In this current study it was observed that improvement of nasal obstruction after 2 months, partial improvement was found 4(13.3%) in group A and 11(36.7%) in group B, which was significantly higher in group B (p=0.036). Complete improvement was 26(86.7%) in group A and 19(63.3%) in group B, which was significantly higher in group A (p=0.036). Similarly, Gomaa et al.[13] compared between the 2 groups regarding the improvement of nasal obstruction with no statistically significant difference between the 2 groups regarding the post-operative improvement of nasal obstruction after 1 month. Gomaa et al.[13] also compared between the 2 groups regarding the improvement of nasal obstruction. There was no statistically significant difference between two groups regarding the post-operative improvement of nasal obstruction after 3 months. Nasal obstruction is better in patients with PSIT than patients with SMD, however they also documented that the proper benefit of nasal airflow in SMD is achieved after 2 months, while the dramatic response is obtained within only 2 weeks postoperatively in patients who had inferior turbinectomy. In another study Nawaz et al.[15] observed their study all the patients in both groups had severe nasal obstruction pre-operatively. Three weeks post operatively in group B ((partial inferior turbinectomy group), 58 (72.5%) felt complete relief with no-obstruction, 22 (27.5%) patients had mild obstruction while none had moderate or severe obstruction of nose. Post-operative nasal patency is significantly better in group B as compared to group A (submucosal diathermy group) (p <0.001). In group A (submucosal diathermy group), 20 (25%) patients had no obstructive symptoms, 36 (45%) had mild obstructive symptoms while 24 (30%) had moderate nasal obstruction.

In this present study it was observed that nasal pain after 2 days, majority patients had moderate pain in both groups, which was 14(46.7%) in group A and 17(56.7%) in group B. The difference was not statistically significant (p>0.05) between the groups. Vishnu and Rajamma[14] also assessed the incidence of headache and nasal pain in both groups. At post-operative day 1 about 36.7% of patients who underwent PIT had headache and nasal pain which was further reduced to 6.7% at the end of 1 week. The incidence of headache and nasal pain in patients who underwent SMD was 13.3% at post-operative day 1 and none of the patients had headache and nasal pain at the end of 1 week.

In my study it was observed that nasal pain after 2 weeks, mild pain was significantly higher in group B (23.3% vs 56.7%) [p=0.017]. Moderate and severe pain were higher in group A but not statistically significant (p>0.05) between the groups. Gomaa et al.[13] observed there was a statistically significant difference (P=0.02) between the two groups regarding the sensation of mild pain, with a lower incidence in patients with PSIT, with no statistically significant difference regarding the sensation of moderate pain. However there was a statistically significant difference (P=0.01) between the two groups regarding the reporting of severe pain with lower incidence in patients with SMD. Salzano et al.[19] reported in their study that 20% of SMD group had moderate pain and 80% had mild pain at the end of 2 weeks post-operatively In study conducted by Imad et al.[16] in 2010, in Peshawar, 44% of patients who had SMD had moderate pain while 56% of these patients had mild pain at 2 weeks post-operatively. According to study by Maskel et al.[20], less pain was reported with laser inferior turbinectomy.

In this study it was observed that intranasal bleeding was significantly absent in group B in comparison to group B (56.7% vs 90.0%) after 2 days. Mild bleeding after 2 days was more in PIT (33.3% vs 10.0%) was statistically significant. In Vishnu and Rajamma14 study, the reactionary hemorrhage was evaluated on post-operative day 1 which was 43.3% in patients who underwent PIT. Only 10% of the patients who underwent SMD had developed reactionary

hemorrhage. In a study conducted by Imad et al.[16] in 2010 it was found that 40% of patients who underwent PIT had moderate bleeding while only 3% who underwent SMD had minimal bleeding. The studies done by Al-Baldawi[12] revealed that the incidence of reactionary hemorrhage was 12.5% in patients who underwent PIT, whereas none of the patients who underwent SMD had a reactionary hemorrhage.

In my study it was observed that mild intranasal crust formation was significantly higher in group A after 2 weeks (73.3% vs 43.3%). Absence and severe intranasal crust formation was not statistically significant between the groups. Similarly, Gomaa et al.[13] compared between the 2 groups regarding the extend of intra-nasal crust formations. There was a statistically significant difference (P=0.02) between the two groups regarding the mild and moderate crust formations (P=0.02 and P=0.07 respectively), with a lower incidence in patients with SMD at 2 weeks of postoperatively. In another Vishnu and Rajamma[14] showed their study nasal crust formation evaluated at the end of the 1st week demonstrated crust formation in 46.7% of patients who underwent PIT and only in 16.7% of patients who underwent SMD. About 5% of those who underwent PIT had developed nasal crust formation and none of the patients who underwent SMD had developed nasal crust formation according to the study by Al-Baldawi[12]. In this study it was observed that after 2 months, intranasal crust formation was absent 22(73.3%) in group A and 25(83.3%) in group B. Eight (26.7%) patients had mild intranasal crust formation in group A and 5(16.7%) in group B. The difference was not statistically significant (p>0.05) between the groups. Similar study done by Gomaa et al.[13] compared between the 2 groups regarding the extend of intra-nasal crust formations. There was no statistically significant difference between the 2 groups regarding the post-operative intra-nasal crust formations after 3 months. In another study Vishnu and Rajamma[14] observed follow-up at the end of 1 month revealed crust formation in 26.7% of PIT patients and only in 6.7% of SMD patients. Follow-up at the end of the 3rd month demonstrated crust formation in 6.7% of PIT patients whereas none of the patients who underwent SMD had crust formation.

Conclusion:

Although surgical management of hypertrophied inferior turbinate is a controversial issue among surgeons, it can be done only when medical treatment fails to relieve symptoms. In this study, it was found that partial inferior turbinectomy (PIT) was better than submucosal diathermy (SMD) in reducing nasal obstruction. On the other hand SMD was better in terms of reactionary haemorrhage, post operative pain and nasal crusting. Hence it can be concluded that SMD was a safer method but PIT was more effective in the management of hypertrophied inferior turbinate.

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