DIAGNOSTIC NASAL ENDOSCOPIC FINDINGS (DNE) OF A PARTIAL MIDDLE TURBINATE RESECTION IN FUNCTIONAL ENDOSCOPIC SINUS SURGERY (FESS)

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ABSTRACT: INTRODUCTION: Middle turbinate is a dynamic structure which is in a crucial position that plays a significant role in pathogenesis of rhinosinusitis and headache. The goal of treating sinus disease with surgery has evolved from removing all diseased sinus mucosa to specific exenteration of the tissue causing obstruction. Once ventilation is restored, it is postulated that the mucosa may regain near normal appearance and function. This study was conducted to evaluate and observe the benefits following partial middle turbinate resection during FESS on various symptoms of rhino sinusitis. **METHODOLOGY:** This is a random control trial. All the patients with chronic rhino sinusitis, was selected, studied, and subjected for FESS with partial middle turbinate resection for 50 patients and 50 patients subjected for FESS with middle turbinate preservation. All the patients were observed in post operative follow up for five months and the data was subjected for statistical analysis. **RESULTS:** In our study there was strongly significant p value of 0.000, 0.002, and 0.000 for edema, discharge and synechiae respectively and moderately significant p value of 0.047 for crusts with respect to DNE findings. In the patients with partial middle turbinate resection, the post operative DNE results also show improvement of 80% in edema, 40% in discharge, 40% in scarring, 30% in synechiae and 20% in crusts compared to the patients with preserved middle turbinate. **CONCLUSION:** Partial Middle turbinectomy appears to be a positive variable and an adjuvant technique in patients with inflammatory disease of paranasal sinus, in terms of the improvement and maintenance of ventilation of osteomeatal complex, especially if anatomical anomalies present. Partial middle turbinectomy is recommended whenever exposure is compromised. **KEYWORDS:** chronic rhino sinusitis, Partial middle turbinectomy, Functional Endoscopic sinus surgery, DNE findings.

INTRODUCTION: Chronic rhino sinusitis is considered to be a disease secondary to obstruction caused by anatomic anomalies and a reactive mucosal edema. Subsequent to obstruction, inflammation occurs, and with this the morphology of the lining mucosa of the nasal sinuses changes¹. Middle turbinate is a dynamic structure which is in a crucial position that plays a significant role in pathogenesis of rhino sinusitis and headache. Anatomical variations like pneumatization, paradoxical middle turbinate may also be contributing factors to disease causation and recurrence. The goal of treating sinus disease with surgery has evolved from the previous concept of removing all diseased sinus mucosa to present procedure of specific exenteration of the tissue causing obstruction². Once ventilation is restored, it is postulated that the mucosa may regain near normal appearance and function. Homeostasis of the large maxillary and frontal sinuses, with their Ostia located within the anterior ethmoidal complex, is dependent on proper physiological condition of this region. The anterior part of the middle turbinate, lying just medial to this area, may

exhibit anatomic deformity and mucosal hyperactivity, exacerbating restrictions to sinus ventilation and drainage. After surgery to ostiomeatal complex, adhesion or synechiae formation between the middle turbinate and lateral nasal wall is a common complication and may lead to re-stenosis of the region and recurrent disease. The middle turbinate is often carefully preserved at Functional Endoscopic Sinus Surgery (FESS). However there is no clear understanding of its importance and its presence may prevent good access to the middle meatus which could be sometimes detrimental to the surgical result. Various techniques of managing the middle turbinate have been suggested, but it is still controversial whether the middle turbinate should be resected as a part of functional endoscopic sinus surgery. It is therefore important to find out a safe and effective surgical procedure for proper management of sinonasal disease. Endoscopic examination by an otolaryngologist is useful in chronic sinusitis. The specificity of endoscopy is 85% and that of ARS is 75%. Diagnostic nasal endoscopy is a routine component of the clinical evaluation with evidence of suspected disease of nose and paranasal sinuses³. Due to the paucity of studies in assessing the safety, efficacy, advantages, disadvantages and complications of middle turbinate resection in FESS and to determine the clinically indications of this approach the present study was undertaken with the following objectives.

1. To study the effects of partial middle turbinate resection in Functional Endoscopic Sinus Surgery and its effect on various DNE Findings.
2. To assess the basis for decision for performing middle turbinate resection in routine FESS.

METHODOLOGY: This is a random control trial carried out over a period of 2 years at ENT department of a tertiary hospital. Institutional ethical committee permissions were taken and informed consent was taken from all the participants of the study. Patients who are suffering from chronic rhino sinusitis and who had to undergo Functional endoscopic sinus surgery were selected and divided into 2 groups randomly. Group 1 comprising of 50 patients with Partial Middle turbinate resection and Group 2 (control group) comprising of 50 patients with Middle turbinate preservation. The inclusion criteria of the study were Patients with sinonasal disease not responding to medical treatment and age of the patients between 15 and 60 years belonging to both sexes. The Exclusion criteria of the study were Patients with any previous sinonasal surgery, Immuno compromised patients, Patients with acute inflammatory sinonasal disease and Patients with granulomatous lesions, benign and malignant neoplasms. Detailed history and clinical examination of each patient is done. All patients are subjected to diagnostic nasal endoscopy, CT scan of paranasal sinuses, both coronal and axial cuts taken. Surgical procedure was carried out and recorded carefully. DNE Findings were noted periodically at intervals of 2 weeks, 2 months and 5 months.

Diagnostic nasal endoscopy was done in all the patients before surgery of both sides of nose and the findings were noted in aspects of polyps, discharge, synechiae, crests, scarring and edema. For polyps scoring is given as- 0 for absence of polyps; 1 for middle meatal polyp; 2 for beyond middle meatus. For Edema, scarring, Crusting, Synechiae scoring is given as 0 as absent; 1 for mild; 2 for severe. In case of discharge scoring is 0 as no discharge, 1 as clear thin discharge, 2 for thick purulent discharge. The DNE findings of 2 groups were compared with Difference between two groups and Difference in the same group at end of 2nd week, 2nd month and 5th month. All the results of study are presented qualitatively. Results on categorical measurements are presented in number percentages. Significance is assessed at 5% level of significance, 2x2, 2x3, 2x4 Chi square

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test has been used to find significance of study parameters on categorical scale between two groups. EPI INFO statistical software was used.

OBSERVATIONS AND RESULTS: All the patients in our study underwent diagnostic nasal endoscopic examination and CT scans, both axial and coronal cuts before surgery. In group 1, 10% of patients had polyp and in group 2 also only 10% patients had polyps on DNE assessment. In group 1, 90% and in group 2, 80% of the patients had nasal discharge. In group 1, 80% of the patients had complete meatal edema and obstruction. In group 2 all the patients had meatal edema. All patients were examined with 0° and 30° endoscopes and following findings were observed that In group 1, 5 patients had polyps, out of which 2 patients had polyps in the middle meatus and 3 patients had polyps beyond the middle meatus. In group 2 also only 5 patients had polyps, out of which 2 patients had polyps in the middle meatus and 3 patients had polyps beyond the middle meatus. In group 1, 45 patients had discharge, out of which 15 patients had clear thin discharge and 30 patients had thick purulent discharge. In group 2, 40 patients had discharge, out of which 20 patients had clear thin discharge and 20 patients had thick purulent discharge. In group 1, 40 patients had severe edema. In group2 all the 50 patients had edema, out of which 35 patients had mild edema and 15 patients had severe edema.

FIG 1: types of surgery performed

In group1, 20 patients and in group 2, 45 patients had undergone uncinectomy and middle meatal antrostomy. In group 1, 25 patients and in group 2, 5 patients had undergone uncinectomy, middle meatal antrostomy and ethmoidectomy. In group 1, 5 patients and in group 2, none had undergone uncinectomy, middle meatal antrostomy, ethmoidectomy and sphenoidotomy (fig 1).

TABLE 1: Comparison of DNE Findings between two groups at post op assessment at 2 weeks

SYMPTOMS	GROUP	NO. OF PATIENTS	DNE FINDINGS			P Value
			0	1	2	
OEDEMA	Group 1	50	10	40	0	0.029
	Group2	50	20	30	0	
DISCHARGE	Group 1	50	10	40	0	0.000
	Group 2	50	30	20	0	
SCARRING	Group 1	50	25	25	0	0.314
	Group 2	50	20	30	0	
SYNECHIAE	Group 1	50	30	20	0	0.045
	Group 2	50	20	30	0	
CRUSTS	Group 1	50	20	30	0	0.314
	Group 2	50	25	25	0	

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At the end of 2nd week there was statistically significant p value of 0.000 for discharge and moderately significant p value of 0.029, 0.045 for edema and synechia respectively. (Table 1)

TABLE 2: Comparison of symptom score between two groups at post op assessment at 2 months

SYMPTOMS	GROUP	NO. OF PATIENTS	DNE FINDINGS			P Value
			0	1	2	
OEDEMA	Group 1	50	40	10	0	0.161
	Group2	50	45	5	0	
DISCHARGE	Group 1	50	45	5	0	0.012
	Group 2	50	35	15	0	
SCARRING	Group 1	50	40	10	0	0.002
	Group 2	50	50	0	0	
SYNECHIAE	Group 1	50	35	15	0	0.041
	Group 2	50	25	20	5	
CRUSTS	Group 1	50	40	10	0	0.029
	Group 2	50	30	20	0	

At the end of 2nd month there was strongly significant p value of 0.002 for scarring and moderately significant p value of 0.012, 0.041, and 0.029 for discharge, synechia and crusts respectively. (Table 2)

TABLE 3: Comparison of symptom score between two groups at post op assessment at 5 months

SYMPTOMS	GROUP	NO. OF PATIENTS	DNE FINDINGS			P Value
			0	1	2	
OEDEMA	Group 1	50	50	0	0	0.000
	Group2	50	25	25	0	
DISCHARGE	Group 1	50	30	20	0	0.029
	Group 2	50	40	10	0	
SCARRING	Group 1	50	45	5	0	0.161
	Group 2	50	40	10	0	
SYNECHIAE	Group 1	50	45	5	0	0.000
	Group 2	50	25	25	0	
CRUSTS	Group 1	50	45	5	0	0.000
	Group 2	50	30	20	0	

At the end of 5th month there was strongly significant p value of 0.000, 0.000, 0.000 for oedema, synechia, crusts respectively. Moderately significant p value of 0.029 for discharge. (Table 3)

Table 4: Percentage of improvement in SYMPTOM SCORE between two groups

SYMPTOMS	GROUP 1	GROUP 2	P VALUE
	% OF IMPROVEMENT		
OEDEMA	80%	10%	0.0000
DISCHARGE	40%	20%	0.0002
SCARRING	40%	40%	1.0000
SYNECHIAE	30%	10%	0.0000
CRUSTS	20%	10%	0.0470

There was strongly significant p value for oedema, discharge, synechia. Moderately significant p value for crusts. Not much significant p value for scarring. (Table 4)

No major surgical complications occurred in this study. There was no case of blindness, diplopia, CSF leak, epiphora. Blood loss was not much significant and no patient required blood transfusion.

DISCUSSION :- In our study there was strongly significant p value of 0.000, 0.002, 0.000 for oedema, discharge and synechia respectively. In our study there was moderately significant p value of 0.047 for crusts. There was 80% improvement in group 1 patients and 10% improvement in group2 patients; with respect to oedema. There was 40% improvement in group 1 patients and 20% improvement in group2 patients; with respect to discharge. There was 30% improvement in group 1 patients and 10% improvement in group2 patients; with respect to synechia. There was 20% improvement in group 1 patients and 10% improvement in group2 patients; with respect to crusting. Toffel Paul H reported in his own article in 1989 which that, early endoscopic series of 129 patients with partial middle turbinectomy, showed a much lower synechia and middle meatal antrostomy failure rate (3% compared to turbinate preservative procedure)⁴. In a study by Davis et al. showed that the subgroup of patients who had undergone partial middle turbinate resection had overall patency rate slightly higher (96.5%) compared to patients with middle turbinate preservation⁵. Lamear et al and Beilingmaier reported that partial middle turbinate resections were safe and produced, antrostomy and OMC patency rates 30% higher than the middle turbinate preservation technique⁶. A study by S.P. Gulati et al showed that only 1 patient had synechia out of 40 patients who had partial middle turbinate resection but 5 patients had synechia out of 40 patients who had middle turbinate preservation⁷.

Our study shows that here was good improvement in post operative symptoms and diagnostic nasal endoscopy in patients with partial middle turbinate resection compared to the patients with middle turbinate preservation. In a study by Thomas E Havas and Lowinger the outcome of the operative complications are as follows: Epistaxis 1 out of 597 patients with middle turbinate preservation and 2 patients out of 509 with middle turbinate resection⁸. Synechia was in 51 patients out of 597 who undergone FESS with middle turbinate preservation and 0 in 509 patients with middle turbinate resection. Out of 597 patients with middle turbinate preservation 93 patients required revision surgery and 36 patients had required revision surgery out of 509 patients who had undergone FESS with middle turbinate resection.

Partial middle turbinectomy seems to be reasonable because it probably prevents adhesions between the remaining middle turbinate and freshly incised lateral nasal wall. Chances of recurrent

polypoidal rhinosinusitis is less with group1 (MTR) patients and synechia, crusting, edema were statistically significant. Our results also concur with Kennedys finding the most important predictive factor and success of FESS is the extent of rhino sinusitis before surgery. In both the groups about 7 patients (15.8%) were having higher stage of disease initially and were more likely to have slow healing and recurrence of disease in long term. Patient with polyp and seasonal allergy have increased rate of closure of middle meatal antrostomy and recurrence of polyp and synechia. There was statistically significant difference in edema, synechia, crusts, nasal obstruction, nasal discharge and sense of smell. Partial middle turbinectomy appears to be a positive variable and an adjuvant technique in patients with inflammatory disease of paranasal sinus, in terms of the improvement of maintenance of ventilation of osteomeatal complex, especially if anatomical anomalies are present. Partial middle turbinectomy is recommended whenever exposure is compromised. It also enhanced the access for endoscopic examination and cleaning of maxillary sinus, ethmoid infundibulum, and frontal recess can be achieved. However long term follow-up, as more than 1 year is required to assess the postoperative outcome of the above surgical study. No significant short or long term complications have resulted from partial resection of middle turbinate. In addition to usual patients having benefited from middle turbinate resection other patients with anatomic changes like high septal deviation of perpendicular plate of ethmoid, obstructing middle meatus. Patient with narrow nasal vault, a septal spur impinging on middle turbinate, large concha bullosa and paradoxically turned middle turbinate also had significant improvement with this above procedure. Partial middle turbinectomy did not impair nasal function. Indeed the procedure significantly enhances these parameters of nasal function. In small series of patients, there was significant improvement with respect to symptoms like nasal obstruction and nasal discharge. The surgical results were enhanced, where as disruption of nasal physiology and subsequent atrophic rhinitis was avoided. By leaving superior and posterior part of middle turbinate we had preserved important landmarks for future surgery. As per the study following are indications of partial middle turbinate resection are elimination of source of middle meatus obstruction, prevention of postoperative synechia, pneumatized middle turbinate or polypoidal degeneration of mucosa and improved access to posterior ethmoidal and sphenoidal sinuses.

CONFLICT OF INTEREST: We declare that there is no conflict of interest

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