



COMPARATIVE STUDY OF MICRODEBRIDER AND CONVENTIONAL INSTRUMENTS IN ENDOSCOPIC SINUS SURGERY FOR SINONASAL POLYPOSIS

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Abstract

Objective To evaluate and compare the benefits of endoscopic sinus surgery using microdebrider and conventional instruments in terms of various intra and post-operative parameters.

Material & Methods The study comprises of 70 patients who consented to undergo endoscopic sinus surgery. The patients were randomised into two groups: group A-Conventional instruments and group B- Microdebrider assisted.

Results There is significant decrease in intraoperative blood loss and surgery duration in group B whereas there is no significant difference between two groups in terms of development of post-operative synechiae and recurrence.

Conclusion Use of powered instruments like microdebrider improves the intraoperative parameters but fails to significantly impact the long term post-operative symptoms or complications.

Keywords Sinonasal polyposis, Microdebrider, Endoscopic sinus surgery, Blood loss, Operative time

INTRODUCTION

Sinonasal polyposis is a benign inflammatory and hyperplastic outgrowth of sinonasal mucosa with predominant etiology being allergy or infection(1). The main symptoms of this include nasal blockage, facial pain and nasal discharge etc. Medical treatment with topical and systemic steroids can produce temporary relieve of symptoms whereas surgical treatment is the mainstay of treatment. Surgical treatment is functional endoscopic sinus surgery (FESS) whose principle is both clearance of pathologic process from the ostiomeatal complex and restoration of mucociliary clearance mechanism of sinuses along with improvement in sinonasal ventilation without harming normal sinonasal anatomy & physiology. FESS can be carried out with either the conventional instruments

or microdebrider (4). The aim of this study is to evaluate the efficiency of the microdebrider and conventional instruments in FESS and to compare the intraoperative and postoperative results in these two methods.

OBJECTIVE

This study was undertaken to study and compare between endoscopic sinus surgery performed using conventional instruments and microdebrider in terms of time taken for surgery, intra-operative visualisation & blood loss and post-operative synechiae development. Visual analogue scores used in both the methods are to be compared at the end of 3 & 6 months post-operative period.

METHODS

This prospective observational study was conducted on 70 patients with bilateral sinonasal polyposis in the dept. of Otorhinolaryngology, VIMSAR, Burla from November 2020 to October 2022. A total of 80 patients were screened and assessed to meet the criteria set for the study but 10 patients lost during follow-up and thus were excluded from the study.

INCLUSION CRITERIA

1. Age group: 10-60 years
2. Diagnosed cases of sinonasal polyposis
3. Patient consenting for endoscopic sinus surgery
4. Patient willing to undergo investigations and post-operative follow-ups

EXCLUSION CRITERIA

1. Age below 10 years and above 60years
2. Patient medically unfit for surgery
3. Pregnant and lactating mothers
4. Patient not consenting for study or follow up
5. Patient having history of previous surgery

All patients of bilateral sinonasal polyposis with clinical symptoms like nasal blockage, facial pain, olfactory disturbances, nasal discharge and headache were considered for the study. Modified Lund-Mackay scoring symptom was used to assess the symptoms using visual analogue scores (VAS) and patients with total score of 20 or more was selected in the study, where 0=no symptoms and 10=great severity of symptoms.

Table 1: The Lund-Mackay scoring system by visual analogue scale

SYMPTOM	PREOPERATIVE	POSTOPERATIVE
Nasal blockage		
Facial pain		
Olfactory disturbances		
Nasal discharge		
Headache		

All cases underwent diagnostic nasal endoscopy and CT Nose & PNS prior to the surgical procedure to have a better understanding of the disease extension and anatomical variations and CT scan showing Lund- Mackay score equal or more than 8 were included in the study.

Table 2: The Lund- Mackay staging system: radiologic staging(3)

SINUS SYSTEM	LEFT	RIGHT
Maxillary (0/1/2)		
Anterior Ethmoids (0/1/2)		
Posterior Ethmoids (0/1/2)		
Sphenoid (0/1/2)		
Frontal (0/1/2)		
Ostiomeatal Complex (0/2)*		
Total		

0: no abnormalities; 1: partial opacification, 2: total opacification

*0: not occluded, 2: occluded

Patients who were consented were included in the study and started on medical treatment with systemic steroids for 2 weeks and a topical nasal steroid for 1 month. Patients in whom disease persisted after optimal medical therapy were equally randomised into two groups namely Microdebrider (M) and conventional instrument (C) with 35 patients in each group. After taking appropriate consent patients were operated under general anaesthesia.

Polypectomy was done along with uncinectomy, middle meatal antrostomy, anterior and posterior ethmoidectomy, sphenoidectomy and frontal sinus clearance depending on the extent of the disease(2). Microdebrider, MICRO XPS-MEDTRONICS was utilised in the surgery. In conventional method Messerklinger approach was undertaken using conventional endoscopic sinus surgery instruments like forceps, curettes etc.

The operative time was estimated from the insertion of vasoconstrictor nasal pack till the insertion of the medicated nasal pack. At the end of the surgery, the visibility of the operative field was determined by the operating surgeon based on the following standards—

BOEZAART VANDERMERWE GRADING

Grade 1—cadaveric conditions

Grade 2—Field is good with requirement of infrequent suctioning

Grade 3—Field is good only with frequent suctioning

Grade 4—Field is not visible after removal of suction before the instruments can perform the task

Grade 5—Abandonment of the surgery due to poor visibility

The nasal pack was removed after 48 hours. Intravenous antibiotics were given for 48 hours post-surgery followed by oral antibiotics for 1 week. Douching with normal saline and topical steroid spray were used till nasal mucosa is healed. Diagnostic nasal endoscopy was done on every follow up visit and findings were noted. Post-op follow up was done on days 1,3,10, 17 and 24 days following surgery and then every month up to 6 months. The level of development of synechiae was documented at each visit.

All the data was analysed using standard statistical methods. The tests used were measures of frequency, measures of central tendency (mean), standard deviation and standard mean. Associations were tested using tests of significance like the independent sample t test and calculation of p-value.

RESULTS/OBSERVATIONS

The observation and results were evaluated and plotted with a total of 70 patients (n=70). The age group of 31-50 years comprises the most number of patients in the study group. Among the patients 30 (43%) were female whereas 40 (57%) were males.

Table 1 shows that the maximum blood loss during Microdebrider ESS is in the range of 140-160ml (in 88.57% of patients) whereas the most blood loss during conventional instrument aided ESS is 181-200ml (in 71.42% of patients). Average blood loss in microdebrider surgery is 156.57ml whereas

that during conventional instruments aided surgery is 202.8ml. This shows the amount of intraoperative blood loss during conventional instrument aided surgery is significantly higher in amount.

Table 1 shows that the average time required for microdebrider surgery is 92.06min with 86% of patients needed only 80-90 min of intraoperative time for complete removal whereas average time in case of conventional instrument aided surgery is 121.43min with maximum number of cases (63%) needed more than 2hrs of surgery time. This data shows microdebrider significantly reduces the operating duration.

Table 2 shows that the rate of development of synechiae at any stage of post-operative follow-up. It was not seen in any patient who underwent microdebrider assisted ESS, but was seen in 20% patients who underwent conventional instrument aided surgery.

A final follow-up was planned at the end of 1 year especially to see the recurrence. It was found in about 22.8% (8) patients who underwent conventional instrument aided surgery and in 8.5% (3) patients who underwent microdebrider assisted ESS.

Table 1: showing statistical comparison between intraoperative observations from the study

Parameters studied	Microdebrider	Conventional instruments	t value	p value
Avg. Intraoperative blood loss	156.57 ml	202.8 ml	19.78	0.005
Avg. Surgery duration	92.06 min	121.43 min	13.95	0.005

Table 2: showing statistical comparison between postoperative observations from the study

Parameters studied	Microdebrider	Conventional instruments	Pearson Chi square value	p value
Synechiae (%)	0	20	2.0	0.157
Recurrence (%)	8.5	22.8	2.0	0.157

DISCUSSION

The predominant age group of this study is 31-50 years which is in contrast to the findings of epidemiological analysis in sinonasal polyposis by Bettega et al(10) which suggested highest prevalence in patients above 50 years of age. This may be explained by probable greater allergic predisposition of the population under study or the smaller sample size.

The male to female ratio was found to be 1:3 which is in agreement with other epidemiological studies which postulated higher male preponderance in cases of nasal polyposis.

The major complication associated with conventional instruments is higher risk of extensive mucosal injury which leads to increased bleeding during surgery and reduced visibility and increased frequency of post-operative complications. Microdebriders offer suction at the surgical site and provide the advantage of suctioning of cut polypoidal tissue along with the blood generated during surgery thus keeping being able to keep the surgical field comparatively clear thus allowing precise surgery and less overall bleeding during surgery. This finding is in accordance with the results from the studies by Krouse and Christmas(7), R Singh et al(8) and Kumar & Sindwani (9).

This study found that the mean duration of surgery is significantly more in conventional group which can be explained by the extended time required to control haemorrhage in certain cases of conventional group. The microdebrider presents a better surgical field due to inbuilt suction clearance at the surgical site itself which significantly lowers the duration of surgery. This finding mirrors the results from study by Saafan et al(6) and Selivanova et al (11) whereas study by R Singh et al didn't find any significant difference in operating duration between the two groups.

N. Kanishka et al reported that there is no statistical difference between conventional group and microdebrider group regarding synechiae formation and recurrence of polyps at 1 year post-operative. The study conducted by Ramya Ramachandran Kaipuzha et al (12) inferred that there is reduced chance for development of synechiae and recurrence in microdebrider group. The findings of our

study agree with the second study whereas it doesn't with the first one. The better post-operative parameters can be attributed to rapid mucosal healing and minimal crust formation associated with microdebrider use.

CONCLUSION

FESS via microdebrider is associated with minimal mucosal injury, reduced operation time and reduced chance of development of post-operative complications like synechiae and recurrence when compared to conventional instruments. Though thorough anatomical knowledge along with better surgical skill and regular periodical follow ups play important role in deciding outcome of the surgery, appropriate surgical equipment or instruments too play a vital role.

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CONFLICT OF INTEREST

None declared

REFERENCE

1. Johansson L., Akerlund A., Holmberg K. et al: Prevalence of Nasal Polyps in adults. *ANN Otol Rhinol Laryngol* 2003;112(7):625-9
2. Textbook of Anatomic Principles of Endoscopic Sinus Surgery: A step by step Approach, Author Renuka Bradoo Pages 54-56
3. Hoang JK, Eastwood JD, Tebbitt CL, Glastonbury CM: Multiplanar sinus CT: A systematic approach to imaging before FESS. *AJR Am J Roentgenol* (2010) June
4. Becker DG: Powered Instrumentation in surgery of the Nose and Paranasal sinuses. *Otolaryngol Head Neck Surgery* 8(1): page 18-21, 2000
5. Hackman TG, Ferguson BJ, Powered Instrumentation and soft tissue effects in the nose and paranasal sinuses. *Curr Opin Otolaryngol Head Neck Surgery*. 2005 Feb: 13 (1): page 22-26
6. Saafan ME, Ragab SM, Albirmawy OA, Elsherif HS: Powered versus Conventional Endoscopic sinus surgery instruments in management of sinonasal polyposis. *Eur Arch Otolaryngol* 2012 Apr 10
7. Krouse JH, Christmas DA Jr: Powered Instrumentation in functional endoscopic sinus surgery II: A Comparative study. *Ear Nose Throat Journal* 1996: 75(1): 42
8. R Singh, Hazarika P, Nayak D, Balakrishnan R, Gangwar N, Hazarika M: A comparative study of microdebrider assisted endoscopic sinus surgery and Conventional endoscopic sinus surgery for nasal polypi. *Indian Journal of Otolaryngology Head & Neck Surgery* 30 November 2011, page 1-4
9. Kumar N, Sindwani R: Benefits with microdebrider surgery during nasal polyposis surgery. *Laryngoscope* (2009) 119:4375(1), page 42-44
10. Bettega S, Soccol AT, Koerner HN, Mocellin M: Epidemiological analysis in patients with nasal polyps. *Int. Arch. Otorhinolaryngol* 2007;11(3), page 223-24
11. Selivanova O, Kuehnemund M, Mann WJ, Amedee RG: Comparison of Conventional instruments and mechanical debriders for surgery of patients with chronic sinusitis. *Am J Rhinol*: 2003;17(4): page 197-202
12. Kaipuzha R, Venkatramanujam N, Kartikeyan P, Pullimotil D: Comparison of microdebrider assisted endoscopic sinus surgery and conventional endoscopic sinus surgery for chronic rhinosinusitis with nasal polyposis. *Romanian Journal of Rhinology*. 2019;5(1): page 91-95