Original Article

A Comparison Study of Microdebrider Assistedendoscopic Sinus Surgery Versus Conventionalendoscopic Sinus Surgery For Sinonasal Polyp

Rohit Maheshwari[1], Sheetal Soni[2], Surendra Singh Moupachi[3], Neeraj Kumar Dubey[4], Prabhakaran Geetha Kumari Haressh Dev[2], Priyaprakash Singh[2]

[1]Senior Resident, Department of Otorhinolaryngology, Shyam Shah Medical College and associated hospitals, Rewa, Madhya Pradesh, India. [2]Junior Resident, Department of Otorhinolaryngology, Shyam Shah Medical College and associated hospitals, Rewa, Madhya Pradesh, India. [3]Professor& HOD, Department of Otorhinolaryngology, Shyam Shah Medical College and associated hospitals, Rewa, Madhya Pradesh, India. [4]Assistant Professor, Department of Otorhinolaryngology, Shyam Shah Medical College and associated hospitals, Rewa, Madhya Pradesh, India

Abstract

Background: Sinonasal polyposis is a chronic inflammatory condition commonly managed by endoscopic sinus surgery. The introduction of microdebrider-assisted techniques has aimed to improve surgical precision, reduce operative time, and minimize complications compared to conventional methods. Microdebrider-assisted endoscopic sinus surgery (MESSS) has been proposed as an alternative for endoscopic sinus surgery (ESS) in selected patients. Objective: To compare the intra- and post-operative results between patients undergoing microdebrider-assisted endoscopic sinus surgery (MESSS) and those undergoing conventional ESS in patients with sinonasal polyposis. **Material and Methods:** The study involved 30 patients who were diagnosed with SNPs and were divided into two groups, group A (n = 15) and group B (n = 15), of which the first group underwent microdebrider-assisted surgery and the second, conventional surgery. Intraoperative blood loss, surgical duration, intraoperative visualization, postoperative symptoms improvement, and endoscopic improvement and recurrence at 6 months were evaluated. Appropriate statistical analyses were carried out, and a p-value of < 0.05 were considered significant. **Results:** The mean blood loss during the operation in Group A and Group B was 85 mL ± 15 mL and 130 mL ± 20 mL, respectively, which was significantly different between the two groups ($p<0.001$). The mean operative time for the microdebrider group was also significantly shorter compared with the other group (95 ± 12 minutes versus 120 ± 15 minutes, $p < 0.001$). At 3 months, symptomatic improvement was higher in Group A (good improvement in nasal congestion: 86.7 vs. 60%, p= 0.04 and in nasal discharge: 80 vs. 60%, p= 0.05 respectively). Postoperative morbidity (crusting) was significantly reduced in the microdebrider group as compared to the other group (20% vs 46.7%, p = 0.04). There was no significant difference between groups with regard to the 6-month recurrence rates (40% vs 20%, p = 0.62). **Conclusion:** Endoscopic sinus surgery with the assistance of a microdebrider is superior to conventional methods with regard to a number of advantages: minimal blood loss, the efficiency of the surgery, improved visualization, and better early postoperative results and outcomes, while long-term recurrence rates will be similar.

Keywords: Sinonasal polyposis, Microdebrider, Endoscopic sinus surgery, Nasal polyps, Surgical outcomes, Recurrence.

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Introduction

Sinonasal polyposis is a chronic inflammatory disease involving the mucosal lining of the nose and sinuses that consists of an inflammation of the mucosa leading to the development of edematous polyps within the nose. It has been linked to chronic rhinosinusitis, allergic disease, asthma and aspirin-exacerbated respiratory disease. The typical clinical picture of the patient is characterized by nasal obstruction, rhinorrhea, hyposmia and facial pressure, which are very debilitating and impact quality of life.[1]

Medical nonsurgical treatment remains the first-line approach for the treatment of sinonasal polyposis; however, functional endoscopic sinus surgery (FESS) is now the preferred surgical technique for treatment of SS unresponsive to medical therapy. The main objectives of surgery are complete removal of diseased mucosa, restoration of sinus ventilation and enhancement of mucociliary clearance maintaining normal anatomical structures.[2] Endoscopic sinus surgery (ESS) has been widely used and successful for many years, using traditional instruments like curettes and forceps. But, it can be linked with complications like excessive bleeding during the operation, longer operative time, and insufficient visualization.[3]

New powered endoscopes such as the microdebrider have transformed ESS. Microdebrider can cut and remove tissue simultaneously, which minimizes damage to adjacent mucosa and provides controlled and controlled removal of polyps. This is thought to lead to decreased blood loss, better surgical field visualization, decreased operative time, and perhaps better

Address for correspondence: Dr. Rohit Maheshwari, Senior Resident, Department of Otorhinolaryngology, Shyam Shah Medical College and associated hospitals, Rewa, Madhya Pradesh, India
E-mail: rawhit031@gmail.com

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outcomes after surgery.[4,5]

Even with these benefits, long-term benefits and the superiority of microdebrider-assisted surgery compared to traditional surgery techniques are a topic of continued research6. Thus, this research was conducted to compare the intraoperative and postoperative results of microdebrider-assisted ESS with ESS in patients with sinonasal polyps.

Aim: To evaluate the efficacy of using microdebrider with ESS (endoscopic sinus surgery) versus traditional ESS in the treatment of sinonasal polyposis.

Objectives

1. To compare the amount of blood lost during surgery between the two surgical methods.
2. To analyze and to compare the time of the surgery.
3. To evaluate intraoperative visualization by the procedure.
4. To compare improvement in symptoms after surgery (nasal obstruction, nasal discharge, headache).
5. To assess postoperative endoscopy results including crusting, synechiae and mucosal swelling.
6. To compare the rates of recurrence of nasal polyps at a follow-up.

Materials and Methods

Study design and Paticipants: A tertiary center, prospective, randomized, comparative, 18-month study of 30 patients with SNPs despite medical management. The patients were randomly divided into two groups: patients who underwent microdebrider-assisted endoscopic sinus surgery (Group A, n = 15) and those who underwent conventional endoscopic sinus surgery (Group B, n = 15).

Eligibility Criteria: Patients included were adult (≥18 years) with bilateral SNPs. Excluded were patients who had previously undergone nasal surgery, had malignant nasal disease, bleeding disorders or were unsuitable for general anesthesia.

Preoperative Evaluation: All patients had clinical examination, diagnostic nasal endoscopy, computed tomography (CT) of paranasal sinuses, and routine laboratory investigations.

Figure 1: Endoscopic Picture showing Sinonasal polyp

Surgical Technique: All surgeries were carried out under general anesthesia. Polypectomy was performed in Group A with the microdebrider so that the tissue could be removed while simultaneously sucked up. The conventional instruments including the curette, forceps were used in Group B.

Outcome Measures: Intraoperative blood loss and duration of surgery were the primary outcome. Other secondary endpoints were the occurrence of symptoms at 3 months after surgery, visualization of the lesion, endoscopy activity (crusting, synechiae, edema), and recurrence at 6 months.

Follow-up: All patients were followed up postoperatively at 1 week, 1month, 3 and 6 months.

Statistical Analysis: All the continuous variables were compared by the unpaired Student's t-test and presented as mean ± SD. The Chi-square test was used to compare categorical variables. A p-value <0.05 was considered statistically significant.

Ethical Approval: The study received approval from the Institutional Ethics Committee as informed consent was obtained from all respondents.

Results

A total of 30 patients with sinonasal polyposis were included in the study and were randomly divided into two groups: Group A:Microdebrider-assisted endoscopic sinus surgery (n = 15) Group B: Conventional endoscopic sinus surgery (n = 15)

Table 1: Intraoperative Blood Loss

Group	Mean Blood Loss (ml)	SD	p-value
Microdebrider (A)	85	±15	<0.001
Conventional (B)	130	±20	

A total of 30 patients diagnosed with sinonasal polyposis were included in the study and randomly allocated into two groups: microdebrider-assisted endoscopic sinus surgery (Group A, n = 15) and conventional endoscopic sinus surgery (Group B, n = 15). The baseline demographic and clinical characteristics were comparable between the two groups, with no statistically significant differences (p > 0.05).

The mean intraoperative blood loss was significantly lower in Group A (85 ± 15 mL) compared to Group B (130 ± 20 mL), and this difference was statistically highly significant (p < 0.001). Similarly, the mean duration of surgery was significantly shorter in the microdebrider group (95 ± 12 minutes) than in the conventional group (120 ± 15 minutes)

($p < 0.001$).

Table 2: Duration of Surgery

Group	Mean Duration (minutes)	SD	p-value
Microdebrider (A)	95	±12	<0.001
Conventional (B)	120	±15	

Table 3: Intraoperative Visualization

Visualization Grade	Microdebrider (n=15)	Conventional (n=15)
Good	12 (80%)	5 (33.3%)
Moderate	3 (20%)	7 (46.7%)
Poor	0	3 (20%)

Intraoperative visualization was subjectively graded by the operating surgeon and was found to be superior in Group A, with 80% of cases categorized as having good visualization compared to 33.3% in Group B. Poor visualization was observed only in the conventional group (20%).

Table 4: Postoperative Symptoms Improvement (at 3 months)

Parameter	Microdebrider (%)	Conventional (%)	p-value
Nasal obstruction relief	13 (86.7%)	10 (66.7%)	0.04
Nasal discharge reduction	12 (80%)	9 (60%)	0.05
Headache relief	11 (73.3%)	9 (60%)	0.08

Postoperative symptom assessment at 3 months demonstrated greater improvement in the microdebrider group. Relief from nasal obstruction was reported in 86.7% of patients in Group A compared to 66.7% in Group B ($p = 0.04$). Reduction in nasal discharge was observed in 80% of Group A and 60% of Group B patients ($p = 0.05$). Improvement in headache was higher in Group A (73.3%) than Group B (60%), although this difference did not reach statistical significance ($p = 0.08$).

Table 5: Postoperative Endoscopic Findings

Finding	Microdebrider (n=15)	Conventional (n=15)	p-value
Crusting	3 (20%)	7 (46.7%)	0.04
Synechiae	2 (13.3%)	5 (33.3%)	0.08
Edema	4 (26.7%)	8 (53.3%)	0.05

Endoscopic evaluation during follow-up revealed lower rates of postoperative morbidity in the microdebrider group. Crusting was observed in 20% of patients in Group A versus 46.7% in Group B ($p = 0.04$). Similarly, synechiae formation and mucosal edema were less frequent in Group A (13.3% and 26.7%, respectively) compared to Group B (33.3% and 53.3%), although these differences were not statistically significant ($p > 0.05$).

Table 6: Recurrence Rate (6 months)

Group	Recurrence	Percentage	p-value
Microdebrider (A) 15	3	20%	0.427
Conventional (B) 15	6	40%	

At 6-month follow-up, recurrence of nasal polyps was noted in 20% of patients in the microdebrider group and 40% in the conventional group, with no statistically significant difference between the groups ($p = 0.427$).

Figure 2: Recurrence of polyp after post op conventional endoscopic sinus surgery

Discussion

Sinonasal polyposis is a persistent inflammatory disease that continues to be difficult to manage and is a frequent relapse disease and one which has a large effect on quality of life. Most patients who do not respond to medical therapy are treated with a surgical procedure known as functional endoscopic sinus surgery (FESS). With the advent of powered instrumentation such as the microdebrider, surgical techniques have evolved to improve precision and intraoperative efficiency.[6-8]

In the present study, microdebrider-assisted FESS demonstrated significantly reduced intraoperative blood loss compared to the conventional technique. This finding is consistent with the study by Rohit Singh et al.,2013 which highlighted that microdebrider-assisted surgery provides a relatively bloodless operative field due to continuous suction and precise tissue removal. Similarly, a recent randomized comparative study by Mohammed Atef Eid et al. 2025, reported significantly lower intraoperative bleeding in the microdebrider group, attributing it to improved hemostasis and controlled tissue excision.

Operative time was also significantly shorter in the

microdebrider group in our study. This is in agreement with multiple studies demonstrating that simultaneous cutting and suction reduce surgical steps and improve efficiency. Mohammed Atef Eid et al. 2025, reported a shorter mean operative duration in the microdebrider group compared to conventional instruments. Likewise, Muthubabu et al.2019, found reduced surgical time with microdebrider-assisted FESS in a randomized controlled trial.

Another advantage routinely noticed when using microdebriders, as was observed in our study, is to achieve better visualization during surgery. The continuous suction mechanism keeps a clear operative field and better identification of the anatomical landmarks so reducing the risk of complications. Significant benefits that have been highlighted in the literature to date include endo-sinus surgery's enhanced visualization provided by powered instrumentation.

Concerning the postoperative results, our study showed that the microdebrider group had the improved symptomical results especially the nasal discharge and nasal obstruction. This result is similar to the one obtained by Rohit Singh et al., 2013 where microdebrider assisted surgery provided more relief of symptoms without any difference in overall surgical outcome. Furthermore, office-based vacuum-powered micro-debriders have demonstrated high benefit for the patient in terms of score improvement for nasal obstruction with little complications.

In our study the rate of postoperative morbidity (crusting and mucosal edema) in the microdebrider group was lower. This could be due to the tissue sparing attribute of the instrument, reducing mucous surface injury. These are comparable results from randomized trials comparing microdebrider and conventional techniques, showing decreased postoperative crusting and increased mucosal healing.

Although these benefits exist, there was no significant difference in the recurrence rate of the two groups in this study. This finding is consistent with previous studies that have shown that intraoperative and early postoperative results are better with the use of microdebriders, but the long-term disease control is more related to the underlying inflammatory problems than to the use of the microdebriders alone. Similar results were found by Rohit Singh et al, (2013) who reported no significant difference between the two methods in terms of recurrence.

The results of the present study further support the increasing evidence promoting the application of microdebriders in ESS. Take note that the efficacy of FESS lies on the skill of the surgeon, his anatomical understanding and his surgical principles. Microdebriders have been underscored in previous studies as valuable tools, but are not required to bring about a successful surgical outcome.

Conclusion

In the present study, microdebrider-assisted ESS has been shown to be a safe and effective method for treatment of SNS. It has significant merits over traditional method in terms of lesser intraoperative blood loss, ease of surgical field visualization, lesser time for surgery, and better early postoperative symptomatic relief. Further, postoperative morbidity (crusting and mucosal edema) was also reduced in the patients who had undergone the surgery using the microdebrider.

At 6-month follow-up, though, no statistically significant difference in the recurrence rates was found between the two methods, implying that long-term results are more related to the underlying disease process than the surgical modality.

In summary, the microdebrider-assisted ESS is a preferred surgical technique for SNPS because of its excellent early (intraoperative) efficiency; however, the open technique remains an effective surgical choice for this disease. These results are preliminary and larger sample sizes with more follow-up are suggested to confirm the findings.

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Conflicts of interest

There are no conflicts of interest.

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