# **Original Research Article**

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# Comparison between microdebrider assisted surgery and the conventional methods in the surgical treatment of nasal polyps

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#### **ABSTRACT**

Background: Microdebrider is emerging as a convenient tool for various ENT surgeries that helps in easier disease clearance and reduced morbidity. Though it requires some surgical expertise initially to master the skill of handling it, it is worth procuring and using in endoscopic sinus surgery. The present study was conducted to compare the microdebrider assisted endoscopic surgery and conventional methods using sinus endoscopes in the surgical management of nasal polyps.

Methods: 30 patients diagnosed with nasal polyposis between the age group of 5 to 60 were equally randomized into 2 surgical groups- powered endoscopic sinus surgery group and conventional endoscopic sinus surgery group with 15 patients in each group. The study aimed at comparing the intra operative (blood loss, duration of surgery) and post operative results (crusting, scarring, discharge, symptoms, recurrence) between the two groups using Lund-Mackay scoring system and visual analogue scale. The data was statistically analysed.

Results: A significant statistical evidence for a shorter operative time, dryness of the field, better surgical conditions and improved VAS scoring at 3 and 6 months postoperatively was observed in the powered endoscopy group than using conventional techniques.

Conclusions: The use of microdebrider in endoscopic sinus surgery has the advantage of complete clearance of disease, smoother intra operative course and better post operative healing when compared to conventional instruments in the treatment of nasal polyps.

Keywords: Microdebrider, Nasal polyposis, Endoscopic sinus surgery, Randomised clinical trial

### INTRODUCTION

Nasal polyposis is regarded as one form of chronic inflammation in the nose and sinuses, as a part of spectrum of rhinosinusitis. Surgery is a straight forward option in patients with pansinus polyps, those not responding to medical management or has subsequent relapses.<sup>2</sup> This includes polypectomy and functional endoscopic sinus surgery (FESS) by Messerklinger traditional instrumentation technique.<sup>3</sup>

Surgery for sinonasal polyposis is a challenge to the endoscopic surgeon due to increased risk of bleeding, lack of precise tissue removal and increased risk of complications like orbital or intracranial injury due to decreased visibility.

Microdebrider, a powered sinus instrument provides satisfactory results by making dissection faster, almost bloodless & safe, lets rapid healing of tissues without harming normal mucosa.<sup>4</sup> Due to suction at surgical site it provides improved visualisation, precision and less frequent interruptions during surgery. With this background, this study was conducted to compare the microdebrider assisted endoscopic surgery and conventional methods using sinus endoscopes in the surgical management of nasal polyps.

#### **METHODS**

This is a prospective randomised controlled study done on 30 pts visiting ENT OPD at VIMS Hospital, Bellary prospectively during the time period of one year i.e. from December 2016 to December 2017.

All patients who were diagnosed with Nasal Polyposis between the age group of 5 to 60 years were included in the study. Exclusion Criteria included pts who were pregnant/lactating, who did not give consent for the study, who were unfit for surgery under GA/LA,who had a h/o prior sinus surgery, who had nasal masses other than polyposis. Ethical clearance was obtained from the local ethical committee.

Patients who consented to be a part of the study were given medical treatment with Topical and systemic steroids for 2 weeks. Patients in whom disease persisted were equally randomized into 2 surgical groups – Powered endoscopic sinus surgery group and conventional endoscopic sinus surgery group with 15 patients in each group.

A subjective visual analogue scale (VAS) was completed by every patient for nasal blockage or congestion, nasal discharge, olfactory disturbance, facial pain or pressure, headache and overall discomfort. Complete nasal examination including diagnostic nasal endoscopy was done in all cases. Mackay and Lund endoscopic score was used to grade nasal polyps. A preoperative CT scan of paranasal sinuses was performed routinely and The Lund and Mackay staging system for radiological staging was applied.

#### Operative procedure

Patients underwent operative procedure under both local and general anaesthesia.

In powered endoscopy group, the microdebrider (Unidrive II, Karl-Storz, Tutlingen, Germany) assisted polypectomy, middle meatal antrostomy, anterior and posterior ethmoidectomy, sphenoidectomy and frontal recesses cleaning was done according to the extent of the disease. In conventional endoscopic group, standard Messerklinger technique described by Stammberger was employed using conventional endoscopic sinus surgery instruments like forceps, curette and snare.

The operative time was kept by an independent nurse and estimated from insertion of the vasoconstrictor cottonoids at beginning of surgery to insertion of the vaseline impregnated nasal pack. At the end of surgery, the surgical conditions and degrees of dryness of the operative field was rated by the surgeon using a six-point scale. We graded the amount of bleeding subjectively as follows:

Table 1: Grading of bleeding.

Grade 0	No bleeding (Cadaveric dissection)
Grade 1	Slight bleeding. No suctioning of blood required.
Grade 2	Slight bleeding. Occasional suctioning required. Bleeding does not threaten surgical field.
Grade 3	Slight bleeding. Frequent suctioning required. Bleeding threatens the surgical field for a few seconds after suction is removed.
Grade 4	Moderate bleeding. Frequent suctioning required. Bleeding threatens the surgical field immediately after suction is removed.
Grade 5	Severe bleeding. Constant suctioning required. Bleeding appears faster than can be removed by suction. Surgical field threatened and surgery not possible.

Postoperatively patients were followed up on 1<sup>st</sup> and 4<sup>th</sup> week, 3<sup>rd</sup> and 6<sup>th</sup> month subjectively with visual analogue score (VAS) and objectively by endoscopic examination of the operative cavities. The amounts of crusting, scarring and synechiae were documented at each visit. The data was expressed as percentage and analysed using statistical package for social sciences (SPSS) version 20.0.

#### **RESULTS**

Maximum patients in this study were in the age group of 11-30 years (60%). Among the study population 19 (63.3%) were males and 11 (37.7%) were females. The most common symptom experienced by all patients was nasal obstruction (100%), followed by voice change and mouth breathing in 25 (83.3%) patients The pre operative visual analogue score showed a higher mean score for symptoms of nasal block (8.63) followed by overall discomfort (8.60) with a mean score lowest for facial pain (Table 2).

According to Mackay staging of CT scan of paranasal sinuses, maxillary sinus was the most commonly involved sinus with Grade 2 disease (66.7%), posterior ethmoid and sphenoid were less involved and frontal sinus was least involved (93.3% with Grade 0 disease) (Table 3).

According to Mackay scoring of nasal endoscopic examination Grade 2 polyp (Polyp beyond middle meatus, not completely obstructing nose) was seen in 25 patients (83.3%) and maximum patients had endoscopic oedema of Grade 1(mild oedema) in 19(63.3%) patients (Table 4).

Table 2: Pre operative visual analogue score of symptoms.

Symptoms	Minimum	Maximum	Mean	Std. Deviation
Facial pain	3	6	4.43	0.817
Headache	3	7	5.07	1.143
Nasal block	8	9	8.63	0.490
Discharge	5	9	7.83	1.053
Olfactory disturbances	3	8	4.60	1.545
Overall discomfort	8	9	8.60	0.498
Total points	31	45	39.17	3.668

Table 3: CT scan grading of paranasal sinuses (lund mackay staging).

Name of sinus	Grade 0	Grade 1	Grade 2
Maxillary	0 (0%)	10 (33.33%)	20 (66.67)
Anterior ethmoid	12 (40%)	6 (20%)	12 (40%)
Posterior ethmoid	20 (66.67%)	3 (10%)	7 (23.33%)
Sphenoid	25 (83.33%)	4 (13.33%)	1 (3.33%)
Frontal	28 (93%)	2 (6%)	0 (0%)

Table 4: Endoscopic scoring of nasal polyposis (Mackay score).

Endoscopic polyp	Frequency	Endoscopic oedema	Frequency
Grade 1	0 (0%)	Grade 1	19 (63.33%)
Grade 2	25 (83.33%)	Grade 2	11 (36.67%)
Grade 3	5 (16.67%)	Grade 3	0 (0%)

Table 5: Comparison of type of surgery vs amount of blood loss.

Type of surgery	Blood loss				Total
	Grade 2	Grade 3	Grade 4	Grade 5	Total
Conventional	0 (0%)	2 (13.3%)	11 (73.3%)	2 (13.3%)	15 (100.0%)
Microdebrider	13 (86.7%)	2 (13.3%)	0 (0%)	0 (0%)	15 (100.0%)
Total	13 (43.3%)	4 (13.3%)	11 (36.7%)	2 (6.7%)	30 (100.0%)

Df - 3, p=0.001.

Intraoperatively, in the conventional technique most of the patients had Grade 4 (73.3%) bleeding while with the use of microdebrider most patients had bleeding of Grade 2 (86.7%) (Table 5).

The mean time required for surgery in conventional type of surgery was 112.0 minutes while the mean time required for surgery with microdebrider type of surgery was 86.67 minutes (Table 6).

Table 6: Comparison of type of surgery vs time required for surgery.

Type of surgery	Time for surgery Mean±SD
Conventional	112.00±10.82
Microdebrider	86.67±12.91*

\*p=0.001

There was no significant difference in the post operative parameters like post operative discharge, synechiae formation and recurrence of polyp between the two methods. The microdebrider technique required lesser number of post operative debridements (2.27) when compared to conventional technique (3.17) (Figure 1).

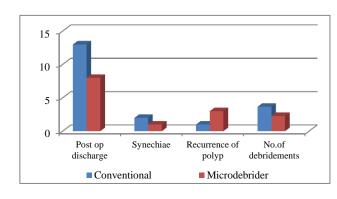


Figure 1: Comparison of post-operative parameters of conventional with microdebrider method.

An independent sample t test showed a significant difference in the mean visual analogue score at 3 months

following surgery in patients who were treated with microdebrider technique but there was no difference at 6 months following any of the two methods of surgeries (Table 7).

Table 7: Comparison of vas at 3 & 6 months with type of surgery.

Total Score	Type of Surgery	Mean±SD	P value
VAS at 3	Conventional	5.87±2.32	*0.030
months	Microdebrider	4.27±1.38*	0.030
VAS at 6	Conventional	3.87±1.35	0.930
months	Microdebrider	3.20±2.59	0.930

\*p<0.05

#### **DISCUSSION**

Patients suffering from nasal polyposis who do not respond to conservative management require definitive surgery to establish good ventilation and drainage of sinuses with mucosal preservation.

Conventional instruments usually tear tissues and stripe the mucus membrane leading to increased bleeding with decreased visibility and increased frequency of complications and scarring. Microdebriders provide suction at the surgical site and offer the advantages of evacuating polypoid tissue without removing the instrument, providing continuous suction of blood from the field with the opportunity for improved visualization and precision and for less frequent interruptions during surgery. 5,6

Singh et al also in their prospective study on 40 patients observed that the amount of intraoperative bleeding in the microdebrider group was 181 ml, compared with 225 ml in the standard group being operated by conventional methods.<sup>7</sup>

Shorter operating time required with microdebrider may be explained by the fact that with its inherent suction of both blood and tissues offers a better dry operative field and better surgical circumstances.

A study conducted by Dokuz Eylul University, Izmer, Turkey (2002) showed that microdebrider is easier and faster way of resecting polyps.<sup>8</sup>

In contrast a study by Selivanova et al who compared the use of the microdebrider as a form of powered instrumentation designed to decrease mucosal trauma with traditional surgical instruments for endonasal sinus surgery on 24 patients, were unable to find a statistical difference (p>0.05) in surgical outcome for patients when using either conventional instruments or mechanical debriders.<sup>9</sup>

Synechiae formation is the most frequently occurring complication after functional endoscopic sinus surgery

ranging from 6 to 27%. Minimizing tissue trauma and preserving normal mucosa are of utmost importance in avoiding excessive scarring, and this is what the microdebrider offers. Stankiewicz reported synechiae in 6.7% of 90 patients. <sup>10</sup>

Setliff and Parsons were the first to report the use of a soft tissue shaver for endoscopic sinus surgery as a tool for the precise removal of diseased mucosa and polyps. They reported, in their series of 345 patients, limited blood loss, accelerated healing time, reduced synechiae, and decreased middle turbinate trauma.<sup>11</sup>

Bernstein et al in their study of 40 cases of endoscopic sinus surgery performed with the microdebrider reported rapid mucosal healing, minimal crust formation, and a low incidence of synechiae formation.<sup>4</sup>

Sauer et al noted that both microdebrider and conventional methods resulted in symptom improvement and in endoscopically visible healing over time, but no significant difference was found between the two techniques. In endoscopic evaluation, only the total score at 3 weeks after surgery was significantly better in the microdebrider group. No significant difference was found at any other time point. Synechia formation, patency of middle meatal antrostomy, and open access to the ethmoid were the same in both groups. In this study of endoscopic sinus surgery the use of the microdebrider did not offer major advantages compared to the standard instruments.<sup>12</sup>

The proximity of skull base and orbit have raised concerns about the safety of microdebrider in endoscopic sinus surgery. The minor and major complication rates for the nasal polyposis group with microdebrider were 11.8% and 0.5%. Complications like ocular injury, Subarachnoid haemorrhage and CSF fistula has been reported in various studies using microdebrider. 14,15

Innovations in powered instrumentation include the suction-irrigation drill, the coblator, and the introduction of a bone-cutting ultrasonic aspirator. The primary drawback of powered instruments continues to be the higher costs associated with their use, whereas their main advantage is the ability to accomplish multiple functions, such as bone removal, suction, and irrigation, with one tool. <sup>16</sup> Recent advances in microdebrider technology now permit 360 degree, blade rotation, continuous tracking of the instrument using surgical navigation, and the ability to control bleeding with bipolar energy. A variety of specialty blades are also available, each attempting to address a specific operative limitation encountered during endoscopic surgery. <sup>17</sup>

## CONCLUSION

The use of microdebrider in endoscopic sinus surgery has the advantage of complete clearance of disease, smoother intra operative course and better post operative healing when compared to conventional instruments.

There was a significant statistical evidence for a shorter operative time in the powered endoscopy group.

The surgical conditions and dryness of the operative field were significantly better in powered group. This highlights the longer haemostatic effect, dry operative field and better surgical circumstances provided by the microdebrider.

No major complications occurred in both the groups. In postoperative course there was no significant statistical difference between the two groups with respect to the outcomes like crusting, discharge, synechiae formation and recurrence of polyp.

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Institutional Ethics Committee

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