

## Original Research Article

# A comparative study of microdebrider assisted versus conventional endoscopic sinus surgery for nasal polyposis

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**Received:** 03 March 2019

**Revised:** 15 May 2019

**Accepted:** 22 May 2019

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### ABSTRACT

**Background:** Nasal polyps are benign, chronic, inflammatory lesions arising from the mucosa of the nasal sinuses or from the mucosa of the nasal cavity. They are a challenge to treat due to their uncertain etiology and tendency to recur. Therapy involves both medical and surgical treatment. Surgical management includes Endoscopic sinus surgery using conventional instruments or by microdebrider.

**Methods:** We conducted a study on 80 patients with nasal polyposis in whom conservative management failed. They were equally randomised into powered and conventional instruments Endoscopic Sinus Surgery (ESS) groups. The groups were compared for surgical outcomes, intra and postoperative complications and recurrence rates.

**Results:** Age of patients suffering from bilateral nasal polyposis ranged from 18 to 55 years with maximum number of patients in the group 31 to 40 years. Nasal polyps were more commonly seen in men (53.75%) than women (46.25%). Most common symptom experienced was nasal obstruction (100%), followed by olfactory disturbance in 88.7% and nasal discharge in 76.25%. There was statistically significant difference in operative time, blood loss and postoperative synechiae, with the microdebrider group showing better outcomes. There was no statistically significant difference in the postoperative VAS (visual analogue score) and recurrence rates between the two groups.

**Conclusions:** Powered endoscopic sinus surgery offers a better therapeutic approach for patients with nasal polyposis than with conventional instruments. It provides bloodless operative field with better visualisation for a more precise, less traumatic procedure with shorter operative time.

**Keywords:** Microdebrider, Nasal polyposis, Endoscopic sinus surgery

### INTRODUCTION

Nasal polyps are one of the most common inflammatory mass lesions of the nose. Polyps are often considered as the ultimate manifestation of chronic inflammation and a part of the spectrum of chronic rhinosinusitis. Management of nasal polyposis first involves medical line of management and in case of failure, definitive surgical treatment.<sup>1</sup> Endoscopic sinus surgery improves both olfaction and quality of life in chronic rhinosinusitis patients with nasal polyps, though no single surgical technique has proved to be entirely curative.<sup>2,3</sup> Functional

endoscopic sinus surgery by Messerklingers' traditional instrumentation technique was conventionally followed but with the entry of powered instruments like microdebrider, a new scope for the management of nasal polyposis opened. Microdebrider was popularised as it precisely debrides tissues and also continuously suction blood away from the surgical field with the opportunity for improved visualisation and precision and for less frequent interruption during surgery.<sup>4</sup> However, whether this technique provides a significant advantage in methodology over the conventional procedure is debatable. This prospective, comparative study was conducted to compare the outcomes of conventional

method and microdebrider assisted endoscopic sinus surgery in the surgical management of nasal polyposis.

## METHODS

The study was conducted in the ENT Department of Bangalore Medical College and Research Institute on 80 patients diagnosed with bilateral nasal polyposis by diagnostic nasal endoscopy, between November 2015 and May 2017. The patients were aged between 18 to 60 years, had failed to adequately respond to medical line of management and were consenting to be a part of the study. Patients with comorbidities like diabetes mellitus, hypertension, neoplasm, immunosuppression, coagulopathy; previously operated for polyposis and those not willing for surgery were excluded from the study. All patients were randomly and equally distributed into two groups: group I who underwent endoscopic sinus surgery using conventional instruments and group II who underwent the same surgery using microdebrider. The various operative procedures included polypectomy, uncinectomy, middle meatal antrostomy, anterior and posterior ethmoidectomy. A subjective visual analogue scale (VAS) was completed by every patient to assess the severity and impact of symptoms for nasal blockage, nasal discharge, olfactory disturbance, facial pain and headache. VAS was ranging from 0 for symptoms not troublesome at all to 10 for the worst imaginable level of symptoms. Complete nasal examination including diagnostic nasal endoscopy was done in all cases. Results were graded according to the extent of polyps as stage I (extending to the middle meatus), stage II (extending to areas beyond the middle conchae without reaching the floor of the nasal passage) and stage III (extending through the entire nasal passage). A pre operative CT scan of nose and paranasal sinuses was performed and Lund and Mackay staging system for radiological staging was applied. This scoring system consists of a scale of 0-2 depending on the presence of opacification of the sinus system and occlusion of the osteomeatal complex (0-no opacification, 1-partial opacification, 2-complete opacification of sinuses. For osteomeatal complex: 0-no occlusion, 2-complete occlusion). Maximum score is 12 per side. Intraoperatively, assessment of duration of surgery and blood loss were done. The operative time was kept by an independent nurse and estimated from the insertion of vasoconstrictor cottonoids at the beginning of surgery to the insertion of Vaseline impregnated nasal pack. Intraoperative blood loss was measured based on the collection of blood in the suction apparatus and subtracting the amount of saline used for irrigation. Postoperatively all patients were followed up after one, three and six months. At each follow-up, the patients were evaluated subjectively with the visual analogue scale (VAS) and objectively by diagnostic nasal endoscopy of the operated cavities. The findings were recorded and the efficiency of treatment was assessed in terms of post operative crusting, scarring, discharge, symptoms and recurrence of nasal polyps.

## Statistical analysis

The data was entered into Microsoft excel sheet, analysed using suitable statistical softwares and presented in the form of graphs, tables, figures and diagrams wherever necessary. Associations were tested using tests of significance like chi square test and the independent sample t test. P value <0.05 was taken as significant.

## RESULTS

Age of patients suffering from bilateral nasal polyposis ranged from 18 to 55 years with the mean age being 33years. Maximum number of patients were in the group 31 to 40 years. Nasal polyps were more commonly seen in men (53.75%) than women (46.25%) with a ratio of 1.7:1. Most common symptom experienced was nasal obstruction (100%), followed by olfactory disturbance in 88.7% and nasal discharge in 76.25% (Figure 1).

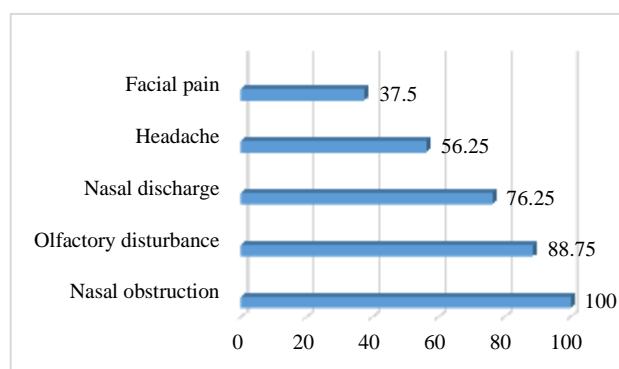


Figure 1: Symptomatology of patients.

Endoscopic grading of polyps showed no patients in stage I, 51 (63.75%) patients in stage II and 29 (36.25%) patients in stage III. Preoperative visual analogue score showed a higher mean score for symptoms of nasal blockage followed by nasal discharge. It was lowest for facial pain (Table 1).

The postoperative VAS score at 6 months had highest mean score of symptom for nasal obstruction (1.98) followed by olfactory disturbance (1.75). The least mean score was for facial pain (0.35) (Table 2).

Maximum intraoperative blood loss was 260 ml and minimum blood loss was 140 ml. Average blood loss in conventional polypectomy was 214.37 ml (SD 26.071) and in microdebrider assisted polypectomy group was 183.12 ml (SD 18.66). There was a statistically significant ( $p < 0.05$ ) difference in the blood loss between the two groups with the debrider group having lesser intraoperative blood loss. The average duration of surgery in the conventional group was 81.75 min (SD 12.823) while in the microdebrider assisted group was 61.27 min (SD 10.74). An independent sample t test showed a significant difference in the mean duration of surgery between the two groups ( $p < 0.05$ ). The duration of surgery was significantly lower in the microdebrider group.

**Table 1: Preoperative visual analogue scale.**

Symptoms	Minimum value	Maximum value	Mean	Standard deviation
Nasal blockage	5	10	7.530	1.492
Nasal discharge	0	9	5.412	3.059
Olfactory disturbance	0	8	5.05	2.024
Headache	0	8	3.6	2.983
Facial pain	0	9	3.587	2.96

**Table 2: Postoperative visual analogue scale.**

Symptoms	Minimum value	Maximum value	Mean	Standard deviation
Nasal blockage	0	6	1.98	1.528
Nasal discharge	0	3	0.98	1.07
Olfactory disturbance	0	4	1.75	1.001
Headache	0	5	1.58	1.246
Facial pain	0	3	0.35	1.000

**Table 3: Comparison of VAS between the conventional and debrider groups.**

Parameters	Conventional group	Debrider group
Mean preoperative VAS Score	25.80	24.175
Mean postoperative VAS at 1 month	15.45	12.075
Mean improvement	10.35	12.1 (p<0.05)
Mean postoperative VAS at 3 months	10.825	5.525
Mean improvement	14.97	18.65 (p<0.05)
Mean postoperative VAS at 6 months	4.05	3.45
Mean improvement	21.75	20.725 (p 0.277)

**Table 4: Comparison of post operative findings between the conventional and debrider groups.**

Parameters	Conventional group	Debrider group	P value
Crusting at 1 <sup>st</sup> month	30	18	0.006
Crusting at 3 <sup>rd</sup> month	14	8	0.133
Crusting at 6 <sup>th</sup> month	5	4	0.725
Scarring/Synechia at 1 <sup>st</sup> month	18	10	0.06
Scarring/Synechia at 3 <sup>rd</sup> month	14	8	0.133
Scarring/Synechia at 6 <sup>th</sup> month	12	4	0.025
Nasal discharge at 1 <sup>st</sup> month	26	20	0.17
Nasal discharge at 3 <sup>rd</sup> month	10	5	0.0152
Nasal discharge at 6 <sup>th</sup> month	3	1	0.304
Recurrence	4	2	0.39

Both the groups experienced a significant improvement in VAS score after surgery. There was statistically significant difference between the two groups in this improvement only at one and at three months postoperative period but not at six months postoperative period (Table 3).

Though there was statistically significant difference in the occurrence of postoperative crusting during the first postoperative month, with higher incidence in the conventional group, in the subsequent follow ups at third and sixth postoperative months there was no statistically significant difference in the two groups (Table 4).

There was no significant statistical difference in the occurrence of scarring/synechia between the two groups at 1st and 3rd postoperative months, but there was a statistically significant difference in the 6th month with more scarring/synechia seen in the conventional polypectomy group (Table 4).

There was no statistical significant difference between the type of surgery and recurrence of polyps (Table 4).

## DISCUSSION

The present study showed male preponderance (53.75%) similar to a study by Bettiga et al in which 41.66% of

patients were males.<sup>5</sup> Majority of the patients were in the age group between 31 to 40 years in our study but Bettiga et al reported higher incidence in elderly in their study.<sup>5</sup> Nasal obstruction was the most common symptom that affected 100% of patients, followed by olfactory disturbance in our study. A study by Radenne et al concluded that nasal polyps, besides causing nasal obstruction, olfactory disturbance and recurrent infection, also impaired the quality of life more than perennial allergic rhinitis.<sup>6</sup> Lee et al concluded that nasal obstruction varied in intensity depending on the site and size of polyps.<sup>7</sup> In our study 83.3% of patients had grade II endoscopic staging of polyps. Lacroix et al in their study on nasal polyposis in black Africans, Chinese and Caucasian patients state that 22% of the Caucasians and 30% of the Chinese presented with nasal polyposis at stage I of the disease. 58% of the Caucasians, 56% of the Chinese and 8% of the Africans presented in stage II of the disease. Stage III polyposis was found in 92% of the Africans, while only 20% of the Caucasians and 14% of the Chinese patients had stage III polyposis.<sup>8</sup>

In the study by Saafan et al comparing powered instruments in FESS to conventional methods, it was found that while both the groups experienced a significant improvement in the VAS after surgery, there was no statistically significant difference in improvement between the groups in total or individual VAS scores except for olfaction.<sup>9</sup> In our study microdebrider group showed better VAS scores at one and three months implying early recovery and relief of symptoms, however, both groups showed similar improvement at sixth month followup.

Singh et al in their prospective study on 40 patients observed that the mean amount of intra operative bleeding in the debrider group was 181ml as compared with 225ml in the conventional instruments group.<sup>10</sup> This result is consistent with the results obtained in the present study. Conventional instruments tend to tear tissues and strip the mucous membrane leading to increased bleeding which, in turn, decreases visibility and increases frequency of complications. Microdebrider evacuates polypoidal tissue with minimal damage to the surrounding normal tissues, thereby reducing blood loss. It also provides continuous suction of blood from the surgical site thereby giving a clearer field for surgery. This added advantage of better visualisation over conventional instruments helps in avoiding inadvertent damage to the surrounding normal structures.

A study conducted by Semih et al concluded that microdebrider is an easier and faster way of resecting polyps, which is consistent with the results of the present study.<sup>11</sup> Microdebrider allows the surgeon to work continuously without having to remove the instrument which may otherwise be necessary while using conventional instruments thus taking more time for the procedure. The longer operating time in conventional group may also be explained by the increased amount of

intraoperative blood loss in them when compared to the debrider group.

The postoperative complications like scarring/synechiae, recurrence was higher in the conventional group similar to a study by Bernstein et al who reported rapid mucosal healing, minimal crust formation and a low incidence of synechiae formation in their study of 40 cases of endoscopic sinus surgery performed with microdebrider.<sup>12</sup> Microdebrider enables accurate removal of nasal polyps while preserving the surrounding normal healthy mucosa enabling better healing with lesser chances of scar formation.

Like every other surgery, a thorough knowledge of the surgical anatomy, good surgical experience, ability to achieve good hemostasis and knowledge about the possible complications that can occur during the operation along with the ability to deal with them are essential for a successful outcome and in lowering the complication rates in surgeries using both powered instruments as well as conventional instruments.

## CONCLUSION

The use of powered instrumentation has revolutionised the practice of functional endoscopic sinus surgery. The study substantiates the fact that microdebrider assisted polypectomy is precise, relatively bloodless surgery. There is significant symptomatic improvement in cases undergoing microdebrider assisted surgery in experienced hands. It is associated with faster healing of tissues with lesser chance of scarring/ synechiae formation. It is both safe and effective, allows thorough exenteration of nasal polyps with minimal bleeding, better surgical field and in lesser time.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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**Cite this article as:** Datta RK, Ramya B, Lakshmi Priya S. A comparative study of microdebrider assisted versus conventional endoscopic sinus surgery for nasal polyposis. *Int J Otorhinolaryngol Head Neck Surg* 2019;5:1030-4.