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Comparative Study Between Conventional Polypectomy With Microdebrider Assisted Endoscopic Sinus Surgery

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ABSTRACT

Background: Nasal polyposis is a frequent presentation in ENT & HNS OPD. When endoscope was introduced, surgical management of nasal polyposis took a turn. More recently microdebrider use is in frequent practice. The objective of this study is to compare the surgical outcome in patients undergoing microdebrider assisted endoscopic surgery and conventional methods using sinus endoscopes in the surgical management of nasal polyps.

Methods: The study was a prospective randomized study carried out in department of ENT in college of medical sciences Bharatpur from January 2021 to December 2021**.** Forty patients undergoing nasal polypectomy were randomly allocated into two groups; Group C (n=20) underwent FESS using conventional instruments, Group M (n=20) underwent FESS assisted with microdebrider. Comparison was done based in intraoperative blood loss and surgical duration, and post operative outcome.

Results: Blood loss was significantly less in Group M when compared with group C (P=0.000). Mean surgical time was also significantly less in group M (79.5 min), (P=0.000). No difference was found regarding postoperative scaring, crusting, nasal discharge, synechiae formation, polyp recurrence and hospital stay (P>0.05) when two groups were compared. Significant symptomatic improvement was observed in both groups in 3 and 6 months follow up visits when compared with preoperative symptoms. Significantly low postoperative VAS score in Group M was observed when compared with group C at 3 months postoperative follow up.

Conclusions: It was concluded that FESS using conventional instruments or assisted with micodebrider is acceptable for surgical management of nasal polyposis. When both techniques are available, microdebrider assisted FESS is superior regarding less intraoperative blood loss, shorter surgical duration and better postoperative outcomes.

Keywords: FESS; microdebrider; conventional; nasal polyposis.

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INTRODUCTION

Nasal polyps are round, soft, semi-translucent, pale or yellow glistening swellings that originate from any part of the nasal mucosa or paranasal sinuses. They are parts of an allergy and inflammatory reaction involving the mucosa of the nose and paranasal sinuses and are invaginatons of the nasal mucosa attached by a pedicle arising from the ethmoidal sinuses, middle turbinate, maxillary sinuses and sometimes from the septum.[1] The initial approach for treatment of nasal polyp is medical management. Medical therapy consists of administration of intranasal steroids or a short course of systemic steroids. Other medical treatments considered are use of antiallergic drugs, antibiotics, leukotriene modifiers. [2] Surgical removal is performed for non-responders to medical management. The purpose of surgery is to restore the nasal physiology by making the nose free from nasal polyps and allowing drainage of infected sinuses. Surgical options include polypectomy and functional endoscopic sinus surgery (FESS) by Messerklinger traditional instrumentation technique. FESS is a minimally invasive technique that was introduced in the 1960s by Professors Messerklinger and Wigand. It was popularized in Europe by Stammberger and in North America by Kennedy who uses an endoscope to improve ventilation and drainage in addition to polyp removal. Definitions of FESS vary, but may be defined as a minimally invasive technique, using an endoscope to restore nasociliary clearance of mucous, drainage and aeration of the sinuses.[3] Endoscopy provides improved visualisation of the sinonasal anatomy and pioneers the way for sinus surgery to safety beyond the nasal cavity and paranasal sinuses.[2]

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Both the techniques of surgical management have been used frequently these days. There is still dilemma regarding advantage in methodology of microdebrider assisted technique over the conventional endoscopic procedure.

METHODS

The study was a prospective randomized study to be carried out in department of ENT in college of medical sciences Bharatpur from January 2021 to December 2021. All patients diagnosed with nasal polyposis visiting ENTHNS OPD at COMS Teaching Hospital planned for surgical management were selected for the study. The duration of study was one year. Fourty patients were included in the study. All patients presenting in ENT & HNS OPD with diagnosis of nasal polyposis were managed medically for two weeks and asked for follow up visits after the period of management. They were reexamined, if disease process and symptoms were not corrected , they were counseled for surgical management. After their approval for surgical management, informed written consent for the surgery and study was taken. They were randomly allocated into two groups with closed envelope technique. We have prepared 40 envelopes with written leaflets containing 'M' (Microdebrider assisted FESS), n=20 and 'C' (Conventional FESS), n=20. After getting consent, envelop was chosen randomly, patient was grouped according to the finding of the envelope. The inclusion criteria for our study was patient of both sexes and of age between 18years to 75 years, patient with History of polyp and those planned for surgery under general anesthesia. Patient unfit for surgery, Patient who didn't give consent for surgery or study, Patients who were unfit for General anesthesia due to medical conditions, Patients who had previous sinus surgery or unable to give informed consent were excluded in our study. All patients presenting in ENT & HNS OPD with diagnosis of nasal polyposis were managed medically for two weeks and asked for follow up visits after the period of management. They were reexamined, if disease process and symptoms were not corrected , they were counseled for surgical management. After their approval for surgical management, informed written consent for the surgery and study was taken. They were randomly allocated into two groups with closed envelope technique. We have prepared 40 envelopes with written leaflets containing 'M' (Microdebrider assisted FESS), n=20 and 'C' (Conventional FESS), n=20. After getting consent, envelop was chosen randomly, patient was grouped according to the finding of the envelope. A subjective visual analogue scale was completed by every patient to access the severity of symptoms for nasal blockade, nasal discharge, olfactory disturbance, facial pain or discomfort. VAS score ranged between 0 and 10, 0 when no symptom was present and 10 when worst imaginable symptom was present. Thorough sino-nasal examination including endoscopy was done in all cases.

Findings were recorded according to the extent of invasion of polyps. Staging was done 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)

Stage III (extending through the entire nasal passage)

Nasal Polyps were graded using Mackay and Lund endoscopic score which included: Polyp grading

0 Absence of polyp

1 Polyp in middle meatus only

2 Polyp beyond middle meatus but not blocking the nose completely

3 Polyp completely obstructing the nose Oedema grading

0 Absence of edema

1 Mild edema

2 Severe edema

Discharge grading

0 No discharge

1 Clear, thin discharge

2 Thick, purulent discharge

Grading sub divisions as tool for data collection

1	Presence of polyp on left side	(0,1,2,3)
2	Presence of Polyp on right side	(0,1,2,3)
3	Edema left	(0,1,2)
4	Edema right	(0,1,2)
5	Discharge left	(0,1,2)

6	Discharge right	(0,1,2)

As a part of pre operative investigation, CT scan of paranasal sinus was performed and Lund and Mackay staging system for radiological staging was done.

0 Absence of opacification
1 Partial opacification
2 Complete opacification

Surgical procedure

Surgery was undertaken under general anesthesia with endotracheal intubation and thorat packing. In the microdebrider assisted endoscopy group (group M), the microdebrider (Magnum) was used. In conventional endoscopic group (Group C) standard Messerklinger technique as described by Stammberger was employed using conventional endoscopic surgery instruments. The operative time was kept by an independent intern doctor posted in ENT department which included the time from insertion of vasoconstrictor nasal pack at the beginning of surgery to the insertion of antibiotic impregnated nasal pack at the conclusion of surgery. At the end of surgery, the surgical condition and degree of dryness of operative field was rated by the surgeon using six point scales as listed below.

0 No bleeding
1 Slight bleeding (Suction not required to clear the operative field)
2 Slight bleeding (Occasional suctioning required, Surgical field not interfered)
3 Slight bleeding (Frequent suctioning required, bleeding interfered surgical field few seconds after suction was removed)
4 Moderate bleeding (Frequent suctioning required, bleeding interfered surgical field immediately after suction was removed)
5 Severe bleeding (Constant suctioning required, Bleeding interfered surgical field despite continuous suctioning being done)

After Surgery

Patient received Intravenous antibiotics, analgesics and maintenance fluid postoperatively till oral feeding was started. Once oral feeding was started, all drugs were given per oral. Oral Antibiotic therapy lasted for one week postoperatively and analgesic was prescribed when required only after 2 days. Nasal pack was removed on the second day after surgery. Saline nasal irrigation and topical steroid spray was applied until healing of nasal mucosa occurred. Patient was discharged on 3rd post operative day and advised for hospital visits on 10, 17, 24, 90 and 180 days postoperatively. Few patients however required more frequent visits till healing occurred. Patients were evaluated subjectively with VAS, objectively by endoscopic examination on days 1, 3, 10, 17, 24, 90 and 180th post operative day. The amounts of crusting, scarring and synechiae formation were recorded at each visit. Post operative scoring was done using Lund

Kennedy scoring system

1	Scarring left	(0,1,2)
2	Scarring right	(0,1,2)
3	Crusting left	(0,1,2)
4	Crusting right	(0,1,2)

0= Absent, 1= Mild, 2= Severe.

RESULTS

This study included 40 patients with Nasal Polyps undergoing endoscopic polypectomy either using conventional techniques or microdebrider assisted technique. It was done to compare the outcome of patients following above mentioned surgical techniques. Those who underwent Conventional Endoscopic Surgery were listed as Group C and those who underwent Microdebrider assisted Endoscopic Surgery were listed as Group M. Ages of both groups were similar when compared. Pre-operative endoscopic scoring was done according to Lund-MacKay grading system. All patients in either group had grade I discharge. This finding was also similar statistically. Bleeding interfered surgical field despite continuous suctioning being done) was present. Grade II bleeding was present in 5 patients in group C and 16 patients in Group M. Grade II bleeding was present in 7 patients in Group C and 4 patients in Group M. 6 and 2 patients in Group C had Grade IV and Grade V bleeding respectively. None of the patients in Group M had Grade IV or Grade V bleeding.

The difference in bleeding grade was statistically significant (P=<0.001) between two groups. This result therefore indicates that Microdebrider assisted endoscopic surgery is associated with significantly lower bleeding when compared with conventional technique (Table 1).

Table 1. Blood loss grade and frequencies; comparison in two group.

Group	Blood loss Frequency (Grade)						p-value
	I	II	III	IV	V	Mean grade	
Group C	0	5	7	6	2	3.25	<0.001
Group M	0	16	4	0	0	2.2	

Mean duration of Surgery in Group C was 98.5 ±12.36 minutes and 79.5 ± 12.45 minutes in Group M. This difference in duration of surgery was statistically significant (P=<0.001). This therefore indicates that Microdebrider assisted endoscopic surgery was associated with significant less surgical time when compared with conventional method (Table 2).

Table 2. Comparison of mean duration of surgery in two groups.

Group	Mean	SD	p-value
Group C	98.5	12.36	<0.001
Group M	79.5	12.45	

Also, 17 (85%) patients and 14 (70%) patients in Group C and Group M respectively had mild scaring postoperatively. 3 (15%) and 6 (30%) patients respectively in Group C and Group M didn't have any scaring during postoperative examination. This difference was not significant statistically (P=0.267). This therefore indicated that both operative techniques are similar regarding postoperative scaring (Figure 1).

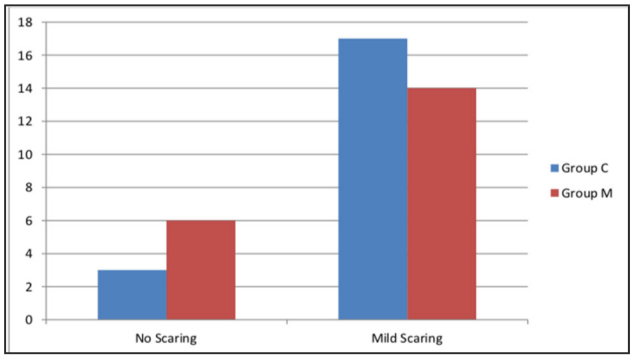

Figure 1. Postoperative scaring; comparison in two groups.

All the patients of both groups had mild crusting (Figure 2).

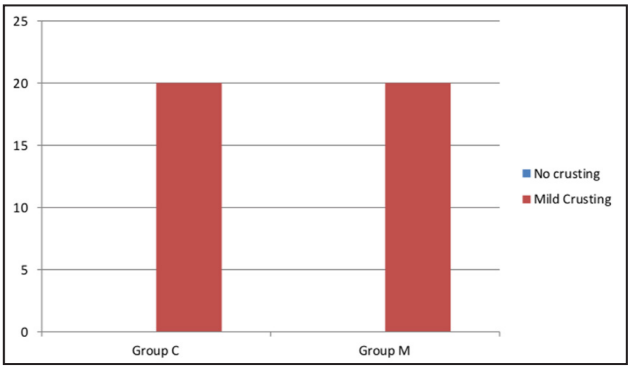

Figure 2.Crusting betyween two group.

Mild Post operative oedema was present in all patient of either group. According to this finding it was indicated that there was no difference regarding postoperative oedema if the surgery was undertaken using conventional technique or microdebrider assisted endoscopic surgery (Figure 3).

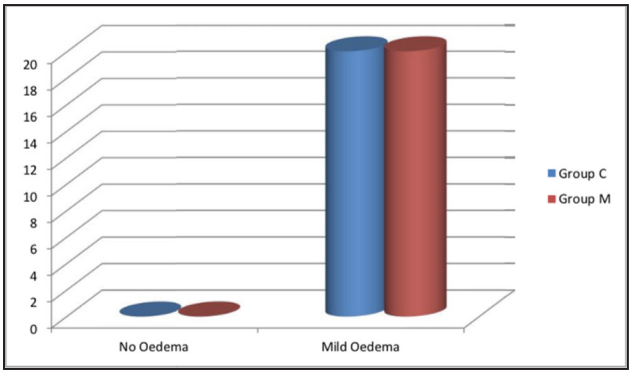

Figure 3. Postoperative Oedema; comparison in two Groups.

Post Operative Synechiae was present in 2 (10%) patients in Group C and 1 (5%) patients in Group M. This finding however was not significant statistically (P=0.56) (Table 3).

Table 3. Postoperative Synechiae; comparison between two groups.

Group	Absent	Present	p-value
Group C	18(90%)	2(10%)	0.56
Group M	19(95%)	1(5%)	

Post operative recurrence of polyp was seen in 3 (15%) patients in either group. There was no difference regarding post operative recurrence of polyp whether surgery was done using microdebrider assisted or conventional endoscopic surgery (Table 4).

There was no significant difference in the mean hospital stay, when two groups were compared

(P=0.731). Mean hospital stay in Group C was 3.30±0.470 days and 3.25±0.444 days in Group M (Table 5).

Table 4. Postoperative recurrence of polyp; comparison between two groups.

Group	Absent	Present	p-value
Group C	17(85%)	3(15%)	0.56
Group M	17(85%)	3(15%)	

Table 5. Postoperative hospital stay in days; comparison between two groups.

Group	Mean	SD	p-value
Group C	3.3	0.47	0.731
Group M	3.25	0.444	

This result showed statistically significant difference for Facial pain (P=0.018); Headache (P=0.015); Nasal Blockade (P=0.021); Nasal Discharge (P=0.010); Overall discomfort (P=0.018) and Total score (P=0.000). The result however did not indicate any difference in outcome of smell disturbance (P=0.374). Also, 3 months postoperatively VAS score was compared for Facial Pain, Headache, Nasal Blockade, Nasal Discharge, Smell disturbance, Overall Discomfort and Total score . this result showed statistically significant difference for Facial pain (P=0.018); Headache (P=0.015); Nasal Blockade (P=0.021); Nasal Discharge (P=0.010); Overall discomfort (P=0.018) and Total score (P=0.000). The result however did not indicate any difference in outcome of smell disturbance (P=0.374) (Table 6).

Table 6. Three month's postoperative VAS score; comparison between two groups.

Symptoms	Group C		Group M		p-value
	Mean	SD	Mean	SD	
Facial pain	0.5	0.513	0.15	0.366	0.018
Headche	0.75	0.639	0.3	0.47	0.015
Nasal Blockade	1.2	0.523	0.8	0.523	0.021
Nasal Discharge	1.1	0.553	0.65	0.489	0.01
Smell	0.75	0.55	0.6	0.503	0.374
Overall discomfort	1.5	0.513	1.15	0.366	0.018
Total	5.75	0.786	3.8	0.834	<0.001

DISCUSSION

Conventional sinus surgery includes external approaches, maxillary sinus irrigation, snare polypectomy, inferior meatal antrostomy and radical transnasal spheno-ethmoidectomy with or without middle turbinate resection. Surgical management has been an approved treatment modality of patients suffering from nasal polyposis, who fail conservative management. Surgery promotes sufficient ventilation and drainage of affected sinuses. Endoscopic surgeries have long been in practice for the management of nasal polyposis. There has been much improvement, refinement and progress in the endoscopic surgical technique. This study was undertaken to compare the surgical outcome of endoscopic surgery done using conventional technique and endoscopic surgery assisted with microdebrider for the management of nasal polyposis. Prevalence of nasal polyps in this study ranged between 15 to 48 years. Maximum patients were between age of 20 to 30 years. When two groups were compared they were statistically similar (P=0.848). Prevalence of disease was found to be more common in male. In our study 62.5% patients were male. When two groups were compared, gender distribution was similar. Similar to or study, in an epidemiological study, Bettiga et al also noted increased prevalence of nasal polyposis in male gender. In their study, age distribution however contradicts result of our study. They found disease more prevalent in age group more than 50 years of age.[4] This result could be attributed to the refusal of surgical management for nasal polyposis in elderly population in our part of society. Presenting symptoms of nasal polyposis are nasal obstruction, nasal discharge, smell disturbances, headache, voice changes and mouth breathing. Among them most common symptom was nasal obstruction, which was present in all the patients. Second common symptom

was nasal discharge (87.5%) followed by headache (32.5%) and other. The 64 presenting symptoms when compared in two groups were not significant statistically P>0.05). Similar to this study Bettiga et al. and Drake Lee et al. also found nasal obstruction and nasal discharge as most common symptoms in patient presenting with nasal polyposis. [4,5] When preoperative VAS scoring for various symptoms was done, highest score was for Nasal blockade followed by nasal discharge. There was significant reduction of VAS score postoperatively. Mean preoperative VAS score for nasal obstruction was 8.4, which reduced to 1.20 in Group C and 0.8 in group M three months postoperatively, this further reduced to 1.05 in Group C and 0.75 in Group M 6 months postoperatively. When the difference was compared between two groups, significant difference was found at 3 month postoperatively (P=0.021). The result however did not show any difference at 6 months postoperatively (P=0.135). The mean preoperative Vas score for nasal discharge was 7.7, which reduced to 1.10 in Group C and 0.65 in group M at three months postoperatively. This difference when compared was statistically lower in Group M (P=0.010). The score further reduced to 0.75 in Group C and 0.40 in Group M, 6 months postoperatively. This result showed statistically significant difference when compared (P=0.025). Mean preoperative VAS score for headache was 4.9, for facial pain was 4.25, for smell disturbance was 4.3 and 8.3 for overall discomfort. The VAS score was respectively 0.75, 0.5, 0.75 and 1.5 at 3 months postoperatively in Group C; and 0.3, 0.15, 0.6, 1.15 at 6 months postoperatively in group M. The result was statistically significant for Headache (P=0.015), facial pain (P=0.018) and overall discomfort (P=0.018). The score for smell disturbance though was lower at three months postoperatively than preoperatively; was not different when compared between two groups(P=0.375). When the result was compared at 6 postoperative months significant difference between two groups was found for headache (P=0.011) and overall discomfort (0.018), which was lower in microdebrider group. The difference was not significant for Facial pain (P=0.080) and Smell disturbance (P=0.389). Total VAS score was 38 on preoperative examination, which reduced to 5.75 in Group C and 3.80 in Group M at 3 months postoperative examinations; this further reduced to 4.35 and 2.45 in Group C and Group M respectively at 6 months postoperative examinations. The difference was significant at 3 months examinations (P=0.000) and 6 months examinations (P=0.000).In short the outcome after surgery was significant improvement in symptoms postoperatively. The improvement was significantly better in microdebrider assisted surgery than in conventional surgery. Similar to our study, saafan et al found significant improvement in symptoms, scored as VAS score, after microdebrider technique when compared with conventional methods. The difference in their study did not met the statistical significant level.[6] R Singh et al in their study have stated that microdebrider precisely resects diseased tissue minimizing inadvertent tissue trauma and stripping, and leads to significant symptomatic improvement in patients after surgery.[7] B Ghera and team in their research article found better postoperative symptom scores in microdebrider assisted endoscopic surgery when compared with conventional technique , which was supposed to be due to accurate and precise tissue removal without damaging the surrounding mucosa.[8] Blood loss was significantly less in microdebrider group in this study. Various studies have stated the similar results. It is supposed to be due to less tissue trauma that occurs with microdebrider. Microdebrider are electrically powered shavers supplied with continuous suction. They precisely resect tissue under clear vision minimizing inadvertent tissue trauma and stripping. In contrast traditional forceps causes an undue amount of trauma by tearing and stripping normal mucosa and increasing chances of bleeding. R singh et al in their study observed significant less bleeding in microdebrider group (181ml) when compared with conventional methods (225ml).[7] Saafan et al; Krouse JH et al P Rathod et al; also found significant less blood loss in microdebrider assisted surgery when compared with conventional non powered instrument

assisted endoscopic sinus surgery.[6,9,10] Mean surgical time in this study was statistically less (P=0.000) in Microdebrider group when compared with Conventional group. Similar result has been published in various studies. It is supposed to be due to less tissue trauma, possible early hemostasis under good vision, better suctioning with inherent suction present in microdebrider. Similar to this study Saafan et al in their study found significant less surgical time in microdebrider assisted endoscopic surgery 83 min (P<0.05) when compared with conventional instruments (94 min) R Singh et al and B Ghera et al, also found significant short duration of surgery when surgery was performed using microdebrider.[7,8] Post operative outcome was compared in two groups regarding synechiae formation, scaring, crusting, nasal discharge, oedema, recurrence and hospital stay. The outcome in both groups was similar in this study. When present, symptoms were mild. Mean hospital stay in Conventional group was 3.3 days and 3.25 days in Microdebrider group, which was not significant statistically. Similar to our study, R singh et al in their study found mild nasal discharge and few recurrence in both groups, which was statistically similar in both conventional and microdebrider assisted endoscopic sinus surgery.[7] O Selivanova et al in their article were unable to find any difference in surgical outcome based on postoperative recovery, healing and incidence of complications when use of microdebrider was compared with conventional instruments assisted FESS.[11] P Rathod and team in their comparative study also found statistical insignificant postoperative outcome in patients undergoing shaver system versus standard surgical instruments in FESS. Ceylan K et al in their article observed improved postoperative outcome following surgery for the management of nasal polypois; they however did not find any difference when two groups were compared.[10,12] V Kakkar and colleagues noticed more scar formation and synechiae formation in patients undergoing surgery using conventional instruments when compared with microdebrider assisted endoscopic surgery. They presumed that conventional instruments is associated with more bone surface exposure leading to edema, granulation tissue formation and adhesion.[13] G Tirelli et al observed significantly lower recurrence but higher rate of synechiae formation when surgery was done using manual instrument compared with microdebrider.[14]Hackman et al in a research article found the potential of powered instruments to cause severe complication following rapid aspiration of orbital and cerebral contents this however did not occur in any patient in this study. [15]

CONCLUSIONS

It is therefore concluded that FESS in the management of nasal polyposis is an acceptable technique either assisted with microdebrider or with conventional instruments. However, use of microdebrider gives the advantage of complete removal of disease, shorter operative time, less blood loss, smoother intraoperative course, better postoperative outcome and symptomatic improvement.

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