

ORIGINAL ARTICLE

The Outcome of endoscopic sinus surgery using microdebrider versus conventional instruments in chronic rhinosinusitis.

Ahmad A. Abdoul Jaleel¹, Esam A. Abo El Magd², Abd El Rahman A. El Tahan³, Engy Nagy Henry^{2*}

¹ Otolaryngology Department, faculty of medicine, Assuit University.

² Otolaryngology Department, faculty of medicine, Aswan University.

³ Otolaryngology Department, faculty of medicine, Suez University.

ABSTRACT

Keywords: nasal polyposis, conventional, microdebrider, resistant rhinosinusitis.

***Corresponding author:** Engy Nagy Henry.

E-mail: enge.nage@aswu.edu.eg

Phone: +201287740993

Background: There is a great impact of chronic rhinosinusitis with polyposis on the quality of life and economy. Even greater than angina and chronic obstructive pulmonary diseases. Many cases don't respond to systemic corticosteroids or even have contraindications. Here, the endoscopic surgery is indicated as stated by the most recent guidelines. **Objectives:** Comparing the intraoperative and postoperative outcomes between the conventional instruments and the microdebrider in removing nasal polyps. **Methods:** This is a prospective randomized controlled study conducted on 100 patients diagnosed with resistant chronic rhinosinusitis with polyposis at Aswan University Hospital. 50 patients underwent endoscopic sinus surgery using conventional instruments, and the other group a microdebrider. Comparing the intraoperative blood loss, field visibility, and the duration of the operation. In addition to the postoperative patient satisfaction and endoscopic improvement between the two groups. **Results:** Our study revealed significant differences in most of the intraoperative and postoperative variables in favor of using the microdebrider for nasal polyposis. **Conclusion:** The microdebrider is preferred by most surgeons to improve field visibility, reduce the operative time along with the amount of blood loss, and achieve patient satisfaction early postoperatively.

INTRODUCTION

EPOS 2020 (European position paper on rhinosinusitis and nasal polyps 2020) defined chronic rhinosinusitis as an inflammation of the nose and paranasal sinuses manifested by nasal blockage or congestion, anterior or posterior nasal drip, facial pressure or pain, or an abnormal smell for more than 12 weeks. Sinoscopic examination reveals polyps, mucoid, or purulent discharge from the meatal complex. Edema in the middle meatus mainly. Abnormal mucosal changes at the osteomeatal complex in CT.(1) There are many treatment options for nasal polyps. Medical treatment using local and systemic steroids can be effective enough to be called medical polypectomy. Although; the side effects

and contraindications of such treatment specially the systemic steroids, can hinder the use of this option.(2) Non- responders to medical treatment or when it is contraindicated can use the second option which is surgery; which is called functional endoscopic sinus surgery (FESS).(3) Surgery can be simple polypectomy or FESS. FESS can be done using Messerklinger conventional instruments; which affect the mucosal integrity and the bleeding in the operative field would be more which would affect the visibility and increase the incidence of complications. Built in suction conventional instruments have been introduced to solve the problem of bleeding in the surgical field but they are heavy and big so their manipulations and usage are difficult. Then the microdebrider takes the invent with the advantage of continuous suction during surgery without the need to other tools.(4)

METHODS

This was a prospective randomized controlled study. After the approval of Aswan University ethical committee (IRB: 286/9/18 in September 2018), it was conducted on 100 patients visiting ENT department at Aswan University Hospital prospectively; presented with chronic rhinosinusitis resistant to medical treatment; with postoperative follow up for one year.

Inclusion criteria:

All Patients were suffering from chronic rhinosinusitis with polyposis resistant to medical treatment whatever their age, sex or presentation. (Fulfilling the definition made by the EPOS 2020).

Exclusion criteria:

Patients were medically unfit or refused the surgical intervention; recurrent or fungal rhinosinusitis, complicated cases or with other system comorbidities, and patients didn't commit their follow up schedule.

Patients were equally randomized into two groups; microdebrider (odd numbered cases) and conventional (even numbered cases) endoscopic sinus surgery method with 50 patients in each group. Every patient in the study was subjected to basic history taking including SNOT22 (Sino-Nasal Outcome Test 22), complete ENT examination with endoscopic scoring (table 1) and radiological evaluation (table 2).

Tab. 1: Meltzer scoring system. (Meltzer et al, 2006)(5)

0	No polyps.
1	Small polyps at middle meatus\ edema.
2	Blocked middle meatus.
3	Polyps extending beyond middle meatus, without complete obstruction.
4	Massive nasal polyposis.

Tab.2 Lund and McKay radiological scoring system of CT nose and paranasal sinuses. For the 4 groups of sinuses; 0= no opacification, 1= partial opacification and 2= complete opacification. For the osteomeatal complex (OMC); 0= not obstructed and 2= obstructed. The total score is from 0 to 24. (Lund V, Mackay I, 1993)(6)

Sinus system	Right	Left
Maxillary sinus	0:2	0:2
Anterior ethmoid	0:2	0:2
Posterior ethmoid	0:2	0:2
Frontal sinus	0:2	0:2
Sphenoid sinus	0:2	0:2
OMC	0 OR 2	0 OR 2
Total for each side	0:12	0:12
Grand total for both sides	0:24	

Intraoperatively; we performed basic FESS including middle meatal antrostomy, anterior, posterior ethmoidectomy, sphenoidotomy and clearance of frontal recess for all patients, as all of them had pansinusitis in their CT films. Regarding group (1) patients, we used a Storz microdebrider with the straight 4-mm blade, while in group (2), we used the conventional instruments in the form of Storz Blakesley's and cutting forceps (straight and angled ones). Storz 0, 30 and 45 degrees endoscopes, 4 mm in diameter were used for sinuses visualization and manipulations. With evaluation of operative duration and blood loss (subtracting the amount of irrigation fluid from the fluid volume in the suction).

Postoperatively; follow up after 1 month, 6 months and 1 year using SNOT 22, endoscopic (table 3) and radiological scoring.

Tab 3: The modified Lund-Kennedy endoscopic score. (Psaltis AJ, et al, 2014)(7)

Polyp	0= no polyp, 1= polyp in middle meatus only, 2= beyond middle meatus
Edema	0= absent, 1=mild,2=severe
Discharge	0=no, 1= clear\thin, 2= thick\purulent
Scarring	0= absent, 1=mild,2=severe
Crusting	0= absent, 1=mild,2=severe

Statistical

analysis:

Statistical analyses of the collected data were performed using SPSS software version 22. The prevalence was analyzed according to gender and age class. For the description of the studied population in terms of demographics, disease history, and smoking status, descriptive statistics were used. Qualitative variables were presented as percentages, and quantitative data as mean \pm standard deviation (SD). Differences between the two operative techniques were tested for statistical significance using the chi-square (or Fisher exact test) for qualitative variables, and the Student's t-test (or Wilcoxon test) for quantitative variables. Model validity was analyzed using Pearson's method. A P value of 0.05 or less was considered significant.

RESULTS

This study conducted on 100 patients at Aswan University Hospital, presented with chronic rhinosinusitis associated with bilateral nasal polypi from September 2018 to March 2020. There was a slight male predominance (55%). (Fig 1)

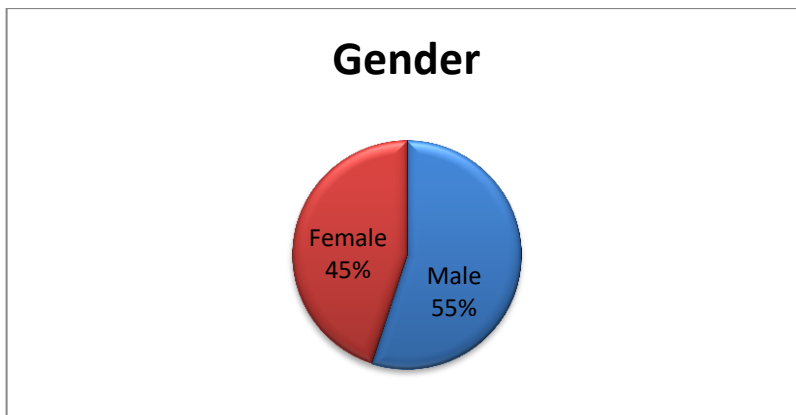


Figure 1: The gender of patients included in the study.

The age of our patients ranged from 16 to 65 years old (mean 36 ± 12). 90 patients were from Aswan governorate while 10 patients were from other nearby governorates (7 patients from Luxor, 2 patients from Qena and 1 patient from Red Sea). 65% of our patients were smokers (including passive smokers). 26 patients were exposing frequently to irritating chemicals whether through working in factories or living nearby. 24 patients were dealing intimately with birds and/ or animals. While 8 patients were exposing frequently to wood or wool dusts. The preoperative SNOT22 score ranged from 25 to 65 (mean 49 ± 8) with the most important presenting symptoms were nasal obstruction in 100% of patients, followed by sleep difficulties in 50% of patients, smell affection in 35% of patients and facial pain in 15% of them. The Meltzer polyp score ranged from 6 to 8 (50th percentile =7). The Lund-Mackay CT score ranged from 16 to 24 (50th percentile=20). All the preoperative variables distribution in both groups were statistically analyzed with no significant difference reflecting effective randomization.

The operative time in the microdebrider group was significantly less than the conventional group by 35% (**p value= 0.001**). The blood loss also was markedly less in the microdebrider group (45% with **p value= 0.001**) that affected the clearness of surgical field greatly. Five cases developed mild complications (2 in the microdebrider group), whether intraoperative or within the first 24 hours postoperative. Three cases developed eyelid emphysema and the other 2 cases periorbital ecchymosis. The 5 cases improved without surgical intervention or any other sequelae.

Our follow up schedule was at 1 month, 6 months and 1 year postoperative evaluating the SNOT22 and the modified endoscopic Lund Kennedy scores in every visit. The results are summarized in table 4.

Tab 4: The postoperative SNOT22 and modified Lund MacKay endoscopic scores in the follow up visits.

	SNOT22	Modified Lund Kennedy
1 month	19.4 +/- 6.4 (P value= 0.11)	28.5+/-2.7 (P value = 0.01)
6 months	10.8+/- 2.7 (P value = 0.004)	20.8+/-5.9 (P value = 0.78)
1 year	6.5+/- 6.9 (P value = 0.002)	12.9+/-10.3 (P value = 0.23)

Six patients developed recurrent nasal polyps within the 1st year postoperative. Five cases of recurrence were from the conventional group, while 1 case was from the microdebrider group with a P value of 0.2.

DISCUSSION

The microdebrider is an electrically powered shaver supplied with continuous suction. It accurately resects tissues with minimal inadvertent tissue trauma and stripping. This is important in avoiding excessive scarring and so the post-operative complications. On the other hand, the blakesly forceps traditionally used in sinus surgery usually cause significant trauma by tearing and stripping of normal mucosa and exposing bone. The main disadvantage of microdebrider is the lack of the tactile feedback especially during soft tissue removal.(8)

Most of the previous studies compared the microdebrider to the conventional instruments used the visual analog score (VAS) to evaluate the patients' symptoms. But they used the VAS for nasal obstruction and smell affection mainly.(9-12) We used of SNOT22, it includes 22 items involving nasal, aural, sleep problems, physical and social performance for more accurate evaluation. The follow up schedules varied between the different studies. Bellad et al. followed their patients at 1, 3, and 6 months (10). Ghera et al.'s follow-up regimen was 1 week, 3, and 6 months (11). While the follow-up duration adopted by Kaipuzha et al. was 6 months postoperative without a definite schedule for the follow-up visits (9). As we deal with a chronic disease with high tendency to recur, we made our schedule of follow-up visits at 1, 6, and 12 months postoperative.

Nearly all the previous studies found that the microdebrider is much better than the conventional instruments in dealing with nasal polyposis whether subjectively (patient satisfaction) or clinically (endoscopic score). Except for Tirelli et al, whose results were in favor of the cutting forceps (13) that may be due to the learning curve and training needed for microdebrider efficient and safe use.

On a local basis, we noted that 10% of patients were from the nearby governorates (Luxor, Qena and Red Sea). Actually this percentage is much less than what we are already dealing with in Aswan University Hospital, but those patients committed to our time plan of regular visits despite their far home towns. This is reflecting the importance of our health services not only for Aswan itself but also other nearby governorates.

The factory exposure risk whether in work or residence has been positive in 26% of patients which should be furtherly investigated and corrected by the preventive and industrial medicine organizations.

We advised the patients who were exposing to chemicals or wood dust for regular checkup as they were carcinogens.

The major limitation in this study has been the Covid 19 pandemic, which has delayed our progress and hindered the commitment to time plan of follow up visits in many cases. Those cases have been omitted from the study to ensure the validity of our study design and its results.

CONCLUSION

Each technical innovation aims at saving time and improving the surgical manipulation and so the more better results with minimal or no complications. Our study proved the significant differences in many aspects in favor of using the microdebrider rather than the conventional instruments in dealing with chronic rhinosinusitis with nasal polyposis. The most important items in our comparison were the operative time, the amount of blood loss, the symptomatic improvement at 6 months and 1 year postoperatively and the modified Lund Kennedy endoscopic score at 1 month postoperatively.

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Abbreviations:

(EPOS 2020): The European Position Paper on Rhinosinusitis and nasal polyps 2020.

OMC: OsteoMeatal Complex.

SNOT22: SinoNasal Outcome test 22.

VAS: Visual Analogue score.