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Original Article

Microdebrider Assisted Endoscopic versus Conventional Sinus Surgery in Sinonasal Polyposis: A Comparative Study

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ABSTRACT

For sinonasal polyposis, functional endoscopic sinus surgery or conventional is the standard surgical approach. Microdebrider assisted endoscopic sinus surgery provides patients with a better therapeutic approach. **Objective:** To assess and compare intraoperative, loss of smell, synechiae formation and polyp recurrence between microdebrider and conventional method in nasal polyposis patients. **Methods:** Cohort Study was carried out in Department of Ear Nose Throat, Shaikh Zayed Hospital, Lahore, 2022-2023. A total of sixty individuals with sinonasal polyposis, presenting in both genders, were included. Once written consent was obtained, the patient's comprehensive demographics were documented. Every patient was split evenly into two groups. Thirty patients each from Group A and Group B underwent endoscopic sinus surgery using traditional endoscopic tools and microdebrider respectively. Results were compared between the two groups in terms of synechiae production, length of operation, postoperative crusting, loss of smell, and intraoperative blood loss. **Results:** Age and gender differences between the two groups were not statistically significant (p-value >0.05). Regarding synechiae and loss of scent, there was no discernible difference between the two groups. **Conclusions:** The endoscopic sinus surgery with microdebrider was more effective for sinonasal polyposis as compared to conventional procedure.

INTRODUCTION

Nasal polyposis is characterized by inflammatory or viral lesions affecting the nasal or paranasal sinuses, presenting initially as smooth, round, semi-translucent masses primarily in the middle and ethmoid meatus. It impacts approximately 1 to 4 percent of the population [1]. Despite its prevalence, studies investigating variables influencing surgical outcomes have often been of low quality, resulting in varying complication rates ranging from 0.3% to 22.4%, with major complications including meningitis, brain fluid leakage, and carotid artery injuries [2].The management of nasal polyposis often involves surgical intervention, with functional endoscopic sinus surgery (FESS) being a widely used procedure. FESS has shown symptomatic improvement rates ranging from 78% to 88%, surpassing those of comparable procedures (citation needed). But issues like bleeding, infection, crusting, loss of smell, and polyp recurrence still need to be addressed [3].A fresh method for FESS has been established with the introduction of microdebrider-assisted surgery. Research contrasting mechanical

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debriders with conventional instruments has demonstrated similar results in terms of ostial patency and synechiae development, with the added benefit of simpler waste handling[4-7].

The current study intended to assess the extra advantages of microdebriders in the local population's FESS for nasal polyposis.

METHODS

A prospective cohort design was used in this study in order to compare the results of traditional sinus surgery with microdebrider-assisted endoscopic sinus surgery in patients with sinonasal polyposis. The study was conducted at the Department of ENT, Shaikh Zayed Hospital, Lahore over the course of one year. The study was approved by Institutional review board of Shaikh Zayed Medical complex with IRB ID SZMC/IRB/Internal/MS/123/19, dated 19-12-2019. A sample of 60 patients was considered, with 80% power of test and 95% level of confidence. The expected mean intra-operative blood loss in patients undergoing functional endoscopic sinus surgery for nasal polyposis with and without microdebrider assistance was estimated to be 81.90±7.26 ml (microdebrider) versus 109.93±6.20 ml (conventional). Non-probability consecutive sampling technique was employed for participant selection, after the consecutive sampling final sample size was achieved. Inclusion criteria include, Patients of both sexes, aged between 20 and 70 years, suffering from nasal polyps as per operational definition, Patients with a Lund-Mackay score >8, Patients who provided written informed consent. Exclusion criteria includes, patients taking antiplatelet therapy or having bleeding disorders, patients who had undergone radiotherapy for oral or pharyngeal tumors in the past month, patients with a history of previous nasal surgery, patients with sinonasal polyposis due to etiologies other than allergic, such as fungal sinusitis, patients requiring other surgeries like septoplasty, Hypertensive patients. Following clearance by the Hospital Ethical Review Committee, eligible patients were told about the study and granted written informed consent. Using a lottery, patients were divided into two groups. Group A had endoscopic sinus surgery with microdebrider assistance, whereas Group B had traditional endoscopic sinus surgery. Surgical procedure was performed, by same Surgeon. Under general anesthesia, an endoscope was inserted into the nose to visualize the polyps and nasal anatomy. Polyp resection was performed using traditional methods in Group B and with the assistance of microdebriders in Group A. Blood loss and surgical time were recorded during the procedure. Patients were managed with appropriate antibiotics and painkillers post-operatively. Follow-up appointments were scheduled at 24 hours for packing removal and at 6 months for further evaluation. The outcome of interest included smell loss, synechia formation, nasal crusting and intraoperational blood pressure, number of follow ups, the need for second operation to eliminate synechia and recurrence and cost of treatment. Data analysis was performed using SPSS version 21.0. Quantitative variables such as intraoperative blood loss and surgical time were presented as mean±SD, while qualitative variables such as gender, crusting, synechiae formation, recurrence, and smell loss were presented as frequency and percentages. Statistical significance was assessed using independent t-tests and chi-square tests, with $p \leq 0.05$ considered significant.

RESULTS

The demographic distribution revealed that in group A and B, were 11 (36.7%) males and 19 (63.3%) females, and 12 (40%) males and 18 (60%) females respectively. The male to female ratios were 1:1.7 and 1:1.5 respectively. Group A had mean age of 37.20±11.55 years. Group B had a mean age of 38.27±11.35 years. The difference in age distribution between the groups was not significant ($p>0.05$) shown in table 1.

Table 1: Demographic Characteristics

Variables	Group A	Group B	p-value
Gender			
Male	11 (36.7%)	12 (40%)	0.68
Female	19 (63.3%)	18 (60%)	
Age			
21-40 years	18 (60%)	17 (56.7%)	0.720
41-60 years	12 (40%)	13 (43.3%)	

The comparison between patients undergoing microdebrider-assisted (Group A) and conventional (Group B) sinus surgery revealed significant differences in several outcome measures. Group A exhibited a higher no of crusting in relation to Group B, with 8 patients (26.7%) experiencing crusting in Group A compared to only 2 patients (6.7%) in Group B ($p = 0.038$*). However, there was no discernible difference in the two groups' incidence of synechiae formation ($p = 0.228$*), with 2 patients (6.7%) and 5 patients (16.7%) in Group B and Group A, respectively, having synechiae. Similarly, while there was a trend towards fewer instances of polyp recurrence in Group B (1 patient, 3.3%) compared to Group A (5 patients, 16.7%), ($p = 0.085$). Loss of smell was reported in 2 patients (6.7%) in Group A, while no patients in Group B experienced this outcome, ($p = 0.150$). Significantly less blood was lost during surgery in Group B than in Group A, where all 30 patients (100%) lost blood between 96 and 130 ml ($p = 0.00$*). Of the patients in Group B, 28 (93.3%) lost blood between 65 and 95 ml. Furthermore, the procedure duration was significantly shorter in Group B, with 27 patients (90%)

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having operative times between 1.0-2.59 hours and only 3 patients (10%) between 3.0-4.0 hours, compared to Group A where 17 patients (56.7%) had operative times between 1.0-2.59 hours and 13 patients (43.3%) between 3.0-4.0 hours (p = 0.00*) as explained in table 2.

Table 2: Outcome Variable Group A versus B

Variable	Group A (Microdebrider Assisted)	Group B (Conventional)	p-value
Crusting	8 (26.7%)	2 (6.7%)	0.038*
Loss of smell	2 (6.7%)	-	0.150
Intraoperative blood loss (ml)			
65-95	-	28 (93.3%)	0.00*
96-130	30 (100%)	2 (6.7%)	
Procedure duration (hours)			
1.0-2.59	17 (56.7%)	27 (90%)	0.00*
3.0-4.0	13 (43.3%)	3 (10%)	

*p<0.05

DISCUSSION

The necessity for definitive surgery in patients with nasal polyposis, who have not responded to conservative treatment, underscores the importance of achieving adequate ventilation and drainage of infected sinuses. Maintaining mucosal integrity or eliminating pathological changes is crucial for effective sinus drainage and tissue regeneration, typically occurring over a period of six months [8]. Microdebriders offer a precise and controlled means of tissue resection, reducing the risk of inadvertent damage and postoperative complications compared to conventional endonasal forceps, which may cause excessive trauma by removing normal mucosa and bone exposure [9]. The percentage of female patients (61.67%) is higher than that of male patients (38.33%), and the majority of patients are between the ages of 21 and 40. This distribution of gender is consistent with study from other authors measuring the outcomes of functional endoscopic sinus surgery (FESS) [10]. Compared to the traditional group, the microdebrider-assisted group had a positively higher rate of polyp recurrence in ($p<0.05$) and a significantly bigger intraoperative blood loss ($p<0.05$). These findings are in accordance with a study conducted by Varman *et al.*, which discovered that the conventional group's rates of scarring, synechiae formation, and polyp recurrence were much greater [11]. Synechiae is a common consequence of endoscopic sinus surgery. The use of microdebriders can help lowering the synechie. In contrast to the traditional group, a greater percentage of patients in the microdebrider group attained full nasal patency, and there was a statistically significant improvement in scent perceptions (P=0.000) in the microdebrider group, according to Salam et al [12]. Another research found that microdebriders are associated with less blood loss [13, 14]. These study findings shows the importance of using microdebriders during endoscopic sinus surgery to provide more effective and less traumatic polyp resection. Apart from the above mentioned benefits, microdebriders also offer surgical suction, which makes it easier to remove polypoid tissues from the surgical site without having to take the tool out. This feature improves the process's efficiency and helps with improved sensitivity, visualisation, and fewer operational disruptions [15]. Furthermore, a non-randomized, non-blind research with 250 patients receiving assistance from microdebriders during surgeries revealed that the group using microdebriders had significantly less intraoperative bleeding than the 225 patients receiving conventional endoscopic treatments [16, 17]. In a similar vein, a different study found that, in nasal polyp procedures, microdebriders dramatically shorten operating times and intraoperative blood loss [18, 19]. The current study also revealed notable differences in intraoperative blood loss and operative time between the groups, consistent with findings from a 5-year prospective randomized controlled study by Saafan *et al* and previous investigations conducted at Dokuz Eylu University [14, 20]. However, the study by Selivanova *et al.*, did not find statistically significant differences in surgical outcomes between conventional instruments and mechanical debriders, contrasting with the findings observed in this research [21].

CONCLUSIONS

When compared to traditional endoscopic sinus surgery, microdebriders are more successful because they require less blood and less time for the procedure, have better postoperative endoscopic and symptom scores, and combine suction and cutting into one device for precise tissue removal that doesn't harm the surrounding mucosa. They also leave fewer scars and synechiae and cause fewer complications.

Authors Contribution

Conceptualization: WK
Methodology: AD, SHS, AN
Formal analysis: ZUSQ
Writing-review and editing: SQ

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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