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Original Research Article

COMPREHENSIVE STUDY OF MICRODEBRIDER IN TURBINATE AND ENDOSCOPIC SINUS SURGERY

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ABSTRACT

Background: The aim is to find out the efficacy of microdebrider in Endoscopic sinus surgery and turbinoplasty in patients who underwent surgery

Materials and Methods: This is a hospital based observational study in 100 patients age group above 12years and below 60 years, patients undergoing endoscopic sinus surgery for sinonasal polyposis, turbinectomy for chronic hypertrophic rhinitis. All the selected patients will undergo diagnostic nasal endoscopy and will be categorized to Turbinate hypertrophy, Sinonasal polyposis. Patients with Sinonasal polyps will be graded according to Meltzer classification.

Results: In our study, in Endoscopic sinus surgery group the mean duration of surgery was 59.15 ± 12.5 minutes in Grade II, 75.62 ± 16.4 minutes in Grade III and 98.15 ± 18.6 minutes in Grade IV. The mean duration of surgery was 75.4 ± 19.48 minutes. In turbinectomy group, the mean duration of surgery was 68.3 ± 19.5 minutes in Allergic rhinitis, 79.5 ± 21.8 minutes in Chronic rhinosinusitis with polyps, 74.1 ± 16.5 minutes in Chronic rhinosinusitis without polyps and 80.2 ± 24.8 minutes in non-allergic rhinitis. The mean duration of surgery was 77.1 ± 22.4 minutes. Per-operative visibility of surgical field according to Boezaart Vandermerwe grading in Endoscopic sinus surgery group was Grade I in 14%, Grade II in 78% and Grade III in 8%. Per-operative visibility of surgical field according to Boezaart Vandermerwe grading in turbinectomy group was Grade I in 12%, Grade II in 82% and Grade III in 6%. Complications of microdebrider Per-operative turbinoplasty were 5patients with mucosal tear, 7 patients with incomplete removal and 6 with Prolonged bleeding. complications of microdebrider Per-operative ESS were 5 with crustations, 2 were with nasal dryness and 1 with Secondary bleeding.

Conclusion: We conclude that, the conventional group had a significantly longer mean surgical duration and bleeding. Because the microdebrider has built-in suction clearance at the surgical site, it offers a better surgical field and drastically shortens the length of time needed for surgery.

Keywords: Microdebrider, Sinonasal polyposis, Endoscopic sinus surgery, Turbinoplasty.

INTRODUCTION

Treating nasal obstruction that is both chronic and recalcitrant to treatment can be extremely difficult. Even though nasal obstruction is not fatal, it can have a serious negative impact on a patient's quality of life. The nasal airway's narrowest point is the anterior end of the inferior turbinate, which is where hypertrophied inferior turbinate can significantly obstruct the nose. Nasal obstruction, mouth breathing, snoring, and secretion stasis are all possible consequences of turbinate hypertrophy. Following the first-line pharmaceutical treatment's failure, surgery is required to address the inferior turbinate hypertrophy. There are numerous surgical options, such as cryosurgery, radiofrequency, laser

argon, carbon dioxide laser, microdebrider, and electrocautery-assisted submucosal ablation. Turbinoplasty has become the method of choice for reducing the volume of turbinate while lowering the risk of complications from the procedure. A surgical procedure called microdebrider-assisted inferior turbinoplasty (MAIT) is used to treat hypertrophic turbinates.[1,2]

Many ailments and diseases collectively referred to as sinonasal diseases are hosted by the nose and paranasal sinuses. Conditions like chronic rhinosinusitis, antrochoanal polyp, ethmoidal polyposis with or without sinusitis, benign conditions like inverted papilloma, juvenile nasopharyngeal angiofibroma (JNA), mucocele of paranasal sinuses, etc. are among the wide range of sinonasal pathology. For cases of sinonasal disease where medical therapy has not been successful, surgery is an effective treatment. Treatment with functional endoscopic sinus surgery (FESS) is now the norm. Restoring the natural drainage pathway and improving ventilation, drug absorption continue to be the primary goals of FESS. Due to their punching, ripping, and stripping actions, the conventional instruments used in endoscopic sinus surgery leave the surgical field covered in blood and leave no mucosal preservation or scarring. The safety of the FESS procedure is dependent on visibility of the operating area, which can be jeopardized by bleeding. It may result in an incomplete surgical procedure, extend the duration of the operation, and cause intraoperative complications.[3]

A modern, multifunctional, electrically powered device with a suction and shaver is called a microdebrider. Tissue is sucked one way by the suction, and then it is shredded between the cannulas as the blade rotates. The biggest benefit of employing the microdebrider as the main tool for endoscopic sinus surgery (ESS) is that it can perform several tasks with a single tool, which limits the working area in small nasal cavities close to the base of the skull. Continuous integrated suction's ability to continuously remove blood, tissue, and bone fragments allows for proper visualization of the operating field, eliminating the need for in-and out-of-the-field movements and cutting down on operating time. The clinical outcome after microdebrider assisted surgery have not been assessed separately in previous studies. In general, microdebrider is considered safe for sinus surgery. So, the present study aims to find out the efficacy of microdebrider in Endoscopic sinus surgery and turbinoplasty in patients who underwent surgery.

MATERIALS AND METHODS

This is a hospital based observational study conducted at Guntur Medical College & Government General Hospital, Guntur for a period of 18 months from July 2022 to December 2023. The protocol for this study was approved by the Institutional Ethical Committee (IEC), Guntur Medical College, Guntur. Prior approval from the Institutional Ethics Committee has been obtained. All the participants in this study are Voluntarily involved. Informed consent took from every participant's guardian. Participant confidentiality will be maintained. Participants were not subjected to any potential harm. Patients who Patients undergoing endoscopic sinus surgery and admitted to Department of ENT in GGH, Guntur.

Inclusion Criteria

Age group above 12years and below 60 years, patients undergoing endoscopic sinus surgery for sinonasal polyposis, turbinectomy for chronic hypertrophic rhinitis.

Exclusion criteria

Nasal endoscopic surgeries for pathologies like skull base lesions, pituitary surgeries, chronic dacryocystitis and tumors, bleeding diathesis Sample Size:

Formula used for sample size calculation is 100 patients were included in the study.

$$\text{Sample size } n_0 = \frac{z^2 pq}{d^2}$$

Simple Random Sampling done. Routine blood investigations and Diagnostic nasal endoscopy, X ray PNS, CT -PNS and MRI are done

Procedure of Data Collection: Written informed consent will be taken before enrolling the patients in the study. All the selected patients will undergo diagnostic nasal endoscopy and will be categorized to Turbinate hypertrophy, Sinonasal polyposis. Patients with Sinonasal polyps will be graded according to Meltzer classification.

Patients will be then subjected to Computed tomography of paranasal sinuses, Opacification and Expansion of Involved sinuses will be noted. Oral Antibiotics for 2weeks and oral Steroids for 10 days are given preoperatively. Intraoperatively Blood collected from individual patient will be charted out according to their grade of polyposis in milliliters. Duration of surgery will be calculated from time of infiltration up to time of anterior nasal packing. Surgical field visibility will be graded according to Boezaart Vandermerwe grading. Postoperatively grading will be done after 3 weeks based on diagnostic nasal endoscopy into Synechiae, crusts, middle meatus collapse, Residual disease.

Statistical Analysis: Patients' data was collected in predesigned proforma. Data shall be analyzed using SPSS 23.0 was used for the analysis and evaluation of the data, and Microsoft Word and MS Excel have been used to generate graphs, tables, etc. For quantitative data, mean and standard deviation (SD) were calculated for qualitative data percentages calculated. A chi-square test was used for comparing differences between categorical variables. For comparison between the means, Wilcoxson matched test was used, and the students t-test used. For

interpretation of results, significance shall be adopted at p- value < 0.05 at a 95% confidence interval.

RESULTS

This is a hospital based observational study conducted at Guntur Medical College & Government General Hospital, Guntur for a period of 18 months from July 2022 to December 2023. This was conducted to assess the role of microdebrider in Turbinate and Endoscopic sinus surgeries. A total of 100 patients were included in the study. Of which 50 were underwent endoscopic sinus surgery for sinonasal polyposis and 50 were underwent turbinectomy for chronic hypertrophic rhinitis.

Table 1: Demographic distribution present study.

Age category	Turbinectomy group	Endoscopic sinus surgery group
12-20 years	8	7
21-30 years	14	16
31-40 years	21	19
41-50 years	6	7
51-60 years	1	1
Total	50	50
Gender		
Male	30	27
Female	20	23
Grading of Sino-nasal polyp based on Meltzer scores		
Grade 0	-	-
Grade I	-	-
Grade II	6	12%
Grade III	26	52%
Grade IV	18	36%
Diagnosis		
Allergic rhinitis	17	34%
Chronic rhinosinusitis with polyps	20	40%
Chronic rhinosinusitis without polyps	7	14%
Non-allergic rhinitis	6	12%

Mean ag e of participants in Turbinectomy group was 24.26 ± 15.29 and for Endoscopic sinus surgery group was 25.61 ± 18.52. The male to female ratio was found to be 1.33: 1. In our study 57% were male and 43% were female patients. 12% were belongs to Grade II according to Meltzer scores, 52% were belong to Grade III and 36% were belongs to Grade IV. The inferior turbinate hypertrophy is a common cause for nasal obstruction. 34% were belongs to Allergic rhinitis, 40% were belongs to Chronic rhinosinusitis with polyps, 14% were belongs to Chronic rhinosinusitis without polyps and 12% were belongs to non-allergic rhinitis.

Table 2: Perioperative blood loss.

Perioperative blood loss	Turbinectomy group	Endoscopic sinus surgery group
<100 ml	16	15
100-150 ml	29	30
150-200 ml	3	4
200-250 ml	1	1
>250 ml	1	0
Average blood loss	122.83 ± 32.15 ml	125.17 ± 29.48 ml
P value= 0.48, non-significant		

Table 3: Perioperative blood loss in both groups

Turbinectomy group	Frequency	Perioperative blood loss
Allergic rhinitis	17	124.59 ± 36.25
Chronic rhinosinusitis with polyps	20	118.26 ± 29.59
Chronic rhinosinusitis without polyps	7	126.05 ± 12.89
Non-allergic rhinitis	6	120.35 ± 26.57
Total	50	122.83 ± 32.15 ml
P value <0.452, non-significance		
Endoscopic sinus surgery group Grading of Polyp		
Grade 0	-	-
Grade I	-	-
Grade II	6	105.25 ± 28.56
Grade III	26	125.12 ± 19.52
Grade IV	18	148.68 ± 16.91
Total	50	125.17 ± 29.48 ml
P value <0.001		

The mean blood loss in turbinectomy group was as follows. It was 124.59 ± 36.25ml in Allergic rhinitis, 118.26 ± 29.59ml in Chronic rhinosinusitis with polyps, 126.05 ± 12.89ml in Chronic rhinosinusitis without polyps and 120.35 ± 26.57ml in non- allergic rhinitis. The mean blood loss perioperatively was 122.83 ± 32.15 ml.

The mean blood loss in Endoscopic sinus surgery group was as follows. It was 105.25 ± 28.56ml in Grade II, 125.12 ± 19.52ml in Grade III, 148.68 ± 16.91ml in Grade IV. The mean blood loss perioperatively in Endoscopic sinus surgery group was 125.17 ± 29.48 ml.

Table 4: Duration of surgery in both groups

Diagnosis in turbinectomy group	Frequency	Duration of surgery
Allergic rhinitis	17	68.3 ± 19.5
Chronic rhinosinusitis with polyps	20	79.5 ± 21.8
Chronic rhinosinusitis without polyps	7	74.1 ± 16.5
Non-allergic rhinitis	6	80.2 ± 24.8
Total	50	77.1 ± 22.4 min
Endoscopic sinus surgery group Grading of Polyp		
Grade 0	-	-
Grade I	-	-
Grade II	6	59.15 ± 12.5
Grade III	26	75.62 ± 16.4
Grade IV	18	98.15 ± 18.6
Total	50	75.4 ± 19.48 min

In our study, in turbinectomy group, the mean duration of surgery was 68.3 ± 19.5 minutes in Allergic rhinitis, 79.5 ± 21.8 minutes in Chronic rhinosinusitis with polyps, 74.1 ± 16.5 minutes in Chronic rhinosinusitis without polyps and 80.2 ± 24.8 minutes in non-allergic rhinitis. The mean duration of surgery was 77.1 ± 22.4 minutes. In our study, in Endoscopic sinus surgery group the mean duration of surgery was 59.15 ± 12.5 minutes in Grade II, 75.62 ± 16.4 minutes in Grade III and 98.15 ± 18.6 minutes in Grade IV. The mean duration of surgery was 75.4 ± 19.48 minutes.

Table 5: Per-operative visibility of surgical field according to Boezaart Vandermerwe grading in both group.

Boezaart Vandermerwe grading	Frequency	Percentage
Turbinectomy group		
Grade I	6	12%
Grade II	41	82%
Grade III	3	6%
Grade IV	0	0
Grade V	0	0
Endoscopic sinus surgery group		
Grade I	7	14%
Grade II	39	78%
Grade III	4	8%
Grade IV	0	0
Grade V	0	0

In our study, Per-operative visibility of surgical field according to Boezaart Vandermerwe grading in turbinectomy group was Grade I in 12%, Grade II in 82% and Grade III in 6%.

In our study, Per-operative visibility of surgical field according to Boezaart Vandermerwe grading in Endoscopic sinus surgery group was Grade I in 14%, Grade II in 78% and Grade III in 8%.

Table 6: The complications of microdebrider Per-operative turbinoplasty according to the causes

Diagnosis in turbinectomy group	Mucosal tear	Incomplete removal	Prolonged Bleeding
Allergic rhinitis (n=17)	1	1	1
Chronic rhinosinusitis with polyps (n=20)	2	2	2
Chronic rhinosinusitis without polyps (n=7)	1	2	2
Non-allergic rhinitis (n= 6)	1	2	1
Total (n=50)	5	7	6

The complications of microdebrider Per-operative turbinoplasty were 5patients with mucosal tear, 7 patients with incomplete removal and 6 with Prolonged bleeding.

Table 7: The complications of microdebrider Perioperative ESS according to the causes

Diagnosis in ESS group	Nasal dryness	Crustation	Secondary bleeding
Grade II (n=6)	0	1	0
Grade III (n=26)	1	2	0
Grade IV (n=18)	1	2	1
Total (n=50)	2	5	1

In our study, the complications of microdebrider Per-operative ESS were 5 with crustations, 2 were with nasal dryness and 1 with Secondary bleeding.

Table 8: The complications of microdebrider post operative healing in turbinectomy group

Diagnosis in turbinectomy	Nasal dryness	Crustation	Secondary bleeding	Residual disease
Allergic rhinitis (n=17)	-	2	-	0
Chronic rhinosinusitis with polyps (n=20)	-	2	-	1
Chronic rhinosinusitis without polyps (n=7)	1	1	-	0
Non-allergic rhinitis (n= 6)	1	1	1	0
Total (n=50)	2	6	1	1

The complications of microdebrider post operative healing in turbinectomy group were 6 with crustation, 2 with nasal dryness, 1 with secondary bleeding and 1 with residual disease.

Table 9: The complications of microdebrider post operative healing in ESS group

Diagnosis in ESS group	Synechiae	Scarring	Crustation	middle meatus collapse	Residual disease
Grade II (n=6)	0	0	1	0	0
Grade III (n=26)	1	0	1	0	0
Grade IV (n=18)	1	1	1	0	1
Total (n=50)	2	1	3	0	1

The complications of microdebrider post operative healing in ESS group were 3 with crustation, 2 with synechiae, 1 with scarring and 1 with residual disease.

DISCUSSION

This is a hospital based observational study conducted at Guntur Medical College & Government General Hospital, Guntur for a period of 18 months from July 2022 to December 2023. This was conducted to assess the role of microdebrider in Turbinate and Endoscopic sinus surgeries. A total of 100 patients were included in the study. Of which 50 were underwent endoscopic sinus surgery for sinonasal polyposis and 50 were underwent turbinectomy for chronic hypertrophic rhinitis.

With the youngest participant being 13 years old and the oldest being 60 years old, the mean age of the participants in the Turbinectomy group was 24.26 ± 15.29 and in the Endoscopic sinus surgery group was 25.61 ± 18.52. In contrast to the results of Bettega et al.'s epidemiological analysis in sinonasal polyposis,[4] which indicated that patients over 50 years of age had the highest prevalence, the study's predominant age group is 21–40 years. This could be explained by the smaller sample size or the population under study's likely higher allergy predisposition. It was discovered that the male to female ratio was 1.33: 1. Of the patients in our study, 43% were female and 57% were male.

Based on Meltzer scores, 12% of the participants in our study fell into Grade II, 52% into Grade III, and 36% into Grade IV. Nasal obstruction is frequently caused by inferior turbinate hypertrophy. Thirty percent of the participants in our study had non-allergic rhinitis, forty percent had chronic rhinosinusitis with polyps, fourteen percent had chronic rhinosinusitis without polyps.

The turbinate is a highly vascular structure, consisting of a large plexus of sinusoidal venous capacity vessels and respiratory mucosa. Because the author carefully handled the shaver to prevent damage and protect the turbinate mucosa, the current study found that perioperative bleeding (bleeding during surgery) was so common that it stopped on its own after surgery. This reduced the risk of accidental mucosal tears, bleeding, and crustation. The present study found that infective rhinosinusitis and non-allergic rhinitis frequently had excessive primary bleeding (4%), which was attributed to hyperaemic engorged turbinate and the possibility of an unintentional mucosal tear. Two patients (2%) experienced secondary bleeding; the first occurred on the fifth day following the operation, and the second on the seventh. These bleeding episodes were primarily caused by infection, which results in hyperaemia and increased turbinate mucosa friability.

Nasal obstruction is commonly caused by pathology in the inferior turbinates, including turbinate hypertrophy; this is especially true in allergy cases. Patients with chronic nasal congestion are advised to have surgery on their inferior turbinates to relieve their symptoms. The benefits of inferior turbinate surgery have been documented in a multitude of reports. Patients with a history of nasal allergies who complained of nasal stuffiness and obstruction symptoms made up our study group. After multiple unsuccessful medical treatments for their symptoms, the patients' quality of life was enhanced by the visual identification of turbinate reduction along with the removal of symptoms. Only the bony turbinate and the erectile submucosal tissue would be the targets of the ideal turbinate surgery. The inferior turbinates' ability to warm and humidify the inspired air is enhanced when the mucosa is preserved. It was suggested to modify one's lifestyle through allergy counselling. For three weeks, they took oral antihistamines, and a few patients also received steroid nasal sprays.

The vital anatomical structure known as inferior turbinates is involved in the heating, filtering, and humidification of inhaled air in the nose. Patients

experience persistent nasal obstruction due to inferior turbinate hypertrophy, which can be quite uncomfortable and concerning. A persistent nasal blockage lowers one's quality of life. Due to unintentional mucosal damage, conventional turbinectomy also carried a markedly increased risk of post- operative crusting and synechiae/adhesion formation. Because they cause less mucosal damage and undervision resection, more recent procedures like endoscopic partial turbinectomy and microdebrider assisted turbinoplasty are becoming more and more popular. The benefits of minimal mucosal damage and undervision resection include less post-operative bleeding and crusting and safety for the surrounding tissues in the nose.

Modern techniques for turbinate resection include endoscopic approaches and microdebriders for surgically reducing the size of turbinates. Conventional methods from the past resulted in significant mucosal loss and tissue damage. Endoscopic turbinectomy allows for the controlled surgical removal of hypertrophied turbinate tissue while under vision. By resectioning hypertrophied turbinate tissue with a small scar at the proximal end of the turbinate and maintaining mucosa, the microdebrider reduces side effects related to damage to the mucosa. Our research revealed that the turbinoplasty technique was superior in reducing post- operative complications such as bleeding, crusting, and the formation of synechiae; however, both procedures were equally successful in relieving nasal obstruction.

A comparison between submucosal diathermy of inferior turbinates and powered turbinoplasty was made by Joniau et al.[5] They discovered that powered turbinoplasty produced much better long-term outcomes—that is, less post-operative crusting and an improvement in nasal obstruction—than submucosal diathermy. When Kassab et al,[6] compared turbinoplasty using a diode laser versus a microdebrider, they found that both methods were equally successful, safe, and had few complications following surgery.

Bozan et al,[7] compared turbinoplasty without fracture and bipolar cautery and found that turbinoplasty was more effective in reducing inferior turbinate volume. Thimmaiah et al,[8] compared turbinectomy with turbinoplasty and turbinectomy in inferior turbinate hypertrophy. They showed less post-operative complications after turbinoplasty, such as bleeding, crusting, synechiae, and headache, but in contrast they showed better long-term relief of nasal obstruction after total turbinectomy as compared to turbinoplasty. One excellent benefit of turbinoplasty is the preservation of the turbinate mucosa, which reduces post-operative granulation formation on damaged or nude mucosa and tissues. This granulation formation is the cause of post-operative crusting and the formation of synechiae and adhesions. Because turbinoplasty removes submucosal tissues, bone, etc. more quickly than endoscopic partial turbinectomy, which takes longer, it also saves time.

The original purpose of endoscopic sinus surgery was to treat polyps and rhinosinusitis. It has since been expanded to include a number of more conditions. The suggested procedure, endoscopic sinus surgery, uses an anterior-posterior approach and is intended to produce a functionally intact sinus with the least amount of surgical intervention required. The primary goal of this conservative procedure is to eradicate the disease in the sinus region in order to restore normal physiology, hence the term "functional."

Maintaining mucosa integrity while performing minimal endoscopic procedures is the cornerstone of this technique. FESS necessitates postoperative follow-up and meticulous attention to preserve mucosa during surgery. Although serious ESS complications are uncommon, appropriate counselling should be provided.[6]

Traditional surgical instruments have a permanent place in rhinological procedures. However, as medical technology has advanced, powered instruments have begun to buck the trend and are quickly gaining traction in place of forceps and curettes. An electrically powered multifunctional tool with a shaver and a suction is called a microdebrider. Tissue is sucked one way by the suction, and as the blade rotates, the tissue is shredded in between the cannulas. Therefore, the goal of the current study is to determine the subjective and objective results of microdebrider in a range of sinonasal diseases.

In our study, in Turbinectomy group 32% of the study subjects were having perioperative blood loss of <100ml, 58% of the study subjects were having perioperative blood loss of 100-150ml, 6% of the study subjects were having perioperative blood loss of 150-200 ml, 2% of the study subjects were having perioperative blood loss of 200-250 ml and 2% of the study subjects were having perioperative blood loss of >250 ml.

In our study, in Endoscopic sinus surgery group, 30% of the study subjects were having perioperative blood loss of <100ml, 60% of the study subjects were having perioperative blood loss of 100-150ml, 8% of the study subjects were having perioperative blood loss of 150-200 ml, 2% of the study subjects were having perioperative blood loss of 200-250 ml and no study subjects were having perioperative blood loss of >250 ml.

The mean blood loss in turbinectomy group was as follows. It was 124.59 ± 36.25ml in Allergic rhinitis, 118.26 ± 29.59ml in Chronic rhinosinusitis with polyps, 126.05 ± 12.89ml in Chronic rhinosinusitis without polyps and 120.35 ± 26.57ml in non-allergic rhinitis. The mean blood loss perioperatively was 122.83 ± 32.15 ml. The mean blood loss in Endoscopic sinus surgery group was as follows. It was 105.25 ± 28.56ml in Grade II, 125.12 ± 19.52ml in Grade III, 148.68 ± 16.91ml in Grade IV. The mean blood loss perioperatively in Endoscopic sinus surgery group was 125.17 ± 29.48 ml.

In our study, the complications of microdebrider Per-operative turbinoplasty were 5patients with mucosal tear, 7 patients with incomplete removal and 6 with Prolonged bleeding.

In our study, the complications of microdebrider Per-operative ESS were 5 with crustations, 2 were with nasal dryness and 1 with Secondary bleeding. The complications of microdebrider post operative healing in turbinectomy group were 6 with crustation, 2 with nasal dryness, 1 with secondary bleeding and 1 with residual disease. The complications of microdebrider post operative healing in ESS group were 3 with crustation, 2 with synechiae, 1 with scarring and 1 with residual disease.

Numerous studies have reported a frequency of 3.4% to 10% for postoperative bleeding. According to Bergmark RW et al,[9] there was 27% post-operative bleeding. Mucosal tears are typically caused by aggressive resection; they affect 9.5% of people with chronic rhinosinusitis (18%) and 12.5% of people with non-allergic rhinitis. According to Serrano E. et al,[10] 7.5% of cases involved mucosal tears. Crustation occurred in 10% of cases with unintentional mucosal tears, but all cases were resolved three weeks after surgery with the use of a saline nasal spray. Since the mucosa and its neurovascular supply were intact, atrophic rhinitis was not seen. Although the incidence rate of complications related to the cause of turbinate hypertrophy varies, there is no statistically significant association.

There are a number of different types of potential complications associated with all turbinate reduction techniques. Every technique has known short- and long-term side effects, including bleeding and atrophic rhinitis, and none is flawless. Resection of the turbinates, either partial or submucous, is not always accurate and can lead to overexcision of tissue, which can cause atrophic rhinitis. Exposure to bone can often result in long-lasting crusting, bad odour, and occasionally bleeding. Crying and crusting after surgery on the inferior turbinate are linked to this phenomenon. With the help of a microdebrider, an inferior turbinectomy can be performed with precise tissue removal and no crusting. During the recovery phase following inferior turbinectomies, scabbing and necrosis are frequently observed. None of these side effects were seen in our patients. The main benefit of this procedure is the preservation of mucosa while debulking the turbinate. turbinate pocket endoscopic examination using suction After the procedure, electrocautery is frequently used to enhance hemostasis. Postoperative bleeding is a common complication of all surgical techniques.

In their comparison of CO2 and neodymium-doped yttrium aluminium garnet lasers for treating hyperplastic inferior turbinates, Lippert and Werner noted that 52% of patients had crusting and 16% of patients experienced postoperative bleeding. Individuals who have a thin layer of mucosa covering their bony hypertrophy are not good candidates for microdebrider turbinectomy. The patient may be more susceptible to mucosal tears because of the thick, calcified bony turbinate. The medial flap contained every mucosal tear.

Although mucosal tears were fairly common, only 5 percent of them remained attached to the septum as synechia. Avoiding any damage to the mucosa through careful septal surgery also avoids this consequence. Because of the new procedure's learning curve, there was a significant decrease in the incidence of tears during the study. There is no need for treatment when tears do occur. Microdebriders are more effective than conventional techniques, because they reduce bleeding (to a relatively bloodless extent), shorten surgical times, and improve postoperative scores.

When compared to standard techniques, microdebrider showed faster healing, decreased bleeding, and ostial occlusion in a study by Krouse et al.[11]

When compared to conventional instruments, Singh R et al,[12] found no statistically significant difference in surgical outcomes for patients; however, patients treated with microdebrider experienced symptomatic improvement. According to the findings of Mohana karthikeyan et al,[13] using a microdebrider has significant advantages over standard techniques in terms of reduced bleeding, safety, and better outcomes. Formation of synechiae, which has a 6–27% chance of occurring after sinus surgery, is one of the most significant complications. Synechiae form when the denuded mucosa comes into contact with one another during the healing process. Trauma from the backbiter and/or mucosal stripping result in the formation of synechiae. A microdebrider prevents excessive scarring by minimising tissue trauma and maintaining normal mucosa. The main risk factor for extensive mucosal damage, which increases bleeding during surgery, reduces visibility, and increases the frequency of post-operative complications, is the main complication associated with conventional instruments. In addition to providing suction at the surgical site, microdebrider also have the benefit of suctioning cut polypoidal tissue and the blood produced during the procedure, keeping the surgical field relatively clear for precise surgery and reduced bleeding during the procedure.

In our study, in Endoscopic sinus surgery group the mean duration of surgery was 59.15 ± 12.5 minutes in Grade II, 75.62 ± 16.4 minutes in Grade III and 98.15 ± 18.6 minutes in Grade IV. The mean duration of surgery was 75.4 ± 19.48 minutes.

In our study, in turbinectomy group, the mean duration of surgery was 68.3 ± 19.5 minutes in Allergic rhinitis, 79.5 ± 21.8 minutes in Chronic rhinosinusitis with polyps, 74.1 ± 16.5 minutes in Chronic rhinosinusitis without polyps and 80.2 ± 24.8 minutes in non-allergic rhinitis. The mean duration of surgery was 77.1 ± 22.4 minutes. In our study, Per-operative visibility of surgical field according to Boezaart Vandermerwe grading in Endoscopic sinus

surgery group was Grade I in 14%, Grade II in 78% and Grade III in 8%.

In our study, Per-operative visibility of surgical field according to Boezaart Vandermerwe grading in turbinectomy group was Grade I in 12%, Grade II in 82% and Grade III in 6%. This result is consistent with the findings of research conducted by Kumar & Sindwani,[14] R Singh et al,[12] and Krouse and Christmas.[15] According to this study, the conventional group had a significantly longer mean surgical duration. This finding can be explained by the longer time needed in some conventional group cases to control bleeding. Because the microdebrider has built-in suction clearance at the surgical site, it offers a better surgical field and drastically shortens the length of time needed for surgery. This result is consistent with research by Saafan et al,[16] and Selivanova et al,[17] while R Singh et al,[12] study found no discernible difference in the length of operation between the two groups. According to N. Kanishka et al., at one year after surgery, there is no statistically significant difference between the conventional group and the microdebrider group with regard to synechiae formation and polyp recurrence. According to research by Ramya Ramachandran Kaipuzha et al,[18] the microdebrider group has a lower likelihood of synechiae development and recurrence. Our study's conclusions support the second study while contradicting the first. The use of microdebriders has been linked to improved post-operative parameters, including faster mucosal healing and less crust formation.

CONCLUSION

We conclude that, the conventional group had a significantly longer mean surgical duration. This finding can be explained by the longer time needed in some conventional group cases to control bleeding. Because the microdebrider has built-in suction clearance at the surgical site, it offers a better surgical field and drastically shortens the length of time needed for surgery.

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