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A COMPARATIVE STUDY OF SHAVER SYSTEM VERSUS STANDARD SURGICAL INSTRUMENTS IN FESS (A STUDY OF 30 CASES) WITH USEFULLNESS OF NAVIGATION SYSTEM IN FESS

KEYWORDS

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INTRODUCTION

Nasal polyposis is regarded as one form of chronic inflammation in the nose and sinuses, as a part of the spectrum of chronic rhinosinusitis. Functional endoscopic sinus surgery was introduced in 1950s in the field of rhinology by Messerklinger traditional instrumentation technique. The aim of this technique is to remove the pathologic tissues inside the osteomeatal complex units and to restore the corrupted mucociliary clearance and sinus ventilation without harming normal nasal physiology and anatomy. Recent interesting modification of endoscopic sinus surgery is an introduction of MICRODEBRIDER or POWERED TISSUE SHAVER or HUMMER. It is designed to exenterate the disease with protection of normal mucosa. Microdebrider provides satisfactory results by making dissection faster, almost bloodless and safe, and lets rapid healing of tissues without harming normal mucosa. In an attempt to lessen complications and operate with greater precision, image guided surgery (navigation system) has been used by surgeons during ESS for intraoperative localization. With the use of 3 reference points and the principles of triangulation, any point in space can be localized. The surgeon can precisely identify the position of the surgical instrument without losing his way. The newer method is always questioned for its significant advantage over the conventional instruments. This study is about the efficacy, safety and precision of use of SHAVER SYSTEM in FESS with comparison to the conventional instruments.

AIMS AND OBJECTIVES

- To study the applications of microdebrider (SHAVER SYSTEM) in FESS.
- To study the blood loss during surgery, operative time spent during surgery, delayed complications, chance of recurrence, iatrogenic trauma and safety with the use of microdebrider.

- Usefullness of surgical navigation system.

EPIDEMIOLOGY AND PATHOPHYSIOLOGY

The prevalence of nasal polyposis in the population has been grossly estimated as 1–4%, though supporting evidence for this finding is scarce[1]. Older reports have suggested a prevalence ranging from 0.2[2] to 2.2[3] %. Autopsy studies have reported an incidence of bilateral nasal polyposis at 1.5 to 2%[4]. Prevalence of nasal polyposis in patients with Allergic Rhinitis is estimated to be between 1.5[5] and 1.7[6]%, and this incidence approaches that of the general population as previously described. Although the male-to-female ratio is 2-4:1 in adults, the ratio in children is unreported. Genetic inheritance has been proposed as a possible etiology of nasal polyposis. Studies have suggested that up to 14% of patients with nasal polyposis have a positive family history[7].

Nasal polyps are a multifactorial disease, with infectious, noninfectious inflammation, anatomic, and genetic abnormalities.

Factors and theories associated with nasal polyposis:
Allergy, Bernouilli phenomenon, Bernstein theory, Epithelial rupture theory, Vasomotor imbalance, Aspirin intolerance, cystic fibrosis, nitric oxide level in mucosa, fungal infections, cellular composition.

MATERIALS AND METHODS

The prospective randomised study was conducted at the Dept of Otorhinolaryngology, Smt. SCL General Hospital, Ahmedabad for a period between July 2011 & Nov 2013. Total 30 patients were enrolled. Out of which 15 patients treated with microdebrider for sinonasal polyposis were compared with 15 patients who were treated with the conventional instruments for the same. In the comparison groups the selection of the patients was done on the following basis :

- History of nasal obstruction, nasal discharge, nasal bleeding, headache or allergic symptoms.

- A thorough clinical examination was done, all patients were investigated for routine hematological and serum investigations. Nasal endoscopy and CT Scan were performed in all cases.

- All the patients had been given three weeks of systemic steroids in tapering dosage (Tab. Prednisolone 10mg thrice daily for first week then twice daily for second week and once daily for third week) and topical intranasal steroid (Fluticasone nasal spray 2 puffs twice a day in both the nostrils) preoperatively.

- The subjects were randomly selected for microdebrider and conventional instruments. Single blinded technique was used.

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- We excluded patients with uncontrolled diabetes, uncontrolled systemic arterial hypertension, liver and kidney diseases.

- We have given postoperatively same course of systemic steroidal therapy in a tapering dosage and a three months course of topical intranasal steroid.

Following factors were analysed during the study:
Blood loss during the procedure, time duration of procedure, the field of surgery.

DATA ANALYSIS AND DISCUSSION
The findings have been discussed under the following headings:

- Demographic details of the study population.

- Details of preoperative symptoms, intra operative findings and postoperative recovery over a period of 6 months.

Age distribution:
In the present study maximum study population were in age group 21-30 years and 31-40 years constituted 23.33% population in each followed by age group 11-20 years and 41-50 years constituted 20% in each group.

According to epidemiological analysis in patients with nasal polyps by Bettega S et al, polypi are more common in elderly over the age group of 50 and rarely affects children and young people[8].

Gender distribution:
In the present study out of the 30 patients 19 were males (63.33%) and 11 were females (36.67%).

According to the epidemiological analysis by Bettiga S et al, men are more commonly affected with polyps (41.66%) which is in accordance with this study[8].

Incidence of preoperative symptoms:
In the present study nasal obstruction and discharge are the most common symptoms that affected 100% of patients followed by recurrent sneezing, anosmia/parosmia, headache and nasal bleeding.

According to Drake Lee[9] the main presenting symptom of nasal polyp is nasal obstruction.

COMPARISION BETWEEN MICRODEBRIDER AND CONVENTIONAL INSTRUMENTS:
Blood loss during surgery:
In the present study blood loss was significantly less in patients operated with microdebrider. Conventional instruments usually tear tissues and stripe the mucous membrane leading to increased bleeding.

Christmas[10] reported a non-randomised non-blinded study of 250 patients who underwent microdebrider assisted surgery and compared them with 225 patients who had undergone traditional endoscopic surgery. An average of 19.5 mL blood was reported for each case with power instruments and an average of 44.5 mL in the "traditional" cases. Thus, he found that surgical bleeding was reduced by more than half in the microdebrider group.

Duration of surgical procedure:
In this study mean time required for surgery was significantly lower in debrider group when compared to conventional methods.

The shorter operating time may be explained by the longer hemostatic time needed to control bleeding in some cases of the conventional group, whereas the microdebrider with its inherent suction of both blood and tissues offers a better dry operative field and better surgical circumstances.

A study conducted by Dokuz Eylul University, Izmer, Turkey showed that microdebrider is easier and faster way of resecting polyps[11].

Field of surgery:
Continuous suction of blood and the debris provide the better field of vision. We cut the tissue under direct vision without hindrance of blood.

Hamels K, Morre TD, Clement PA and Setliff RC have shown in their study that microdebrider provides better field of surgery[12].

In our study we also find the surgical field level 2 in comparisons to conventional group that is level 3.

Injury to surrounding normal mucosa and vital structures:
Conventional instruments usually tear tissues and stripe the mucosa. This mechanism may lead to injury to surrounding normal mucus membrane. In cases of functional endoscopic sinus surgery injury to normal surrounding mucosa may lead to post operative adhesions and scarring.

In our study there is a single case of a complication of CSF rhinorrhoea by standard surgical instruments method.

Christmas DA, Krouse JH in their study described the safety of the microdebrider in experienced hands[13].

Rate of Recurrence of nasal polyp:
Sinonasal polyposis is known to recur.

Bernstein JM, Christmas DA[14] reported better radiological and endoscopic score in microdebrider group than in conventional instrument group.

In our study conventional group has recurrence rate of 7 out of 15 cases, microdebrider group has recurrence rate of 5 out of 15 cases.

The following conditions might be the reasons for the recurrence which were not considered in our present study:

- Low compliance of the patients for the treatment due to High cost and Long duration.
- Aspirin sensitivity based on positive oral, bronchial or nasal provocation or an obvious history.
- Asthma/bronchial hyper reactivity/COPD based on symptoms and respiratory function tests.
- Allergy based on specific serum IgE or skin prick tests.

Rate of synechiae formation: In postoperative course there was no significant statistical difference between the two groups with respect to synechiae formation.

Stankiewicz[15] reported synechiae in 6.7% of 90 patients.

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CONCLUSION

The microdebrider (powered tissue shaver) can be used efficiently and safely in otorhinolaryngological conditions like sinonasal polyposis.

Powered endoscopic sinus surgery (shaver system) offers a better therapeutic approach for patients with sinonasal polyposis when compared to endoscopic surgery with the conventional instruments. It provides a bloodless dry operative field with better visualization for a more precise less traumatic procedure with minimal intraoperative complications, shorter operative time with low rate of recurrence.

The application of image guidance (navigation system) can be viewed as one way to improve overall visualization during the course of endoscopic sinus surgery as it gives three dimensional (3D) approach of the pathology as well as normal anatomy of the paranasal sinuses so complete access and removal of the sinonasal polyposis will help in disease free quality of life and low recurrence rates with long disease free interval between postoperative recurrence. We have not used image guide system because of very high cost but to lessen the complications & precise surgery, future for image guided study is excellent. We will support the use of this system for all patients as nasal polyposis has got high recurrence rate.

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