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Dr. Ansh Dawar
KLE Dr. Prabhakar Kore Hospital, Nehru Nagar, Belagavi, Karnataka, India

Dr. Prashant H Patil
KLE Dr. Prabhakar Kore Hospital, Nehru Nagar, Belagavi, Karnataka, India

Dr. Basavaraj P Belaldavar
KLE Dr. Prabhakar Kore Hospital, Nehru Nagar, Belagavi, Karnataka, India

Dr. Nitin R Ankale
KLE Dr. Prabhakar Kore Hospital, Nehru Nagar, Belagavi, Karnataka, India

Dr. Priti S Hajare
KLE Dr. Prabhakar Kore Hospital, Nehru Nagar, Belagavi, Karnataka, India

Corresponding Author:
Dr. Ansh Dawar
KLE Dr. Prabhakar Kore Hospital, Nehru Nagar, Belagavi, Karnataka, India

Metanalysis of comparison for conventional functional endoscopic sinus surgery vs microdebrider assisted Functional Endoscopic Sinus Surgery (FESS) for patients of chronic rhinosinusitis with sinonasal polyposis

Ansh Dawar, Prashant H Patil, Basavaraj P Belaldavar, Nitin R Ankale and Priti S Hajare

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Abstract
Background: When it comes to medical therapy for sinonasal polyposis, the standard surgical approach is Functional Endoscopic Sinus Surgery (FESS), either conventionally or with powered instruments. When compared to FESS, the more current method of microdebrider assisted FESS provides patients with a more effective therapeutic approach. The goal is to compare the intraoperative and postoperative outcomes of both techniques compared by 5 studies and assess the usefulness of microdebriders in FESS in comparison to traditional equipment. When the microdebrider was first introduced many decades ago, powered sinus instruments entered the scene. Since then, endoscopic sinus and skull base surgery have been performed using a number of other powered instruments, including the endoscopic drill (with suction-irrigation), the coblator, and the ultrasonic aspirator. We have done a metanalysis on various studies performed all over the world where both techniques have been used and compared to evaluate the outcomes on patients with Chronic Rhinosinusitis with Sinonasal polyposis. The research demonstrated that Microdebrider-assisted FESS yields superior outcomes, including reduced intraoperative bleeding (relatively bloodless), shorter surgery duration, the combination of cutting and suction in one instrument, precise and accurate tissue removal, and decreased tissue healing time.
Objective: Metanalysis of 5 studies to assess and contrast the advantages in FESS with traditional tools and Microdebrider in terms of several intra-and post-operative metrics.
Study type-metanalysis: Material and methods-Metanalysis of studies done from 2014 to 2024 for evaluation of intra-and post-operative results of Conventional FESS vs Microdebrider assisted FESS.
Result: By combining cutting and suction into a single instrument, microdebrider-assisted FESS improves outcomes by reducing intraoperative bleeding (which is comparatively bloodless) and surgical duration, allowing for more accurate and precise tissue removal and a shorter recovery period.
Conclusion: When treating nasal polyposis, the microdebrider is far superior to traditional tools. Patients report feeling significantly better in a shorter amount of time after surgery. The surgical field is clear and bloodless, and the maneuvers are simpler for the surgeons.

Keywords: FESS, sinonasal polyposis, microdebrider-assisted FESS, chronic rhinosinusitis

Introduction
The edematous nasal mucosa that fills the nasal cavity distinguishes nasal polyps as benign lesions. One typical symptom of chronic rhinosinusitis is nasal polyposis. It is then separated into several endotypes based on the etiology, which is crucial to identify in order to accomplish effective management [2]. A frequent inflammatory condition of the paranasal mucosa, nasal polyposis causes polyps to protrude into the nasal cavity [3]. It may be the main symptom or one of several syndromes, such as asthma or aspirin idiosyncrasy. Restoring nasal breathing and olfaction, reducing nasal symptoms, and preventing recurrence are the goals of treatment [3].
Both medicinal and surgical methods can be used to treat nasal polyposis. A microdebrider and common instruments may or may not be used during FESS. A few decades ago, the microdebrider was developed, leading to the emergence of motorized sinus tools [4]. Since then, a variety of other powered tools have been used in endoscopic sinus, such as ultrasonic aspirator, coblator, and endoscopic drill (with suction irrigation) [4].

An electrically powered shaver with a cylindrical form is the microdebrider. The microdebrider preserves the nasal mucosa with minimal blood loss [5].

Materials and Methods

Comparing the intra and post operative outcomes of conventional FESS with microdebrider-assisted FESS, a meta-analysis of research conducted between 2014 and 2024.

Inclusion criteria

1. Researches conducted between 2014 and 2024 contrasting the results of microdebrider-assisted FESS with traditional FESS on patients with Chronic Rhinosinusitis with Sinonasal polyposis.
2. Age distribution of the patients ranged from 25 to 77 years.

Exclusion criteria

1. Studies involving only one type of surgery for patients with Chronic Rhinosinusitis with Sinonasal polyposis.
2. Studies involving other methods of surgery patients with Chronic Rhinosinusitis with Sinonasal polyposis.
3. Studies involving cases with active infection, bleeding disorders, recurrent ethmoidal polyps with history of previous surgery were not included in the study.

Both traditional endoscopic polypectomy and microdebrider-assisted endoscopic polypectomy were performed on the patients (Microdebrider Group). In every case, anterior and posterior ethmoidectomy, middle meatus antrostomy, and uncinectomy were performed. Every piece of polypoidal tissue that was removed was sent for histological analysis [6]. The amount of blood loss (based only on the collection of blood in the suction apparatus) and the length of the procedure (from the beginning of the procedure to nasal packing) were recorded intraoperatively.

On the second day following surgery, patients were released and instructed to continue using steroid nasal spray in addition to regular saline nasal douches [7]. After a week, the cases were examined, and endoscopic cleaning was done. In order to precisely check for polyp recurrence, discharge, scarring, crusting, and symptomatic improvement, patients were closely monitored until the sixth month [8].

Discussion

When polyposis patients do not improve with conservative treatment, a final procedure is required to allow proper ventilation and drainage of the affected sinuses. To enable sinus outflow, mucosal preservation is required; if mucosal damage is severe, attempts should be made to partially remove the pathological changes. It usually takes six months for ciliated cells to regenerate [9].

The microdebrider is a cylindrical, electrically powered instrument with continuous suction. To minimize inadvertent tissue injury and stripping, it meticulously resects tissues. This is essential for avoiding serious scarring and post-operative problems. Conversely, the blunt forceps frequently used in endonasal sinus surgery may cause severe stress by tearing and stripping normal mucosa and exposing bone [10].

There are rare chances of complications when it comes to Microdebrider assisted FESS for patients of chronic sinusitis with sinonasal polyposis which include damage of lamina papyracea and skull base which can be avoided by detailed CT scan analysis for each patient and can be avoided with regular practice.

The advantages of microdebriders are well documented [3]. Several studies have demonstrated the improvement in patient outcomes from microdebrider use in sinus surgery when compared to traditional instruments including decreased damage to sinonasal mucosa, faster operating times/reduced time under general anesthesia, improved surgical visibility, faster healing with reduced scarring, and reduced bleeding. Nonetheless, as with any surgical instrument, microdebriders have unique risks and limitations [4]. Because there is less bone exposure and less mucosal peeling, the use of a microdebrider speeds up the healing process. A cleaner surgical field is the result of constant suction at the surgical resection site [13].

Results

Although the accuracy of microdebrider assisted polypectomy depends on the surgeon's anatomical expertise and operational skills, the study supports the idea that it is a precise, comparatively bloodless procedure. All 5 studies taken for the metanalysis have shown significant advantage of using Microdebrider assisted FESS over conventional method of FESS.

Therefore, they are beneficial but not necessary for FESS to be effective. When performed by skilled professionals, microdebrider-assisted surgery significantly improves symptoms. Lastly, according to histological investigation, the microdebrider had no effect on the resected specimen's morphologic characteristics. The report reiterates how useful the microdebrider is for young, aspiring FESS surgeons. There were no significant issues in any group. In both groups, there were no ocular issues, synechiae, or leaks of cerebrospinal fluid. This might be the result of skilled surgery and meticulous imaging analysis. The study's minor outcomes include slight intraoperative bleeding, nasal discharge, crusting, and mild scarring in the microdebrider group. Minor side effects in the traditional group included intraoperative blood loss, scarring, and crusting, as well as the onset of nasal blockage three months after the procedure because of damage to the olfactory receptors caused by conventional surgery until they regenerate. Polyp recurrence was observed in both groups, but not in the microdebrider group.

Conclusion

When treating chronic rhinosinusitis with nasal polyposis, the study demonstrated the substantial differences in numerous factors that favor the use of the microdebrider over traditional tools. The duration of the procedure, the volume of blood lost, and the improvement in symptoms were the most crucial factors in our comparison.

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