

Evaluating the Risks and Potential Outcomes of Functional Endoscopic Surgery: Observational Research

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Abstract

Aim: The current study set out to evaluate tertiary hospital-acquired sequelae after functional endoscopic surgery (FESS).

Methods: The Present investigation was single-center, prospective, observational study, done in Department of ENT. The study lasted for two years. The current study included 200 patients who met the study criteria during the study period.

Results: The patients' ages ranged from 19 to 30 years old, making up 46% of the total, with those between 31- and 40-years old accounting for 29%. More male patients (68%) than female patients (32%). For FESS patients, the number of procedures done all at once ranged from uncinectomy (100%), middle meatal antrostomy (100%), anterior ethmoidectomy (100%), posterior ethmoidectomy (76%), sphenoidectomy (32%), frontal recess surgery (26%), and reduction of the middle turbinate (1%). In this research, endoscopy was able to successfully handle the two significant problems that occurred, one of which was a cerebrospinal fluid leak (1%). After careful and effective management, a small number of problems such as periorbital emphysema (3%), sinus infection (1%), periorbital ecchymosis (1%), and synechiae (5%), which required treatment, were effectively addressed.

Conclusion: Although FESS has a low complication rate and is often a safe surgery, it does have the hazards of any surgical intervention and serious problems may happen. It is one of the most frequently done procedures in otorhinolaryngology.

Keywords: Functional Endoscopic Sinus Surgery (FESS), Chronic Rhinosinusitis (CRS), nasal polyps, complications

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Introduction

Nose and paranasal sinus illnesses may now be more accurately diagnosed and treated with the use of the nasal endoscope. Patients have benefitted from more precise surgery, function preservation, and quicker recovery thanks to the nasal endoscope's ability to identify sinus and nasal pathology inside the nose's tight gaps and recesses and delicately treat the condition. [1] Many problems might arise during sinus surgery due to the close proximity of the sinuses to the orbit, anterior cranial fossa, and vascular systems, as well as the fact that individual anatomy is quite diverse. The possibility of re-establishing sinus drainage and mucosal repair is highlighted by the phrase functional endoscopic sinus surgery. The goal of functional endoscopic surgery is to keep the patient's anatomical structure and physiological functions intact. Every patient's surgical procedure is tailored to their specific needs.

The middle meatus osteomeatal complex and ethmoidal cells are the primary foci. The possibility of re-establishing sinus drainage and mucosal repair is highlighted by the phrase functional endoscopic sinus surgery. [2] For cases of chronic rhinosinusitis (CRS) that have not improved with medication, endoscopic sinus surgery (FESS) may be a lifesaver. This minimally invasive procedure allows for direct visual assessment and sinus opening. If your case of chronic rhinosinusitis (CRS) has not responded to effective medical therapy, whether it's due to nasal polyposis or allergic fungal sinusitis, FESS is the way to go. [3] Messenklinger first introduced FESS in 1978, and it was the first technique to address the underlying pathophysiological mechanism of sinusitis. [4]

Functional Endoscopic Sinus Surgery (FESS) is a set of minimally invasive surgical techniques which allow direct visual examination and opening of the sinuses for the treatment of Chronic Rhinosinusitis (CRS) which has not responded to medical treatment. FESS is the gold standard for treatment of chronic rhinosinusitis (CRS), with or without nasal polyposis and allergic fungal sinusitis refractory to optimal medical treatment. [5] FESS confers the advantage of being minimally invasive and allows for sinus air cells and sinus ostia to be opened under direct visualization. [6-8] The primary goal of FESS is to return the mucociliary drainage of the sinuses to normal function. FESS is a complex procedure, due to the sinuses' location near the cranium and orbit as well as its propensity for bleeding, this is a delicate procedure that requires skill and precision. [9] As with any invasive treatment modality an extensive list of complications has been reported in the literature so far. The major complications associated with FESS include severe hemorrhage, leakage of cerebral spinal fluid, and visual disturbances. Examples of minor complications are mild hemorrhage, periorbital hematoma and cellulitis, subcutaneous emphysema, and epiphora. [6]

The current study set out to evaluate tertiary hospital-acquired sequelae after functional endoscopic surgery (FESS).

Materials and Methods

The present investigation was a prospective, observational, single-center study that was carried out in the Department of ENT at Nalanda Medical College and Hospital in Patna, which is located in the state of Bihar in India. This study lasted for a total of two years. For the current investigation, there were a total of two hundred patients who met the study criteria over the course of the study period.

Inclusion Criteria:

patients 18-60 years, either gender, with CRS with or without polyps and patients with mucoceles posted and operated for FESS.

Exclusion Criteria:

Patients with diagnosed benign and malignant tumours. Patients with pathologies like lesions of the

pituitary, orbit, lacrimal apparatus, intracranial complications of sinusitis. Patients with gross septal deviation, patients with bleeding diathesis and other general conditions like diabetes and hypertension.

Participants were briefed about the study and asked for their signed permission before it began. A comprehensive history was taken from each patient, including a broad range of symptoms such as headaches, face discomfort, nasal discharge, nasal obstruction, and nasal mass. An extensive otolaryngological evaluation was carried out, with a focus on eliciting discomfort in the sinuses and performing anterior and posterior rhinoscopy. Both subjective symptoms and physical signs led to the final diagnosis of CRS. When necessary, we conducted routine laboratory investigations, nasal endoscopies, and radiological evaluations (CT scan of the posterior nasal sinuses, X-ray of the paranasal sinuses in water's view, and occasionally lateral view, which includes the nasopharynx). Patients were placed under general anaesthesia and then positioned supine with their heads lifted to a 30-degree angle and slightly tilted to the right for the Functional Endoscopic Sinus Surgery. Each patient had FESS using the "Messerklinger Technique," an anterior-to-posterior technique. Septoplasty, uncinectomy, polypectomy, anterior ethmoidectomy, posterior ethmoidectomy, middle meatal antrostomy, and partial middle turbinectomy are all parts of the surgical technique. The procedure was carried out by two highly experienced surgeons. (with over five years of experience). For seven days after surgery, the middle meatus was filled with detachable gauze.

The data was examined using SPSS 22.0 after it had been produced and imported into Microsoft Excel. While ratios and proportions were computed for categorical variables, standard deviations (SD), means, percentages, and frequencies were computed for continuous data. When appropriate, we used a chi-square test or a Fisher exact test to look for percentage differences among qualitative variables. A statistically significant result was defined as a p-value below 0.5.

Results

Table 1: Age and gender distribution

Characteristics	N	%
Gender		
Male	136	68
Female	64	32
Age in years		
19-30	92	46
31-40	58	29
41-50	34	17
51- 60	16	8

Majority of patients were from 19-30 years age group (46%) followed by 31-40 years age group (29%). Male patients (68%) were more as compared to female (32%).

Table 2: Surgical procedures performed

Surgery	N	%
Uncinectomy	200	100
Middle meatal antrostomy	200	100
Anterior ethmoidectomy	200	100
Posterior ethmoidectomy	152	76
Sphenoidectomy	64	32
Frontal recess surgery	52	26
Reduction of the middle turbinate	2	1

In patients undergoing FESS, multiple surgeries were performed simultaneously such as uncinectomy (100%), middle meatal antrostomy (100%), anterior ethmoidectomy (100%), posterior ethmoidectomy (76%), sphenoidectomy (32%), frontal recess surgery (26%) and reduction of the middle turbinate (1%).

Table 3: Complications

Complications	N	%
Major		
CSF leak	2	1
Minor		
Adhesions requiring treatment	10	5
Periorbital emphysema	6	3
Epistaxis requiring packing	4	2
Periorbital ecchymosis	2	1
Sinus infection	2	1

In present study we noted only 2 major complications as CSF leak (1%) which was effectively managed by endoscopy. Few minor complications as synechiae requiring treatment (5%), periorbital emphysema (3%), epistaxis requiring packing (2%), periorbital ecchymosis (1%) and sinus infection (1%), all were managed conservatively and successfully.

Discussion

Many problems might arise during sinus surgery due to the close proximity of the sinuses to the orbit, anterior cranial fossa, and vascular systems, as well as the fact that individual anatomy is quite diverse. Complications can be lessened with the use of modern radiographic technology, such as computed tomography (CT) scans, magnetic resonance imaging (MRI) scans, and image guidance navigation systems, which allow for detailed analysis of complicated anatomy both before and during surgery.

Naked polyps can be seen in chronic rhinosinusitis (CRS). Eighty percent of polyps originate in the infundibulum, uncinate process, or middle meatal mucosa, according to multiple studies. [6,7] Nasal polyposis has several potential causes, some of which include infections, allergies, trauma, chemicals, metabolic diseases, and psychogenic factors. [8] Although medical therapy is the first line of defence in CRS, surgical intervention is typically considered when non-invasive methods of symptom

relief are exhausted or when complications are present. Severe intraoperative or immediate postoperative haemorrhage; cerebrospinal fluid leak; orbital problems (such as ecchymosis, diplopia, or decreased visual acuity); and minor complications (such as adhesions, infection, minor bleeding, and postoperative pain) are the usual categories into which FESS complications are placed. [10]

The patients' ages ranged from 19 to 30 years old, making up 46% of the total, with those between 31- and 40-years old accounting for 29%. More male patients (68%) than female patients (32%). For FESS patients, the number of procedures done all at once ranged from uncinectomy (100%), middle meatal antrostomy (100%), anterior ethmoidectomy (100%), posterior ethmoidectomy (76%), sphenoidectomy (32%), frontal recess surgery (26%), and reduction of the middle turbinate (1%). Pain, vasovagal attack, and swallowed nasal packs were listed as potential additional complications in the study by Scott et al., [11], which included 315 patients. The complication rate was 2.5% and included epistaxis, infection, and swallowed nasal packs. The procedures were terminated due to these complications. The majority of the 6.6% total adverse event rate reported by the 3128 patients enrolled in the National Sinonasal Audit was associated with mild bleeding. Only 0.4% experienced serious complications, and 0.2% had issues specific to the orbit. There were two cases of

periorbital emphysema and five cases of peri-orbital haemorrhage. Neither their intraocular nor extraocular movements were impaired in any of them. 0.06% experienced a cerebrospinal fluid leak that was corrected during the operation, and two more patients had to be readmitted due to significant postoperative bleeding.

In present study we noted only 2 major complications as CSF leak (1%) which was effectively managed by endoscopy. Few minor complications as synechiae requiring treatment (5%), periorbital emphysema (3%), epistaxis requiring packing (2%), periorbital ecchymosis (1%) and sinus infection (1%), all were managed conservatively and successfully. After multivariate analysis, there was a statistically significant increase in complication rates with increasing SNOT-22 and Lund-Mackay CT scores, and extent of polyposis. [12] Suzuki et al., [13] found an overall incidence of surgical complications after FESS at 0.5%, with the corresponding rates for cerebrospinal fluid leak 0.09%, orbital injury 0.09%, and hemorrhage requiring surgery 0.1%. James G. Krings et al., [10] conducted a retrospective cohort analysis of 78,944 primary FESS cases, 288 major complications were identified representing a complication rate of 0.36% (95% CI 0.32%–0.40%).

In a retrospective study of 1658 patients who underwent FESS for chronic rhinosinusitis with or without polyps or mucocele, Seredyka-Burduk M et al. [14], 32.68% of the patients required revision surgery and only 10.1% had been previously operated in same Department. Overall complications occurred in 11 patients (0.66%). Minor complications were observed in 5 patients (0.3%) with the most frequent being periorbital ecchymosis with or without emphysema. Major complications were observed in one patient (0.06%) and were related to a lacrimal duct injury. The orbit and its content are at risk during ESS because the lamina papyracea is very thin or may be incomplete. This site is the most potential risk area, especially when we do not have a good quality of vision or using powered instrumentation. The minor complications are referred to lamina papyracea injury mostly during maxillary antrostomy or ethmoidectomy. This complications are mostly seen with hypoplastic maxillary sinus or Silent Sinus Syndrome (SSS). [15-17] In cases of Outpatient FESS, surgery itself presents an independent risk factor for an unanticipated overnight hospital admission, and for early hospital readmission due to nasal bleeding, pain, or intolerance of nasal packing or dressing. [18,19]

From its introduction, the concepts of endoscopic sinus surgery continue to evolve because of increased understanding of the anatomy, improved endoscopes and video equipment, newer instrumentation, and improved technology.

Preoperative imaging of the patient to understand the extent of the disease and anatomical variations, thorough knowledge of anatomy, identification of key landmarks, preservation of normal sinus mucosa, meticulous intra operative tissue handling, periodic saline irrigation, proper hemostasis and using technologically advanced instruments are the major factors, which can definitely reduce the occurrence of complications and improve the patient outcome. [20] The use of FESS allows for a much less invasive and traumatic procedure, resulting in shorter surgery and healing times, less postoperative discomfort, and fewer surgical complications.

Conclusion

Despite the fact that FESS has a low complication rate and is often a safe treatment, it does carry the risks that are associated with any surgical intervention, and it is possible that major complications may arise. In the field of otorhinolaryngology, it is one of the operations that is performed the most often.

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