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Original Research Article

A Single-Centre, Prospective Assessment of the Complications of Functional Endoscopic Sinus Surgery (FESS)

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Abstract

Aim: This clinical study was aimed to study complications of functional endoscopic sinus surgery (FESS) at a tertiary care hospital in southern Bihar region.

Material & Methods: The present study was single-center, prospective, observational study, including 100 patients conducted in Department of ENT, Narayan medical College and hospital, Sasaram, bihar, India Study duration was of one and a half years.

Results: Majority of patients were from 19-30 years age group (44%) followed by 31-40 years age group (28%). Male patients (70%) were more as compared to female (30%). In patients undergoing FESS, multiple surgeries were performed simultaneously such as uncinectomy (100%), middle meatal antrostomy (100%), anterior ethmoidectomy (100%), posterior ethmoidectomy (72%), sphenoidectomy (28%), frontal recess surgery (22%) and reduction of the middle turbinate (1%). In present study we noted only 1 major complication as CSF leak (2%) 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.

Conclusion: FESS is one of the most commonly performed operations in otorhinolaryngology and is generally a safe procedure, with a low rate of complications but as with any surgical intervention, it carries risks and major complications may occur.

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

Introduction

The nasal endoscope has revolutionized the diagnosis and treatment of diseases of the nose and paranasal sinuses. The use of nasal endoscope for the identification of sinus and nasal pathology within the narrow spaces and recesses of the nose and delicate management of the disease has benefited the patient by providing more accurate surgery, preservation of function, and faster healing. [1] Because of highly variable individual anatomy and the intimate relationships to the orbit, anterior cranial fossa and vascular structures, sinus surgery has many potential complications.

The term functional endoscopic sinus surgery is used to draw attention to the potential for re-establishing sinus drainage and mucosal recovery. Functional Endoscopic Sinus Surgery aims at maintaining the physiological function and anatomic structure. The extent of the operation is individualized according to each patient. It is focused on the osteomeatal complex in the middle meatus and the ethmoidal cells. The term functional endoscopic sinus surgery is used to draw attention to the potential for re-establishing sinus drainage and mucosal recovery. [2] 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. [3] FESS was the first procedure addressing the underlying pathophysiologic mechanism of sinusitis as first described by Messenklinger in 1978. [4]

FESS confers the advantage of being minimally invasive and allows for sinus air cells and sinus ostia to be opened under direct visualization. [4,5] Over the last 20 years and with the advancement of surgical and diagnostic tools, FESS became not only the treatment of choice for CRS but also the treatment of orbital and skull base problems as well as its propensity for bleeding, this is a delicate procedure that requires skill and precision. [7,8] FESS is done in a very tight and dangerous anatomical areas and hence it is associated with major fatal and minor complications. 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. [6,9] To reduce the rate of complications, only surgeons with vast experience, proper surgical and diagnostic setups are allowed to perform this type of surgery.

The present clinical study was aimed to study complications of functional endoscopic surgery (FESS) at a tertiary hospital.

Material & Methods

The present study was single-center, prospective, observational study, including 100 patients conducted in Department of ENT, Narayan medical College and hospital, Sasaram, bihar, India Study duration was of one and half years.

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, intra-cranial complications of sinusitis.
- Patients with gross septal deviation, patients with bleeding diathesis and other general conditions like diabetes and hypertension.

Study was explained to patients and a written informed consent was taken. All the patients were subjected to detailed history of wide spectrum of presenting symptoms viz. facial pain, headache, nasal discharge, nasal obstruction and nasal mass. A thorough ENT examination with special emphasis on anterior and posterior rhinoscopy and elicit sinus tenderness was done. The diagnosis of CRS was made in accordance with history and objective findings. Routine laboratory investigations, nasal endoscopy,

radiological assessment (X-ray of the paranasal sinuses Water's view and sometimes lateral view including nasopharynx) and CT Scan PNS were done whenever required.

All patients underwent Functional Endoscopic Sinus Surgery, in supine position with head elevated to 30 degree and slightly turned to right, under General anaesthesia. The 'Messerklinger Technique' of FESS was followed in all the patients, this is an anterior to posterior approach. the surgical procedure consist of septoplasty, polypectomy uncinectomy, anterior ethmoidectomy, middle meatal antrostomy, posterior ethmoidectomy, partial middle turbinectomy. The surgery was performed by two senior surgeons. (experienced more than 5 years). After the surgery the middle meatus was packed with removable gauze packing for 7days.

Statistical Analysis

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Frequency, percentage, means and standard deviations (SD) was calculated for the continuous variables, while ratios and proportions were calculated for the categorical variables. Difference of proportions between qualitative variables were tested using chi-square test or Fisher exact test as applicable. P value less than 0.5 was considered as statistically significant.

Results

Table 1: Age and gender distribution

Characteristics	N	%
Gender		
Male	70	70
Female	30	30
Age in years		
19-30	44	44
31-40	28	28
41-50	18	18
51- 60	10	10

Majority of patients were from 19-30 years age group (44%) followed by 31-40 years age group (28%). Male patients (70%) were more as compared to female (30%).

Table 2: Surgical procedures performed

Surgery	N	%
Uncinectomy	100	100
Middle meatal antrostomy	100	100
Anterior ethmoidectomy	100	100
Posterior ethmoidectomy	72	72
Sphenoidectomy	28	28
Frontal recess surgery	22	22
Reduction of the middle turbinate	1	1

In patients undergoing FESS, multiple surgeries were performed simultaneously such as uncinectomy (100%), middle meatal antrostomy (100%), anterior ethmoidectomy (100%), posterior ethmoidectomy (72%), sphenoidectomy (28%), frontal recess surgery (22%) and reduction of the middle turbinate (1%).

Table 3: Complications

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

In present study we noted only 1 major complication as CSF leak (2%) 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. We did not noted any major complications such as Orbital haematoma (post septal), Loss of vision, Diplopia, Meningitis, Brain abscess, Focal brain damage, Haemorrhage requiring transfusion, Carotid artery injury, Epiphora, Blindness, CNS deficits Or any Minor complications such as Dental or lip pain or numbness, Bronchospasm, Dental or lip pain or numbness or anosmia. No mortality was observed.

Discussion

Sinusitis is a common problem that leads to a significant amount of health care expenditure due to direct costs of physician visits and antibiotics as well as indirect costs related to reduced productivity and a decrease in quality of life. [4,9] The cornerstone of accurate diagnosis and treatment of chronic rhinosinusitis (CRS) is a thorough history, complete physical examination including nasal endoscopy and computed tomographic (CT) analysis. [10] The treatment for maxillary sinusitis was aimed at simple drainage of suppuration of antrum. In 19th century, Caldwell and Luc [11] independently described technique that included the creation of a canine fossa antrostomy, complete eradication of infected mucosa, and to facilitate drainage and aeration via. inferior meatal antrostomy and closure of the oral incision. The first attempt at nasal and sinus endoscopy was made by Hirshman in 1901, using a modified cystoscope. In 1925, Maltz, a New York rhinologist, used the term sinoscopy and advocated the technique for diagnosis. [12] 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. [13]

Majority of patients were from 19-30 years age group (44%) followed by 31-40 years age group (28%). Male patients (70%) were more as compared to female (30%). In patients undergoing FESS, multiple surgeries were performed simultaneously such as uncinectomy (100%), middle meatal antrostomy (100%), anterior ethmoidectomy (100%), posterior ethmoidectomy (72%), sphenoidectomy (28%), frontal recess surgery (22%) and reduction of the middle turbinate (1%). Scott et al., [14] in their study on 315 patients documented a complication rate of 2.5% (epistaxis, infection and swallowed nasal pack) also reported possible additional complications includes pain, vasovagal attack and swallowed nasal pack which terminated the procedures. The National Sinonasal Audit of 3128 patients reported a total adverse event rate of 6.6 %, most of which was related to minor

bleeding. 0.4 % had major complications, 0.2 % were orbital complications. Five patients had a peri-orbital haematoma and 2 had periorbital emphysema. None had a reduction in visual acuity or extra-ocular movements. 0.06 % had a CSF leak, which were addressed intraoperatively and a further two returned to theatre because of major post-operative hemorrhage. 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. [15] Suzuki et al., [16] 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., [17] 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 present study we noted only 1 major complication as CSF leak (2%) 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. We did not noted any major complications such as Orbital haematoma (post septal), Loss of vision, Diplopia, Meningitis, Brain abscess, Focal brain damage, Haemorrhage requiring transfusion, Carotid artery injury, Epiphora, Blindness, CNS deficits Or any Minor complications such as Dental or lip pain or numbness, Bronchospasm, Dental or lip pain or numbness or anosmia. No mortality was observed. In a retrospective study of 1658 patients who underwent FESS for chronic rhinosinusitis with or without polyps or mucocele, Seredyka-Burduk M et al. [18], 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 is 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). [14-16] 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. [19,20]

Conclusion

FESS is one of the most commonly performed operations in otorhinolaryngology and is generally a safe procedure, with a low rate of complications but as with any surgical intervention, it carries risks and major complications may occur.

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