Original Article

Ocular complications of functional endoscopic sinus surgery

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Abstract

Objectives: To evaluate the ocular complication of functional endoscopic sinus surgery in patients with chronic sinus disease.

Methods: In a prospective descriptive, cross- sectional study without control group, 53 patients who underwent functional endoscopic sinus surgery for refractory chronic sinus diseases were evaluated .Patients underwent a complete Otolaryngology and Ocular examination and functional endoscopic sinus surgery.

Results: A total of 53 functional endoscopic sinus surgery procedures were included in this study. Mean age of patients was 37.56 ± 1.74 years (range from 20 to 60); 26 (49.1 per cent) were females and 27 (50.1 per cent) were males. Of these patients, 24 (45.3 per cent) had rhinosinusitis without nasal polyposis, and the rest 29 (54.7 per cent) had rhinosinusitis with nasal polyposis . Among the 53 cases, there were 7 (13.1%) with ocular complications following functional endoscopic sinus surgery; one case (1.9%) of cellulitis, 6 cases (11.3%) of lids swelling and conjunctival injection. It was noted that 83.77% improved postoperatively, concerning pain in the head and face. The difference between postoperative complications and causes (two groups sinusitis with nasal polyp and sinusitis without nasal polyp) was statistically meaningful (p=0.001). There was not significant difference in post-operative complications between the two age groups; below and above 40 years (p=0.45).

Conclusion: Functional endoscopic sinus surgery is an effective treatment modality against medical therapy for chronic sinus diseases.

Keywords: Functional endoscopic sinus surgery, FESS, Chronic sinus disease, Ocular complication (JPMA 61:537; 2011).

Introduction

Functional endoscopic sinus surgery (FESS) is one of the more common procedures for chronic sinus diseases treatment. It is safe in experienced hands.[1] Due to the close anatomical relationship between the paranasal sinuses and the orbit, involvement or injury of the orbit from processes primarily located in the paranasal sinuses, may occur.[2] FESS may cause variations in the IOP compartment, the changes in IOP are not statistically significant.[3] The orbit, the extra-ocular muscles, the optic nerve and the lacrimal drainage system can be damaged during FESS. The risk of injury is correlated to the anatomical variations, the history of previous surgery, the extent and the gravity of the disease and the skill of the surgeon. Early surgical intervention is indicated if there is risk of visual loss, or if no improvement is observed within 48 hours of starting medical therapy. For some years, the popularity of functional endoscopic sinus surgery (FESS) for the management of rhinosinusitis and nasal polyposis has increased significantly .The advantages of FESS in these patients were the avoidance of external ethmoidectomy and its external facial scar, an early drainage of the affected sinuses, Subperiosteal orbital abscess (SPA), and the eradication of the disease from the fronto-ethmoidal region leading to an enhanced recovery and a reduced hospital stay.[4] Subperiosteal orbital abscess (SPA) is a serious complication of paranasal sinusitis, which can lead to blindness or even death. FESS is also a safe, convenient and minimally invasive procedure in patients presenting with serious complications of sinusitis.[5-7] Chronic rhinosinusitis, allergic fungal sinusitis, inverting papilloma, and other neoplasms account for most unilateral nasal polyposis.[8] The individual symptoms of a cohort of patients with medically refractory chronic rhinosinusitis are nasal congestion, fatigue, headache, decreased sense of smell, nasal drainage, and facial pain-pressure. Late periorbital haemorrhage can occur after FESS with potentially catastrophic consequences.[9] Radiologists should be familiar with radiological findings of ophthalmic complications during functional endoscopic sinus surgery (FESS) and correlate them with the clinical manifestations and mechanisms of injury.[10] The incidence of iatrogenic CSF rhinorrhoea has also increased, especially after the introduction of endoscopic sinus surgery.[11] Image-guided surgery is increasingly acknowledged as a useful technology also for endoscopic sinus surgery. Minor complications may include bleeding, infection, crusting, synechia formation, ostial stenosis, and tooth or lip numbness, or recurrence of disease. Major complications may include hyposmia/anosmia, exposure of orbital fat and Dura, damage to extraocular muscles, blindness, vascular damage,

cerebrospinal fluid (CSF) leak, intracranial injury and death. Defining the true incidence of major and minor complications has been complicated by variable reporting among authors.[12] This article will review the data surrounding ophthalmic complication of endoscopic sinus surgery.

Methods

A retrospective review of prospective measurement of ocular complications in consecutive patients 20 to 60 years of age who underwent FESS was conducted. In a descriptive and cross-sectional study design, 53 patients were evaluated for postoperative complication of functional endoscopic sinus surgery. Patients' demographic data, operative details, post-operative course and follow-up results were recorded. Patients underwent a complete Otolaryngology and Ophthalmic examination was done by general objective examination, nasal sinus endoscopy, CT axial and coronal tomograms of paranasal sinuses and in some cases with MRI during the preoperative evaluation. Before performing FESS, surgeons are obligated to discuss the procedure and its risks through the process of informed patient consent and then all of 53 patients were treated at an academic referral center with functional endoscopic sinus surgery. The surgery was done under endotracheal anaesthesia with hypotension. A literature review was performed to identify and compare all complications. Data were expressed as mean ± SD for age, and the frequencies were calculated for other parameters. The homogeneity of groups was analyzed by t-test, and χ^2 test for the properties of patients. χ^2 test and logistic regression analysis were used to evaluate the relationship between the properties of patients and the occurrence and types of complications. Statistical analysis was made by SPSS 15 statistical package. P<.05 was regarded as statistically significant.

Results

In the period studied, 53 patients underwent FESS. There were 27 (50.9%) males and 26 (49.1%) female patients between the ages of 20 and 60 years with a mean age of 37.56 ± 1.74 years. There were 7 (13.1%) minor complications and no major complications. Of the minor complications, there was 1 (1.9%) case of mild cellulitis and 6 (11.3%) cases of postoperative lid swelling and conjunctival injections in the immediate postoperative period. No other intraoperative or early postoperative ophthalmic complications were found.

All the patients had FESS that addressed maxillary sinus disease, and 65% had surgery involving the ethmoid sinuses; 32%, the frontal sinuses; and 3%, the sphenoid sinus. One of the patients with more extensive disease involving the frontal sinus had cellulitis postoperatively, but none of the patients with sphenoid disease had any complications. This included 12 (0.48%) postoperative nose bleeds, 5 (0.56%) cases of infection following septal surgery, 7 (0.75%) cases of septal perforation and various minor functional endoscopic sinus surgery (FESS) complications (2.17%). These figures are either below or within the quoted literature rates. There were no major complications or deaths recorded following nasal surgery. Twenty -nine patients had uncomplicated pansinusitis, whereas 33 patients (53.2%) had 1 or more orbital, intracranial, soft tissue, or bony complication. The complications are summeraized in Table-1. The difference between postoperative complications and causes (two groups sinusitis with nasal polyp and sinusitis without nasal polyp) was statistically meaningful (p=0.001). There was no significant difference between the two age groups: below 40 and above 40 years and postoperative complications. (p=0.45). In 80% the operation was bilateral .Evidence of definitive diagnosis by endoscopy was obtained in less than half of the cases. CT scan, however, sometimes in combination with MRI, determined the causes and pathology in all the cases. A follow-up of at least one year post-surgery showed good results in all the patients who underwent endoscopic sinus surgery. The most common symptoms were headache and nasal obstruction. The preoperative signs of patients are summarized in Table-2. The preoperative causes of patients of Functional Endoscopic Sinus Surgery are summarized in Table-3. All patients recovered completely without any residual eye symptoms or complications.

Table-1: Postoperative complications after endoscopic sinus surgery.

Complications	Age group		Total
	20-40	41-60	20-40
No complication	23	23	46
Lids swelling and injection	6	0	6
Cellulitis	1	0	1
Total	30	23	53

Table-2: The preoperative signs of patients before endoscopic sinus surgery.

Signs	Frequency	Percent
Nose occlusion Discharge	33	62.3
Headache & pharangeal pain	11	20.8
Epistaxi& anos aemia	9	17.0
Total	53	100.0

Table-3: The preoperative causes of patients of Functional Endoscopic Sinus Surgery.

		Frequency	Percent
Valid	Sinusitis with polyposis	29	54.7
	Sinusitis without polyposis	24	45.3
Total		53	100.0

Discussion

Functional endoscopic sinus surgery is one of the most common surgical procedures performed by otolaryngologists. Potential risks exist in the surrounding structures during sinus surgery. The incidence of serious complications of endoscopic sinus surgery has been reported as 0.5% or less.[3] In our study, among the 53 cases, there were 7 (13.1%) minor complications and no major complications.

Sinus disease and its surgical treatment carry the risk of orbital complications, including the possibility of blindness. Knowledge of variations in the possible patterns of origins, courses, and distributions of the ethmoidal arteries are necessary for the diagnosis and important for the treatment of orbital disorders.[2,10] Ethmoidal arteries are damaged in endonasal surgical interventions and in operations performed on the inner wall of the orbit. Advances in surgical techniques, instrumentation, and regional arterial anatomy have resulted in functional operations of endoscopic sinus and orbital surgery with fewer complications. The radiological findings of ophthalmic complications during functional endoscopic sinus surgery (FESS) had correlation with the clinical manifestations and mechanisms of injury. This was a cross sectional study of the clinical findings of 7 (13.1%) cases with orbital complications during FESS. The most common site of entry into the orbit during FESS was the lower medial orbital wall. Orbital magnetic resonance and computed tomography findings correlate very well with the abnormal eye movements clinically observed, and can assist in clarifying the cause of injury and guide surgical corrective management of patients suffering orbital complications from FESS. Rhinosinusitis is a very common upper respiratory illness.[11] In this study 29 patients had uncomplicated pansinusitis, whereas 33 patients (53.2%) had 1 or more orbital, intracranial, soft tissue, or bony complication.

The safety and effectiveness of FESS for treatment of chronic sinusitis in adults has been shown and well documented. In their review of the literature, Terris and Davidson showed that in 1713 patients undergoing FESS, 63% experienced very good results, 28% experienced good results, and 9% had poor results. They reported CSF leaks in 0.6% of patients, postoperative epistaxis in 1.5% of patients, and minor complications in 2% of patients.[2] in this study; we did not have any case of CSF leak.

Functional endoscopic sinus surgery has been successfully utilized in the surgical treatment of medically refractory rhinosinusitis. Our series had seven cases, each showing a different ophthalmologic complication after FESS. The lacrimal drainage system injury was more frequently observed on the sides operated. However, a variety of orbital complications due to FESS have been reported in the literatures , including optic nerve damage, haemorrhage, infection, compromise of the lacrimal drainage apparatus, and strabismus but cellulitis as a complication of FESS was not reported until now. Major complications ranged from 0 to 1.5% (median, 0%) and minor complications ranged from 1.1 to 20.8% (median, 7.5%).[1,5,9] The potentially most serious complications were cerebrospinal fluid leaks, injury to the internal carotid artery, dural exposure, meningitis, bleeding requiring transfusion, periorbital/orbital fat exposure, and orbital penetration . The surgeon's knowledge of the sinus anatomy is critical, especially in revision sinus cases in which landmarks are distorted or absent. The primary symptom of blockage was most successfully treated by both conventional and functional surgery (70% and 84% asymptomatic or improved at 6 months). In this study pain was relieved in 75% and discharge relieved in 76% cases. Just fewer than 12 % experienced slight postoperative complications in the form of haemorrhage and infection. Among the patients, 70-80% were symptom free or had improved after operation. Late complications were insignificant. Functional endoscopic sinus surgery (FESS) has become the standard technique for the treatment of chronic polypoid sinusitis. According to the literature, complications of sinus surgery, such as orbital lesion range from 1.3 to 9.3 percent.[9] Anatomical and technical knowledge, gained from cadaver sections as well as surgical experience, have helped to prevent complications. Complications, such as a orbital haematoma or cellulitis , are rarely seen today.In many cases postoperative scarring is not clinically significant. FESS is effective in the treatment of chronic sinusitis and nasal polyps. The success of operation is directly related to the excellent surgical skills. A preoperative visual assessment is highly recommended to avoid possible medico legal misadventures.

All of patients recovered completely without any residual eye symptoms or complications.

Conclusions

Functional endoscopic sinus surgery (FESS) is a surgical modality for some diseases of the nose and paranasal sinuses. FESS is a relatively recent surgical procedure that uses nasal endoscopes to minimize cutting and trauma to the skin. Extreme care is required with this surgery due to the paranasal sinus' proximity to the orbits, brain, internal carotid arteries, and optic nerves.

However, even with these possible serious risks, there are many benefits to be reaped by a patient with appropriate indications from a well-performed FESS. A surgeon with appropriate experience must be present to manage the procedure.

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