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Effectiveness of FESS in the treatment of sinus diseases

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Abstract

Functional endoscopic sinus surgery (FESS) is a minimally invasive, very precise surgical technique that has innovated for the management of chronic nasal and paranasal sinus lesions. the prospective study was performed at the Department of Otorhinolaryngology in Basra Teaching Hospital, in the period from February 2019 to August 2020. The study included sixty-two patients who were clinically, endoscopically, and radiologically suggestive to have Sino-nasal diseases and did not respond to usual medical treatment. The study included sixty-two patients, thirty-four of them were males twenty-eight were females, male to female ratio was 1.21:1, their ages ranged from 9 to 74 years, the commonest age group operated upon was 41-50 years. In conclusion, Functional endoscopic sinus surgery (FESS) is a minimally invasive surgical procedure that allows direct thorough visual examination and re-opening of the sinuses for the treatment of a set of sinonasal diseases, which has not responded to medical treatment. The use of FESS permits a much less aggressive and traumatic procedure, resulting in a shorter time for surgery and the healing process, with very good improvement, less postoperative awkwardness, and relatively fewer surgical complications.

Keywords: Sinonasal diseases, FESS, Basra Teaching Hospital

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Introduction

Functional endoscopic sinus surgery (FESS) is a minimally invasive, very precise surgical technique that has innovated for the management of chronic nasal and paranasal sinus lesions [1, 2]. The past surgical concept is to create paranasal mucosal drainage by gravity through making a hole and mucosal lining removal i.e. extensive procedures, while in FESS we establish sinus drainage and ventilation through the normal anatomical pathways while keeping maximum attention to preserve the mucosal lining in addition to sinus air cells and sinus ostia are opened under direct visualization [3, 4].

The ability to treat paranasal sinus disease has been revolutionized by fiberoptic endoscopes and computed tomographic (CT) scanning [5]. Fiberoptic endoscopes have made it possible to examine the nose thoroughly from the anterior nares to the postnasal space [6].

The endoscopic procedure requires local anesthetic and may be performed in the office The specific features that must be identified and assessed during the examination are the middle turbinate and the middle meatus (osteomeatal complex), anatomic obstruction, mucopus and nasal polyps. The reasoning and concepts supporting the use of FESS have recently become widely accepted. The term “functional” was introduced to distinguish this type of endoscopic surgery from non-endoscopic, “conventional” procedures that are successfully undergone in patients who have recurrent acute or chronic infective sinusitis in addition to nasal polyposis and masses [7-10] A CT scan before FESS is mandatory to identify the patient's ethmoid anatomy and its relationship to the skull base and orbit.

A CT scanning also allows the extent of the disease to be defined, as well as any underlying anatomic abnormalities that may predispose a patient to sinusitis. Patient selection therefore involves a thorough history and physical examination. In patients with nasal polyposis that is not controlled with topical corticosteroids, FESS permits the accurate removal of polyps using suction cutters. It is not known whether the disease-free interval is extended for patients having endoscopic ethmoidectomies for polyposis compared with conventional polyp surgery, but the postoperative discomfort is minimal [11,12].

The most catastrophic complication of FESS is blindness resulting from damage to the optic nerve, however, the evidence indicates that the frequency of this complication is extremely low [13].

A cerebrospinal fluid leak is the single most common major complication of FESS, occurring in about 0.2 percent of cases.13 The leak is usually recognized at the time of surgery and can easily be repaired; it should be suspected if there is a clear nasal discharge postoperatively. Unless the discharge is contaminated with blood, the presence of glucose means that it is most likely to be cerebrospinal fluid. Absolute confirmation may be obtained by having a sample tested for the presence of beta 2 transferrin. Other, less serious, but still rare complications include orbital hematoma and nasolacrimal duct stenosis [13,14].

Patients and methods

This prospective study was performed at the Department of Otorhinolaryngology in Basra Teaching Hospital, in the period from February 2019 to August 2020. The study included sixty-two patients who were clinically, endoscopically, and radiologically suggestive to have Sino nasal diseases and not responded to usual medical treatment. Malignant diseases of

the nose and paranasal sinuses were excluded. Preoperative CT of sinus and nasal endoscopy serves as a road map for surgery. Surgery was performed usually under general anesthesia except in five patients (two pregnant women who were in the first trimester and three patients with uncontrolled diabetes mellitus, and hypertension). Patients were put in a supine position with elevation of the head.

After proper nasal mucosal decongestion, the 0o and 30o endoscopes were commonly used along with special Blakesly straight and angled forceps. Following the first pass (examination of nasopharynx and inferior meatus), the scope was moved medially to the middle turbinate to see the sphenoethmoidal recess, the opening of posterior ethmoids, and the sphenoidal sinus (second pass). Third pass, when the endoscope was passed into the middle meatus to see osteomeatal complex also called the key area.

Uncinate process, ethmoidal bulla, hiatus semilunaris, and frontal recess were visualized, uncinectomy was done to visualize the opening of the maxillary sinus, and ethmoidal bulla if enlarged is also removed by opening at its medial and inferior portion with a Blakesley's forceps. Posterior ethmoidectomy was done by identifying the ground lamella posterior to the bulla, which was pierced by a cutting forceps, any other pathology was also dealt. Likewise, the merocele pack was removed after 24 hours [15,16] and then patients were followed up for 6 months.

Results

The study included sixty-two patients, thirty-four of them were males twenty-eight were female, male to female ratio was 1.21:1, their ages ranged from 9 to 74 years, and the commonest age group operated upon was 41-50 years, this is clearly demonstrated in table 1.

Table 1.

Demographic characteristics of the studied patients.

Age groups	males	females	Total no.	%
9-20	2	5	7	11.2
21-30	4	7	11	17.7
31-40	6	5	11	17.7
41-50	10	4	14	22.5
51-60	6	4	10	16.1
61-70	5	3	8	12.9
>70	1	0	1	1.6
Total	34	28	62	100

The commonest presenting symptoms of the patients were nasal blockage, congestion or obstruction. Which represent (85.4%), followed by nasal discharge, headache, and fascial pain (69% and 66%) respectively as shown in Table 2.

Table 2.

The presenting symptoms of included patients

Presenting symptoms	No.	%
Nasal obstruction	53	85.4
Nasal drainage	43	69.3
Headache and fascial pain	41	66.1
Hyposomnia and anosmia	36	58
Voice changes	20	32.2
Snoring	18	29
Nose-bleed	6	9.6
Significant sneezing	4	6.4

The most common indication of FESS was chronic rhinosinusitis thirty-eight patients of the studied patients, 20 patients had rhinosinusitis without nasal polyps, while 18 had chronic rhinosinusitis with nasal polyps, as shown in Table 3.

Indications of FESS	No.	%
Chronic rhinosinusitis without nasal polyp	20	32.2
Chronic rhinosinusitis with nasal polyp	18	29
Allergic fungal sinusitis and mycetoma	11	17.7
Acute recurrent rhinosinusitis	4	6.4
Inverted papilloma	3	4.8
Frontoethmoidal mucoceles	2	3.2
Removal of foreign body in maxillary sinus	2	3.2
Antrochoanal polyp	1	1.6
Drainage of periorbital abscess	1	1.6

Most of the patients were primary cases (operated for the first time), which involved 48 patients, while revision surgery was performed for fourteen patients, this is clearly illustrated in figure 1.

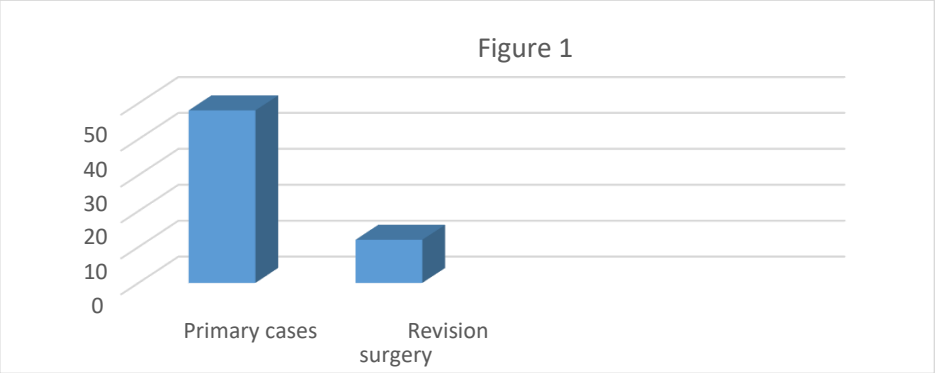

Figure1.

Demographic presentation of Primary and Revision surgery.

The commonest reason for revision surgery was recurrent nasal polyposis which comprised 35.7%, followed by persistent anterior ethmoid cells (21.4%) as shown in Table 4.

Table 4.

Causes of revision surgery.

Causes of revision surgery	No.	%
Recurrent nasal polyposis	5	35.7
Persistent Anterior ethmoidal	3	21.4
lateralization of remnant of middle turbinate	2	14.2
Recurrent allergic fungal rhinosinusitis	2	14.2
Persistent agger nasi cells	1	7.1
Persistent/recurrent frontal sinus disease	1	7.1

The complications of FESS occurred in (15) patients (24.19%). The majority were minors (8 patients, 12.9 %), and most of them were synechiae, while in 7 patients (11.29 %), the complications were major, and common major complications were severe intraoperative and postoperative bleeding, this is shown in Table 5.

Table 5.

Complications of FESS

Major complications	No.	%
Bleeding	3	4.8
Intraoperative	2	3.2
Postoperative	1	1.6
Anosmia	1	1.6
Minor complications	**No.**	**%**
Synechia	5	8.06
Dental pain and paresthesia	2	3.2
Stenosis of the maxillary sinus ostium	1	1.6

The total number of patients who improved was 55 patients, in 37 patients the recovery was complete, and in 18 patients. was partial while in 7 patients there was no improvement. As shown in figure 2.

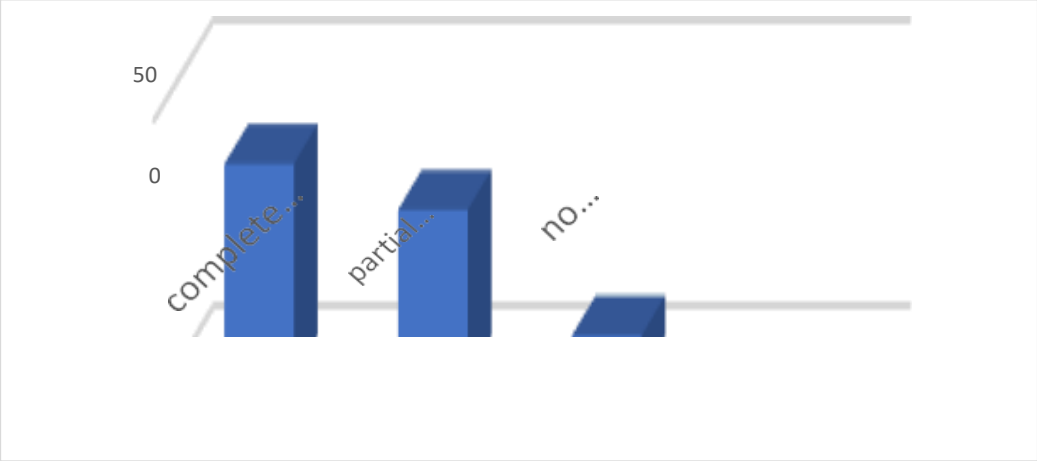

Figure 2.

Demographic comparison in post-operative recovery

Discussion

The age of the studied participants was between 9-74 years while in many studies such as one done by Miller RS et al. in Alabama and another one in South Korean by Cho KS et al. [17, 20] was between 35 to 43 years, and 54 years in a study in Vancouver by Nael shoman et al. [18]. Males were 34 and they represent 54.8 % of the total patients while the females were 28. The gender distribution reported in other studies [17-20] was male proportion

ranging from 54% to 67%, these results are nearly comparable with our study, While Shahbaz's study which involved 50 cases 13 were females and 37 were males, and the age distribution was 6-65 years, this finding is also similar to ours [21].

The commonest indication of FESS in our study was chronic rhino sinusitis (38 patients, 61.2%) of the studied patients, 20 patients had rhino sinusitis without nasal polyps, while 18 had chronic rhino sinusitis with nasal polyps, this is goes with Dale H. Rice study, and he stated that the two basic indications for FESS, are chronic bacterial sinusitis and recurrent acute bacterial sinusitis [22]. 50 0 Figure 2 Demographic comparison in post-operative recovery as with all surgical interventions, the aim of FESS should provide appropriate resolution of pathology without recurrence of the disease. Despite this admirable aim, the reality is that up to 20% of patients will require revision FESS within 5 years, 43% of which will be within the first postoperative year [23].

In our study, the revision surgeries performed for those who did FESS is only 22 % (14 out of 62), which is nearly equal to or below these studies which stated that the majority of patients undergoing FESS will require a single operation, 19% of patients will require revision surgery [24, 25].

The main cause for revision surgery in our study was recurrent nasal polyposis which represents 35.7%, this result is lower than the percentage of Jeffery M King et al. Which was 44.4 % and the cause of revision surgery was recurrent and persistent nasal polyposis this difference may be explained by the different sample size [24]. In our study, the commonest symptoms were nasal obstruction blockage (85.4%), followed by nasal discharge, headache, and facial pain (69.3% and 66.1%) respectively, these results were comparable with Shahbaz et al study, but not the comparable with Howard's study in which he found that majority of symptoms were nasal discharge and sinus pain (128 and 91) respectively [21].

The majority of patients underwent FESS in our study, more than 88.7% were improved, while in 7 patients (11.2%), there was no improvement, this result is better than many studies which recorded that improvement is more than 75%, (29,30) probably the cause behind that is the short follow up period in the present study, but it is much less than a study was done by Kennedy D in Philadelphia for 120 patients as they found that 97.5% of patients noted improvement of their complaints [28].

In 2003, a review of the literature by Lieu and Piccirillo revealed 35 studies that showed improvement of symptoms after FESS ranging from 69 to 94% [29] shahbaz found that FESS with one-year follow-up, resulted in improvement of nasal obstruction by 92%, rhinorrhea 88%, post nasal drip 88% and snoring 90% out of 50 patients. The complications of FESS in our study occurred in 15 patients (24.1%). The majority were minors (8 patients,

12.9%), mainly synechiae, while in 7 patients (11.2%), the complications were major and common major complications were severe intraoperative and postoperative bleeding. Suzuki, Sayaka, et al. in Japan found out the overall complication rate was 0.50%; the rates of CSF leakage, orbital injury, hemorrhage (requiring surgery and blood transfusion,) and toxic shock syndrome were 0.09%, 0.09%, 0.10%, 0.18%, and 0.02%, respectively [30] Dalziel et al. found the complication rates be less than 1%. He stated that the causes for decrement include improved training and instrumentation [31]. Hoseman W. et al stated that complication rates have been reduced as training, experience, and comfort with endoscopes and powered instruments have increased. In experienced hands, minor complication rates of 5% and major complication rates below 1% were cited [32].

Conclusions

Functional endoscopic sinus surgery (FESS) is a minimally invasive surgical procedure that allows direct thorough visual examination and re-opening of the sinuses for the treatment of a set of sinonasal diseases, that has not responded to medical treatment. The use of FESS permits a much less aggressive and traumatic procedure, resulting in a shorter time for surgery and the healing process, with very good improvement, less postoperative awkwardness, and relatively fewer surgical complications.

Abbreviations

Not applicable

Declarations

Ethics approval and consent to participate

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Competing Interests

The authors declare that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

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