

## **Functional Endoscopic Sinus Surgery (Fess)**

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**Objective:** To evaluate our experience with functional endoscopic sinus surgery since its introduction in our department in 1997 and compare our results with other studies in the International literature.

**Setting:** ENT ward, King Fahd Hospital of the University.

**Design:** A prospective-retrospective study.

**Method:** One hundred seventy-two patients admitted to surgical management between 1998-2004. History followed by ENT-examination, pre-operative work up included a complete allergy investigation, in addition to CT, MRI, MRA (Magnetic Resonance Angiogram) and Angiography were performed. Improvement was assessed using subjective and objective scales. All patients underwent FESS-treatment. Postoperatively, the patients were provided with special pharmacotherapy and postoperative care through regular clinic check ups.

**Results:** One hundred seventy-two patients (110 males, 48 females, 14 paediatrics) diagnosed as nasal polyposis underwent 246 FESS procedures. CTs were classified according to Lund-Mackay system. Their major complaints were nasal obstruction due to bilateral or unilateral nasal polyposis, 62% of them had either allergic rhinitis (AR) or allergic fungal sinusitis (AFS) as primary disease. Postoperative improvement was good. The majority had a prior surgical intervention in the form of polypectomies or FESS. We had few major and minor complications. All patients had reasonable postoperative medications and follow up.

**Conclusion:** FESS is an effective surgical modality in treating nasal polyp and is accepted as the gold standard treatment for nasal polyposis. The patients' symptoms either improved or become disease free. We have encountered few complications. AR and AFS are the major causes for nasal polyposis in our society. CT is the best diagnostic tool pre-operatively. Postoperative medications and follow up influenced markedly the outcomes.

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Functional endoscopic sinus surgery (FESS) has been introduced to USA in 1985 by David Kennedy and years before in Europe by Messenklinger and Stammberger<sup>1,2</sup>. Since its introduction, it has become the standard surgical intervention for patients with chronic rhinosinusitis (CRS) refractory to medical therapy. Over years physicians have performed sinus surgery, FESS was the first procedure addressing the underlying pathophysiologic mechanism of sinusitis as first described by Messenklinger in 1978<sup>1</sup>. 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<sup>3,4</sup>. It is estimated that at present 40-50% of all ENT surgeons had attended at least one instructional course on FESS. Nowadays, FESS is a mandatory part of any ENT-Residency Training Programme<sup>5</sup>. FESS is done in a very tight and dangerous anatomical areas and hence it is associated with major fatal and minor complications. To reduce the rate of complications, only surgeons with vast experience, proper surgical and diagnostic setups are allowed to perform this type of surgery. Over the years (since 1994) FESS moved from the traditional conservative procedure to the minimum invasive sinus technique (MIST) as first described by Messenklinger<sup>6</sup>. Pre-operative assessment and postoperative medications and follow up are very important for a better outcome and fewer complications<sup>8</sup>. The objective of this study is to evaluate our experience with FESS since its introduction in our department in 1997 and compare our results with other results in the international literature.

## **METHOD**

It is a prospective-retrospective study of 172 patients admitted for endoscopic nasal surgical management between 1998-2004. ENT history including allergy have been taken. Patients were then subjected to ENT examination including nasal endoscopy and microscopy. A complete allergic workup which included nasal smear, total IgE and skin prick testing (few) were performed. Few patients were tested because either there were contraindications or the material for the test was not available or it was expired. CT-scanning (coronal and axial views) have been taken for each patient pre and postoperatively. The CTs of the sinuses were evaluated using the Lund-Mackay staging system (0-2) in collaboration with the radiologist. MRI, MRA and angiography were requested occasionally. Postoperative improvement were evaluated using a five-point scale (0-11) and were divided to objective and subjective improvement. Only functional endoscopic sinus surgery technique have been used, but occasionally combined with non-endoscopic technique. All specimens were subjected to histopathological examination. Patients were followed up weekly in the first one month, then monthly in the first three months, then three monthly for the rest of the year, then six monthly in the second year. All informations were entered in special designed data sheets for later analysis.

## **RESULT**

The study was conducted for six years, from January 1998 to January 2004. One hundred seventy-two patients (110 males, 48 females and 14 paediatrics) were admitted for endoscopic nasal surgical management. A total of 246 surgical procedures (160 male, 68 female and 18 paediatric) were performed. Patients' age ranged between 5-72 years (mean 34.2 years). Patients' symptoms are shown in Table I. The major symptom is nasal obstruction, least is epistaxis and nasal and face deformities. Table II showed that 61 of patients have asthma and are under

treatment. Ninety-four patients were operated previously, once or several times for polypectomy under general or local anesthesia. Thirty-six had one or more FESS procedure. The result of nose examination by rhinoscopy, microscopy and endoscopy (zero/30 degree) is presented in Table III, which showed that 74 patients had bilateral polyps, 96 had unilateral polyps, 12 had deviated nasal septums (DNS), seven had inferior turbinate hypertrophy (ITH), and two had inverted papillomas.

The diagnosis was based on history, examination and radiology, histopathological findings confirmed the diagnosis of allergic rhinitis (AR) in 70 cases (41%) and allergic aspergillos fungal sinusitis (AAFS) in 36 cases (21%).

#### (Table 4)

Allergy testing was performed only in 60% of the patients. Forty-three patients showed elevated total IgE (normal = 120iu/ml), most patients were patients having either allergic rhinitis, asthma or allergic fungal sinusitis. Very few showed elevated eosinophilia. CT scans of the sinuses could be traced only in 132 patients (77%). CTs showed that 70% were class II and 30% class I (Lund-Mackay).

All our patients underwent functional endoscopic sinus surgery alone or in combination with non-endoscopic surgery.

#### (Table 5)

Whenever the approach was difficult due to deviated nasal septum (DNS), septoplasty was performed prior to FESS. Postoperative medications of prednisolone tablet (0.4 - 0.8 mg/kg) for 3-4 weeks were given as tapering dose to 50% of patients with allergic rhinitis in addition to local steroid spray, systemic antibiotic and alkaline nasal douching. Itraconazole as an antifungal has been given only to patients with aspergillosis who were classified pre-operatively as semi-invasive in a daily dose of 200-400mg for 2-6 months.

#### (Table 6)

Few major and few minor postoperative complications were seen.

#### (Table 7)

Two cases of unilateral cerebrospinal fluid (CSF) leaks, one was seen immediately and the other three months postoperatively. Both were repaired using rotating flap technique under endoscopy. Two transitional anosmia, 26 adhesions (have been released under local anesthesia) and one ecchymosis which disappeared spontaneously were seen postoperatively. Good follow up was more than 78%. Follow up ranged from few weeks to few years with a mean of 9 months. There was a high recurrence rate of 23% within the first 3-12 months especially among patients with asthma, allergy and fungus infection. The objective and subjective scores were more or less identical. Eighty percent (80%) rated their improvement as excellent or very good and 20% rated improvement as good or no improvement at all. Postoperative CTs done during the follow up were few; therefore, their evaluations are impossible and will be of no value to the study.

## DISCUSSION

Functional endoscopic sinus surgery (FESS) has revolutionized the surgical treatment of chronic rhinosinusitis since its introduction in 1985. The significant reduction in morbidity that resulted from an intranasal endoscopic approach led to significant patient demand for FESS and a rapid proliferation of surgeons performing this surgery<sup>9</sup>. With the help of FESS 80% of patients felt free of symptoms and 79% were free of disease. The overall improvement were very good to excellent. Not all symptoms were improved equally. Nasal obstruction was the symptom most responsive (95%) and post nasal drip was the symptom least responsive to FESS treatment. Similar observation had been made by Dalziel et al, Montague et al and Senior et al<sup>5,8,10</sup>. May be this prompt improvement is due to the fact that the great majority of patients were having nasal polyposis, similar observation was made by others<sup>5,11</sup>. The majority of CTS (70%) were classified as class II (Lund Mackay) and as such required anterior and posterior ethmoidectomy in addition to sphenoidectomy<sup>12</sup>. Most probably because we were dealing with allergic rhinitis and aspergillosis in the majority of cases (62%)<sup>10,11</sup>. We found a very close correlation between the CTs and surgical findings in most of the cases. These correlation could be improved through proper history and clinical finding as suggested by Stammberger et al<sup>13</sup>.

We studied the significance of elevated IgE, blood eosinophilia and nasal smear in the diagnosis of allergic rhinosinusitis and allergic fungal sinusitis, unfortunately this significance could not be confirmed. Stewart et al found that elevated total IgE with RAST has a diagnostic evidence in fungal sinusitis when fungal culture and histological examination are negative<sup>14</sup>. Stachler et al considered the predictive values of total IgE, total eosinophil count and nasal cytogram (nasal smear)<sup>15</sup>. Polyposis of the nose either bilateral or unilateral was the clinical diagnosis and indication for FESS in 99% of the patients and were caused in 62% by allergic rhinitis (AR) or allergic fungal sinusitis (AFS). It confirms our suspicion that allergic rhinosinusitis and aspergillo fungal sinusitis are on the increase as stated by Zakzouk et.al and Dagistani et al<sup>16,17</sup>.

We recorded a slight increase of recurrence of polyps, which was 23% within the first 3-12 months. Dalziel et.al. in their systematic review of endoscopic sinus surgery for nasal polyps reported 8% disease recurrence and 28% polyp recurrence<sup>10</sup>. Recurrence of polyps in our study is due to the fact that more than 60% of our patients are allergic and may be due to the poor postoperative medication in form of systemic or local steroid or systemic antifungal. Senior et.al. and Kennedy et.al. stated that excellent results following FESS can be maintained with appropriate postoperative management<sup>8,9</sup>. The complications rate reported in our study are less than expected because most of the patients had either previous surgery of polypectomy, FESS or ESS . We had two major complications (CSF leaks 0.8%) and thirty minor complications (12%). Wigand reported 2% intra-operative CSF leak rate in his early series<sup>18</sup>. Stankiewicz reported 1.25% complication rate in his early series<sup>19</sup>. Dalziel et.al. showed an overall complication rate of six percent<sup>10</sup>. Montague et.al. reported a minor complications rate of 1.2% and a zero (0%) major complications<sup>5</sup>.

Revision surgeries are usually associated with high rate of major complications, whereby poor postoperative medication and follow up are associated with high rate of minor complications<sup>5,8</sup>. One of the CSF leaks appeared in the immediate postoperative period and the other appeared

three months later. Both have been identified and closed using transnasal endoscopic technique as advised by Church et.al. Zweig et.al and Kirtane et al<sup>20- 22</sup>.

The follow up was over 78% within the first 3-9 months, after that it declined sharply. Twenty-two percent attended the clinic either once or never. Regular follow up is of great importance and any irregularity will jeopardize the outcome<sup>19,20</sup>. Regular follow up helps to promote healing, may delay recurrence and reduce complications<sup>9</sup>.

## CONCLUSION

FESS is the surgical solution for chronic rhinosinusitis because it provides better vision, precision and less complications. In our study AR and AFS are the major causes of polyposis in our society. With the help of FESS we have achieved a high improvement rate of 80% subjectively and objectively.

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**Table 1: Presenting Symptoms**

Nasal Obstruction	155
Headache	56
Itching	87
Post nasal discharge	68
Nasal discharge	46
Anosmia	48
Hyposmia	31
Epistaxis	10
Nasal deformity	10
Sneezing	92

**Table 2: Past Medical and Surgical History**

Bronchial Asthma	61
Polypectomy	94
FESS	36
Mucocele	1
Caldwell luc	2
SMR/Septoplasty	2

**Table 3: Results of Anterior Rhinoscopy, Microscopy and Endoscopy**

Bilateral polyposis	74
Unilateral polyposis	96
Inverted papilloma	2
Deviated nasal septum	12
Inferior turbinate hypertrophy	7
Chonca bullosa	8
Deformity	2
Adhesion	5

**Table 4: Diagnosis and Indication for Surgery**

Allergic polyposis due to aspergillosis fungal sinusitis	36
Allergic bilateral polyposis	54
Idiopathic polyposis	56
Allergic unilateral polyposis	16
Antro choanal polyp	3
Choncha bullosa	11
Maxillary sinus mass	4
Ethmoid cancer	1
Inverted papilloma	2
Deviated nasal septum	2
Inferior turbinate hypertrophy	7
CSF leak	2
Adhesion	5

**Table 5: Surgery Performed**

<b>DISTRIBUTION</b>	<b>NO.</b>
Bilateral FESS	87
Unilateral FESS	92
Septoplasty	16
Release of choncha bullosa	11
Caldwell Luc	4
Removal of Antrochoanal Polyp	3
Release of Adhesion	5
CSF Leak Repair	2
Inverted Papilloma Excision	2

**Table 6: Postoperative Medications**

	<b>Total No.</b>	<b>Prednisolone Tapering Dose 1-6 Months</b>	<b>Itraconazole only 1-6 Months</b>	<b>Itraconazole + Prednisolone</b>	<b>Topical Steroid Spray 1-6 Months</b>	<b>Alkaline Nasal Douchs</b>	<b>Antibiotic</b>
<b>Allergic Rhinitis – ARS</b>	58	28	-	-	58	58	58
<b>AFS</b>	27	12	6	13	27	27	27
<b>Idiopathic Pathology</b>	54	5	-	-	30	54	54

**Table 7: Post FESS Complications**

<b>COMPLICATION</b>	<b>MINOR</b>	<b>MAJOR</b>	<b>OUTCOME</b>
CSF Leak		2	Repaired
Adhesions after 2-4 weeks	26		Released
Ecchymosis	1		Disappeared after 3 weeks
Temporary Anosmia	2		Back to normal after 3 months
Espistaxis	1		Controlled

July 25, 2005

**TO :**       **The Chief Editor**  
Bahrain Medical Bulletin  
P.O. Box 32159  
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Dear Sir,

We are sending to you our article entitled: Functional Endoscopic Sinus Surgery (FESS) King Fahd Hospital of the University (KFHU) Experience to be considered for publication in your respected journal.

We give the exclusive copyright of our article to the Bahrain Medical Bulletin.

With hope to hear from you soon.

P.S. Please confirm reception.

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October 5, 2005

**TO :** **Dr. Jaffar Al-Bareeq**  
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Dear Dr. Jaffar,

Thanks for your kind letter enclosed the comments of the reviewers.

All comments have been answered and corrections incorporated in the text and sent back to you by mail and email.

Hopefully it will be all right.

Best regards.

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**Prof. Abdul Aziz Ashoor-**  
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### *Answers to the Reviewers Comments*

1. The major part of the study is retrospective and the minor part prospective. It is seldom done, but it is possible. Do you have other suggestion?
2. MRA means Magnetic Resonance Angiogram. It was done 4 times and angiography 2 times.
3. Done as requested.
4. I mean few patients were tested because either there were contraindications or the material for the test was not available or it was expired.
5.
  - a. In addition to the reasons mentioned under 4, there was no reagent for IgE estimation or the treating doctor forgot to request it or the patient did not do it.
  - b. Sentence should not start with number (as requested by you), but if you think it should be that way please change it accordingly.
  - c. All our patients primarily had polyposis, additionally to that they had what mentioned in Table 3 (from 3-8). You noticed that the total amount of 1 + 2 = 170 patients.
  - d. I mean polyposis due to allergic aspergillo fungal sinusitis.
  - e. Yes, I mean mos (month), had been corrected in the text
6. In the discussion:
  - a. Yes, most of our patients had advanced disease as shown in the CTs and required ethmoidectomy and sphenoidectomy.
  - b. It is supposed to be one sentence. I mean the diagnostic significance of these values (IgE, blood eosinophilia and nasal smears) could not be confirmed (corrected in the text).
  - c. It is related to the statement before. It means as long the significance of these values (IgE, blood eosinophilia and nasal smear) could not be confirmed, so Stachler et.al. advised to speak about predictive values and not diagnostic values.
  - d. I mean both of them, (not given and not taken the medication).

