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RESEARCH ARTICLE

THE BENEFITS OF FUNCTIONAL ENDOSCOPIC SINUS SURGERY (FESS) IN MANAGEMENT OF CHRONIC SINUSITIS & MIDDLE MEATUS DISEASES

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ABSTRACT

This study was carried out to observe the efficiency of endoscopic sinus surgery in the management of middle meatus diseases. The study was done in our private clinics & in the ENT department of AL-yarmouk Teaching Hospital Baghdad - Iraq. This effort represent prospective study of 100 patient with sinonasal diseases who were underwent functional endoscopic sinus surgery. The main presenting symptoms of patient were nasal obstruction (76%), anterior nasal discharge (67%), headache (56%), facial pain (62%), hyposmia / anosmia (30%), post nasal drip (53%). Most of the patients have got partial or complete symptomatic relief. Minor complications of FESS occurred in (22%) which includes adhesions, minor epistaxis, infection and periorbital ecchymosis it was concluded that FESS is a safe & efficient method for dealing with different sinonasal diseases.

Aims of the study: To evaluate the efficiency of functional endoscopic sinus surgery (FESS) in management of middle meatus diseases.

Concept: The introduction of nasal endoscope has revolutionized the planning & treatment of nose & paranasal sinus diseases. In the 1960s Messerklinger began his work with endoscopic diagnosis and surgery of sinuses. The main indications for functional endoscopic sinus surgery are recurrent acute sinusitis that does not respond to medical therapy. Endoscopic nasal surgery have grown far beyond FESS & now include other nasal, orbital and anterior skull base procedures.

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INTRODUCTION

Basic Principles of Endoscopic Sinus Surgery

Objective of Endoscopic sinus surgery (Devyani lal and James A Stankiewicz, 2010)

The primary objective of Functional Endoscopic sinus surgery (FESS) is to restore paranasal sinus function by reestablishing the physiologic pattern of ventilation and mucociliary clearance. Surgery is always used as an adjunct to medical therapy. The goal is to remove diseased mucosa and bone, preserve normal tissue, and judiciously widen the true natural ostia of the sinuses. The ostiomeatal complex is most often the primary target of endoscopic sinus surgery because minimal inflammation in this area can lead to disease in the maxillary, anterior ethmoid, and frontal sinuses Fig (Devyani lal and James A Stankiewicz, 2010).

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Bony septations should be removed, but aggressive removal of mucosa is inappropriate and causes postoperative problems with healing. Uninvolved sinuses should be left alone. In spite of adequate surgery, mucosal disease may persist and require further medical therapy, a development that is predictive of revision surgeries. More extensive surgery may be necessary for complicated acute rhinosinusitis, extensive fungal or polyp disease, and tumors.

Indications of Endoscopic Sinus Surgery (Devyani lal and James A Stankiewicz, 2010)

Any sinonasal pathology may be approached endoscopically or externally. There is no absolute indication for an endoscopic approach for any sinonasal disease. Although the majority of sinus procedures are performed endoscopically to treat CRS, the indication for surgery is relative. In contrast, surgery is absolutely mandated in certain sinonasal conditions, such as impending orbital or intracranial complications of acute rhinosinusitis, invasive fungal rhinosinusitis, cerebrospinal fluid (CSF) rhinorrhea, sinonasal tumors, and expansile mucoceles and polyps that cause orbital or skull base erosion. As with the indications, there is no absolute contraindication to use the endoscopic approach. The decision to use an external

or an endoscopic approach depends on" the amount of exposure needed as well as the surgeon's training and experience.

The indications for endoscopic sinus surgery are

Chronic rhinosinusitis

CRS is a relative indication for surgery. Surgery is indicated in patients in whom maximal medical therapy has failed. ESS is the exclusive surgical procedure in primary sinus surgery, with external or headlamp—guided procedures being rarely used now.

Recurrent acute rhinosinusitis

Surgery is indicated for patients with four or more episodes of acute rhinosinusitis annually that are refractory to medical therapy.Disease must be documented endoscopically or on CT scan while the patient is symptomatic before any surgical intervention is undertaken.

Acute complications of rhinosinusitis

Acute complications, both orbital and intracranial, that are unresponsive to medical therapy require immediate surgical intervention. Traditionally, external procedures have been used because nasal edema and inflammation can compromise endoscopic exposure. However, in experienced hands, ESS is safe and effective.

Sinonasal polyposis

Nasal polyps that erode through the skull base or the lamina papyracea must be removed to prevent impending complications. A relative indication for surgery is polyps that cause nasal obstruction and do not respond to medical therapy. Surgery is adjunctive to medical therapy—for instance, with topical and systemic steroids. Polyps can often be cured by surgery in patients without asthma but frequently recur in patients with asthma. Polyps in patients with Samter's triad (nasal polyps, asthma, and aspirin sensitivity) are very difficult to treat.

Mucoceles

Mucoceles are epithelium-lined, mucus-containing sacs that completely fill a paranasal sinus. They are expansile and cause bony erosion. They must be removed or drained to prevent intracranial and orbital complications. Mucoceles are more commonly found in the frontal and ethmoidal sinuses, although isolated sphenoid mucoceles have been reported. In the past, open approaches have been used to completely remove the lining of the mucocele. However, this practice can be dangerous because mucoceles can erode through the skull base or through the lamina papyracea into the orbit. Endoscopic management with marsupialization is safe in this situation, because complete removal of the cyst lining is not required. Although technically more challenging, this latter approach is very effective, with recurrence rates near 0%.

Intractable epistaxis

Uncontrolled posterior epistaxis can be controlled with endoscopic assistance in identification of the bleeding vessel.
G- CSF rhinorrhea and anterior meningoencephaloceles:

Endoscopic repair is now standard for CSF rhinorrhea, with success rates higher than 90%.Meningoencephaloceles may also be repaired endoscopically.

Non—invasive fungal rhinosinusitis

Allergic fungal rhinosinusitis and noninvasive fungal balls, are usually treated endoscopically. A large antrostomy or ostioplasty is created. The fungal debris is irrigated and removed.

Invasive fungal rhinosinusitis

lnvasive fungal rhinosinusitis is almost exclusively a disease of the severely immunocompromised. All insensate mucosa and dead tissue must be debrided till healthy, bleeding tissue is encountered.

Removal of foreign bodies

Repair of choanal atresia

Endonasal endoscopic approaches can be used to treat choanal atresia. However, patients with bilateral atresia should undergo primary transpalatal repairs owing to the high failure rate for the transnasal approach. To improve success rates, some writers advocate postoperative stenting, but others condemn it. Postoperative dilatation and mitomycin C therapy have been used. Endoscopic repair with use of an image guidance system may improve the success rate.

Headaches and facial pain

For patients with normal CT findings and no rhinogenic cause of headache, the role of sinus surgery is debated.

Tumors

Benign and malignant tumors of the nasal and paranasal cavities may be resected endoscopically or with endoscopy-assisted approaches.

Expanded utilization of transnasal endoscopic approaches

The nose and the paranasal sinuses are being utilized as a pathway to approaching territories in the anterior and middle skull base, the intracranial cavity, and other regions in the skull.

Endoscopic dacryocystorhinostomy, CSF leak repair, orbital and optic decompression

3 – Complications (Devyani lal and James A Stankiewicz, 2010). Complications related to ESS can be divided into minor and major categories (Box 1).Minor complications can usually be treated with minimal consequences.The most common minor complication is synechia formation, which does not require any type of revision. Major complications include major hemorrhge, blindness, and intracranial injury. However, catastrophic complications do occur rarely, They can be treated safely if recognized early. Box (1). Complications of Endoscopic Sinus Surgery (Devyani lal and James A Stankiewicz, 2010).

Minor Complications

- Minor epistaxis
- Hyposmia
- Adhesons
- Headache
- Periorbital ecchymosis or emphysema
- Dental or facial pain

Major Complications

- Major epistaxis
- Anosmia
- Nasolacrimal trauma
- Carotid injury, intracranial hemorrhage, stroke.
- Orbital hematoma, diplopia, decreased visual acuity, blindness.
- Cerebrospinal fluid leak, pneumocephalus, meningitis.

Endoscopic technique

In our study, two steps were arranged for each patient

Diagnostic endoscopy

The nose is decongested (xylometazoline topical drop 0.05-O.1%) and anasthetized (lidocaine nasal spray 4%) and the nasal endoscopic (degree $3O^o$) examination of the nose, including the inferior, middle, and superior meatus is performed (three passes). The first pass is made along the floor of the nasal cavity proceeding posteriorly toward the nasopharynx. During this pass, the inferior turbinate, septum, nasopharynx, and eustachian tube orifice are all examined for mucosal changes and the presence of secretions. The endoscope may also be rolled under the inferior turbinate to visualize the inferior meatus and Hasner valve. The second pass is made between the inferior and middle turbinate, then courses medial to the middle turbinate into the sphenoethmoidal recess. The superior septum, inferior aspect of the middle meatus, superior turbinate, and sphenoid sinus ostia should all be visualized with this pass. Finally, the third pass involves maneuvering the endoscope below the middle turbinate into the middle meatus to examine the lateral nasal wall and ostiomeatal complex. The ethmoid bulla, hiatus semilunaris, and uncinate process should all be examined with this pass.

Surgical Endoscopy: This is done in all patients under general anaesthesia with hypotensive technique using Hopkins rigid endoscopes 4mm in diameter with different angles 0^o, 30^o, and 70^o.

Premedication: Hypotensive drugs were given to the patients in the night before surgery.

Position: The patient is placed in reverse Trendlenberg position (head up 15 degree) and the face turned toward the surgeon.

Preparation of the nose (local anaesthesia): The procedure begins with the application of topical decongestants (cotton wicks soaked with adrenaline 1:1000 on 30cc normal saline are inserted in the nasal cavity and in the middle meatus) and then local anasthesia is provided by injecting 1% lidocaine (Xylocaine) with 1:100,000 epinephrine as a vasoconstrictor before all procedures.

Surgical technique: The extent of surgery decided based on the findings in pre-operative CT scan and endoscopic examination, and intra-operative assessment of paranasal sinuses. A right—handed surgeon stands on the right side of the patient. The middle turbinate is gently medialized with attention paid to transmission of force to the lateral lamella of the cribriform plate and then the following surgical steps are selectivelly performed.

Resection of the uncinate process (uncinectomy)

The uncinate process is identified with the 0° degree endoscope passed into the middle meatus. The uncinate process is usually crescent shaped. it is sometimes necessary to gently ‘rotate the middle turbinate medially with a freer elevator to expose the uncinate. When polyps are present, the uncinate is identified from its posterior free end, which often has a rolled edge or anterior eversion. A ball-tipped probe is slid into the infundibulum to find this posterior free edge,a sickle knife or an elevator is used to resect the uncinate process via a. vertical incision that starts on its anterior aspect and is then continued inferiorly and posteriorly along the crescent shaped anterior margin, care is taken not to breach the medial orbital wall, which may lie lateral to the uncinate process superiorly. Any reminant of uncinate process is then removed with a Blakesley forward biting forceps,using gentle grasping and twisting motion.

Middle meatal endoscopic antrostomy

The removal of the uncinate process exposes the infundibulum , which is the central drainage pathway for the anterior sinuses. The maxillary sinus ostium is found first, not only to allow for drainage but also to help with identification of the orbit. The maxillary sinus ostium is elliptic and is usually found within the infundibulum, behind the lower third of the uncinate. Accessory ostia are more circular and are commonly found within the posterior fontanelle. The drainage of the maxillary sinus occurs through the natural ostium; opening an accessory ostium of the sinus and missing the natural ostium leads to mucus recirculation and persistent infection. If there is significant mucosal edema, the maxillary ostium identified by ball-tipped probe that is gently passed into the infundibulum to help identify the natural ostium. Sliding the probe gently down the infundibulum and identify the ostium when the probe easily passes into the maxillary sinus. lf the natural ostium is patent it is not be manipulated. if it is edematous and obstructed.

A straight punch used to open it further both posteriorly and inferiorly if necessary. Larger antrostomies are preferred for patients with polyps. Placing one free edge of the punch into the ostium under direct visualization enables widening of the ostium to be safely carried posteriorly without damage to the orbital wall. Biting anteriorly in the natural ostium is avoided , strip mucosa off the walls of the maxillary sinus was also avoided, so as to prevent scarring and mucociliary dysfunction. Once the maxillary antrostomy is complete, the sinus is carefully examined with a 30-degree endoscope. Disease in the sinus removed with curved endoscopic instruments, irrigation via a medial antrostomy. Any pus or debris sampled for culture and if the results revealed fungal infection then it is excluded from the study. All landmarks, including the medial and inferior orbital wall, are carefully identified.

Anterior ethmoidectomy

The ethmoid bulla is the largest cell of the anterior ethmoid complex and is usually the first, most prominent cell seen within the middle meatus. This cell forms the posterior border of the hiatus semilunaris. With use of a punch forceps, the ethmoid bulla entered along its inferior and medial aspect. Once this opening is formed, the anterior and medial walls can be easily taken down to expose the posterior wall.

The lateral wall of the ethmoid bulla is the lamina papyracea, which can be identified as soon as the cell is opened. Mucosa preserved laterally. Opening the agger nasi and suprabullar cells completes the anterior ethmoidectomy. Dissection was not carried out medial to the superior vertical attachment of the middle turbinate. Dissection continued posteriorly till the basal lamella is identified, which is the posterior limit of the anterior ethmoid. Care is taken to preserve mucosa over the lamina papyracea.

Posterior ethmoidectomy

To open the posterior ethmoids, the inferior and medial aspects of the vertical basal lamella was removed. These cells can be large, and the skull base is often prominently exposed at this point in the dissection. Care is taken not to open the horizontal basal lamella, because to do so not only destabilizes the middle turbinate but also exposes the vessels coming from the internal maxillary artery, causing acute or delayed hemorrhage. If a sphenoethmoid cell is present, the posterior ethmoids will extend lateral and superior to the sphenoid sinus.

These cells can usually be identified in the preoperative CT scan and are important to identify during surgery because the optic nerve may be dehiscent within the lateral aspect of the cell. Dissection should remain low in the posterior ethmoids until the skull base and sphenoid sinus are identified. Continued dissection in a posterior and inferior direction will open the posterior ethmoidal cells into the superior meatus. Examination medial to the middle turbinate should be undertaken to ensure that posterior ethmoid drainage is patent.

Frontal sinusotomy

In general, if the frontal sinus is not diseased, it should be left alone. If frontal disease is present, opening the frontal recess is warranted, with care taken to minimize mucosal injury and prevent middle turbinate lateralization. Anteriorly, the frontal recess is a cone shaped space below the ostium of the frontal sinus. The medial wall of the frontal recess is the most anterior aspect of the middle turbinate, the lateral wall is the lamina papyracea, and the anterior wall is the posterior wall of the agger nasi.

Endoscopic septoplasty

significant septal deviations can cause lateral displacement of the middle turbinate, obstructing the OMC. Septal deviations can make ESS technically difficult. If the patient has no symptoms from the deviation, septoplasty may be added to the endoscopic sinus procedure. If septoplasty makes the endoscopic procedure simpler, or makes postoperative endoscopy and debridement easier, it should be performed during ESS. It may be easier to perform ESS on the side with adequate exposure, then perform a septoplasty and continue the procedure on the contralateral side.

Concha bullosa exenteration

The concha bullosa addressed in patients with rhinosinusitis undergoing surgery, primarily because their removal improves visualization of the middle meatus.

Endoscopic polypectomy

In a primary procedure, polyps are easy to approach endoscopically because they are gelatinous and have minimal blood supply. Antrochoanal polyps have been treated endoscopically.Polyp removal along with the wide middle meatal antrostomy created by the disease process.

RESULTS

After analysis of data from the questionnaire formula , the following results are obtained

Age Distribution

The commonest age group affected was between 21-30 years (young adults) while the least common age group affected was between 41-55 years.

Table (3.1) shows age distribution

Age (years)	No. of patients	Percentage (%)
10-20	12	12%
21-30	52	52%
31-40	26	26%
41-55	10	10%
Total	100	100%

Sex Distribution

Male patients were 59 (59%) while female patients were 41(41%), male: female ratio 1.4:1

Table (3.2) shows sex distribution (n=100)

Sex	No. of patients	Percentage (%)
Male	59	59%
Female	41	41%

Duration of chief complaint

32 patients (32%) of our patients presented with duration of symptoms ranging between 1-2 years while 20 patients (20%) presented with duration > 4 years.

Table (3.3) shows the duration of chief complaint (n=100)

Duration	No. of patients	Percentage (%)
< 1years	25	25%
1-2 years	32	32%
2-4 years	23	23%
> 4 years	20	20%

Occurrence of peroperatiove symptoms

The most prevalent symptom was nasal obstruction, it was seen in 76 patients (76%)

Table (3.4) shows the occurrence of preoperative sympotoms (n=100)

Complaints	No. of patients	Percentage (%)
Nasal obstruction	76	76%
Nasal discharge	67	67%
Facial pain	62	62%
Headache	56	56%
Post nasal dirp	53	53%
Soe throat	45	45%
Sneezing	35	35%
Hyposmia/anosmia	30	30%
Snoring	27	27%

Endoscopic findings

Polypoid tissue was the commonest endoscopic finding (35%) while the enlargent of ethmoidal bullae (5%) of patients was the least finding. We found that endoscopy was good predictor of CT scan findings.

Table (3.5) Shows endoscopic findings (n=100)

Finding	No. of patients	Percentage (%)
Polypoid tissue	35	35%
Mucosal edema	33	33%
Inflammatory exudates	25	25%
Septal deviation	16	16%
Abnormal uncinate process	11	11%
Inferior meatal antrostomy	10	10%
Accessory ostium	8	8%
Enlarged middle turbinate	8	8%
Inferior turbinate hypertrophy	7	7%
Enlargement of ethmoidal bullae	5	5%

CT scan finding

Sinus mucosal thickening or opacification was the most frequent CT scan finding which was found in(75%) of patients, while Aggar nasi pneumatization (5%) and Giant Ethmoid Bulla(5%) were the least findings as they found in the patients.

Table (3.6) shows CT scan findings (n=100)

Findings	No. of patients	Percentage (%)
Sinus mucosal thickening or opacification	75	75%
Maxillry sinus	58	
Ethmoidal siuses	50	
Frontal sinus	10	
Sphenoid siuus	15	
Ostiomeatal unit obstruction	70	70%
Sinonasal polyposis	25	25%
Septal deviation	16	16%
Concha bullosa	8	8%
Aggar nasi pneumatization	5	5%
Giant Ethmoid Bulla	5	5%

Indication of FESS

Sinusitis (chronic/recurrent acute) was the commonest indication of FESS, while Antrochoanal polyp was the least indication.

Table (3.7) Shows indication of FESS (n=100)

Indication	No. of patients	Percentage (%)
Sinusitis (chronic/recurrent acute)	75	75%
Ethmoidal polyp	17	17%
Antrochoanal polyp	8	8%

Types of surgical procedures

Uncinectomy is the predominant surgical procedure as it was performed in (100%) of patients, while frontal recess surgery was the least one as it was done in two of patients.

Table (3.8) shows Types of surgical procedures (n=100)

surgical procedures	No. of patients	Percentage (%)
Uncinectomy	100	100%
Maxillary antrostomy	91	91%
Anterior ethmoidectomy	53	53%
Polypectomy (ethmoidal ; antrochoanal)	25	25%
Concha bullosa exenterated	8	8%
Posterior ethmoidectomy	8	8%
Endoscopic septoplasty	3	3%
Frontal recess surgery	2	2%

Complications of FESS

Minor complications occurred in 20 cases (20%) which included adhesions (11%), Minor epistaxis (5%), periorbital ecchymosis (3%), infection (1%) and Major epistaxis was only major complications recorded in 1 case (1%).

Table (3.9) Complications of FESS (n=100)

Complications	No. of patients	Percentage (%)
Monor		
Adhesions	11	11%
Minor	5	5%
Periorbital ecchymosis	3	3%
Infection	1	1%
Major		
Major	1	1%

Outcome of FESS

Complete relief of symptoms was observed in 77 patients (77%) and partial relief of symptoms in 16 cases (16%) while no relief of symptoms found in 7 cases (7%).

Table (3.10) Outcome of FESS (n=100)

Relief of symptoms	No. of patients	Percentage (%)
Complete	77	77%
Partial	16	16%
No relief	7	7%

DISCUSSION

In this study the majority of patients (52%) were in the group of 21-30 years being consistent with the findings of Al-azzawi M.J.1998 (in his study about the management of middle meatal diseases found that 46% of his patients were between 21-30 years) and Rahman *et al*, but inconsistent with Venkatachalam (Al-azzawi, 1998; Rahman *et al*., 2003; Venkatachalam and Anurag, 2002). The ages range from 11 to 55 years with mean age of 36 years which indicates that young adults had more incidence of ostiomeatal complex pathology. Male to female ratio was 1.4:1, which is similar to some other series e.g (Rahman MZ *et al*., 2003; Stammbeger, 2003). The main presenting symptoms of the patients in the study included nasal obstruction (76%). This result is consistent with findings of Rice (1989), Mathews *et al*. (1991), Stammberger (1990), Wigand (1990) and Bunzen *et al*. (2006). The table below show comparison with Stammberger, Wigand and Bunzen *et al* frequencies.

Nasal obstruction was the predominant chief complaint in our study that is similar to others studies. The causes of nasal obstruction are multiple and probably explained by the fact that, most patients had generalized mucosal edema, septal deviation and nasal polyposis. In this study, Polypoid tissue was the commonest endoscopic finding (35%) while the enlargement of ethmoidal bullae (5%) and aggar nasi Pneumatization (5%) were the least findings. In the study performed by Al-azzawi in 1998, the most common endoscopic finding was enlarged bulla which was found in 54% of patients, followed by mucopus in the middle meatus in 26%, of patients, and polyps in 20% of patients (Al-azzawi, 1998). In another study done by R.H. Kamel in 1989, he found blocked maxillary ostium in (32.91%), purulent discharge in the middle meatus (27.21%), and enlarged bulla (19.62%) (Kamel, 1989).

In this study, Sinus mucosal thickening or opacification (75%) and Ostiomeatal unit obstruction (70%) were the most frequent CT scan findings that is similar to the study performed by Tezer *et al*. (2006) where mucosal thickening was the most common CT finding in his 399 patients and as follow: in the maxillary sinus (48.85%), ethmoidal sinus (43.60%), frontal sinus (27.56%), and Sphenoidal sinus (18.8%). (Mesut *et al*., 2006) in another study done by Engin *et al* (2003) concha bullosa was the commonest CT finding which was found in (32.3%), enlarged bulla ethmoidalis was found in (26.2%), and Haller's cells in (1O%) (Engin Dursun *et al*., 2003). While in a study performed by Berenholz *et al*. 2000, the commonest CT finding was septal deviation which was found in 65% of patients, less commonly was the mucosal thickening in 43% of patients, while inferior turbinate hypertrophy was found in 40% of patients, and concha bullosa in 20% of them (Berenholz *et al*., 2000). Major indications for FESS were chronic sinusitis and recurrent acut sinusitis (75%), ethmoidai polyp (17%), antrochoanal polyp (8 %). This result differs from a study of Levine HL, where ethmoidai polyp (52.40%) and chronic sinusitis (47.6%) (Levine, 1990). The common surgical steps were uncinectomy (100%) and middle meatal antrostomy (91%), followed by anterior ethmoidectomy (53%), polypectomy (25%), concha bullosa exenterated (9%) posterior cethmoidectomy (8%) endoscopic septoplasty (3%) and frontal recess surgery was the least one as it was done in (2%) of patients. In a study performed by Nair *et al* 2010 he found that uncinectomy was also done in 100% of patients, clearance of disease from the OMC in 82.7%, anterior ethmoidectomy in 48.2%, frontal recess surgery in 42%, posterior ethmoidectomy in 30.9% of patients.

The least surgical steps in his study were sphenoidotomy and septoplasty which were done in 27.2% and 19.8% of patients respectively (Nair *et al*., 1987). In this study minor complication occurred in 20 (20%) cases which included adhesions 11 (11%), minor epistaxis 5 (5%), periorbital ecchymosis 3(3%), infection 1(1%) and major complications like major epistaxis was recorded in 1 cases (1%). No life threatening complications such as CSF leak, Orbital hematoma, blindness and lntracranial hemorrhage were noted. Stankiewicz JA, reported "a 29% complication rate in 90 patients operated upon, with 7 major and 19 minor complications. (Stankiewicz and Maywood, 1987) Schaefer *et al.* (1989), number of patients (100) reported 14% minor and 0% major complications (Schaefer *et al*., 1989). Wigand and Hoseman (1991), number of reported ten cases of crerbrospinal fluid leak, two cases of intracranial infection and one case haemorrhage over more than 1000 cases (Wignad and Hosemann, 1991) Stammberger and Wolf (1988) reported two cases of cerebrospinal fluid leak and no other major complications in 4000 cases (Stammberger and Wolf, 1989). Wigand and Hoseman (1991) reported ten cases of crerbrospinal fluid leak, two cases of intracranial infection, one case haemorrhage and one case death over more than 1000 cases (Wignad and Hosemann, 1991). The post-operative major complications that we recorded were in minor group of patients encouraging our progress in the application of FESS technique for patients with nasal symptoms related to ostiomeatal complex. After six weeks and after 3 months, we do subjective assessment for our patients regarding each of symptoms that we have operated on, according to the symptom (i.e free of symptoms or improved or no change).

In our study, Complete relief of symptoms was observed in 77 (77%) patients and partial relief of symptoms in 16 cases (16%) But no relief of symptoms found in 7 cases (7%). In another studies done by Venkatachalam VP reported 19 patients (76%) had complete relief of symptoms, 4 patients (16%) had partial relief of symptoms and 2 patients(8%) had no relief of symptoms in the follow-up period of 15-33 months (mean 19.2 months), and by Smith et-al, complete relief of symptoms were recorded in more than 80% cases (Smith and Brindley, 1993). Majority of the patients were released from the hospital within 48 hours of operations, as no life threatening complications were noted during operations. The results is revealed that FESS had the combined advantages of precise atraumatic removal of the disease with minimal morbidity and at the same time retaining the physiological function of the nose and paranasal sinuses.

Conclusion

Endoscopic sinus surgery is a beneficial procedure for middle meatus diseases and provided a safe and efficient method for dealing with different middle meatus diseases. Nasal endoscopy provides an illuminated view into the nasal cavity so that sinonasal diseases can be managed with high success for alleviation of symptoms and improvement of disease with less morbidity. Hypotensive anaesthesia with experienced surgeon are essential to have proper safe procedure. Post operative follow up is as important as surgery and should be tailored according to each patient needs.

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