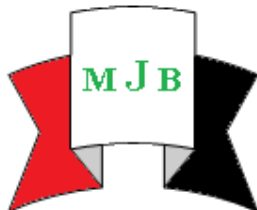


Complications of Endoscopic Sinus Surgery

Alaa Mtashar Al-Mansoury* Yaseen Adeeb Al-Dori* Bahaa Mohsen Al-Anbary*
*Al-Yarmouk Teaching Hospital
E-mail:bahaa_ent@yahoo.com



Received 11 January 2015

Accepted 16 March 2015

Abstract

Endoscopic sinus surgery (ESS) is obtained to restore paranasal sinus function which usually will lead to reestablishing the physiologic pattern of ventilation and muco-ciliary clearance.

To evaluate the complication of endoscopic sinus surgery (ESS) after management of different sinonasal diseases and how to deal with these complications ninety patients with different sinonasal diseases who were underwent functional endoscopic sinus surgery were seen and evaluated in department of otolaryngology.

They had been submitted to clinical and endoscopic examination of the nose.

All patients had a coronal and axial CTscan preoperatively, and all procedures were performed under general anesthesia. The extent of surgery was mainly decided depending on the findings in pre-operative CT scan of paranasal sinuses.

The main presenting symptoms of patients were nasal obstruction (71.1%), anterior nasal discharge (65.5%), facial pain (63.3%), headache (55.5%), postnasal drip (50%) & hyposmia/anosmia (31.1%). Most of the patients have got partial or complete symptomatic relief. The minor complications of endoscopic sinus surgery occurred in 18 cases (19.97%) which include adhesions (11.1%), minor epistaxis (5.55%), periorbital ecchymosis (2.22%) & infection (1.1%). Major complications occurred in 6 cases (4.27%) which was Major epistaxis (2.22%), CSF leakage (2.22%), Meningitis (1.1%) Pneumocephalus (1.1%).

It was concluded that endoscopic sinus surgery (ESS) is an efficient method for treating different sinonasal diseases and can be performed with success rate to alleviate symptoms with less morbidity especially when there is good clinical and preoperative CT scan assessment with endoscopic sinus surgery training courses and proper hypotensive anaesthesia and good postoperative care.

Key words: Complications, endoscopic sinus surgery.

مضاعفات جراحة الجيوب الأنفية المنظارية

الخلاصة

جراحة الجيوب الأنفية المنظارية يتم بواسطتها الحصول على استعادة وظيفة الجيوب الأنفية التي عادة ما تؤدي إلى استعادة النمط الفسيولوجي لتهوية الجيوب وتسريع التخلص من الإفراز المخاطي للجيوب الأنفية.

مفهوم جراحة الجيوب الأنفية المنظارية هو إزالة الأنسجة المعرقة للصرف في مجمع الصماخ العظمي للجيوب الأنفية مع الحفاظ على التشريح الطبيعي الغير معرقل للأغشية المخاطية. يوفر التلسكوب الليفي البصري الصلب للأنف منظاراً رائعاً داخل منطقة الصماخ العظمي، والسماح للعملية جراحية لأن تتركز على وجه التحديد على المناطق الرئيسية المهمة.

تم تصميم هذه الدراسة لمراقبة مضاعفات جراحة الجيوب الأنفية المنظارية بعد معالجة الأمراض المختلفة للأنف والجيوب الأنفية. وقد أجريت الدراسة في قسم الأذن والأنف والحنجرة في مستشفى اليرموك التعليمي خلال الفترة من كانون الثاني ٢٠١٢ وحتى شباط ٢٠١٣.

تسعون مريضاً كانوا يعانون من أمراض مختلفة في الجيوب الأنفية خضعوا لعملية جراحة الجيوب الأنفية المنظارية الوظيفية وشهدوا وتم تقييمهم في قسم الأنف والأذن والحنجرة. وقد تم تقديمهم إلى الفحص السريري والتنظير الأنفي.

كان قد أجري لجميع المرضى فحص الأشعة المقطعية بالوضعيتين الاكليلية والمحورية قبل الجراحة، وأجريت كافة العمليات تحت التخدير العام. وتقرر مدى التداخل الجراحي بشكل رئيسي اعتماداً على نتائج الأشعة المقطعية للجيوب الأنفية قبل العملية.

كانت الأعراض الرئيسية للمرضى انسداد الأنف (٧١.١٪)، وإفرازات الأنف الأمامي (٦٥.٥٪)، وآلام الوجه (٦٣.٣٪)، والصداع (٥٥.٥٪)، إفرازات خلف الأنف (٥٠٪) ونقص الشم / فقدان الشم (٣١.١٪). قد حصل معظم المرضى على تخفيف للأعراض جزئياً وكامل. حدثت مضاعفات طفيفة من جراحة الجيوب الأنفية المنظارية في ١٨ حالة (١٩.٩٧٪) والتي تشمل التصاقات (١١.١٪)، رعاف بسيط (٥.٥٥٪)، كدمات حول محجر العين (٢.٢٢٪) والالتهابات (١.١٪). حدثت مضاعفات كبيرة في ٦ حالات (٤.٢٧٪) الذي كان رعاف شديد (٢.٢٢٪)، وتسرب السائل الشوكي (٢.٢٢٪)، التهاب السحايا (١.١٪) و تسرب الهواء الى داخل القحف (١.١٪).
تم التوصل إلى أن جراحة الجيوب الأنفية المنظارية هي وسيلة فعالة لعلاج أمراض الجيوب الأنفية المختلفة، ويمكن أن تؤدي بنسبة عالية من النجاح إلى تخفيف الأعراض مع أقل معدلات من الاعتلال وخاصة عندما يكون هناك تقييم جيد للأشعة المقطعية الأسري قبل الجراحة مع الدورات والتدريب على جراحة الجيوب الأنفية بالمنظار والتخدير الخافض للضغط المناسب والرعاية الجيدة بعد العملية الجراحية.
وكان الهدف من الدراسة هو لتقييم مضاعفات عملية جراحة الجيوب الأنفية المنظارية بعد تقييم الأمراض المختلفة للجيوب الأنفية وكيفية التعامل مع هذه المضاعفات.

Introduction

Endoscopic sinus surgery (ESS) is obtained to restore paranasal sinus function which usually will lead to reestablishing the physiologic pattern of ventilation and muco-ciliary clearance. The concept of (ESS) is the removal of tissue obstructing the Osteometal Complex (OMC) and the facilitation of drainage while conserving the normal non-obstructing anatomy and mucous membrane. The rigid fiberoptic nasal telescope provides superb intra-operative visualization of the OMC, allowing the surgery to be focused precisely on the key areas.

This study was designed to observe the complications of endoscopic sinus surgery after management of different sinonasal diseases.

Patients and Methods

Selection of patients:

Ninety patients were selected ,been seen and evaluated in department of otolaryngology in AL-Yarmouk teaching hospital between January 2012 and February 2013 .The patients were evaluated by history, clinical examination ,endoscopic examination and CT scan (coronal and axial views) for different nasal complain.

All procedures were performed under general anaesthesia.

Inclusion Criteria:

1. Clinically and radiologically suggested chronic rhinosinusitis or recurrent acute

rhinosinusitis when the patients did not respond to adequate medical therapy.

2. Benign sinonasal tumour (Nasal polyp, Angiofibroma , Inverted papiloma)

3. Presence of anatomical variation in patients with facial pain and headache (i.e septal deviation or concha bullosa).

Exclusion Criteria:

1. Malignant conditions of nose and paranasal sinuses.

2. Revision ESS.

3. ESS for biopsy.

4. ESS for management of epistaxis.

Endoscopic technique:

The following surgical steps are selectively performed according to patient disease:

- Resection of the uncinate process (uncinectomy)
- Middle meatal antrostomy
- Anterior ethmoidectomy:
- Posterior ethmoidectomy:
- Frontal sinusotomy:
- Endoscopic septoplasty
- Concha bullosa exenteration
- Endoscopic polypectomy
- Shenoidectomy
- After finishing the operation, light anterior nasal packing is performed in which packs were inserted in the middle meatus and the nasal cavity.

Post-operative care:

Once a patient has awaked from general anesthesia, the head elevated. In the recovery room, a quick and close observation for the general, visual and mental status examination is performed and especially concern for consciousness and visual examination of the patient. The

packs in the nasal cavity are usually removed in the first postoperative day, while the packs in the middle meatus usually removed in the second or third post-operative days.

Then sodium bicarbonate nasal douches and a short course of a nasal decongestant with antibiotics (usually for 10-14 days) continued. Patients are advised to avoid strenuous activity, nose blowing, and any medications that may increase the risk of bleeding. Patients were advised to visit within the first 3 to 6 days after surgery.

During this visit, the sinuses are examined endoscopically. Crusts and clots, which may impede drainage of mucus, is debrided.

Results

1. Age Distribution:

The commonest age group affected was between 21– 30 years (young adults) 51 patients (56.7%) while the least common age group affected was between 41– 55 years 8 patients (8.9%).

2. Gender distribution:

Male are more affected 56 patients (62.2%) than females 34 patients (37.8%).

3. Duration of chief complaint:

Most of the patients have duration of symptoms of 1-2 years 30 patients (33.4%).

4. Occurrence of preoperative symptom:

The most prevalent symptom was nasal obstruction; it was seen in 64 patients (71.1%).

5. Endoscopic findings:

Polypoid tissue was the commonest endoscopic finding (35.5%) while the enlargement of ethmoidal bullae (5.55%) of patients was the least finding.

6. CT scan findings:

Sinus mucosal thickening or opacification was the most frequent CT scan finding which was found in (74.44%) of patients, while Aggar nasi pneumatization (5.55%) and Giant Ethmoid Bulla (5.55%) were the least findings as they found in the patients.

7. Indications of ESS:

Sinusitis (chronic/recurrent acute) was the commonest indication (65.5%) of ESS, while fungal rhinosinusitis was the least indication (4.5%).

Table 1: Indications of ESS (n=90).

Indication	No. of patients	%
Sinusitis(chronic/recurrent acute)	59	65.5 %
Ethmoidal polyp	22	24.5 %
Antrochoanal polyp	5	5.5 %
Fungal sinusitis	4	4.5 %
Total	90	100%

8. Types of surgical procedures:

Uncinectomy is the commonest surgical procedure , it was performed in 90

patients (100%), while frontal recess surgery was the least one , it was done in three patients (3.3%) .

Table2 : types of surgical procedures(n=90)

Surgical procedures	No. of patients	%
Uncinectomy	90	100%
Middle meatal antrostomy	85	94.44%
Anterior ethmoidectomy	51	56.66%
Polypectomy	31	34.4%

(ethmoidal; antrochoanal)		
Concha bullosa exenteration	7	7.77%
Posterior ethmoidectomy	9	10%
Endoscopic septoplasty	9	10%
sphenoidectomy	4	4.4%
Frontal recess surgery	3	3.3%

9. Complications of FESS:

9.1 minor complications of FESS:

Minor complications occurred in 18 cases(19.97%) which included adhesions

(11.1%), Minor epistaxis (5.55%), periorbital ecchymosis (2.22%), infection (1.1%) .

Table 3.1: minor Complication of FESS

Complications	No. of patients	(%)
Adhesions	10	11.1%
Minor epistaxis	5	5.55%
Periorbital ecchymosis	2	2.22%
Infection	1	1.1%

9.2 Major complications of ESS:

Major complications occurred in 6 cases (4.27%) which were Major epistaxis

(2.22%) ,CSF leakage (2.22%), Pneumocephalus (1.1%).

Table 3.2: show major Complication of FESS

Complications	No. of patients	(%)
Major epistaxis	2	2.22%
CSF leakage	2	2.22%
Orbital hematoma	0	0.0%
Blindness	0	0.0%
Intracranial hemorrhage/infection	0	0.0%
Nasolacrimal trauma	0	0.0%
Pneumocephalus	1	1.1%
Meningitis	2	1.1%

9.3 Management of minor complications:

Table 3.3: management and result of minor Complication of ESS

Complication	Time of occurrence	Management	Result
Adhesions	4-6 weeks	Released under local anesthesia	Improved
Minor epistaxis	First 3 day	Conservative measures. -head up position -icepacks -one patient need repacking with vasaline pack for 24 hours	Stopped
Periorbital ecchymosis	1 day	Conservative measures. -head up position	Spontaneous improvement

		-icepacks	within 2 weeks
Infections	1 weeks	Regular suction clearance and systemic antibiotic	Improved

9.4 Management of major complications:

Table 3.12: management and result of major Complication of ESS

Complication	Time of occurrence	Management	Result
Major epistaxis	1 weeks	Endoscopic examination and cauterization under GA and repack	stopepd
CSF leakage	3 month	Conservative treatment	Stopped
CSF leakage	5 hours	Remove packs+ antibiotics	Worsen
Meningitis	2 days	Antibiotics	Worsen
Pneumocephalus	2 days	Waiting	Death

Discussion

In this study, the majority of patients (56.7%) were in the group of 21-30 years being consistent with the findings of Rahman et al [1], but inconsistent with Venkatachalam [2].

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 1.6:1, which is similar to some other series e.g Rahman MZ et al [1] and Stammberger H [3].

The main presenting symptoms of the patients in the study included nasal obstruction (71.1%).

This result is consistent with findings of Rice [4], Mathews *et al.* [5], Stammberger [6], Wigand [7] and Bunzen *et al.* 2006 [8].

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 (35.5%) while the enlargement of ethmoidal bullae(5.55%) was the least findings.

In a 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%) [9].

Major indications for endoscopic sinus surgery were chronic sinusitis and recurrent acute sinusitis (65.5%), extensive nasal polyposis (24.5%), antrochoanal polyp (5.5%). This result differs from a study of Levine HL, where ethmoidal polyp (52.40%) and chronic sinusitis (47.6%) [10].

The common surgical steps were uncinectomy (100%) and middle meatale antrostomy (94.44%), followed by anterior ethmoidectomy (56.66%), unilateral polypectomy (34.4%), concha bullosa exenterated (7.77%),endoscopic septoplasty (10%), sphenoidectomy (4.4%) and frontal recess surgery was the least one as it was done in (3.3)% 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 [11].

In this study, minor complications occurred in 18 (19.97%) cases which

included adhesions 10 (11.1%), minor epistaxis 5 (5.55%), periorbital ecchymosis 2 (2.22%), infection 1 (1.1%) and major complications occurred in 7 cases (4.27%) which was Major epistaxis 2 (2.22%), CSF leakage 2 (2.22%), Meningitis 1 (1.1%), Pneumocephalus (1.1%).

Stankiewicz, reported a 29% complication rate in 90 patients operated upon, with 7 major and 19 minor complications [12].

Schaefer et al (1989), number of patients (100) reported 14% minor and 0% major complications [13].

Wigand and Hoseman (1991), reported ten cases of cerebrospinal fluid leak, two cases of intracranial infection and one case haemorrhage over more than 1000 cases [14].

Stammberger and Wolf (1988) reported two cases of cerebrospinal fluid leak and no other major complications in 4000 cases [15].

Regarding how to deal with each complication. About minor epistaxis the patients were examined endoscopically identifying the bleeding site then electrical cauterization was done. Patients with major epistaxis were admitted to the hospital, given them pint of blood and repack them (anterior packing) and observe them for two days then the packs were removed and ensure that homeostasis is secured. Patients with periorbital ecchymosis were advised to use icepacks.

Two patients presented with CSF leakage, the first one develops intermittent CSF leakage after 3 month of operation, and were managed conservatively with strict bed rest and head elevation at least 30 degree, also patients advised to avoid coughing, sneezing, nose blowing, and straining or Valsalva maneuvers. Stool softeners were recommended, as well as antiemetics to avoid emesis or retching, antitussives to avoid coughing, and strict blood pressure management. The goal of these measures is to reduce active flow through the leak, reduce CSF pressure,

and allow the healing of the defect to seal the leak, avoiding surgical intervention. In a series of 81 cases of traumatic CSF fistula, the overall rate of cessation with conservative treatment was 39.5% when used for 3 days. Resolution with conservative treatment of CSF fistulas involving temporal bone origin was 60%, whereas anterior skull base defects resolved 26.4% of the time with conservative treatment [16].

The second one was 31 year female which presented as bilateral extensive nasal polyposis, after operation she showed delay in the post operative recovery. After five hour her consciousnesses deteriorate and had watery nasal discharge and fever. The patient referred to RCU and then intubated. At the second day the patient underwent head CT scan which revealed air collection in the brain ventricle, seven days after, the patient died.

In conclusion, patients with basal skull fracture who develop worsening of their neurological status should have a CT scan examination to exclude development of complications like delayed pneumocephalus.

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 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).

Majority of the patients were released from the hospital within 48 hours of operations.

The results 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 safe and efficient method for dealing with different sinonasal 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.

References

- 1- Rahman MZ et al.** FESS – A Review of personal series of 207 cases. Journal of Dhaka Medical College, 2003; 12 (1): 56-59.
- 2- Venkatachalam VP, Anurag.** Comparative evaluation of Functional Endoscopic Sinus surgery and conventional surgery in management of chronic sinusitis. JIMA, 2002; 100(2):1
- 3- Stammberger H.** FESS- Endoscopic Diagnosis and Surgery of the paranasal sinuses and Anterior Skull Base. The Messerklinger Technique and Advanced Applications from the Graz School. Endopress. Tuttlingen, Germany, 2003, p. 13.
- 4- Rice DH.** Endoscopic sinus surgery: results at 2 year follow up. Otolaryngology Head Neck Surgery, 1989, 101: 476-477.
- 5- Mathews BL, Smith LE, Jhones R, Miller C, Bookschmidt JK.** Endoscopic sinus surgery: Outcome in 155 cases. Otolaryngology Head Neck Surgery, 1991; 104: 244-6.
- 6- Stammberger H, Posawetz W:** Functional endoscopic sinus surgery: concept, indications and results of the Messerklinger technique. Eur Arch Otorhinolaryngol 1990; 247:63-76.
- 7- Wigand, M.** Endoscopic surgery of paranasal sinuses and skull base. New York, NY: Thieme medical publishers.1990.
- 8- Bunzen DL, Campos A, Leao FS, Morais A, Sperandio F, Caldas NS.** Efficacy of functional endoscopic sinus surgery for symptoms in chronic rhinosinusitis with or without polyposis. Rev Bras Otorrinolaringol (Engl Ed) 2006; 72:242-6.
- 9- R. H. Kamel.** Nasal endoscopy in chronic maxillary sinusitis. The journal of laryngology and otology 1989; 103: 275-8.
- 10- Levine, HL.** Functional endoscopic sinus surgery: Evaluation, surgery and follow up of 250 patients, Laryngoscope, 1990; 100: 79-84.
- 11- S Nair, RS Bhadauria, S Sharma.** Impact of endoscopic sinus surgery on symptom manifestation on chronic rhinosinusitis. MJAFI 2010; 66: 41-5.
- 12- Stankiewicz JA, Maywood IL.** Complications of endoscopic intranasal ethmoidectomy. Laryngoscope, 1987; 97: 1270-1273.
- 13- Schaefer, SD, Manning, S. and Close, L.G:** Endoscopic paranasal sinus surgery; Indications and Considerations. Laryngoscope, 1989; 99: 1-5.p
- 14- Wigand ME. and Hosemann W.G.** Results of endoscopic sinus surgery of the paranasal sinuses and anterior skull base. Journal of Otolaryngology, 1991; 20: 385-390.
- 15- Stammberger H. and Wolf G:** Headaches & Sinus disease. The endoscopic approach. Ann. Otol Rhinol. Laryngol, 1989; 97: 3-23.
- 16. Yilmazlar S, Arslan E, Kocaeli H, et al.** Cerebrospinal fluid leakage complicating skull base fractures: analysis of 81 cases. Neurosurg Rev 2006;29:64–71.