

Original Article

SAFETY IN FUNCTIONAL ENDOSCOPIC SINUS SURGERY (FESS)

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Objective: To document the peroperative and postoperative complications of functional endoscopic sinus surgery.

Material & Methods: 113 patients diagnosed as having sinonasal polyposis who underwent FESS at ENT unit 1 SIMS/SHL from September 2010 to June 2012, were registered in this study.

Results: Out of 113 patients 15 developed complications out of which only 2 had major ones.

Conclusion: Extreme care is required in FESS because of paranasal sinuses proximity to vital structures. Complications if identified early can be managed adequately.

Keywords: Complications, FESS (Functional endoscopic sinus surgery), sinonasal polyposis

Introduction

FESS, which is a minimally invasive surgical technique, has significantly advanced the ability of the rhinologists to execute their skills, in eradicating sinonasal pathologies. Since its introduction in 1980, FESS is practiced in many parts of the world. Initially limited to the management of sinusitis and polyps, its application is extended to include transphenoidal hypophysectomy, repair of CSF rhinorrhoea, orbital decompression, dacryocystorhinostomy, anterior skull base surgery, excision of mucoceles and tumors. However as technique expands the possibilities for treating extensive para nasal sinuses disease endoscopically, potential complications may always be anticipated and encountered. These potential complications range widely and are divided into minor and major categories, in reporting outcomes. The true incidence of complications remains debatable because of author's perception and inadvertent under reporting. Different studies report complications rate as low as 0.3% to as high as 22.4% with major complications reported most of the time.¹ Timely identification and adequate treatment is critical to reduce the risk of permanent injury and impacts outcome of the complications.² In spite of all these complications FESS is considered the standard of care for the surgical treatment of medically refractory chronic rhinosinusitis.

Material & Methods

This retrospective study was conducted at the department of ENT Unit I SIMS/Services Hospital Lahore to assess the complications and their management in FESS. Patients having nasal polyposis, allergic fungal rhinosinusitis and invasive fungal rhinosinusitis were included in the study. 113 patients, were operated from September 2010 to

June 2012. Out of these, 15 patients had recurrent disease, in which surgical landmarks were distorted. Their diagnosis was based on thorough history, detailed examination, histopathology and CT scan with FESS protocol. A preoperative course of systemic steroids was given to these patients with the intention to reduce the vascularity and the bulk of the disease. It is established that adequate preoperative medical treatment decreases the complication rate by restoring the anatomy to normal as much as possible. Patients underwent planned FESS with incorporation of zero degree and angled endoscopes along with use of microdebriders. Peroperatively repetitive evaluation of landmarks and a clear look on exposed eyes was considered essential.

Results

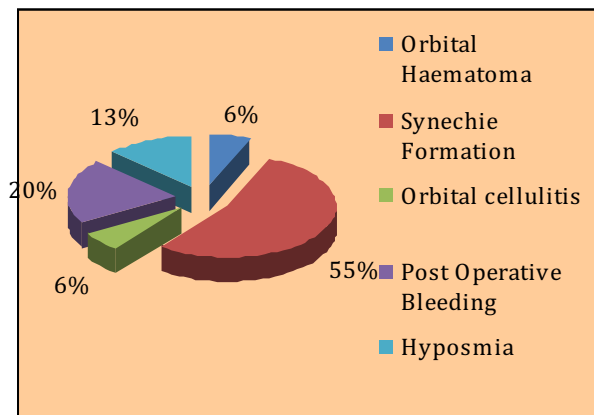
One hundred and thirteen patients who presented to ENT floor with sinonasal polyps were assessed as fulfilling the criteria of undergoing FESS on the basis of clinical examination, laboratory and radiological evidences. Only two patients had serious complications of developing orbital cellulitis and orbital hematoma leading to transient loss of vision. Two patients were found to have postoperative hyposmia. Three patients had postoperative bleeding per nose. Synechie or adhesion formation was seen in eight patients during post operative follow up.

Discussion

Extreme care is required in FESS because of paranasal sinuses proximity to vital structures. Our study reveals overall complication rate of 13.2%. Amongst these major complications were 1.7%. Minor complications were estimated to be 11.5%. As mentioned earlier international statistics disclose the complication rate ranging from 0.3% to as high as 22.4%.¹ Stankiewicz reported 5% incidence of major

Table-1: Complications of FESS (n=113).

Complications	Number of Patients	Percentage
Orbital Haematoma	01	0.8%
Orbital Cellulitis	02	0.8%
Post operative bleeding	03	2.6%
Synechie formation	08	07%
Hyposmia	02	1.7%

**Fig-1:** Complications Of FESS .

complication rate during subsequent 90 cases.³ Risk factors for developing complications include absence of middle turbinate, extensive disease, previous surgery with loss of anatomical landmarks. Increased complications rate in revision surgery has also been evaluated with the loss of surgical landmarks and potential scarring; revision cases would be expected to result in increased complications. However Dalziel did not find a significant relationship between complications and revision surgery.⁴ So combination of revision surgery as a risk factor is not clear. Main reason of complications can be due to poor visibility. Holzmann and Soyka concluded that FESS was safe in hands of less experienced surgeons provided that the degree of difficulty in cases is 'highly adapted to their abilities.'⁵ Casiano concluded that thorough knowledge of anatomy of the region and computer assisted surgery improves accuracy and reduces the risk of major complications with less experienced surgeons.⁶ Orbital hematoma was managed effectively with lateral canthotomy and inferior cantholysis resulting in return of normal vision. Orbital cellulitis was managed conservatively with intravenous antibiotics and anti-inflammatory regimens. Synechie formation is a common complication which in our set up was managed by lysis, but various studies have mentioned placement of spacers like merocil, gelfoam and sialistic.⁷

Mitomycin is also studied in preventing synechie but is reported with mixed results.⁸ Epistaxis is another complication encountered which was managed by nasal packing. However both non-surgical and surgical options are employed. Mannit, et al surgically managed epistaxis by TESPAL.⁹ Postoperative pain is observed quite commonly which was managed with routine analgesics, however studies show usefulness of acetaminophen without use of opioid analgesics.¹⁰ Panda et al documented that adrenaline soaked cotton balls significantly improve the quality of surgical field.¹¹ Soler and coauthors designed a checklist for standardized practice in endoscopic sinus surgery which was helpful regarding safety of this procedure.¹² Use of CT navigation 3 dimensional study in FESS decreased the rate of complications by improving identification and avoiding damage to vital structures.¹³ Garth and Martin concluded in their study done on 61 patients undergoing FESS that use of image guided FESS surgery increased surgical effectiveness and decreased surgical morbidity.¹⁴ Use of advanced CT and MRI scanners combined with computing power allowing 3-D reconstruction have positive effect on surgical safety.¹⁴ More recently, balloon catheter systems have been introduced to dilate sinus ostia.¹⁵

Conclusion

A thorough knowledge of anatomy remains essential for performing FESS. However malformations, previous operations and massive polyposis may interfere greatly with intraoperative orientation exposing patient to major risks. Surgeon performing FESS is mainly concerned with bony landmarks, less concerned about the soft tissue changes. Lower rate of complications of FESS is related to limited resection. Goal of surgery is to identify and enlarge narrow ostia of sinuses for proper ventilation and drainage. Complication rate decreases with increasing experience. Special circumstances affecting safety level of surgeon experience and skill was exposed by different authors. Complications rate decreases with adequate preoperative medical treatment to reduce bulk of disease and restoring anatomy to some extent. It is emphasized that a proper data collecting protocol should be established as regards documenting complications so that FESS surgeons can improve the safety of this valuable procedure.

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References

1. McMains KC, safety in endoscopic sinus surgery. Current opinion in otolaryngeal Head Neck Surg 2008;16(3):247-251.
2. Rosentiel, David B, Silers Michael J. The long term results of functional endoscopic sinus surgery. Current opinion in otolaryngeal Head Neck Surg. February 2000-vol 8 pp 27-31.
3. Stankiewicz J. Complications of endoscopic sinus surgery. Otolaryngol Clin N Am 1989; 22: 749-758.
4. Dalziel K, Stein K, Round A, Garside R, Royle P. Endoscopic sinus surgery for excision of nasal polyposis: a systemic review of safety and effectiveness. Am J Rhinol 2006;20:506-519.
5. Soyka MB, Holzmann D. Correlation of complications during endoscopic sinus surgery with surgeon skill level and extent of surgery. Am J Rhinol 2005;19: 274-281.
6. Caisano RR, Numa WA. Efficacy of computed tomographic image guided endoscopic sinus surgery in residency training programs. Laryngoscope 2000 aug;110(8):1277-1282.
7. Lee JY, Lee SW. Preventing lateral synechia formation after endoscopic sinus surgery with silastic sheet. Arch Otolaryngol Head Neck Surg 2007;133:776-779.
8. Kim ST, Gang IG. Effect of mitomycin C on size of antrostomy after endoscopic sinus surgery. Ann Oto Rhinol Laryngol 2006;115:672-678.
9. Nouraei SA, Maani T, Hajioff D, Saleh HA, Mackay IS. Outcome of endoscopic sphenopalatine artery occlusion for intractable epistaxis; a 10-year experience. Laryngoscope 2007;117:1452-1456.
10. Kempainen T, Kokki H, Tuomilehto H, Seppä J, Nuutinen J. Acetaminophen is highly effective in pain treatment after endoscopic sinus surgery. Laryngoscope 2006;116:2125-2128.
11. Panda N, Verma RK, Panda NK. Efficacy and safety of high concentration adrenaline wicks during Functional Endoscopic Sinus Surgery. J Otolaryngol Head and Neck Surg. 2012 April;41(2):131-7.
12. Soler ZM, Poetker DA, Rudmik L, Psaltis AJ, Clinger JD, Mace JC, et al. Multi institutional evaluation of sinus surgery checklist. Laryngoscope. 2012; 122(10):2132-6.
13. Wormald PJ. The anatomy of frontal recess and frontal sinus in three dimensional reconstruction. In: Endoscopic sinus surgery anatomy, three dimensional reconstruction, and surgical technique. New York: Thieme, 2005. pp. 35-54.
14. Garth Oslon, Martin J. Image guided FESS. Otolaryngol Head Neck Surg 2000;123:188-194.
15. Bolger WE. Safety and outcomes of balloon catheter sinusostomy: a multicentre 24 week analysis in 115 patients. Otolaryngol Head Neck Surg 2007; 137:10-20.

Answer Picture Quiz

This is an x-ray of a 47-year-old man with a history of cirrhosis associated with alcohol abuse presented with a 2-day history of shortness of breath. Before this symptom developed, he had been treated with repeated thoracentesis of the right side for cirrhosis-associated hydrothorax. On pulmonary examination, breath sounds were absent on the right side, and a succussion splash was audible in the right

upper chest when the patient was gently shaken. Chest radiography showed hydropneumothorax with a collapsed right lung and an adjacent thoracic air/liquid level, which was probably the result of repeated thoracentesis. The patient was treated with chest-tube placement and diuretics. An analysis of the pleural effusion revealed transudative fluid without evidence of infection or cancer.