

Challenges of Endoscopic Sinus Surgery (ESS) In Managing Rhinosinusitis, UATH Experience

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I. Introduction

The development of Endoscopic Sinus Surgery in the late 70s (Austria 1970s) had led to huge strides in the understanding of paranasal sinus anatomy, knowledge in the pathogenesis of sinus diseases and the treatment of chronic Rhinosinusitis. Rhinosinusitis is one of the most common chronic adult health problems in the Western world with a recent European study estimating the prevalence of chronic rhinosinusitis (CRS) at 11%.¹ Specialized and specifically designed instruments guided by illuminated telescopes which project highly improved and magnified images to monitors are used to visualize the internal architecture of the nose and paranasal sinuses. This has greatly enhanced the appreciation of sinus disease processes and minimally invasive techniques can now be carried out with anticipation of reduced complications.^{1,2} Though ESS is routine procedures in developed countries, it is still evolving in developing nations like ours. Despite all limitations, the following data on the epidemiology of chronic rhinosinusitis of the ENT practice will allow a better view on all described diseases.^{2,3} When considering the outcomes of sinus surgery, it is important to define how these should be measured. 'Objective' measures of surgery, such as endoscopic appearances, ostial patency or changes in CT scans, were often reported as the primary outcome in early studies of endoscopic sinus surgery.^{1,3,4} It has been recognised that the effects of CRS on physical and mental health may translate into absence from work - absenteeism. Any deleterious effect on concentration due to CRS whilst at work is described as presenteeism.^{5,6}

Risk factors like smoking and gastro-oesophageal reflux are discussed regarding their influence on CRS prevalence. Moreover, co-morbidities of CRS, like asthma, conditions of the cardiovascular system and depression are all documented and their influence on CRS is discussed. Furthermore, data on CRS prevalence in special cohorts, like immunocompromised patients.^{5,6,7} The direct costs associated with chronic rhinosinusitis are higher than the background costs in managed care patients because of increased office visits and medication prescriptions, and the indirect costs due to restricted activity days are enormous.^{6,8,9} Medical treatment has had a significant impact on treatment, and the current surgical treatment of endoscopic sinus surgery based on anatomical understanding is an improvement on the outcome. The need for improved surgical intervention is needed.^{10,11,12} The burden of chronic Rhinosinusitis is underestimated in developing countries and the cost of both the medical and surgical treatments are huge but this review aims to evaluate the introduction of ESS in University of Abuja Teaching Hospital.

II. Methodology

Study design

This was a four year retrospective study carried out of all patients who had Functional Endoscopic Sinus Surgery (FESS) and its affiliates in UATH from June 2013 to April 2017.

Setting

The study was carried out at the otolaryngology department of University of Abuja Teaching Hospital, Gwagwalada which is a 396 bedded tertiary health institution with the capacity to build up to 500 beds, located in Gwagwalada area council of FCT, 45km from the city centre.

Patients' selection

Patients that had conventional ESS were recorded as such while those who had the use of endoscopic instruments and tower but without strict adherence to conventional scope vs. instrument relationship or full monitor fixation was recorded as endoscope assisted sinus surgery (EASS), here direct visualization of intra nasal structures with telescope lighting was often relied upon.

All records from the case note of patients were retrieved from the health information management system of the hospital after due approval from the ethics committee of the hospital and the information such as treatment procedures were analyzed accordingly.

Indications For ESS/Patient Recruitment

The commonest indication for ESS in our centre was chronic Rhinosinusitis poorly responsive to medical treatment; along with Polypoid Rhinosinusitis. Each accounting for 26.8% of patients. Other indications were Fungal Rhinosinusitis 26.4% (5 patients), benign Sinonasal Tumors (4 patients) and Allergic Rhinosinusitis (3 patients). Patients assessed to require ESS were counseled to anticipate a minimal post-operative concerns with this technique. The overall cost of surgery (excluding investigations were made less than conventional nasal surgeries (approximately \$100 less) to encourage patients enrollment in the first two (2) years of its commencement.

Theatre Set Up

It is ideal to have a theatre dedicated for ENT surgeries or even better dedicated for endoscopic sinus surgery. We have not been fortunate to have either. The drawbacks we have observed from sharing theatre space with other fields of surgery is that equipments have to be moved whenever patients are booked from where they are stored into the theatre and back again. This usually takes 45mins to 1 hour to set up, test run and sterilize. To minimize surgery time, nasal preparation goes on simultaneously with anaesthetic set up while the endoscopic set up is proceeding.

Another challenge encountered is the frequent shuffling of peri-op staff and anaesthetists, resulting in replacement of fairly experienced staff with a new one requiring a complete orientation of this procedure. We have made efforts to encourage interested theatre staff to be trained and stationed for ESS.

Anaesthesia

All our patients had general anaesthesia with endotracheal intubation and hypopharyngeal packing to prevent aspiration or ingestion of blood/other materials/tissue from the operation site. We advocate hypotensive anaesthetic methods to reduce nasal bleeding and haemodilation techniques. This is not straight forward, since vasoconstrictive agents (adrenaline 1:200,000 dil/xylomepha) placed on and injected into the operation site.

A watchful, carefully observant anaesthetist is required to achieve hypotensive anaesthesia throughout surgery that many times in our case last hours.

Our experience has however been uneventful except for one occasion when the patient had hypotension with cardiac arrest on table necessitating a rush of normal saline and eventual blood transfusion. After stabilizing the patient which added 25 minutes to surgical time, surgery was completed and patient monitored post-op in ICU.

Nasal Preparation

Nasal preparation is advocated and improves visual field reduces bleeding and improves every passage of the instrument. We advocate the use of long strips of autoband impregnated with xylometozoline and diluted adrenaline (1:20,000) passed through the medial aspect of the nasal floor then raised upwards to avoid injury to the turbinates or septal mucosa. This can be achieved even in the presence of nasal polyps which are compressed or even crushed in the process. Nasal preparation was carried out while setting the instruments, before the patient is anaesthetized to give maximum time for the drugs to take effect.

Surgical Time

Our average time for ESS has been on the average of 4 hours at onset, this steadily reduced to 2 ½ hours and less as we improved in instrument handling and setting, and resolving instrument trouble shooting. We had a setback towards the ending of 2014 when the microdebrider spoilt as a result of poor cleaning post-op and infrequent lubrication and use, we advocate the weekly test running and lubrication of the microdebrider in centers where ESS is not carried out weekly to preserve the function of rotating motorized parts of the instrument.

Data Analysis: Data were analysed using SPSS 19.0 software. Probability value of <0.05 was considered as statistically significant.

III. Results

This study was carried out among 41 patients who had convectional ESS in the department of otolaryngology and careful study of their case file, average hospital admission for all the 41 patients in the study were 4 days and there was no mortality recorded.

The mean age of the 41 patients who had convectional ESS was 39.2±4.2 with the highest proportion within the age range of 31-40 years accounting for 13 (31.5%) of the total patients studied and the lowest proportion being <10 years group accounting for 1 (2.4%). Nine patients with ESS procedure representing 21.9% were within the 41-50 years age group, 7 and 6 were from the 10-20 and 21-30 years age group representing 17.0% and 14.0% respectively. However, this distribution was not statistically significant (P >0.05,

Table 1). There were 19 males (46.3%) and 22 females (53.7 %), the male to female ratio (M:F) was 1:1. (Figure 1).The commonest surgical diagnosis was Polypoid Rhinosinusitis and chronic Rhinosinusitis each consisting of (26.8%) patients, while fungal Rhinosinusitis accounted for 12.2%. the rest were Allergic Rhinosinusitis 9.8%, Antrochoanal polyp 4.9% and ethmoidal mucocele 7.3%. (Figure 2).

Amongst all these patients 28 (68.3%) had conventional ESS while 13 (31.7%) had endoscopic assisted sinus surgery. The duration of surgery was on the average 4hrs (1st year), 2.6hrs (2nd year), for conventional ESS while EASS took 2.3 hrs. (Figure 3).Three patients received intra-op transfusion (7.1%) and 1 patient had cardiac arrest on table, while others were uneventful. Nasal packs were left for 48hrs in 24.4% of patients, for 24hrs in 2 patients while the rest were removed immediate post op or < 12hrs. No facial swelling was recorded. The commonest complaint was post op nasal blockage after nasal pack removal. However, all resolved in 3-5 days. Intranasal adheitions was not recorded.

Table 1: Distribution of patients who had Convectional ESS.

Age group (years)	Total	Percent (%)
<10	1	2.4
10 – 20	7	17.0
21 – 30	6	14.0
31- 40	13	31.5
41 – 50	9	21.9
51 – 60	4	9.8
>60	2	4.7
Total	180	100.0
df = 6	P >0.05	

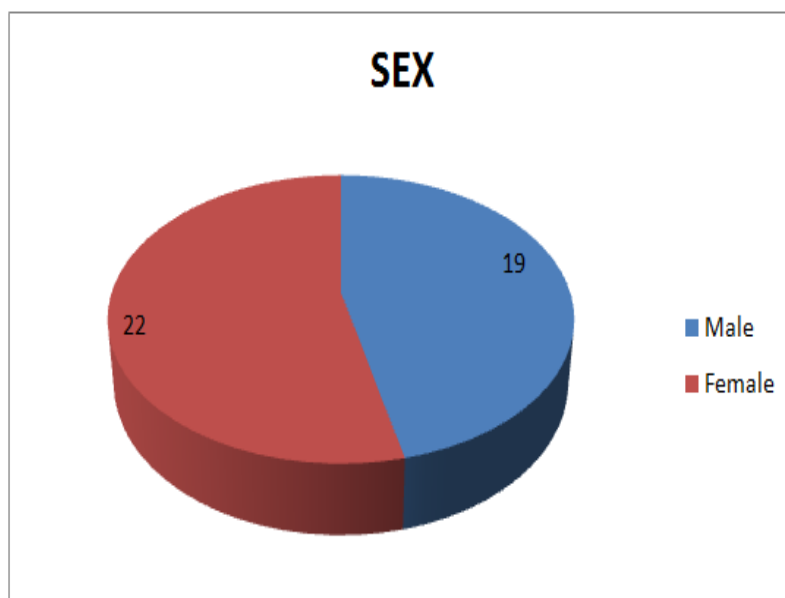


Table 1: Sex distribution among patients who had Convectional ESS

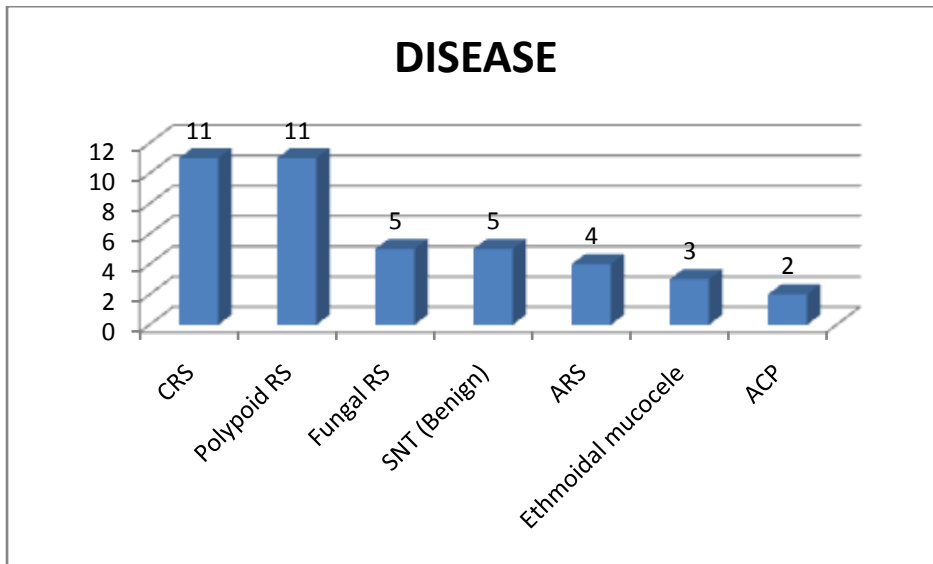


Table 2: Disease pattern among patients who had Convectional ESS

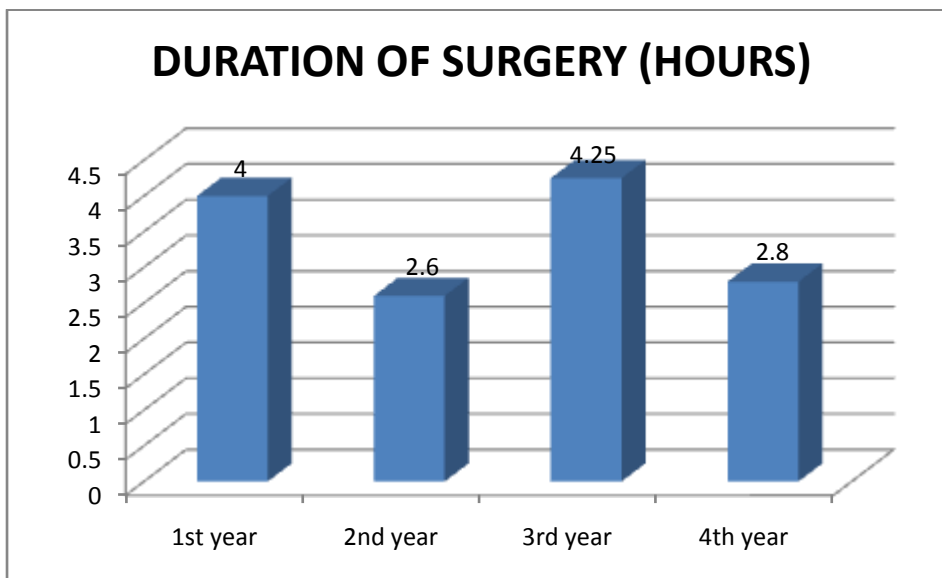


Figure 3: Duration of Surgery among patients who had Convectional ESS

IV. Discussion

A less radical yet effective way of surgically treating chronic Rhinosinusitis has always been sought for by authors in the centre, hence endoscopic sinus techniques was a welcome development. This became possible with the installation of ENT consoles equipped with telescopic capabilities in late 2012 for the centre along with the purchase of ESS instrument sets and video projecting devices for the theatre. This was closely followed by building of a CT unit.

Nasopharyngoscopy is a clinical technique for real-time visualization of intranasal and nasopharyngeal mucosal lining and intraluminal architecture. This is achieved with the use of telescopes.

We found this useful in preparing patient for ESS and to assist residents (trainees) practice the art of sinus endoscopy. This procedure was carried out in the clinic every Fridays mainly and other clinic days based on the discretion of the consultants.

All patients considering ESS were mandated to have CT scans. The radiologists were specifically asked to provide $\geq 2\text{mm}$ coronal cuts of PNS. The cost (relatively higher) of carrying out CTs have on some occasions delayed the booking of patients and scared some away. This however improved with growing enlightenment and acceptance of this relatively costly procedure. The NHIS also reduced this cost burden for patients by providing counterpart payments.

Another challenge that was faced at the onset was the type CT cuts selected by the radiologist. The surgeons had to repeatedly meet with the radiologist to review patients scan organs, hence the specific request were made for coronal cuts mainly. The role of multidisciplinary collaboration cannot be over emphasized.

V. Surgical Challenges

Orientation: It takes time to adjust to the new, enlarged illuminated nasal cavity anatomy. As one also learns to navigate through distinct structures as with such technology eye/hand coordination improves with practices. **Misting:** The nasal cavity has constant humidifying airflow patterns which tend to result in misting of telescope tips. We overcome that by the frequently withdrawal of telescope tips and dipping in savlon (detergent based antiseptic) soaked cotton wool plagets placed in a gallipot close to the surgical field.

Bleeding: Bleeding is notorious for obstructing surgical fields and if heavy and persistent may result in an abandonment of the procedure (grade 4/5) so great efforts must be taken to avoid or control this. We commence use of 0.1% xylometazoline nasal spray on the night before and morning of surgery and subsequently place autoband nasal pack on table impregnated with a mixture of 0.1% xylometazoline and Adrenaline 1:100,000 to improve surgical field and reduce bleeding. Small strips are kept for intra operative use during surgery. Here adequate hypotensive anaesthesia/control of BP by anaesthetist is invaluable. Bipolar Diathermy has been advocated by some, but we have found limited need for its use. **Distorted Anatomy:** This may be encountered in repeat surgeries or excision of benign nasal tumors or granulomas that have distorted anatomy. The middle turbinate is the most important trademark; however the inferior turbinate septum helps re-orientation.

Instruments Handling: The coupling, cleaning and maintenance of instrument have been of immense challenge. The motorized parts of the microdebrider easily gets stuck without constant use, oiling and correct cleaning. We sterilize steel instrument with paracef. Hypochloride solutions tend to erode and destroy the instrument. A standing rule has also been placed to limit the movement of the endoscopic tower to just a specific theatre to safeguard against falls, breaks and wearing away of electrical fittings. **Human Resource:** Availability, patience and dedication of all staff is necessary from those directly in-charge of keeping, setting up and cleaning the instrument.

VI. conclusion

This radical yet effective surgically intervention in the treatment of chronic Rhinosinusitis is a milestone in the management of patients and an improvement in the service delivery in the center. The outcome of this intervention are summarized above and succinctly achieved by the team work of the staffs in the department. This should help to improve services in the center and elicit future advance research.

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