



## Research paper

# A 5-year experience in functional endoscopic sinus surgery under local anaesthesia

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### ABSTRACT

**Introduction:** Functional endoscopic sinus surgery (FESS) under local anaesthesia performed as an office-based procedure is an alternative to general anaesthesia. It is gaining popularity among otorhinolaryngology – head and neck surgeons.

**Aim:** This study assesses the outcome of FESS performed under local anaesthesia in a tertiary centre over a 5-year period.

**Material and methods:** A retrospective data collection was conducted. All adults who underwent FESS under local anaesthesia for a 5-year period from June 2014 to June 2019 in Otorhinolaryngology-Head and Neck Surgery (ORL-HNS) Department, Sarawak General Hospital, Malaysia were included in this study. Data and information on preoperative assessment, surgical indication, sinuses operated on, intraoperative findings and postoperative complications and follow up were recorded.

**Results and discussion:** A total of 150 patients met the inclusion criteria. The most common indication was chronic rhinosinusitis with nasal polyp (78%). All paranasal sinuses were operated on. In 43% of cases local anaesthesia was used alone, while 57% received both local anaesthesia and intravenous anaesthesia. Majority of patients (90%) were discharged home the next day. Four patients (2.7%) developed epistaxis postoperatively which did not require surgical intervention.

**Conclusions:** FESS under local anaesthesia is a safe and feasible alternative to general anaesthesia and is well tolerated by patients. Complications of general anaesthesia can be avoided.

## 1. INTRODUCTION

Recent advancement in techniques and surgical instrumentation has seen more rhinological procedures being performed in the office setting under local anaesthesia. Functional endoscopic sinus surgery (FESS) is a procedure that is commonly performed in the otorhinolaryngology unit and is normally done under general anaesthesia. However, many centres are currently performing FESS as an office-based procedure under local anaesthesia with minimal complications while avoiding the risks of general anaesthesia. In Malaysia, it is still uncommon for FESS to be performed under local anaesthesia.

In this study, we collect data on the outcome of FESS performed under local anaesthesia in the Otorhinolaryngology Head and Neck Surgery Department, Sarawak General Hospital, a tertiary centre in the island of Borneo.

## 2. AIM

The objective of this study is to evaluate the outcome of FESS under local anaesthesia in our centre.

## 3. MATERIAL AND METHODS

### 3.1. Data collection

A retrospective data collection was performed on all patients who had undergone FESS under local anaesthesia between June 2014 to June 2019 in the Otorhinolaryngology Head and Neck Surgery, Sarawak General Hospital, Malaysia. We included all patients who had undergone FESS under local anaesthesia in our center and excluded patients whose data were incomplete or lost to follow up. A total of 150 patients met the inclusion criteria. Data and information that were collected includes age, sex, underlying co morbidities, wait time, indication for surgery, type of surgery, intra operative and post-operative surgical complications. For each case, we also collected data on the sinuses that were operated on, whether the FESS was unilateral or bilateral, duration of the surgery and whether any previous surgery was performed for the patient. Wait time was defined as the time from the last clinic visit when the decision for surgery was made until the day of surgery. All of the surgeries were performed by 4 surgeons with at least 2 years of surgical experience and have assisted the surgical consultants in multiple FESS under local anaesthesia. All FESS were performed in the Otorhinolaryngology Head and Neck Surgery Department of Sarawak General Hospital following the protocol in Appendix 1. The data were tabulated and analyzed by simple data analysis using percentage and proportions.

### 3.2. Surgical procedure

Patients were assessed a day prior in the ENT clinic and then admitted at 6 a.m. on the day of surgery. Branulla was inserted and the patients' blood pressure, pulse rate and oxygen satu-

ration were monitored continuously throughout the procedure. Lignocaine gel and nasal packing were then inserted 30 minutes before surgery. Lignocaine gel was applied at the osteomeatal complex region, inferior and middle turbinates for FESS or to the septum for septoplasty. Nasal cavity was then packed with cottonoid soaked with a mixture of adrenaline, cocaine and normal saline: 1 mL of adrenaline (1 : 1000), 2 mL of cocaine (10%), and 4 mL of normal saline. The patient's face was cleaned with normal saline and head drape applied. Dental local anaesthesia was administered at the axillary of the middle turbinate for FESS or septum for septoplasty. If the patients experienced any discomfort or pain, an initial dose of 25 µg of intravenous pethidine will be administered and if needed, an additional 25 µg will be given for a total maximum dose of 50 µg. A fully equipped resuscitation trolley was available in the Department, and if the need arises the code blue team was on standby. FESS (uncinate process, anterior ethmoid, posterior ethmoid and middle antrostomy) and septoplasty was then performed. The patients were reminded to swallow any blood or fluid that was trickling down from the nasopharynx to prevent coughing or choking. Hemostasis was secured with bipolar diathermy, adrenaline packing, gentle and minimum normal saline flushing. The nasal cavity was then packed with NasoPore or Merocell intraoperatively. The patients were observed in the ward postoperatively. Patients that stayed near the hospital can be allowed home 4–6 h after observation in the ward. Postoperatively, medications that were prescribed to patients included a course of oral antibiotics, usually from the penicillin group, topical decongestant, antihistamine, oral painkiller if needed and nasal lavage. Intranasal steroid spray was started a week after surgery. We reviewed the patients a week after surgery for nasal toileting in the ENT clinic, then 2 weeks to a month later.

## 4. RESULTS

A total of 158 patients were operated on during that period. However, data were only collected from 150 patients as 8 were lost in follow up. There were 99 male and 51 female patients. The majority were from the 51–60 years old age group, which makes up about 27% of the total number of patients. The youngest patient was 14 years old while the oldest patient was 77 years old, with a mean age of  $45.4 \pm 15.1$  years. More than half of the patients (59%) did not have any comorbidities while the remaining ones had either one or a combination of underlying medical illnesses such as hypertension (13%), diabetes mellitus (7%) and bronchial asthma (12%). The most common diagnosis (Table 1) was chronic rhinosinusitis with nasal polyposis which constitutes more

**Table 1. Diagnosis.**

| Diagnosis                                  | Number of patients<br>(n = 150) |
|--|---------------------------------|
| Chronic rhinosinusitis with nasal polyp    | 119                             |
| Chronic rhinosinusitis without nasal polyp | 17                              |
| AntroChoanal polyp                         | 14                              |

than three-quarter of cases (80%), followed by chronic rhinosinusitis without nasal polyposis (11%), and antrochoanal polyp (9%). In total, 78% of patients had no previous surgery while the remaining patients had surgery or surgeries performed on them prior to the current procedures.

The median wait time was 5.1 weeks (range 0–10 weeks) with 55% of patients getting their procedure done within a month from the last clinic visit. FESS was performed in all the patients. The maxillary, ethmoid, sphenoid and frontal sinuses were operated on as required. The number of sinuses that were operated on are shown in Table 2 with the most common sinus being the maxillary sinus, followed by the anterior ethmoid, posterior ethmoid, sphenoid sinus and frontal sinus. In total, 4 patients had a full house FESS performed under local anaesthesia; 71% had procedures performed bilaterally while 29% of patients had unilateral procedures done. With regards to anaesthesia, 65 patients required only local anaesthesia while 85 patients required both local anaesthesia and intravenous pethidine. The mean duration of the FESS performed was  $49.4 \pm 20.9$  minutes. All surgeries were able to be completed with none being stopped prematurely. Average estimated intraoperative blood loss was 30–50 mL. We did not encounter any major intraoperative complication such as cerebrospinal fluid leakage, orbital injury, bleeding or vasovagal attack. NasoPore were inserted into the nasal cavities in 42% of patients while 58% of patients were inserted with Meroceol postoperatively. Four patients (3%) developed postoperative epistaxis which required further intervention such as posterior nasal packing. None of these patients required surgical intervention for the epistaxis. In total, 90% of patients were discharged the next day, 7% on the second day and 3% were allowed home on the third postoperative day. Two patients were allowed home on the same day. Out of the 11 patients that were discharged on the second day, 2 were kept for monitoring due to postoperative epistaxis while the remaining were kept in the ward for logistical issues. Patients discharged on the third day required further nonsurgical intervention for postoperative epistaxis (posterior nasal packing). Thirteen percent of patients developed recurrence that was noted during follow up which was a minimum of 3 months postoperatively.

## 5. DISCUSSION

Rhinologic surgery and procedure performed under local anaesthesia is not a new concept as it has been done in one form or another for the past 3 decades. A survey by the American Rhinologic Society<sup>1</sup> in 2016 among its members showed that 99% of respondents performed office based rhinologic procedures with the majority performing about 11–20 procedures in a month. Sixty three percent reported an increase in the number of office-based rhinologic procedures performed in the past 5 years. It has gained widespread popularity due to the improvement in surgical instruments such as the electrical powered microdebrider which allows access to all the paranasal sinuses.<sup>2</sup> Newer and recent tech-

**Table 2. Paranasal sinus operated on.**

| Paranasal sinus operated on | Number of patients |
|-----------------------------|--------------------|
| Maxillary sinus             | 150                |
| Anterior ethmoidal sinus    | 111                |
| Posterior ethmoidal sinus   | 76                 |
| Sphenoid sinus              | 10                 |
| Frontal sinus               | 4                  |
| Combination                 | 113                |
| Full house FESS             | 4                  |

Comments: The numbers show that the maxillary sinus was operated in 150 patients, while the anterior ethmoidal sinus were operated on in only 111 cases, the posterior ethmoidal sinus operated on in 76 cases and so forth. The ‘combination’ means that a combination of the sinuses were operated on which means that in 113 cases, more than 1 sinus were operated on.

niques that can be performed under local anaesthesia have also been developed which include FESS, sinus balloon dilatation, drug eluting stents and in office navigation.<sup>2</sup> The common diagnosis for FESS in our centre were chronic rhinosinusitis with or without nasal polyps and antrochoanal polyps (Table 1). Our study also showed that all paranasal sinuses can be operated on under local anaesthesia (Table 2). A study by Prickett et al.<sup>3</sup> in the United States showed that the total cost of performing rhinologic office-based procedures is approximately 2.7 times lower than performing the procedure under general anaesthesia.

FESS under local anaesthesia has the advantage of a shorter recovery time, lesser symptoms of epistaxis, nausea and vomiting compared to general anaesthesia.<sup>4,5</sup> Patients are also allowed home earlier with a shorter duration of missed work or school.<sup>6</sup> However, in our setting most patients are kept overnight due to logistical issues as many of them live a distance away from the hospital and have transportation issues to come back to the hospital in the event of an emergency. In an ideal setting where the patients are able to come back to the hospital immediately during an emergency, the patients can be discharged home on the same day. The wait time for surgery is also shorter at 5.1 weeks in our study, as the wait time could be longer if the surgery is performed under general anaesthesia. In a study by Gittelman et al.,<sup>7</sup> conducted on 232 patients, it was reported that patients who had undergone rhinologic procedures under local anaesthesia had a lower blood loss (23 mL) compared to patients under general anaesthesia (58 mL). In our study, the estimated blood loss in was 30–50 mL which is between these 2 estimates. This is probably due to a few factors which include patient selection where patients with less extensive disease will have their procedures done under local anaesthesia, hence the lesser blood loss, compared to patients with more extensive disease where the estimated blood loss will be higher. The other possible factor is surgeons tend to be more cautious while performing procedures such as FESS under local anaesthesia due to patients’ discomfort and possible risk of aspiration. All the patients in our centre were packed routinely with either NasoPore or Meroceol postoperatively. This is the preference of the surgeons in our centre as it low-

ers the risk of bleeding postoperatively and thus reducing the likelihood of the patients seeking emergency care in the hospital for epistaxis as many patients have logistic issues due to the distance of their homes to the hospital.

Complications of FESS under local anaesthesia is similar to the ones performed under general anaesthesia which includes cerebral spinal fluid leak, orbital injuries and intraoperative bleeding. In this study however, we did not encounter any such complications. Scott et al.,<sup>8</sup> in their study on 315 patients documented a complication rate of 2.5% (epistaxis, infection and swallowed nasal pack) which is comparable to our complication rate of 2.6%. Four of our patients developed epistaxis postoperatively which resolved with nasal repacking. None of our patients developed post-operative infection. In that same paper,<sup>8</sup> reported possible additional complications includes pain, vasovagal attack and swallowed nasal pack which terminated the procedures. Ravansky et al.,<sup>9</sup> reported a vasovagal incidence of 0.16% in a study involving 4973 patients who had undergone office-based procedures and it was noted that the vasovagal episodes were most commonly seen in patients with dyslipidaemia and hypertension. In our study, we did not face any of the above complications to the point that we have to terminate our surgery. These complications can be avoided or reduced with better assessment of the patients' pain threshold, adequate pain control with anaesthesia and meticulous surgical techniques.

Patient selection plays an important role in deciding whether the patient is a suitable candidate for FESS under local anaesthesia. To the best of the authors' knowledge, there are no universally accepted algorithm and assessment to determine whether a patient is suitable for FESS under local anaesthesia. Careful explanation on the procedure, focusing especially on the point where the patient will be conscious throughout the process and possible complications such as pain and discomfort during the surgery and the risk of termination of the procedure needs to be conveyed to the patient. If the patient could not tolerate the procedure even with adequate anaesthetic medications, the procedure should be abandoned and to be performed later as an elective surgery under general anaesthesia. In performing procedures under local anaesthesia, any sudden movement by the patients can have potential serious adverse outcome. Other factors that must be considered includes underlying medical illnesses, anxiety level and severity of disease. Certain personality traits such as patients with histrionic personality traits are not favourable candidates for office based rhinologic procedures.<sup>7</sup> A patient's ability to tolerate nasal endoscopy is a good predictor of the patient's capacity to undergo and complete the office based procedures.<sup>8,10</sup> The surgical extent of FESS under local anaesthesia is also tailored to the degree of the polyposis and the disease. Sinuses that will be operated on are the sinuses that are involved. An extensive procedure could cause discomfort and pain to the patients which may lead to the procedure being abandoned and also risks further complications.

## 6. CONCLUSIONS

FESS under LA is safe and is a feasible alternative to general anaesthesia. The scope of office-based rhinologic procedures has the potential to grow with the introduction of newer techniques and instruments.

### Conflict of interest

None declared.

### Funding

None declared.

### Ethics

This study was approved by the Medical Research & Ethics Committee (MREC), Ministry of Health, Malaysia. (NMRR ID: NMRR-19-2286-49627).

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