Anesthetic considerations in FESS....the surgeon view

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Cairo University Hospital is a 4200-bed teaching hospital that provides both primary and tertiary care in metropolitan Cairo. More than 25 admissions weekly comprise adult & pediatric patients with sinus pathologies for in-patient management.
Anesthetic considerations in FESS; the surgeon view

The goal of anesthesia for FESS is to produce:

- Still patient.
- Protect the airway from contamination.
- Avoid post-operative pain or nausea.
- Ensure a prompt recovery to facilitate early discharge (day cases)
- Reduce bleeding and provide optimal operating conditions to decrease the incidence of surgical complications.

Reduce bleeding & Improve surgical field conditions

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Lower blood pressure

= Reduce complications
Local vs. general anesthesia

- Originally, it was thought that patients should preferably be operated under local/topical anesthesia with combined sedation.

- Avoid and signal complications

Local vs. general anesthesia

- FESS has evolved over time, many of the surgical procedures currently performed under FESS might be prolonged and accompanied by bleeding.

- Surgeons become much more aggressive with the scope of their endoscopic procedures, with the resection of areas not easily anesthetized with local anesthesia.
Local vs. general anesthesia

- Anxiety, stress, and discomfort may ensue in both patients and surgeons. In such cases, an increased risk of complications might occur.

- Currently, local anesthesia is still considered suitable for minor procedures in selected patients, but general anesthesia is preferred for most cases.

Preoperative Evaluation

- History of obstructive sleep apnea (OSA) and the use of continuous positive airway pressure (CPAP).

- Patients’ cardiovascular status and the ability to tolerate locally applied vasoconstrictors is an area of concern.
Preoperative Evaluation

- Chronic steroid use ...Patients undergoing FESS do not routinely need a stress dose of steroids as long as they receive their usual daily maintenance steroid dose.

- Probability of a life-threatening bronchospasm associated with the triad of non-steroidal anti-inflammatory drug (NSAID) sensitivity, asthma, and nasal polyps

Induction Considerations

Various methods are used to reduce bleeding and to guarantee better visibility(surgical conditions) during FESS. (100-300 ML)
Position patients in reverse Trendelenburg, with at least 15 head up. … But the use of reverse Trendelenburg position has additional risks.

Induction Considerations

- Blood pressure measurements obtained at the level of the heart, either with a blood pressure cuff or an arterial line transducer, will not reflect the real and lower values of the most elevated body parts.

- Also there is an increased risk of venous air embolism
• Body temperature... Sustaining normal body temperature during surgery is very important in reducing surgical bleeding

• Even insignificant hypothermia would alter platelet functions and increase bleeding

**Induction Considerations**

• Injected and topical vasoconstrictors together with local anesthetics are applied to the nasal mucosa to relieve postoperative pain, decrease blood loss and mucosal congestion, and enhance hemostasis.

• Commonly used vasoconstrictors include cocaine, epinephrine, and phenylephrine. Cocaine has local anesthetic and vasoconstrictor properties.

• Systemic absorption of cocaine and the vasoconstrictors contained in local anesthetics occurs (Arrhythmias & uncontrolled hypertension) so it is important to monitor patients carefully during surgery considering the potential for adverse side effects.
The effect of topical application of epinephrine 1:1000 may actually be able to provide a similar hemostatic effect as intranasal injection during FESS...with less systemic absorption.

Injection of a local anesthetic/epinephrine mixture into the pterygo-palatine fossa rather than at the operative site, has also been shown to improve Surgical conditions with less systemic absorption.

Airway Management

Endotracheal Tube

Versus

Laryngeal Mask Airway
Endotracheal Intubation

- The advantages of using an ETT are its familiarity and ability to secure the airway and provide positive-pressure ventilation if required.

- The use of an oral RAE tube versus a standard ETT allows for less kinking at the mouth.

Endotracheal Intubation

- An orally placed RAE or standard ETT positioned in the midline and secured to the chin is often used with a throat pack to reduce blood contamination of the oral airway.

- At the end of the surgery the pack should be removed and a careful inspection of the oral cavity and postnasal space should be performed. Any clot left behind can be inhaled after removal of the ETT and lead to airway obstruction and even death.
LMA Airway

- Patients managed with a flexible LMA, using spontaneous ventilation, are less or at least as likely to have blood in the airway compared with patients on ETT with much more less bleeding & better surgical field

(NO REFLEX RELEASED CATECHOLAMINES)

- Also softener emergence from OR due to less incidence of laryngeal spasm.

LMA Airway

- The anesthesiologist should be familiar with the device before use it in FESS.

- Any incorrect placement, dislodgement during the surgery, or suboptimal recovery after removal creates the potential for airway obstruction and contamination of the lower airway with blood and secretions.
Extubation

- Extubation is usually undertaken with patients awake or deep.
- The advantage of awake extubation for FESS is the return of laryngeal reflexes that allows airway protection from further contamination with blood and secretions.
- The disadvantage of awake extubation is the possibility of laryngospasm & pulmonary edema, coughing and subsequent oxygen de-saturation, and increased risk of bleeding.

Maintenance of Anesthesia

- The use of total intravenous anesthesia (TIVA) with avoidance of inhalational anesthetics (Isoflurane-Sevoflurane) reduces bleeding and improves visualization of the surgical field, making TIVA the strongly preferred anesthetic technique for many ENT surgeons.
- TIVA also has the potential to decrease coughing on emergence and postoperative nausea and vomiting (PONV) in the postoperative period.
Maintenance of Anesthesia

- Propofol and remifentanil are safe and improve the quality of the surgical field by reducing blood loss.

- When inhaled anesthesia using isoflurane and fentanyl was compared with TIVA using propofol and remifentanil, both techniques were equally effective in achieving controlled hypotension.

Controlled hypotension

- Controlled hypotension has been advocated to reduce blood loss and improve surgical conditions in FESS.

  This was defined by pharmacologically achieved mean arterial pressures between 60 to 70 mm Hg.
**Controlled hypotension**

- A reduction in arterial pressure can be achieved through a reduction in systemic Vascular resistance (SVR), cardiac output (CO) or both.

  \[\text{MAP} = \text{SVR} \times \text{CO}\]

  Vasodilators or negative inotropics \(\sqrt{\sqrt{\sqrt{\text{}}}\text{}}\)

**Maintenance of Anesthesia**

- Controlled hypotension is not without risk.

- Morbidity due to ischemic organ failure as a consequence of controlled hypotension has been estimated to be 0.6%.

- Contraindications to controlled hypotension are: Cerebrovascular insufficiency, ischaemic heart disease, significant heart failure and hepatic or renal dysfunction.
Spontaneous vs. intermittent positive pressure ventilation (IPPV)

- Hypoventilation with hypercapnia produces vasodilatation and tachycardia.

- The maintenance of normocapnia or even hypocapnia, has been advocated to minimize bleeding and optimize the surgical field during FESS

Postoperative Care

- The incidence of postoperative nausea and vomiting after FESS is not well reported.

- The presence of blood in the stomach, inflammation of the uvula and throat, and the occasional use of opioids for pain control may all be contributing factors.

- Decompressing the stomach with an orogastric tube before extubation may be helpful in cases with excessive bleeding in which an ETT was used.
Postoperative Care

- Other standard treatments for PONV, such as a scopolamine patch, ondansetron, and dexamethasone, should be used depending on patient history and risk factors for PONV.

Prophylaxis is better to treatment of establish PONV

First line: TIVA and dexamethasone
Rescue medication: serotonin antagonists
The expected postoperative pain from FESS ranges from mild to moderate, which is related to both surgical trauma and nasal packing. Oral acetaminophen and an NSAID/cyclooxygenase 2 inhibitor usually provide safe and effective analgesia.

Summary

- Functional endoscopic sinus surgery has become one of the most common head and neck procedures performed.

- Proper anesthetic management is essential for a successful outcome. Different anesthesia techniques are discussed, including local versus general anesthesia, LMA versus ETT, and inhaled anesthesia versus TIVA.

- The anesthetic plan should be tailored, taking into consideration patient comorbidities.
Thank you