

# Anesthesia for Functional Endoscopic Sinus Surgery: A Review

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## KEYWORDS

- Functional endoscopic sinus surgery • Anesthesia
- Rhinosinusitis • Chronic sinusitis

Rhinosinusitis is the inflammation of the nose and paranasal sinuses. The paranasal sinuses provide lubrication to the upper respiratory tract, resonance to the voice, and lighten the weight of the skull. The sinuses are maintained in a healthy state by a mucociliary transport mechanism that keeps the protective layer of mucous flowing out of the sinuses through the sinus ostia. When the sinus ostia are blocked, because of allergy, inflammation, infection, irritation, abnormal anatomy, or any other cause of obstruction, infection may ensue.<sup>1</sup>

Sinus surgery has been performed for more than 100 years. Functional endoscopic sinus surgery (FESS) has been practiced only in the last 25 years. It was previously thought that once the mucosa had become chronically inflamed, it was irreversibly damaged and had to be removed. Previous surgical techniques involved radical and extensive removal of the diseased paranasal sinus lining. These procedures left scars and caused significant bruising and discomfort.

Messerlinger<sup>2</sup> showed that the paranasal sinuses drain in a consistent pattern into an area called the ostiomeatal complex. The ostiomeatal complex is composed of the middle meatus under the middle turbinate. All of the paranasal sinuses drain into this region, either directly or in the case of the posterior ethmoid and the sphenoid sinus, indirectly, having ostia situated more posteriorly. The rationale behind FESS is that localized pathology in the ostiomeatal complex blocks the ostia and leads to inflammation in the dependent sinuses. Using fiberoptic endoscopes, it is possible to access

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the postnasal space from the anterior nares and to remove the ostiomeatal blockage.<sup>3</sup> FESS restores normal sinus ventilation and mucociliary function in a minimally invasive manner.

FESS has a high rate of success, approximately 90%, for symptomatic improvement in patients with medically refractory chronic rhinosinusitis.<sup>4</sup> The FESS approach is now used for a variety of surgical indications in addition to chronic sinusitis. These indications include resection of inverted papilloma, skull base tumor excision, treatment of vascular malformations associated with hereditary hemorrhagic telangiectasia, and transsphenoidal pituitary tumor resection.

Complications of FESS relate to the proximity of the paranasal sinuses to the orbit and brain. Fortunately, the reported complications are few, at least when the surgery is performed by experienced surgeons. Major complications include cerebrospinal fluid leak, penetration into the brain, intracranial infection, blindness resulting from orbital trauma or damage to the optic nerve, hemorrhage requiring transfusions or surgical control, carotid artery injury, and anosmia. Minor complications include nasolacrimal duct injury, synechiae, subcutaneous emphysema, ostial stenosis or closure, and minor bleeding.<sup>5-7</sup>

### LOCAL VERSUS GENERAL ANESTHESIA

When FESS was originally introduced, it was thought that patients should preferably be operated under local/topical anesthesia with combined sedation. In this manner, patients would be able to signal any kind of pain or discomfort, alerting and allowing the surgeon to minimize trauma and complications.<sup>8,9</sup> However, FESS has evolved over time and many of the surgical procedures currently performed under FESS might be prolonged and accompanied by bleeding. The use of CT guidance and the evolution of the surgical technique have allowed surgeons to become much more aggressive with the scope of their endoscopic procedures, including skull base surgery and the resection of areas not easily anesthetized with local anesthesia. Anxiety, stress, and discomfort may ensue in both patients and surgeons. In such cases, an increased risk of complications might occur. For a good surgical result and experience, it is crucial that both patients and surgeons feel comfortable during the operation. Currently, local anesthesia is still considered suitable for minor procedures in selected patients, but general anesthesia is preferred for most cases to meet more challenging surgical needs.<sup>10</sup>

### PREOPERATIVE EVALUATION

Preoperative evaluation should be performed in every case in which an anesthesia provider will be involved and should be the same for local and general anesthesia. There are specific areas of concern involved in preoperative evaluation.

- Concern exists when there is a history of obstructive sleep apnea (OSA) and the use of continuous positive airway pressure (CPAP) devices at home, in which case they may be needed during postoperative recovery time. Unfortunately in many cases, CPAP use in the perioperative period is complicated by the surgery itself and discouraged by the surgical team.
- Patients' cardiovascular status and the ability to tolerate locally applied vasoconstrictors is an area of concern, as in patients with a history of coronary artery disease (CAD) or cardiac arrhythmias.
- Concern exists with chronic steroid use, in which case patient management is controversial. Patients undergoing FESS likely do not routinely need a stress

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