Evaluation and Decision Making in Frontal Sinus Surgery

Alok T. Saini, MD, Satish Govindaraj, MD*

KEYWORDS

• Frontal sinus outflow tract • Mucociliary clearance • Acute viral rhinosinusitis
• Acute bacterial rhinosinusitis • Chronic rhinosinusitis • Surgical decision making

KEY POINTS

- Management of frontal sinusitis requires a thorough understanding of the anatomy of the frontal sinus and its outflow tract and the pathogenesis of acute and chronic sinusitis.
- Each case of frontal sinusitis is unique and so requires an individualized approach for management.
- Knowledge of the surgical techniques available and the specific circumstances in which they should be used is necessary for obtaining optimal outcomes in the treatment of frontal sinusitis.

INTRODUCTION

Management of frontal sinusitis can be challenging for even the most experienced otolaryngologists. The challenges that the treating physician face are deciding whether medical or surgical treatment is needed and if a surgical procedure is necessary, then determining which procedure will serve as the best option. Many times there is no clear-cut solution, and the answer rests with the physician's clinical judgment and experience.

A thorough understanding of both the pathogenesis of acute and chronic rhinosinusitis (CRS) and the anatomy of the frontal sinus is required in order to properly treat frontal sinusitis and its complications. To the young otolaryngologist, simply understanding the complex anatomy of the frontal sinus and its outflow tract can be difficult. After years of training, frontal sinus surgery remains technically challenging to even the most skilled rhinologists; however, perhaps the most difficult aspect of managing frontal sinusitis is understanding the treatment options available and knowing which approach provides the highest likelihood of success in specific circumstances. When contemplating treatment, one must distinguish between acute and chronic

No conflicts or disclosures for either author.
Otolaryngology-Head and Neck Surgery, Mount Sinai Medical Center, One Gustave L. Levy Place, New York, NY 10029, USA
* Corresponding author.
E-mail address: satish.govindaraj@mountsinai.org

Otolaryngol Clin N Am 49 (2016) 911–925
http://dx.doi.org/10.1016/j.otc.2016.03.015 **oto.theclinics.com**
0030-6665/16/$ – see front matter

Abbreviations	
CRS	Chronic rhinosinusitis
CT	Computed tomography
EMLP	Endoscopic modified Lothrop procedure
FSOT	Frontal sinus outflow tract
LP	Lothrop procedure
MMLP	Modified mini-Lothrop procedure
MSLP	Modified subtotal-Lothrop procedure

sinusitis. Once that distinction is made, medical and surgical treatment protocols can be initiated. These protocols are determined by severity of disease, patient anatomy, and technical expertise of the operating surgeon. These factors all come into play with both the evaluation and the decision making in frontal sinus surgery.

RELEVANT ANATOMY/PATHOPHYSIOLOGY

Anatomy

In most adults, 2 frontal sinuses exist and are separated by an intersinus septum that can vary in location. Each sinus consists of a thick anterior plate that serves as a buffer in the setting of trauma and a thinner posterior plate. The posterior plate separates the frontal sinus from the anterior cranial fossa, and below the frontal sinus floor is the orbit. For this reason, infection in the frontal sinus has the potential to spread to both the orbit and the intracranial cavity.

The frontal sinus outflow tract (FSOT) is described as an hourglass. It consists mainly of 3 structures: the frontal sinus infundibulum, ostium, and recess. The frontal sinus infundibulum is a funnel-shaped area at the inferior aspect of the frontal sinus that leads to the frontal sinus ostium. The ostium opens into the frontal sinus recess. The frontal recess is bounded laterally by the lamina papyracea, medially by the middle turbinate, anteriorly by the agger nasi, and posteriorly by the ethmoid bulla. The superior attachment of the uncinate process determines whether the frontal sinus has a medial or lateral drainage pathway. Most commonly, the uncinate attaches to the lamina papyracea, leading to a medial drainage pathway (Fig. 1). In cases where the uncinate attaches to the skull base, the frontal sinus drains lateral to the uncinate.

Fig. 1. Arrow demonstrates uncinate attaching to lamina papyracea signifying a medial frontal sinus drainage pathway.