Abstract

Background: Frontal sinus disease has historically been one of the most challenging aspects of endoscopic sinus surgery. In select cases, anatomic variations may hinder access using traditional endoscopic approaches. We propose a modification of the standard Draf IIB procedure which incorporates a frontal intersinus septectomy to access and manage recalcitrant contralateral frontal sinus disease. Additionally, we propose a case where this modification obviates the need for more extensive endoscopic or surgical approaches.

Study Design: An anatomic study via cadaveric dissection and photodocumentation.

Methods: Endoscopic dissection was performed on 2 fresh cadaveric heads to demonstrate the Draf IIB (resection of the frontal sinus floor from the lamina papyracea to the nasal septum) with the addition of frontal intersinus septectomy and to determine the feasibility of this approach to access contralateral disease. High-quality photos and high definition videos were obtained.

Results: Each dissection was successfully performed with adequate access to the contralateral frontal sinus. The Draf IIB allowed ample access for instrumentation and resection of the intersinus septum in each of the dissections.

Conclusions: The modified Draf IIB with frontal intersinus septectomy was demonstrated to be a feasible approach and potential alternative to more extensive endoscopic procedures. This modification will be useful in addressing difficult to access unilateral frontal disease in those cases with limited access via traditional frontal sinusotomy approaches.

Introduction

Recalcitrant frontal sinus disease may often be difficult to access and manage using current endoscopic frontal sinus surgical techniques. Anatomic limitations exist that can limit access to frontal sinus ostia in a select group of patients and provide a significant challenge to the endoscopic surgeon.

In previous reports, including one by Cho et al, two factors are generally considered important in the decision of how to treat frontal disease: the patency of the ipsilateral frontal sinus outflow tract and the accessibility of the disease via endoscopic instrumentation. Possible causes of endoscopic inaccessibility to the frontal sinus may include, but are not limited to, complex anatomic topography, prior surgical scarring or stenosis of frontal recess, tumor or new bone formation, prior trauma, and prior medial ethmoid or middle turbinate decompression.

The endoscopic Draf Type IIB in its present form, is described originally by Draf in the early 1990s. This procedure generally involves removal of the frontal sinus floor extending from the lambda papyracea to the nasal septum unilaterally. In this study we propose a modification of the standard Draf IIB technique, which would include an anterior frontal sinus septectomy (MDFIS) to access and manage contralateral frontal sinus disease in those select patients who fit the criteria proposed by Cho et al including an otherwise inaccessible frontal sinus. In contrast to a combined external transfrontal and endoscopic approach demonstrated in previous literature, we offer a wholly endoscopic means of addressing this select patient population.

Methods and Materials

Cadaver Dissection

We dissected a total of two cadaveric heads provided by voluntary donation for medical education and research purposes through the Department of Anatomy at UMDNJ – New Jersey Medical School. Cadavers were fresh, supplied within one week of death, without prior dissection or manipulation based on availability. Dissection was performed with standard technique. All dissections were performed using the same surgical instrumentation, which included Gyrus diode laser dissection blades and burs (Gyrus diode ©, Southborough, MA) and a standard endoscopic sinus instrumentation set. Standard 45° and 70° endoscopes were used interchangeably throughout the dissection procedures. A standard endoscopic sinus tower was used for video and photo-documentation.

Description of Operative Technique

The modified Draf IIB with frontal intersinus septectomy (MDFIS) begins, as described in the literature, with identification of the frontal recess and frontal ostium, particularly of the non-diseased side. With an endoscopic sphenoid septal cyst dissection blade and burrs (Gyrus diode ©, Southborough, MA) and standard sinus instrumentation, mucosa is removed from the anterior face of the frontal recess bordered by the anterior-septal insertion of the middle turbinate. Dissection proceeds initially in an anterior direction through the anterior insertion of the middle turbinate until the level of the nasal bones is reached. Medially, a portion of the nasal bone is removed until the nasal septum is encountered, thereby removing the anterior face of the frontal recess on one side.

The perpendicular plate of the ethmoid is then removed up to the floor of the frontal sinus. The floor of the frontal sinus is then removed anteriorly to the nasal crest. As much bone as is possible is removed anteriorly during this portion of the procedure to provide access to the frontal sinus anteriorly and allow endoscopic visualization of the frontal sinus.

An endoscopic frontal intersinus septectomy is performed, as to provide adequate space to pass endoscope and instrumentation to the contralateral frontal sinus. At this point, access to the contralateral (i.e., diseased) frontal sinus is achieved and drainage is established via the frontal sinusotomy (Figures 1 and 2).

Conclusions

We believe that unilateral frontal sinus disease is a substantial indication for advanced endoscopic procedures. With our proposed modification of a standard Draf IIB endoscopic procedure we expand the ability of minimally invasive surgery to those select patients who may have otherwise required more extensive surgical treatment.

- We modified the Draf IIB with frontal intersinus septectomy (MDFIS), as demonstrated in this cadaver study, provided significant access to difficult to reach aspects of the frontal sinus in much the same way that a more extensive or traditional external frontal sinus procedure may have. The added advantage of angled endoscopes especially the 70-degree endoscope, provided wide visual fields for safe access (Figure 2). In addition, by limiting the extent of surgical dissection, we demonstrate the added advantage of preserving as much of the normal frontal drainage pathway as possible and avoiding the morbidity of an external procedure.

- We believe the MDFIS will decrease the potential post-operative morbidity by limiting dissection and bypassing difficult anatomic limitations of a select patient population. Additionally this may prove to potentially decrease operative time as well.

- The modified Draf IIB with frontal intersinus septectomy, was demonstrated in our cadaveric study to be a feasible approach and potential alternative to more traditional endoscopic procedures in addressing unilateral frontal sinus disease. This modification will be particularly useful to sinus surgeons in addressing difficult to access disease that may have otherwise required open approach or more extensive endoscopic resection.

References