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The lateral recess or supraorbital region of the frontal sinus (FS; pneumatization of the FS over the orbit) is difficult to access endoscopically. Surgical intervention to this region is often limited to external approaches or advanced endoscopic techniques such as the endoscopic modified Lothrop procedure (EMLP).1 Recently, we described a modification of the EMLP termed the modified hemi-Lothrop procedure (MHLP), which limits the dissection of the EMLP to the ipsilateral diseased FS, thereby sparing the natural drainage pathway of the contralateral nondiseased FS.2 In this study, we investigate the effectiveness of the MHLP and provide our experience with 15 patients who underwent this technique.

Materials and Methods

Subjects

Fifteen patients (9 males, 6 females) with unilateral supraorbital FS pathology treated with a MHLP were retrospectively reviewed. Fourteen patients met the criteria for chronic rhinosinusitis (CRS), of which 21.4% (3/14) had CRS with nasal polyps and 42.8% (6/14) had a type IV frontal cell. The last patient had an ossifying fibroma. Demographic data, presenting symptoms, pathology, radiologic findings, prior surgeries, and perioperative data were reviewed. The decision to proceed with an MHLP was based on symptoms plus radiographic evidence of laterally located FS disease. Patients usually undergo a Draf 2A initially, then a Draf 2B if their disease cannot be adequately managed with a Draf 2A, and an MHLP if the Draf 2B is insufficient at addressing the disease. In the case of the laterally located ossifying fibroma, an MHLP was planned for binostril bimanual access from the start. Cases in which access to both FS is needed were excluded as these patients underwent a standard EMLP. Patients’ outcomes were assessed using symptomatology and endoscopic examination on the last follow-up evaluation. Institutional review board approval was obtained.

Surgical Technique

The endoscopic MHLP (unilateral Draf 2B plus a superior septectomy), which we previously described,2 begins with a standard Draf 2B on the ipsilateral diseased side. A superior septectomy without a frontal intersinus septectomy is then performed. Careful attention is used in keeping the superior septectomy anterior to the coronal plane of the posterior FS table to prevent inadvertent entry into the anterior cranial fossa. This transseptal corridor allows for a second portal through the contralateral nasal cavity to introduce instruments and angled endoscopes to facilitate bimanual dissection (Figure 1A, B). Furthermore, use of angled endoscopes through the contralateral nasal corridor allows for far-lateral visualization of the supraorbital FS (Figure 1C, D). The mucosa of the posterior frontal sinus recess (FSR) is judiciously preserved to prevent circumferential scarring. Postoperatively, patients are treated with 10 days of oral corticosteroid and broad-spectrum antibiotics.

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Results

Seventy-three percent of the patients (11/15) had prior surgical procedures leading to their current symptoms or had unsuccessful previous surgery with persistent symptoms. The mean age was 42.7 years (range, 15-68 years). All patients underwent successful frontal sinusotomies via the MHLP without major or minor complications and had a patent drainage pathway assessed endoscopically after a mean follow-up of 18.2 months (range, 3-32 months). No infection, mucocele formation, epistaxis, cerebrospinal fluid leakage, or other complications occurred. All patients reported resolution of their symptoms and had patent FSR for the duration of their clinical follow-up. One patient with a history of cocaine abuse reported a new complaint of nasal stuffiness after the MHLP. This was successfully treated with nasal steroid spray.

Discussion

Management of FS disease remains a challenge for sinus surgeons. Despite numerous techniques, successful FS surgery is difficult to achieve. Currently, primary treatment of FS disease is medical management. Surgery through standard endoscopic approaches is reserved for refractory cases. In most instances of refractory frontal sinusitis, established endoscopic techniques are sufficient in restoring normal mucociliary clearance and aeration. However, removal of unilateral disease located laterally in the supraorbital FS such as an obstructed type IV frontal cell (Figure 2) can be quite challenging. Often, surgical options are limited to the EMLP and more extensive externally based procedures including FS obliteration. However, FS obliteration is associated with potential long-term complications. Advances in endoscopic techniques and instrumentation have provided additional tools to address these cases. One such technique, the EMLP, has been proven to restore drainage of the FS while avoiding some of the morbidity of external approaches. However, in unilateral supraorbital FS disease, the EMLP involves unnecessary dissection of the nondiseased contralateral FS outflow pathway.

The MHLP provided access through a better angle of approach and allowed adequate access to the supraorbital

Figure 1. (A) Artwork in the coronal plane demonstrating the dissection technique for the endoscopic modified hemi-Lothrop procedure (MHLP). Via the ipsilateral left nasal cavity, a Draf IIB is performed (red arrow). An anterior superior septectomy is performed (black bracket), and the ipsilateral diseased frontal sinus is accessed via the contralateral nasal cavity (blue arrow). (B) Coronal computed tomography scan after an endoscopic MHLP. Access via traditional ipsilateral frontal sinusotomy approach (C), and the endoscopic MHLP via the contralateral nasal cavity (D). © 2011 Chris Gralapp.
FS area. Furthermore, by limiting the extent of surgical dissection to the diseased FS, the mucociliary drainage pathway of the nondiseased contralateral FSR was preserved. An important technical point is the ability to perform bimanual binostril dissection with this technique, which can be helpful for solid lesions of the supraorbital FS region. Patients with inflammatory FS disease or laterally based FS mucoceles are adequately managed with the creation of a drainage pathway. Conversely, patients with laterally based solid tumors of the FS (inverted papillomas, osteomas, fibrous dysplasia, ossifying fibroma, etc) require adequate surgical freedom (degree of maneuverability) for radical resection of these lesions. In our experience, this is better achieved through a binostril bimanual technique via the superior septectomy corridor.

The endoscopic MHLP appears to be a potential alternative to traditional endoscopic procedures in addressing unilateral laterally based supraorbital FS disease. This modification is useful in addressing difficult-to-access diseases that may otherwise have required open or more extensive endoscopic approaches than warranted by the disease process. However, this study is limited by its small sample size, the lack of a control group, and all limitations inherent to a retrospective study.

**Author Contributions**

Jean Anderson Eloy, conception, design, data acquisition, analysis, interpretation, drafting of article, final approval; Arjuna B. Kuperan, data acquisition, drafting of article, final approval; Mark E. Friedel, data acquisition, revision, final approval; Osamah J. Choudhry, acquisition of data, revision, final approval; James K. Liu, analysis and interpretation of data, revision, final approval.

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**References**


