
Revision Functional Endonasal Sinus Surgery

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Abstract

Revision functional endonasal sinus surgery (FESS) is recommended for patients whose symptoms of chronic or recurrent sinusitis persist despite primary FESS, long-term maximal medical therapy, and no sign of other abnormalities as demonstrated by computed tomography. After analyzing the charts of 673 patients who underwent primary FESS, we reviewed the 63 cases of revision surgery performed between 1986 and 1989. This retrospective analysis presents the management and outcome of 16 children (<16 years) and 47 adults who had revision FESS. The overall success rate of revision FESS was 78%, with no major complications, reflecting the improved management of sinus disease offered by this procedure.

Introduction

Functional endonasal sinus surgery (FESS) is a relatively new surgical procedure that was introduced in the late 1970's.¹ This functional surgery requires explicit knowledge of the anatomy and physiology of the paranasal sinuses. Thorough training is demanded for this delicate procedure.

We report our experience of revision FESS for 63 patients. Revision FESS is indicated if symptoms of chronic sinusitis persist after primary FESS and optimal medical treatment. Based on the pathologic findings of a CT scan of the sinuses, the revision surgery uses the same techniques as the original procedure, but revision FESS can be quite challenging because the usual anatomic landmarks may be absent or distorted, increasing the risk of complications.

Patients and Methods

Patients

From June 1986 to June 1989, 700 patients had FESS performed by members of the Otolaryngology Consultants of Memphis. Twenty-three patients were lost to follow-up, but the records of 673 patients were thoroughly reviewed. The age range of the patients was between 14 months and 81 years; 463 patients were adults, and 210 were children.

We reviewed the 63 cases requiring revision FESS. Sixteen of these patients were children and 47 were adults (>16 years).

Revision surgery was considered only if symptoms of chronic sinusitis persisted after optimal medical treatment failed. Medical treatment included cefaclor or cefuroxime axetil, steroid spray, systemic decongestant, liquefying agents, and occasionally, systemic steroids and antihistamines. At least two courses of this medical regimen were administered before revision surgery was considered.

In all 63 cases, sinonasal discharge cultures and sensitivities were obtained. All patients were evaluated by an allergist and had allergy treatment, if indicated. In children, nasal mucosal biopsies and serum specimens were obtained to rule out underlying systemic abnormalities, such as cystic fibrosis, immotile cilia syndrome, or immune deficiencies.

A high-resolution coronal CT scan of the sinuses was obtained before revision surgery, because it facilitated an accurate diagnosis and identified the surgical landmarks that were valuable in planning surgery for cases of previously operated sinuses and persistent disease.

Procedure

All revision FESS procedures were performed by members of the Otolaryngology Consultants of Memphis. The technique of revision FESS is essentially the same as that of primary FESS. We followed the Messerklinger approach,^{2,3} but if the anatomic landmarks were severely distorted, we employed the Wigand approach.^{4,5}

Optimal vasoconstriction is essential for performing adequate surgery and achieving the therapeutic goal. Before surgery, the patient was administered a topical decongestant

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spray, either Neo-Syneprine® or Afrin®. Using caution, the surgical site was injected, using a 27-gauge, 3.8-cm needle and a 1.8-ml dental carpule, with 2% Lidocaine and 1:50,000 epinephrine to achieve topical anesthesia and vasoconstriction. The maximal dose was individualized according to the patient's age, weight, and physiologic status. An alternative dose is 2% Lidocaine with 1:100,000 epinephrine.

The nose was then packed with neurosurgical cottonoid pledgets soaked in 4% cocaine solution. Surgery was delayed for at least 10 minutes to allow the epinephrine and cocaine to produce maximal vasoconstriction, which minimized bleeding and optimized visualization.

The surgery began with an endoscopic nasal examination to identify anatomic landmarks. The inferior turbinate, middle turbinate, septum, medial orbital wall (lamina papyracea), fovea ethmoidalis, base of the skull, frontal recess, maxillary sinus ostium, and sphenoid sinus ostium should be identified, if possible. The uncinate process, bulla ethmoidalis, and basal lamella are usually lacking because of prior surgery. The middle turbinate might have been partially or totally removed. The ostiomeatal complex could be obstructed by adhesions, and the ethmoid sinuses might be totally obliterated. When the anatomic landmarks were scarce, we usually identified the sphenoid sinus ostium before starting the Wigand approach of posterior to anterior dissection.^{4,5}

In adult and pediatric patients, the 0° 4-mm Storz-Hopkins telescopes were used for the initial inspection. Pathologic tissues were cleared using a Blaksely forceps or upbiting instruments. The 30° 4-mm telescope and the sidebiting, Gruenwald, and backbiting forceps were used to manipulate the maxillary sinus ostium or frontal recess. The 70° 4-mm telescope was rarely needed.

At the end of the procedure, 40 mg of methylprednisolone were injected and antibiotic steroid ointment was applied. The patient was usually discharged the day of surgery.

Postoperatively, every patient is maintained on a regimen of steroid nasal spray, local nasal decongestant, saline nasal mist, and a broad-spectrum oral antibiotic for 6 weeks. Steroid sprays and other medications are weaned during the last 2 weeks of therapy.

Patients were seen 3 to 5 days after surgery, and nasal endoscopic examination was scheduled 2 to 3 weeks after revision FESS. For the adults, endoscopic examination was performed weekly for the first 2 months, and thereafter, the examination schedule depended on the rate of recovery. For children, both revision FESS and nasal endoscopy were performed under general anesthesia.

Results

Of 673 patients who underwent FESS for chronic or recurrent sinusitis, 63 (9.4%) required a revision procedure.

In the adult group, the revision rate was 10.2% (47/463), and in the pediatric group, the revision rate was 7.6% (16/210).

In adults, the most common presenting symptoms were headache, nasal congestion, and nasal discharge. In children, the symptoms were chronic cough and purulent nasal discharge.

Each of the 63 patients had a primary FESS performed by a member of the Otolaryngology Consultants of Memphis. All patients completed two or more 6-week trials of optimal medical therapy before revision FESS was considered. Forty-seven (75%) patients completed two trials, 12 (19%) had three trials, and 4 (6%) had four trials.

All patients were tested for allergies and treated, if necessary. High-resolution CT scans of sinuses were obtained for all patients before surgery. Two children had cystic fibrosis, and 1 child had immotile cilia syndrome.

After failing medical therapy, 63 patients had bilateral revision FESS (126 procedures). Revision surgery was performed 6 to 36 months (mean, 12 months) after primary FESS. Each revision FESS required 30 to 60 minutes (mean, 45 minutes), and blood loss ranged from 10 to 50 ml (mean, 20 ml).

The intraoperative findings included adhesions and extensive polyposis. Twenty-seven (43%) of 63 patients had significant fibrosis. Most adhesions were located between the lateral nasal wall and the middle turbinate, obstructing the ostiomeatal complex. Fourteen (22%) patients had recurrent polyps in the ethmoid or frontal recess. Eighteen (29%) patients had both adhesions and recurrent polyps, and 4 (6%) had maxillary antrum stenosis. There was no significant difference in the intraoperative findings between the adult and pediatric age groups.

After revision FESS, symptoms improved for 49 (78%) of the 63 patients. These results are comparable to results for primary FESS.⁶ No serious complications occurred in any of the revision cases.

Discussion

FESS has become a popular and widely accepted modality of treatment for chronic sinusitis, gradually replacing more traditional procedures since its introduction into the United States. FESS is a functional approach that treats sinus disease by removing diseased tissue, primarily from the ostiomeatal complex, with minimal trauma.

Reports about revision FESS remain scarce because the procedure is still in its infancy.^{2,3,7} Revision FESS is considered only if severe symptoms of chronic or recurrent sinusitis persist despite primary FESS and a long-term regimen of medical therapy. Recurrence of symptoms after primary surgery may be caused by postoperative adhesions, which usually form between the middle turbinate and lateral nasal wall. If not treated early, adhesions tend to recur or persist,

REVISION FUNCTIONAL ENDONASAL SINUS SURGERY

causing ostiomeatal obstruction and recurrent sinusitis. Minimizing tissue trauma during surgery, injecting steroid at the surgical site, close follow-up, nasal endoscopic examination, and early lysis can help in reducing the incidence of adhesions.

In children, other systemic abnormalities, such as cystic fibrosis, immotile cilia syndrome, and immune deficiencies must also be ruled out as a cause of recurrent symptoms.

A high-resolution coronal CT of the sinuses is mandatory for establishing an accurate diagnosis and providing a clear picture of the existing anatomy. Meticulous review of the CT scans before surgical intervention in revision cases can assist physicians in preparing surgical plans and avoiding complications.

Recurrent or persistent polyposis is another common finding in revision FESS. Polyps are considered persistent if detected within the first 3 months after surgery. Their persistence may be due to inadequate removal during primary surgery. However, polyps also recur late after the primary surgery because the underlying pathologic process has recurred.

The techniques and principles of revision FESS are essentially the same as for primary FESS, but extreme caution should be taken during revision surgery because the usual anatomic landmarks are often distorted or missing. Meticulous surgical cleaning is required to avoid further recurrence of disease.

Our results for revision FESS compare favorably with those of primary surgery. Lazar and colleagues⁶ reported a 79% success rate in their review of 210 pediatric FESS cases; Levine and co-workers⁸ reported success rates of 80 to 89%; Schaefer and associates⁹ had an 83% success rate; Kennedy¹⁰ reported successful outcomes for 92% of his patients; and Lusk and colleagues¹¹ achieved a rate of 80%.

Morbidity can be quite high in revision FESS because of distorted anatomy, extensive adhesions, and bleeding. Most complications can be avoided by ensuring maximal preoperative vasoconstriction, by planning the operating using a CT scan, and by performing meticulous surgery.

Reports of experience with revision FESS are deficient because it is a relatively new procedure in the United States,^{7,12} but it appears that the outcomes for revision surgery are at least as good as those for primary surgery. Although larger series and longer follow-up periods are needed, our results indicate that revision FESS can be recommended for patients whose symptoms persist despite primary surgery and maximal medical treatment.

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