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Minitrephination as an adjunctive measure in the endoscopic management of complex frontal sinus disease

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ABSTRACT

Background: Frontal sinus disease and its surgical management continues to remain an area of controversy among rhinologists. This is evidenced by the multitude of surgical procedures, both external and endoscopic, that have been developed in its management. This study was performed to evaluate the safety and efficacy of frontal sinus minitrephination in combination with endoscopic frontal sinus exploration for the management of complex frontal sinus disease.

Methods: A retrospective chart review identified 13 patients treated with minitrephination, in conjunction with endoscopic frontal sinus exploration, at the University of California at Los Angeles Medical Center or West Los Angeles VA Medical Center from July 2004 to October 2005.

Results: Thirteen patients with diagnoses of chronic sinusitis ($n = 10$), nasal polyposis ($n = 7$), frontal mucocele ($n = 4$), allergic fungal sinusitis ($n = 3$), and inverting papilloma ($n = 1$) underwent either unilateral ($n = 9$) or bilateral ($n = 4$) minitrephination during primary or revision functional endoscopic sinus surgery. Median follow-up was 14.2 months. There were no complications attributed to the procedure, and all patients had improvement of their sinus symptoms and displayed no evidence of recurrence of their frontal sinus disease at last follow-up.

Conclusion: Minitrephination is a safe and effective adjunct in the management of complex frontal sinus disease, as it allows identification of the frontal recess and vigorous irrigation of the sinus contents.

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Key words: Allergic fungal sinusitis, chronic sinusitis, endoscopic sinus surgery, frontal recess, frontal sinus, frontal sinusitis, minimally invasive sinus surgery, minitrephination, mucocelles, trephine

Frontal sinus disease includes a range of pathological conditions ranging from chronic sinusitis to nasal polyposis, mucocelles, and allergic fungal sinusitis (AFS). Disease within the frontal sinus continues to be one of the most challenging problems to confront the sinus surgeon. Evidence of this difficulty is shown by the plethora of surgical procedures, both external and endoscopic, that have been developed to treat disease within the frontal sinus.¹ These procedures include more traditional approaches such as the Lynch frontoethmoidectomy² and osteoplastic flap with frontal sinus obliteration³ as well as more recent procedures developed with the aid of endoscopic equipment. Functional endoscopic sinus surgery (FESS) has led to procedures such as endoscopic frontal sinusotomy or exploration,^{4–6} the frontal sinus rescue procedure as eloquently described by Kuhn and colleagues,⁷ endoscopic transseptal frontal sinusotomy,⁸ and the modified Lothrop procedure.⁹ At the present time endoscopic frontal sinusotomy/exploration remains the mainstay of treatment in the management of primary frontal sinus disease. The other described endoscopic procedures usually are reserved for

recurrent or more complex frontal sinus disease recalcitrant to frontal sinus exploration. These advanced procedures, however, usually require significant training and comfort with the complex anatomy of the frontal recess as well as a multitude of specifically designed equipment to reach this region endoscopically. In addition, image guidance usually is required.

Minitrephination is a technique described by Gallagher and Gross¹⁰ that can be used by the endoscopic sinus surgeon to identify easily and accurately the frontal recess as well as irrigate thick, inspissated mucus or fungal debris out of the frontal sinus to treat conditions such as chronic sinusitis, mucocelles, and AFS. This study reviews our experience with minitrephination in combination with endoscopic frontal sinus exploration in the management of complex frontal sinus disease and advocates it as a safe and effective method that compares favorably with more advanced endoscopic techniques.

MATERIALS AND METHODS

After appropriate institutional review board approval, we performed a retrospective chart review of the medical records of 13 patients who underwent combined frontal sinus exploration of one or both frontal recesses *via* FESS as well as external minitrephination of one or both frontal sinuses by the senior author (M.B.W.) at the University of California, Los Angeles Medical Center and the West Los Angeles VA Medical Center between July 2004 and October 2005. A complete history and physical exam including nasal endoscopy was performed before surgery on all patients and a sinus CT scan was reviewed by the senior author before surgical management. Criteria for surgical management included persistent frontal sinus disease as identified by symptomatology, clinical

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Table 1 Summary of patient data

Patient	Age (yr)	Sex	Indication	Symptoms on Presentation	Previous Sinus Surgery	Procedures Performed	Side of Minitrrephination	Stent Placed	Status	F/U (mon)
1	46	F	CS, right frontal mucocele	FP, NO, S, H	Yes ×1	Bilateral FESS with frontal sinus exploration	Right	Yes (R)	NED, open	21
2	50	M	CS	FP, NO, S, H	Yes ×1	Bilateral FESS with frontal sinus exploration	Right	Yes (R)	NED, open	20
3	73	M	CS, NP, L frontal mucocele	FP, P, NO, S	Yes ×2	Bilateral FESS with frontal sinus exploration and nasal polypectomy	Left	Yes (S)	NED, open	20
4	52	M	Bilateral frontal mucoceles	FP, P, D, E	No	Septoplasty, bilateral FESS with frontal sinus exploration	Bilateral (medial + lateral)	Yes (R × 2)	NED, open	20
5	17	M	CS	FP, NO, S	Yes ×1	Bilateral FESS with frontal sinus exploration	Bilateral	No	NED, open	15
6	15	M	AFS, NP, left ethmoid mucocele with postobstructive frontal sinus opacification	P, E, NO, S	No	Left FESS with frontal sinus exploration and nasal polypectomy	Left	No	NED, open	14
7	17	F	Left inverting papilloma with postobstructive left pansinusitis	FP, NO, B	No	Left endoscopic medial maxillectomy with frontal sinus exploration	Left	No	NED, open	14
8	46	M	CS, NP	FP, NO, S	Yes ×4	Bilateral FESS with frontal sinus exploration and nasal polypectomy	Left	Yes (R)	NED, open	10
9	64	M	CS	FP, NO, S	No	Septoplasty, bilateral FESS with frontal sinus exploration	Left (medial + lateral)	No	NED, open	10
10	46	F	CS, AFS, NP	FP, NO, S	Yes ×4	Bilateral FESS with frontal sinus exploration and nasal polypectomy	Bilateral	No	Recurrent right CS;# L open	10
11	62	M	CS, NP	NO, S	Yes ×1	Bilateral FESS with frontal sinus exploration and nasal polypectomy	Right	No	NED, open	9
12	45	M	CS, NP, recurrent right frontal mucocele	FP, P, NO, S, H	Yes ×6*	Bilateral FESS with frontal sinus exploration and nasal polypectomy	Bilateral	No	NED, open	9
13	56	F	CS, AFS, NP	FP, NO, S, H	Yes ×2	Bilateral FESS with frontal sinus exploration	Right	No	NED, open	7

*Patient had previously undergone six procedures, three endoscopic procedures for CS/NP and three procedures for recurrent right frontal mucoceles, including two external frontoethmoidectomies and one osteoplastic flap with frontal sinus obliteration.

#At time of surgery, frontal recess on left side was noted to be patent on irrigation from above via minitrrephination; however, the right frontal recess was obstructed due to severe stenosis. CS = chronic sinusitis; NP = nasal polyposis; FP = facial pain; NO = nasal obstruction; S = sinusitis; H = hyposmia; P = proptosis; D = diplopia; E = epiphora; B = bleeding/epistaxis; R = Reiter bivalve fluoroplastic nasal stent; S = silastic stent; NED = no evidence of disease.