Functional Endoscopic Sinus Surgery in Patients with Sinugenic Headache

RONAYOOTH BOONCHOO, M.D.*

Abstract

Sixteen patients were operated on by functional endoscopic sinus surgery. Their principal complaint was facial pain or headache which was thought to be of sinugenic origin. These patients had no osteomeatal complex obstruction on diagnostic nasal endoscopy and also had unremarkable sinus diseases on computed tomography scan of paranasal sinuses. The operative procedures were very limited functional endoscopic sinus surgery which included middle meatotomies with uncinectomies and partial turbinectomies (frontoinferior). Ten patients (62.5%) had no headache postoperatively, and six patients (37.5%) had a reduction in severity. These patients also had a significant reduction in severity of associated nasal symptoms (yellow or green nasal discharge, nasal blockage, postnasal drainage, asthma, allergies). ($p<0.05$) The pathophysiologic mechanism of facial pain or headache in these patients is probably related to reversible mucosal disease. This report focuses on a small group of select patients who had specific complaints and had underlying nasal mucosal disease in the form of allergy or vasomotor rhinitis. This therapy is not recommended for every patient, but only a small, selected group of patients who had classic complaints of sinus headache and had had medical treatment failures even if their nasal endoscopy and computed tomography scans were normal.

Headache can be very frustrating for both the patient who suffers from it and for the physician from whom treatment is requested. In general, the otolaryngologist is confronted by three different and distinct groups of headache patients(1).

1. Those with headaches clearly related to some sinus problems, such as inflammatory disease, neoplasm, barotrauma, or other readily identifiable causes.

2. Those with headaches clearly traceable nonsinus causes such as migraine, neuralgia, cervical spine disorders, too low/high blood pressure or other vascular disorders, temparomandibular joint disease, ophthalmic refraction problems, allergies, etc.

3. Those whose problems are not clear and in whom there seems to be no overt indication of sinus disease. In this group, referred headache of

*Department of Otolaryngology, Vajira Hospital, Bangkok 10300, Thailand.

sinus and nasal origin in the absence of sinus inflammatory disease is one of the clinical entities that is rapidly gaining acceptance in both the otorhinolaryngologic and neurologic communities[2,3]. These referred headaches can mimic migraine and other vascular-type headaches[3]. Various intranasal abnormalities or anatomic variations have been implicated in this disorder, including enlargement of the ethmoid bulla[1] septal deviations and spurs[4], and middle turbinate anomalies[5]. The purpose of this report is to study a subpopulation of this group of patients who had severe facial pain or headaches thought to be sinugenic in origin without intranasal abnormalities or anatomic variations on nasal endoscopy or computed tomography (CT) scan and had had medical treatment failure. These patients were operated on by functional endoscopic sinus surgery (FESS). The results of the study and pathophysiologic mechanism of headache in these patients will be discussed.

MATERIAL AND METHOD

Sixteen patients who had a chief symptom of facial pain or headache that occurred independently of episodes of sinusitis underwent a diagnostic nasal endoscopy and CT scans of the paranasal sinuses. These patients had no obstruction of the osteomeatal complex (OMC) on diagnostic nasal endoscopy and had normal CT scans. The headaches were severe in nature and located in the midface and periorbital areas, with corresponding pressure or throbbing sensations. These patients also had some associated nasal symptoms such as nasal blockage, postnasal drainage, green or yellow nasal discharge, and nasal allergies.

All patients underwent a preoperative evaluation consisting of a detailed history, a complete otolaryngologic examination, a diagnostic nasal endoscopy, an allergy evaluation, and a CT scan of the paranasal sinuses. CT scans were obtained when the patients did not respond to medical management. All patients underwent preoperative neurology consultation for facial pain or headache to exclude other neurogenic headache. In all patients, comprehensive medical management had failed to control their headache. The medical management included antihistamines, decongestants, nasal steroid sprays, and simple analgesics.

All patients underwent FESS, the operative procedures were limited to uncinectomies, middle meatotomies, and partial middle turbinectomies (frontoinferior). No ethmoidectomies or sphenoidectomies were performed.

After discharge patients were followed-up regularly, with a mean follow-up period of 18 months (range 2 to 50 months). All patients were asked to provide answers to the questionaires that elicited information regarding the following :

1. A rating score for facial pain or headache.
2. A rating of five associated symptoms (yellow or green nasal discharge, nasal blockage, postnasal drainage, asthma, allergies).
3. An impression of their overall symptoms after FESS (worse, the same, slightly better, much better, symptom free).

A simple rating score for facial pain or headache and five associated symptoms was used to calculate the total symptom score for each patient regarding their preoperative and postoperative status. A score of O was given to "none", I for "mild", and 2 for "severe". The data were examined by the use of Wilcoxon's signed rank test with significance placed at $p<0.05$ and 95 per cent confidence intervals.

RESULT

Of 16 patients who underwent FESS, 37.5 per cent (6 patients) were male and 62.5 per cent (10 patients) were female, Average age was 36.5 years (range from 18 to 64 years old). A total of 32 sides were operated on. No intranasal abnormalities or anatomic variations were found intraoperatively.

Twelve of 16 patients were found to be allergic with positive skin testing. Ten patients were treated medically and two patients underwent immunotherapy. The remaining four patients were nonallergic by skin testing. All were believed to have varying degrees of vasomotor rhinitis. Results of the neurology consultation for all patients were negative for neurogenic causes.

Of 16 patients all had severe headache preoperatively, ten patients (62.5%) had no headache postoperatively (rating for severe to none) and the other six patients (37.5%) had a reduction in severity, falling from rating of severe to mild (Fig.1). The frequency of preoperative and postoperative severe symptoms for five associated symptoms are shown in Fig. 2. A reduction in the total symptom score was seen in all patients. The

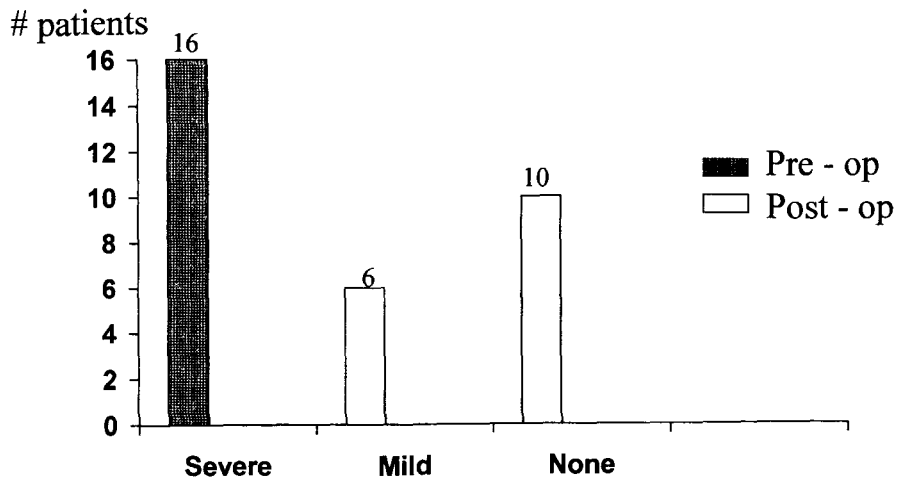

Fig. 1. Impact of FESS on facial pain/headache (N = 16).

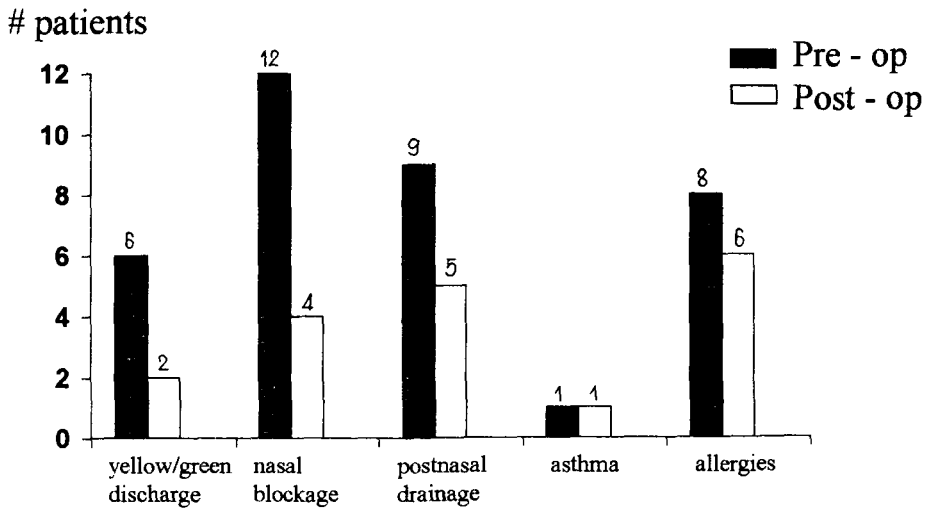

Fig. 2. Frequency of severe symptoms.

average total symptom score per patient was 7.5 preoperatively and 3.875 postoperatively (Fig. 3). This was significant at $p<0.05$. All of the patients reported that their symptoms overall were improved (slightly better or much better) ; however, "symptom free" or complete elimination of symptoms was not accomplished in any patient.

DISCUSSION

Typical complaints of possible sinugenic headache are pain at the very top of the calvarium sometimes together with a "centrally located" or bitemperal pain, indicating possible sphenoid or posterior ethmoid disease. Pain around the glabella, around the inner canthus, "between" or

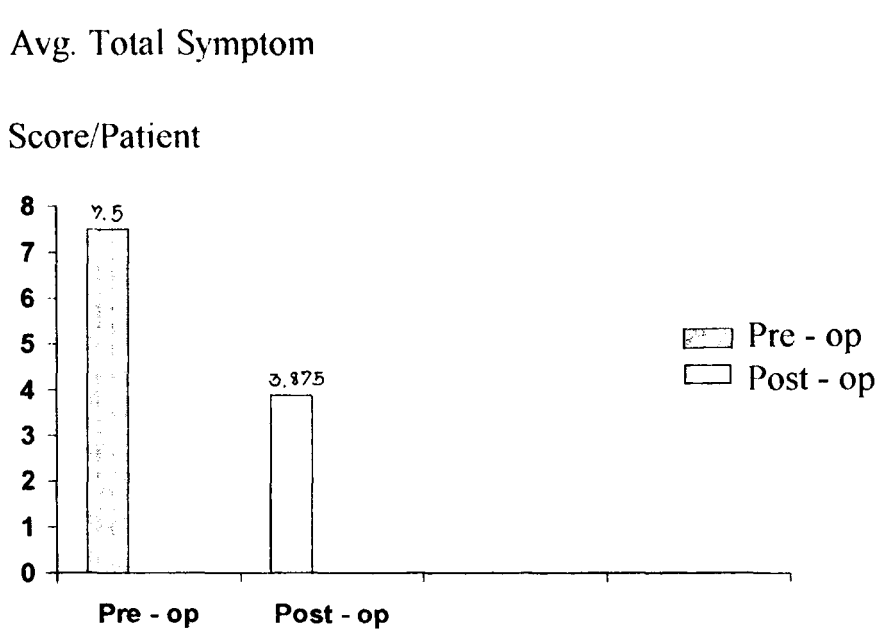

Fig. 3. Impact of FESS on total symptom score.

"above" the eyes or intraorbitally suggests anterior ethmoid and/or frontal sinus disease. The pain is usually characterized as being "dull" and is combined with a feeling of pressure and fullness. In acute cases there may be a pulsating pain, especially when the head is bent forward or when the patient is under physical stress[1].

In 1927, Sluder[6] described the phenomenon of vacuum headaches, where narrow drainage pathways of sinuses closed off with barometric pressure changes, resulting in pain over the involved sinuses without inflammatory disease. In 1943 McAuliffe et al[7] reported the results of an interesting experiment in which they stimulated various areas within the nasal cavity and paranasal sinuses with a variety of noxious stimuli. They concluded that the mucosa lining the sinus cavities was significantly less pain-sensitive than the sinus ostia and turbinates. They suggested that turbinate engorgement was the true cause of headache pain that accompanies sinusitis. Since then various authors have reported on the association between various nasal and paranasal sinus pathologies and headaches or facial pain[4,8-13].

Since patients with sinugenic headaches may not present necessarily with a typical sinusitis history, we should investigate for underlying causes with nasal and sinal causation in mind. Negative findings do not rule out a sinus causation.

In general, indications for performing FESS are (1) chronic sinusitis that fails to respond to medical therapy and (2) recurrent acute sinusitis known to be related to abnormalities of the osteomeatal complex[14-16]. However, it is interesting to note a more expanded list of indications that has been put forth (without specific criteria) including "headaches, pressure feelings, postnasal discharge, tubal dysfunctions, adjuvant surgery to allergy treatments", and others[15]. The role of FESS in patients who had no apparent mucosal or anatomic OMC abnormality on nasal endoscopy or CT scan and who had headaches believed to be sinugenic in nature has been unclear. In this study, a reduction in the severity of facial pain or headaches was accomplished by FESS. A reduction in the severity of associated symptoms was also expected at a significant level. However, a complete relief of all symptoms was not accomplished in any patient in this study because their underlying nasal mucosal disease persisted. This observation suggests that optimal management of nasal mucosal disease is difficult to achieve.

The pathophysiologic mechanism by which these patients experience sinugenic facial pain or

headaches is probably due to reversible mucosal disease of nasal and paranasal sinuses which is associated with allergic and vasomotor rhinitis. Allergen and irritants cause inflammation leading to mucosal edema and can result in OMC obstruction. When the sinuses ostia are blocked and retention of secretion occurs, often giving rise to a pounding pain. Studies have demonstrated that hypoxia in the sinuses is one of the factors that can give a sensation of pain[1]. Since this obstruction is extrinsically mediated and likely mucosal, it can reverse and may account for its sinusoidal natural history. Endoscopic examination in these patients may not demonstrate obvious OMC obstruction because its reversibility and even during symptomatic periods because decongestion is routinely used before nasal endoscopy.

Most sinugenic facial pain or headache patients are treated adequately by medical therapy, and this report focuses on a small group of selected patients who had surgery. A surgical treatment option in these patients is considered when they have an evidence of mucosally OMC obstruction such as the patient's history, known mucosal disease (allergy or vasomotor rhinitis), nasal endoscopy (although without obvious OMC obstruction), CT scan, and failure of a prolonged course of aggressive medical treatment.

SUMMARY

Although facial pain or headaches are common symptoms in patients with inflammatory condition within the nasal cavities or paranasal sinuses, they occasionally may be the major presenting symptom without associated symptoms suggestive of an infection. In selected patients with classic facial pain or headaches believed to be of sinugenic origin who have no apparent OMC obstruction on nasal endoscopy or CT scan, a reduction in severity of headaches can be expected with limited FESS. The reversible nasal mucosal disease may play a role in this type of sinus disease. All of these patients had nasal mucosal disease, associated with allergy in the allergic patients and vasomotor rhinitis in nonallergic patients, all had had medical failures, and all had improved symptoms overall, but none had a complete elimination of nasal symptoms. Therefore, maximum medical management is recommended before surgical intervention. In addition, most patients with sinugenic headaches are treated medically with excellent results and are never operated on.

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REFERENCES

1. Stammberger H, Wolf G. Headaches and sinus disease : the endoscopic approach. Ann Otol Rhinol laryngol 1987; 97 (Suppl 134): 3-23.
2. Chow JM. Rhinologic headaches. Otolaryngol Head Neck Surg 1994; 111: 211-8.
3. Clerico DM. Sinus headaches reconsidered : referred cephalgia of rhinologic origin masquerading as refractory primary headaches. Headache 1995; 35: 185-92.
4. Gerbe RW, Fry TL, Fischer ND. Headache of nasal spur origin : an easily diagnosed and surgically correctable cause of facial pain. Headache. 1984; 24: 329-30.
5. Goldsmith AJ, Zahtz GD, Stegnajajie A, et al. Middle turbinate headache syndrome. Am J Rhinol 1993; 7: 17-23.
6. Sluder G. Nasal Neurology, Headaches and Eye disorders. St. Louis : C.V. Mosby 1927: 31-67.
7. McAuliffe GW, Goodell H, Wolff HG. Experimental studies on headache : pain reference from the nasal and paranasal structures. Ass Res Nerv Dis Proc 1943; 23: 185-92.
8. Hansen RM. Pain of nasal origin. Laryngoscope 1968; 78: 1164-71.
9. Masing H. Functional aspects in septal plasty. Rhinology 1977; 15: 167-72.
10. Ryan SE Sr, Ryan RE Jr. Headache of nasal origin. Headache 1979; 19: 173-9.
11. Koch-Henriksen N, Gammelgaard N, Hvidegaard T, Stoksted P. Chronic headache : the role of deformity of the nasal septum. BMJ 1984; 288: 434-5.

12. Schonsted Madsen U, Stoksted P, Christensen PH, Koch-Henriksen N. Chronic headache related to nasal obstruction. J Laryngol Otol 1986; 100: 165-70.
13. Whittet HB. Infraorbital nerve dehiscence : the anatomic cause of maxillary sinus "vacuum headache"? Otolaryngol Head Neck Surg 1992; 107: 21-8.
14. Kennedy DW. Surgical update. Otolaryngol Head Neck Surg 1990; 103: 884-6.
15. Stammberger H, Posawetz W. Clinical review. Functional endoscopic sinus surgery. Concept, indications and results of the Messerklinger technique. Eur Arch Otorhinolaryngol 1990; 247: 63-76.
16. Stammberger H. Endoscopic sinus surgery-concepts in treatment of recurring rhinosinusitis. Part II. Anatomic and pathophysiologic considerations. Otolaryngol Head Neck Surg 1986; 94: 147-56.

การผ่าตัดโพรงไซนัสด้วยวิธีส่องกล้องในผู้ป่วยที่มีอาการปวดศีรษะจากโพรงไซนัส

*รณยุทธ บุญชู, พ.บ.**

การศึกษาจากผู้ป่วยจำนวน 16 ราย ที่มีอาการปวดศีรษะจากโพรงไซนัสโดยการผ่าตัดไซนัสด้วยวิธีส่องกล้อง ผู้ป่วยเหล่านี้มาด้วยอาการสำคัญคือ อาการปวดศีรษะซึ่งน่าจะมีสาเหตุมาจากโพรงไซนัส แต่ไม่พบว่ามีการอุดตันของ osteo-meatal complex จากการตรวจวินิจฉัยด้วยวิธีส่องกล้อง หรือภาพถ่ายเอกซเรย์คอมพิวเตอร์ การผ่าตัดประกอบด้วย การขยายรูเปิดของ Maxillary sinus, การเอากระดูก uncinate ออก และตัดบางส่วนของปุ่มกระดูก middle turbinate ผลของการศึกษาพบว่า ผู้ป่วย 10 ราย (62.5%) หายจากอาการปวดศีรษะภายหลังการผ่าตัด และผู้ป่วย 6 ราย (37.5%) มีอาการปวดลดลง นอกจากนี้ยังพบว่าความรุนแรงของอาการที่พบร่วมอื่น ๆ (อาการเสมหะเหลืองหรือเขียว, อาการคัดจมูก, อาการเสมหะลงคอ, อาการหอบหืด, อาการภูมิแพ้) ก็ลดลงอย่างมีนัยสำคัญทางสถิติ ($P<0.05$) กลไกของอาการปวดศีรษะในผู้ป่วยเหล่านี้น่าจะมีสาเหตุจากการอุดตันของ osteomeatal complex จากการบวมอย่างชั่วคราวของเยื่อบุจมูก ในโรคหวัดเรื้อรัง เช่น โรคหวัดภูมิแพ้ หรือโรคหวัดที่มีสาเหตุจากความไม่สมดุลของระบบประสาทอัตโนมัติ (Vasomotor rhinitis) รายงานนี้ศึกษาเฉพาะผู้ป่วยกลุ่มเล็ก ๆ กลุ่มหนึ่งซึ่งมีอาการปวดศีรษะจากโพรงไซนัสค่อนข้างชัดเจน มีโรคหวัดเรื้อรังอยู่ และอาการปวดไม่ดีขึ้น ภายหลังการรักษาด้วยการให้ยาอย่างยาวนานและเต็มที่แล้ว ไม่ได้เป็นการรักษาแบบมาตรฐานสำหรับผู้ป่วยที่มีอาการปวดศีรษะจากโพรงไซนัสทุกราย

* กลุ่มงานโสต ศอ นาสิก, วชิรพยาบาล, กรุงเทพ ฯ 10300