Surgical Outcomes for Rhinogenic Contact Point Headaches

Devrim Bektas^a Zekeriya Alioglu^b Nurettin Akyol^c Ahmet Ural^a
Osman Bahadir^a Refik Caylan^d

Departments of ^aOtolaryngology, ^bNeurology and ^cOphthalmology, School of Medicine, Karadeniz Technical University, Trabzon, and ^dDepartment of Otolaryngology, Etlik Ihtisas Education and Research Hospital, Ankara, Turkey

Key Words

Endoscopic sinus surgery • Rhinogenic contact point headache • Surgical outcome • Concha bullosa • Nasal septal deviation

Abstract

Objective: To evaluate the surgical outcome in patients diagnosed as having rhinogenic contact point headaches (RCPH). **Subjects and Methods:** Thirty-six patients (aged 17–58 years) with RCPH underwent mini functional endoscopic sinus surgery procedures. Patients' pain complaints were evaluated with a visual analog scale (VAS) both pre- and postoperatively. **Results:** All patients reported a decrease in the intensity of pain postoperatively. Nineteen patients (52.7%) reported complete relief. The difference between the preoperative (mean 8.62) and postoperative VAS pain scores (mean 2.11) was statistically very significant ($p = 0.0000$). No major complications were encountered. **Conclusion:** The removal of contact points in patients with RCPH is very effective in carefully selected patients.

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Introduction

It is not so uncommon in the setting of an office to encounter a patient complaining of severe recurrent pain localized to the glabella, supraorbital region, or eye without any clinical or radiological inflammatory signs of rhinosinusitis. These unfortunate patients usually pay multiple visits to otorhinolaryngology, neurology, and/or ophthalmology clinics where their examinations reveal normal findings. Not too infrequently, they may be misdiagnosed and treated for rhinosinusitis, migraine, or vascular-type headaches.

Facial pain of sinus and nasal origin in the absence of inflammatory sinonasal disease is a clinical entity that has received attention in both otorhinolaryngology and neurology societies [1, 2]. In 1948, Wolff [3] showed that stimulation of the middle turbinate and the nasal septum, both innervated by the anterior ethmoidal nerve, caused pain in the medial canthus area and the supraorbital region. In 1980, Morgenstein and Krieger [4] described a middle turbinate headache syndrome having a typical pattern of pain without being associated with any signs of sinus infection. It did not take too long to recognize sinonasal abnormalities, such as septal spurs [5] and a pneumatized middle [6] or superior turbinate [7, 8], as

causes of typical headaches. The proposed mechanism in such cases is the mucosal contact between the nasal septum and the middle turbinate acting as a mechanical stimulus to produce an axonal reflex resulting in the reported pain, as studied and described elsewhere in detail by Stammberger and Wolf [9].

In 2004, mucosal contact headache was added as a secondary headache disorder in the International Classification of Headache Disorders [10]. The guide described mucosal contact headache as variations in mucosal congestion mediated by gravitational changes. The criteria in the guide require the abolition of headache within 5 min following the application of topical anesthesia to the contact point area and significant improvement of the headache in less than 7 days after removal of the mucosal contact points.

This study was conducted to evaluate the surgical outcome of patients diagnosed and treated as having rhinogenic contact point headaches (RCPH).

Subjects and Methods

The recognition of the clinical features of this entity led us to seek the cooperation of the Departments of Neurology and Ophthalmology which, in the absence of any other etiologic factors that may be related to the patients complaints, referred their patients presenting with the characteristic pain of this disease for further evaluation. A total of 52 patients were diagnosed as having RCPH at the Department of Otolaryngology. All patients underwent a preoperative evaluation including detailed medical history, a complete ENT examination, diagnostic nasal endoscopy, state and signs of allergy, and coronal CT scans of the nose and paranasal sinuses. Any sign of inflammatory disease such as nasal polyps or mucopurulent discharge as well as hyperplastic mucosa as noted during nasal endoscopy or on the CT scans required exclusion from the study group. Those patients with a diagnosis or a history of nonsinus headache causes such as migraine and other vascular disorders, chronic daily headache, neuralgias, cervical spine disorders, temporomandibular joint disorders, and ophthalmic refraction problems were also excluded from the study group. The patients were asked about the use of analgesics or other drugs and their adequacy for alleviating their complaints.

Diagnostic Criteria

The patients were initially screened on the basis of the following criteria for inclusion into the study group:

The major complaint was headache or facial pain described as chronic, recurrent, excruciating, and/or disabling over the glabellar area and/or extending over the middle canthus region and/or supraorbital area unilaterally or bilaterally; no signs of any inflammation, mass, or allergy in the nasal cavity and the paranasal sinuses as noted in the nasal endoscopy or CT of the paranasal sinuses performed on the symptomatic patient; completely normal neurological examination and normal cranial CT; complete-

ly normal ophthalmologic evaluation, and identification of mucosal contact areas related to one or more anatomic variations on endoscopy and CT. The presence of all of the criteria led to the preliminary diagnosis of RCPH. The diagnosis was further confirmed if palpation of a suspected contact point within the nasal cavity provoked pain of a similar nature, and/or if the topical application of lidocaine solution to the suspected area with the help of a cotton pledget or in the form of nasal spray (xylocaine 10%) relieved the pain in the next 10–15 min as recommended by Anselmo-Lima et al. [6].

This second step required patients to visit the clinic when experiencing the pain, which was not a major concern since the patients generally had complaints during their presentation or a frequent recurrence of complaints caused them to visit our clinic in the following couple of days. An initial trial of diagnostic blocks by the local infiltration of 1% lidocaine hydrochloride solution in the ambulatory setting was not tolerated by most patients and was therefore abandoned.

Patients were initially offered conservative treatment with nasal decongestants to relieve their symptoms and/or topical corticosteroid sprays for 8 weeks if they met the 2 criteria stated above. Those patients with a frequent recurrence of pain or treatment failure were offered surgical treatment as an alternative.

The demographic features of the patients, the nature and duration of the complaint, the endoscopic and CT findings of contact areas, and anatomic variations were recorded. A visual analogue scale (VAS) was used as the primary efficacy measure. Patients recorded their individual sensation of pain on a scale measuring 10 cm in length. The scale was marked as no pain on one end and maximum pain on the other end without any other markings in between. The mark on the scale was measured in millimeters for quantification.

Surgery was performed only under local infiltration anesthesia (1% lidocaine hydrochloride with 1:100,000 epinephrine). The endoscopic sinus surgery technique described elsewhere in detail [11] was applied using Messerklinger's technique and its minor modifications aimed to removing only the parts of the anatomic variations causing mucosal contact.

Concha bullosa was treated by lateral, subtotal, or submucous resection to allow the lateralization of the medial remnant of the turbinate away from the nasal septum. An uncinate process was resected if pneumatized or medially or laterally bent. In the presence of an overpneumatized bulla, it was opened removing only the bulge of the cell following uncinectomy. Agger nasi cells, if narrowing the frontal recess, were also removed carefully without traumatizing the mucosa of the frontal recess area. A paradoxically bent middle turbinate was treated by segmental resection with turbinate scissors throughout its bulbous part leaving the lamellar or superior part of the turbinate intact. Absence of bleeding at the end of surgery precluded the use of any nasal packing.

In cases with nasal septal deviation or septal spurs, nasal septoplasties or spur resections were carried out. Nasal septoplasty required postoperative nasal packing for 48 h. Postoperatively, all patients were administered oral azithromycin 500 mg/day for 3 days and frequent nasal douches were performed 5–6 times daily for 10 days. Patients were discharged to return for postoperative care on the tenth postoperative day. In the control visits, synechiae or crusts, if present, were removed by nasal endoscopy.

Table 1. Anatomic variations noted on nasal endoscopy and CT of the 36 patients

Anatomic variations	n
Bilateral concha bullosa	26
Nasal septal deviation or spurs	12
Overpneumatized ethmoidal bulla	11
Unilateral concha bullosa	8
Agger nasi cells	4
Malformed uncinate process	3
Paradoxical middle turbinate	2

Subjects

Of the 52 patients, 13 were referred from the Department of Neurology and 8 from the Department of Ophthalmology. Sixteen patients were excluded from the study group due to a lack of medical records such as a VAS evaluation pre- or postoperatively, or because they were lost to follow-up in the postoperative period. A total of 36 patients, 21 females and 15 males, were included into the study group. The patients' ages ranged from 17 to 58 years with a mean of 31.3 ± 1.98 years. The mean age for females was 30.8 ± 2.79 years and for males 32 ± 2.81 years. All of the patients were operated on by the same surgeon (R.C.).

Nature of Pain

The typical complaint of patients with RCPH was excruciating pain between the eyes, across the forehead, reflecting over the eyebrows, or at the root of the nose. Almost all patients reported an aggravation of the pain following exposure to winds or cold air and/or after leaving their hair wet following a shower or a walk in the rain. The pain was experienced almost daily or 4–5 times a week, lasting several hours, with analgesics such as acetaminophen offering partial and transitory relief. The mean chronicity period of the headaches was 4.2 years ranging from 1 to 12 years. All of the patients reported the duration period of their headaches to be more than 1 year. Three patients reported the duration period to be 10 years or greater. Of 36 patients with facial pain or headache, 14 complained of nasal obstruction while 7 complained of postnasal discharge.

Follow-Up and Statistical Analysis

Patients were followed for at least 6 months. Postoperative VAS scores were recorded at the end of 6 months. Patients that were lost to follow-up after surgery were excluded from the study group. The demographic data and pre- and postoperative VAS values were examined by use of a paired t test and the Wilcoxon signed-rank test. Data were expressed as means $\pm$ standard error of mean.

Results

The anatomic variations causing possible mucosal contact between the middle turbinate and the nasal septum or the lateral nasal wall as diagnosed during the na-

Table 2. Mini functional endoscopic sinus surgery procedures applied to patients with RCPH

Partial anterior ethmoidectomy	14
Septoplasties	8
Septal spur resection	4
Middle turbinate	
Lateral resection	29
Subtotal resection	3
Segmental resection	2
Submucous resection	2
Total resection	0

sal endoscopy and/or CT scans are given in table 1. In 12 of 36 (33%) patients concha bullosa was recognized as the sole anatomic variation causing mucosal contact with the nasal septum or lateral nasal wall or with both of the structures. In the remaining 24 (66%) cases there were multiple anatomic variations causing mucosal contact.

Intraoperatively, the resection of the lateral half of the concha bullosa in 3 (8.3%) patients caused a mobile or flaccid middle turbinate due to an excessively thin remnant of the medial bony lamella, which was also removed, leaving only the posterior one third of the middle turbinate intact (subtotal resection) (table 2).

All 36 patients reported a postoperative absence of headaches or a decrease in the intensity of them. Nineteen (52.7%) patients reported complete relief of pain following surgery and 17 (47.3%) reported occasionally having minimal pain which they no longer considered significant. None of the patients reported an increase in the frequency or intensity of their headaches postoperatively. All of the patients with nasal obstruction ($n = 14$) noted relief and 3 of 7 patients with postnasal discharge ($n = 7$) reported a decrease in their complaints.

In the postoperative period, major complications were not encountered. The most common minor complication was synechiae of the middle turbinate to the lateral nasal wall, which was encountered in 5/36 (13.9%) patients. This required resection of the fibrous tissue and repacking of the middle meatal area with a sinus pack that was trimmed to the size of the raw area. It is noteworthy that all 5 patients had undergone simultaneous nasal septoplasties and concha bullosa resection requiring the insertion of nasal packs into the nasal cavity. In 3 patients (2 with paradoxical middle turbinate and 1 with nasal septal deviation) epistaxis following the removal of nasal packing required repacking of the nose. Patients were followed for an average of 11.7 months, ranging from 6 to 15 months.

Statistical analysis of preoperative pain VAS scores revealed a mean value of 8.62 ± 0.18 ; postoperatively the mean value was 2.11 ± 0.25 . The difference between pre- and postoperative VAS scores was statistically very significant ($p = 0.0000$).

Discussion

The middle turbinate is a thin bony structure covered with mucosa on the lateral wall of the nose [12]. Its anterior part and the nasal septum are both supplied by the anterior ethmoidal nerve. RCPH is basically a referred pain and this concept is founded on the fact that 2 different afferent sensory neurons, 1 with its receptor in the nasal mucosa and the other in the skin of the temple, zygoma, forehead, and medial canthus area synapse on the same sensory neuron of the sensory nucleus of the fifth cranial nerve. Stimulation of the receptors in the nasal mucosa is misinterpreted by the sensory cortex as originating from the skin (referred pain to the glabellar or supraorbital region). Mucosal contact between the middle turbinate and the nasal septum or the lateral nasal wall is believed to be the causal factor of the stimulus. The stimulation of polymodal receptors within the nasal cavity initiates orthodromic and antidromic impulses. The orthodromic impulses carried through the C fibers mediate pain in the central nervous system. The antidromic impulses carried in a retrograde fashion result in the release of substance P at the receptor site causing local vasodilatation, hypersecretion, smooth muscle contraction, and the extravasation of plasma [9]. It must be emphasized that mucosal contact is not strictly limited to patients with anatomic variants in the nose. It is commonly noted in patients with rhinosinusitis, allergic rhinitis, or nasal polyps. However, studies [13, 14] have demonstrated that there are very few nerve fibers in hyperplastic mucosa and nasal polyps and, consequently, lower quantities of vasoactive mediators such as tachykinin, neurokinin A, and substance P are found in these tissues. These findings may aid in explaining why patients with chronic inflammatory diseases are frequently pain-free or have higher thresholds of pain than those with acute disease or events [13].

The factors causing the mucosas of the anatomic structures to contact each other vary greatly. The nasal mucosa is known for its ability to swell by way of vasomotor responses to hormones (especially high levels of estrogen), emotions (resentment, humiliation, frustration, and anxiety), environmental changes (the inhalation of irri-

tant fumes or dust), and numerous pharmacological agents [15]. The majority of our patients described their pain as being triggered following exposure to wind or cold air. Cold dry air is also known to initiate a hypersecretory state by a complex mechanism. It is hypothesized that sensitivity to cold dry air is due to an impaired humidification of air by the nasal mucosa in extreme temperatures, resulting in hyperosmolar secretions that trigger nerves [16]. In the presence of anatomic variations without any signs of inflammatory disease, the narrowed spaces in the nose make up the predisposing areas for triggering the initial stimulus caused by swelling of the erectile tissue.

The pneumatization of the middle turbinate causing it to expand is termed *concha bullosa*. It is the most common anatomic variation of the middle turbinate and is generally found bilaterally [17]. In our study group, the most common anatomic variation narrowing the intranasal spaces was *concha bullosa*, which was bilateral in 76.4% of cases. The expansion of the middle turbinate offers a greater area for mucosal contact both medially and laterally, which may possibly be an explanation for its high incidence in this syndrome. Anselmo-Lima et al. [6] also reported 5 patients with *concha bullosa*, which caused middle turbinate headache syndrome and the complete resolution of headache following surgery in all of their patients. In contrast, the most common cause of headache was septal spurs in a series of patients with rhinologic headaches as reported by Chow [2]. Similar findings were also reported by Gerbe et al. [5], who diagnosed septal spurs as a cause of headache in 18 out of 20 patients. In our study, septal deviation or spurs were only second in frequency to *concha bullosa*.

Although the Headache Society Classification of 2004 aimed to classify RCPH, this syndrome is far from being fully understood. This is not only because of the small number of patients analyzed in the studies, but also because of some conflicting issues in the pathogenesis. For instance, in some cases mucosal contact points may not be the primary pathology and act only as a trigger factor that increases the probability of a headache attack [18, 19]. Therefore, in some cases the abolishment of headache attacks in the early postoperative period may mean only a primary neurologic disease in a quiescent phase. Another problem is in the diagnostic process. The mucosal contacts in areas inaccessible to topical anesthetics or topical decongestants make diagnosis difficult [8]. This is especially true for ethmoid-septal or superior turbinate-septal contacts [8]. In this case, the clinician may not be willing to perform surgery because of the lack of supportive

signs of RCPH. The role of surgery in this small population of patients without the signs of inflammatory disease remains unclear. While many studies report successful outcomes [8, 19–22], some authors claim that RCPH is a central process and that surgical intervention is unnecessary [23].

This study was not designed to include a control group, so the placebo effects of surgery are beyond the limits of evaluation. We chose to evaluate our patients with a VAS rather than with simple scoring alone in order to yield more objective results. The subjective decrease noted in the intensity and frequency of pain postoperatively in all of our patients is comparable to the results reported in the literature [5, 20–22]. However, it must be emphasized that although postoperative nasal endoscopy yielded the resolution of suspected contact areas, a total eradication of

pain was achieved in 52.7% of our patients according to the VAS evaluation. This finding may point to the fact that there may be additional underlying mechanisms provoking pain other than mucosal contact. In light of these results and despite the seemingly rewarding surgical results of this clinical entity, it is strongly suggested that further quantitative and objective methods are necessary to evaluate the real surgical outcome.

Conclusion

Our results show that when a demonstrated contact point headache responds to local anesthetics/vasoconstrictors, the surgical removal of the contact point may alleviate the headache.

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