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Original Article

Prevalence and etiological causes of sinus headache in 113 consecutive patients with chronic rhinosinusitis

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Abstract. The aim of this article is to examine the prevalence and etiological causes of sinus headache in patients with chronic rhinosinusitis. Patients who complained of sinus headache were identified and their presenting symptoms were analyzed in the light of the final diagnosis, after surgical treatment and follow-up. The mean follow-up time for patients with sinus headache was 3.2 months (range, 4-16 weeks). Patients' responses to treatment were classified under three categories; complete improvement, partial improvement and no response to treatment. Headache resolved completely in nine (34.6%) out of 26 patients diagnosed with chronic sinusitis and complaining of headache, while partial resolution was seen in five (19.2%) and no change in pain in 12 (46.1%). Five patients with partial improvement and 12 patients with no improvement were re-evaluated through consultation with the neurology clinic. Eleven patients were diagnosed with migraine and five with tension type headache. No additional disease to sinusitis was determined in one patient. Sinonasal surgery may be beneficial in patients with primary headaches.
We believe that new diagnostic criteria for migraine without aura and tension type headache accompanied by sinonasal pathologies are now needed.

Key words: Headache, sinonasal pathologies, migraine

1. Introduction

Sinus headache is a common problem in otorhinolaryngological practice. Episodes of pain or pressure over the area of the sinuses (i.e., frontal, maxillary, ethmoid) or around the eyes are frequently reported. Symptoms reported by patients with sinus headache secondary to sinusitis include nasal obstruction, hyposmia and purulent nasal discharge (1). Clinically, endoscopic signs of the disease, including mucosal edema and particularly mucopus, are usually present (2). Treatment often consists of multiple courses of antibiotics, steroids and decongestants. Patients sometimes undergo sinus surgery, but often little or no relief of their symptoms are reported. This is because chronic sinus headache is often attributed to sinusitis in these patients, many of whom are therefore referred to the otorhinolaryngologist.

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A distinct group of patients in whom sinus headache is the main symptom but for whom no positive endoscopic and radiologic findings has been identified (3,4,5). Schreiber et al. evaluated 2991 patients with sinus headache and reported that 80% of all cases were eventually diagnosed with migraine (6).

The International Headache Society (IHS) has published diagnostic criteria for primary headache (7). Several researchers have reported that patients who present with "sinus headache" meet IHS criteria for migraine and have associated autonomic symptoms that may be mistaken for "sinus" symptoms.

The aim of this study was to examine the prevalence and etiological causes of sinus headache in patients with chronic rhinosinusitis at endoscopy and paranasal sinus tomography (PCT) examination.

2. Methods

The present study includes 26 patients with sinus headache among 113 patients that have been operated on due to chronic sinusitis. Endoscopic examination and PCT data for these 26 patients with chronic rhinosinusitis (CRS), who underwent sinus surgery and attended

regular check-ups until the conclusion of the study, were examined. Exclusion criterias were atypical infection, malignancy, acute rhinosinusitis exacerbation and ciliary dysmotility.

Written informed consent was obtained from each patient upon inclusion in the study. Detailed medical history was recorded and physical as well as endoscopic nasal examination was performed for each patient. PCT images (screening coronal views, 5-mm sections at 8-mm intervals) were assessed for nasal cavity and paranasal sinus region.

Patients who complained of sinus headache were identified and their presenting symptoms were analyzed in the light of the final diagnosis, after treatment and follow-up. The mean follow-up time for patients with sinus headache was 3.2 months (range, 4-16 weeks). Patients' responses to treatment were classified under three categories: complete improvement, partial improvement and no response to treatment.

3. Results

The mean age of all the patients was 41 years (range, 23–63 years); 69.2% (n=18) were male and 30.7% (n=8) female. Additional nasal pathology was present in 21 (80.7%) of the patients with headache, and 22 (84.6%) had headache accompanied by nasal obstruction**.** The most common nasal pathology was septal deviation (65.3%). Purulent nasal discharge was present in 17 (65.3%) patients, mucocele in four (15.3%), fungal sinusitis in two (7.6%) and nasal polyposis in seven (26.9%). The most commonly blocked sinus was the maxillary sinus (80.7%) (Table 1).

Table 1. Involved of sinus headache

Involved sinus	Number of patients	%
Maxillary sinus	21	80.7
Frontal sinus	11	42.3
Ethmoid sinus	16	61.5
Sphenoid sinus	7	26.9

Patients described their pain most commonly as located in the frontal and maxillary regions, as well as in the periorbital region (26.9%) (Table 2). Nineteen (73%) patients described their pain as throbbing. Eighty-two percent of patients described their headache as a sudden-onset pain and 65.3% suffered from bilateral pain. In terms of observed symptoms, 46.1% of patients suffered from nasal congestion, 30.7% from rhinorrhea, 7.6% from vertigo, 76.5% from sinus sensitivity and 7.6% from blurred vision.

Table 2. Localization of headache

Localization	Number of patients	%
Maxillary region	4	15.3
Frontal region	7	26.9
Temporal region	6	23.0
Occipital region	5	19.2
Periorbital region	7	26.9

All patients had previously undergone one or more medical treatments with a diagnosis of sinusitis. Headache resolved completely in nine (34.6%) out of 26 patients diagnosed with chronic sinusitis and complaining of headache, while partial resolution was seen in five (19.2%) and no change in pain in 12 (46.1%) after endoscopic sinus surgery with/without septoplasty. Five patients with partial improvement and the 12 patients with no improvement were re-evaluated through consultation with the neurology clinic. Eleven patients were diagnosed with migraine (7 female, 4 male) and five with tension type headache 3 (female, 2 male). No additional disease to sinusitis was determined in one patient.

4. Discussion

Sinus headache is a common problem in the general population, and sinus headache is often attributed to sinusitis. Neurovascular event-based headaches, which develop due to diseases other than sinonasal pathologies but which exhibit similar symptoms (such as rhinorrhea, nasal obstruction and tearing) are often interpreted as rhinosinusitis (8,9). Migraine and tension-type headache are often confused with headache attributed to rhinosinusitis because of a similarity in pain location (7). Diagnostic criteria in sinusitis-related headache have been set out by the IHS (7). Other conditions that are often considered to induce headache have not been confirmed as causes of headache. These include deviation of the nasal septum, hypertrophy of turbinates, atrophy of sinus membranes and mucosal contact.

Although the IHS does not list chronic sinusitis among the causes of headache, chronic infective rhinosinusitis has been assumed to be a major cause of chronic facial pain in many patients (7). This is defined as inflammation of the nose and paranasal sinuses lasting 12 weeks or more and is characterized by two or more of the following symptoms: nasal blockage or congestion,

discharge, reduction or loss of smell, and facial pressure or pain, together with either endoscopic signs of disease and/or CT changes (10). Endoscopic sinus surgery (ESS) is still the most valid form of treatment in conditions that do not respond to medical treatment (11,12,13,15).

Sinus headache symptoms were present in 26 of the 113 patients operated on with a diagnosis of CRS in our study. Complete improvement was observed in nine (34.6%) of these after surgery. Partial or no improvement was observed in the remaining 17 (65.4%) patients. Following consultations with the neurology department, migraine without aura was determined in 11 of these patients and tension-type headache in five. Treatment directed toward causes was initiated, and positive responses were obtained in 15 patients. The causes of primary headache should be investigated in the presence of sinus headache in patients diagnosed with CRS. However, this study also shows full improvement in headache symptoms in 34.6% (n=9) of patients diagnosed with CRS with sinus headache and partial improvement in 19.2% (n=5). This may be explained in two ways:

1. headache may be attributed to an infection, or
2. sinonasal contact points may trigger sinus headaches.

Additional nasal pathology was present in 80.7% (n=21) of the patients with facial pain in our study, and surgery directed toward the anatomical pathology in the nasal cavity was performed in addition to ESS. On the other hand, there was no pathology other than CRS in 19.3% (n=5) of patients, and ESS only was performed on them. Some authors suggest that sinonasal contact points may evoke sinus headaches in some patients and that those patients may benefit from surgical interventions (15,16). It has been suggested that these endonasal contact points provoke miscellaneous forms of headaches via the trigeminovascular system, as well as the release of substance P (17,18). Cook et al. reported that 12 out of 18 patients who underwent sinus surgery for facial pain with no CT or endoscopic evidence of sinus disease reported had a significant reduction in their symptoms (19). Parsons and Batra retrospectively described 34 patients with headaches who had contact points surgically excised and they found that, post-operatively, there was a 91 per cent reduction in intensity and an 84 per cent decrease in frequency (20). Nasal and sinus-related pain can mimic primary headache syndromes, and differential diagnosis is difficult. The sinuses and most of the anterior craniofacial structures are innervated by branches of the trigeminal sensory nerves. Noxious stimulation of the sinuses and adjacent structures of any kind will trigger afferent sensory volleys into the trigeminal ganglion. This may in turn activate a response in the trigeminal vascular system resulting in symptoms possibly mimicking migraine pain or other conditions, such as neuralgia (21).

5. Conclusion

Sinonasal surgery may be beneficial in patients with CRC and headaches, however sometimes primary headache, most often migraine, accompany sinonasal pathology. Therefore treatment for patients diagnosed with chronic sinusitis and complaining of headache must be determined in consultation with the neurology clinic.

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