



Nasal Septum Deviation is Not a Cause of Migraine or Tension Headache

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Authors' contributions

This work was carried out in collaboration of all authors. Authors AK and ME designed the study and wrote the protocol. Authors AB and HY looked for septum deviation. Authors AK, HD and SD performed the statistical analysis, managed the literature search and wrote the first draft of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Objective and Aim: Nasal septum deviation (NSD) is an important otorhinolaryngologic cause of headache. We evaluated the frequency of common forms of headache in subjects with NSD.

Methods: All participants underwent examination, 4-mm rigid nasal endoscopy exam. One hundred and eighty six patients (age ≥ 20 years) who had a diagnosis of NSD responded to a questionnaire used by neurologists to diagnose migraine and tension type headache. Migraine symptoms and pain severity were recorded using a 0 to 10 visual analog scale (VAS). Subject's pain severity of tension type headache was evaluated by VAS. To recruit controls, another subjects without NSD were enrolled.

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Results: A total of 97 subjects (52.2%) suffered from headache. In comparison, 63.7% of controls suffered from headache. In both groups, tension headache and migraine were the most common headache types. The groups were similar in terms of headache types ($p > 0.05$).

Conclusion: Nasal or sinus disease can not manifest solely as headache. It seems that the presence of nasal disorders are suggested to have been coincidental in relation to headache. A study involving NSD grading is needed for further clarification.

Keywords: Headache; migraine; tension headache; nasal septum / nasal septum deviation; sinusitis.

1. INTRODUCTION

There are many otorhinolaryngologic causes of headaches, and the most common include various sinus problems, nasal septum deviation (NSD), and variation in the uncinat process or turbinates [1-3]. Termination in the same group of sensory neurons in the sensory nucleus of the trigeminal nerve or mediation of neuropeptides, such as substance P, which is released by mechanical pressure induced in areas of contact between opposing mucosal surfaces (e.g., superior turbinate and nasal septum) may cause migraine-type headache, even without evidence of mucosal disease [1,2]. Some authors have speculated that even in the absence of inflammation of the paranasal sinuses, a headache often results from pressure on the nasal mucosa because of anatomical variation [2]. In short, affected patients may present with severe headache with radiation to the periorbital or facial areas even when active disease of the head and neck or sinonasal region is not found. In one study in which 83.3% of patients showed significant improvement in the severity of headache after surgery, the authors concluded that anatomical abnormalities in the sinonasal region induced headache and that patients with refractory primary headache might benefit from a workup and treatment of their previously undiagnosed rhinologic disorders [3]. During the last 20 years, it has been accepted that nasal secondary headaches are triggered via the trigeminal system by contact points between the lateral nasal bones and the septum [4]. According to the convergence hypothesis, trigeminal system disinhibition is also important in the development of tension headache [5]. Because of these previous studies, we believed that it was important to consider the presence of headache in patients with NSD for both clinical and research purposes. The aim of this study is to evaluate the relationship between NSD and the most common primary headaches which are migraine and tension type.

2. MATERIALS AND METHODS

The goal of this study is to determine the frequency of most commonly seen headache types in subjects with NSD. All subjects attended to Ear-Nose-Throat (ENT) outpatient clinics in every Wednesday during 1-30 May 2010 were evaluated by the same physician. Twenty-five patients refused to participate and 237 patients who completed ENT and neurology examinations. CT was performed to obtain 2.5–3.0-mm axial and coronal studies of the paranasal sinuses if NSD was diagnosed.

All participants have been examined for NSD which was defined as failure of the nasal septum to be in the midline where it is supposed to be. The diagnosis of NSD was ascertained after assimilating information gathered from two sources including physical examination of the external and internal nose using a nasal speculum and the patient's history (i.e. difficulty in breathing, nasal congestion, snoring, sleep apnea). Secondly, they were asked whether they had headache or not during last 1 year. The patients with a history of headache were sent for neurological exam and evaluation of headache which was determined by diagnostic criteria of International Headache Society and types of headache (migraine, tension or the others) were recorded [6]. Visual analog scores (VAS) between 0 and 10, duration of headache (hour per attack), and frequency of headache (how many times per month) for both migraine and tension type headache were evaluated. Thirdly, the participants were divided into two groups: Group I (The patients with NSD) and Group II (The patients without NSD). Lastly, the groups were compared in clinical aspects. Informed consent was obtained from each participant, and the study was approved by the Local Ethics Committee.

2.1 Statistical Analysis

SPSS 11.0 software was used (SPSS Inc., Chicago, IL,USA). Continuous variables were

expressed as mean values +/- SD. Correlations were performed using Pearson's correlation coefficient. Chi-square test was used to evaluate the differences between gender, presence of headache and headache types in each group. The *t*-test was used to evaluate the relative differences between VAS scores, duration of headache and frequency of headache for each type of headache. *P*-values<0.05 was considered statistically significant.

3. RESULTS

As it was seen in Table 1, there were NSDs in 186 patients (78.5%) and 72 of the 186 patients (38.7%) had at least one concha bullosa. One-hundred and twenty-nine subjects (54.4%) were shown to be suffering from any type headache in the participants. Tension headache (n=39), migraine (n=30), sinusitis related headache (n=16), and other headache types (n=6) were diagnosed. Thirty-eight patients (29.5%) complained from headache, but the migraine or tension type headache diagnosis criteria was not met. In both groups, tension headache and migraine were the most common headache types. There were NSD in 97 (75.2%) of these 129 patients, but there was not any statistically significant relationship between presence of NSD and any headache type. When you evaluate the patients in each group, there was not any statistically significant relationship between presence of NSD and any headache type too. Group I and Group II were similar in socio-demographical and clinical aspects (Table 1). The groups were similar in comparison of headaches. In addition, there was no correlation between VAS, duration of headache and frequency of headache, the presence of concha bullosa and presence of septum deviation in both migraine and tension type headache patients.

4. DISCUSSION

Sinusitis, otalgia, neuralgia, and vascular disorders are some well-known causes of headaches related to otolaryngology; there are also some atypical causes, such as those related to the teeth or nasal passages [7,8]. A pneumatized superior concha, NSD, neoplasm, deflexion of the uncinat process, and variation in the ethmoid bone may also result in headache [7,8,9]. NSD is the most commonly encountered sinonasal anatomical anomaly related to headache [2,3]. NSD-related headache is mostly seen in the frontal area, and most treated patients show significant improvement in

headache severity [3]. Migraine-type headache of patients with no nasal symptoms resolves after correction of NSD and weather- or menstruation-related migraine attacks can easily be treated by concha surgery, which is performed to treat NSD in particular [3,9-11].

In fact, nasal or paranasal infections do not result in headache, and nasal congestion is frequent in patients with septum deviations because of vasodilatation of the nasal mucosa [1]. Headaches resulting from disease of the nose or paranasal sinuses are usually associated with congestion, fullness, discharge, or obstruction. However, sinusitis is a very common misdiagnosis in migraine patients without aura. Furthermore, some forms of tension headache can simulate frontal sinusitis. Radiological studies have demonstrated that sinonasal pain often fails to correlate with CT findings [11-13]. However, rhinosinusitis does cause headache in some cases, or can add to other headache forms with an overlap of symptoms [11-13]. Complex mechanisms such as neurogenic inflammation, correlation with migraine, and nasal obstruction due to deformities of the cartilaginous and bony septum are involved in patients with pain [13,14]. Some types of headache of sinonasal origin may be present in the absence of inflammation or infection. Contact points between the lateral nasal wall and the septum could trigger and sustain pain via the trigeminovascular system in migraine or cluster headache [13,14]. Yazici et al. [11] reported that 73.73% of subjects with migraine or tension headache had rhinologic abnormalities, and nasal septal deviation (73.97%) was the most commonly seen abnormality in these patients. A surgical approach to triggering factors related to contact points may be important in patients with nonresponsive headaches, including those with a diagnosis of migraine [10,14-16]. In Yazici et al. [11], 27.39% of patients with rhinological pathologies had headache and they could easily be treated with classic agents. Because of all those reports, the revised International Classification of Headache Disorders included a chapter on headaches attributed to disorder of the nose and sinuses (IHS classification).

However, we found no relationship between migraine or tension headaches and NSD. There were more patients with migraine or tension headaches in Group I, but the difference was not statistically significant. Many patients (n = 38, 29.5%) with nonspecific headaches did not meet the diagnostic criteria for migraines or tension

Table 1. Clinical and socio-demographical findings of the participants

Variable	Group I (n=186)	Group II (n=51)	p value
Age (year)	37.02±13.49	34.37±13.74	0.21
Gender			
Female	96	36	
Male	90	15	
Number of patients with headache (n)	97 (52.2%)	32 (63.7%)	0.17
Number of patients with migraine (n)	24 (12.9%)	6 (11.8%)	0.82
Characteristics of migraine			
Visual analog score	5.33±0.86	5.66±0.81	0.40
Duration (hour)	5.04±1.65	4.33±1.50	0.35
Frequency (how many times/month)	3.04±0.99	3.50±1.22	0.34
Number of patients with tension headache (n)	31 (16.7%)	8 (15.7%)	0.86
Characteristics of tension type headache			
Visual analog score	3.20±1.39	3.71±1.89	0.40
Duration (hour)	4.23±1.38	4.28±0.95	0.35
Frequency (how many times/month)	3.53±1.13	4.00±1.00	0.34
Other types of headache	17 (9.1%)	5 (9.8%)	0.38
Sinusitis	13	3	
Idiopathic stabbing	1	1	
Related to cranial trauma	1	1	
Myofacial	1	0	
Related to eye problem	1	0	
Non-defined headache	25 (25.8%)	13 (25.5%)	0.45

*n: numbers, Group I: The patients with NSD, Group II: The patients without NSD

headaches. Many more patients had nonspecific headaches in Group II, resulting in another comparison problem. Another limitation of our study was the lack of a grading system for NSD diagnosis. In a new report, a septal deviation angle cutoff of 10 degrees was chosen for distinguishing positive from negative for septal deviation and then advised in classification [17]. We made CT exams for all people with NSD but we did not measure shifting and make classification. Supporting our clinical exam findings, we have found that septums deviated at least 4 mm in CT exams of all patients. Regardless, a large cohort study in the literature supports the present findings; in that study, the presence of contact points or other rhinological problems were suggested to have been coincidental in relation to facial pain or migraines [7].

5. CONCLUSION

In conclusion, nasal or sinus disease cannot manifest solely as headache, and headaches around the frontal or eyeball areas are usually migraine or tension headaches, as commonly seen in our study. Of course, rhinological factors may affect pain intensity. It is still not apparent whether headaches provoke rhinological symptoms or rhinological factors result in

migraine or tension headaches. Future studies involving grading in relation to NSD and other rhinological components are needed.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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