

ORIGINAL RESEARCH

Symptoms related to anatomical variations of osteomeatal complex (OMC) in patients with sinonasal symptoms referred to ENT clinic of Loghman Hakim hospital between Sep 2014-Sep 2015

Navid Ahmady Roozbahany¹, Farzad Nikooseresh^{2*} 

1. Assistant Prof. of ENT, Loghman Hakim Hospital, Shahid Beheshti University of Medical Sciences
2. Resident of ENT, Loghman Hakim Hospital, Shahid Beheshti University of Medical Sciences

Address: Department of ENT, Loghman Hakim Hospital, Tehran, Iran. Email: farzad25@gmail.com

Date Received: July, 2017

Date Accepted: August, 2017

Online Publication: December 21, 2017

Abstract:

Introduction: Headache or facial pain, nasal obstruction, nasal discharge, PND and hyposmia or anosmia are all symptoms of rhinosinusitis. Approximately 10% of people will experience these symptoms throughout their lives. Acute and chronic rhinosinusitis causes both symptomatic inflammation of the nasal and sinus mucosa. The role of anatomical variations of osteomeatal complex (OMC) in development of these symptoms has so far been discussed. The purpose of this study is to determine the frequency of these disorders in the target population and determine their possible role in the occurrence of sinonasal symptoms.

Material and Methods: This is a descriptive cross-sectional study in which patients with sinonasal symptoms referred to the ENT clinic of Loghman Hakim hospital during the period of September 2014 to September 2015 were enrolled in the study and their CT scan in the coronal view, reviewed for the existence of different anatomical variations of osteomeatal unit. Their symptoms were recorded in the table of symptoms. At the end of the study, we searched for any relation between anatomical variation of OMC and sinonasal symptoms.

Results: A total of 100 patients were enrolled in the study, of which 66 were female and 34 were male. The most common symptoms in these patients were nasal obstruction 72%, headache 67%, nasal discharge 31% and hyposmia 29%. Nasal anatomical variations were also prevalent: nasal deviation 49.57%, nasal spur 25.21%, concha bullosa 23.5%, and Infraorbital cell 1.6%.

Conclusion: The incidence of headache was higher in a group of patients with septal deviation than those with other anatomical variations and this difference was significantly higher in the group with septal spur and septal deviation at the same time than other anatomical variants. The incidence of nasal obstruction in patients with septal deviation and patients with septal deviation and septal spur at the same time was significantly higher than other variations. There was no statistically significant relationship with the effect of other anatomical variations on sinonasal symptoms.

Keywords: Rhinosinusitis, Anatomical variation, Osteomeatal complex, Sinonasal symptoms

Introduction:

The nasal cavity continues from the nasal holes in the anterior to the posterior holes (choanes) and is divided into two right and left nasal cavities through the nasal septum.

Acute and chronic rhinosinusitis triggers both symptomatic inflammation of the nasal and sinus mucosa, and the differentiation of both is based on the duration of symptoms (1). Headache or facial pain, nasal congestion and nasal obstruction, nasal discharge, posterior nasal discharge (PND), and hyposmia are all major diagnostic criteria for rhinosinusitis, and approximately 10% of people will experience these symptoms continuously or alternately through out life (1,2).

Nasal cavity anatomy varies from person to person. Some anatomical variations are more common in people, and even more often in patients with chronic inflammatory disease of the nose and sinus (rhinosinusitis) (1,2,5,6). The frequency of different anatomical variations in the nasal cavity in various societies has been studied over and over again (1,2,5,6). Concha bullosa is a pneumatized turbinate of the nose and usually occur in the middle turbinate. Concha bullosa can obstruct middle meatus or infundibulum. The asymmetric curvature of the nasal septum from the lateral side (septal deviation) can cause pressure to the middle turbinate and narrow the middle meatus. Septal spur is often associated with septal deviation, causing more disruption of the osteomeatal complex (1,2,5,6). The significance of these anatomical variations is due to their association with the passage of air in the nose. If these variations cause reduction of air flow in nasal cavities or nasal obstruction, a sinusitis may occur. However, this relationship has never been proven (2,4,5,6).

The role of sinus disease in developing chronic headaches is widely accepted, but there is not enough scientific evidence for this theory (4). The relationship between anatomical changes of the nose and headache is studied in the articles and the causes involved in this relationship are wider than the simple deviation of nasal septum and turbinate, which causes mechanical stimuli through contact between these two walls. Infection and Inflammation has association with migraine and the role of nasal obstruction have been proven in this regard (4,8).

The sinuses do not have pain. However, the nasal mucus and the Osteomeatal unit can both

cause pain in the nose and sinus. Also, the sinuses can cause referral pain in many areas of the face and head. The anatomical interface between sinonasal problems and headache is a pair of nerve V (trigeminal). This nerve sends sensory signals to the nasal cavity and paranasal sinuses, but it also carries out pain-sensitive structures in the cavity of the brain such as dura and blood vessels. This causes referral headache (7).

Maru et al. examined 61 patients with chronic rhino sinusitis (CRS) and the most common variations are: septal deviation 55.7%, concha bullosa 42% and haller cell 36% (2).

Wani et al. reviewed coronal CT scan of 150 patients with CRS that undergoes endoscopic surgery and 30% of them had septal deviation and 25% had concha bullosa (5).

Bolger et al. reviewed 202 patients with and without CRS for anatomical variations of nasal cavity and there was no significant difference between two groups (13).

Pruna et al. reviewed 85 patients with CRS, which 88.2% of them had septal deviation and 67.2% of them had concha bullosa (15).

Kaygusuz et al. reviewed 91 patients for anatomical variation in nasal cavity that 65 of them had CRS and 34 of them were in the control group and at the end of study there were no significant difference between two groups (16).

Material and Methods:

We designed a descriptive cross-sectional study, in which all patients referred to the ENT clinic of Loghman Hakim hospital who had sinonasal symptoms enrolled the study. After obtaining informed consent, patient undergoes nasal endoscopy and their CT scan was examined in the coronal view. According to the Lund Mackay score scoring system, the patient's assessment form for them was full and the information was classified. Patients who had nasal polyposis in their nasal endoscopy and whose symptoms were due to polyposis were excluded. A total 100 patients were selected for the study at last.

Results:

Sixty-six of a total 100 patients were female and 34 were male. Youngest patient was 18 and oldest one was 76 and the mean age of

participants were 42.3 with the standard deviation of 14.5.

Most common anatomical variation of OMC were septal deviation 49.57%, septal spur 25.21%, concha bullosa 23.5% and haller cell 1.6%. concha bullusa was seen in 12 men (42.8%) and 16 women (57.2%), septal deviation in 12 men (42.3%) and 40 women (57.66%), septal spur in 10 women (33.33%) and 27 men (66.66%) and both of the infraorbital cells were seen in women.

The most common symptom in our study were nasal obstruction 72%, headache 67%, posterior nasal discharge (PND) 31%, hyposmia 29% and nasal discharge 19%. 71.66% of patients with headache are female and 28.33% are male, 61.11% of patients with nasal obstruction were female and 38.88% were male, 57.81% of patients with nasal discharge were female and 42.18% were male. From 68 patients who complain of headache in this study 53.7% locate it in frontal area, 43.2% in medial cantus or retro-orbital area, 10.4% in face, 7.4% in lateral cantus area and 5.9% in temporal area.

Conclusion:

Rhinosinusitis is a group of disorders that can cause symptoms by inflammation in the paranasal sinus mucosa. The most common symptoms are pain or pressure in the face, nasal congestion, nasal discharge, posterior nasal discharge (PND) and headache. Pathogenesis of acute rhinosinusitis are typically related to infectious processes. However, in chronic rhinosinusitis, the interaction of viruses, bacteria, allergies, fungi, and other external substances with sinonasal epithelium leads to sustained mucosal inflammation and signs (13).

Mucosal clearance is the first line to defend sinuses from infection, and anything that disrupts the mucosal clearance of the sinuses can increase the risk of infection, exacerbate inflammation and symptoms. Acquired obstruction of the ostiomeatal complex, either through prior trauma or infection, is a well-established cause of CRS, typically CRSsNP (17). The presence of anatomical disorders that disturbs the normal clearance of the ostiome-

atal unit has been studied and criticized in several studies. However, researchers have not been able to show an increased prevalence of anatomic variants in patients with CRS versus controls (13,14,15).

In the previous epidemiological studies, the prevalence of sinonasal symptoms was higher in women than in men. In this study, 66% were female and 34% were male. The youngest patient in our study was 18 years old and the oldest was 76 years old. The mean age was 42.3 with a standard deviation of 14.5.

Concerning the prevalence of anatomical anomalies in the ostiomeatal unit in individuals with rhinosinusitis, there were many studies in different societies and races, and in the current study, septal deviation with 49.57% was the most common disorder. In previous studies, prevalence of septal deviation was 55.7 (1), 25% (5), 62.5 (14) and 88.2% (15) were reported. The prevalence of concha bullusa in the target population of the study was 25.21% versus 42% (2), 47.5% (14), 76.2% (15) and 30% (16) in previous studies. Only two of our patients had infraorbital cell (1.6%) and septal spur was noted in 25.21% of patients.

The concha bullusa was seen in 12 men (42.8%) and 16 women (57.2%), septal deviation in 12 men (42.3%) and 40 women (57.66%), septal spur in 10 women (33.33%) and 27 men (66.66%), and both of the infraorbital cells were seen in women.

The incidence of headache was higher in a group of patients with septal deviation than those with other anatomical variations, and this difference was significantly higher in the group with septal deviation and septal spur at the same time than other anatomical variations. However, there was no significant difference in the incidence of other sinonasal symptoms in association with anatomical variations.

The incidence of nasal obstruction in patients with septal deviation and the patients with septal deviation and septal spur together were significantly higher from other variations.

Conflict of interests

Authors declare no conflict of interests.

Relationship between anatomical variations and sinonasal symptoms

	Head ache	Nasal Obstruction	Nasal discharge	PND	Hyposmia
Concha Bullosa	19.3%	18.6%	13.4%	15.7%	11.4%
Septal Deviation	53.4%	50%	51.6%	47.3%	54.2%
Septal Spur	25%	30.4%	32.25%	34.2%	31.4%
Haller cell	2%	1%	3.1%	2.6%	2.8%
Total	100%	100%	100%	100%	100%

References:

1. Adeel M , Rajput MS, Akhter S, Ikram M, Arain A, Khattak YJ : Anatomical variations of nose and paranasal sinuses; CT scan review, J Pak Med Assoc. 2013 Mar;63(3):317-9..
2. Y.K.Maru ,V.Gupta : Anatomic variations of the bone in sinonasal CT , Indian Journal of otolaryngology and head and neck surgery Vol,53 No.2 april-June 2001.
3. Hatipoğlu HG, Cetin MA, Yüksel E. Concha bullosa types: their relationship with sinusitis, ostiomeatal and frontal recess disease. Diagn Interv Radiol. 2005;11 (3): 145-9.
4. Carlotta Pipolo ,Sara Portaleone ,Giovanni Felisati : Nose and headache: what have we learned?, Neurol Sci (2011) 32 (Suppl 1):S131–S133.
5. Asif A. Wani ,Sohit Kanotra ,Mohammad Lateef , Rafi q Ahmad ,Sajad M. Qazi ,Shawkat Ahmad : CT scan evaluation of the anatomical variations of the ostiomeatal complex,Indian Journal of otolaryngology head&neck surgery (July-September 2009)61:163-168.
6. Satheesh Kumar Bhandary _ Shrinath D. Kamath P : Study of relationship of concha bullosa to nasal septal deviation and sinusitis, Indian Journal of otolaryngology head&neck surgery(July-September 2009)61:227-229.
7. Roger K. Cady, MD, and Curtis P. Schreiber : Sinus Problems as a Cause of Headache Refractoriness and Migraine Chronification , MDotolaryngol Clin North Am 2004, **37**:267–288
8. Nick S. Jones, MD, FRCS : Midfacial Segment Pain: Implications for Rhinitis and Sinusitis,. Current Allergy and Asthma Reports 2004, 4:187–192.
9. Mohammad Sadeghi•Babak Saedi•Yasser Ghaderi : Endoscopic Management of Contact Point Headache in Patients Resistant to Medical Treatment,. Indian J Otolaryngol Head Neck Surg(August 2013) 65(Suppl 2):S415–S420.
10. Jeferson Cedaro de Mendonça , Ivo Bussoloti Filho : Craniofacial pain and anatomical abnormalities of the nasal cavities, Rev Bras Otorrinolaringol.V.71, n.4, 526-34, jul./aug. 2005.
11. Hopkins C, Browne JP, Slack R, Lund V, Brown P : The Lund-Mackay staging system for chronic rhinosinusitis: how is it used and what does it predict? Otolaryngol Head Neck Surg. 2007 Oct;137(4):555-61.
12. Navid Ahmady Roozbahany,Semiramis Nasri: Nasal and paranasal sinus anatomical variations in patients with rhinogenic contact point headache, Auris Nasus Larynx 40 (2013) 177–183.
13. Satish Nair: Correlation between symptoms and radiological findings in

- patients of chronic rhinosinusitis: a modified radiological typing system; *Rhinology*, 47,181-186, 2009
14. 14.Mecit Kantarci, R. Murat Karasen, Fatih Alper,Omer Onbas, Adnan Okur, Adem Karaman: Remarkable anatomic variations in paranasal sinus region and their clinical importance; *European Journal of Radiology* 50 (2004) 296–302
 15. 15.Xavier Pruna: Morpho-functional evaluation of osteomeatal complex in chronic sinusitis by coronal CT; *Eur Radiol* (2003) 13:1461–1468 DOI 10.1007/s00330-002-1644-3
 16. 16.Ahmet Kaygusuz • Mehmet Haksever •Davut Akduman • Suñdu.Aslan • Zeynep Sayar: Sinonasal Anatomical Variations: Their Relationship with Chronic Rhinosinusitis and Effect on the Severity of Disease—A Computerized Tomography Assisted Anatomical and Clinical Study; *Indian J Otolaryngol Head Neck Surg* (July–Sept 2014) 66(3):260–266
 17. 17.R. K. Mundra • Yamini Gupta • Richi Sinha • Alaknanda Gupta: CT Scan Study of Influence of Septal Angle Deviation on Lateral Nasal Wall in Patients of Chronic Rhinosinusitis; *Indian J Otolaryngol Head Neck Surg* (Apr–Jun 2014) 66(2):187–190