THE INFLUENCE OF NASAL SEPTUM DEFORMITY DEGREE ON SUBJECTIVE NASAL BREATHING ASSESSMENT

UTICAJ STEPENA DEFORMITETA NOSNE PREGRADE NA SUBJEKTIVNU OCENU DISANJA NA NOS

Slobodan SAVOVIĆ1,2, Vladimir KLJAJIĆ1,2, Maja BULJČIK ĆUPIĆ4,2 and Ljiljana JOVANČEVIĆ1,2

Summary

Introduction. The aim of this paper is to determine the influence of nasal septum deformity degree on the subjective nasal breathing assessment as well as the existence of correlation between one side of the nose with nasal septum deformity and the subjective feeling of difficulty in breathing on that side in the subjects with different degrees of nasal septum deviation. Material and Methods. The research included 90 randomly chosen patients, who claimed to have nasal breathing difficulties. Every patient assessed subjectively which side of the nose made breathing difficult and scored the breathing on that side from 0 to 10 cm on the visual analogue scale. Results. The patients from the third group described their breathing as the most difficult, while the subjects from the first group claimed that their nasal breathing problems were the least difficult. The subjective feeling of heavy nasal breathing on the deformed nasal septum side was significantly different in all groups (H = 38.466, p = 0.000). In the second and the third group of patients there was a significant correlation between the deformed side of the nose and the subjective heavy breathing on that side (p < 0.05), whereas this correlation was not found in the first group (p > 0.05). Conclusion. The subjective feeling of difficulty in breathing on the deformed side of the nose is intensified with the degree of the nasal septum deformity, thus this feeling was reported only by the subjects with a higher degree of the nasal septum deformity. Key words: Nasal Septum + abnormalities; Respiration; Self-Assessment; Nasal Obstruction; Diagnosis; Tomography, X-Ray Computed

Sažetak.

Uvod. Cilj ovog rada bio je da se utvrdi da li postoji uticaj stepena deformiteta nosne pregrade na nos pregrade na subjektivnu procenu disanja na nos, kao i da li postoji podudarnost između strane nosa sa deformitetom nosne pregrade i subjektivnog osećaja težeg disanja na tu stranu nosa. Materijal i metode. Istraživanjem je obuhvaćeno ukupno 90 bolesnika, koji su se žalili na otežano disanje na nos. Svaki bolesnik je subjektivno određio stranu nosa na koju teže diše i svoje disanje na nos je procenio na vizuelnoj analognoj skali od 0 do 10 cm. Rezultati. Bolesnici treće grupe su subjektivno proce- njuju kao najtežu, dok ispitanici prve grupe subjektivno imaju najmanje tegobe kada je disanje na nos u pitanju. Subjektivna ocena disanja na nos na stranu gde postoji deformitet nosne pregrade značajno se razlikuje između svih grupa (H = 38,466, p = 0,000). U drugoj i trećoj grupi ispitanika postoji podudarnost između strane nosa na kojoj se nalazi deformitet nosne pregrade i subjektivno težeg disanja na tu stranu nosa (p < 0,05), dok u prvoj grupi ovu podudarnost nije nađena (p > 0,05). Zaključak. Sa porastom stepena deformiteta nosne pregrade raste i subjektivni osećaj težeg disanja na tu stranu nosa. Poklapanje strane nosa na kojoj se nalazi deformitet nosne pregrade i subjektivnog osećaja težeg disanja na tu stranu nosa postoji samo kod ispitanika sa izraženijim stepenom deformiteta nosne pregrade. Ključne reči: Nosna pregrada + deformiteti; Disanje; Samo-procena; Nosna opstrukcija; Dijagnoza; CT

Introduction

Heavy nasal breathing is one of the most common reasons why patients go to otorhinolaryngologists [1]. Nasal breathing difficulties result either from mechanical changes inside the nose (the most common being nasal septum deformity, anatomic structure variations in the medium nasal meatus as well as tumorous changes in the nose) or from nasal mucous membrane swelling (most commonly inflammatory changes of diverse etiology). Nasal septum deformities (NSD) can be associated with nasal pyramid deformities, or they can occur individually [2, 3].

Blaugrund [4] has found clinically significant nasal septum deformities in 20% of the general population, while Yang-Gi et al. [5] have given an accurate description of 22.38% of the general population in Korea, most commonly in men and the elderly. There is a great diversity regarding nasal septum deformity classification. Kamami et al. [6] classify them according to the size of the obstruction of the particular half of the nose, while Kaya-
lioglu et al. [7] are of the opinion that the nasal septum is always deformed when its deviation from the middle facial line exceeds 3 mm at any point. Collet et al. [8] assess the significance of nasal septum deformity on the basis of any contact of nasal septum mucous membrane with the lateral wall mucous membrane before or after anemisation of the mucous membrane of the nose. Harar et al. [9] and Elahi and Frenkel [10] classify nasal septum deformities based on computed tomography (CT) findings, determining the angle that is covered by the line from crista galli to spina nasalis anterior interior and the line drawn from crista galli to the point where the biggest nasal septum deformity is. Ingo and Helmut Baumann [11] have given a classification of nasal septum deformity on the basis of its leading and accompanying anatomic change. Within this division, they have described the accompanying changes on lower and medium nasal conchae.

In some patients, clinical findings of anterior rhinoscopy correlate greatly with the subjective nasal breathing assessment, while in other patients it is not the case [1]. According to the clinical practice, there are patients who have manifest nasal septum deviation but have no breathing difficulties whatsoever, while there are patients with no deviations who suffer from nasal breathing difficulties.

The aim of this paper is to determine the influence of nasal septum deformity degree on the subjective nasal breathing assessment as well as the existence of a correlation between one side of the nose with nasal septum deformity and the subjective feeling of difficulty in breathing on that side in the subjects with different degrees of nasal septum deviation.

**Material and Methods**

The research included 90 randomly chosen patients, 26 women and 64 men who claimed to have nasal breathing difficulties. The patients who had any other nasal ailment besides nasal septum deformity were excluded from the study because its presence could have a direct influence on their subjective feeling of breathing difficulties. The average age of the examined patients was 31.12 years. On the basis of nasal septum deformity, the subjects were divided into three groups (30 patients in each group). The first group (I) included the patients with the deformity that was less than 10°. In the second group of patients (II), the degree of nasal septum deformity was from 10° to 15°. The third group (III) consisted of the patients with nasal septum deformity that was greater than 15°. The degree of deformity was determined by CT of the nose as an angle consisting of the line drawn from crista galli to spina nasalis interior inferior and the line drawn from crista galli to the point of the greatest degree of the deformity. The value of nasal septum deformity was expressed in whole numbers. Every patient subjectively assessed the side of the nose which made breathing difficult and it was compared with clinical and CT findings. Afterwards, the patients subjectively assessed their breathing on that side from 0 to 10 on the visual analogue scale (VAS), where 0 is no nasal breathing difficulties at all and 10 marks not being able to breathe on the side where deformity is. Mann-Whitney and Kruskal-Wallis test was used for statistical analysis.

**Results**

Subjective nasal breathing on the deformed nasal septum side was significantly different in all groups (H = 38.466, p = 0.000). The patients from group III described their breathing as the most difficult, while the subjects from group I claimed that their nasal breathing problems were the least difficult. Between the first and the second group of patients the values were Z = 3.648, p = 0.000; between the first and the third group of patients the values were Z = 5.042, p = 0.000; while the results of comparing the second and the third group were the following: Z = 4.297, p = 0.000 (Table 1).

In the second and the third group of patients there was a significant correlation between the deformed side of the nose and a subjective heavy breathing on that side (p < 0.05), while this correlation was not found in the first group (p > 0.05) (Table 2).

**Discussion**

The average age of our subjects was 38.6 years, with male patients being in majority (70.83%), which is in accordance with the results of other authors [6, 12, 13].

Nasal obstruction is the leading symptom in 15% of British outpatients who visit their ear, nose

**Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAS</td>
<td>visual analogue scale</td>
</tr>
<tr>
<td>CT</td>
<td>computed tomography</td>
</tr>
<tr>
<td>ENT</td>
<td>ear, nose, throat</td>
</tr>
<tr>
<td>NSD</td>
<td>nasal septum deformity</td>
</tr>
</tbody>
</table>

**Table 1. Subjective nasal breathing assessment on the side with a nasal septum deformity**

<table>
<thead>
<tr>
<th>Group/Grupa</th>
<th>Side with nasal septum deformity/Strana sa deformitetom nosne pregrade</th>
<th>Average value/Prosečna vrednost</th>
<th>SD</th>
<th>Median/Mediana</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1.84</td>
<td>1.30</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>3.57</td>
<td>1.22</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>6.83</td>
<td>1.54</td>
<td>7.00</td>
<td></td>
</tr>
</tbody>
</table>
and throat (ENT) doctors [14], while Viano-Mattila [15] states that 200 patients, who visited their otorhinolaryngologists for other reasons primarily, complained of temporary or permanent nasal breathing difficulties as well. Since numerous reasons can lead to heavy breathing, it is very difficult to determine the real reason of this disorder on the basis of sheer clinical examination. Only in the patients in whom mucous component as well as tumorous changes and anatomic variations of the medium conchae (which are exclusively described as anatomic variation causes of heavy breathing) are excluded as a culprit [16, 17], it can be said that if there is a nasal septum deformity, it really is the major cause of heavy nasal breathing. The definition of septum deviation is not standardized. It is subjective and restrictive because it is limited in the space and ignores the possibility of bilateral deviation [8]. Despite the fact that nowadays we have numerous objective methods to assess nasal breathing function, the subjective nasal breathing assessment is still the most relevant, and it is implemented as a method in indications for surgical procedures to cure nasal septum deformities as well as the evaluation of post surgical results [18–20].

Our results show that there is, among the examined groups with the rise of deformity degree, statistically significant heavy breathing more difficult breathing on the side of the nose where the deformity is; in every group p < 0.001. As for the correlation between the deformed side of the nose and subjective nose breathing assessment by the examined patients, it was found to be p < 0.05 in group II and III with a bigger nasal septum deformity, whereas it was not found in group I with the lowest degree of deformity, p > 0.05. Sipila et al. reported the same results, but they had implemented different methodology [21]. Namely, they found that there was a correlation between the side of subjective nasal breathing and the side with the actual nasal septum deformity only in patients with greater degrees of nasal septum deformity i.e. when the difference in the airflow resistance between the sides of the nose was at least 60–70%. While examining nasal breathing function, Badrkić [22] concluded that subjective nasal breathing assessment did not correlate with objective findings as well as that patients were aware of their nasal breathing improvement after rhinoplasty; however they were not able to give a precise assessment.

## Conclusion

The subjective feeling of difficulty in breathing on the deformed side of the nose is intensified with the degree of the nasal septum deformity; thus, this feeling was reported only by the subjects with a higher degree of nasal septum deformity.

## References

12. Naito K, Miyata S, Saito S, Sakurai K, Takeuchi K. Comparison of perceptual nasal obstruction with rhinoman-
metric and acoustic rhinometric assessment. Eur Arch Otorhino-


Rad je primljen 6. X 2014.
Recenziran 10. X 2014.


