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Assessment of Relationship Between Sleep Position and Nasal Septum Deviation with Polysomnographic Data

Abstract

Objective: The aim of this study was to investigate the relationship between septum deviation and sleeping position in patients with nasal septum deviation.

Methods: The study included 25 patients with nasal septum deviation on the right side, 25 patients with septum deviation on the left side, and 25 patients without septum deviation as the control group. The polysomnography reports of these patients were assessed retrospectively, and the spans of rest in the right, left, and supine positions were evaluated.

Results: The right side-lying time was significantly longer than the left side-lying time in the group with right side deviation ($P < .01$). In the group with left sided septal deviation, the left side-lying time was significantly longer than the right side-lying time ($P < .01$). There was no significant difference between the 2 side-lying periods ($P = .118$). Moreover, the ratio of sleep duration in the supine/non-supine position in the groups with deviation was significantly higher than that in the control group.

Conclusion: The results of our study showed that patients with nasal septum deviation slept more in the supine position than those without deviation and slept more on the deviated side when sleeping in the non-supine position.

Keywords: Nasal septum, sleeping habits, polysomnography

Introduction

Sleep, in which people spend one-third of their lives on average, is a dynamic process that significantly affects health.[1] We begin our sleep in a particular position and change positions voluntarily or involuntarily to put our body in a relaxed state. Various studies have shown that an adult person changes their position between 11 and 45 times on average during an 8-hour sleep period.[2-4] The most common sleeping position in healthy adults is the side-lying position.[2]

The nasal mucosa is a dynamic tissue that is controlled by the autonomic nervous system. The process in which both nasal cavities enter the congestion and decongestion period sequentially is called a nasal cycle, and 70% of the population is known to experience it.[5] The presence of pathologies such as unilateral nasal septum deviation increases nasal airway resistance and decreases airflow when the side of nasal cavity without deviation enters the congestion period.

The nose is responsible for approximately half of the upper respiratory tract resistance.[6] Nasal airway resistance may vary according to the position of the body and is higher in the lying position than in the sitting position.[7] In the side-lying part, the nasal passage opening on the lying side decreased, while the lumen of the contralateral nasal passage increased.[8]

In light of this information, we planned this study based on the hypothesis that patients with nasal septum deviation would prefer to lie on the side of the deviation because their open nasal cavities could become obstructed due to congestion if they lie on the side opposite to the deviation. Therefore, they will experience breathing difficulty.

Methods

In this study, files of patients aged between 18 and 65 who underwent polysomnography in a tertiary hospital between January 1, 2019, and November 30, 2020, were retrospectively reviewed. Polysomnography was performed using a 31-channel ALICE 6 LDe device (Respironics, Murrysville, PA, USA). The Helsinki Declaration rules were adhered to during the

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study, and the Yozgat Bozok University clinical research ethics committee approved the study (2017-KAEK-189_2021.02.10_01). Written informed consent was obtained from all patients.

Patients underwent ear, nose, and throat examinations and were divided into 2 groups: group 1 included 25 patients with septal deviation on the right side, and group 2 included 25 patients with septal deviation on the left side. In addition, 25 patients without septum deviation were included in the control group. Patients with obstructive nasal diseases such as nasal polyps, concha hypertrophy, allergic rhinitis, and previous nasal surgery were excluded from the study.

Demographic data, such as age and sex, were obtained from the patient files. Patients' polysomnography reports were examined, and their total length of stay, duration in the supine position, and right and left side-lying times were recorded. The relationship between septum deviation and sleeping positions of the patients was examined.

Statistical Analysis

Statistical Package for the Social Sciences (SPSS) version 21.0 (IBM SPSS Corp.; Armonk, NY, USA) was used for all data analyses. Demographic data comparison between the groups was assessed using one-way analysis of variance. The chi-square test was used to analyze the categorical data. An independent-samples *t*-test was used for statistical comparison of data that matched normal distribution, and the Mann-Whitney U test was applied to compare data without normal distribution between the groups. In the same group comparison, a paired *t*-test was used for normal distribution and the Wilcoxon test for non-normal distribution. Descriptive data are presented as mean ± standard deviation. Statistical significance was set at $P < .05$.

Results

No statistically significant differences were found between the groups in terms of age and sex ($P = .249$ and $P = .852$, respectively). Demographic data of the groups are shown in Table 1.

The mean right side-lying time and left side-lying time for group 1 was 173.66 ± 73.31 and 32.75 ± 30.94 minutes, respectively. In this group, the mean right side-lying time was significantly longer than the mean left side-lying time ($P < .001$).

In group 2, which had left side deviation, the mean left side-lying time and right side-lying time were 133.06 ± 56.65 and 26.14 ± 27.78 minutes, respectively. The average left side-lying time was significantly longer than the average right side-lying time ($P < .001$).

The mean right side-lying time and left side-lying time for the control group were 130.60 ± 48.94 and 113.60 ± 40.93 minutes, respectively. Although the mean right side-lying time was longer than the mean left side-lying time in this group, the difference was not significant ($P = .118$). The groups' mean duration of sleep on the right and left sides are shown in Table 2.

The mean supine/non-supine sleep duration ratio of groups 1 and 2 (40.84 ± 21.25 and 43.54 ± 23.04, respectively) was higher than that of the control group (24.52 ± 19.16) ($P < .05$ and $P < .05$, respectively). There was no significant difference between groups 1 and 2 in the supine/non-supine sleep duration ratios ($P = .669$).

Discussion

Many factors affect the sleeping position. Children prefer to sleep more in the prone position compared with adults. A significant majority of adults sleep in the lateral lying position, and the frequency of lying in the supine position increases in the elderly population.[9] Obese individuals and pregnant women prefer to sleep in the supine position.[10] On the other hand, the results of our study show that patients with nasal septum deviation prefer to lie on the side of the deviation during side-lying.

Studies have shown that sleeping position has significant effects on many physical and mental disorders.[9,11,12] In a study conducted with young adults, it was revealed that those with poor sleep quality sleep more in the supine position compared with those with good sleep quality.[13] In addition, bedmates of people who snore report that they snore louder while lying on their back and that snoring decreases during side-lying. Although there is no consensus on the healthiest sleeping position, it is thought that side sleeping has more advantages considering the worsening effect of the supine position on respiratory function during sleep.[4] In our study, the total side-lying time was shorter in patients with nasal septum deviation than in patients without deviation owing to shorter side-lying time on the side opposite to deviation. According to our study results, it may be thought that

Table 1. Patient Characteristics

Parameter	Group 1	Group 2	Control group	*P*
Gender, n (%)				
Male	13 (52)	12 (48)	14 (56)	.852
Female	12 (48)	13 (52)	11 (44)	
Age, mean ± SD, years	52.36 ± 8.95	48.52 ± 9.51	48.12 ± 10.92	.249

SD: standard deviation.

Table 2. The Groups' Mean Duration of Sleep on the Right side and Left side

Groups	Right side sleep duration (minutes, mean ± SD)	Left side sleep duration (minutes, mean ± SD)	*P*
Group 1	173.66 ± 73.31	32.75 ± 30.94	<.001
Group 2	26.14 ± 27.78	133.06 ± 56.65	<.001
Control group	130.60 ± 48.94	113.60 ± 40.93	.118

SD: standard deviation.

respiratory sleep problems may be seen more frequently in patients with septum deviation owing to the longer sleep time in the supine position.

Increased airway resistance can cause snoring and sleep apnea, and nasal congestion is a common problem in patients with snoring and obstructive sleep apnea. Many studies have found a connection between nasal obstruction and sleep apnea.[14,15] A survey conducted by Virkulla et al.[16] showed that nasal obstruction is an independent factor that increases the severity of obstructive sleep apnea in individuals without obesity. It is known that patients with obesity prefer to sleep in the supine position, which increases the severity of obstructive sleep apnea by creating a negative effect on respiratory parameters.[17] In our study, patients with nasal septum deviation preferred to sleep more in the supine position compared with those without septum deviation. Although we did not examine patients with obesity and those without obesity separately, considering that patients with obesity already sleep more in the supine position, it can be thought that the effect of septum deviation on increasing sleep time in the supine position may be even more prominent in patients without obesity. In the stud by Virkulla et al.[16], the researchers did not evaluate patients with septum deviation in the duration of lying in the supine position. Conducting prospective research to assess the effect of septum deviation on sleeping position in patients without obesity will significantly contribute to the literature.

Septum deviation is known to have adverse effects on the sleep quality.[18] Sleeping positions also affect sleep quality, and frequent changes in sleeping positions negatively affect sleep quality.[19,20] According to our study results, patients with septum deviation lie in a position opposite to their deviation for a short time. Considering this situation, it can be concluded that they change their sleeping position more frequently. This may be one of the reasons why patients with septum deviation have poor sleep quality. Conducting new studies investigating the frequency of changing sleeping positions in patients with nasal septum deviation will clarify this issue.

In conclusion, although there is a clinical observation that patients with septum deviation lie on the deviation side, we have not encountered any study in the literature that proves this observation with an objective method. Our study is the first to present this observation with an objective evaluation such as polysomnography. Conducting prospectively planned studies with a larger patient population will add valuable information to the literature.

Ethics Committee Approval: Ethics committee approval was received from the Yozgat Bozok University clinical research ethics committee (2017-KAEK-189_2021.02.10_01).

Informed Consent: Written informed consent was obtained from all patients who participated in this study.

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