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ORIGINAL ARTICLE

Does Congenital Nasal Septal Deviation have an Influence on the Blood Count?

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ABSTRACT

Aim: To investigate the impact of chronic hypoxia due to congenital septal deviation on the blood count.

Materials and methods: The study was retrospective and included 213 patients of both sexes, 141 patients in the study group and 72 controls. The study group consisted of patients with congenital septal deviation. They were healthy and did not have additional obstructive sleep apnea syndrome (OSAS) and any other kind of disease nor were taking medications that could have an influence on the blood count. Patients were divided into groups according to their smoking, alcohol, and drug habits. Septal deviations were classified using Mladina classification. In testing blood count the count of red blood cells, hemoglobin, hematocrit, and number of platelets were considered.

Results: In the tested group, there were 63.83% of men and 36.17% of women. The median age was 32. The results of the blood count of the patients who were operated because of the marked septal deviation did not differ from the results of the blood count of the control group. There was no statistically significant difference even in one parameter: Red blood cells count, hemoglobin, hematocrit, and platelets count.

Conclusion: Nasal septal deviation, which is operated at the ear, nose, and throat (ENT) departments, is mostly a problem of quality-of-life. It affects patient's everyday living and disturbs him/her in doing their daily activities. However, serious consequences that affect the blood count and could have an impact on the patient's other systems could not been seen.

Clinical significance: This work is important because of the increasing number of studies that are being carried out, which are attempting to find a correlation between chronic hypoxia due to septal deviation and cardiovascular diseases. With this study, we wanted to show that, in simple cases of nasal septal deviation, there does not exist marked chronic hypoxia that could have an impact on the blood count, specifically in the number of platelets and red blood cells.

Keywords: Blood platelets, Erythrocyte count, Hematocrit, Hemoglobin, Nasal obstruction, Nasal septum, Other study, Platelet count.

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INTRODUCTION

Impaired nasal breathing is mostly caused by nasal septal deviation. The smaller the deviation the less-impaired is the nasal breathing. Marked septal deviation leads to chronic nasal obstruction. This further causes increased resistance of upper respiratory tract, which causes chronic hypoxia and hypercarbia due to alveolar hypoventilation. This leads to increased risk for hypercoagulopathy.[1]

Chronic hypoxia can be responsible for oxidative stress, inflammation, atherosclerosis, endothelial dysfunction, and hypertension.[2,3] It is associated with heart failure, pulmonary hypertension, cardiac arrhythmias, acute myocardial infarction, and stroke.[4,5] Intermittent obstruction of the airways and desaturation cause changes in the autonomic nervous system. This also leads to cardiovascular morbidity.[6]

Chronic hypoxia affects the blood count. In order to compensate for the low oxygen levels and inadequate tissue oxygenation, the number of red blood cells elevates. Also, the hemoglobin and hematocrit levels increase.[7,8] The number and the function of platelets are changed. Platelet function is increased and aggregability and hypercoagulability of the blood are higher.[9,10] The main indicator of platelet function is the mean platelet volume (MPV). It presents one of the platelet activation indices, which reflect the platelet production rate.[11] The larger the platelets are, the higher are their function and activity and the higher their prothrombotic potential is. In hypoxic conditions, the MPV level increases and platelet level decreases.[11,12] The MPV and platelet levels were researched in a number of studies in order to find a relationship between their changes in hypoxic conditions and impact of such a condition on cardiovascular status of patients.[13-16]

In this study, we focus on the effect of chronic hypoxia due to the marked septal deviation on the blood count, i.e., the number of red blood cells, hemoglobin, hematocrit, and number of platelets, while those parameters are mostly changed in hypoxic conditions.[7,8,11,12]

We want to know if there is a possibility that changes in blood count could be a result of hypoxia due to septal deviation, and could these changes help to distinguish patients, who are candidates for septal surgery.

MATERIALS AND METHODS

The study was retrospective and included patients operated at the tertiary care university hospital in a period of 1 year. There were 213 patients of both sexes included in the study, 141 patients in study group and 72 controls. Groups were formed so as to get homogeneity.

In the study group, patients with congenital septal deviation, i.e., those who did not have any information about nose trauma, but had nasal septal deviation were included. Patients who had had previous nose or face trauma just like patients with OSAS were excluded from the study. Also excluded were patients who had blood, heart, chronic lung, kidney, bone marrow or inflammatory diseases, or were taking some drugs that could have an influence on the results of the blood count. This implies that patients were generally healthy, but only had impaired nasal breathing due to the nasal septal deviation.

The control group consisted of patients who were in the hospital during the same time as the study group. They were same in age and sex and they did not have any kind of nose or paranasal sinuses diseases. Their nose breathing was not impaired, They also did not have any other kind of disease, such as blood, heart, kidney, lung, bone marrow, inflammatory, or other chronic diseases, which could have an influence on the blood count. They were hospitalized because of other diseases, such as ear diseases.

All operations were done under general anesthesia.

According to smoking habits, patients were divided into two groups, smokers and nonsmokers. According to drug and alcohol use, patients were also divided into two groups, those who were taking drugs daily and drank alcohol daily and those who did not.

Patients in the tested group were further divided into groups following Mladina classification.[17]

This classification consists of seven types of septal deviations. First six are different, and the seventh one is a combination of the first six. In type I, patients with the unilateral vertical septal ridge in the valve region that does not reach the valve itself are included. In type II, those with the unilateral vertical septal ridge in the valve region touching the nasal valve are included. Type III implies unilateral vertical ridge located more deeply in the nasal cavity, type IV implies S-shaped nasal septum, type V implies almost horizontal septal spur, while type VI implies massive unilateral bone spur. Type VII represents the variation of these types. One more type of deviation that does not fit in this classification was septal subluxation.

An additional finding, which further impaired breathing, was hypertrophic inferior turbinate and according to this finding, patients were divided into two groups.

In testing the blood count, the counts of red blood cells (erythrocyte), hemoglobin, hematocrit, and number of platelets were performed.

Statistics

All data were imported into Excel and analyzed using MedCalc Statistical Software version 15.8 (MedCalc Software bvba, Ostend, Belgium). Descriptive statistics was used. The difference in blood count tests was tested using independent samples t-test; p value less than 0.05 was considered statistically significant.

RESULTS

There were 213 patients included in the study. In the tested group, there were 141 patients, 63.83% of men and 36.17% of women. The median of age was 32, with a minimum age of 18 and a maximum of 71. In the control group, there were 72 patients, 54.17% of men and 45.83% of woman. The minimum age of patients was 16 years and the maximum was 64 years. The median was 39 years. There was no statistically significant difference in age between these two groups ($p > 0.05$).

The results are shown in Tables 1 to 4.

Table 1: Demographic characteristics of the patients in tested group

	n	*%*
Sex		
Men	90	63.83
Women	51	36.17
Total	141	100
Age		
<30 years	63	44.68
31–50 years	62	43.97
>51 years	16	11.35
Total	141	100

Table 2: Pathoanatomical characteristics of nasal septal deviations

Characteristic			*n*	*%*
Type of the septal deviation		I	0	0
		II	3	2.13
		III	30	21.28
		IV	0	0
		V	34	24.11
		VI	4	2.84
		VII	70	49.64
Subluxation		Yes	22	15.6
		No	119	84.4
Hypertrophic concha nasalis inferior		Yes	46	37.62
		No	95	67.38
Additional paranasal sinus disease	Clinical	Yes	28	19.86
		No	113	80.14
	MSCT	Yes	34	24.11
		No	80	56.73

MSCT: Multislice computerized tomography

Table 3: Patient habits

Habits		*n*	*%*
Smoking	Yes	43	30.5
	No	98	69.5
Drinking alcohol	Yes	17	12.06
	No	124	87.94
Chronic drug abuse	Yes	52	36.88
	No	89	63.12

Table 4: The mean of the blood count in both groups

Group	*Red blood cells*	*Hematocrit*	*Hemoglobin*	*Platelets*
Tested group	4.92	0.45	147.4	237.75
Control group	4.85	0.43	146.67	236.33
p-value[a]	0.06	0.34	0.28	0.46

[a]Independent samples t-test

DISCUSSION

The present study showed that there was no statistically significant difference between the two tested groups of patients. The results of the blood count of the patients who were operated because of the marked septal deviation do not differ from the results of the blood count of the control group. There was no statistically significant difference in even one parameter: Red blood cells count, hemoglobin, hematocrit, and platelets counts.

In the study by Ulu et al,[11] the number of platelets in the patients with marked septal deviation was decreased. Also, in the study of Unlu et al[12] platelet count values were decreased. The mean of platelet levels in the study group was 237.35, and in the control group, the mean was 236.33, with a p-value of 0.46.

The results of other parameters showed that a significant difference does not exist. This results also cannot be compared with other results because no researcher, to our knowledge, until now has studied the effect of chronic hypoxia due to septal deviation on the blood count.

We did not find a difference, which is due to the fact that the difference does not exist or the present sample was too small to distinguish the difference present. In this study, 213 patients were tested, with 141 patients in the study and 72 patients in the control group. A greater sample may be more appropriate for study. On the contrary, focusing only on the patients with marked septal deviation with OSAS syndrome might give different results. These patients have real periods of intermittent asphyxia, which affects their blood count. Patients with septal deviation, especially the one, i.e., not very expressed, may not have real hypoxic problems. Only those whose deviation is so prominent so as to cause a periods of asphyxia may have changes in the blood count. Also, maybe the diagnosis of the septal deviation, which is needed to treat effectively, was not clearly set, i.e., patients operated could have had a better quality-of-life without that operation. However, the question is whether we need to wait for the septal deviation to cause serious blood count changes, so that it can be operated on?

The importance of this study lies in the fact that we really needed to know if congenital nasal septal deviation does affect the blood count. That prompts us to study if impaired quality-of-life was the most important reason patients came to visit the ENT specialist or was there a much serious problem in the background? The fact remains that changes in blood count due to hypoxic conditions could have a really serious, and sometimes deadly consequences, mainly cardiovascular.

In the future, larger studies could be done. It would be better to focus only on the patients with OSAS syndrome, because of the nature of their disease.

CONCLUSION

Nasal septal deviation, which is operated at the ENT departments, is mostly problem of life quality. It affects patient's everyday living, disturb him in doing his daily activities. But serious consequences, which affect the blood count and could have an impact on the other patients systems yet could not been seen.

CLINICAL SIGNIFICANCE

This work is important because of the increasing number of studies that are being performed to find a correlation between chronic hypoxia due to septal deviation and cardiovascular diseases. With this study, we wanted to show that maybe in simple cases of nasal septal deviation, there does not exist marked chronic hypoxia that could have an impact on the blood count, specifically in the number of platelets and red blood cells.

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