Clinical Group

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Introduction

Nasal obstruction is one of the most common complaints within the otolaryngology clinics and it is mainly caused by septum deviation [1,2]. Septum deviation has a close relationship with hypoxia and with hypoxia average platelet counts increase [3,4]. Platelets have an important role in damage repair in both endothelial and haemostasis. Platelets produce proinflammatory mediators such as cytokines and chemokine’s during vascular inflammation. Furthermore, they also lead to release of mediators from the cells in the vascular wall. Activate platelets lead to formation of thrombi by either repairing the endothelial cell erosion or forming an atherosclerotic plaque. This triggers the start of atherothrombotic diseases [5,6].

Snoring and hypoxia caused by nasal obstruction is usually caused by septal and external deviation, which is treated surgically. Rhinoplasty is technique applied in two ways as closed and open (external), and it allows visibility into the nose cartilage and bone structure, also allows bimanual surgery manipulations and grafting [7]. The first explanation of rhinoplasty is from Indian Sushutra and Samhita from MO 600. Open rhinoplasty was introduced by Rheti in 1934 [8,9].

With this study we have aimed to demonstrate the hemogram values, platelet marks, PLO and NLO values which have been changed due to hypoxia in patients who have gone under septal reconstruction by open rhinoplasty.

Materials and Methods

This is a retrospective study consisting of patients with nasal congestion, snoring and misshaped nose symptoms, with severe septal deviations and external deviations who have visited the clinic between 2013–2016. The patient group consisted of 77 males and 23 females (total 100), with mean age of 22.5 ±4.7 (18–34). The control group was consisted of

Research Article

The Evaluation of Hematologic and Platelet Function in Total Septum Reconstruction Patients

Abstract

Objective: Nasal septal deviation is a common disorder of the nose and patients commonly visit clinics with complaints of nasal obstruction. As a result of nasal obstruction, patients are exposed to snoring, which causes hypoxia. Hypoxia leads to chronic inflammation, oxidative stress and endothelial dysfunction. Platelet-to-lymphocyte ratio (PLR) and neutrophil-to-lymphocyte ratio (NLR) are new markers for inflammation. In this study we have aimed to study the relationship between hypoxia, PLR, NLR and other platelet markers in patients with septum and external deviations.

Methods: 100 patients (77 male, 23 female) with nasal obstruction, external nasal deformity and snoring symptoms, with severe septum deviations and external deviations were studied. The control group consisted of 101 (73 male, 28 female) people, making it in total 201 people in the study. Preoperative blood samples were taken from these subjects to look at the Hb (haemoglobin), Htc (haematocrit), RBC (the number of red blood cells), MCV (mean corpuscular volume), MCH (mean corpuscular haemoglobin), MCHC (mean corpuscular haemoglobin volume), MPV (mean platelet volume), neutrophils, lymphocytes PDW (platelet distribution ratio), PC (platelet count), PLR and NLR values.

Results: The PLR and NLR values were significantly higher in the control group compared with the female patient group. The PDW and MCH values were significantly higher in the male patient group compared with the control group.

Conclusion: We have shown that PLR and NLR values is a correlation in female patients with septum deviation. And we detected that PDW values were high in male patients with septum deviation. Patients with apparent septum deviation should be subject to surgery as soon as possible.
healthy volunteers with similar ages, 73 males and 28 females (total 101) with a mean age of 22.1±3.5 (18–32). Inclusion criteria control group was not presenting with complaints of nasal obstruction, snoring which on anterior rhinoscopy and nasal endoscopy were not diagnosed to have deviated nasal septum.

The patients with marked septal deviation were diagnosed by anterior rhinoscopy and nasal endoscopy (Karl Storz, Germany). A lot of patients had a nasal trauma story. The other problems causing upper airway obstruction such as hypertrophied tonsils, adenoid vegetation, nasal polyps and chronic rhinosinusitis were included in this study. The patients with rhinosinusitis and nasal polyps were followed up with medical treatment and not taken in to the study. There weren’t apnea stories in patients. The patients consisted of simple snorers but all patients were extremely hard breathing. Each of the cases has had open rhinoplasty. All the patients had at least one nasal passage completely blocked due to caudal deviation and severe septal deformities. As a result, the septum was completely removed and extracorporeal septum reconstruction was applied. Lateral osteotomy was applied to some patients following a hump excision. The preoperative blood samples were transferred to tubes containing ethylene-diamine-tetraacetic acid (EDTA). Venous blood samples were used to measure Hb (haemoglobin), HTC (haematocrit), RBC (red blood cell count), MCV (mean corpuscular volume), MCH (mean corpuscular haemoglobin), MCHC (mean corpuscular haemoglobin volume), MPV (mean platelet volume), neutrophils, lymphocytes PDW (platelet distribution ratio) and PC (platelet count). Blood counts were studied by an auto-analyser (Abbott Cell-Dyn 3700 Hematology Analyzer, USA).

Statistics

In the patient group n=100 and control n=101 cases were evaluated. The male and female were done separately the statistical analysis. The statistical analysis was completed using SPSS 20 programme. Unpaired two-sample t-test is used to analyse results. For results showing normal distribution, the control group and patient groups values were compared using unpaired two-sample independent samples t test; b Mann-Whitney U Test; * The differences between patient and control groups are significant; a:0.05.

Results

Present study includes 100 cases, out of which, 77 cases (51.3 %) were males while 23 cases (45.1 %) were females. Among 101controls, 73 (48.7 %) were males and 28(54.9 %) females. The patient group consisted of 77 males and 23 females, with mean age of 22.90±4.72 and 21.17±4.56. The control group consisted of 73 males and 28 females, with mean age of 22.67±3.70 and 20.68±2.51. Average Hb, Htc, RDW, lymphocyte, neutrophil, PC, RBC, MCH, PDW, MCHC, MPV, PLR, NLR values are presented on Tables 1,2. The male patient group showed significantly higher PDW and MCH values compared to the control group (Chart 1,2). The incidence of the male patient in PLR and NLR was also studied but the observation was statistically not significant. According to the analysis, PLR and NLR parameters between the female patients

| Table 1: Comparison of parameters for patient and control group (Male). |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|                            | Male                        | Control                     | P                           |
| Age*                      | 22.90±4.72                  | 22.67±3.70                  | 0.747                       |
| PC*                       | 237.00±46.50                | 249.96±62.04                | 0.148                       |
| RBC*                      | 5.30±3.34                   | 5.38±3.35                   | 0.174                       |
| MCH*                      | 29.35±1.48                  | 28.79±1.40                  | 0.019*                      |
| PDW*                      | 16.69±2.08                  | 14.29±2.63                  | 0.001*                      |
| MCHC*                     | 33.70±1.13                  | 33.75±1.10                  | 0.788                       |
| MPV*                      | 8.99±1.13                   | 9.34±1.31                   | 0.079                       |
| PLR*                      | 110.66±57.60                | 120.74±64.65                | 0.124                       |
| Neutrophila               | 4.48±1.52                   | 4.42±1.35                   | 0.817                       |
| Lymphocyte%b              | 29.13±7.53                  | 30.04±7.79                  | 0.467                       |
| Hb/Median (Min-Max)       | 15.50(11.60-17.00)          | 15.40(12.30-17.90)          | 0.587                       |
| HCT/Median (Min-Max)      | 46.30(36.00-52.30)          | 45.60(37.40-52.50)          | 0.463                       |
| RDW/Median (Min-Max)      | 13.00(11.80-16.80)          | 13.10(11.50-15.80)          | 0.743                       |
| Lymphocyte% Median (Min-Max) | 2.10(1.25-5.00)            | 2.18(1.00-5.04)             | 0.955                       |
| Neutrophila Median (Min-Max) | 59.40(41.80-82.80)        | 58.60(38.10-76.00)          | 0.775                       |
| NLR/Median (Min-Max)      | 2.05(0.94-5.00)             | 1.95(0.81-5.17)             | 0.567                       |

| Table 2: Comparison of parameters for patient and control group (Female). |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|                            | Female                      | Control                     | P                           |
| Age*                      | 21.74±5.65                  | 20.68±2.51                  | 0.625                       |
| PC*                       | 272.57±57.56                | 275.54±62.18                | 0.861                       |
| RBC*                      | 4.73±1.21                   | 4.72±1.33                   | 0.909                       |
| MCH*                      | 27.49±2.26                  | 28.10±1.70                  | 0.278                       |
| PDW*                      | 15.74±1.91                  | 15.65±1.75                  | 0.857                       |
| MCHC*                     | 32.97±1.14                  | 33.30±1.02                  | 0.280                       |
| MPV*                      | 9.08±1.72                   | 8.66±1.27                   | 0.324                       |
| PLR*                      | 121.73±28.18                | 153.14±65.86                | 0.039*                      |
| Neutrophila               | 4.31±2.97                   | 5.06±1.32                   | 0.027*                      |
| Lymphocyte %c             | 31.10±8.91                  | 25.11±7.99                  | 0.015*                      |
| Hb/Median (Min-Max)       | 13.20(10.40-16.80)          | 13.35(10.80-15.50)          | 0.368                       |
| HCT/Median (Min-Max)      | 39.50(34.20-49.40)          | 40.05(34.70-45.60)          | 0.405                       |
| RDW/Median (Min-Max)      | 13.80(12.20-16.50)          | 13.30(12.20-16.60)          | 0.056                       |
| Lymphocyte% Median (Min-Max) | 2.30(1.30-4.35)            | 2.05(1.23-3.50)             | 0.122                       |
| Neutrophila% Median (Min-Max) | 58.20(1.00-72.20)         | 64.00(42.10-87.00)          | 0.025*                      |
| NLR/Median (Min-Max)      | 1.86(0.50-4.00)             | 2.50(0.75-5.18)             | 0.017*                      |

a-independent samples t test; b-Mann-Whitney U Test; * The differences between patient and control groups are significant; p<0.05.
and control groups were found to be statistically significant (p=0.039, p=0.017) (Chart 3,4). Furthermore, the lymphocyte %, neutrophil, neutrophil % parameters differences were also found to be statistically significant between the female patient and control group (p=0.015, P=0.027, p=0.025) (Chart 5,6). The patients that no significant differences were found between PC, RBC, MCHC, MPV, Hb, Hct and RDW values. The smoking group included 58 (%28.9) and non-smoking group included 143 (% 71.1). The recorded level of smoking among male patients was 42 (%28). The recorded level of smoking among female patients was 16 (%31.4). There was no significant difference in the presence smoking between the two groups (p=0.328).

Discussion

Nasal obstruction is one of the most common symptoms in nasal septum deviation [1,2,10]. Septum deviation accompanied by the nasal roof, is less commonly seen than insulating septum deviations. Due to nasal obstruction, patients are exposed to intermittent hypoxia. One of the consequences of hypoxia is the difference in platelet function. As shown by previous studies, chronic hypoxia could lead to many cardiovascular diseases by the activation of platelets leading to hypercoagulation (7,11,12). Similar platelet activation mechanisms are seen in nasal obstruction, which is one of the causes of intermittent hypoxia.

MPV is a parameter that is used in evaluating the size of platelets, as well as being a marker for platelet reactivation potential [3,13]. MPV is a routine hemogram parameter and it gives information on platelet function. Larger platelets are more adhesive and are inclined to be more aggressive [5,6,14]. MPV increases with age, while platelet count decreases [14].
That cardiopulmonary complication will occur is not known; hematopoietic stem cell reserve during aging. However, the time for the age-related changes, this may be a variation in patients. Concerning the mechanisms that are responsible increase the risk of cardiopulmonary complication risk in female patient. As nasal obstruction period is elongated, also results, the population, septum deviation accompanied by the nasal roof changes in platelets due to hypoxia start with PDW and that first change in PDW value being an increase. We found that PLR and NLR values were not statistically significant in male patients. We have found that PLR and NLR values were not significant in female patients group. Koseoglu et al. [5], have studied MPV and PLR values in OSAS patients and have shown that as the severity of OSAS increased, the PLR values also increased. They also suggested that PLR could be used as a biomarker in OSAS patients with cardiovascular diseases. In patients suffering from septum deviation, it was seen that as age increased, MPV and PDW values increased, which also increased the risk of cardiopulmonary diseases [3]. The male patient group showed significantly higher PDW. Therefore, we can say that the first changes in platelets due to hypoxia start with PDW and that PDW may be a good criterion.

PLR is a new biomarker, which allows detecting inflammation in both patients with cardiac or noncardiac diseases [11,16]. Song et al. [11], have claimed that PLR and PDW values are inflammatory markers that can show platelet activation and inflammation. Several studies have also shown that PLR and NLR values are markers that detect inflammation [7,12,17,18]. In our study, we have found that the PLR and NLR values were not significant in male patients. We have found that PLR and NLR values were significantly in female patients group. Koseoglu et al. [5], have studied MPV and PLR values in OSAS patients and have shown that as the severity of OSAS increased, the PLR values also increased. They also suggested that PLR could be used as a biomarker in OSAS patients with cardiovascular diseases. In patients suffering from septum deviation, it was seen that as age increased, MPV and PDW values increased, which also increased the risk of cardiopulmonary diseases [3]. The male patient group showed significantly higher PDW. Therefore, we can say that the first changes in platelets due to hypoxia start with PDW and that PDW may be a good criterion.

This study showed that, within the young male patient population, septum deviation accompanied by the nasal roof results, the first change in PDW value being an increase. We detected that PLR and NLR values is a significantly in young female patient. As nasal obstruction period is elongated, also increase the risk of cardiopulmonary complication risk in patients. Concerning the mechanisms that are responsible for the age-related changes, this may be effect a variation in hematopoietic stem cell reserve during aging. However, the time that cardiopulmonary complication will occur is not known; patients with apparent septum deviation should be subject to surgery as soon as possible. To conclude, studies have shown that markers, which show the evaluation of hematologic, are also markers that lead in the mortality and morbidity of diseases, which develop due to snoring in patients with septum and external deviations. We believe that further retrospective and prospective studies are required for the markers, which show hematologic functions and platelet activation.

**Ethics Committee Approval**

The study was approved by the Local Ethic Committee of Kahramanmaras Sutcu Imam University, 70–03/2016.

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