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Can neutrophil-lymphocyte, platelet-lymphocyte ratio and mean platelet volume be marker in tonsil hemorrhage?

Erkan Yildiz[1], Orhan Kemal Kahveci[2], Sahin Ulu[2], Halit Bugra Koca[3]

[1]Afyonkarahisar Suhut State Hospital, Department of Otorhinolaringology, Afyonkarahisar, Turkey
[2]Afyonkarahisar Healty Science University Hospital, Department of Otorhinolaringology, Afyonkarahisar, Turkey
[3]Afyonkarahisar Healty Science University Hospital, Department of Medical Biochemistry, Afyonkarahisar, Turkey

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Abstract
The aim of this study was to determine the relationship between neutrophil-lymphocyte ratio (NLR), platelet-lymphocyte ratio (PLR) and mean platelet volume (MPV) in patients with bleeding after tonsillectomy surgery compared to non-bleeding patients, and to determine the risk of bleeding in patients undergoing surgery. Thirty patients with pediatric hemorrhage after the adenotonsillectomy and tonsillectomy surgery at the Otorhinolaryngology Clinic of Afyon Kocatepe University Hospital between 2012-2016 and 30 patients without any infection were included in the study. Patients were evaluated retrospectively. Neutrophil-lymphocyte ratio (NLR), platelet-lymphocyte ratio (PLR) and mean platelet volume (MPV) values were recorded in preoperative patients. They were compared with control patients. There were 30 patients in both groups (n=30). The average age was 8 in the control group and 7 in the patient group. There was no significant difference in NLR. (p=0.085). There was a significant difference in terms of PLR (p=0.039). There was a significant difference in MPV. (p=0.022). There was no significant difference in PLR and MPV values in patients with bleeding after tonsillectomy. There was no significant difference in NLR values.

Keywords: Tonsillectomy, adenoidectomy, bleeding, hemogram, mean platelet volume

Introduction

Tonsillectomy is the most common operation in childhood. The most common complications are chronic tonsillitis and sleep apnea (tonsillar hypertrophy). [1,2] The most common complications of tonsillectomy are bleeding, pain, vomiting, fever and malnutrition. The most serious of these is postoperative bleeding and rarely leads to death. Bleeding is most common in 7-10 days. A significant number of these patients are re-operated [3,4].

In recent years, neutrophil-lymphocyte ratio (NLR), platelet-lymphocyte ratio (PLR) and mean platelet volume (MPV) have been used as markers of inflammation in many diseases. There are studies showing that these rates are insignificant [5-9].

There are not many studies showing the risk of postoperative bleeding after tonsilectomy in the literature [9]. In our study, we wanted to show whether the markers in the blood values taken preoperatively increase the risk of postoperative bleeding.

***Coresponding Author:** Erkan Yildiz, Afyonkarahisar Şuhut State Hospital, Department of Otorhinolaringology, Afyonkarahisar, Turkey
E-mail: dr.erkanyildiz@hotmail.com

Material and Methods

Thirty patients with pediatric hemorrhage after the adenotonsillectomy and tonsillectomy surgery at the Otorhinolaryngology Clinic of Afyon Kocatepe University Hospital between 2012-2016 and 30 patients were included in the study. The patient group consisted of children aged 5-18 who underwent adenotonsillectomy or tonsillectomy due to open-mouthedness, snoring, sleep apnea or frequent tonsillitis. Patients with rheumatologic and immunological diseases were excluded from the study. Patients with tonsillar bleeding due to early traumatic food were excluded from these patients. All patients underwent tonsillectomy with cold knife-bipolar cautery method. Hemogram values of these patients were analyzed retrospectively. Neutrophil-lymphocyte ratio (NLR), platelet-lymphocyte ratio (PLR) and mean platelet volume (MPV) values were recorded in preoperative patients.

The children in the control group were selected from patients aged between 5 and 18 years who had no complaints of sleep apnea or frequent tonsillitis in the last month. Neutrophil-lymphocyte ratio (NLR), platelet-lymphocyte ratio (PLR) and mean platelet volume (MPV) values of these patients were also recorded retrospectively.

The values of both groups were compared with each other.

Statistical analysis

SPSS 22.0 (For Windows) was used for data analysis. The normal distribution of the variables was analyzed by Kolmogorov-Smirnov test. MPV variable was consistent with normal distribution. Since NLR and PLR values did not correspond to age distribution, Mann-Whitney U test was used. Chi-square test was used for comparison of groups by sex. A p value of <0.05 was considered statistically significant.

Results

There were 30 children in the patient group and the control group (n=30). The mean age in the patient group was 7 (5-18) and in the control group = 8 (5-18). Neutrophil-lymphocyte ratio (NLR) was not significantly different. (p=0.085, p> 0.05). A significant difference was observed in platelet-lymphocyte ratio (PLR) (p=0.039, p <0.05) (Figure 2). There was a significant difference in mean platelet volume (MPV). The number of girls / boys was 18/12 in the control group and 11/19 in the patient group (p= 0.022, p <0.05). There was no significant difference between two groups in terms of gender and age (Table 1).

Table 1. Comparison of age, gender and rates

	Control	Patient	p value
Age	8(5-18)	7 (5-18)	
Gender (Male / Female)	18/12	11/19	
Neutrophil-Lymphocyte Ratio (NLR)	1.14	1.08	(p=0.085, p>0.05)
Platelet-LymphocyteRatio (PLR)	95.2	127	(p=0.039, p<0.05)
Meanplateletvolume (MPV)	7,7±0,26	10.2±0,72	(p=0.022, p<0.05)

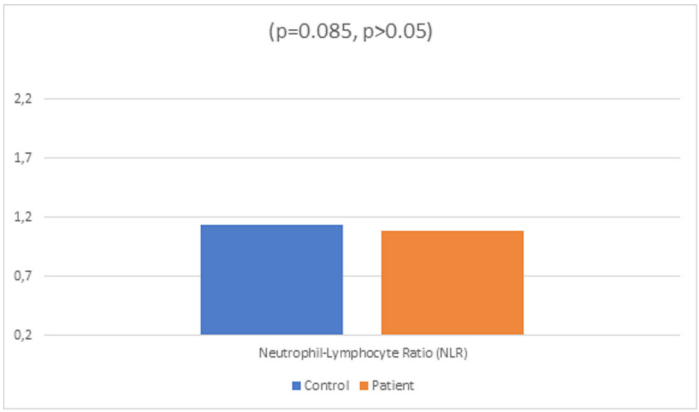

Figure 1. Neutrophil-Lymphocyte Ratio (NLR)

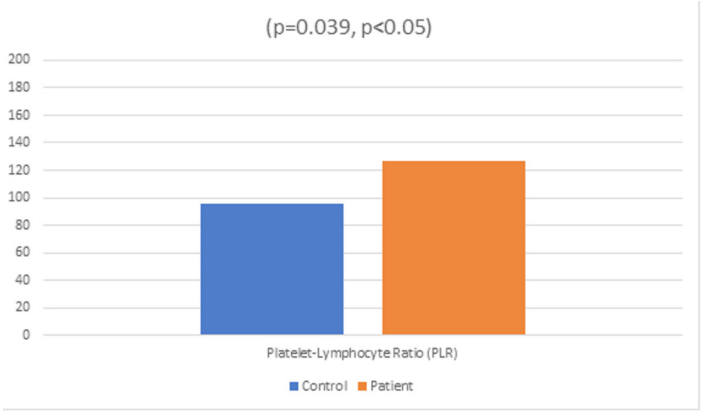

Figure 2. Comparison of Platelet-Lymphocyte Ratio (PLR)

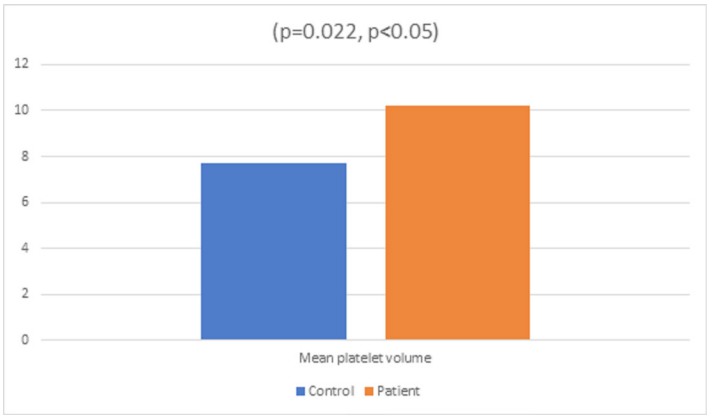

Figure 3. Comparison of mean platelet volume (MPV)

Discussion

Tonsillectomy is the most common operation in pediatric age group. Sleep apnea or frequent tonsillitis are the most common causes of surgery. In the US, more than 530,000 children under the age of 15 years are operated each year [10]. Tonsillectomy can be performed by cold knife, bipolar or unipolar cautery pen, radiolabelling or robotic surgery. The most important and most serious complication of tonsillectomy is bleeding. The incidence of hemorrhage is approximately 20%. (83%) As the time and age increased after the operation, the morbidity and mortality increased. Postoperative bleeding is more common in older patients (69% above age 11). Bleeding exceeding 50 cm3 is a serious risk of mortality [11,12]. Tonsillotomy as well as tonsillectomy has been an important option in children [13].

Many studies have been performed on bleeding after tonsillectomy. The risk of bleeding increased in patients with attention deficit hyperactivity disorder, older children in the age group and patients with a high number of infections during the year [14] The use of dexamethasone during the surgery did not increase the risk [15]. Various techniques have been defined in postoperative surgical approaches. There are various methods such as suture technique, re-cauterization, and surgical replacement [16]. In a study conducted on TTH with a erythrocyte distribution volume (RDW) after tonsillectomy, a significant reduction in distribution volume after tonsillectomy was observed [17].

Complete blood count (CBC) is an important diagnostic test for identification of infection. The number of leukocytes and platelets

increases due to infection. NLR, PLR and MPH can be easily calculated with complete blood count, low cost and practical tests. A lot of research has been done recently about these values. An important part of them was performed in ear nose throat patients. These rates were not found to be significant in patients with tinnitus. Patients with nasal polyposis, patients with deep neck infection, laryngeal premalignant lesions, tympanoplasty patients and patients with sudden hearing loss was significant [18-23].

The clinical value of NLR, however are limited to the field of ENT medicine. There are two studies on NLR and PLR in patients who underwent tonsillectomy in the literature. Yorulmaz MA et al. Found significantly higher rates in patients who had tonsillectomy but had no bleeding. In the study of Başal Y. et al., There were no significant differences in NLR, PLR and MPH values. In the literature, there were no previous studies related with these markers for bleeding after tonsillectomy [24,25]. In a study conducted on patients undergoing adenoidectomy, NLR showed no significant pre- or postoperative inflammatory markers [26]. It has been determined that it can be used before and after treatment in patients with chronic tonsillitis [27].

In our study there was no significant change in NLR. There was a significant increase in PLR and MPH values. Therefore, the increase in risk after tonsillectomy can be used to increase these two ratios. This method is very cheap and practical.

Conflict of interest
The authors declare that there are no conflicts of interest.

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Ethical approval
Consent of ethics was approved by the local ethics committee.

Erkan Yildiz ORCID: 0000-0002-0265-7327
Orhan Kemal Kahveci ORCID: 0000-0002-6159-133X
Sahin Ulu ORCID: 0000-0003-0193-1942
Halit Bugra Koca ORCID: 0000-0002-5353-3228

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