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# Journal Editorial Board

## Overview

The International Journal of Current Medical and Biological Sciences is an international, peer-reviewed, open-access electronic and conventional published journal in the English language. The journal accepts clinical and experimental studies, editorial articles, technical and educational reviews, clinical case reports, original images, letters to the editor, and congress abstracts that contribute to general medicine and academic studies.

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Introduction: Information that will explain the subject and the purpose of the study is given.

Material and method: The place, time, and planning of the study, as well as the elements and methods used, should be reported. Data collection, characteristics of patients and individuals, characteristics of the experimental study, and statistical methods should be explained in detail.

Results: The obtained data should be given together with the statistical results.

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If the journal is used as a source: year, volume, issue, start and end pages are given.

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**Books;** 1. Wagner G. S. Marriott's Practical electrocardiography, Tenth ed. Lippincott Williams Publisher, 2000: 124-129

**Web article**: Abood S. Quality improvement initiative in nursing homes: The ANA acts in an advisory role. Am J Nurs [serial on the Internet] 2002 [cited 12 Aug 2002]. Available from: www.nursingworld.org/AJN/2002/june/wawatch.htm

**Website;** Cancer-pain.org [homepage on the Internet]. New York: Association of Cancer Online Resources [updated 16 May 2002; cited 9 July 2002]. Available from: www.cancer-pain.org

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Use of humans and animals (including material/data) for experimental or other scientific purposes, Clinical studies on humans, Animal studies,

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The patient's clear identity should not be shared in the Case Report - Series.

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Case Report

# Bilateral Acute Corneal Hydrops Case

*Bilateral Akut Korneal Hidrops Olgusu*

**Ayhan Sağlık[1], Ekrem Can Arabacı[1], Sinem Kaya[1], Ferdağ Sağlık[2]**
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[2] Department of Internal Medicine, Mehmet Akif Inan State Hospital, Sanliurfa, Türkiye

**Abstract**

In this case report, it is aimed to present the clinical findings and treatment of a 9-year-old girl who developed bilateral acute corneal hydrops (ACH) at short intervals. Our patient first presented with ACH findings first the right eye and then 1 month later in her left eye. At first admission, both visual acuities were at very low levels and she had advanced stage keratoconus. The patient had a history of eye rubbing accompanied by mild to moderate allergic conjunctivitis. Corneal cross-linking treatment was planned for the left eye, but it could not be performed due to the rapid development of ACH in the left eye within 1 month. In cases of advanced keratoconus accompanied by eye rubbing in young children, caution should be exercised in case it progresses to bilateral ACH.

**Keywords:** acute corneal hydrops; keratoconus; eye rubbing; cornea; cross-linking

**ÖZ**

Bu vaka takdiminde kısa süre aralıklarla bilateral akut korneal hidrops (AKH) gelişen 9 yaşındaki kız çocuğunun klinik bulguları ve tedavisinin sunulması amaçlanmıştır. Hastamız ilk olarak sağ gözden ve takiben 1 ay sonra sol gözden AKH bulguları ile başvurdu. İlk başvuruda her iki görme keskinliği de çok düşük seviyelerdeydi ve ileri evre keratokonusu mevcuttu. Hastada hafif, orta şiddette alerjik konjoktivite eşlik eden göz kaşıma öyküsü mevcuttu. Sol göze korneal cross-linking tedavisi planlandı, ancak 1 ay içerisinde çok hızlı bir şekilde sol gözden de AKH gelişmesi üzerine yapılamadı. Küçük çocuklarda, göz kaşımanın eşlik ettiği ileri evre keratokonus vakalarında bilateral AKH'a ilerleme açısından dikkatli olunmalıdır.

**Anahtar Kelimeler:** akut korneal hidrops, keratokonus, göz kaşıma, kornea

**Highlights**

- Bilateralt acute corneal hydrops (ACH) in keratoconus is a relatively rare condition
- In cases of keratoconus with advanced stage at a young age, and eye rubbing due to allergic conjunctivitis; Caution should be exercised in terms of rapid progression to bilateral ACH.

## Introduction

Acute corneal hydrops (ACH) in keratoconus is a relatively rare condition (2.6-2.8 %). Bilateral ACH was detected in 0.84% (23 cases) of 2723 cases with keratoconus (1, 2). Studies have shown that the average age of patients who develop ACH is generally 25 years of age and it is more common in male gender. Additionally, during the diagnosis of keratoconus: Earlier age at diagnosis, steeper keratometry, and lower Snellen visual acuity were strongly associated with the development of ACH. ACH may also develop at a higher rate in eyes with severe allergic eyes. (1,3). In this case report, we investigated the effect of triggering mechanisms on spontaneously developing ACH under conditions of bilateral normal intraocular pressure and without mechanical trauma.

## Case Report:

A nine-year-old girl presented to the clinic with complaints of lacrimation and severe photophobia in the right eye. Her history was negative for any systemic, congenital, genetic disorder (Down Syndrome) or atopy

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(recurrent rhinitis and dermatitis), but she complained of chronic eye rubbing.

There was no history of topical or systemic medication and family history was negative for any corneal ectatic disease. Uncorrected distance visual acuity (UDVA) was counting fingers (CF@) at 3 ft in the right eye and CF@ 5 ft in the left eye. On initial examination with slit lamp biomicroscope, mild to moderate vernal conjunctivitis, and corneal edema compatible with ACH in the right eye (Figure-1) and transparent corneal appearance in the left eye were present. Corneal topography and anterior segment OCT could not be obtained from the right eye due to extreme pain and photophobia secondary to corneal edema. Scheimpflug image (Pentacam HR, Oculus; Wetzlar, Germany) consistent with advanced keratoconus in the left eye were acquired **(Figure-2).** In the corneal topography imaging performed in the left eye at the first examination, the anterior mean simulated keratometry (Km) value was measured as 61.2 diopter (D), while the thinnest corneal thickness was measured as 371 µm. Posterior elevation maps showed a thin, irregular cornea with a large ectasia. Intraocular pressure measured using an iCare tonometer (iCare IC100, iCare Finland, Oy, Finland) was 12 and 11 mmHg in the right and left eyes, respectively.

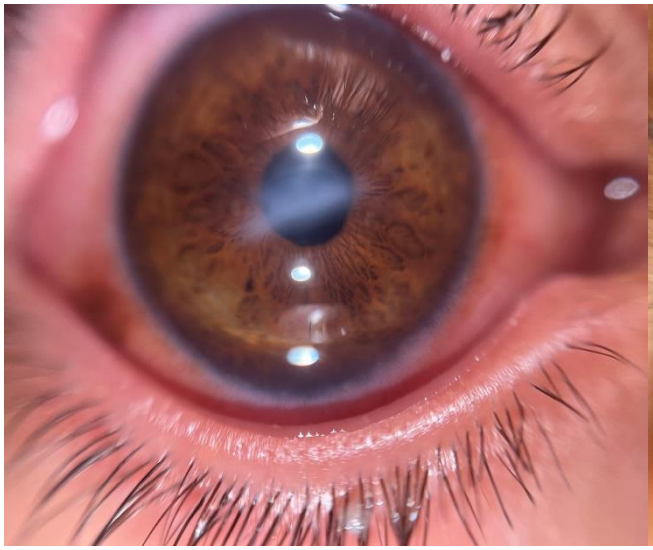

**Figure-1. Acute corneal hydrops in the right eye**

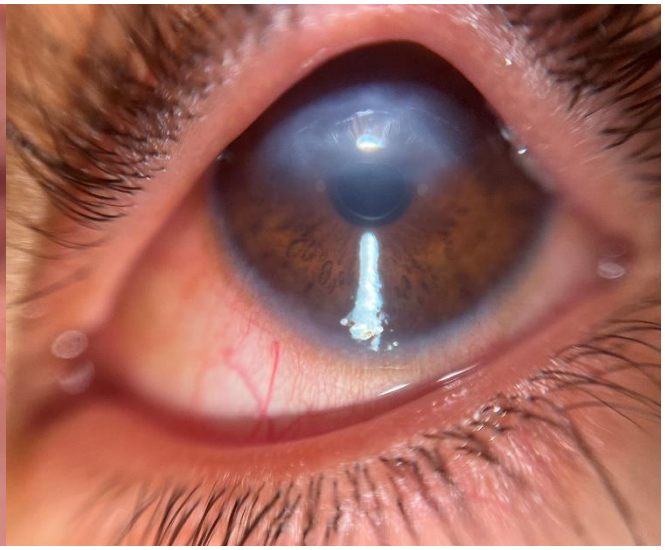

**Figure-3. Acute corneal hydrops in the left eye**

As the patient was a refugee, she could not be reached for 1 month after the treatment of her right eye. Therefore, unfortunately, corneal crosslinking was not possible in the left eye. Biomicroscopic examination performed 1 month after treatment showed corneal scar in the right eye compatible with previous hydrops and corneal edema in the left eye compatible with ACH **(Figure -3).**

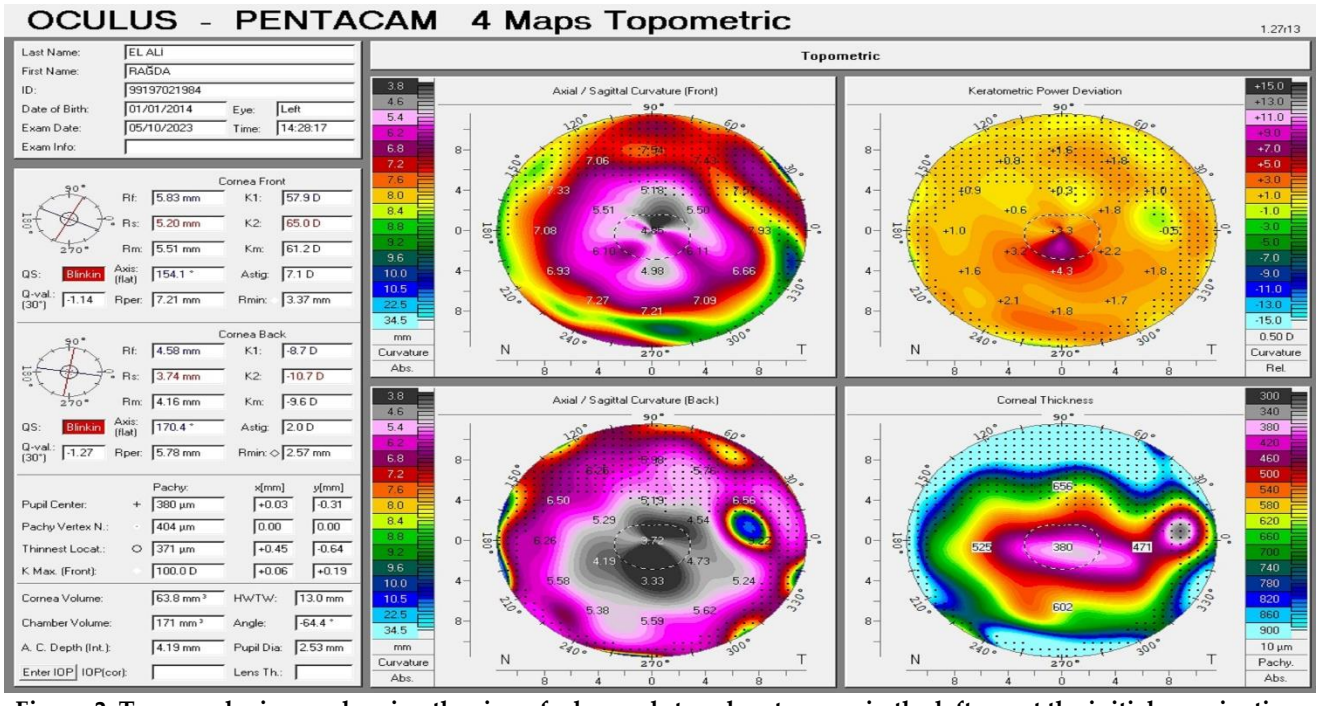


**Figure-2. Topography image showing the sign of advanced stage keratoconus in the left eye at the initial examination**

Fundoscopic examination was not possible due to corneal edema. A-Scan ultrasound showed normal retina and vitreous. While the central corneal thickness (CCT) obtained by anterior segment OCT (The SPECTRALIS SD-OCT (Heidelberg Engineering GmbH, Heidelberg, Germany) could not be measured in the right eye at the first examination, it was 379 μm in the left eye. At the last examination, it was 454 μm in the right eye (Figure-4), and 987 μm in the left eye **(Figure-5).**

In the first treatment, the patient was hospitalized and followed up for one week including topical sodium chloride 5%, prednisolone acetate, moxifloxacin, brinzolamide+timolol combination, cyclopentolate and artificial tear eye drops treatment. At the 1-week follow-up visit, corneal edema in the right eye had decreased and progression to scarring was observed. After 1 month, the same treatment protocol was applied for the left ACH.

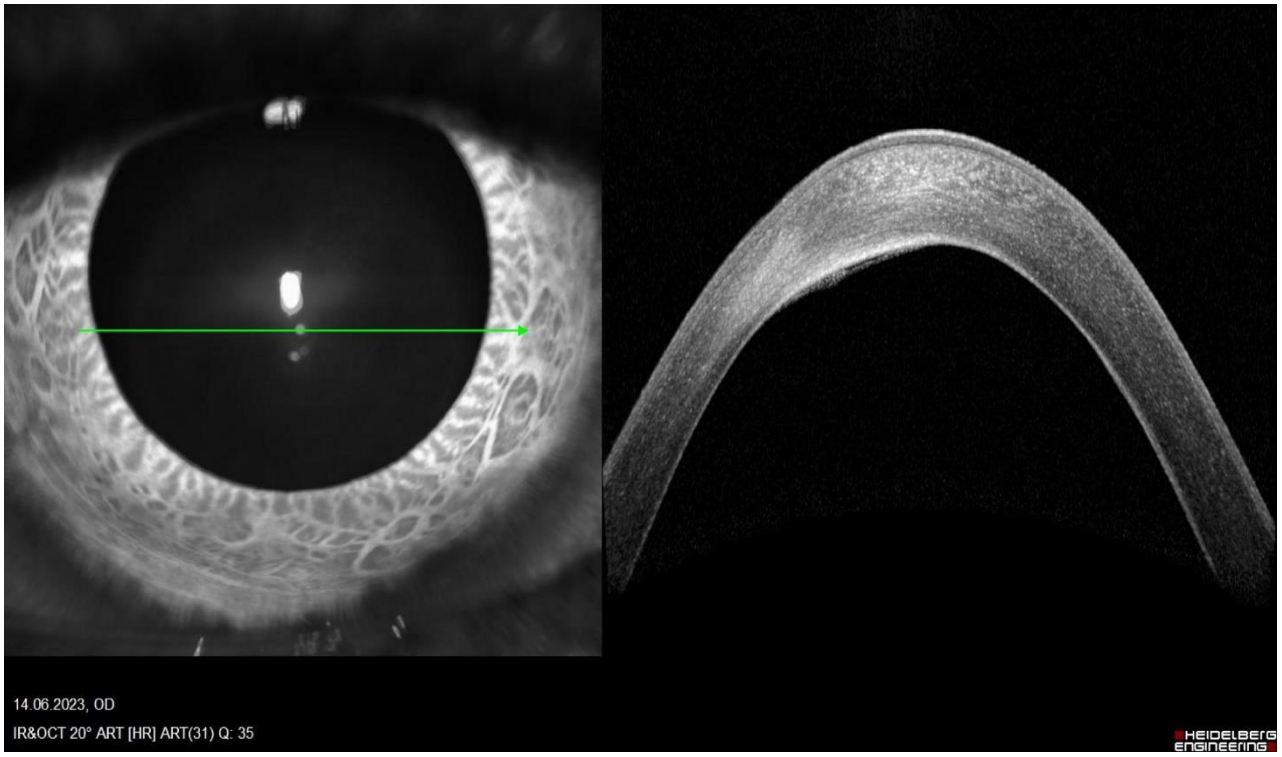


**Figure-4. At the last examination, right eye anterior segment OCT image**

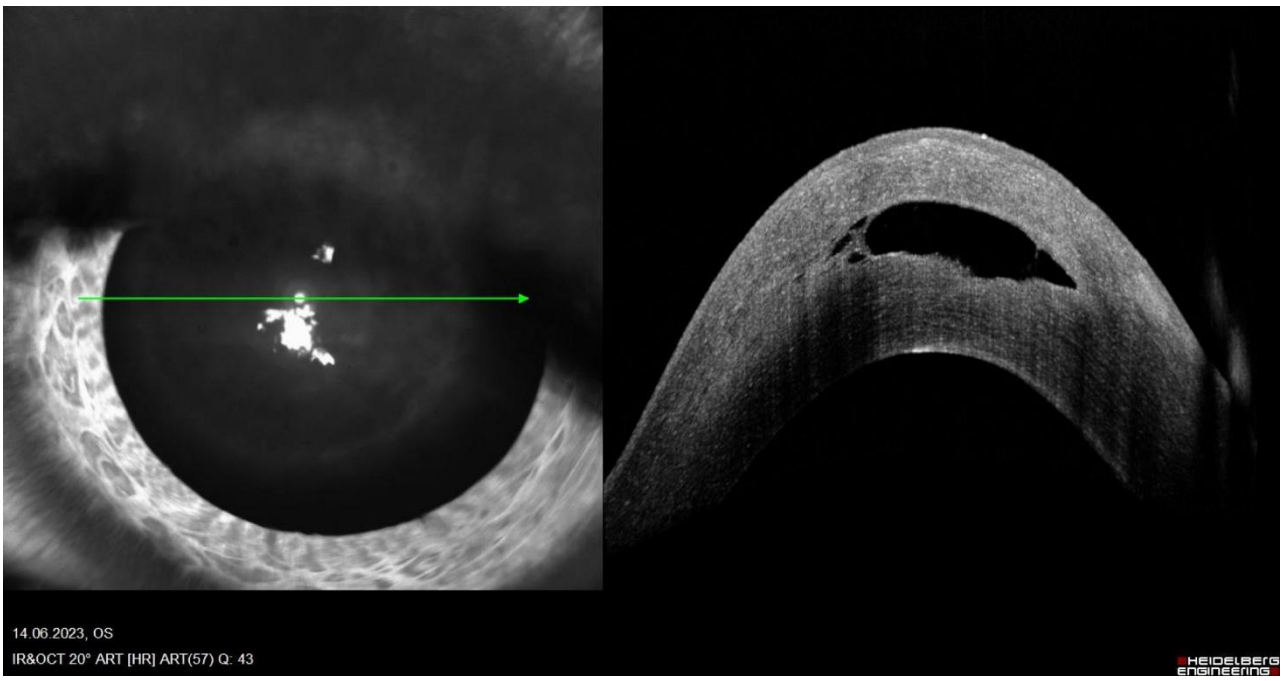


**Figure-5. At the last examination, left eye anterior segment OCT image**

## Discussion

In this report, we present the clinical findings of a 9 years old girl who was followed and treated for bilateral ACH. Our patient had mild to moderate vernal conjunctivitis, eye rubbing, and a history of recent ACH in the right eye. In this case report, we wanted to examine the reasons that led our patient to a state of ACH in a short period of time. We had no data at the time of admission, except that our patient had advanced stage keratoconus in her left eye, was young, and had ACH in her right eye.

Bilateral ACH in keratoconus is a rare and serious condition (mean 0.84%) (1). There are few studies in the literature showing this rare condition. It is not easy to predict when some cases will progress to ACH. Atopy and a history of eye rubbing a high risk for hydrops in young patients with keratoconus (4). Eye rubbing seems to explain why most ACH are one-sided presentations. More likely to have bilateral ACH and abnormal chronic eye rubbing habits in Down syndrome (5). For this reason, it may be good to have corneal crosslinking treatment early, especially at young ages.

In cases of bilateral ACH, equal degrees of cone apex thinning and unprovoked intraocular pressure by eye rubbing (intraocular pressure within the normal range), in contrast to the asymmetric progression in keratoconus, would make susceptibility to descemet rupture unusual (6).

It seems likely that eyes with thinner and more advanced stage cones have less resistance to the forces that expand the IOP (7).

As a result, in cases of keratoconus with advanced stage at a young age, and eye rubbing due to allergic conjunctivitis; Caution should be exercised in terms of rapid progression to bilateral ACH.

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Case Report

# Report of a Case with Status Epilepticus Associated Rhabdomyolisis

*Status Epileptikus İlişkili Rabdomiyoliz Olgusunun Sunumu*

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**Abstract**

Status epilepticus is one of the important neurological emergencies due to the high rates of morbidity, mortality and workforce loss it causes. Status epilepticus is a condition that needs to be recognized and treated quickly because it is both life-threatening and causes serious sequelae. Status epilepticus can lead to Rhabdomyolysis, although it is a rare occurrence. In this case report, a forty-one-year-old female patient with a history of epilepsy is presented. She had eight generalized tonic-clonic seizures within seven hours. At the time of admission, the patient's creatinine kinase level was measured as 11434 U/L. Creatinine kinase level decreased with hydration therapy. No acute kidney injury occurred. As a result, patients with status epilepticus are accompanied by muscle damage. Especially patients at risk for acute kidney injury should be closely monitored for creatinine kinase and urine output.

**Keywords:** Status epilepticus, rhabdomyolysis, tonic-clonic seizures

**ÖZ**

Status epileptikus, yüksek morbidite, mortalite ve iş gücü kaybına neden olan önemli nörolojik acil durumlar arasında yer almaktadır. Status epileptikus, hem yaşamı tehdit edici hem de ciddi sekellerle sonuçlanabilen bir durum olduğu için hızlı bir şekilde tanınması ve tedavi edilmesi gereken bir durumdur. Status epileptikus, nadir bir sonuç olmasına rağmen Rabdomiyolizise yol açabilir. Bu vaka raporunda, epilepsi öyküsü olan kırk bir yaşındaki bir kadın hasta sunulmaktadır. Hasta, yedi saat içinde sekiz generalize tonik-klonik nöbet geçirdi. Yatış anında, hastanın kreatin kinaz seviyesi 11434 U/L olarak ölçüldü. Hidrasyon tedavisi ile kreatin kinaz seviyesi azaldı. Akut böbrek yetmezliği oluşmadı.

Sonuç olarak, status epileptikuslu hastalarda kas hasarı eşlik edebilir. Özellikle akut böbrek yetmezliği riski altındaki hastaların kreatin kinaz ve idrar çıkışı açısından yakından izlenmesi önemlidir.

**Anahtar Kelimeler:** Status epileptikus, rabdomiyoliz, tonik-klonik nöbet

**Highlights**

- Status epilepticus is a life-threatening condition.
- Even though rhabdomyolysis is a rare consequence of epilepsy, it should not be forgotten.
- Early diagnosis and treatment of rhabdomyolysis may prevent kidney failure.

## Introduction

Status epilepticus stands out as a critical neurological emergency, contributing significantly to morbidity, mortality, and productivity loss. As with epilepsy, the causes of the status vary. It may develop after acute brain injury or as a symptom of epilepsy. Status epilepticus is a condition that needs to be recognized and treated quickly because it is both life-threatening and causes serious sequelae (1). Status epilepticus is divided into three subtypes: tonic-clonic, focal SE with impaired consciousness, and absence. For diagnosis, two time intervals have been defined. The time to initiate emergency treatment, t1, is within 5-15 minutes. The onset of neurological consequences is determined to occur within 30-60 minutes (2).

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Rhabdomyolysis (Rb) is the release of toxic muscle content into the circulation as a result of damage to striated muscles due to traumatic or non-traumatic causes and destruction of muscle tissue (3). While drugs, muscle diseases and neuroleptic malignant syndrome are prominent among non-traumatic causes, status epilepticus is among the rare causes (4).

In this case report, we aimed to discuss the clinical course and treatment approach of Rb caused by status epilepticus in the light of current literature.

**Case presentation**

A forty-one-year-old female patient presented to our clinic reporting seven seizures within a six-hour period. Her medical history revealed a background of epilepsy and generalized anxiety disorder, and she was regularly taking quetiapine (300 mg), alprazolam (0.5 mg), and levatiracetam (500 mg) daily. Importantly, it was discovered from the patient's relatives that she had not been adhering to her medication regimen for the past week. The physical examination on admission indicated a blood pressure of 128/78 mmHg, temperature of 37.1°C, and a heart rate of 78 beats/minute. The patient exhibited full muscle strength in both lower extremities with no sensory or motor deficits, but appeared prone to sleep, consistent with a postictal state. No abnormalities were noted in other system examinations.

In the examinations performed, hemoglobin 11.3 g/dl (12.0-15.5 g/dl), white blood cell 24.7 $10^3$/µl (4.0-11.0 x 10^3/µL), platelet 304 $10^3$/µl (150-450 x 10^3/µL), alanine transferase 17 U/L (7-56 U/L), aspartate transferase 26 U/L (5-40 U/L), alkaline phosphatase 125 U/L (30-120 U/L), gamma glutamyl transferase 55 U/L (9-48 U/L), lactate dehydrogenase 1016 U/L (140-280 U/L), sodium 135 mEq/L (135-145 mEq/L), calcium 9.05 mEq/L (8.5-10.5 mEq/L), potassium 4.35 mEq/L (3.5-5.1 mEq/L), blood urea nitrogen 13.6 mg/dL (7-20 mg/dL), creatinine 0.83 mg/dL (0.6-1.3 mg/dL), C-reactive protein 41 mg/dL (0-5 mg/dL), creatine kinase (CK) 11434 U/L (26-192 U/L), blood gas parameters were within normal limits. In the urinalysis, the color of the urine was light yellow and clear, and no erythrocytes were seen. Cranial computed tomography and magnetic resonance imaging were within normal limits.

The patient had a generalized tonic-clonic seizure lasting 10 minutes in the first hour of follow-up in the emergency department. Diazepam 5 mg was administered intravenously. It was observed that the seizure activity stopped. Levatiracetam was administered at a dose of 30 mg/kg. The patient was diagnosed with seizure-related Rb and started on intravenous fluid therapy.

During the follow-up, there was no decrease in the amount of urine, acidemia did not develop, kidney function tests were within normal limits and the complaints decreased. At the thirty-fourth hour of his treatment, CK decreased to 507 U/L. The patient was explained that he needed to take his medications and was discharged.

**Discussion**

Epilepsy is a disease that requires the patient to be prepared for physical changes, compliance with daily medication use, recurrent medical examinations and acute medical emergencies, and negatively affects the quality of life (5). An important clinical presentation of epilepsy is status epilepticus. Status epilepticus is an important cause of mortality and morbidity in epilepsy patients. In status epileptus, ischemia and permanent neuronal damage may occur in the brain tissue due to the inability to meet the excessively increased oxygen demand in the brain tissue during excessive neuronal activity (6). Additionally, the lack of respiratory effort during a tonic-clonic seizure results in ventilation failure. Lack of ventilation causes widespread tissue hypoxia. Lactate, the most well-known biomarker of tissue hypoxia, is used to differentiate seizures from pseudo-seizures due to this pathogenesis. Similar to neuronal tissue, increased oxygen consumption experienced during tonic-clonic contractions in muscle tissue causes ischemia in muscle tissue. Considering the lack of ventilation, we reveal the cornerstones that explain muscle damage in status epilepticus (7).

Rhabdomyolysis is a syndrome characterized by muscle necrosis and the release of intracellular muscle components into the circulation. Causes of Rb include drugs, toxins, infections, muscle trauma, convulsive seizures, hyperthermia, electrolyte imbalances, muscle enzyme defects, cocaine and alcohol use (9). Symptoms of Rb usually have an acute onset and include myalgia, stiffness, weakness, malaise, low-grade fever, and dark (usually brown) urine. However, symptoms related to the musculoskeletal system are observed in only half of the cases (10). In severe Rb, symptoms such as nausea, vomiting, abdominal pain and tachycardia may be observed. In some cases, mental status changes may occur secondary to urea-induced encephalopathy. In a small number of cases, edema, tenderness in the affected muscle groups and hemorrhagic discoloration of the overlying skin may be observed. Muscle edema may not occur until rehydration with intravenous fluids. Depending on the cause, the affected muscle groups may be localized or widespread. Postural muscles of the thighs, spine and lumbar region

are usually affected. Acute Rb may develop without any of these signs and symptoms, and the patient's physical examination findings may be normal. Therefore, the diagnosis is usually made by detailed anamnesis (recent cocaine use, etc.), detection of increased serum CK levels, or detection of myoglobinuria in routine laboratory tests (11).

Although prolonged tonic-clonic seizure was held responsible for the basic pathogenesis in our case, it is also mentioned in the literature that antiepileptics may be the cause of Rb. Especially levatiracetam stands out in terms of Rb (12). The rationale for not considering antiepileptic-related Rhabdomyolysis in our case was the concurrent elevation of tissue hypoxia markers and the subsequent decrease in CK levels following the seizure.

**Conclusion**

Ppatients experiencing status epilepticus are susceptible to muscle damage. Vigilant monitoring of CK and urine output is particularly crucial, especially for patients at risk of acute kidney injury.

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**Letter to the Editor**

# A Proctological Disease That Should Be Keep in Mind in the Patient Presenting with Chronic Constipation: Dyssynergic Defecation

*Kronik Kabızlık ile Başvuran Hastada Akılda Tutulması Gereken Proktolojik Bir Hastalık: Dissinerjik Defekasyon*

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**Dear Editor.**

I read with interest the article titled "A Rare Cause of Chronic Constipation in Family Medicine Practice: Dyssynergic Defecation" published by Öztürk et al. in your journal (1). The 32-year-old female patient mentioned in the article has a chronic constipation problem that started in childhood and the systematic diagnosis and treatment protocol applied for this problem actually advises us that there should be an algorithm that should be applied to every patient presenting with chronic constipation. The regression of the patient's complaints after this diagnosis and treatment process shows us once again that a correct diagnosis is a must for the patient to benefit from the treatment.

Rao et al. In a systemic review published by them, dyssynergic defecation is defined as a lack of coordination of the rectoanal, abdominal and pelvic floor muscles necessary for proper relaxation and is said to be characterized by inadequate anal relaxation, paradoxical anal contraction or inadequate rectal thrust forces (2). This situation must be demonstrated with an anal manometer **(Figure 1)**. In other words, in this disease, there is no pathology that would cause constipation in the proximal parts of the colon.

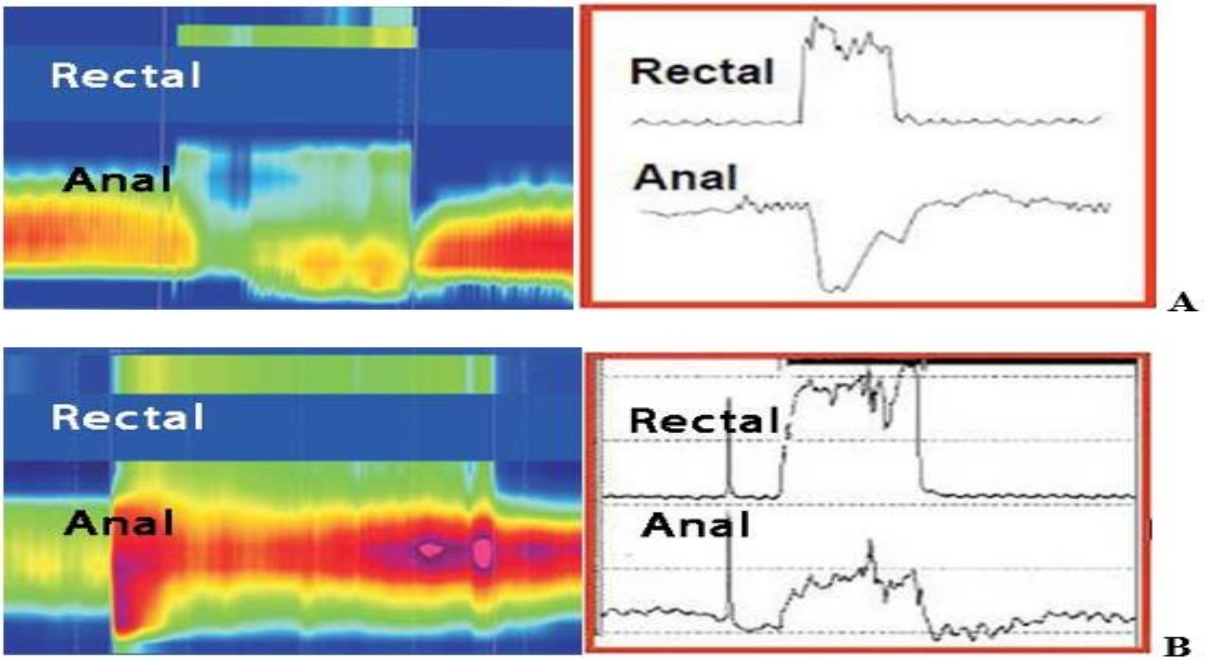


**Figure 1. Normal (A) and abnormal (B) pressure findings of the rectum and anal canal on the anal manometer during straining (3).**

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In a recently published study, 84% of patients described excessive straining during defecation, 76% experienced a feeling of incomplete evacuation, and 74% had abdominal bloating (4). However, these constipation-related symptoms appear to be better predictors of colonic slow transit than pelvic symptoms. This makes it difficult to diagnose dyssynergic defecation based on history alone (5). Therefore, using the same approach as in your article, it should be kept in mind that the etiology of chronic constipation should not be sought only in intra-abdominal pathologies, but that the cause may be a disease of proctological origin, such as dyssynergic defecation. I congratulate you for your article in terms of emphasizing this important issue.

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Original article

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# Does the eosinophil-to-monocyte ratio predict inflammation in patients with diabetic retinopathy?

*Eozinofil/monosit oranı diyabetik retinopatili hastalarda inflamasyonu öngörüyor mu?*

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**Abstract**

**Background:** Our purpose is to investigate the demographic, clinical, and haematological parameters of patients diagnosed with diabetic retinopathy (DRP) without coronary artery disease and control group.

**Materials and Method**: This study was retrospective and the information of all patients was retrospectively scanned and their anamnesis was noted from the medical record files. A total of 151 patients, 75 with DRP and 76 in the control group without diabetes and a history of coronary artery disease, were included in the study. For all statistics, a p-value below 0.05 was considered significant.

**Results:** There was no distinction between the DRP and the other group in terms of clinical and demographic features. The serum glucose (p<0.001), creatinine (p=0.029), and triglyceride (p=0.047) were higher in patients with the DRP group However, eosinophil level (p=0.009) and eosinophil-to-monocyte ratio (EMR) (p=0.003) values were lower in DRP patients. Multivariable linear regression analyses showed serum glucose (OR:1.241, 95% CI [1.087 – 1.418], p<0.001) and EMR (OR:0.966, 95% CI [0.440–2.117], p= 0.030) were potential risk factors for DRP.

**Conclusion**: In our research, we observed that the serum eosinophil level and EMR in patients with DRP were lower than in other patients and that this, together with the high glucose level, had an independent predictive value for DRP. Future large-scale studies will shed light on this topic.

**Keywords**: Diabetic retinopathy and Eosinophil-to-monocyte ratio, inflammation

**ÖZ**

**Amaç:** Amacımız, koroner arter hastalığı olmayan diyabetik retinopati (DRP) tanısı alan hastalar ile kontrol grubunun demografik, klinik ve hematolojik parametrelerini araştırmaktır. **Gereç ve Yöntem:** Bu çalışma retrospektif olduğundan tüm hastaların bilgileri retrospektif olarak tarandı ve tıbbi kayıt dosyalarından anamnezleri not edildi. Çalışmaya 75'i DRP'li, 76'sı diyabeti olmayan ve koroner arter hastalığı öyküsü olmayan kontrol grubundan olmak üzere toplam 151 hasta dahil edildi. Tüm istatistikler için 0.05'in altındaki bir p değeri anlamlı kabul edildi.

**Bulgular:** DRP ile diğer grup arasında klinik ve demografik özellikler açısından farklılık yoktu. Serum glukoz (p<0.001), kreatinin (p=0.029) ve trigliserit (p=0.047) DRP grubundaki hastalarda daha yüksekti. Ancak eozinofil düzeyi (p=0.009) ve eozinofil-monosit oranı (EMR) (p=0.003) değerleri DRP hastalarında daha düşüktü. Çok değişkenli doğrusal regresyon analizleri serum glukozunun (OR:1.241, %95 GA [1.087 – 1.418], p<0,001) ve EMR'nin (OR:0.966, %95 GA [0.440–2.117], p=0.030) DRP için potansiyel risk faktörleri olduğunu gösterdi.

**Sonuç:** Araştırmamızda DRP'li hastalarda serum eozinofil düzeyi ve EMR'nin diğer hastalara göre daha düşük olduğunu ve bunun yüksek glukoz düzeyiyle birlikte DRP için bağımsız bir prediktif değere sahip olduğunu gözlemledik. Gelecekte yapılacak geniş çaplı çalışmalar bu konulara ışık tutacaktır.

**Anahtar Kelimeler:** Diyabetik retinopati ve Eozinofil/monosit oranı, enflamasyon

## Highlights

- Diabetic retinopathy, which develops in an inflammatory process, is a preventable cause of blindness worldwide.
- Eosinophils play an important role, especially in thrombosis formation and the vascular inflammation process.
- In recent years, the eosinophil-monocyte ratio has been associated with mortality in many disease, including coronary artery disease.

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**Introduction**

Diabetic retinopathy (DRP), a microvascular complication of diabetes, is one of the main occasions of preventable blindness worldwide (1). Unfortunately, damage to the retina vessels occurs in the presence of accompanying factors such as high glucose levels and hypertension. Neovascularization resulting from neural and retinal vascular dysfunction is the most important reason for the development of retinopathy. However, it is tough to know which patients will develop retinopathy and which will not (2).

Neutrophils, lymphocytes, and monocytes, which play a role in systemic inflammation, are thought to be related to the development and progression of atherosclerosis, plaque rupture, vascular dysfunction, and left ventricular restructuring in conditions such as coronary artery disease and cerebrovascular disease (3). In addition to these cells, in recent years it has been observed that eosinophils play an important role, especially in thrombosis formation and vascular inflammation process (4). Diabetic retinopathy, which develops in an inflammatory process, is a disease that can be prevented or its course can be slowed down with early diagnosis and treatment. The parameters that need to be studied to recognize these patients early are still being investigated. In this study, the clinical and laboratory findings of patients without any history of cardiac disease and diagnosed with DRP were compared with patients without diabetes and the relationship between them was examined.

**Materials and Methods**

**Study design**

151 patients with diabetes mellitus and non-diabetes mellitus were divided into the DRP group and those without the DRP group.

**Patient population**

The research was retrospective and the information of all patients was retrospectively scanned and their anamnesis were noted from the medical record files. A total of 151 patients, 75 with DRP and 76 in the control group without diabetes and a history of coronary artery disease, were included in the study.

All patient's demographic details such as age, sex, diabetes mellitus, hypertension, hyperlipidemia and smoking were recorded. Blood specimens were collected from all patients in the fasting situation and routine laboratory tests (absolute blood count, glucose, creatinine, lipid profile, and thyroid function tests) were studied. A standard protocol using auto-analyzer measures the level of glycosylated haemoglobin. Lymphocyte, monocyte, and eosinophil numbers were measured in haematological analyses using automatic devices and expressed as x10 3 cells/µ. EMR was expressed as the absolute eosinophil count/monocyte counts ratio.

When diagnosing diabetes, the American Diabetes Association (ADA) guidelines were taken into account (fasting blood sugar ≥126 mg/dL, 2-hour plasma glucose level in the oral glucose tolerance test ≥200 mg/dL). (5) Body mass index (BMI) was obtained by dividing kilograms by the square of height (weight, kg/height,m2). The logMAR scale was used to best corrected visual acuity (BCVA). Stereoscopic slit-lamp biomicroscopy and indirect ophthalmoscopy were used for All patients who underwent detailed fundoscopic examination using All patients underwent digital fundus photography and fluorescein angiography. The guidelines of the study group (ETDRS) for the early treatment of diabetic retinopathy in Type-2 DM were used for diagnosing and classifying patients with diabetic retinopathy (6). Patients with coronary artery disease, chronic liver or kidney diseases, and who received treatment for arrhythmias, and heart failure due to ischemic/valvular heart disease were excluded from the research. All patients go through cardiovascular examination and electrocardiographic and echocardiography measures were obtained. All patients were examined with a 12-lead ECG (Marquette Mac 1200, GE) in the supine situation after resting for at least 15-20 minutes Considering the advice of the American Society of Echocardiography, each of the patients go through a transthoracic echocardiographic scanning with a commercially accessible device utilized 4 MHz probes (Vivid 9 Pro, GE Vingmed, Milwaukee, Wisconsin, USA) in the left lateral decubitus position. Left ventricular ejection fraction (LVEF) was measured according to Simpson's method (7).

**Statistical Analysis**

Statistical analysis was implemented using SPSS 20.0 (USA, Armonk, NY, IBM Corporation) from the gathered data analysis, continuous factors are stated as mean ± standard deviation (SD), and categorical factors are stated as a percentage of the group total %. Kolmogorov Smirnov test was utilized to decide whether the factors demonstrated normal distribution Continuous factors with normal distribution were evaluated using Student's t-test. The Chi-Square test was utilized for categorical factors. Univariable and multivariable regression analyses were implemented for the relationship between DRP and creatinine, triglyceride, eosinophil, and EMR. For each of the statistics, a p-value under 0.05 was noted as significant.

**Results**

There was no dissimilarity between the DRP and the control group in terms of clinical and demographic features **(Table 1).** The average age of the DRP group was (58.8 ± 6.6) years, and the control group was (57.8 ± 9.5) years. The glucose level (210.9 ± 76.2 vs 96.3 ± 31.6 mg/dL, p<0.001), serum creatinine level (0.8 ± 0.2 vs 0.7 ± 2.1 mg/dL, p = 0.029) and serum triglyceride levels (196.8 ± 113.5 vs 162.9 ± 75.7mg/dL, p = 0.047) were higher in patients with DRP group **(Table 1).** The average HbA1c level was 10.1 ± 2.1 % with DRP group. However, eosinophil level (0.2 ± 0.1 vs 0.2 ± 0.2 x103/μL, p = 0.009) and EMR (0.38 ± 0.26 vs 0.52 ± 0.29, p = 0.003) values were lower in DRP patients **(Table 1), (Figure 1).**

Univariable linear regression analyses showed serum glucose level (OR:1.091 95% CI [1.050 – 1.133], p<0.001), serum creatinine level (OR:5.302, 95% CI [1.163 – 24.168], p = 0.031), eosinophil level (OR:0.041, 95% CI [0.003 – 0.506], p = 0.013) and EMR (OR:0.153, 95% CI [0.042 – 0.566], p = 0.005) were associated risk factors for DRP (Table 2).

Multivariable linear regression analyses showed serum glucose (OR:1.241, 95% CI [1.087 – 1.418], p<0.001) and EMR (OR:0.966, 95% CI [0.440 – 2.117], p = 0.030) were potential risk factors for DRP **(Table 2).**

**Table 1. Demographic, clinical and hematologic features of patients with diabetic retinopathy and control group.**

| Variables | Diabetic retinopathy group (n=75) | Control group (n=76) | P-value |
|---|---|---|---|
| **Age, years** | 58.8 ± 6.6 | 57.8 ± 9.5 | 0.447 |
| **Female gender, n, (%)** | 44 (58.6) | 35 (46.1) | 0.143 |
| **Body mass index, kg/m²** | 28.7 ± 5.3 | 27.4 ± 5.7 | 0.132 |
| **Systolic blood pressure, mmHg** | 132.4 ± 26.2 | 128.2 ± 22.76 | 0.287 |
| **Diastolic blood pressure, mmHg** | 81.4 ± 14.5 | 781 ± 12.4 | 0.145 |
| **Heart rate beat/min** | 81.3 ± 13.4 | 76.7 ± 10.9 | 0.104 |
| **Ejection fraction, %** | 58.5 ± 5.8 | 59.7 ± 6.2 | 0.214 |
| **Hypertension, n (%)** | 34 (45.3) | 33 (43.4) | 0.207 |
| **Current smoking, n (%)** | 18 (24.0) | 16 (21.1) | 0.786 |
| **Glucose, mg/dL** | 210.9 ± 76.2 | 96.3 ± 31.6 | <0.001 |
| **HbA1c, %** | 10.1 ± 2.1 | | |
| **Creatinine, mg/dL** | 0.8 ± 0.2 | 0.7 ± 2.1 | 0.029 |
| **Total cholesterol, mg/dL** | 200.1 ± 44.1 | 198.1 ± 34.9 | 0.768 |
| **LDL-C, mg/dL** | 111.3 ± 39.4 | 119.1 ± 3.5 | 0.224 |
| **HDL-C, mg/dL** | 49.8 ± 17.1 | 47.3 ± 8.7 | 0.298 |
| **Triglyceride, mg/dL** | 196.8 ± 113.5 | 62.9 ± 75.7 | 0.047 |
| **Vitamin B12, pg/mL** | 399.3 ± 206.2 | 382.7 ± 179.3 | 0.715 |
| **TSH, mlU/L** | 1.6 ± 1.1 | 1.7 ± 0.9 | 0.602 |
| **C-reactive protein, mg/dL** | 1.3 ± 2.3 | 1.5 ± 1.5 | 0.621 |
| **Neutrophil, $10^3$/μL** | 5.8 ± 1.2 | 6.8 ± 3.8 | 0.550 |
| **Lymphocyte, $10^3$/μL** | 4.8 ± 1.4 | 4.4 ± 0.9 | 0.062 |
| **Monocyte, $10^3$/μL** | 0.5 ± 0.2 | 0.4 ± 0.4 | 0.089 |
| **Eozinofil, $10^3$/μL** | 0.2 ± 0.1 | 0.2 ± 0.2 | 0.009 |
| **EMR** | 0.38 ± 0.26 | 0.52 ± 0.29 | 0.003 |

**Abbreviations:** EMR: Eosinophil to monocyte ratio, HDL: High-density lipoprotein, LDL: Low-density lipoprotein cholesterol, n: number of patients, TSH: Thyroid-stimulating hormone.

**Table 2. The determination of independent risk factors for DRP with logistic regression analysis**

| Variables | Univariable | | Multivariable | |
|---|---|---|---|---|
| | **OR (95 % CI)** | **P-value** | **OR (95 % CI)** | **P-value** |
| **Glucose, mg/dL** | 1.091 (1.050-1.133) | <0.001 | 1.241 (1.087 - 1.418) | <0.001 |
| **Creatinine, mg/dL** | 5.302 (1.163-24.168) | 0.031 | 1.175 (0.001 - 12.895) | 0.601 |
| **Triglyceride, mg/dL** | 1.004 (1.000-1.008) | 0.051 | 0.992 (0.979 - 1.005) | 0.244 |
| **Eosinophil, $10^3$/μL** | 0.041 (0.003-0.506) | 0.013 | 177.781 (0.244 - 1.293) | 0.066 |
| **EMR** | 0.153 (0.042-0.566) | 0.005 | 0.966 (0.440 - 2.117) | 0.030 |

**Abbreviations:** EMR: Eosinophil to monocyte ratio.

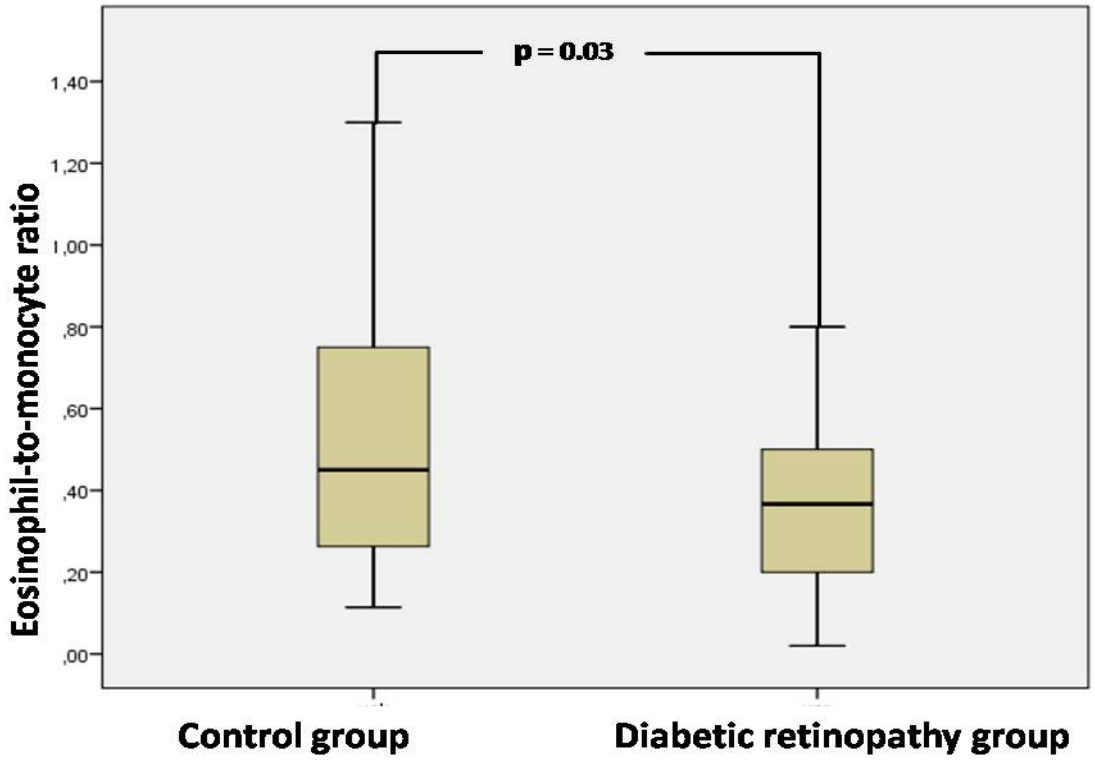


**Figure 1. Demonstration of the relation between eosinophil-to-monocyte ratio with diabetic retinopathy and control group.**

**Discussion**

In this study, we observed that the EMR in DRP patients without known coronary artery disease compared to the control group and that this was an independent risk factor in DRP patients.

DRP is an inflammatory process, and it is known that various cells migrate to areas of inflammation and certain cytokines are released (8,9). Eosinophils are increased in various allergic, parasitic and microbial diseases. They secrete immunosuppressive cytokines such as interleukin 10, 4 and 3. Eosinophils are thought to play a role in the secretion of endothelial growth factors, chemokines and some cytokines and promote angiogenesis (10). Eosinophilic activity has also been shown to contribute to fibroblast differentiation in damaged lung tissue and the release of proteases and cytokines, which are critical components of tissue remodeling (11).

Eosinophils also play a role in thrombus initiation, progression, and rupture. Eosinophils help platelets adhere to the beneficial vessel wall and cause the release of immunosuppressive cytokines such as IL-10, IL-4, and IL-13, which have been suggested to modulate the inflammatory response. Eosinophils assist platelets adhere to the injured vessel wall and cause the release of immunosuppressive cytokines such as IL-10, IL-4, and IL-13, which have been suggested to modulate the inflammatory response. Eosinophils infiltrate the myocardium in atherosclerotic plaque rupture, which is involved in the pathogenesis of acute coronary syndrome (10). In the study conducted by Deng et al., it was found that the EMR was lower in patients presenting with acute coronary syndrome and was associated with long-term mortality (12,13).

In our research, we observed that eosinophil count and EMR were lower in patients with DRP. There may be several reasons why the eosinophil rate was lower in our study than in the control group. DRP is an inflammatory process, and blood cell accumulation in the area triggers angiogenesis. Serum eosinophils also act with these inflammatory cells and gather in the inflamed area, which may explain the decrease in serum eosinophil levels (13,14,15).

Monocytes are pro-inflammatory cells, and where there is inflammation, they release cytokines and adhesion molecules such as interleukin 6, TNF alpha, and other cells into the environment through immune mediation (14). However, the number of eosinophils is normally less than in monocytes, so the decrease in eosinophils in the serum becomes more pronounced than in monocytes, causing the eosinophil-monocyte ratio to increase. During an

inflammatory process, reasons such as cellular destruction in peripheral tissue, suppression of mature eosinophil migration from the bone marrow, suppression of eosinophil production, and accumulation of eosinophils in inflammatory areas may cause a decrease in eosinophils. Also, under acute stress, adrenal glucocorticoid and epinephrine secretion may be related to eosinophil reduction (16,17)

In our study, the EMR was found to be 0.38 in patients with DRP, and since there is no other study similar to our study, a comparison could not be made. However, Kulahçıoğlu et al. In their study, they found that in patients with high-risk pulmonary embolism, the EMR was lower than 0.03 and was an independent predictor of all-cause mortality (4).

One of the inflammatory parameters investigated in diabetic patients is serum C peptide level. C-peptide is a molecule that co-excretes with insulin and is used to estimate the insulin reserves of diabetic patients. The role that C-peptide plays in the human body is not clearly known, but it varies depending on the target tissue, pathophysiological conditions, and interaction with bioactive molecules. Toprak et al. found a relationship between C-peptide level and acute coronary syndrome, coronary artery ectasias, contrast-associated nephropathy and no-reflow phenomenon (18,19,20,21)

**Limitations**

In this research, the number of patients was restricted and this study was a single-center. Patients were not followed up for adverse events Since it was a retrospective study. Since there has been no such study before, adequate comparisons with other studies could not be made. Since c-peptide kits were not available in our center, c-peptide levels could not be measured. Adding the c peptide level in the participants could have made the study more enriching.

**Conclusion**

In our study, we found that the serum eosinophil level and EMR in patients with DRP were lower than in other patients and that this, together with the high glucose level, had an independent predictive value for DRP. Eosinophils are one of the inflammatory cells, and while their serum level increases in infectious diseases, their level decreases in thrombus or non-infectious inflammations. It is thought that large-scale studies on this topic will help us understand the role and importance of eosinophils in inflammation.

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# Evaluation of online biostatistics education for doctors during the pandemic period

*Pandemi döneminde doktorlara yönelik uzaktan biyoistatistik eğitiminin değerlendirilmesi*

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**Abstract**

**Background:** This research evaluates the results of a distance biostatistics training for physicians during the COVID-19 pandemic.

**Materials and Method**: Online basic-level biostatistics training consisting of six courses was conducted between 21 October-30 December 2020. At the beginning and after the training, the structured Biostatistics Basic Knowledge Questionnaire consisting of 20 questions developed by the researchers was applied to the physicians who took the training.

**Results:** A total of 198 medical doctors participated. At the end of the training, 21 of those who participated in the research at the beginning attended more than half of the courses, 45 of them attended less than half of the courses, and 132 physicians did not attend any of the courses. 80.8% of the participants stated that they took the training to make their statistics in their scientific research. After the training, regardless of their professional title and department, the score change was not significant for those who did not attend the classes at all, ($p=0.306$), while it was found that the score increased significantly for those who attended less than half and those who attended more than half of them ($p<0.001$ for both).

**Conclusion**: The high achievement of even those who attended only some of the courses after the training shows that such distance education models should be developed and widely extended.

**Keywords**: Pandemic, Biostatistics, Distance education

**ÖZ**

**Amaç:** Pandemi döneminde hekimlere yönelik uzaktan eğitim ile biyoistatistik dersi verilerek etkisi incelenmiştir.

**Gereç ve Yöntem:** 21 Ekim- 30 Aralık 2020 arasında toplam altı dersten oluşan online temel düzey biyoistatistik eğitimi gerçekleştirilmiştir. Eğitim başlangıcında ve sonrasında araştırmacılar tarafından geliştirilen 20 soruluk 'Biyoistatistik Temel Bilgi Düzeyi Anketi' uygulanmıştır.

**Bulgular**:Toplam 198 hekim katılmıştır. Eğitimler sonunda başlangıçta araştırmaya katılanların 21'i derslerin yarısından fazlasına, 45'i derslerin yarısından azına katılırken, 132 hekim ise hiçbir derse katılmamıştır. Katılımcıların %80,8'i bilimsel araştırmalarda kendi istatistiklerini yapabilmek için katıldığı beyan ederken, eğitim beklentisi ise %79,3'ünde yüksek ya da çok yüksektir. Eğitimi sonrasında mesleki unvan ve bölümden bağımsız olarak derslere hiç katılım göstermeyenlerin skor değişimi anlamlı olmazken ($p=0,306$), yarıdan azına katılanlar ve yarıdan fazlasına katılanlarda anlamlı olarak skorun arttığı saptanmıştır (her ikisi için $p<0,001$).

**Sonuç:** Eğitimlerin sonrasında derslerin bir kısmına katılanlarda dahi yüksek başarı elde edilmesi bu tür eğitim modellerinin geliştirilmesini gerektiğini önemini göstermektedir.

**Anahtar Kelimeler:** Pandemi, Biyoistatistik, Uzaktan eğitim

## Highlights

- Physicians made efforts to participate in academic trainings even during the pandemic period
- Distance education models should be developed and widely extended.

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**Introduction**

After the announcement of the COVID-19 (Coronavirus Disease-19) pandemic made by the World Health Organization (WHO) in March 2020, some distance education models (internet applications, television, radio, home packages, etc.) started to be implemented in 73% of 127 countries with the closure of schools (1). In Turkey, education was suspended at many education levels, including higher education. As of March 23, the distance education model was switched to all over the country and continued in 2021 (2). In distance education models, information is delivered to distant people with the help of tools such as satellite, video, audio, graphics and computers, and education can be provided for people in different places at the same or different times (3,4). Thus, we have entered a period in which many online platforms are widely used in education in our country and in the world (5). The impact of this mandatory change is discussed in many studies. Lack of internet and technological devices are characterized as possible negativities. The sense of security created by distance education during the spread of the SARS-CoV-2 virus, the flexibility of learning, and the ability to provide a learning environment similar to face-to-face education with the advancement of technology are expressed as positive aspects of this education model (6,7).

As in all fields of science, people trained in the field of medicine are expected to keep pace with important developments. In order to evaluate and contribute to the scientific literature as part of evidence-based practices, researchers should be competent in areas such as biostatistics, computers and epidemiology, and for this, courses in these areas should be included at various levels of education, including medical faculties (8-10). However, among the courses taken until graduation from medical faculties, there are no courses that will contribute to scientific studies except Biostatistics and Public Health courses. As a matter of fact, in a study conducted with specialist physicians in Turkey, 87% of the participants stated that the statistical courses they took in undergraduate and 84% in specialty education were insufficient during scientific studies. In the same study, 90.6% of the participants stated that they received help in statistics for their studies during specialty training (8).

In the evaluations, it is pointed out that there are inaccuracies in the design and findings of most published studies (11). In a multicenter cross-sectional study, it was reported that participants in medical specialty training could not correctly interpret commonly used important statistical concepts. It was stated that this may affect clinical judgment and medical decision-making processes as well as following and contributing to the scientific literature (12). In a study involving the opinions of specialist physicians regarding statistics education, it was suggested that statistics education should be included in specialty education, that education should be supported by courses or certificate programs, and that there should be research consultancy and training centers that can provide services for employees in health institutions (8). In studies, it is emphasized that it is important for physicians to make a special effort to improve themselves in the field of statistics and/or research in their busy working life after undergraduate or specialty education, to have accessible training opportunities such as online trainings suitable for limited time and to evaluate the effectiveness of these trainings (13).

This study was conducted to evaluate the achievement of the goal of increasing the competence of physicians in the field of biostatistics by distance biostatistics training for the members of an educational foundation established by physicians, to define the participation and attendance status of the training, and to determine the relationship between participation status and training success.

**Materials and Methods**

**Study design**

This study, which conducted between October 21, 2020 and December 30, 2020, has an observational descriptive type. It was prepared with 283 people who were members of an educational foundation established by physicians and participated in biostatistics training. Only 33.3% of the participants (21 people attended 4-6 courses and 45 people attended 1-3 courses). Therefore, among those who did not attend any course, two people were matched according to age (±5 years) and gender for each person who attended. Duplicate respondents and participants other than those matched were excluded from the study. Accordingly, a total of 198 people were included in the analyses, 132 of whom did not attend the courses and 66 of whom attended the courses. Sample selection is detailed in Figure 1.

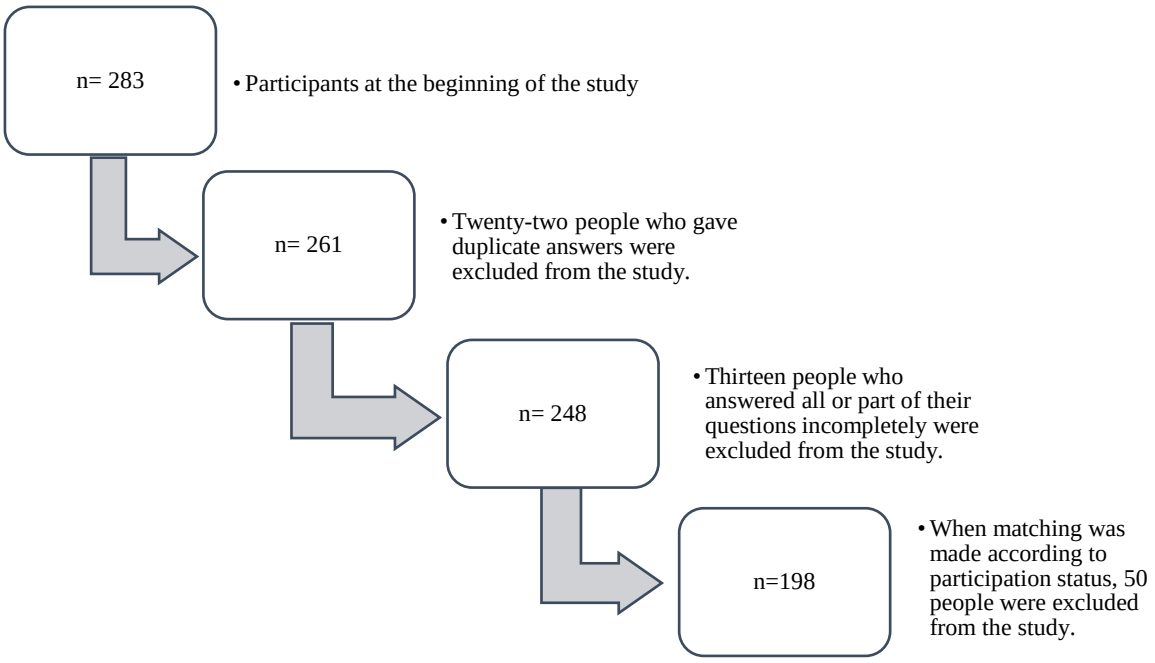


**Figure 1. Sample selection of the study**

The course consisted of a total of 6 lectures (1-2 hours in duration) on evidence-based medicine, research methods, theoretical basic biostatistics and applied biostatistics, one week apart. The training was delivered online via "Zoom Video Communications". Participation status of the persons to the training was recorded and tracked according to the time they appeared online on the system. The trainer (MO) was an experienced biostatistician and a specialist physician who is an associate professor of public health. The online courses were recorded and made available to the participants for 6 months. In order to ensure instructor-participant interaction in online education, complementary practices were conducted immediately after the theoretical information in the lessons. No homework was assigned and no interim assessment was made. Although preliminary work was done to avoid technical problems during the training, it was not possible to participate in the lessons from Apple/Mac operating systems, and the training could only be carried out on Windows operating systems. Participants were administered the 'Biostatistics Basic Knowledge Level Questionnaire' consisting of 20 questions developed by the researchers before starting the training (first test) and at the end of the training (post-test). While the questionnaire was being developed, it was piloted by a group of 10 doctors consisting of Public Health Specialists. As a result of the pilot application, the questions that were not understood or thought to be far from measuring information were revised and the questionnaire was finalized. There are technical questions in the questionnaire that measure knowledge about biostatistics. For example, 'Cox regression analysis is a univariate analysis'. The answers that the participants can give to these questions are "yes, no and don't know". The minimum score was set as '0' and the maximum score was set as '20', with the correct answer scoring '1' and incorrect and don't know answers scoring '0'. Cronbach's alpha test was used to evaluate the internal consistency of the questionnaire and a satisfactory result was obtained (Cronbach's Alpha = 0.83).

**Statistical Analysis**

The research data were collected in the virtual (online) environment with the help of "Google Survey" and transferred to IBM SPSS (Version 23.0) program in computer environment with MS Office programs and analyzed. The conformity of the variables to normal distribution was examined by histogram plots and Kolmogorov-Smirnov test. Mean±standard deviation and percentage values were used to present descriptive analyses. Analysis of covariance (ANCOVA) analysis was used to compare the scores obtained from the Biostatistics Basic Knowledge Level Questionnaire. The results were evaluated with 95% confidence interval and margin of error $p<0.05$.

**Ethical Consideration**

The online written informed consent of all participants included in the study and the permission of Osmaniye Korkut Ata University Scientific Research and Publication Ethics Committee (Decision No: 2021/4/4) were obtained. No fee was charged by the trainers or the foundation for the training (course).

**Results**

A total of 198 physicians, 92.9% of whom were women, participated in the study. The mean age of the subjects was 37.7±5.7 years (min-max 27-59). Their average professional experience was 13.4±5.6 years. 67.7% of the participants worked in internal sciences, 63.6% were consultants and 24.2% were academicians. As can be seen in Table 1, 77.8% of the participants were married.

**Table 1. Demographic characteristics of the participants**

| Demographic characteristics | | n | % |
|---|---|---|---|
| **Gender** | Male | 14 | 7.1 |
| | Female | 184 | 92.9 |
| **Marital Status** | Single | 36 | 18.2 |
| | Divorced/spouse deceased | 8 | 4.0 |
| | Married | 154 | 77.8 |
| **Professional Title** | Academician | 48 | 24.3 |
| | Research Assistant | 24 | 12.1 |
| | Specialist Doctor | 126 | 63.6 |
| **Department** | Internal Departments | 134 | 67.7 |
| | Surgical Departments | 48 | 24.2 |
| | Basic Science Departments | 16 | 8.1 |

Among the participants, 80.8% stated that they attended the training in order to be able to do their own statistics in scientific research. While 5.6% of the participants stated that they would like to receive advanced statistics training, 5.1% stated that they would like to reach basic statistical knowledge. Expectation from the training is high or very high in 79.3% of the respondents. When the scientific publication status of the participants in the study presented in Table 2 is analyzed, it is seen that those with ULAKBIM/TR Indexed or International indexed publications are above 60% in both categories. However, only 19.7% of the participants had received biostatistics education outside the medical faculty.

**Table 2. Participants' opinions on education and scientific publication status**

| | | n | % |
|---|---|---|---|
| **Reason for attending the training** | To study advanced statistics | 11 | 5.5 |
| | To learn enough to make your own statistics | 160 | 80.8 |
| | To understand the statistics made in the articles | 17 | 8.6 |
| | To reach a basic level of statistical knowledge | 10 | 5.1 |
| **Expectation level from education** | Low | 2 | 1.0 |
| | Moderate | 39 | 19.7 |
| | High | 88 | 44.5 |
| | Very high | 69 | 34.8 |
| ULAKBIM/ TR indexed scientific publications | | 127 | 64.1 |
| International indexed (ESCI, SCI-E, etc.) publications | | 120 | 60.6 |
| Those who have any prior statistics education (other than medical faculty) | | 39 | 19.7 |

When the competencies required to conduct a scientific research were examined, 54% of the participants had no experience in sample analysis, 32.3% had experience in preparing ethics committee documents, 28.8% had experience in preparing institutional permission documents and 28.3% had moderate experience in data entry into SPSS. For basic statistical analysis, 40.4% of the participants had no experience, while 34.3% had little experience (Table 3).

In the present study. after the online biostatistics training. regardless of professional title and department. the score change was not significant in those who did not attend the courses at all ($p=0.306$). while the score increased significantly in those who attended less than half and more than half of the courses ($p<0.001$ for both) **(Table 4 and Figure 1).**

**Table 3. Participants' level of experience in some areas necessary for scientific publication**

| | Level of Experience | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | None | | Less | | Moderate | | High | | Very High | |
| | n | % | n | % | n | % | n | % | n | % |
| Sample analysis | 107 | 54.0 | 55 | 27.8 | 27 | 13.6 | 8 | 4.0 | 1 | 0.5 |
| To be able to prepare an ethics committee application form | 11 | 5.6 | 32 | 16.2 | 64 | 32.3 | 63 | 31.8 | 28 | 14.1 |
| To be able to prepare institution permit documents | 28 | 14.1 | 39 | 19.7 | 57 | 28.8 | 45 | 22.7 | 29 | 14.6 |
| To be able to enter data to SPSS | 43 | 21.7 | 40 | 20.2 | 56 | 28.3 | 41 | 20.7 | 18 | 9.1 |
| To be able to perform basic statistical analysis | 80 | 40.4 | 68 | 34.3 | 36 | 18.2 | 11 | 5.6 | 3 | 1.5 |
| To be able to use bibliography programs | 97 | 49.0 | 44 | 22.2 | 27 | 13.6 | 22 | 11.1 | 8 | 4.0 |
| Ability to upload articles to the journal | 54 | 27.3 | 36 | 18.2 | 48 | 24.2 | 38 | 19.2 | 22 | 11.1 |

**% Percentage of row**

**Tablo 4. The relationship between participation in training and "Biostatistics Basic Knowledge Level Questionnaire" score**

| Training attendance status | | Mean | Std. Error | %95 Confidence Interval | | p |
|---|---|---|---|---|---|---|
| | | | | Lower CI | Upper CI | |
| Never Participated | Post-before training | 0.108[a] | 0.221 | -0.327 | 0.543 | 0.306 |
| ≤50% of participation[1] | Post-before training | 3.291[a] | 0.382 | 2.538 | 4.045 | <0.001 |
| >50% of participation[2] | Post-before training | 9.234[a] | 0.553 | 8.142 | 10.325 | <0.001 |

**a: The covariates in the model are Professional Title = 3.041 and Department = 1.396. 11-3 courses. 2 4-6 courses**

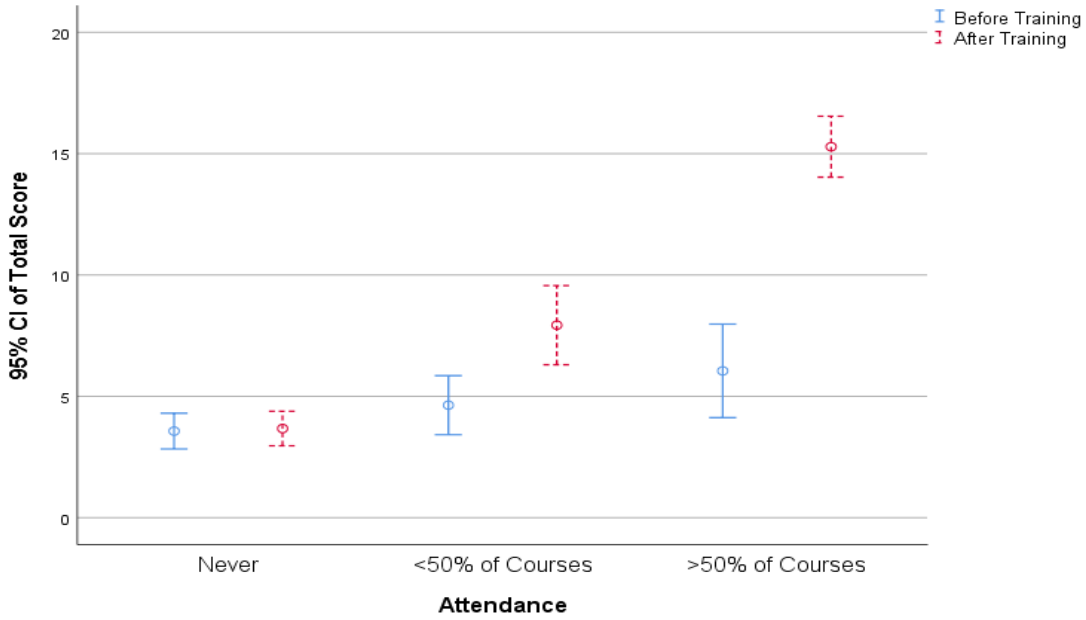


**Figure 2. The relationship between participation in training and "Biostatistics Basic Knowledge Level Questionnaire" score**

## Discussion

In this study, we evaluated the results of online biostatistics training provided to physicians under COVID-19 pandemic conditions. A total of 198 physicians, the majority of whom were women, with an average age of 37.7 years, 63.6% from internal medicine sciences and 67.7% specialists participated in the study. In distance education models, it is recommended that the target group should be suitable for this education model for the effectiveness of education (14). Considering the age and education level of the participants, it is understood that they can adapt to the distance education model. In order to provide effective online education in large groups,

it is recommended to use a suitable online platform, to develop strategies to maintain the attention of the participants, to have people with different abilities in the group, and to support learning with practice. Although biostatistics education is a suitable field for online education due to the nature of the field, health professional groups also constitute a suitable audience for such education (8).

It is seen that 80.3% of the participants did not have a biostatistics education (except for the biostatistics education received at the faculty of medicine) and 80.8% of them participated in the training in order to make their own statistics in scientific research. In a study conducted among specialist physicians in Turkey, 86.3% of the participants stated that they received a training on biostatistics during their specialty training, but 87.2% of them stated that the biostatistics training received during undergraduate and 84.6% during specialty training was insufficient (8). In a study conducted among pathologists, 18 statistical tests used in the field of pathology were determined and the level of knowledge of the participants was questioned, and the level of knowledge for these statistical tests was associated with having received additional statistical training before (15). It is seen that the training provided at the level of medical faculty and specialty education on biostatistics is insufficient and additional training is needed.

After the online biostatistics training, the score changes of those who did not attend the courses at all was not significant regardless of professional title and department. When the adjusted score differences of the participants according to their professional titles and departments were examined, it was determined that those who attended more than half of the trainings had the highest score differences. Those who participated in less than half of the trainings also had a significant score difference compared to those who did not participate at all. These results show that the effectiveness of the trainings is related to the level of participation in the training. Although 66.6% of the participants enrolled in the courses, they never attended the courses. In an evaluation conducted during the COVID-19 pandemic, it was stated that distance education may reduce student attendance and motivation, and that formative assessment that can provide rapid feedback to students in online courses is important for the success of education (16). In the same study, it was stated that the previous use of technology in education was one of the main factors determining the success of education in the early 2000s when online education was just beginning to be implemented (16). In other studies, it has been stated that flexible learning conditions and recording of courses will play an important role in increasing educational success (17,18). In this study. the trainings were recorded and it was tried to provide the opportunity to benefit from the training at flexible hours for the groups who could not participate in class hours.

**Limitations**

One of the limitations of the study is that the reasons why these people did not continue the training were not questioned. The fact that those who used Mac operating systems during the training could not participate in the training may have caused more or less than expected differences between the groups. Since the operating system used by those who did not participate in the training was not questioned and therefore the characteristics of this group were not known. the situation could not be checked during the analysis. For similar future studies aiming to increase scientific literacy in health research. it would be useful to question the participants' previous online training experiences. to continue biostatistics support to the participants in the long term. to conduct interim evaluations and to evaluate the participants together with their publication outputs.

Possible reasons for course non-attendance leading to failure to achieve the desired success, which have been shown in the literature, may be connection problems, previous experiences, inexperience in the use of technology. The fact that the trainings can only be attended through the Windows operating system may have affected course absenteeism. In addition, the majority of the participants were married, working female physicians with an average age of 38. Although the participants were not questioned about having children and the number of children, considering the effect of the closure of schools and kindergartens during the pandemic on the care of children, women's invisible housework load (secondary shift) may have caused them not to spare time for trainings.

The people included in the study are a group who voluntarily want to receive biostatistics training and are not a representative sample of all physicians; therefore, the results of the study should be evaluated without generalization. It will only be possible to determine whether the goal of learning enough biostatistics to be able to perform their own statistics, which is included in the individual goals of the participants in the study, has been achieved by evaluating the results of the study in the longer term. No additional interviews were conducted with those who did not continue the training and no intervention was made to increase motivation.

Situations that affect the gathering of people such as epidemics also affect education and training activities, and distance education models emerge as a solution. However, considering that "lifelong learning" has become a necessity, it is important to increase post-graduate continuing education opportunities and to ensure that it is

accessible to everyone. In this study, although participation was not compulsory, a general analysis of the relationship between participation in the training and course success is presented. The high success rate after the training, even for those who attended only a part of the courses, shows that such training models should be developed. Despite its limitations, this study suggests that online biostatistics trainings can be effective for improving the concept of biostatistics literacy. but additional studies are needed to increase attendance to the courses.

**Conclusion**

It has been observed that physicians made efforts to participate in academic trainings even during the pandemic period. Distance education models can create equality of opportunity, enhance the learning experience, support development and overcome geographical limitations, especially for those living outside metropolitan areas.

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# The Effect of Preoperative Anxiety and Depression on Edema and Ecchymosis in Rhinoplasty Surgery

*Rinoplasti Cerrahisinde Preoperatif Anksiyete ve Depresyonun Ödem ve Ekimoz Üzerine Etkisi*

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**Abstract**

**Background**: Periorbital edema and ecchymosis are frequently observed after rhinoplasty. Stress response, inflammation and catabolic process affect the formation of edema and ecchymosis. Anxiety and stress response have an effect on wound healing and postoperative recovery. This study aimed to investigate whether preoperative anxiety and depression levels affect periorbital edema and ecchymosis.

**Materials and Methods:** In this study, 94 (51 female, 43 female) patients were assessed. Beck Anxiety and Beck Depression scales were filled 1 hour before surgery by the patients. The relationship between edema and ecchymosis that may occur after surgery and anxiety, depression and quality of extubation was evaluated.

**Results:** According to this study there was not correlation between preoperative anxiety, depression, extubation quality and edema, ecchymosis and no statistically significant difference was found (p>0.05).

**Conclusion:** Anxiety and depression, which are commonly seen before surgery, had no effect on periorbital edema and ecchymosis.

**Keywords:** Rhinoplasty, Edema, Ecchymosis, Anxiety, Depression.

**ÖZ**

**Amaç:** Rinoplasti sonrası periorbital ödem ve ekimoz sıklıkla görülür. Stres yanıtı, inflamasyon ve katabolik süreç ödem ve ekimoz oluşumunu etkiler. Anksiyete ve stres cevabın yara iyileşmesi ve ameliyat sonrası derlenme üzerinde etkisi vardır. Bu çalışmanın amacı preoperatif anksiyete ve depresyon düzeylerinin periorbital ödem ve ekimozu etkileyip etkilemediğini araştırmaktır.

**Gereç ve Yöntem:** Bu çalışmada 94 (51 kadın, 43 kadın) hasta değerlendirildi. Beck Anksiyete ve Beck Depresyon ölçekleri ameliyattan 1 saat önce hastalar tarafından dolduruldu. Cerrahi sonrası görülebilen ödem ve ekimoz ile anksiyete, depresyon ve ekstübasyon kalitesi arasındaki ilişki değerlendirildi.

**Bulgular**: Bu çalışmaya göre preoperatif anksiyete, depresyon, ekstübasyon kalitesi ile ödem, ekimoz arasında korelasyon yoktu ve istatistiksel olarak anlamlı fark bulunmadı (p>0,05).

**Sonuç:** Ameliyat öncesi sıklıkla görülen anksiyete ve depresyonun periorbital ödem ve ekimoz üzerine etkisi yoktur.

**Anahtar Kelimeler:** Rinoplasti, Ödem, Ekimoz, Anksiyete, Depresyon

**Highlights**

- Rhinoplasty patients have mild preoperative anxiety/depression.
- There is no relationship between anxiety/depression and edema /ecchymosis in rhinoplasty patients.
- There is no relationship between patients extubation quality and edema/ecchymosis in rhinoplasty patients.

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**Introduction**

Nasal surgery (rhinoplasty and septoplasty) is a common surgical procedure performed today. Periorbital ecchymosis, edema (1) and pain (2) are common after rhinoplasty and septoplasty surgery. Periorbital edema and ecchymosis that can be seen after rhinoplasty have a negative impact on the quality of recovery and time to discharge. Edema and ecchymosis may cause temporary visual loss, permanent pigmentation, scar tissue formation, and prolonged return to social life (1). The body's stress response, tissue damage, inflammation, and catabolic process are factors involved in the formation of edema and ecchymosis after rhinoplasty.

Anxiety is defined as an emotional state or response consisting of unpleasant tension, worry, nervousness, and activation of the autonomic nervous system (3). Surgical patients may experience anxiety due to surgical procedures and anesthesia. Among adult patients, this rate varies between 48%. Preoperative anxiety leads to more pain, delayed recovery, and decreased patient satisfaction (4).

Preoperative patients frequently have a certain level of anxiety and stress, and anxiety and depression affect inflammation and coagulation (5). After rhinoplasty surgery preoperative anxiety and distress may affect the occurrence of periorbital edema and ecchymosis. This study aimed to investigate whether preoperative anxiety and depression levels affect periorbital edema and ecchymosis, which are commonly seen after rhinoplasty.

**Materials and Methods**

**Study design**

This prospective clinical study was conducted between May 2022 and August 2023 and was approved by Tokat Gaziosmanpasa University Clinical Research Ethics Committee (22-KAEK-079). Patients who agreed to participate in the study provided written informed consent and complied with the Declaration of Helsinki. The study included 100 patients aged 18-65 years, with an American Society of Anesthesiology (ASA) classification of I-II, who were identified as eligible for rhinoplasty with the open osteotomy technique. Patients with anxiety, depression, bleeding and coagulation disorders, and anti-inflammatory and anticoagulant drug use were excluded. All surgical procedures were performed by the same surgeon.

Beck Anxiety and Beck Depression scales were filled 1 hour before surgery by the patients who agreed to participate in the study. After routine blood pressure, heart rate, and blood oxygen saturation (SpO2) monitoring, anesthesia was induced with 1◎/kg fentanyl, 2 mg/kg propofol, and 0.6 mg/kg rocuronium. Anesthesia was maintained throughout surgery with 50% air, ◎50% oxygen, 2% sevoflurane, and 0.25 ◎/kg remifentanil infusion. Mean arterial pressure (MAP) was maintained between 60-65 mmHg throughout the operation. All patients were kept in a semi-sitting position with a 45° angle for 24 hours postoperatively. 10 mg/kg paracetamol and 1 mg/kg tramadol were administered intraoperatively for postoperative pain control and 10 mg/kg paracetamol for postoperative pain. At the end of surgery, the quality of extubation was evaluated with a 5-point Likert scale. 1= no cough, easy breathing, 2= very mild cough (1-2 times), 3= moderate cough (3-4 times), 4= severe cough and difficult breathing (5-10 times), 5=laryngospasm and severe cough, difficult breathing. The relationship between extubation quality and anxiety and depression was compared in the study. All patients were photographed on days 1, 2, and 7 to evaluate postoperative edema and ecchymosis. The scoring system developed by Kara and Gokalan (6) and scored on a scale of 0-4 was utilized for edema and ecchymosis **(Figure 1-2).** Periorbital edema and ecchymosis were evaluated by 3 independent observers. The relationship between these values and the preoperative anxiety and depression values of the patients was investigated.

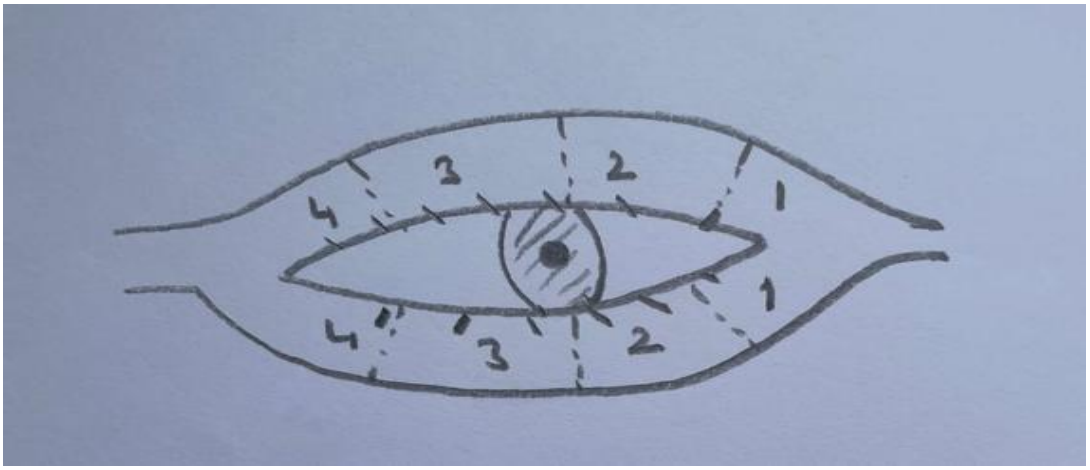


**Figure 1. Level for periorbital ecchymosis: 0 (none), 1 (in the medial canthus), 2 (extending to the pupil), 3 (past the pupil), and 4 (extending to the lateral canthus).**

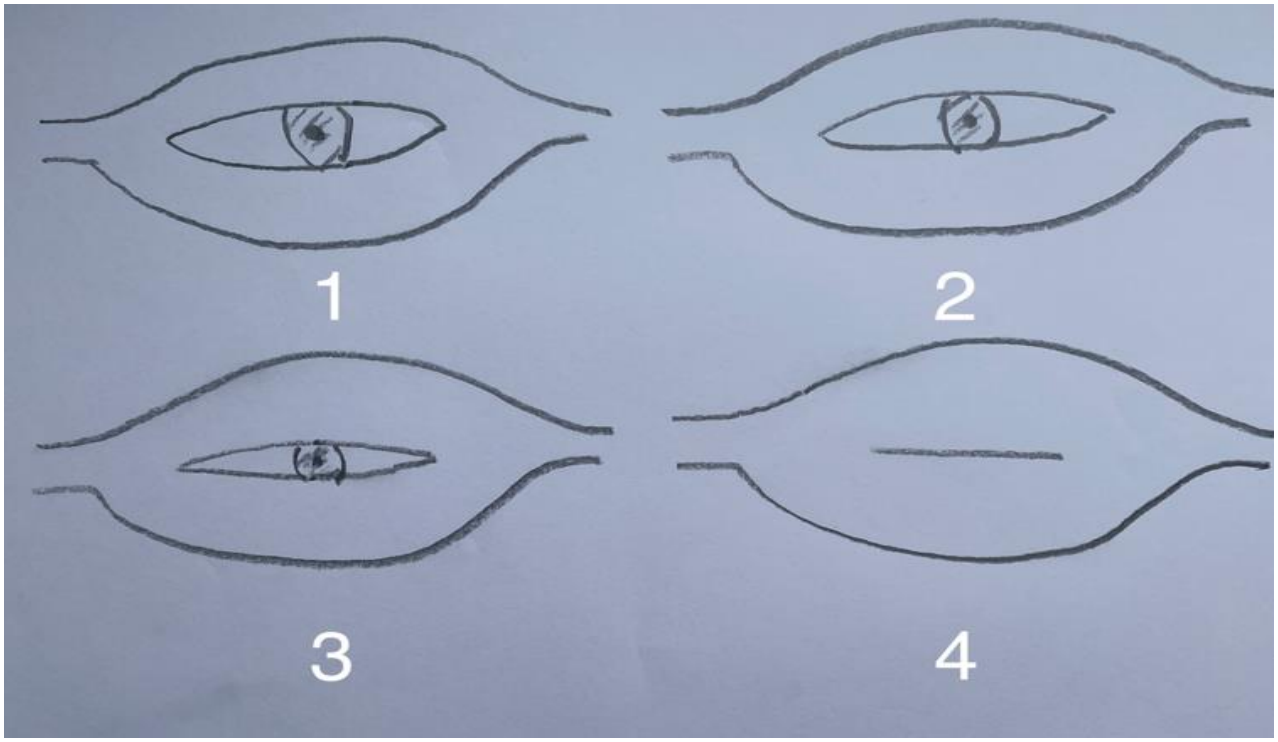


**Figure 2. Scale for eyelid edema: 0 (none), 1 (minimal), 2 (covering to the iris), 3 (extending to the pupil), and 4 (massive edema).**

**Statistical Analysis**

The sample size was calculated with a type 1 error value of 0.05, power of 0.80, ◎:0.2, and r= 0.30 (low-level relationship) between anxiety and edema score, and 85 patients were considered sufficient for the study. Numerical data were expressed as mean and standard deviation and categorical data as numbers and percentages. The normal distribution of the data was evaluated by one sample Kolmogorov-Smirnov test. Correlation analysis was employed to investigate the relationship between anxiety and depression and edema and ecchymosis. Statistical Package for Social Sciences (SPSS, IL) version 21.0 was used to evaluate all data. The statistical significance value was considered as $p<0.05$ when analyzing the data.

**Results**

In this study, 94 (51 female, 43 female) patients were assessed (**Figure 3).** The patients' demographic information and preoperative anxiety, depression, extubation quality and first day edema, second day edema, seventh day edema and first day ecchymosis, second day ecchymosis, seventh day ecchymosis values is shown in **Table 1**. The average preoperative anxiety and depression values were 10.35±10.96 and 13.25±10.61, respectively. The mean first day edema, second day edema, seventh day edema and first day ecchymosis, second day ecchymosis, seventh day ecchymosis values were 2.0±0.89, 2.11±0.92, 1.17±0.40, 3.12±0.87, 3.13±0.85, 2.47±0.91 respectively. According to the results there was not correlation between preoperative anxiety, depression, extubation quality and edema, ecchymosis and no statistically significant difference was found ($p>0.05$), **(Table 2).**

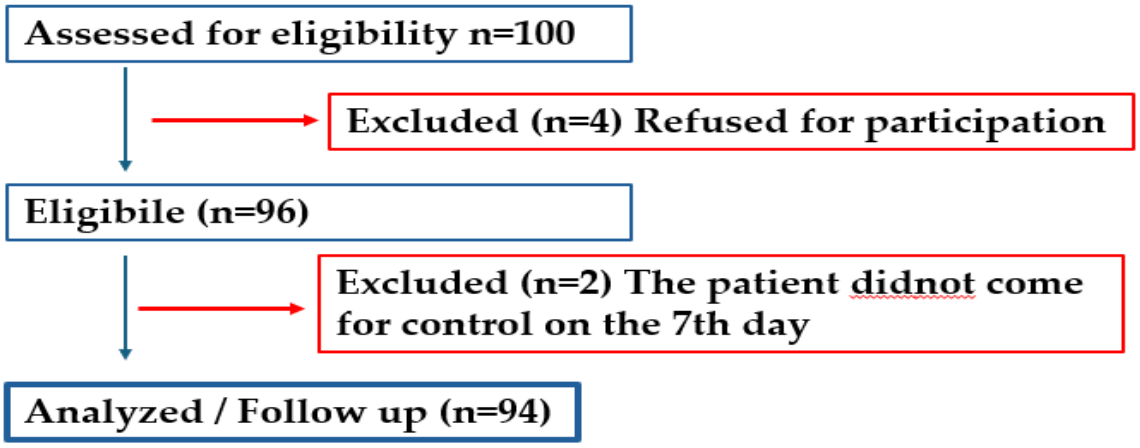


**Figure 3. Flow chart**

**Table 1. Descriptive analysis of the demographics, predictors, and outcomes**

| Variable | | n | Mean ± SD |
|---|---|---|---|
| **Demographics** | Age (years) | | 26.67 ± 8.6 |
| | Gender (Female/Male) | 51/43 | |
| | ASA(I/II) | 72/22 | |
| | Comorbidity (-/+) | 19/75 | |
| | Duration of surgery(hour) | | 2.11 ± 0.42 |
| | Blooding during surgery (ml) | | 120 ± 40 |
| **Predictors** | | | Median (min-max) |
| | Anxiety | | 6 (0-45) |
| | Depression | | 12.5 (0-47) |
| | Extubation quality | | 2 (1-4) |
| | First day edema | | 2 (1-4) |
| | Second day edema | | 2 (1-4) |
| | Seventh day edema | | 1 (1-3) |
| | First day ecchymosis | | 3 (1-4) |
| | Second day ecchymosis | | 3 (1-4) |
| | Seventh day ecchymosis | | 3 (1-4) |

ASA, American Society of Anesthesiologists

**Table 2. Correlations among predictors and outcomes**

| Predictors | Predictors or outcomes (n =94) | Correlation coefficients | p |
|---|---|---|---|
| **Beck anxiety** | First day edema | 0.039 | 0.711 |
| | Second day edema | 0.030 | 0.777 |
| | Seventh day edema | 0.020 | 0.852 |
| | First day ecchymosis | 0.018 | 0.865 |
| | Second day ecchymosis | 0.010 | 0.923 |
| | Seventh day ecchymosis | 0.113 | 0.280 |
| **Beck depression** | First day edema | 0.038 | 0.718 |
| | Second day edema | 0.053 | 0.614 |
| | Seventh day edema | 0.058 | 0.535 |
| | First day ecchymosis | -0.054 | 0,606 |
| | Second day ecchymosis | -0.008 | 0.938 |
| | Seventh day ecchymosis | 0.004 | 0.968 |
| **Extubation quality** | First day edema | -0.085 | 0.414 |
| | Second day edema | -0.104 | 0.318 |
| | Seventh day edema | -0.202 | 0.051 |
| | First day ecchymosis | 0.025 | 0,809 |
| | Second day ecchymosis | 0.075 | 0.471 |
| | Seventh day ecchymosis | 0.088 | 0.400 |

**Discussion**

This is the first study to investigate the effect of preoperative anxiety and depression on edema and ecchymosis in rhinoplasty surgery. The findings of this study showed that there was no correlation between periorbital edema and ecchymosis, which have an impact on the quality of recovery and discharge of patients after rhinoplasty, and the level of anxiety and depression that can often be observed in patients before surgery. The neuroendocrine and neurohumoral response triggered by anxiety is a response to the body's hemostatic system (coagulation and fibrinolysis). Inadequacy in this response leads to changes associated with atherosclerosis and thrombosis (5). Different studies have been carried out investigating anxiety and homeostasis. Numerous studies show that psychological stress and anxiety have an effect on coagulation and fibrinolysis through mediators (7). In a study by Dululas et al. (8), depression was found to be correlated with coronary artery disease and different hemostatic parameters. In the study conducted by Geiser et al. (9), it was observed that fibrinolysis was impaired, and coagulation was activated in patients with anxiety and depressive disorders.

In another study, it was observed that coagulation levels (Factor VII, von Willebrand factor (vWF) were found to be high in the patient group and that these effects on coagulation recovered with the improvement of psychiatric symptoms after psychotherapy and treatment (10).
Stress response after trauma and injury causes immunological, hematological, and endocrine responses. Inflammation and hemorrhage of soft tissues are the most common causes of edema and ecchymosis (11). The duration of surgery, the procedure performed, and the coagulation status are effective in the formation of ecchymosis (12), which occurs especially with damage to vascular structures (11).
There were studies in which different drugs such as lidocaine, adrenaline, and steroids (1), and various surgical (13) and anesthesia techniques (14) were applied for the prevention of edema and ecchymosis, which affect the quality of recovery and discharge of the patient in rhinoplasty surgery. This study, which investigated the relationship between preoperative anxiety and depression levels and edema and ecchymosis in a different way, found no significant relationship. It is accepted that there is a relationship between anxiety and depressive symptoms with coagulation. The absence of such a relationship in this study may be related to the duration and level of preoperative anxiety.

**Study limitations**

The first limitation of this study is that blood coagulation parameters were not studied. The second limitation is the subjective assessment of edema and ecchymosis. The third limitation is the relatively small sample size.

**Conclusion**

Despite the apparent effect of anxiety and depression on the quality of recovery and discharge of patients, preoperative anxiety and depression showed no effect on the occurrence of edema and ecchymosis.

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