



EFFECTIVENESS OF MEAN PLATELET VOLUME IN DIAGNOSIS OF PATIENTS WITH TESTICULAR TORSION

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ABSTRACT

Introduction: Testicular torsion(TT) is an emergency condition in children and adolescents. If diagnose and treatment are delayed irreversible ischemic injury and testicular loss risk can occur. This study aims to determine the diagnostic value of mean platelet volume(MPV) for patients with testicular torsion. **Materials And Methods:** We retrospectively evaluated 33 patients who were diagnosed with testicular torsion between December 2020 and December 2023 in our institution. 28 healthy controls were selected among healthy subjects referring to our clinic who had no disease at that time. Inclusion and exclusion criteria were created. The patients were divided into two groups; patients with testicular torsion and healthy subjects. We evaluated the mean platelet volume between the two groups and after surgery. **Result:** MPV was significantly higher in the group with torsion and its levels were found significantly decreased compared with the control group ($p < 0,001$). The platelet levels were also lower in torsion patients compared to the control group and the difference was statistically significant ($p < 0,001$). The significant difference in the levels of MPV and the control group was dissolved after the surgery ($p < 0,001$) **Conclusion:** We don't have any specific laboratory marker to determine testicular torsion. MPV can be a useful parameter for patients with testicular torsion and may support to evaluation of differential diagnosis for acute scrotal pathologies without wasting time for surgical intervention.

KEYWORDS : platelet testicular torsion, mean platelet volume

INTRODUCTION

Acute spermatic cord torsion or testicular torsion is an urological emergency condition in children and adolescents. It is characterized by testicular rotation around the cord. It disrupts blood supply and if treatment is delayed necrosis occurs. The treatment is urgent surgical intervention including orchidopexy or orchidectomy, according to testicle viability (1,2). The classic symptom of testicular torsion is sudden scrotal pain. Nausea and vomiting may occur, and in delayed cases, severe scrotal edema may develop. Physical examination findings include an abnormal testicular position and tenderness. If diagnosis and treatment are delayed, irreversible ischemic injury starts, and testicular function and testicular loss risk can occur. The etiology of testicular torsion is unclear (3).

The role of serum biochemical markers in determining spermatic torsion is controversial. Cheap, available markers could provide rapid diagnosis and prevent wasting time for the operation.

Platelets play a very important role in the pathogenesis of atherosclerotic complications by contributing to thrombus formation(4).

Mean platelet volume(MPV) is a commonly used measure of platelet size and shows us platelet activation. This marker is an available, simple, and inexpensive test that is easy to interpret in our clinic practice. MPV levels are a determinant factor for ischemic episodes like diabetes mellitus(5,6), myocardial infarction(7,8), ischemic stroke(9), smoking(10), and renal artery stenosis(11).

Testicular torsion due to the underlying ischemic pathology of the spermatic cord, we researched whether platelet activity increases in this patient group and improves after surgery. Our first aim was to determine the diagnostic value of MPV for patients with testicular torsion, second aim was to evaluate using MPV for differential diagnosis for acute scrotal pathologies without wasting time for surgical intervention.

MATERIALS AND METHODS

Design

This was a retrospective case-control study. The patients were divided into two groups; patients with testicular torsion and healthy subjects. Our study was approved by the Institutional Ethics Committee.

Inclusion criteria

Males of all ages diagnosed as having testis torsion were included.

Exclusion criteria

Patients with cardiovascular disease, hepatic or renal failure, using anticoagulant-antiplatelet medications, previously detected malignancy, diabetes mellitus, hyperthyroidism, pregnancy, chronic obstructive pulmonary disease, and smoking were excluded from our study.

Participants

Our study included 33 diagnosed testicular torsion patients and 28 healthy control patients admitted to our clinics. We retrospectively evaluated the patient who was diagnosed with testicular torsion between December 2020 and December 2023 in our institution. All the patient's laboratory test was recorded at diagnosis time and after surgery. Controls were selected among healthy subjects referring to our clinic who had no disease at that time.

Laboratory methods

Biochemical measurements were performed at the laboratory in Private Abat Medical Center and Firat Medical Faculty using an autoanalyzer (Beckman Coulter LH 780 Haematology System).

Statistical analysis

All statistical analyses were performed with the Statistical Package for the Social Sciences (SPSS) 15.0 Package (SPSS Inc., Chicago, IL, USA). Descriptive statistics were presented as arithmetic mean \pm Standard deviation. The significance of the mean differences between groups was assessed by the Student's *t*-test and Mann-Whitney test. Also, the

nonparametric Wilcoxon Signed Ranks test is used to test for differences between related (paired) samples. Relationships between variables were tested using Pearson's correlation analysis. ROC curve graphics were used in the comparison of sensitivity and specificity. P values of less than 0.05 were regarded as significant.

RESULTS

A total number of 33 patients with diagnosed testicular torsion patients were evaluated and 30 were included in our study. The control group consisted of 28 people. The mean age was found 21.6 ± 4.8 in torsion patients and 23.1 ± 4 in the healthy group. There was no significant difference between the age groups (p=0.19). The demographic dispersion of the subjects is summarized in Table 1.

Table-1: Baseline characteristics of patients and control group

	Torsion patients	Controls	p
Number of group	30	28	0.19
Age (years)	21,6±4.8	23,14±4	

In torsion patients, platelet count was detected as 143± 55.3 x 109 /L and MPV as 10.6±1.5fl; which was 151 ± 38.9.x 109 /L and 8.1 ± 1.2 fl in control group.

MPV was significantly higher in the group with torsion and its levels were found significantly decreased compared with the control group (p<0,001). The platelet levels were also lower in torsion patients compared to the control group and the difference was statistically significant (p<0,001). The parameters are reported in Table 2.

Table-2: Baseline MPV and PLT levels of study groups

	Patients (n=30)	Controls (n=28)	p
MPV (fL)	10,6±1,5	8,1±1,2	<0,001
PLT (x10 ⁹)	143±55,3	151±38,9	<0,001

The significant difference in the levels of MPV and the control group was dissolved after the surgery (p<0,001). The affect of surgery on MPV and platelet levels in patients with torsion is given in Table 3.

Table-3: Before and after surgery levels of MPV and PLT

	Before surgery	After surgery	p
MPV (fL)	10,6±1,5	9,7±1,2	<0,01
PLT (x10 ⁹)	143±55.3	145±68	0,85

DISCUSSION

Testicular torsion is caused by the torsion of the spermatic cord within the space of the tunica vaginalis. Intravaginal torsion of the spermatic cord is an emergency condition, with a risk of irreversible ischemic injury to testicular function if not immediately treated (12,13).

The incidence of testicular torsion under 18 years of age is estimated to be 3.8 per 100.000 (14). The mechanism is not clear yet. Bell-clapper deformity, trauma, exercise, and hyperactive cremasteric reflex are involved in testicular torsion(12,13).

Urgent diagnosis is important to preserve testicular function and to prevent other associated morbidity. Diagnosis is made by symptoms careful physical examination and ultrasound findings. Yapanoğlu and friends showed that the sensitivity and specificity of Doppler ultrasonography were 94% and 100%, in the diagnosis of testicular torsion(15) In another study, the sensitivity of Doppler ultrasonography in patients with acute scrotum was 88.9% and specificity was 98.8%(16).

Symptoms of testicular torsion are relatively nonspecific. The role of the serum biochemical markers in determining testicular torsion is controversial. We need an easily and available serum marker that leads to fast diagnosis for

surgical evaluation in emergency rooms.

Mean platelet volume(MPV) is available, simple, and inexpensive test for indicating platelet activation. Its level is a determinant factor for ischemic episodes like myocardial infarction(17), ischemic stroke (18), and renal artery stenosis(19). Testicular torsion is also a disease of ischemic origin of the spermatic cord.

The differential diagnosis with other testicular diseases is very important because a delay in diagnosis may cause irreversible consequences. Doppler ultrasound shows a specificity of %97-100 (20), but we don't have any specific laboratory marker to determine testicular torsion. Maybe MPV can be useful parameter for patients with testicular torsion and may support the evaluation of differential diagnosis for acute scrotal pathologies without wasting time for surgical intervention.

Günes and friends found a significant difference in terms of platelet levels between TT and controls as in our study. But no significant difference between TT and MPV(21), contrarily we found a significant difference between TT and MPV.

In conclusion; MPV can be a useful parameter for patients with testicular torsion and may support to evaluation of differential diagnosis for acute scrotal pathologies without wasting time for surgical intervention.

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