Mean Platelet Volume and Testicular Torsion: New Findings

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Introduction: Testicular torsion is an emergency at any age; the aim of this study is to evaluate the role of mean platelet volume to assess the viability of the testes before surgery

Materials and methods: We retrospectively analysed the medical records of consecutive patients who underwent surgical exploration for acute scrotal pathology between January 2014 and December 2016 in our institution. Patients were divided into two groups (detorsion of testes and orchyectomy); a third group was created as control group. All patients underwent blood exam before surgery; inclusion and exclusion criteria were created. We also evaluated the association between mean platelets volume and the testicular recovery during surgery

Result: After reviewing medical charts following the inclusion and exclusion criteria, 8 patients were enrolled in Group 1 and 11 patients in Group 2. 33 healthy controls were enrolled in Group 3. MPV value in Group 1 resulted significantly different ($p < 0.01$) from the value in Group 2 and 3. The duration of symptoms was shorter than 6 hours in 4/8 (50%) patients in Group 1; this early referral to hospital allowed prompt detorsion and testicular recovery. In these "early-presenting" patients, MPV value was significantly lower than in patients with torsion of testicular appendage ($p = 0.01$) and in controls ($p = 0.001$).

Conclusion: MPV could be a useful adjunct in diagnosing TT, aiding its differential diagnosis with Torsion of the testicular appendage. The lower MPV value in "early-presenting" patients with TT suggests a role in predicting the testis viability, and therefore the appropriate treatment.

Keywords: mean platelet volume; pediatric; testicular torsion.

INTRODUCTION

Testicular torsion (TT) occurs in 1 out of 4000 males younger than 25 years[(1)]. The differential diagnosis with other conditions, such as epididymo-orchitis (EO) and torsion of the testicular appendage (TTA), remains challenging. Testis' viability decreases after 6 hours after onset of symptoms, therefore a prompt diagnosis is necessary[(2)]. The risk of testicular loss and unnecessary surgery improved the need for novel diagnostic techniques. Recent studies focused on the role of hematologic parameters, such as mean platelet volume (MPV), in diagnosing TT[(3)]. The present study aimed to evaluate this parameter in diagnosing TT and in its differential diagnosis with other acute scrotal pathologies.

MATERIALS AND METHODS

We retrospectively analysed the medical records of consecutive patients who underwent surgical exploration for acute scrotal pathology between January 2014 and December 2016 in out institution, a tertiary referral centre. Patients were divided into two groups: patients diagnosed with TT (Group 1) and patients with other acute scrotal pathologies (Group 2). Patients with peri-natal (extravaginal) torsion and with history of scrotal trauma were excluded. Controls were selected among healthy subjects referring to our Hospital for elective non-genitourinary surgery (Group 3); a complete blood count was performed as common practice before the surgical procedure. Patients from Group 1 and 2 had a blood count performed at time of the admission at the emergency department (ED). Clinical features, colour Doppler ultrasound (CDUS) and laboratory findings were compared. Duration of symptoms in Group 1 was classified as longer or shorter than 6 hours. Statistical analysis was performed using the Chi-Square, student t-test and Fisher exact tests with a P value less than .05 considered as significant.

RESULTS

During the study period 14 patients with testicular torsion, 19 with torsion of testicular appendage and 33 as controls were considered. After reviewing medical charts 8 patients were enrolled in Group 1 and 11 patients in Group 2 and all 33 healthy controls in Group 3. those patients excluded were considered only for the mpv value but not for the timing of symptoms. Patients' characteristics are resumed in **Table 1**. MPV value in Group 1 resulted significantly different ($p < 0.01$) from the value in Group 2 and 3 (**Table 2**). The duration of symptoms was shorter than 6 hours in 4/8 (50%) patients in Group 1; this early referral to hospital allowed prompt detorsion and testicular recovery. In these "ear-

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Received July 2017 & Accepted November 2017

Table 1. General characteristics of study population

	Group 1 (n=8)	Group 2 (n=11)
Mean age (years)	13 (12-15)	10 (8-13)
Side, left	4 (50)	7 (64)
Symptoms duration < 6 hours	4 (50)	1 (10)
Clinical findings		
Swelling	8 (100)	3 (27)
Erythema	8 (100)	5 (45)
Fever	1(12)	0
Vomit	2 (25)	0
CDUS, blood flow		
Absent	4 (57)	3 (43)
Decreased	-	1 (10)
Equal	-	5 (50)
Increased	-	4 (40)
Detorsion	4 (50)	-

Table 2. Hematologic parameters of the study population

	Group 1	Group 2	Group 3
Mean age (years)	13 (12-15)	10 (8-13)	13 (10-17)
Laboratory results			
MPV (fL)			
< 6 h	6.5 (5.5-7.4)	8.1 (6-10.1)	8.25 (7-10.2)
> 6 h	6.18 (5.9-6.4)		
	6.83 (5.5-7.4)		
PLT (103/µL)	306.250	298.360	253.430

Mean values are shown (range)
MPV, mean platelet volume
PLT, platelet count

ly-presenting" patients, MPV value was significantly lower than in patients with TTA ($p = 0.01$) and in controls ($p = 0.001$).
All patients with TT underwent prompt scrotal exploration, with detorsion of the testis; viability was tested by testicluar puncture in three different zones. In cases of testicular necrosis, an orchiectomy was performed.
No significant difference was evidenced in terms of MPV value between Group 2 and Group 3. No significant difference was found between Group 1 and Group 2 in terms of platelet (PLT) count.

DISCUSSION

Testicular torsion is an emergency condition which needs prompt recognition and treatment, in order to avoid gonadal necrosis and subsequent fertility impairment. The differential diagnosis with other acute scrotal pathologies, such as EO and TTA, can be challenging. Clinical and CDUS findings aid the diagnosis, but in certain cases they can lead to unnecessary scrotal exploration. As previously reported, clinical findings show high sensitivity but low specificity (4); on the other hand, CDUS shows specificity of 97-100%[5], but it is limited by high operator-dependence.
In recent years, an effort has been made in order to find useful adjuncts in diagnosing TT. A study conducted by Günes and colleagues[6] found a significant difference in terms of neutrophil to lymphocyte ratio (NLR), platelet to lymphocyte ratio (PLR) and PLT between patients with TT and controls, while no predictive role of MPV value was found. NLR and PLR couldn't be evaluated in our study, since these parameters aren't routinary measured in our ED. A subsequent study conducted by Bitkin and colleagues[3] found PLT count and PLR to be useful in differentiating between epididymitis and TT. MPV value didn't show significant difference between the EO and the TT groups. Moreover, recent studies[3,7] found MPV value significantly higher in the TT group than in the control group, in opposition to our findings. In the present study, 4 out of 8 (50%) patients with TT presented at the ED within 6 hours after onset of symptoms, while 9 out of 10 (90%) patients with TTA referred to hospital later. This finding is consistent with previous reports[7-9]. Detorsion was possible in all these "early-presenting" patients, while orchiectomy was performed in the "late-presenting" ones; as reported in the literature, irreversible loss of the testicle begins after the first 6 hours[10]. MPV value showed significant difference between "early-presenting" patients (< 6 hours) in Group 1 and patients in Group 2 and 3 with a significant cut-off of 6,5 fl. This finding suggests that MPV value could be an indicator of testis viability in selected patients. No significant difference was found between late-presenting patients in Group 1 and the other groups. In conclusion, MPV could be a useful adjunct in diagnosing TT, aiding its differential diagnosis with TTA. The lower MPV value in "early-presenting" patients with TT suggests a role in predicting the testis viability, and therefore the appropriate treatment. Further large studies evaluating MPV role are needed.

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