ORIGINAL ARTICLE

Evaluation of acute traumatic coagulopathy in pediatric trauma patients

Yavuz Selim Ayhan,[1] Ali Korulmaz,[2] Ali Ertuğ Arslankoylu[3]

[1]Private Ruha Academia Hospital, Şanlıurfa-*Türkiye*
[2]Pediatric Intensive Care Unit, Kocaeli City Hospital, Kocaeli-*Türkiye*
[3]Department of Pediatric Intensive Care, Mersin University Faculty of Medicine, Mersin-*Türkiye*

ABSTRACT

BACKGROUND: This study aimed to evaluate acute traumatic coagulopathy in pediatric trauma patients and to assess the effectiveness of coagulopathy-related findings in predicting prognosis.

METHODS: Patients aged between one month and 18 years who were admitted to our hospital due to trauma between October 2016 and January 2021 were included in the study. Demographic data, type of trauma, presence of acute bleeding, history of blood product transfusion, coagulation and hemogram parameters, as well as Glasgow Coma Scale (GCS), Injury Severity Score (ISS), Pediatric Trauma Score (PTS), Pediatric Index of Mortality 2 (PIM2), and Pediatric Logistic Organ Dysfunction (PELOD) scores were recorded. The relationship of each variable with acute traumatic coagulopathy (ATC) was statistically analyzed.

RESULTS: A total of 282 patients, including 196 males and 86 females, were included in the study. The most common injury mechanism was motor vehicle accidents (47.5%), and the most frequent type of injury was head trauma (41.8%). Acute traumatic coagulopathy was detected in 141 patients (66.8%). There were statistically significant differences between the groups with and without acute traumatic coagulopathy in terms of admission body temperature, blood product transfusion, length of stay in the pediatric intensive care unit, GCS, PTS, ISS, PIM2, and PELOD scores ($p<0.05$). Additionally, creatinine, aspartate aminotransferase (AST), alanine aminotransferase (ALT), pH, and HCO3 levels in blood gas analyses were significantly different between the groups ($p<0.05$). However, systolic and diastolic blood pressure, heart rate, urea, platelet count, and lactate levels showed no statistically significant differences between the groups ($p>0.05$). The mortality rate and frequency of blood product transfusion were found to be statistically significantly higher in the group with acute traumatic coagulopathy ($p<0.05$) Exitus was observed in 14 (19.4%) transfused patients, while no deaths were recorded among non-transfused patients.

CONCLUSION: Trauma patients admitted to pediatric intensive care units should be closely monitored due to the risk of developing coagulopathy. The international normalized ratio (INR) can be used independently to predict the prognosis of these patients. Mortality rates are higher in patients who receive transfusions.

Keywords: Acute traumatic coagulopathy; trauma; transfusion; pediatric intensive care.

INTRODUCTION

Trauma is the second leading cause of death after infections in children aged 1-4 years in underdeveloped and developing countries, and it is the leading cause of death in children over 4 years old. In developed countries, it is the leading cause of death among children aged 1 to 14 years.[1,2] In pediatric trauma cases, variations in anatomical structure, physical activity levels, and activity environments based on age lead to differences in the types of accidents and resulting pathologies. Factors such as climate, culture, development level, season, time of day, and age can influence the frequency of trauma

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Address for correspondence: Ali Korulmaz
Pediatric Intensive Care Unit, Kocaeli City Hospital, Kocaeli, Türkiye
E-mail: alikorulmaz@hotmail.com

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exposure in children.[3] The most common cause of death in cases of multiple trauma is severe head trauma.[4]

Hemorrhage is the leading cause of death in patients admitted with trauma. It can result directly from the trauma itself or from a failure to maintain hemostasis in the early stages of injury. Coagulopathy may also contribute to this outcome.[5] Acute traumatic coagulopathy develops in several stages. In the first stage, multiple hemostatic pathways, including fibrinolysis, are activated due to tissue damage. The second stage arises from resuscitation-related factors. The use of colloids and red blood cells leads to the dilution of hemostatic factors. A prothrombotic state may develop, potentially resulting in venous thromboembolism. This can lead to disseminated intravascular coagulation (DIC) in patients who are resuscitated late or inadequately.[6] Although significant progress has been made in trauma management through advancements in technology, knowledge, and clinical experience, acute traumatic coagulopathy (ATC) is still a major problem in trauma patients. It continues to be an independent predictor of mortality and significantly affects survival rates.[5]

Children with severe injuries are at risk of life-threatening complications such as ATC. Because trauma causes cognitive, physiological, and anatomical impairments in children, individualized treatment approaches are often necessary. Patients who survive the initial trauma period should be hospitalized in intensive care units and closely monitored. During the intensive care period, fluid and/or blood product replacement should be administered to correct coagulopathy and reduce mortality. However, the literature on the evaluation of coagulopathy in pediatric trauma patients is limited. The aim of our study is to evaluate traumatic coagulopathy in pediatric trauma patients admitted to the pediatric intensive care unit (PICU) and to investigate its relationship with morbidity and mortality.

MATERIALS AND METHODS

In this study, the medical records of 282 patients aged between one month and 18 years who were admitted to the intensive care unit due to trauma between October 10, 2016 and January 1, 2021 at Mersin University Faculty of Medicine PICU were reviewed. The clinical and laboratory findings of 211 patients with complete data were retrospectively analyzed. Patients who were admitted to our hospital within the first 24 hours after trauma, due to motor vehicle accidents, gunshot wounds, penetrating injuries, or falls, and who did not have prior hospitalization at another facility for the same trauma were included in the study. Patients admitted due to burns and drowning were excluded from the study. In addition, patients with a familial or known history of coagulopathy, those using anticoagulants, and those with chronic diseases were excluded from the study, as pre-trauma coagulation results were unknown, making it difficult to determine whether coagulopathy developed as a result of trauma. Patients admitted due to burns or drowning, those with a familial or known history of coagulopathy, anticoagulant use, or chronic disease were also excluded. Age, gender, physical examination findings, type and mechanism of trauma, presence of active bleeding, Glasgow Coma Scale (GCS), Pediatric Trauma Score (PTS), Injury Severity Score (ISS), laboratory parameters, surgical status, duration of PICU hospitalization, need for blood transfusion, Pediatric Index of Mortality 2 (PIM2), and Pediatric Logistic Organ Dysfunction (PELOD) scores were recorded. A review of the literature was conducted, and international normalized ratio (INR) >1.2, platelet count <100,000 µ/L, activated partial thromboplastin time (aPTT) >35 seconds, prothrombin time (PT) >14.5 seconds, and fibrinogen <170 mg/dL were defined as coagulopathy.[7,8,9] In the period to which the study data belong, D-dimer and platelet function tests were not routinely performed and, therefore, were not included as evaluation criteria for acute traumatic coagulopathy.

Complete blood count analysis was performed using electrical impedance and flow cytometry (XN-1000, Sysmex Corp, Japan). Coagulation tests (fibrinogen, PT, and aPTT) were performed using an autoanalyzer (Thrombolyzer XCR, Behnk Elektronik, Germany). Urea, aspartate aminotransferase (AST), and alanine aminotransferase (ALT) were measured enzymatically; creatinine was measured colorimetrically; and electrolytes were analyzed using the ion-selective electrode (ISE) method (AU680, Beckman Coulter Inc., Japan). Blood gas pH and bicarbonate analyses were performed using a blood gas analyzer (ABL800 FLEX, DK-2700 Brønshøj, Radiometer Medical Aps., Denmark).

Statistical Analysis

To evaluate ATC in trauma patients monitored in the PICU, the data collected in this study were analyzed using the Statistical Package for the Social Sciences version 22.0 (SPSS Inc., Chicago, IL, USA). Frequencies (f) and percentages (%), as well as averages and standard deviations, were calculated to determine distributions based on demographic variables. Independent samples t-test and one-way analysis of variance (ANOVA) were performed to assess ATC in children under 18 years of age.

Ethics Committee Approval

Ethics committee approval for this study was obtained from the Mersin University Rectorate Clinical Research Ethics Committee (Approval Number: 2021/700, Date: 17.11.2021.

RESULTS

The mean age of the patients included in the study was 8.5±5.8 years. Males constituted 69.5% of the patient population. Motor vehicle injury was the most common mechanism of injury (47.5%), followed by falls (41.8%). One patient was admitted to the hospital due to a fall-related trauma that also involved a motor vehicle accident. Isolated head trauma was the most

frequent type of injury (41.8%), and the most common injury site was also the isolated head region (37.9%) (Table 1).

Patients for whom coagulopathy data were available were divided into two groups: those with and without ATC. ATC was identified in 141 patients (66.8%). When the groups were compared, the duration of stay in the intensive care unit and ISS score were significantly higher, while GCS and PTS values were significantly lower in the ATC group ($p<0.05$). Additionally, admission body temperature, vital signs, PIM2, and PELOD scores were also compared between groups (Table 2).

The AST, ALT, and creatinine levels were statistically significantly different ($p<0.05$) between the two groups, while the differences in platelet count and urea levels were not significant ($p>0.05$). Additionally, blood gas analysis showed statistically significant differences in pH, base excess (BE), and bicarbonate (HCO3) values between the groups ($p<0.05$), whereas no significant difference was observed in lactate levels ($p>0.05$) (Table 3).

When compared in terms of gender, presence of hemorrhage, and surgical intervention, no statistically significant differences were found between the groups with and without ATC ($p>0.05$). However, the mortality rate and frequency of blood product transfusion were significantly higher in the group with acute traumatic coagulopathy ($p<0.05$). Additionally, the difference in injury sites between the two groups was also statistically significant ($p<0.05$) (Table 4).

Table 1. Types and mechanisms of trauma

Mechanism of Trauma			Type of Trauma			Site of Injury		
	n	%		n	%		n	%
Gunshot wound	9	3.2	Head trauma	118	41.8	Head	107	37.9
Stab wound	6	2.1	Head and blunt trauma	83	29.4	Head and extremities	22	7.8
Fall	118	41.8	Head and penetrating trauma	1	0.4	Head and trunk	41	14.6
Fall and vehicle injury	1	0.4	Blunt trauma	57	20.2	Head, trunk, and extremities	38	13.5
Non-accidental trauma	14	5.0	Blunt and penetrating trauma	1	0.4	Abdomen	2	0.7
Motor vehicle injury	134	47.5	Penetrating trauma	22	7.8	Extremities	10	3.5
						Trunk	46	16.3
						Trunk and extremities	16	5.7

Table 2. Comparison of vital signs and clinical scores in patients with and without acute traumatic coagulopathy

	Non-ATC (n=70)	ATC (n=141)	
	Mean±SD (Min-Max)	Mean±SD (Min-Max)	p
Age (years)	9.5 (0.2-17.0)	12 (0.2-18.0)	0.283
Systolic blood pressure (mmHg)	116.1±13.2	113.5±23.7	0.388
Diastolic blood pressure (mmHg)	74.9±9.7	71.9±18.1	0.205
Body temperature (°C)	36.6±0.8	36.2±1.4	**0.011**
Pulse (beats/min)	111.3±20.9	114.5±27.5	0.394
SpO_2	98.4±2.7	97.9±3.8	0.290
PICU length of stay (days)	4 (2-27)	6 (1-52)	**0.001**
GCS	15 (3-15)	14 (3-15)	**0.0001**
PTS	10 (3-12)	8 (-2-12)	**0.0001**
ISS	16 (4-41)	20 (4-75)	**0.005**
PIM2	1.4 (0.2-7.3)	2.0 (0.1-66.9)	**0.037**
PELOD	10 (0-21)	10 (0-41)	**0.0001**

GCS: Glasgow Coma Scale; PTS: Pediatric Trauma Score; ISS: Injury Severity Score; PIM2: Pediatric Index of Mortality 2; PELOD: Pediatric Logistic Organ Dysfunction; PICU: Pediatric Intensive Care Unit. $p<0.05$ was considered statistically significant.

Table 3. Comparison of laboratory results between patients with and without acute traumatic coagulopathy

	Non-ATC (n=70)	ATC (n=141)	
	Mean±SD (Min-Max)	Mean±SD (Min-Max)	p
Platelet	302,500 (80,000-592,000)	303,000 (63,000-662,000)	0.831
Fibrinogen	279 (142-452)	223 (41-1179)	**0.001**
PT	13.5±0.7	17.6±4.9	**0.0001**
aPTT	25.9±3.6	31.8±11.9	**0.0001**
INR	1.02±0.1	1.34±0.5	**0.0001**
AST	42.5 (19-1439)	64 (15-1548)	**0.003**
ALT	23.4 (8-540)	32 (5-1586)	**0.049**
Urea	27 (8-50)	26 (11-45)	0.145
Creatinine	0.46 (0.14-1.2)	0.55 (0.21-1.29)	**0.041**
Blood Gas Results			
pH	7.4±0.1	7.3±0.1	**0.0001**
BE	-3 (-11.8-8.8)	-6 (-25.0-11.1)	**0.0001**
HCO_3	21.7 (1.2-31.2)	20 (3.9-33.3)	**0.001**
Lactate	2.6 (0.3-8.4)	3.2 (0.2-20.0)	0.071

ALT: Alanine Aminotransferase; AST: Aspartate Aminotransferase; BE: Base Excess; INR: International Normalized Ratio; PT: Prothrombin Time; aPTT: Activated Partial Thromboplastin Time. p<0.05 was considered statistically significant.

Table 4. Comparison of clinical variables between patients with and without acute traumatic coagulopathy

	Non-ATC		ATC		
	n=70	%	n=141	%	p
Male	49	70.0	103	73.0	0.745
Female	21	30.0	38	27.0	
With bleeding	15	21.4	46	32.6	0.108
With transfusion	7	10.0	65	46.1	**0.0001**
Undergoing surgical procedure	32	45.7	84	59.6	0.077
Exitus (death)	0	0.0	14	9.9	**0.0001**
Head injury	30	42.9	33	23.4	
Head and extremity injury	2	2.9	16	11.3	
Head and trunk injury	5	7.1	33	23.4	
Head, trunk, and extremity injury	7	10.0	25	17.7	**0.0001**
Abdominal injury	0	0.0	1	0.7	
Extremity injury	3	4.3	7	5.0	
Trunk injury	20	28.6	17	12.1	
Trunk and extremity injury	3	4.3	9	6.4	

p<0.05 was considered statistically significant.

Transfused patients had significantly lower median PTS and GCS values and higher ISS values compared to non-transfused patients (p<0.05). Death occurred in 19.4% of transfused patients, whereas no deaths were observed among

Table 5. Comparison between transfused and non-transfused patients

	Non-Transfused	Transfused	p
GCS	15 (3-15)	11 (3-15)	0.0001
PTS	10 (-1-12)	4 (-2-11)	0.0001
ISS	16 (4-41)	27 (8-75)	0.0001
Exitus (death)	0 (0.0)	14 (19.4)	0.0001
Survival	139 (100.0)	58 (80.6)	

GCS: Glasgow Coma Scale; PTS: Pediatric Trauma Score; ISS: Injury Severity Score. p<0.05 was considered statistically significant.

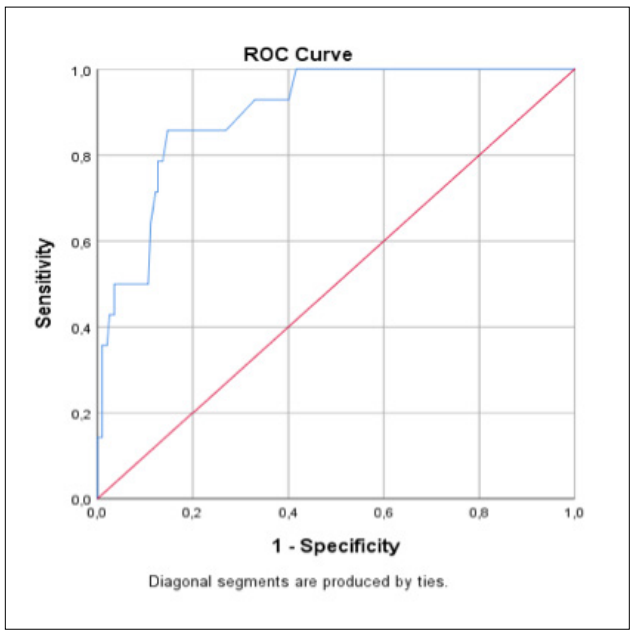

Figure 1. INR ROC analysis for predicting mortality.

non-transfused patients (Table 5).

A cut-off value for INR was determined to assess prognosis prediction using receiver operating characteristic (ROC) analysis. This cut-off value was established using only the patient group, as there was no control group in the study. Therefore, comparative analyses between different populations were not performed for INR. If a patient's INR value was >1.335, the probability of death was estimated at 90% (95% confidence interval [CI]: 0.83-0.97), with 85.7% sensitivity and 85.3% specificity (Fig. 1).

DISCUSSION

Acute traumatic coagulopathy is a consequence of severe injury and serves as an independent predictor of mortality and morbidity. In addition to exogenous factors such as fluid or blood product transfusion and shock, endogenous factors include consumption of clotting factors, hyperfibrinolysis, and activation of protein C.[10] The developmental stages of acute traumatic coagulopathy consist of several phases. The first stage is characterized by the activation of multiple hemostatic pathways, including fibrinolysis, in response to tissue damage. The second stage is believed to result from resuscitation-related factors.[6]

In our study, 69.5% of the patients admitted to the pediatric intensive care unit due to trauma were male, and the mean age was 8.5 years. In the study by Leeper et al.,[8] 65% of the patients were male, and the mean age was 8.4 years. In the study by Talving et al.,[11] the mean age of the patients was found to be 10.7 years. The mean age of the patients in our study was similar to that reported by Leeper et al.[8] and younger than that reported by Talving et al.[11] In our study, motor vehicle injuries were the most common mechanism of injury, accounting for 47.5% of cases. In a study conducted by Anıl et al.[12] involving 213 patients, motor vehicle injury was also the most common mechanism (43.7%). Similarly, in the study by Kart et al.,[13] motor vehicle injury was the most frequent cause of trauma (47.7%). When our data are evaluated in conjunction with the literature, the differences in mean age and injury mechanisms may be attributed to variations in factors such as residential areas, socioeconomic status, and lifestyle characteristics of the patients.

Hemorrhage following severe trauma is the leading cause of death within the first hours after injury.[14] Uncontrolled hemorrhage is responsible for approximately 40% of deaths resulting from severe multiple trauma.[15] It has been reported that the mortality rate of patients with coagulation abnormalities in the emergency department is four times higher than that of patients without such abnormalities.[16] Thus, it can be concluded that hemorrhage is one of the most important preventable causes of death following severe trauma. Coagulopathy was identified in 26% of patients in the study by Ulusoy et al.[17] and in 28% of patients in the study by Peiniger et al.[18] In our study, ATC was detected in 66.8% of the patients. The higher rate of trauma-related coagulopathy in our study compared to the literature may be attributed to the fact that the majority of our patients sustained motor vehicle accidents and head injuries, both of which are associated with a high risk of ATC. In our patient group, coagulation disorders

were more frequently observed in those with head injuries and extremity and/or trunk injuries. Since mortality increases in patients with acute coagulation disorders, vital signs should be monitored more closely, and treatment planning should be approached with greater caution in trauma patients.

The Glasgow Coma Scale is a clinical scoring system used to assess the severity of head trauma and the level of consciousness by evaluating eye opening, verbal response, and motor response. A study by Strumwasser et al.[19] in pediatric patients demonstrated that a GCS score of eight or lower was associated with a high risk of mortality due to acute traumatic coagulopathy. Another study that examined GCS scores in 200 pediatric patients in relation to coagulopathy and mortality found that a GCS score of 8 or lower on admission was an independent predictor of coagulopathy specifically due to coagulation abnormalities.[20] Peiniger et al.[18] found that the presence of coagulopathy on admission was significantly higher in trauma-exposed pediatric patients with a GCS score of ≤8 compared to those with a GCS score >8. In our study, GCS scores were found to be lower in patients with ATC; however, since we did not classify patients based on GCS scores of 8 and above, a detailed evaluation and comparison could not be made.

Hemorrhage is the leading cause of death in patients admitted with trauma. It may result directly from the trauma or from the inability to maintain hemostasis in the early phase of trauma or the development of coagulopathy.[5] The international normalized ratio is commonly used instead of PT in patients with bleeding. Common causes of prolonged PT/INR include the use of adrenergic drugs, deficiencies in certain coagulation factors, vitamin K deficiency, liver disease, and disseminated intravascular coagulation. In the study by Driessen et al.,[21] blood products were administered to an average of 30-40% of patients in each age group across a total patient population divided into four different age groups. In general, erythrocyte suspension and fresh frozen plasma were used. In our study, similar to findings in the literature, 34.1% of the patients received blood product transfusions. Among the transfused patients, 19.4% (n=14) died. No deaths occurred among non-transfused patients. The development of ATC was found to be statistically significantly higher in transfused patients. The indications for transfusion in trauma patients receiving blood product transfusions should be continuously updated in accordance with current clinical guidelines and workshops. These indications remain critically important due to both the serious complications associated with blood product transfusion and the increased mortality rate in patients who do not receive timely transfusion.

Among the studies investigating the risk factors predicting acute traumatic coagulopathy, Cohen et al.[22] found that an ISS ≥15, base deficit ≤6, pre-crystalloid administration, GCS score, and changes in heart rate and/or blood pressure were associated with the development of ATC. In the study conducted by Patregnani et al.[23] on pediatric trauma patients with ISS ≥15, 46% were reported to be in severe shock, and 38% were coagulopathic. In our study, there were statistically significant differences in blood gas parameters, pH (≤7.30), base deficit (≤6), and HCO3 (≤20), as well as hepatic and renal dysfunction, body temperature, duration of stay in the PICU, blood product transfusion, and scores including GCS, PTS, ISS, PIM2, and PELOD between patients with and without ATC. These parameters were found to be useful in predicting the development of coagulopathy. In particular, our study observed that the risk of ATC increased as the median ISS value increased. This finding was consistent with the results reported by both Cohen et al.[22] and Patregnani et al.[23] in the literature. Although the differences were statistically significant, the standard deviations of some variables, such as length of stay in the PICU and ISS, were high in both patient groups. This variability was attributed to the severity of trauma and the diversity of injured organs among our patients. Previous studies in the literature[22] have used various parameters, similar to those in our study, to predict the risk of ATC development.

The development of coagulopathy was identified as an independent risk factor for mortality according to stepwise logistic regression analysis in the study by Strumwasser et al.[19] Additionally, a GCS score of <8, hypotension, penetrating injury, ISS ≥16, and the need for erythrocyte suspension transfusion within the first six hours after hospitalization were found to be associated with mortality in pediatric trauma patients, regardless of population characteristics. Leeper et al.[24] reported a mortality rate of 9% in a study involving 133 patients. In coagulopathy testing, mortality was 10.1% in patients with an INR of 1.3 or 1.4, increased to 36.1% for INR values between 1.5 and 1.7, and reached 64.3% for INR >1.8. In the final logistic regression analysis, an INR ≥1.3 was identified as the strongest independent predictor of mortality, with an odds ratio of 3.77. Peiniger et al.[18] reported an overall mortality rate of 13.5% in pediatric patients with blunt, isolated traumatic brain injury. In a study conducted by Lin et al.[25] on 106 patients with traumatic lung injury (TLI), the area under the ROC curve for INR in predicting 28-day mortality was 0.826 (95% CI: 0.733-0.938), with a cut-off value of 1.36. The 28-day mortality risk for TLI patients with INR ≥1.36 was found to be 8.5 times higher than for those with INR <1.36. In our study, ROC analysis was performed for INR, and an INR >1.335 was identified as a predictor of mortality, with a probability of 90% (95% CI: 0.83-0.97), 85.7% sensitivity, and 85.3% specificity. In the literature, mortality ROC cut-off values for INR have been reported to vary, as seen in our study and the study of Leeper et al.[24] International and multicenter studies are needed to establish a standardized ROC cut-off value for use in clinical practice. The mortality rate in our study was 9.9%, which is similar to the rates reported in other studies in the literature.

The limitations of our study include its single-center design, the absence of a control group, and the retrospective nature

of the study. Additionally, the ATC status of some patients could not be evaluated due to incomplete coagulopathy data.

CONCLUSION

In conclusion, ATC occurs in many trauma patients admitted to the pediatric intensive care unit. ATC was more frequently observed in patients with injuries involving multiple anatomical sites. Mortality occurred only in patients who received blood product transfusion and developed ATC. The INR may be a useful parameter for predicting mortality in pediatric trauma patients. Various parameters have been used in the literature to predict mortality; therefore, multicenter and prospective studies are needed to establish reference parameters for mortality prediction.

Ethics Committee Approval: This study was approved by the Mersin University Rectorate Clinical Research Ethics Committee (Date: 17.11.2021, Decision No: 2021/700).

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ORİJİNAL ÇALIŞMA - *ÖZ*

Pediatrik travma hastalarında akut travmatik koagülopatinin değerlendirilmesi

AMAÇ: Travma hastalarında akut travmatik koagülopatinin değerlendirilmesi ve koagülopati sonuçlarının prognozu öngörmedeki etkinliğini araştırmaktır.

GEREÇ VE YÖNTEM: Hastanemize travma nedeniyle Ekim 2016 ile Ocak 2021 tarihleri arasında başvuran 1 ay-18 yaş arasındaki olgular çalışmaya dahil edilmiştir. Hastalara ait demografik veriler, travmanın türü, akut kanama varlığı, kan ürünü transfüzyon öyküsü, koagülasyon ve hemogram parametreleri ve ayrıca GKS (Glaskow Koma Skalası), ISS (Yaralanma Şiddet Skoru), PTS (Pediatrik Travma Skoru), PIM2 (Pediatrik Mortalite İndeksi 2) ve PELOD (Pediatrik Lojistik Organ Disfonksiyonu) değerleri kayıt altına alındı ve akut travmatik koagülopati (ATK) ile ilişkisi istatistiksel olarak analiz edildi.

BULGULAR: Çalışmaya 196'ı erkek, 86'ı kız toplam 282 hasta alındı. En sık yaralanma mekanizması ve yaralanma türü sırasıyla; %47.5 ile motorlu taşıt yaralanması ve %41.8 ile kafa travması olmuştur. Akut travmatik koagülopati 141 (%66.8) hastada saptanmıştır. Hastaların başvuru vücut sıcaklığı, kan ürünü transfüzyonu, çocuk yoğun bakım ünitesinde yatış süresi, GKS, PTS, ISS, PİM 2 ve PELOD skorları akut travmatik koagülopati olan ve olmayan gruplar arasında istatistiksel olarak anlamlı fark bulunmuştur ($p<0.05$). Ayrıca hastaların laboratuvar tetkiklerinde kreatinin, AST (Aspartat Aminotransferaz), ALT (Alanin aminotransferaz), kan gazında Ph ve HCO3 sonuçları gruplar arasında istatistiksel olarak aynı şekilde anlamlı fark tespit edilmiştir ($p<0.05$). Ancak vital bulgulardan sistolik ve diyastolik kan basıncı, nabız, laboratuvar tetkiklerinde üre, trombosit sayısı ve laktat düzeyi ise gruplar arasında istatistiksel olarak anlamlı fark çıkmamıştır ($p>0.05$). Akut travmatik koagülopati grubunda mortalite oranı ve kan ürünü transfüzyon sıklığı istatistiksel olarak anlamlı derecede daha yüksek bulundu ($p<0.05$). Transfüze edilen hastalardan 14'ünde (%19.4) eksitus tespit edildi, ancak transfüzyon yapılmamış hastalarda tespit edilmemiştir.

SONUÇ: Koagülopati gelişme riski nedeniyle çocuk yoğun bakıma kabul edilen travma hastaları yakın takip edilmelidir. Bu hastaların prognozu öngörmede INR (international normalized ratio) tek başına kullanılabilir. Transfüzyon yapılan hastalarda mortalite oranı yüksektir.

Anahtar sözcükler: Akut travmatik koagülopati; çocuk yoğun bakım; travma; transfüzyon.

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