ORIGINAL ARTICLE

Predicting mortality in penetrating thoracic trauma in the emergency department: The prognostic value of the glucose-to-potassium ratio

Mesut Buz,[1] **İzzet Ustaalioğlu**[2]

[1]Department of Thoracic Surgery, University of Health Sciences, Kartal Dr. Lütfi Kırdar City Hospital, İstanbul-*Türkiye*
[2]Department of Emergency Medicine, Gönen State Hospital, Balıkesir-*Türkiye*

ABSTRACT

BACKGROUND: Penetrating thoracic injuries are critical conditions that significantly influence the clinical outcomes of trauma patients in the emergency department (ED). This study evaluates the prognostic value of the glucose-to-potassium ratio (GPR) in predicting mortality among patients presenting to the ED with isolated penetrating thoracic injuries caused by stabbings.

METHODS: This retrospective cohort study was conducted in the emergency department of a tertiary hospital from January 1, 2021 to January 1, 2023. It includes patients diagnosed with isolated penetrating thoracic injuries resulting from stabbings. A database analysis was performed using patient records documenting demographic information, clinical findings, laboratory results, and outcomes.

RESULTS: Among the 88 patients included in the study, categorized into deceased (14.8%, n=13) and survivors (85.2%, n=75), the median glucose level was significantly higher in the deceased group (168 [interquartile range, IQR 145-229 mg/dL]) compared to the survivor group (126 [IQR 111-151 mg/dL]) ($p<0.001$). Conversely, potassium levels were lower in the deceased group (3.3 [IQR 3.01-3.82] mEq/L) compared to the survivor group (3.87 [IQR 3.5-4.18] mEq/L) ($p=0.007$). The GPR was higher in the deceased group (51.6 [IQR 42-75.1], $p<0.001$) than in survivors (32.6 [IQR 29-54.8]). The area under the receiver operating characteristic (AUROC) for the GPR in predicting mortality was 0.831 (95% confidence interval [CI] 0.736-0.903). With a cutoff value of ≥40.23, the sensitivity was 84.62% (95% CI 54.6-98.1), and the specificity was 78.67% (95% CI 67.7-87.3).

CONCLUSION: Our findings indicate that the GPR is a valuable prognostic marker for mortality in patients with stabbing-induced penetrating thoracic injuries presenting to the ED. This highlights its potential utility in early risk stratification within this patient population.

Keywords: Chest trauma; penetrating; stabbing.

INTRODUCTION

Thoracic injuries are particularly significant among severely injured trauma patients, with nearly 50% of polytrauma cases involving some form of thoracic injury.[1] Chest traumas are classified into blunt and penetrating categories. Among penetrating injuries, firearm-related wounds constitute 5.94%, while knife stabbings account for 93.7%, making them the predominant causes of such traumas.[2] Stabbings are responsible for 52% of penetrating thoracic injuries.[3]

Predicting mortality among trauma patients is a crucial component of trauma management. Numerous prognostic markers have been studied, emphasizing the association between elevated serum glucose levels and decreased potassium levels observed in trauma patients. These metabolic shifts have sparked discussions regarding the role of glucose metabolism

Cite this article as: Buz M, Ustaalioğlu I. Predicting mortality in penetrating thoracic trauma in the emergency department: The prognostic value of the glucose-to-potassium ratio. Ulus Travma Acil Cerrahi Derg 2025;31:40-46.

Address for correspondence: Mesut Buz
Department of Thoracic Surgery, University of Health Sciences, Kartal Dr. Lütfi Kırdar City Hospital, İstanbul, Türkiye
E-mail: mesutbuzmd@gmail.com

Ulus Travma Acil Cerrahi Derg 2025;31(1):40-46 DOI: 10.14744/tjtes.2024.96644
Submitted: 08.11.2024 Revised: 20.12.2024 Accepted: 23.12.2024 Published: 03.01.2025

in resuscitating strategies and mortality prediction.[4]

The glucose-to-potassium ratio (GPR) reflects the combined impact of two critical biochemical parameters: hyperglycemia and hypokalemia, which indicate the body's response to trauma-induced stress. Following trauma, elevated stress hormone levels, particularly adrenaline and cortisol, result in increased plasma glucose levels and a reduction in potassium levels.[5] These physiological changes influence energy metabolism and cellular function, directly impacting the prognosis of trauma patients.[6] Furthermore, the simplicity of GPR measurement offers a practical alternative in the emergency department (ED) compared to other complex and time-consuming scoring systems. GPR has been evaluated in various trauma-related conditions, such as traumatic brain injury, subarachnoid hemorrhage, and blunt abdominal trauma, demonstrating its potential significance in predicting morbidity and mortality under traumatic and systemic stress.[7-9]

This study aims to evaluate the potential of the GPR as a predictor of mortality in patients with isolated penetrating thoracic injuries caused by stabbings and presenting to the ED.

MATERIALS AND METHODS

This retrospective cohort study was conducted from January 1, 2021 to January 1, 2023, at Kartal Dr. Lütfi Kırdar City Hospital. The hospital, with its extensive infrastructure of 1,195 beds, 24 clinics, 51 specialties, 16 buildings, and coverage across 5 districts, provided ED assessments for the patients included in the study. Conducted in a tertiary care setting, the study involved comprehensive clinical and radiological evaluations to confirm diagnoses of isolated penetrating thoracic injuries. The study analyzed a database containing detailed information on patient demographics, clinical presentations, laboratory findings, and outcomes. The research protocol was approved by the Institutional Ethics Committee at Kartal Dr. Lütfi Kırdar City Hospital (Approval Number: 2023/514/248/17, Date: 27.04.2023).

Patients were included if they presented with isolated penetrating thoracic injuries. Exclusion criteria included pregnancy, diabetes mellitus, presenting blood glucose levels above 200 mg/dL, a history of medication affecting potassium levels, acute or chronic renal failure, and patients under 18 years of age. At the center where the research was conducted, all patients were evaluated in a dedicated trauma area within the ED, with assessments performed according to Advanced Trauma Life Support (ATLS) protocols. Data collection involved a retrospective analysis of medical records, focusing on patients with thoracic injuries. The study identified relevant cases using International Classification of Diseases (ICD) codes S20 to S29, which cover a range of thoracic injuries, from superficial harm to severe conditions such as open wounds, fractures, and internal organ damage. We retrospectively collected demographic data (age and gender), clinical observations (blood pressure and pulse rate), laboratory findings (alanine aminotransferase [ALT], aspartate aminotransferase [AST], urea, creatinine, glucose, potassium [K], white blood cell count [WBC], hemoglobin [Hgb], hematocrit [Hct], and platelets), and patient outcomes (tube thoracostomy, underwater seal drainage, surgical intervention, and mortality) from medical records based on the initial presentation of patients to the ED. The primary outcome of the study was in-hospital mortality.

Statistical Analysis

Statistical analyses were performed using MedCalc Statistical Software version 20.218 (MedCalc Software Ltd., Ostend, Belgium) and SPSS version 30.0 (IBM Corp., Armonk, NY). Descriptive statistics were expressed as mean ± standard deviation (SD) for normally distributed continuous variables and as median [interquartile range (IQR)] for non-normally distributed data, while categorical variables were presented as frequencies and percentages. Normality was assessed using the Kolmogorov-Smirnov test, supported by visual histogram analysis. Group comparisons were conducted using the independent samples t-test or the Mann-Whitney U test for continuous variables and the Chi-square test or Fisher's exact test for categorical variables. Receiver operating characteristic (ROC) curve analysis was used to evaluate the diagnostic performance of the GPR, with sensitivity, specificity, positive likelihood ratio (+LR), and negative likelihood ratio (-LR) calculated. Youden's index (to determine optimal cutoff values), precision (the proportion of true positives among predicted positives), and recall (the proportion of true positives correctly identified) were also calculated to further assess diagnostic performance.[10,11] A p-value <0.05 was considered statistically significant, and 95% confidence intervals (CIs) were reported.

RESULTS

The study included 88 patients, divided into two groups based on outcomes as detailed in Table 1: deceased (14.8%, n=13) and survivors (85.2%, n=75). No statistically significant difference was observed between the groups in terms of median age (p=0.210) and gender ratio (p=0.125). The deceased group had a significantly lower mean systolic blood pressure (BP) (118.4±23.2 mmHg) compared to the survivor group (98.3±31.3 mmHg), with an average difference of 20.1 mmHg (95% CI 5.4-34.7 mmHg) (p=0.008). Similarly, the mean diastolic BP in the deceased group (60.5±20.4 mmHg) was lower than in the survivor group (74.5±12.7 mmHg), with an average difference of 14 mmHg (95% CI 1.4-26.6 mmHg) (p=0.032). No statistically significant difference was found in mean pulse rates between the groups (p=0.082).

Laboratory findings are summarized in Table 2. Median levels of ALT, AST, urea, and creatinine were significantly higher in the deceased group compared to the survivor group (p=0.001, p<0.001, p=0.001, and p<0.001, respectively). De-

Table 1. Vital signs and physical examination outcomes in patients with penetrating thoracic trauma

Parameter	Survivors (n=75)	Deceased (n=13)	p	Mean Difference (95% CI)
Age (years)	26 (21-39)	32 (22-54.5)	0.210	
Sex (male)	69 (92%)	10 (76.9%)	0.125	
Systolic BP (mmHg)	118.4±23.2	98.3±31.3	0.008	20.1 (5.4-34.7)
Diastolic BP (mmHg)	74.5±12.7	60.5±20.4	0.032	14 (1.4-26.6)
Pulse Rate (/min)	98.2±18.4	108±19.4	0.082	
Pneumothorax	65 (86.7%)	12 (92.3%)	0.57	
Hemothorax	33 (44%)	9 (69.2%)	0.083	
Surgical Intervention	6 (8%)	7 (53.8%)	<0.001	
Tube Thoracostomy	51 (68%)	12 (92.3%)	0.073	

BP: Blood Pressure; CI: Confidence Interval.

Table 2. Biochemical markers and their impact on mortality in patients with penetrating chest injuries

Parameter	Survivors (n=75)	Deceased (n=13)	p	Mean Difference (95% CI)
ALT (U/L)	18 (13-26)	33 (20.5-71.5)	0.001	
AST (U/L)	23 (19-30)	53 (33-89)	<0.001	
Urea (mg/dL)	28 (24-33)	54 (28.5-84)	0.001	
Creatinine (mg/dL)	0.89 (0.76-1.08)	1.09 (0.98-1.45)	<0.001	
Glucose (mg/dL)	126 (111-151)	168 (145-229)	<0.001	
Potassium (mEq/L)	3.87 (3.5-4.18)	3.3 (3.01-3.82)	0.007	
GPR	32.6 (29-54.8)	51.6 (42-75.1)	<0.001	
WBC (x10^9/L)	12.1±3.9	14±4.8	0.116	
Hemoglobin (g/dL)	13.7±4.8	10.7±3.2	0.007	2.9 (1-4.9)
Hematocrit (%)	41±6.3	24.3±10.4	0.004	10.4 (4-16.8)
Platelet (x10^9/L)	274±77	178±85	<0.001	96 (49-143)

ALT: Alanine Aminotransferase; AST: Aspartate Aminotransferase; GPR: Glucose-to-Potassium Ratio; WBC: White Blood Cell Count; CI: Confidence Interval.

ceased patients had significantly higher median glucose levels (168 mg/dL [IQR 145-229]) compared to survivors (126 mg/dL [IQR 111-151]) (p<0.001). Conversely, median potassium levels were significantly lower in deceased patients (3.3 mEq/L [IQR 3.01-3.82]) than in survivors (3.87 mEq/L [IQR 3.5-4.18]) (p=0.007). The GPR was significantly higher in the deceased group (51.6 [IQR 42-75.1]) compared to the survivor group (32.6 [IQR 29-54.8]) (p<0.001).

Hemoglobin, hematocrit, and platelet counts were significantly lower in the deceased group by an average of 2.9 g/dL (95% CI 1-4.9 g/dL), 10.4% (95% CI 4-16.8%), and 96 ×109/L (95% CI 49-143 ×109/L) respectively (p=0.007, p=0.004, and p<0.001). No significant difference was observed in mean WBC counts (×109/L) between the groups (p=0.116). Simi-

Table 3. Sensitivity analysis of the glucose-to-potassium ratio (GPR) for predicting mortality

GPR Cutoff Value (≥)	Sensitivity	Specificity	Youden's Index	Precision	Recall
29.8810	1.000	0.680	0.320	0.203	1.000
30.0246	1.000	0.667	0.333	0.206	1.000
30.7042	1.000	0.640	0.360	0.213	1.000
30.7212	0.923	0.640	0.283	0.200	0.923
34.0347	0.846	0.547	0.393	0.244	0.846
40.1149	0.846	0.773	0.619	0.393	0.846
41.8813	0.769	0.800	0.569	0.400	0.769
44.4961	0.692	0.813	0.506	0.391	0.692
55.0072	0.462	0.920	0.382	0.500	0.462
60.1365	0.308	0.960	0.268	0.571	0.308
73.8209	0.231	0.973	0.204	0.600	0.231
79.1123	0.154	0.987	0.141	0.667	0.154

GPR: Glucose-to-Potassium Ratio.

larly, no significant differences were found in the rates of pneumothorax, hemothorax, or thoracostomy with underwater seal drainage between the groups (p=0.570, p=0.083, and p=0.073, respectively). However, the rate of surgical intervention was significantly higher in the deceased group (53.8%, n=7) compared to the survivor group (8%, n=6) (p<0.001).

ROC curve analysis demonstrated that the GPR is a strong predictor of mortality, with an area under the ROC curve (AUROC) of 0.831 (95% CI 0.736-0.903). At the optimal cutoff value of ≥40.23, determined by the highest Youden Index, the GPR achieved a sensitivity of 84.62% (95% CI 54.6-98.1) and a specificity of 78.67% (95% CI 67.7-87.3). Additional diagnostic performance metrics included a positive likelihood ratio (+LR) of 3.97 (95% CI 2.42-6.49) and a negative likelihood ratio (−LR) of 0.2 (95% CI 0.054-0.7). To evaluate the robustness of the GPR as a predictor of mortality, a sensitivity analysis was conducted by assessing various cutoff values of the GPR and their corresponding sensitivity, specificity, Youden's Index, precision, and recall (Table 3). The analysis revealed that at a GPR cutoff value of ≥30.7042, the sensitivity was 100%, and specificity was 64%, with a Youden's Index of 0.360.

DISCUSSION

In this study, the GPR in patients presenting to the ED with isolated penetrating thoracic injuries was found to be significantly higher in the deceased group compared to the survivor group. The impact of blood glucose levels on trauma patients and their predictive value for mortality has been a widely discussed topic among trauma and emergency medicine researchers. Pathophysiological studies on post-trauma plasma glucose levels differentiate between early and chronic phases. Stress hyperglycemia, characterized by increased production of catecholamines such as adrenaline, noradrenaline, and dopamine due to sympathetic system activation, and the resultant rise in glucagon and corticosteroid levels, is considered protective in the acute phase, This physiological response provides fuel for the immune system and brain, with mild to moderate stress hyperglycemia (140-220 mg/dL blood sugar) potentially being beneficial.[12-14] In this study, surviving patients demonstrated significantly lower blood sugar levels compared to deceased patients. The latter group exhibited average blood sugar levels corresponding to moderate hyperglycemia, while survivors had lower averages. Similarly, studies investigating blood glucose levels in the early phase following head trauma have reported higher glucose values in deceased patients compared to survivors.[15] Additionally, another study examining the relationship between initial hyperglycemia and injury severity in trauma patients, regardless of etiology, found a similar association between hyperglycemia and severe trauma, consistent with the findings of our study.[16] These pathophysiological mechanisms suggest that while mild to moderate hyperglycemia might indicate a better prognosis, hyperglycemia is also identified in the literature as a potential indicator of poor prognosis, specifically mortality. This duality challenges the reliability of hyperglycemia as a sole predictor of mortality in trauma patients.

Therefore, potassium levels are similarly a frequent focus of research in trauma patients. Considering the physiological mechanisms and outcomes, an early increase in serum glucose levels after trauma, as expected, along with a decrease in

potassium concentration, is anticipated to be associated with a poor prognosis following trauma.[17] In our study, consistent with this information, potassium levels in surviving patients were higher than those in deceased patients. While the clinical significance of this difference could be questioned due to the closeness of potassium values, it was observed that potassium levels in surviving patients were within the normal serum potassium range (3.5-5.5 mEq/L), whereas the average potassium levels in deceased patients were below this range.[18] The challenge with many studies on hypokalemia and trauma is that most involve small cohorts, focus on specific subgroups of trauma patients, or fail to account for the severity of hypokalemia, which limits the use of potassium alone as a mortality predictor.[19] However, our findings indicate that when potassium levels are integrated with other metabolic parameters, such as glucose, into the GPR, they provide valuable prognostic insights for trauma patients.

The perspective that post-trauma pathophysiological processes, such as stress-induced catecholamine discharge and its effects, can influence both glucose and potassium levels has, in recent years, raised questions about the use of the GPR as a mortality predictor in trauma patients in EDs.[9] Our study highlights the utility of the GPR as a composite biomarker that integrates these metabolic derangements, demonstrating its strong predictive value for mortality in patients with penetrating thoracic trauma. This finding underscores the GPR's potential for rapid and practical application in ED triage, particularly given that mortality from trauma-related injuries is one of the most critical complications encountered in the ED. In this study, the GPR was evaluated in patients with penetrating thoracic trauma caused by stabbing, a context where physical examination alone provides limited insights into the depth and severity of the wounds. The rapid determination of GPR values through point-of-care (POC) testing could significantly improve mortality management. Deceased patients were found to have a significantly higher GPR compared to survivors. A recent study involving patients with blunt abdominal trauma identified the GPR as a mortality predictor, reporting a cutoff value of 33.9, an area under the curve (AUC) of 0.771, sensitivity of 72.7%, and a specificity of 84.1%. In our research on patients with isolated penetrating thoracic trauma caused by stabbing, using a GPR cutoff value of ≥40.23, we observed a sensitivity of 84.62% (95% CI 54.6-98.1) and a specificity of 78.67% (95% CI 67.7-87.3).

In the context of previous trauma studies in the literature, Table 4 provides a comparison of our findings with similar studies evaluating various trauma biomarkers. The GPR in our study demonstrated a high prognostic value for mortality in penetrating thoracic trauma, with an AUROC of 0.831. Katipoğlu and Demirtaş reported a similar prognostic value for GPR in patients with blunt abdominal trauma, with an AUROC of 0.771.[9] These results are comparable to the findings of El-Menyar et al., who reported an AUROC of 0.771 for blood glucose as a mortality predictor in general trauma.[16] The sensitivity and specificity values in our study were also consistent with those reported in other studies examining GPR and other biomarkers in various trauma populations.[7,8]

This study investigates the potential of the GPR to predict mortality following isolated penetrating thoracic injuries. The findings reveal that the GPR is significantly higher in deceased patients compared to survivors, demonstrating high validity as a predictor of mortality.

One of the primary limitations of this study is the relatively small sample size of the deceased group, which may affect the statistical power of the analyses and limit the generalizability of the findings. Blood samples were collected upon patient

Table 4. Comparison of findings from this study with similar studies evaluating different trauma biomarkers

Study	Population	Biomarker	Cutoff Value	Sensitivity (%)	Specificity (%)	AUROC	Outcome
Current Study	Penetrating Thoracic Trauma	Glucose-to-Potassium Ratio	40.23	84.62	78.67	0.831	Mortality
Katipoğlu & Demirtaş (2022)	Blunt Abdominal Trauma	Glucose-to-Potassium Ratio	33.95	72.7	84.1	0.771	Mortality
El-Menyar et al. (2021)	General Trauma	Blood Glucose	200 mg/dL	72.7	84.1	0.771	Mortality
Fujiki et al. (2017)	Subarachnoid Hemorrhage	Glucose-to-Potassium Ratio	30.7	80	75	0.800	Poor Outcome
Zhou et al. (2020)	Severe Traumatic Brain Injury (TBI)	Glucose-to-Potassium Ratio	35.9	74.6	69.5	0.750	30-day Mortality

admission to the emergency department as soon as possible after arrival. However, no standardization protocol was applied to the timing of sample collection. This lack of standardization may introduce variability in measurements, particularly for glucose and some other parameters, which could affect the reliability of biomarker assessments. Future studies should consider standardizing sample collection times to minimize variability. Additionally, the small sample size could result in wider confidence intervals and may not capture the full variability of the patient population with penetrating thoracic injuries. Furthermore, the current findings are specific to patients with isolated penetrating thoracic injuries. To enhance the generalizability of the results, future research should include patients with diverse trauma mechanisms, varying age groups, and different comorbidity profiles. The results of this study should be interpreted with caution, and larger, multicenter studies are needed to confirm these observations. Additionally, prospective studies are essential to validate our results and establish causal relationships, which could enhance the clinical utility of the GPR in predicting mortality among trauma patients.

CONCLUSION

This study indicates that the GPR may serve as a significant predictor of mortality in patients with isolated penetrating thoracic injuries. The GPR offers a readily accessible and rapid biomarker for emergency physicians in the initial evaluation of patients with penetrating thoracic trauma. Given the high prognostic value demonstrated in our study, the GPR could be integrated into early triage protocols to help identify patients at higher risk of mortality.

Ethics Committee Approval: This study was approved by the Kartal Dr. Lütfi Kırdar City Hospital Ethics Committee (Date: 27.04.2023, Decision No: 2023/514/248/17).

Peer-review: Externally peer-reviewed.

Authorship Contributions: Concept: M.B.; Design: M.B.; Supervision: M.B.; Materials: M.B., İ.U.; Data collection and/or processing: İ.U., M.B.; Analysis and/or interpretation: İ.U., M.B.; Literature review: M.B., İ.U.; Writing: M.B., İ.U.; Critical review: M.B.

Conflict of Interest: None declared.

Financial Disclosure: The author declared that this study has received no financial support.

REFERENCES

1. Lundin A, Akram SK, Berg L, Göransson KE, Enocson A. Thoracic injuries in trauma patients: Epidemiology and its influence on mortality. Scand J Trauma Resusc Emerg Med 2022;30(1):69. [CrossRef]
2. Aghaei Afshar M, Mangeli F, Nakhaei A. Evaluation of injuries caused by penetrating chest traumas in patients referred to the emergency room. Indian J Surg 2015;77(3):191–4. [CrossRef]
3. Bieler D, Kollig E, Hackenberg L, Rathjen JH, Lefering R, Franke A; Committee on Emergency Medicine, Intensive Care and Trauma Management(Sektion NIS) of the German Trauma Society (DGU). Penetrating injuries in Germany - Epidemiology, management and outcome an analysis based on the TraumaRegister DGU®. Scand J Trauma Resusc Emerg Med 2021;29(1):80. [CrossRef]
4. ten Boekel E, Vroonhof K, Huisman A, van Kampen C, de Kieviet W. Clinical laboratory findings associated with in-hospital mortality. Clin Chim Acta 2006;372(1-2):1–13. [CrossRef]
5. Şimşek T, Şimşek HU, Cantürk NZ. Response to trauma and metabolic changes: Posttraumatic metabolism. Ulus Cerrahi Derg 2014;30(3):153–9.
6. Alışkan H, Kılıç M, Ak R. Usefulness of plasma glucose to potassium ratio in predicting the short-term mortality of patients with aneurysmal subarachnoid hemorrhage. Heliyon 2024;10(18):e38199. [CrossRef]
7. Fujiki Y, Matano F, Mizunari T, Murai Y, Tateyama K, Koketsu K, et al. Serum glucose/potassium ratio as a clinical risk factor for aneurysmal subarachnoid hemorrhage. J Neurosurg 2018;129(4):870–5. [CrossRef]
8. Zhou J, Yang CS, Shen LJ, Lv QW, Xu QC. Usefulness of serum glucose and potassium ratio as a predictor for 30-day death among patients with severe traumatic brain injury. Clin Chim Acta 2020;506:166–71. [CrossRef]
9. Katipoğlu B, Demirtaş E. Assessment of serum glucose potassium ratio as a predictor for morbidity and mortality of blunt abdominal trauma. Ulus Travma Acil Cerrahi Derg 2022;28(2):134–9.
10. Ruopp MD, Perkins NJ, Whitcomb BW, Schisterman EF. Youden index and optimal cut-point estimated from observations affected by a lower limit of detection. Biom J 2008;50(3):419–30. [CrossRef]
11. Saito T, Rehmsmeier M. The precision-recall plot is more informative than the ROC plot when evaluating binary classifiers on imbalanced datasets. PLoS One 2015;10(3):e0118432. [CrossRef]
12. Umpierrez GE, Isaacs SD, Bazargan N, You X, Thaler LM, Kitabchi AE. Hyperglycemia: An independent marker of in-hospital mortality in patients with undiagnosed diabetes. J Clin Endocrinol Metab 2002;87(3):978–82. [CrossRef]
13. Marik PE, Bellomo R. Stress hyperglycemia: An essential survival response! Crit Care 2013;17(2):305. [CrossRef]
14. Vedantam D, Poman DS, Motwani L, Asif N, Patel A, Anne KK. Stress-induced hyperglycemia: Consequences and management. Cureus 2022;14(7):e26714. [CrossRef]
15. Danisman B, Yilmaz MS, Isik B, Kavalci C, Yel C, Solakoglu AG, et al. Analysis of the correlation between blood glucose level and prognosis in patients younger than 18 years of age who had head trauma. World J Emerg Surg 2015;10:8. [CrossRef]
16. El-Menyar A, Asim M, Mir F, Hakim S, Kanbar A, Siddiqui T, et al. Patterns and effects of admission hyperglycemia and inflammatory response in trauma patients: A prospective clinical study. World J Surg 2021;45(9):2670–81. Erratum in: World J Surg 2021;45(9):2682. [CrossRef]
17. Ookuma T, Miyasho K, Kashitani N, Beika N, Ishibashi N, Yamashita T, et al. The clinical relevance of plasma potassium abnormalities on admission in trauma patients: A retrospective observational study. J Intensive Care 2015;3(1):37. [CrossRef]
18. Rastegar A. Serum potassium. In: Walker HK, Hall WD, Hurst JW, editors. Clinical methods: The history, physical, and laboratory examinations. 3rd ed. Boston: Butterworths; 1990. Chapter 195.
19. Ookuma T, Miyasho K, Kashitani N, Beika N, Ishibashi N, Yamashita T, et al. The clinical relevance of plasma potassium abnormalities on admission in trauma patients: A retrospective observational study. J Intensive Care 2015;3(1):37. [CrossRef]

ORİJİNAL ÇALIŞMA - *ÖZ*

Penetran torasik travmalarda mortaliteyi öngörme: Acil serviste glukoz-potasyum oranının prognostik değeri

AMAÇ: Penetran torasik yaralanmalar, acil servisteki (AS) travma hastalarının klinik sonuçlarını önemli ölçüde etkileyen kritik durumlardır. Bu çalışma, AS'ye bıçaklanma nedeniyle izole penetran torasik yaralanmalarla başvuran hastalarda glukoz/potasyum oranı'nın (GPR) mortaliteyi öngörmedeki prognostik değerini değerlendirmeyi amaçlamaktadır.
GEREÇ VE YÖNTEM: Bu çalışma, 1 Ocak 2021 ve 1 Ocak 2023 tarihleri arasında üçüncü basamak bir hastanenin acil servisinde gerçekleştirilmiştir. Retrospektif kohort çalışması niteliğindeki bu araştırma, AS'de bıçaklanmaya bağlı izole penetran torasik yaralanma tanısı almış hastaları içermektedir. Hasta dosyalarında kaydedilen demografik bilgiler, klinik bulgular, laboratuvar sonuçları ve sonuçlara dayalı bir veri tabanı analizi yapılmıştır.
BULGULAR: Çalışmadaki 88 hasta, ölenler (%14.8, n=13) ve hayatta kalanlar (%85.2, n=75) olarak iki gruba ayrılmıştır. Ortanca glukoz seviyesi ölenlerde (168 [IQR 145–229 mg/dL], p<0.001) hayatta kalanlara göre (126 [IQR 111–151 mg/dL]) anlamlı derecede yüksekti; potasyum seviyesi ise hayatta kalanlarla kıyaslandığında (3.87 [IQR 3.5 - 4.18] mEq/L) daha düşüktü (3.3 [IQR 3.01-3.82] mEq/L, p=0.007). GPR, ölenlerde (51.6 [IQR 42-75.1], p<0.001) hayatta kalanlara göre (32.6 [IQR 29 - 54.8]) daha yüksekti. Glukoz/potasyum oranının mortaliteyi öngörmedeki AUROC değeri 0.831 (95% CI 0.736–0.903) olarak bulundu. ≥40.23 eşik değeri ile sensitivite %84.62 (95% CI 54.6–98.1), spesifisite %78.67 (95% CI 67.7–87.3) idi.
SONUÇ: Bulgularımız, GPR'nin, AS'ye bıçaklanmaya bağlı penetran torasik yaralanmalarla başvuran hastalarda mortalite için değerli bir prognostik belirteç olarak hizmet ettiğini ve bu hasta popülasyonunda erken risk sınıflandırmasında potansiyel rolü olduğunu göstermektedir.

Anahtar sözcükler: Bıçaklama; göğüs travması; penetran.

Ulus Travma Acil Cerrahi Derg 2025;31(1):40-46 DOI: 10.14744/tjtes.2024.96644