Original Article

Cukurova Anestezi ve Cerrahi Bilimler Dergisi

Clinical Characteristics and Outcomes of Adult Traffic Accident Patients in a Tertiary Care Intensive Care Unit

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Abstract

Objective: This study aimed to evaluate the clinical characteristics, treatments administered, and mortality-related factors of adult patients treated for traffic accident–related trauma in a tertiary care intensive care unit. **Materials and Methods:** A total of 183 patients aged ≥18 years admitted to the Anesthesia Intensive Care Unit between 2020 and 2022 due to traffic accidents were retrospectively analyzed. Demographic data, accident type, admission GCS, APACHE II and TRISS scores, surgical intervention status, laboratory findings, length of ICU stay, and discharge outcomes were evaluated. Independent predictors of mortality were assessed using logistic regression analysis. **Results:** Of the 183 patients, 153 (83.6%) were male. The overall mortality rate was 11.5%. Non-survivors had significantly lower hemoglobin, GCS, and TRISS scores, and significantly higher lactate, APACHE II scores, transfusion, and inotropic support requirements compared with survivors. Logistic regression identified a low TRISS score as an independent risk factor for mortality. **Conclusion:** Traffic accidents represent an important cause of ICU mortality. The TRISS score is a strong and independent predictor of mortality in this patient population.

Keywords: Traffic accident; TRISS; Intensive care unit; Mortality

1. Introduction

Traffic accidents represent a major public health problem worldwide. According to WHO data, approximately 1.2 million deaths occur annually due to traffic accidents, and 20 to 50 million people sustain injuries or permanent disabilities each year. Globally, traffic accidents rank 11th among all causes of death and account for 2.1% of total mortality[1].

Injuries from traffic accidents are among the leading causes of ICU hospitalizations. In Türkiye, trauma patients with poor general condition due to traffic accidents are admitted to intensive care units[2–4]. This study aimed to investigate the effects of various clinical and demographic factors on mortality among patients admitted to the Anesthesiology Intensive Care Unit of Kahramanmaraş Sütçü İmam University between 2020 and 2022 due to traffic accident–related trauma.

Received:
23.02.2026
Accepted:
17.06.2026
Published:
30.06.2026

2. Materials and Methods

This study was approved by the Ethics Committee of Kahramanmaraş Sütçü İmam University Health Practice and Research Hospital (decision number 03, session 2023/06, dated June 6, 2023). Medical records of patients admitted to the Reanimation ICU between January 1, 2020, and December 31, 2022, due to traffic accident–related trauma were retrospectively reviewed. Among 278 initially identified patients, 46 younger than 18 years and 49 with incomplete data were excluded, resulting in a final population of 183 patients. Patients were divided into survivor and non-survivor groups. TRISS combines physiological parameters from the Revised Trauma Score (RTS), anatomical injury severity from the Injury Severity Score (ISS), and age to estimate survival probability.

Statistical Analysis

Normality was assessed using the Kolmogorov–Smirnov and Shapiro–Wilk tests. Non-normally distributed continuous variables were compared using the Mann–Whitney U test or Kruskal–Wallis H test with Dunn–Šidák post hoc correction. Categorical variables were compared using the Chi-square or Fisher's exact test. Binary logistic regression assessed independent predictors of mortality. ROC analysis evaluated diagnostic performance. A p-value <0.05 was statistically significant. SPSS v22.0 and R v3.3.2 were used.

3. Results

Of 183 patients, 153 were male and 30 female, with a median age of 42 years. The most common accident type was in-vehicle (54.1%), followed by out-of-vehicle (24.0%) and motorcycle (21.9%). Fifty-seven patients underwent emergency surgery, 101 elective surgery, and 25 none. Inotrope/vasopressor support was required in 43 patients, blood transfusion in 95, and 58 had at least one chronic comorbidity (Table 1).

Table 1. Demographic and clinical characteristics of the study population (n = 183)

Variable	n	% / Median (Q1–Q3)
Age (years)		42 (28–57)
Sex — Male	153	83.6
Sex — Female	30	16.4
In-vehicle traffic accident (IVTA)	99	54.1
Out-of-vehicle traffic accident (OVTA)	44	24.0
Motorcycle accident	40	21.9
Surgery — Yes	158	86.3
Surgery — No	25	13.7
Inotrope/vasopressor — Yes	43	23.5
Blood transfusion — Yes	95	51.9
Chronic comorbidity — Yes	58	31.7

Data are presented as median (Q1–Q3) or n (%). IVTA: In-vehicle traffic accident; OVTA: Out-of-vehicle traffic accident.

146 patients were transferred to wards, 16 discharged directly from ICU, 17 died, and 4 had brain death. Overall mortality rate was 11.5% (21 patients) (Table 2).

Table 2. Intensive care unit discharge outcomes

ICU Discharge Status	n	%
Discharged	16	8.7
Transferred	146	79.8
Death (Exitus)	17	9.3
Brain death	4	2.2

ICU: Intensive Care Unit.

No significant differences were observed between survivors and non-survivors in age, sex, or accident type. Median GCS was higher in survivors (13 vs. 5), APACHE II higher in non-survivors (76 vs. 14.5), and TRISS higher in survivors (81.65 vs. 9.8).

Hemoglobin was higher in survivors (12.8 vs. 10.3 g/dL) and lactate higher in non-survivors (4.0 vs. 2.3 mmol/L) (Table 3).

Table 3. Comparison of clinical scores and laboratory parameters between survivors and non-survivors

Variable	Survivors Median (Q1–Q3)	Non-survivors Median (Q1–Q3)	p-value
GCS	13 (8–14)	5 (3–7)	<0.001
APACHE II score	14.5 (9–36)	76 (63–82)	<0.001
TRISS score	81.65 (62.3–90.5)	9.8 (5.2–20.2)	<0.001
Hemoglobin (g/dL)	12.8 (10.9–14.3)	10.3 (8.0–11.5)	<0.001
Lactate (mmol/L)	2.3 (1.6–3.3)	4.0 (2.6–5.2)	<0.001

Mann–Whitney U test. Data are presented as median (Q1–Q3).

Emergency surgery was more frequent in non-survivors (52.4%) and elective surgery in survivors (59.9%) (p = 0.002). Mechanical ventilation, inotrope/vasopressor, and transfusion requirements were significantly higher in non-survivors (p < 0.001). No significant difference in chronic comorbidity (Table 4).

Table 4. Comparison of surgical history, ICU stay, mechanical ventilation, and treatment requirements

Variable	Survivors	Non-survivors	p
Surgery — None n (%)	19 (11.7)	6 (28.6)	0.002
Surgery — Emergency n (%)	46 (28.4)	11 (52.4)	
Surgery — Elective n (%)	97 (59.9)	4 (19.0)	
ICU stay (days) Median (Q1–Q3)	6.5 (5–13)	7 (5–15)	0.847
Mechanical ventilation (days) Median	0 (0–2)	7 (5–15)	<0.001
Inotrope/vasopressor — No n (%)	140 (86.4)	0 (0)	<0.001
Inotrope/vasopressor — Yes n (%)	22 (13.6)	21 (100)	
Blood transfusion — No n (%)	86 (53.1)	2 (9.5)	<0.001
Blood transfusion — Yes n (%)	76 (46.9)	19 (90.5)	
Chronic comorbidity — No n (%)	112 (69.1)	13 (61.9)	0.503
Chronic comorbidity — Yes n (%)	50 (30.9)	8 (38.1)	

Mann–Whitney U test or Chi-square/Fisher's exact test as appropriate.

Table 5. Binary logistic regression analysis of factors associated with mortality

Variable	B	Wald	p-value	Odds Ratio (95% CI)
Age	-0.003	0.010	0.921	0.997 (0.947–1.050)
GCS	0.565	2.273	0.132	1.760 (0.844–3.671)
APACHE II	0.036	0.450	0.502	1.037 (0.933–1.151)
TRISS score	-0.122	14.330	<0.001*	0.885 (0.831–0.943)
Hemoglobin	-0.169	0.638	0.424	0.845 (0.558–1.278)
Lactate	0.297	1.030	0.310	1.345 (0.759–2.385)

**Statistically significant (p < 0.05). Nagelkerke R^2 = 0.737.*

Binary logistic regression (Nagelkerke R^2 = 0.737) identified a low TRISS score as the only independent risk factor for mortality (p < 0.001; OR = 0.885, 95% CI: 0.831–0.943) (Table 5). ROC analysis demonstrated strong predictive performance (AUC = 0.949, cut-off: 26.1) (Table 6, Figure 1).

Table 6. ROC analysis of TRISS score for mortality prediction

AUC	SE	p-value	95% CI	Cut-off
0.949	0.031	<0.001*	0.889–1.000	26.1

*AUC: area under the curve; SE: standard error; CI: confidence interval. *Statistically significant.*

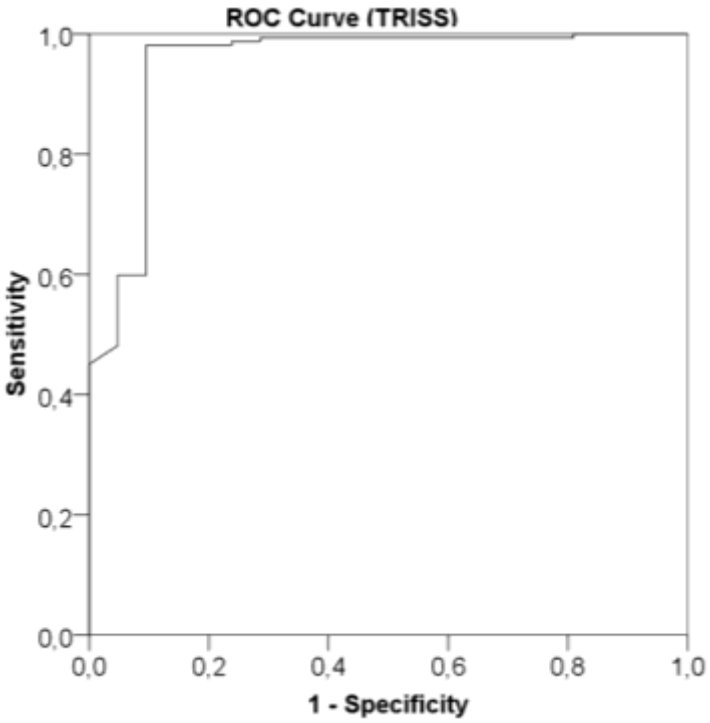

Figure 1. Receiver operating characteristic (ROC) curve of the TRISS score for predicting mortality.

4. Discussion

In Turkiye, 555,668 traffic accidents occurred in 2023, resulting in 2,984 deaths and 354,323 injuries[5].

The median age of 42 years is consistent with other domestic and international studies. A Serbian study on severely injured polytrauma patients reported a median age of 40.5 years, indicating that traffic accident–related trauma predominantly affects individuals in their economically productive years[6–10].

Male predominance (83.6%) is consistent with previous trauma studies and is generally attributed to greater social mobility, higher proportion of male drivers, and riskier driving behavior[6–11].

The mortality rate of 11.5% is lower than rates reported in other studies (23.3–42%), which may reflect differences in ICU admission criteria, trauma severity, and institutional management strategies[6,11,12].

Mijaljica et al. demonstrated that TRISS and APACHE II were strong predictors of mortality (AUC 0.90–0.86) in polytrauma patients[10]. In our study, TRISS demonstrated even stronger performance (AUC 0.949), and logistic regression confirmed low TRISS as an independent risk factor.

Bayissa et al. reported that hemoglobin >10 g/dL was associated with a 75% lower mortality rate in trauma patients[14]. Odom et al. demonstrated significantly higher mortality with elevated lactate in 4,742 trauma patients[16], findings consistent with our results.

5. Conclusion

In this retrospective study of 183 adult ICU patients with traffic accident–related trauma, no significant differences were observed between survivors and non-survivors regarding age, sex, accident type, chronic comorbidity, or ICU stay duration. Non-survivors had lower GCS and TRISS scores, higher APACHE II scores, lower hemoglobin, and

higher lactate. TRISS was identified as the only independent risk factor for mortality by logistic regression, with strong predictive performance by ROC analysis (AUC: 0.949, cut-off: 26.1). Trauma scoring systems provide valuable contributions to mortality and morbidity prediction. Limitations include single-center retrospective design and incomplete hospital records.

Author Contributions: Concept/Design: M.A., M.K.; Data acquisition: M.K.; Data analysis and interpretation: M.A., M.K.; Drafting manuscript: M.A., M.K.; Critical revision: M.A., M.K.; Supervision: M.A. All authors approved the final manuscript.

Acknowledgement: This study was derived from a medical specialty thesis conducted at Kahramanmaraş Sütçü İmam University Faculty of Medicine.

Ethical Approval: This study was approved by the Ethics Committee of Kahramanmaraş Sütçü İmam University Health Practice and Research Hospital (decision number 03, session 2023/06, dated June 6, 2023). The study was conducted in accordance with the Declaration of Helsinki. Informed consent was waived due to the retrospective design.

Conflict of Interest: The authors declared no potential conflicts of interest.

Funding: The authors received no financial support for this research.

Data Availability: Data are available from the corresponding author upon reasonable request.

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