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Clinical outcomes of in-hospital cardiac arrest in a tertiary hospital and factors related to 28-day survival: A retrospective cohort study

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Abstract:

OBJECTIVES: The primary aim was to define factors related to the return of spontaneous circulation (ROSC) after in-hospital cardiac arrest (IHCA), and the secondary aim was to determine factors related to 28-day mortality in patients admitted to intensive care unit (ICU) after ROSC.

METHODS: In this retrospective study, we included the patients who suffered from IHCA in a tertiary hospital between July 2016 and April 2019. Pre- and post-resuscitation characteristics of the patients and event characteristics were defined to reveal the independent factors associated with ROSC and 28-day survival.

RESULTS: A total of 254 patients (median age 73 years, 58.3% males) underwent cardiopulmonary resuscitation (CPR). The ROSC rate was 45.7%. Of all, 51 patients (median age, 63 years, 54.9% males) were admitted to in-hospital ICUs. The 28-day survival rate was 31.4%. The independent risk factors were chronic kidney disease (odds ratio [OR], 3.18, 95% confidence interval [CI], 1.37–7.19, $P = 0.007$), chronic obstructive pulmonary disease (OR, 2.84, 95% CI, 1.23–6.61, $P = 0.015$), asystole as an initial rhythm (OR, 2.94, 95% CI, 1.27–6.79, $P = 0.012$), multi-trauma-related complications (OR, 21.11, 95% CI, 4.71–94.69, $P < 0.001$), and septic shock (OR, 4.10; 95% CI, 1.16–14.54, $P = 0.029$) for ROSC; and a cerebral performance category score >2 (OR, 20.86, 95% CI, 2.74–158.65, $P = 0.003$), Acute Physiology and Chronic Health Evaluation II score >14 (OR, 7.58, 95% CI, 1.06–54.23, $P = 0.044$) for 28-day mortality.

CONCLUSIONS: Independent risk factors related to ROSC and 28-day mortality were defined in the study. However, further studies are needed to devise new strategies for increased hospital discharge with preserved neurologic functions.

Keywords:

Cardiopulmonary arrest, cardiopulmonary resuscitation, code blue, intensive care, mortality

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Introduction

In-hospital cardiac arrest (IHCA) is a common problem.[1] The global incidence of IHCA has a wide variability in different regions as 1.5–2.8 events in Europe[2-6] and 6–7 events in the USA[3,7,8] per 1000 admissions. In the USA, the estimation of pediatric IHCA is more than 15000 events each year.[7]

Authorities recommended quality-improvement initiatives to improve outcomes

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Box-ED Section

What is already known on the topic?

Many factors were defined related to the return of spontaneous circulation (ROSC) in patients with in-hospital cardiac arrest (IHCA) and 28-day survival after ROSC.

What did this study ask?

What are the factors related to ROSC in patients who underwent cardiopulmonary resuscitation and 28-day survival in patients admitted to intensive care unit after ROSC?

What did this study find?

The independent risk factors were chronic kidney disease, chronic obstructive pulmonary disease, asystole as an initial rhythm, multi-trauma-related complications (pneumothorax, hemothorax, cardiac tamponade, hemorrhage, or hemorrhagic shock), and septic shock for the ROSC; and a cerebral performance category score >2, and an Acute Physiology and Chronic Health Evaluation II score >14 for 28-day mortality.

Why does this study matter to clinicians?

Factors defined above contribute to increasing ROSC rate and improving outcomes.

of cardiopulmonary resuscitation (CPR). An optimal cardiac arrest team composition was considered compulsory for this purpose.[9] A cardiac arrest team, including a critical care expert, evaluates the critical patients; leads CPR; transfers these patients to advanced care facilities if required.[10] Despite the improvements, the survival rate in patients who achieved the return of spontaneous circulation (ROSC) ranges from 14.8% to 37.9% in different patient cohorts.[2-6,11] However, the actual data from Turkey about IHCA are limited. To our knowledge, previous findings may no longer reflect the current risk factors related to ROSC and 28-day mortality.

In the present study, we aimed to assess patients who underwent CPR due to IHCA and determine factors associated with ROSC and 28-day mortality in patients admitted to the intensive care unit (ICU) after ROSC.

Methods

Study design and setting

This retrospective study was conducted on IHCAs in a tertiary hospital between July 2016 and April 2019. The local ethics committee approved the study (Prof. Dr. Cemil Taşçıoğlu City Hospital, Local Ethics Committee, Date: 31.04.2019, Nr: 1268). The need for the written informed consent was waived due to the study design.

Selection of participants

IHCA cases that occurred in our center between July 2016 and April 2019 were included in the study. Patients suffering cardiac arrest in the departments such as operation theater, ICU, emergency service were not included in the study. The ROSC was defined as the presence of spontaneous circulation during the 1st h after CPR. We did not use any do-not-resuscitate or withdrawal procedure in practice due to legal restrictions.

Methods and measurements

Patient and event characteristics were collected from electronic medical records and blue code forms. Patients' age, gender, comorbidities, and length of hospital stays were recorded. Possible reasons for the IHCAs were screened. Acute Physiology and Chronic Health Evaluation II (APACHE II) score, Charlson comorbidity index (CCI), Glasgow coma scale (GCS) on the 24th h of ICU admission, and cerebral performance category (CPC) score on ICU discharge were recorded. To clarify the mortality risk factors directly related to IHCA and exclude the other factors originating from late complications of hospitalization, we followed up the patients 28 days for mortality. We also evaluated 28-day survival according to the median APACHE II score.

Outcomes

The primary outcome of the study was to define factors associated with ROSC in IHCA cases. The secondary outcome was to determine the risk factors for 28-day mortality in patients admitted to in-hospital ICUs after ROSC.

Statistical analysis

The SPSS Statistics software (Statistical Package for the Social Sciences Version 24.0; IBM Corporation, Armonk, NY, USA) was used to perform statistical analysis. Categorical variables were expressed as counts and percentages and analyzed using the Chi-square test or Fisher exact test. Continuous variables were expressed as the median and interquartile range and analyzed using the Mann–Whitney *U*-test. The independent effect of each factor on ROSC and 28-day mortality was determined using logistic regression analysis. We built two separate models to define independent risk factors for ROSC and 28-day mortality. To build the models, a purposeful method was used to select clinically important, statistically significant subsets of covariates adjusted for confounders. Age was not included in the model for 28-day mortality separately because of the APACHE II score. The omnibus test was used to check the goodness of fit in the logistic regression models and the test revealed a $P < 0.001$ for both models. An odds ratio (OR) and a 95% confidence interval (CI) were reported for each independent factor. A two-tailed

P value lower than 0.05 was considered statistically significant.

Results

A total of 303 patients were assessed. Of them, 254 patients underwent CPR and were divided into two groups as follows: The ROSC group (n = 116) and the non-ROSC group (n = 138) [Figure 1]. The rate of ROSC was 45.7% [Table 1]. Of all, 58.3% were male, and the median age was 73 (45–84). Patients with ROSC were younger than the patients with non-ROSC. Most of the patients had at least one or more coexisting comorbidities. The patients with COPD, coronary artery disease, chronic kidney disease (CKD), and congestive heart failure were significantly higher in the non-ROSC group.

Patients in the emergency surgery ward were significantly higher in the non-ROSC group than in the ROSC group (26 [18.8%] vs. 4 [3.4%], P < 0.001). However, patients in the neurosurgery ward were significantly high in the ROSC group than in the non-ROSC group (8 [6.9%] vs. 0 [0.0%], P = 0.002). The rate of the IHCA cases reached in 2 min or shorter was significantly higher in the ROSC group than the non-ROSC group (104 [89.7%] vs. 106 [76.8%], P = 0.005). The median duration of the CPR was longer in the non-ROSC group (45.0 [40.0–45.0] min) than in the ROSC group (10 [5.0–16.0] min). The most common initial rhythm in CPR was asystole. Patients with an initial rhythm of pulseless ventricular tachycardia (VT) or ventricular fibrillation (VF) were significantly higher in the ROSC group than the non-ROSC group (19 [16.4%] vs. 7 [5.1%], P = 0.004). Conversely, patients with an initial rhythm of asystole were particularly high in the non-ROSC group than in the ROSC group (126 [91.3%] vs. 90 [77.6%], P = 0.003).

The high number of patients with no documentation of any clinical condition before IHCA was notable [Table 2]. Patients with multi-trauma related complications (pneumothorax, hemothorax, cardiac tamponade, hemorrhage, or hemorrhagic shock) (25 [18.1%] vs. 2 [1.7%], P < 0.001) and septic shock (14 [10.1%] vs. 4 [3.4%], P = 0.039) were significantly higher in the non-ROSC group than in the ROSC group.

In this cohort, a total of 166 patients achieved ROSC. Of them, 65 patients were transferred to external ICUs, and 51 (median age, 63 [43–77], 54.9% males) were admitted to in-hospital ICUs [Figure 1]. Patients admitted to in-hospital ICUs were divided into the recovered (n = 16) and the deceased (n = 35) groups according to 28-day ICU survival [Table 3]. Deceased patients were older than recovered patients. Compared with the recovered patients, deceased patients had significantly higher median APACHE II scores, CCI, and lower GCS scores. Patients with an APACHE II scores >14 and a CPC score >2 were significantly higher in the deceased group than in the recovered group (20 [57.1%] vs. 3 [18.8%], P = 0.015), (29 [82.9%] vs. 5 [31.3%], P = 0.001, respectively). Most of the patients had at least one or more coexisting comorbidities. Deceased patients more frequently had hypertension than recovered ones. The most common initial rhythm was asystole (72.5%), and it was significantly higher in the deceased group than the recovered group (29 [82.9%] vs. 8 [50.0%], P = 0.021).

In multivariate analysis [Table 4], multi-trauma-related complications (pneumothorax, hemothorax, cardiac tamponade, hemorrhage, or hemorrhagic shock) (OR, 21.11, 95% CI, 4.71–94.69, P < 0.001), CKD (OR, 3.18, 95% CI, 1.37–7.39, P = 0.007), COPD (OR, 2.84, 95% CI, 1.23–6.61, P = 0.015), asystole (OR, 2.94, 95% CI, 1.27–6.79, P = 0.012), and septic shock (OR, 4.10, 95%

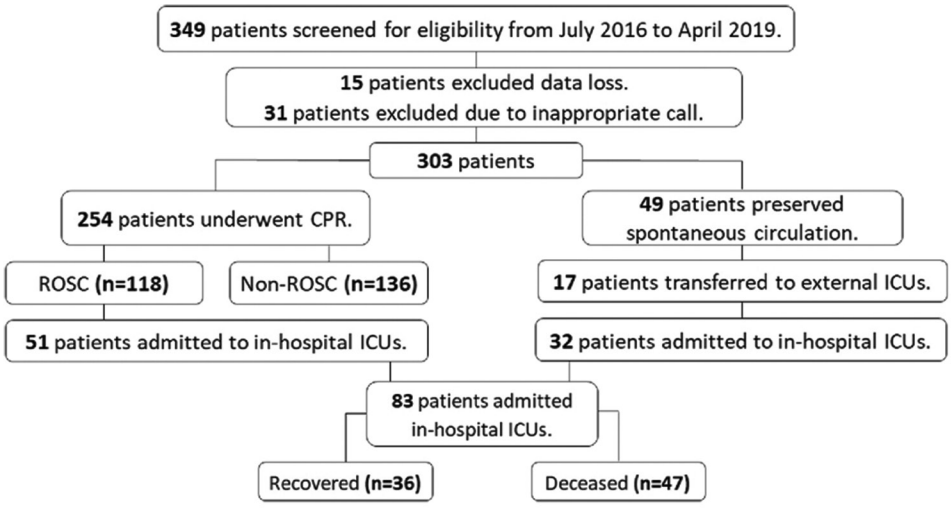

Figure 1: Flowchart of the study

Table 1: Patient and event characteristics related to return of spontaneous circulation

Patient characteristics	All cases (*n*=254)	ROSC group (*n*=116)	Non-ROSC group (*n*=138)	*P*
Age, year	73 (45-84)	68 (46-79)	75 (63-84)	0.032
Gender, male	148 (58.3)	69 (59.5)	79 (57.2)	0.75
Comorbidities	201 (79.1)	90 (77.6)	111 (80.4)	0.67
Hypertension	173 (68.1)	84 (72.4)	89 (64.5)	0.13
Diabetes mellitus (type II)	89 (35.0)	40 (34.5)	49 (35.5)	0.86
COPD	56 (22.0)	13 (11.2)	43 (31.2)	<0.001
Coronary artery disease	56 (22.0)	17 (14.7)	39 (28.3)	0.015
CKD	37 (14.6)	10 (8.6)	27 (19.6)	0.028
Congestive heart failure	36 (14.2)	9 (7.8)	27 (19.6)	0.015
Malignancy	27 (10.6)	10 (8.6)	17 (12.3)	0.53
Cerebrovascular disease	18 (7.1)	6 (5.2)	12 (8.7)	0.25
Chronic liver disease	2 (0.8)	0 (0.0)	2 (1.4)	0.92
Hospital stays before IHCA, days	4 (1-8)	4 (2-8)	4 (1–8)	0.73
Event characteristics				
Wards				
Internal medicine	120 (47.2)	56 (48.3)	64 (46.4)	0.76
Emergency surgery	30 (11.8)	4 (3.4)	26 (18.8)	<0.001
General surgery	19 (7.5)	10 (8.6)	9 (6.5)	0.53
Orthopedics and Traumatology	14 (5.5)	6 (5.2)	8 (5.8)	0.83
Medical oncology	9 (3.5)	4 (3.4)	5 (3.6)	0.94
Cardiology	9 (3.5)	4 (3.4)	5 (3.6)	0.94
Neurosurgery	8 (3.1)	8 (6.9)	0 (0.0)	0.002
Hematology	7 (2.8)	2 (1.7)	5 (3.6)	0.36
Pediatrics	7 (2.8)	5 (4.3)	2 (1.4)	0.17
Others	31 (12.2)	17 (14.7)	14 (10.1)	0.26
Duration to reach patients, min	2.0 (1.0-2.0)	1.5 (1.0-2.0)	2.0 (1.0-2.0)	0.029
≤1.00	117 (46.1)	58 (50.0)	59 (42.8)	0.16
≤2.00	210 (82.7)	104 (89.7)	106 (76.8)	0.005
Duration of CPR, min	27.0 (10.0-45.0)	10.0 (5.0-16.0)	45.0 (40.0-45.0)	<0.001
Initial rhythm				
Asystole	216 (85.0)	90 (77.6)	126 (91.3)	0.003
Pulseless VT/VF	26 (10.2)	19 (16.4)	7 (5.1)	0.004
PEA	12 (4.7)	7 (6.0)	5 (3.6)	0.40
Defibrillation	40 (15.7)	23 (19.8)	17 (12.3)	0.13

All values are expressed as *n* (%) or median (IQR). ROSC: Return of spontaneous circulation, COPD: Chronic obstructive pulmonary disease, CKD: Chronic kidney disease, IHCA: In-hospital cardiac arrest, CPR: Cardiopulmonary resuscitation, VT: Ventricular tachycardia, VF: Ventricular fibrillation, PEA: Pulseless electrical activity, IQR: Interquartile range

Table 2: Documented clinical conditions before in-hospital cardiac arrest

	All cases (*n*=254)	ROSC group (*n*=116)	Non-ROSC group (*n*=138)	*P*
Abnormal breathing pattern[a]	110 (43.3)	52 (44.8)	58 (42.0)	0.66
Deterioration in mental status[b]	81 (31.9)	38 (32.8)	43 (31.2)	0.79
Multi-trauma related complications[c]	27 (10.6)	2 (1.7)	25 (18.1)	<0.001
Hypovolemic shock	24 (9.4)	10 (8.6)	14 (10.1)	0.68
Cardiac arrhythmia	19 (7.5)	13 (11.2)	6 (4.3)	0.039
Septic shock	18 (7.1)	4 (3.4)	14 (10.1)	0.039
Syncope	7 (2.8)	3 (2.6)	4 (2.9)	0.88
Convulsion	3 (1.2)	3 (2.6)	0	0.06
Anaphylaxis	1 (0.4)	1 (0.9)	0	0.28
No documentation	173 (68.1)	80 (69.0)	93 (67.4)	0.79

[a]Abnormalities caused by hypoxemia, hypercarbia, metabolic, and lactic acidosis, [b]Ischemic or hemorrhagic central nervous pathologies, [c]Trauma-related pneumothorax, hemothorax, cardiac tamponade, hemorrhage, or hemorrhagic shock. More than one clinical condition has been recorded for some patients. All values are expressed as numbers (percentages) or median (IQR). ROSC: Return of spontaneous circulation, IQR: Interquartile range

CI, 1.16–14.54, P = 0.029) were independent factors for ROSC. A CPC score >2 on the discharge from ICU (OR, 20.86, 95% CI, [2.74–158.65], P = 0.003), an APACHE II score >14 (OR, 7.58, 95% CI, [1.06–54.23], P = 0.044) were independent risk factors for 28-day mortality in patients admitted to ICU after ROSC.

Table 3: Clinical characteristics and outcomes of the patients admitted to in-hospital intensive care units

Patient characteristics	All cases (*n*=51)	Recovered group (*n*=16)	Deceased group (*n*=35)	*P*
Age, year	63 (43-77)	48 (15-66)	69 (50-84)	0.008
Gender, male	28 (54.9)	7 (43.8)	21 (60.0)	0.37
APACHE II score	14 (7-20)	9 (6-11)	17 (9-24)	0.007
APACHE II score >14	23 (45.14)	3 (18.8)	20 (57.1)	0.015
CCI	3 (0-6)	0 (0-3)	4 (1-6)	0.017
GCS score	6 (4-10)	11 (8-13)	5 (4-6)	< 0.001
CPC score				
1: Good cerebral performance	4 (7.8)	4 (25.0)	0	0.007
2: Moderate cerebral disability	13 (25.5)	7 (43.8)	6 (17.1)	0.08
3: Severe cerebral disability	18 (35.3)	5 (31.3)	13 (37.1)	0.76
4: Coma or vegetative state	16 (31.4)	0	16 (45.7)	0.001
5: Brain death	0	0	0	N/A
CPC score>2	34 (66.7)	5 (31.3)	29 (82.9)	0.001
Comorbidities	35 (68.6)	7 (43.8)	28 (80.0)	0.021
Hypertension	31 (60.8)	5 (31.3)	26 (74.3)	0.005
Diabetes mellitus (type II)	21 (41.2)	4 (25.0)	17 (48.6)	0.14
Congestive heart failure	5 (9.8)	1 (6.3)	4 (11.4)	1.00
CKD	4 (7.8)	2 (12.5)	2 (5.7)	0.58
Coronary artery disease	8 (15.7)	3 (18.6)	5 (14.3)	0.69
COPD	6 (11.8)	3 (18.8)	3 (8.6)	0.36
Malignancy	4 (7.8)	1 (6.3)	3 (8.6)	1.00
Cerebrovascular disease	2 (3.9)	1 (6.3)	1 (2.9)	0.53
Hospital stay before ICU admission, days	3 (1-7)	4 (1-8)	3 (1-6)	0.61
Event characteristics				
Duration to reach patients, min	2.0 (1.0-2.0)	2.0 (1.0-2.0)	2.0 (1.0-2.0)	0.92
≤1.00	23 (45.1)	6 (37.5)	17 (48.6)	0.55
≤2.00	43 (84.3)	15 (93.8)	28 (80.0)	0.41
Duration of CPR, min	10.0 (5.0-16)	7.5 (5.0-14.5)	12.0 (6.0-19.0)	0.14
Initial rhythm				
Asystole	37 (72.5)	8 (50.0)	29 (82.9)	0.021
Pulseless VT/VF	10 (19.6)	5 (31.3)	5 (14.3)	0.25
PEA	4 (7.8)	3 (18.8)	1 (2.9)	0.09
Defibrillation	11 (21.6)	6 (37.5)	5 (14.3)	0.09

All values are expressed as numbers (percentages) or median (IQR). ICU: Intensive care unit, CPR: Cardiopulmonary resuscitation, APACHE II score: Acute Physiology and Chronic Health Evaluation II score, CCI: Charlson comorbidity index, GCS: Glasgow coma scale, CPC: Cerebral performance categories, N/A: Not applicable, CKD: Chronic kidney disease, COPD: Chronic obstructive pulmonary disease, VT: Ventricular tachycardia, VF: Ventricular fibrillation, PEA: Pulseless electrical activity, IQR: Interquartile range

Discussion

In the study, we assessed the patients who underwent CPR and were treated in the ICU after ROSC and found a few noteworthy results. Comorbidities including CKD and COPD, asystole as a first observed rhythm in CPR, multi-trauma-related complications, and septic shock were independent factors related to ROSC. In addition, we determined that a CPC score >2, and an APACHE II score >14 were independent risk factors for 28-day mortality in patients admitted to the ICU after ROSC.

In this cohort, the ROSC rate was 45.7%. The ROSC rate ranges from 35.7% to 54.0% in different patient cohorts.[2,3,5,11-13] We found that coexisting comorbidities, including CKD and COPD, were the independent risk factors related to ROSC. A previous study revealed that patients who did not have comorbidities included in CCI have a higher survival rate.[12] Age-another parameter of the CCI was also a factor for ROSC. Notably, younger patients' survival rate was higher regardless of hospital conditions, event characteristics, and patient characteristics such as coexisting comorbidities.[14] In this cohort, resuscitation success was significantly low in older patients than the younger ones. Compared with the other wards, CPR attempts in the emergency surgery ward more frequently resulted in death. Patients in this ward consist of individuals who underwent emergency surgery without preoperative optimization in a decompensated status. Thus, as an addition to coexisting comorbidities, the current functional status of the patients is also an essential factor related to ROSC.

Asystole as a first observed rhythm was another independent factor related to ROSC. Shockable rhythms were strongly associated with ROSC, as in

Table 4: Independent risk factors for return of spontaneous circulation and 28 days mortality

Factors affecting ROSC	OR (95% CI)	*P*
CKD	3.18 (1.37-7.39)	0.007
COPD	2.84 (1.23-6.61)	0.015
Congestive heart failure	2.31 (0.93-5.76)	0.72
Coronary artery disease	1.11 (0.47-2.58)	0.82
Asystole as an initial rhythm	2.94 (1.27-6.79)	0.012
Multi-trauma related complications	21.11 (4.71-94.69)	< 0.001
Septic shock	4.10 (1.16-14.54)	0.029
Gender, male	1.16 (0.65-2.07)	0.61
Factors affecting 28 days mortality		
CPC score >2	20.86 (2.74-158.65)	0.003
APACHE II score >14	7.58 (1.06-54.23)	0.044
Asystole as an initial rhythm	6.27 (0.92-42.82)	0.06
Hypertension	3.46 (0.58-20.70)	0.17
Gender, male	1.03 (0.17-6.29)	0.98

ROSC: Return of spontaneous circulation, OR: Odds ratio, CKD: Chronic kidney disease, COPD: Chronic obstructive pulmonary disease, CPC score: Cerebral performance category score, APACHE II score: Acute physiology and chronic health evaluation II score, CI: Confidence interval

previous studies.[2,4] Early defibrillation is one of the critical elements of CPR.[8,13,15,16] Many factors may affect achieving shockable rhythms. Patients with monitored and witnessed cardiac arrest have higher rates of survival.[4,5,12,13,15,16] In the neurosurgery ward, it is routine to provide monitoring for each critical patient. That is why the ROSC rate was significantly higher in the neurosurgery ward than in the others.

We also found that septic shock and multi-trauma-related complications as underlying reasons for IHCAs were independent risk factors for ROSC. Despite the improvements, patients with sepsis have worse outcomes than patients without sepsis.[17] A large cohort study revealed that sepsis-related IHCA has a 0.65-fold lower rate of survival to discharge.[18] In addition, trauma is associated with reduced survival in cases with IHCA.[5] These consequences highlight the importance of early diagnosis of sepsis and the need for trauma teams to approach trauma-associated IHCA.

The evaluation of 51 patients admitted to in-hospital ICUs due to IHCA revealed a 28-day survival rate of 31.4%. In prior studies, 30-day survival rates range between 24% and 56%.[2,4,12,16,19]

We found that a CPC score >2 on ICU discharge was an independent risk factor for 28-day mortality. In addition, higher GCS scores were related to higher rates of survival. The mainstay of preserved cerebral functions depends on maintaining the cerebral perfusion with an optimal global oxygen delivery during CPR. Delayed arrival of rescue team more than 2 min was defined as a risk factor for decreased 30-day survival.[4] However, the duration of CPR is another factor associated with improved neurologic outcomes.[5,12,20]

Furthermore, asystole as a first observed rhythm in CPR independently related to 28-day mortality. Although shockable rhythms are strongly associated with short-term survival,[5,6,12,13] pulseless VT/VF as an initial rhythm did not relate to 28-day survival in this cohort. The small sample size might be the reason for this result in this study.

An APACHE II score >14 was another independent risk factor for 28-day survival. Usually, the higher APACHE II scores and CCI were the risk factors for ICU mortality, but the patients with an APACHE II score >14 should be closely monitored. Patients with CKD might decrease the compensation capacity of the patients against the peri-resuscitation pathologies, especially acidosis. Diabetes mellitus, coronary artery disease, stroke, respiratory failure, and malignancy are the other risk factors for short or long-term survival.[4,21,22]

Limitations

The study has several limitations. The results of the single-center retrospective data should be supported by other studies. The further data of the patients transferred to external ICUs were not evaluated. Furthermore, patients assessed in the in-hospital ICUs had a heterogeneous character.

Conclusions

Despite the developments in healthcare quality, IHCA is still a common problem all around the world. In the present study, we defined the independent factors related to ROSC, such as comorbidities including CKD, COPD; asystole as an initial rhythm; trauma-related complications, and septic shock. In addition, a CPC score >2 on ICU discharge and APACHE II score >14 were the independent risk factors for the 28-day mortality. It is clear that the extensive definition of factors associated with ROSC contributes to approaching IHCA and reduced mortality. Nevertheless, further studies are needed to increase discharge rates with a good neurologic outcome.

Author contribution

MNY: Conceptualization (supporting), data curation (equal), formal analysis (lead), investigation (equal), methodology (supporting), validation (lead), visualization (lead), writing (lead) NDY: Conceptualization (supporting), data curation (equal), formal analysis (supporting), methodology (supporting), visualization (supporting), writing (support) MA: Data curation (equal), investigation (equal), methodology (supporting), writing (support) ROK: Data curation (equal), investigation (equal), methodology (supporting), writing (support) TM: Conceptualization (supporting), methodology (supporting), project administration (supporting), Writing – review & editing (support) NT: Conceptualization (lead), methodology (lead), project administration (lead), supervision (lead), Writing – review & editing (lead).

Conflicts of interest
None Declared.

Ethical approval
The study was approved by local ethics committee of Prof. Dr. Cemil Taşçıoğlu City Hospital with a decision number and date of 1268/31.04.2019.

Consent to participate
Written informed consent was waived due to restrospective design of the study.

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