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Investigation of the Effect of Initial Cardiac Rhythm on Survival in Patients Admitted with Cardiopulmonary Arrest to the Emergency Department

Acil Servise Arrest Nedeniyle Getirilen Hastalarda İlk Tespit Edilen Kardiyak Ritmin Sağkalım Üzerine Olan Etkisinin Araştırılması

Taner Sahin, Ahmet Furkan Nalbant

Department of Emergency Medicine, Kayseri City Training and Research Hospital, University of Health Sciences, Kayseri, Türkiye

Abstract

Aim: Cardiopulmonary arrest is the condition of insufficient oxygen delivery to tissues as a result of sudden cessation of circulatory and respiratory functions. This study aimed to investigate the causes of arrest in patients admitted with cardiopulmonary arrest and the effect of initial cardiac rhythm on patient survival.

Material and Method: Out of 1126 patients who had an in-hospital and out-of-hospital cardiac arrest and were admitted to our emergency department, 1009 patients were included in this retrospective study following the exclusion criteria. In addition to the demographic characteristics of patients, their initial rhythms and mortality states were assessed.

Results: There was a significant relationship between patients' clinical outcomes and initial cardiac rhythms ($p<0.001$). The mortality rate (77.1%) was higher in patients whose initial cardiac rhythm was asystole. While the rate of acidosis was higher in inpatients the rate of trauma was higher in mortal patients ($p<0.001$). ST elevation was higher in patients whose cardiac rhythm returned and right bundle branch block was higher in those who died, however, these were not statistically significant.

Conclusion: The initial rhythm analysis in arrest patients is crucial specifically in the detection of ventricular fibrillation and pulseless ventricular tachycardia which are shockable rhythms and patient survival increases with early diagnosis and intervention.

Keywords: Cardiopulmonary arrest, cardiac rhythm, mortality

Öz

Amaç: Kardiyopulmoner arrest, dolaşım ve solunum fonksiyonlarının aniden durması sonucu dokulara yetersiz oksijen taşınması durumudur. Bu çalışmada kardiyopulmoner arrest ile başvuran hastalarda arrest nedenlerini ve başlangıç kardiyak ritminin hasta sağkalımına etkisini araştırmak amaçlandı.

Gereç ve Yöntem: Geriye dönük olarak yapılan bu çalışmaya, hastane içi ve hastane dışı kardiyak arrest geçiren ve acil servisimize başvuran 1126 hastadan dışlama kriterleri sonrasında 1009'u dahil edildi. Hastaların demografik özelliklerinin yanı sıra başlangıç ritimleri ve mortalite durumları değerlendirildi.

Bulgular: Hastaların klinik sonuçları ile başlangıç kardiyak ritimleri arasında anlamlı bir ilişki vardı ($p<0.001$). Başlangıçta kalp ritmi asistoli olan hastalarda mortalite oranı (%77,1) daha yüksekti. Yatan hastalarda asidoz oranı daha yüksek iken, ölümlü hastalarda travma oranı daha yüksekti ($p<0.001$). Kalp ritmi dönen hastalarda ST elevasyonu, ölenlerde sağ dal bloğu daha fazlaydı ancak bunlar istatistiksel olarak anlamlı değildi.

Sonuç: Arrest hastalarında ilk ritim analizi, özellikle şoklanabilir ritimler olan ventriküler fibrilasyon ve nabızsız ventriküler taşikardinin saptanmasında çok önemlidir ve erken tanı ve müdahale ile hasta sağkalımı artar.

Anahtar Kelimeler: Kardiyopulmoner arrest, kardiyak ritim, mortalite

Corresponding *(İletişim)*: Taner SAHİN, Emergency Medicine Department Kayseri City Training and Research Hospital affiliated with University of Health Sciences, Kayseri, Türkiye
E-mail *(E-posta)*: taner.sahin@sbu.edu.tr
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INTRODUCTION

Cardiopulmonary arrest (CPA) is the condition of insufficient oxygen delivery to tissues as a result of sudden cessation of circulatory and respiratory functions. The emergency response in which the required oxygen is provided and circulatory functions are restored by chest compression for the survival of a patient diagnosed with CPA is called cardiopulmonary resuscitation (CPR). In case CPR is not performed effectively or early death or permanent brain damage may happen.[1] An immediately and effectively performed CPR positively affects the chance of survival. About 15-20% of deaths worldwide are caused by cardiac arrest. Only 5-10% of out-of-hospital cardiac arrests (OHCA) can be returned and about 6% of these patients are discharged from the hospital with neurological well-being.[2] Cardiac arrest is a condition that often results in the death of patients. However, most cardiac causes are treatable and thereby reversible.[3] In this sense, the latest international guidelines released by the International Liaison Committee on Resuscitation (ILCOR)[4], the European Resuscitation Council (ERC)[5], and the American Heart Association (AHA)[6] recommend the treatment of potentially reversible causes of cardiac arrest. CPR Guidelines of both ERC and AHA divide these causes into two groups of 5 by their first letters: 5H (Hypovolemia, Hypoxia, Hydrogen ion [acidosis], Hypo-/Hyperkalemia, and other electrolyte disorders; Hypothermia) and 5T (Tension pneumothorax, Tamponade [cardiac], Toxins, Thrombosis coronary, and Thrombosis pulmonary).[7,8]

Initial rhythms in cardiac arrest are divided into two non-shockable rhythms (asystole and pulseless electrical activity [PAE]) and shockable rhythms (ventricular fibrillation [VF] or pulseless ventricular tachycardia [PVT]). The initial presence of a shockable rhythm in out-of-hospital cardiac arrest is a sign of a good prognosis.[9] Several studies in the literature have revealed that the detection of a shockable rhythm as the initial rhythm is a sign of good prognosis compared to the detection of a non-shockable rhythm.[10,11] Therefore, the initial rhythm gives an opinion about the patient's possibility of survival.

This study aimed to detect the causes of arrest in patients admitted with CPA to our hospital and investigate the effect of initial cardiac rhythm on patient survival.

MATERIAL AND METHOD

Patients who were diagnosed with OHCA and in-hospital cardiac arrest (IHCA) in the Tertiary Emergency Clinic of Kayseri City Hospital between 01.06.2018 and 15.04.2022 were included in this study which was designed as a retrospective cohort study. Out of 1126 patients included in the study, 54 patients diagnosed with non-traumatic pediatric arrest and 63 with missing data in their files were excluded. As a result, a total of 1009 patients were included in the study. The principles in the Declaration of Helsinki were considered during the study and the ethical approval required for the study was obtained before the study. The study was approved by the Kayseri City Education and Research Hospital Clinical Ethics Committee with date:16.06.2022, and number:653.

Age, gender, location of arrest, detected cause of arrest (5H/5T), initial cardiac rhythm, initial return rhythm in case of return of spontaneous circulation (ROSC), and clinical outcomes of patients admitted with CPA were recorded after the patient files were scanned on the health management information system (HBYS) and emergency department (ED) patient file archive.

Statistical Methods

SPSS 26.0 (IBM Corporation, Armonk, New York, United States) software program was used in the analysis of variables. Normality in the distribution of data was assessed with the Shapiro-Wilk/Francia Test. Mann-Whitney U test with Monte Carlo results was used in the comparison of patients' clinical outcomes and ROSCs and in-hospital mortality states of patients if they were hospitalized according to their ages. Pearson Chi-Square and Fisher-Freeman-Halton tests tested with the Monte Carlo Simulation technique were used in the comparison of categorical variables such as gender, location of arrest, cause of arrest, initial cardiac rhythm, and stable rhythm detected following ROSC and clinical outcome and ROSCs by the state of mortality inwards the patients were hospitalized. Comparison of the rates in columns with each other was expressed with Benjamini-Hochberg adjusted p values. The sensitivity and specificity rates for the relationship between the classification separated by the cutoff value calculated according to the state of mortality of ROSC patients in their wards by age and real classification were assessed and expressed with ROC (Receiver Operating Curve) analysis. Quantitative variables were expressed in mean (standard deviation) and median (minimum-maximum) values while categorical variables were expressed with n (%) in the tables. Variables were assessed in 95% confidence interval and p-values lower than 0.05 were accepted significantly.

RESULTS

There was no significant difference between clinical outcomes and age of patients and clinical outcomes and gender of patients ($p=0.054$ and $p=0.088$). When the relationship between patients' location of arrest and survival was assessed it was observed that 85.1% of OHCA patients died while 20.3% of IHCA patients survived following intervention. A statistically significant difference was detected in both parameters ($p=0.033$). There was a significant relationship between the clinical outcomes of patients and detected causes of arrest ($p<0.001$). While the rate of acidosis was higher in inpatients the rate of trauma was higher in mortal patients ($p<0.001$).

There was a significant relationship between the clinical outcomes of patients and their initial cardiac rhythms ($p<0.001$). The mortality rate (77.1%) was higher in patients whose initial cardiac rhythm was asystole. The most commonly detected initial cardiac rhythm among patients who were hospitalized following ROSC was asystole (63.7%). A statistically significant difference was found between patients whose initial cardiac rhythm was VF and the mortal group among patients who were hospitalized following ROSC ($p<0.001$). In the mortal group, there was a statistically significant difference between

patients in whom atrioventricular (AV) block and left bundle branch block (LBBB) were detected following ROSC (p=0.003 and p=0.008). ST elevation was higher in patients who were hospitalized following ROSC and the right bundle branch block (RBBB) was higher in those who died, however, they were not statistically significant (**Table 1**).

The median age of mortal patients in the ward where individuals with ROSC were hospitalized was 72 (minimum-maximum= 6-100) years and the median age was significantly higher compared to the age of surviving patients (non-mortal individuals) (<0.001). The rate of mortality was higher among women with ROSC (0.047). There was a significant relationship between the detected causes of arrest and mortality states in the wards where they were hospitalized (p=0.001). While hypoxia (24.7%) and acidosis (23.6%) were higher in mortal patients, cardiac thrombosis (MI) (75.0%) was higher in the surviving group in the ward. There was a significant relationship between initial cardiac rhythm and survival (p<0.001). There was a significant difference between asystole (69.1%) in mortal patients and VF (50%) and PVT (8.9%) in surviving patients. There was a significant difference among mortality states of patients according to their stable electrocardiogram (ECG) rhythms detected following ROSC (p<0.001). Accordingly, while atrial fibrillation (AF) (18.8%) and RBBB (18.4%) were higher in mortal patients ST-segment elevation (STE) (50%) was higher in surviving patients (**Table 2**).

Patients' ages and mortality states in the wards where they were hospitalized were compared with ROC analysis. According to that ROC analysis, sensitivity was 63.2% and specificity was 62.5% for 66 years of age as the obtained cutoff value of age by mortality. The AUC value was 0.655 (0.039) and this cutoff value was statistically significant in the differentiation of mortality (p<0.01) (**Figure 1**).

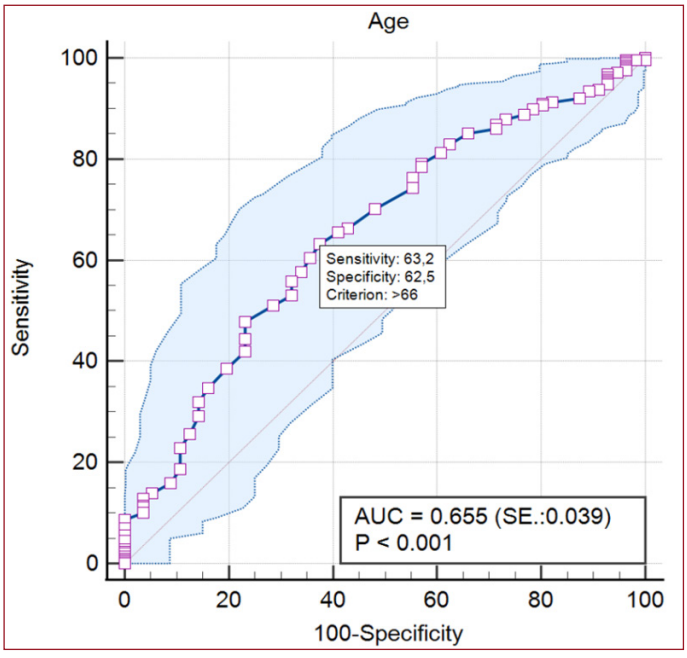

Figure 1. Receiver Operating Curve (ROC) analysis of patients' ages and mortality states in the ward they were hospitalized

Table 1. Patient's demographic data, causes of arrest, initial cardiac rhythms, rhythms following the return of spontaneous circulation

	Total	Clinical Outcome		P
	(n=1009)	Mortal (n=665)	Hospitalization (n=344)	
	Median (min-max)	Median (min-max)	Median (min-max)	
Age	72 (2-105)	72 (2-105)	70 (6-100)	0.054[u]
	n (%)	n (%)	n (%)	
Gender				0.088[c]
Female	389 (38.6)	269 (40.5)	120 (34.9)	
Male	620 (61.4)	396 (59.5)	224 (65.1)	
Location of Arrest				0.033[c]
In-hospital	169 (16.7)	99 (14.9)	70 (20.3)	
Out-of-hospital	840 (83.3)	566 (85.1)	274 (79.7)	
Detected Cause of Arrest				<0.001[f]
Hypoxia	229 (22.7)	152 (22.9)	77 (22.4)	
Hypovolemia	32 (3.2)	21 (3.2)	11 (3.2)	
Hyperkalemia	85 (8.4)	52 (7.8)	33 (9.6)	
Acidosis	140 (13.9)	69 (10.4)	71 (20.6)	<0.001
Hypoglycemia	11 (1.1)	8 (1.2)	3 (0.9)	
Tension pneumothorax	5 (0.5)	5 (0.8)	0 (0.0)	
Cardiac tamponade	3 (0.3)	3 (0.5)	0 (0.0)	
Pulmonary thrombosis (emboli)	38 (3.8)	23 (3.5)	15 (4.4)	
Cardiac thrombosis (MI)	397 (39.3)	271 (40.8)	126 (36.6)	
Intoxication	9 (0.9)	5 (0.8)	4 (1.2)	
Trauma	60 (5.9)	56 (8.4)	4 (1.2)	<0.001
Initial Cardiac Rhythm				<0.001[c]
Asystole	732 (72.5)	513 (77.1)	219 (63.7)	<0.001
PEA	75 (7.4)	46 (6.9)	29 (8.4)	
VF	170 (16.8)	88 (13.2)	82 (23.8)	<0.001
PVT	32 (3.2)	18 (2.7)	14 (4.1)	
A stable rhythm was detected following the return of spontaneous circulation				0.013[f]
NSR	54 (12.6)	7 (8.3)	47 (13.7)	
Bradyarrhythmias (AV block)	20 (4.7)	9 (10.7)	11 (3.2)	0.003
Tachycardia (Sinus Tachycardia)	44 (10.3)	8 (9.5)	36 (10.5)	
AF	70 (16.4)	12 (14.3)	58 (16.9)	
SVT	19 (4.4)	2 (2.4)	17 (4.9)	
ST elevation (MI)	86 (20.1)	12 (14.3)	74 (21.5)	
ST depression	17 (4.0)	1 (1.2)	16 (4.7)	
RBBB	74 (17.3)	18 (21.4)	56 (16.3)	
LBBB	32 (7.5)	12 (14.3)	20 (5.8)	0.008
Extrasystoles	12 (2.8)	3 (3.6)	9 (2.6)	

[c] Pearson Chi-Square Test(Monte Carlo), [f] Fisher freeman Halton Test(Monte Carlo); posthoc test: Benjamini-Hochberg correction, [u] Mann Whitney u Test(Monte Carlo)
PEA: Pulseless Electrical Activity, VF: Ventricular Fibrillation, PVT: Pulseless Ventricular Tachycardia, ECG: Electrocardiography, NSR: Normal sinusoidal rhythm, AV: Atrioventricular, AF: Atrial Fibrillation, MI: Myocardial Infarction, RBBB: Right bundle branch block, LBBB: Left bundle branch block

Table 2. Relationship of re-arrest and mortality state following the return of spontaneous circulation with the location of arrest, causes of arrest, and cardiac rhythm

	Did those who returned die in their wards?		P
	Yes (n=288)	No (n=56)	
	median (min-max)	median (min-max)	
Age	72 (6-100)	63 (18-88)	<0.001[u]
	n (%)	n (%)	
Gender			0.047[c]
Female	107 (37.2)	13 (23.2)	
Male	181 (62.8)	43 (76.8)	
Location of arrest			0.718[c]
In-hospital	60 (20.8)	10 (17.9)	
Out of hospital	228 (79.2)	46 (82.1)	
Cause of Arrest			<0.001[f]
Hypoxia	71 (24.7)	6 (10.7)	0,022
Hypovolemia	10 (3.5)	1 (1.8)	
Hyperkalemia	31 (10.8)	2 (3.6)	
Acidosis	68 (23.6)	3 (5.4)	0,002
Hypoglycemia	3 (1.0)	0 (0.0)	
Tension pneumothorax	0 (0.0)	0 (0.0)	
Cardiac tamponade	0 (0.0)	0 (0.0)	
Pulmonary thrombosis (emboli)	14 (4.9)	1 (1.8)	
Cardiac thrombosis (MI)	84 (29.2)	42 (75.0)	<0.001
Intoxication	3 (1.0)	1 (1.8)	
Trauma	4 (1.4)	0 (0.0)	
Initial Cardiac Rhythm			<0.001[f]
Asystole	199 (69.1)	20 (35.7)	<0.001
PEA	26 (9.0)	3 (5.4)	
VF	54 (18.8)	28 (50.0)	<0.001
PVT	9 (3.1)	5 (8.9)	0,044
A stable ECG Rhythm was detected after the return of spontaneous circulation			<0.001[f]
NSR	35 (12.2)	12 (21.4)	
Bradyarrhytmia (AV block)	11 (3.8)	0 (0.0)	
Tachyarrhythmia (Sinus Tachycardia)	33 (11.5)	3 (5.4)	
AF	54 (18.8)	4 (7.1)	0,034
SVT	16 (5.6)	1 (1.8)	
ST elevation (MI)	46 (16.0)	28 (50.0)	<0.001
ST depression	14 (4.9)	2 (3.6)	
RBBB	53 (18.4)	3 (5.4)	0.016
LBBB	18 (6.3)	2 (3.6)	
Extrasystoles	8 (2.8)	1 (1.8)	

[c] Pearson Chi-Square Test(Monte Carlo), [f] Fisher freeman Halton Test(Monte Carlo); psthoc test: Benjamini-Hochberg correction, [u] Mann Whitney u Test(Monte Carlo)
PEA: Pulseless Electrical Activity, VF: Ventricular Fibrillation, PVT: Pulseless Ventricular Tachycardia, ECG: Electrocardiography, NSR: Normal sinusoidal rhythm, AV: Atrioventricular, AF: Atrial Fibrillation, MI: Myocardial Infarction, RBBB: Right bundle branch block, LBBB: Left bundle branch block

DISCUSSION

Modern CPR methods have started to be tried to keep CPA patients alive since the 1960s and still continue to be developed today. On the other hand, both ERC and AHA CPR guidelines recommend early CPR in case of asystole and PEA rhythms and early defibrillation in the detection of VF and PVT rhythms which are called shockable rhythms. The importance of early CPR and early defibrillation is emphasized in both guidelines.[4,6] In this study, there was a significant relationship between clinical outcomes and initial cardiac rhythms of CPA patients. Roberts D et al. reported in their study that initial rhythm in CPA patients was strongly associated with in-hospital mortality,[12] which is similar to the findings in our study. The mortality rate was higher (77.1%) in patients whose initial cardiac rhythm was asystole in our study. In addition, the survival rate after CPR was the highest in patients whose initial cardiac rhythm was VF. It was stated in a study in Australia that the prevalence of shockable rhythm was 82% in surviving patients who were OHCA.[13] In another study in America, 69.33% of 3952 patients initially had non-shockable rhythm.[14] Thompson L. E. et al. found that initial rhythm was VF in 12.5% of CPA patients, PEA in 42.2%, and asystole in 37.6%.[15] In another study, 295 (4%) of OHCA patients initially had PEA and then a shockable rhythm, and 155 (2%) initially had asystole and then a shockable rhythm.[9] In another study performed in 2021, the prevalence of ROSC was higher in IHCA patients whose initial rhythm was PEA compared to those whose initial rhythm was asystole.[16] In our study, the most commonly detected initial cardiac rhythm was asystole (63.7%) among patients who were hospitalized following ROSC. The rate of shockable rhythm was 58.9% in surviving patients following CPA. The rates of patients' initial rhythms were stated as 72.5% for asystole, 7.4% for PEA, 16.8% for VF, and 3.2% for PVT. In other words, a shockable rhythm was detected in 20% of patients. Survival rates of patients whose initial rhythms were VF and PVT were higher (48.2% for VF, 43.7% for PVT, 38.6% for PEA, and 29.9% for asystole). Survival rate was reported higher in patients whose initial rhythm was VF in a study performed in Sweden.[17] Similarly, the rate of hospitalization following ROSC was higher in patients whose initial rhythm was VF in our study. Findings in our study support the result that early defibrillation has a positive effect on patient survival in presence of a shockable rhythm in CPA patients as emphasized in ERC and AHA CPR guidelines.

Acute coronary syndromes (ACS) are a common cause of arrest in patients with cardiac arrest. A 12-lead ECG should be performed as soon as possible in order to exclude ACS following ROSC.[18] The European Association of Percutaneous Cardiovascular Interventions and ERC recommend emergency coronary angiography (CAG) in patients in whom STE is detected on ECG.[19] In our study, the survival rate was higher (50%) in patients in whom STE was observed on ECG performed following ROSC. ECG should be assessed in detail following ROSC.[19] Non-specific changes and specific changes mimicking myocardial infarction (i.e. STE, ST segment depression, and abnormal T wave morphology) are observed in 3-16% of patients who had just been resuscitated.[20] It was reported in a study that the presence of combined/extended ECG criteria including the presence of ST elevation and/or depression and/or LBBB and/or non-specific QRS widening and/or RBBB on ECG could help detection of patients who could benefit from CAG following ROSC.[21] In our study, 86 (20.1%) patients in whom STE was detected on ECG following ROSC underwent CAG. On the other hand, AV-block was higher in 9 patients (10.7%) and LBBB was higher in 12 patients (14.3%) in the groups dying

of arrest following ROSC. It was confirmed in our study that undergoing CAG for patients who had STE on ECG performed following ROSC had a positive effect on patient survival. Therefore, we think patients should definitely receive an ECG examination following ROSC. On the other hand, the presence of AV-block, LBBB, and RBBB on ECG can be a sign of poor prognosis in terms of patients' clinical outcomes.

Whether patient age is indicated alone to start CPR is controversial in the literature. Although survival rates differ survival decreases by age in studies assessing age and survival in literature. An increase was observed in mortality by age in our study. The mortality rate was interestingly calculated higher as a result of re-arrest in the female gender following ROSC. According to a study performed on the elderly population, in-hospital survival rates following IHCA and OHCA got better in the past ten years but did not become more than 28.5% and 11.1% respectively.[22] When locations, where patients had arrested, were assessed it was observed that most of the patients (83.3%) were OHCA in our study. Additionally, the mortality of patients was compared according to their states of IHCA and OHCA and it was observed that 20.3% of IHCA patients survived after intervention and that 85.1% of OHCA patients died. The reason for that result was commented as fast access to IHCA patients in the hospital and the opportunity to initiate early CPR and early defibrillation; however, there may be delays in access to OHCA patients and initiating early CPR. According to a study performed on a total of 136,328 IHCA and OHCA patients in Sweden, the survival rate increased by years accompanied by progresses in CPR, the highest survival rate was among patients between the ages of 0 and 39, the survival rate increased to 17.5% in 2020 from 9.1% in 1990, and the highest increase in survival rate was in the age group of 40-49 years.[23] On the other hand, the mean survival rate ranged from 0.5% to 0.8% in a study on 234,767 IHCA patients and the survival rate decreased with age according to that study. In addition, the arrest rate of the male gender was reported higher in all age groups.[24] Kazaure H. S. et al. reported in their study assessing 813,493 arrest patients at and above the age of 18 that 54.3-55% of the patients were male, 80.7% were ≥65 years old, and the mean survival rate was 23%.[25] In a study in which 45,567 arrest patients at and above the age of 65 were assessed by Thompson L. E. et al., 55.5% of patients were male, the mean age was 72, and the survival rate was calculated as 16.6%.[15] In our study, the rate of male patients was higher (61.4%), and the mean age of patients was 72, which is similar to findings in the literature. In addition, the rate of survival was initially calculated as 34.9%. Compared to the available studies, the high rate of survival in our study can be explained by conditions that patients can access to hospital by ambulance in a short time as transportation to our hospital is easy and that CPA patients receive CPR according to the current ERC and AHA guidelines as our ED is a clinic providing training on the specialty of emergency medicine.

Detection of underlying causes in CPA patients also affects patient survival. AHA and ERC CPR guidelines abbreviated the causes of reversible arrest by their first letters as 5H/5T.[7,8] According to a study, while cardiac causes of arrest increased with age traumatic arrests decreased with age.[24] In another study, the rate of cardiac causes of arrest was 65.1%, the rate of pulmonary causes of arrest was 4.6% and the rate of traumatic causes of arrest was 2.3%.[23] In our study, while the survival rate of arrest resulting from cardiac causes (ACS) was higher the patient's survival rate of patients with hypoxia, acidosis, and traumatic arrests was lower. We believe that CPR performed effectively, on time, and in good quality can prevent patients from hypoxia. In addition, arterial blood gas analysis performed as soon as possible during CPA can help detect acidosis. Trauma is still a social problem today and the number of cars, industrialization, building industry, and domestic accidents are gradually increasing. Traumatic injury is the leading cause of death among individuals between the ages of 1 and 44 in industrialized countries and may result in more than 30,000 preventable deaths only in the USA.[26] In our study, traumatic cardiac arrests were associated with mortality. Therefore, we recommend taking preventive measures for traumas and the transport of traumatic patients to the hospital as fast as possible.

Limitations

Our study was performed prospectively and in a single center and pediatric arrest patients and pregnant arrest patients excluding pediatric traumatic arrest patients were not included in the study, which can be accepted as the limitations of our study.

CONCLUSION

CPA is a condition reported in all age groups and survival of patients can increase through early diagnosis, early CPR, early defibrillation, and early transport to the hospital. Analysis of initial rhythm is crucial specifically in the detection of VF and PVT which are shockable rhythms and increases the survival of patients. Increasing age and male gender can be accepted as risk factors the for increase in mortality in CPA patients. Undergoing CAG in an early period for patients who have STE on ECG performed following ROSC has a positive effect on patient survival. We believe that the detection of the reversible causes of arrest in CPA patients and initiating a cause-specific treatment can increase patient survival.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was approved by the Kayseri City Education and Research Hospital Clinical Ethics Committee with date:16.06.2022, and number:653.

Informed Consent: Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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