

## DISCUSSION

Cardiopulmonary resuscitation (CPR) for cardiac arrest is a frequently performed medical intervention. Studies of CPR among hospitalized patients revealed survival to discharge ranging from 6% in cancer patients in the USA <sup>(99)</sup> to as high as 43% in monitored bed patients in Sweden.<sup>(100)</sup> A previous study done in Pakistan showed CPR outcomes similar to the outcomes seen in more developed settings. <sup>(101)</sup>

Multiple reasons have been described for this variation including differences in inclusion/exclusion criteria, differences in the setting in which the CPR was performed and problems with definitions of common variables.<sup>(102)</sup>

The quality of cardiopulmonary resuscitation (CPR) plays a crucial role in reducing patient mortality rates. Fewer pauses and better chest compression quality are thought to improve overall survival following cardiac arrest .<sup>(103)</sup>

However, rescuer fatigue can lead to degradation in compression quality.<sup>(104,105)</sup> have reported that during out of hospital cardiac arrest(OHCA), resuscitation, chest compressions are delivered for only half of the time, and most of these compressions are too shallow.

There are limited data on the outcomes of CPR from low and middle income countries. The differences in resources and the disease pattern in low and middle income countries are likely to have an impact on the eventual outcome of CPR. <sup>(106)</sup>

So, the present study aimed to study the outcome of cardiopulmonary resuscitation of adults in ER in the Alexandria Main University Hospital.

To achieve this target, 100 consecutive adult patients who were submitted to CPR were included in the study. They were subjected to short history taking, resuscitation procedure reporting and outcome of the procedure documenting whether resuscitation or death.

In the present study, the included patients had a mean age of 48.08  $\pm$  18.2 years. They included 56 males and 44 females. This is in harmony with the results of Enohumah <sup>(107)</sup> who evaluated the demographic characteristics of patients who suffered cardiac arrest in ICUs to identify those factors influencing outcome after resuscitation following cardiac arrest. In their study, males predominated females (68.0 % vs 32.0 %).

In our study, causes of admission were cardiac causes 34 patients while other medical and surgical causes were reported in 45 and 12 patients respectively. Trauma was the cause of admission in 9 patients. This is in agreement with Khan <sup>(108)</sup> who studied the outcome and predictors of in-hospital cardiopulmonary resuscitation (CPR) among adult patients at a tertiary care centre in Pakistan. In their study, among 383 cases subjected to CPR, medical non cardiac causes were the most common cause of admission followed by cardiac cause, surgical causes and trauma.

In respect to the preexisting conditions, our study found that hypertension was the most common preexisting in the studied patients followed by ischemic heart disease, diabetes and malignancy. 10 patients had two or more conditions while the remainder 90 patients had one or less conditions. This also agrees with the former study of Khan. <sup>(108)</sup>

Regarding the reported initial rhythm in the studied patients, we found that asystole was the most common presenting rhythm (60.0 %) followed by PEA (22.0 %) and VF (9.0 %) while VT, sinus bradycardia and torsade de pointes were found in 6, 2 and 1 patients respectively. This is in accordance with the study of Amer <sup>(109)</sup> who studied the outcome and the predictors of in-hospital cardiopulmonary resuscitation (CPR) among elderly patients admitted to Ain Shams University Hospitals, Egypt. In this study, asystole was the most common arrhythmia detected at the time of arrest (85.1%), followed by ventricular tachycardia (8.7%) and ventricular fibrillation (6.2%).

As regards CPR characteristics in the studied patients, the time to starts CPR was 0.25  $\pm$  1.24 minutes. The mean duration of CPR was 33.3  $\pm$  18.5 minutes. The mean number of shocks was 2.7  $\pm$  1.45 while duration of the 1<sup>st</sup> shock was 9.4  $\pm$  8.4 minutes.

In the current study, only 24 patients who had CPR were resuscitated while the remainder 76 died. This figure is close to that found by Möhnle<sup>(110)</sup> who performed an analysis of survival after in-hospital cardiopulmonary resuscitation. In this study, In-hospital emergencies handled by the cardiac arrest team in the years 2004 to 2006 were analyzed retrospectively, and patient and event characteristics were tested for their associations with survival after cardiopulmonary resuscitation. The results were compared to a similar prior analysis for the years 1995 to 1997. After cardiopulmonary resuscitation, the survival rate to discharge was 30.2% for the years 2004 to 2006 compared to 25.1% for the years 1995 to 1997.

In comparison, the study of Chalkias,<sup>(111)</sup> only 15.6 % of patients survived within 24 hours. Also, in the study of Goldberger<sup>(112)</sup> who investigated whether duration of resuscitation attempts varies between hospitals and whether patients at hospitals that attempt resuscitation for longer have higher survival rates than do those at hospitals with shorter durations of resuscitation efforts, it was found that 15.4% survived to discharge.

Comparison between survivors and non-survivors regarding the demographic characteristics had shown no statistically significant differences. This is in accordance with Ferguson<sup>(113)</sup> who evaluates whether the duration of cardiopulmonary resuscitation (CPR) and other variables affect discharge rates and survival rates after discharge. In this study age and gender were not significant predictors of resuscitation outcome.

Comparison between survivors and non-survivors regarding the cause of admission showed no statistically significant differences. This is in line with the study of Krittayaphong.<sup>(114)</sup> In this study, the cause of admission wasn't a significant predictor for CRP outcome in the studied series.

Comparison between survivors and non-survivors regarding the preexisting condition had shown higher frequency of cases with more than two preexisting conditions in non-survivors when compared with

survivors. However, the difference was statistically marginal. This agrees with the former study of Khan.<sup>(108)</sup>

In the present study, there was higher frequency VT/VF in survivors when compared with non-survivors. This is in agreement with Jones<sup>(115)</sup> who described in-hospital resuscitation outcomes and factors associated with survival at Auckland City Hospital, New Zealand. A retrospective audit of all cardiac arrests 2004-06 determined patient demographics, resuscitation time intervals, interventions, survival and neurological outcome at 12 months. Factors associated with survival to discharge were explored. Survival was higher in first rhythm VT/VF.

Regarding the relation between CPR parameters and resuscitation outcome, the present study found survived patients had significantly shorter time to start CPR and shorter CPR time when compared with non-survivals. This is in agreement with Patel<sup>(116)</sup> who found that shorter CPR duration is a significant predictor of resuscitation outcome.

In our study, adrenaline was the most commonly used drug with no statistically significant differences between survivors and non-survivors. This is in agreement with the study of Peberdy et al.,<sup>(117)</sup> who studied cardiopulmonary resuscitation of adults in a report of 14720 cardiac arrests. In their study, adrenaline was the most commonly used drug.

## SUMMARY

A cardiac arrest is the cessation of cardiac mechanical activity confirmed by the absence of a detectable pulse and apnea (or agonal respiration).

Cardiopulmonary resuscitation (CPR), early defibrillation, and appropriate implementation of post-cardiac arrest care, leads to improved survival and neurologic outcomes.

Outcome of cardiac arrest of adult at ED varies in relation to data categories which are hospital variables, patient variables and arrest variables.

Our study included 100 adult male and female patients, who were admitted to the Emergency Department in Alexandria Main University Hospital, Faculty of Medicine, with the diagnosis of cardiac arrest at their presentation or during hospital admission and received cardiopulmonary resuscitation . The aim of this study was registration of the outcome of cardiopulmonary resuscitation of adults in ER as regards: age, sex, history, time of starting CPR, duration of CPR, initial rhythm, time of first shock and number of shocks , given drugs and data in survivors, as initial rhythm after return of spontaneous circulation, chronic disease and initial event before arrest .

In this study, the included patients had a mean age of  $48.08 \pm 18.2$  years. They included 56 males and 44 females, 34 patients with cardiac causes , 45 and 12 patients with medical and surgical causes respectively. Hypertention was the most common preexisting condition in the studied patients followed by ischemic heart disease, diabetes and malignancy, 10 patients had two or more conditions while the remainder 90 patients had one or less conditions.

Our study revealed that, asystole was the most common presenting rhythm (60.0 %) followed by PEA (22.0 %) and VF (9.0 %) while VT, sinus bradycardia and torsade de pointes were found in 6, 2 and 1 patients respectively.

In the present study, the time to start CPR was  $0.25 \pm 1.24$  minutes. The mean duration of CPR was  $33.3 \pm 18.5$  minutes. And as regards to shocks our study revealed that The mean number of shocks was  $2.7 \pm 1.45$  while the time of the 1st shock at  $9.4 \pm 8.4$  minutes.

In our study only 24 patients who had CPR were resuscitated while the remainder 76 died and no statistically significant differences between survivors and non-survivors regarding neither the demographic characteristics nor the cause of admission.

This study had shown higher frequency of cases with more than two preexisting conditions in non-survivors when compared with survivors, and also higher frequency VT/VF in survivors when compared with non-survivors.

In this study, survived patients had significantly shorter time to start CPR and shorter CPR time when compared with non-survivals.

## CONCLUSIONS

In conclusions, this study is analysis of a registered data regarding events and outcomes of cardiopulmonary resuscitation occurring in the ED comparing survivors and non survivors.

Our results concluded that:

- Patients have better chance to survive if starting an immediate CPR with no interruptions and short duration in patients with no comorbid conditions.
- Patients with the higher frequency VT/VF have better chance to survive.
- neither the demographic characteristics nor the cause of admission had statistically significant differences between survivors and non survivors.
- Hypertention was the most common preexisting condition in the studied patients followed by ischemic heart disease, diabetes and malignancy.