

Short Communication



Evaluation of cardiopulmonary resuscitation for patient outcomes in Imam Reza General Hospital Tabriz, Iran

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Abstract

Introduction: Cardiopulmonary resuscitation (CPR) is a life-saving procedure for patients experiencing cardiac arrest. The success rate of in-hospital arrests varies from 2% to 27% according to different studies. Aim of our study was an investigation on in-hospital cardiac arrest in a tertiary hospital in north-west of Iran.

Methods: We included all in-hospital cardiac arrests over a three-month period of time. Data related to age and sex of patients, cause of hospitalization, length of stay, cause of cardiac arrest, and outcome of CPR has been studied.

Results: Sixty-six patients with cardiac arrest were recorded. Mean age was 62.59 (± 20.7) years. Cardiovascular disease, neurological diseases, and lung diseases were the most common causes of hospitalization. The median length of hospitalization prior to arrest was seven days. CPR was initiated within 30 seconds of arrest detection in all cases. The initial cardiac arrest rhythm was asystole in majority of cases (80.3%) followed by ventricular tachycardia in 10.6 % and pulseless electrical activity (PEA) in 9.1% of cases. Five patients could survive to discharge in which two patients had a good neurologic outcome.

Conclusion: This study indicates that in-hospital cardiac arrest has a poor prognosis, with asystole being the most prevalent initial rhythm.

Introduction

Cardiopulmonary resuscitation (CPR) is a crucial procedure to save lives in patients with cardiac arrest. Based on different circumstances, success rate reported between two percent to 27% for in-hospital cardiac arrests.¹⁻⁵ We assessed CPR quality for in-hospital cardiac arrests in Imam Reza General Hospital, a tertiary hospital in Tabriz city, north-west of Iran.

Materials and Methods

We included all in-hospital cardio-pulmonary arrests in adult patients in a three-month period. Out-of-hospital arrests and pediatric arrests were excluded. Demographic data including age, sex, cause of hospitalization, length of hospitalization and cause of cardiac arrest were studied. We also used a checklist to investigate CPR statistics and quality, including first response time, primary cardiac rhythm, first defibrillation time, length of CPR and

outcome of CPR. Glasgow outcome scale (GOS) has been used to determine the outcome of CPR.

Results

Sixty-six patients with cardiopulmonary arrest were recorded in our hospital between 15th January to 15th March 2021. Thirty-nine patients were male and 27 were female. Mean age was 62.59 (± 20.7). The most common underlying diseases in the studied patients were cardiovascular disease, neurological diseases and lung diseases with 37 cases (56.1%), 29 cases (43.9%) and 19 cases (28.8%), respectively. The median (25th and 75th percentages) of the number of hospitalization days until resuscitation was 7 (2-13) days. In all of these individuals, the time elapsed from the announcement of the resuscitation code to the commencement of resuscitation was immediately. Intubation was performed in all cases. The first detected cardiac rhythm after cardiopulmonary

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arrest was asystole in 53 cases (80.3%), pulseless electrical activity (PEA) in 6 cases (9.1%) and ventricular tachycardia (VT) in 7 cases (10.6%). All VT patients underwent CPR before first defibrillation. Thirty-five cases (53.5%) resuscitated once, 24 cases (36.4%) twice, 5 cases (7.6%) three times and 4 cases (2.3%) resuscitated for four times. The mean (standard deviation) of resuscitation time in the first attempt was 28.56 (± 14.5) minutes, in the second CPR was 30.81 (± 11.2), in the third and fourth CPRs were 31.43 (± 11.1) and 47.50 (± 3.5) minutes respectively. Return of spontaneous circulation (ROSC) was detected in 36 patients with first time cardiac arrest, seven patients with second time cardiac arrest and two patients with third time cardiac arrest. None of the patients could survived after fourth cardio-pulmonary arrest. The outcome of resuscitation according to GOS criteria was death in 62 cases (93.9%), vegetative status in zero cases (0.0%), severe disability in two cases (0.3%), relative disability in one case and in two cases (0.3%) complete recovery was achieved. PEA had highest rate for successful resuscitation with two successful CPR out of six arrests followed by VT with two successful CPR out of seven arrests. Only one of survived patients had asystole rhythm. Generally, the rate of hospital discharge after resuscitation was five cases (14.10%) out of 66 patients.

Discussion

The aim of this study was to investigate the consequences of CPR in patients at Imam Reza Medical Center. The results of the study show that the success of the resuscitation outcome in the first time was more than the second and third times. Also, the outcome of resuscitation according to Glasgow Coma Scale (GOS) criteria was death in the majority of patients and there were only two complete recoveries, which indicates that the resuscitation was not successful. These results reflect consonance with previous works on this issue. For example, in a study by Singh et al only nine patients out of 127 in-hospital cardiac arrest patients could survived to discharge from hospital. Majority of cardiac arrest rhythm was asystole/PEA in that study likewise ours. In contrast to their work, we found a higher rate of cardiac arrest in male patients and patients in our study had a higher age which could be due to different underlying diseases in two populations. We had no burn patients in our study but 34% patients in that study were burn victims.⁶ Asystole/PEA was predominant initial arrest rhythm in studies of Huang et al, Patel et al and Khan et al which could be attributed to late recognition of cardiac arrest.⁷⁻⁹ Mohamed et al. also reported 15 hospital discharges out of 207 cardiac arrests in their study. These low survive rates reflect the grave outcome of in-hospital arrest.¹⁰ Although some studies reported higher survival rates. For example, Homayounfar and Azarbakht, reported a survive to discharge up to 21%. In that study most patients had cardiac events and were admitted in cardiac care unit (CCU).¹¹

Conclusion

Although in our study CPR in patients with PEA had a higher success rate, but due to small sample size, this cannot be statistically relied.

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Authors' Contribution

Conceptualization: Masoud Faghieh Dinavari, Hassan Soleimanpour and Seyed Pouya Paknezhad.

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Competing Interests

The authors declare that they have no competing interests.

Consent for Publication

Not applicable.

Data Availability Statement

All data generated or analyzed during this study are included in this published article. If anyone would like to request data, please contact the corresponding author.

Ethical Approval

The current study was approved by the Research Ethics Committee of Tabriz University of Medical Science (No: IR.TBZMED.REC.1399.954).

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References

1. Kabiri N, Hajebrahimi S, Soleimanpour M, Asghari Ardebili R, Hajipoor Kashgsaray N, Soleimanpour H. Basic life support training for intensive care unit nurses at a general hospital in Tabriz, Iran: a best practice implementation project. *JBI Evid Implement*. 2024. doi: [10.1097/xeb.0000000000000434](https://doi.org/10.1097/xeb.0000000000000434).
2. Soleimanpour H, Behringer W, Tabrizi JS, Sarahrudi K, Golzari S, Hajdu S, et al. An analytical comparison of the opinions of physicians working in emergency and trauma surgery departments at Tabriz and Vienna medical universities regarding family presence during resuscitation. *PLoS One*. 2015;10(4):e0123765. doi: [10.1371/journal.pone.0123765](https://doi.org/10.1371/journal.pone.0123765).
3. Ojaghi Haghighi SH, Shams Vahdati S, Mahmoudie T, Sepehri Majd P, Mirza-Aghazadeh-Attari M. Outcomes of cardiopulmonary resuscitation in the emergency department. *J Emerg Pract Trauma*. 2017;3(2):49-52.
4. Ghaffarzadeh A, Shams Vahdati S, Salmasi S. Assessment of emergency medicine residents' cardiopulmonary resuscitation team in Imam Reza hospital. *J Cardiovasc Thorac Res*.

- 2012;4(3):85-6. doi: [10.5681/jcvtr.2012.021](https://doi.org/10.5681/jcvtr.2012.021).
5. Khoshbaten M, Soleimanpour H, Ala A, Shams Vahdati S, Ebrahimian K, Safari S, et al. Which form of medical training is the best in improving Interns' knowledge related to advanced cardiac life support drugs pharmacology? An educational analytical intervention study between electronic learning and lecture-based education. *Anesth Pain Med*. 2014;4(1):e15546. doi: [10.5812/aapm.15546](https://doi.org/10.5812/aapm.15546).
 6. Singh S, Namrata, Grewal A, Gautam PL, Luthra N, Tanwar G, et al. Evaluation of cardiopulmonary resuscitation (CPR) for patient outcomes and their predictors. *J Clin Diagn Res*. 2016;10(1):UC01-4. doi: [10.7860/jcdr/2016/14773.7012](https://doi.org/10.7860/jcdr/2016/14773.7012).
 7. Huang CH, Chen WJ, Ma MH, Chang WT, Lai CL, Lee YT. Factors influencing the outcomes after in-hospital resuscitation in Taiwan. *Resuscitation*. 2002;53(3):265-70. doi: [10.1016/s0300-9572\(02\)00024-2](https://doi.org/10.1016/s0300-9572(02)00024-2).
 8. Patel MJ, Khan NU, Furqan M, Awan S, Khan MS, Kashif W, et al. APACHE II scores as predictors of cardio pulmonary resuscitation outcome: evidence from a tertiary care institute in a low-income country. *Saudi J Anaesth*. 2012;6(1):31-5. doi: [10.4103/1658-354x.93053](https://doi.org/10.4103/1658-354x.93053).
 9. Khan NU, Razzak JA, Ahmed H, Furqan M, Saleem AF, Alam H, et al. Cardiopulmonary resuscitation: outcome and its predictors among hospitalized adult patients in Pakistan. *Int J Emerg Med*. 2008;1(1):27-34. doi: [10.1007/s12245-008-0016-4](https://doi.org/10.1007/s12245-008-0016-4).
 10. Mohamed GH, Al Daylami A. Evaluation of in-hospital cardiopulmonary resuscitation. *Bahrain Med Bull*. 2005;27(1):1-7.
 11. Homayounfar S, Azarbakht Z. The study of in hospital prognosis of 101 patients who admitted in coronary care unit and resuscitated after cardiac arrest. *Avicenna J Clin Med*. 2002;8(4):19-23.