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Clinical profile and Outcome of patients who had Cardiopulmonary arrest in Non ICU settings – A Retrospective Analysis in a Tertiary care hospital

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Abstract
Background: *The study was undertaken in view of alarming morbidity and mortality in the patients who suffered cardiopulmonary arrest in Non ICU settings.*
Aims and Objectives: *The aim of the study was to analyze the clinical profile and outcome of the patients who suffered cardiopulmonary arrest in Non ICU settings like wards, dialysis units, endoscopy rooms etc.*
Methodology: *The study was done Apollo hospital, Hyderabad- a JCI accredited tertiary care centre which contained Code blue emergency response system. It's a retrospective observational study, period being 1 year from Nov 2016 to Nov 2017. The patients age, sex, diagnosis, place of arrest, response time to resuscitation and code blue team arrival; percentage of survivors and non survivors.*
Conclusions: *Most of the cardiopulmonary arrest was during the 8AM to 2PM. Patients who had Cardiac, renal disease and sepsis as a primary diagnosis had more mortality. Majority of the patients had non shockable peri arrest rhythm which has poor prognosis. Up to 48% of patients had successful initial resuscitation which shows the importance of code blue team and short response time. Out of 25(48%) patients who achieved successful ROSC, only 10(19.23%) could be discharged alive from ICU which shows the importance of good intensive care of post cardiac arrest patients.*
Keywords: *Cardiopulmonary arrest, Clinical profile, Out come, Survival rate.*

Introduction

The basic techniques of cardiopulmonary resuscitation (CPR) have been established since 1960 when Kouwenhoven, Jude and Knickerbocker described closed chest massage[1]. Cardiopulmonary resuscitation (CPR) is a frequently performed intervention in the Medical Intensive Care

Unit. Although ICU population is subjected to additional monitoring, potentially faster detection of cardiopulmonary arrest (CPA), and initiation of CPR, its benefits are offset by higher underlying severity of illness when compared to those not in ICU. Few studies focus on in-hospital CPR rather than in-ICU CPR. Most hospitals worldwide now have cardiac arrest teams and early intervention by a medical emergency team has been shown to significantly reduce the incidence of and mortality from unexpected cardiac arrest in hospital[2]. .

But despite the availability of such teams and advances in cardiopulmonary resuscitation the risk of death from such an event has remained largely static at 50-80%[3-5].

The aim of the study was to analyze the clinical profile and outcome of the patients who suffered cardiopulmonary arrest in Non ICU settings like wards, dialysis units, endoscopy rooms etc.

Material and Methods

The study was done Apollo hospital, Hyderabad- a JCI accredited tertiary care centre which contained Code blue emergency response system. It's a retrospective observational study, period being 1 year from Nov 2016 to Nov 2017. We received Institutional Review Board approval to perform a retrospective medical records review on adult patients who received CPR at our hospital. This was a retrospective study of in-hospital cardiopulmonary resuscitation techniques and outcomes following cardiac arrest at various wards. The resident doctors are available round the clock in hospital. Any arrest at different places of hospital e.g. hospital wards, recovery rooms (RR), high dependency units (HDUs), outpatient department (OPD), casualty etc, is informed to critical care doctors , who attends the case immediately and Code blue emergency response system persons reacts immediately . Emergency response team was formed and all its members were advanced cardiac life support providers. The ERT consisted of anaesthesiologist, intensivists, intensive care nurse, and ward nurse. The nurse assigned to the team was responsible for knowing the location of the crash cart. A separate SOP guided the maintenance of crash carts. The crash cart would not be opened unless there was a cardiopulmonary arrest. The ward nurse would check the equipment on every day. Utmost care would be given to the check of defibrillators. Presence of a well charged battery, cleanliness of paddles, constant supply of electrocardiogram cable, jelly, and recording paper are assured every day. Defibrillator check is performed during every shift and the result of the test is pasted in the log book. It was made certain that other resuscitative equipments such as functioning laryngoscope, availability of endotracheal tubes and other support equipments were available. Emergency drugs commonly used during resuscitation were kept handy in the crash cart. The contents were checked only if the crash cart seal was found broken.

The recommendations of the 2005 American Heart Association (AHA) cardiopulmonary resuscitation (CPR) guidelines were used by all the resuscitators.[6]

Cardiac arrest was defined by the absence of a detectable pulse ("pulselessness"), by the patient's unresponsiveness or by any arrest rhythms noticed on monitors. Resuscitation was deemed successful if a stable circulation was established and the resuscitation team disbanded[7]. Immediate survival was defined as the restoration of normal circulation for > 20 minutes. The patients age, sex, diagnosis, place of arrest, response time to resuscitation and code blue team arrival; percentage of survivors and non survivors.

Results

This was a retrospective study conducted at Apollo health city Hyderabad. This study is a retrospective observational audit conducted on the patient data obtained in our patients who received CPR during period 1 year from Nov 2016 to Nov 2017. It includes Cardio pulmonary arrest patients from non icu wards. It includes 52 patients of with 30 males and 22 females. Mean age of patients was 58.13 years. Twenty seven patients (52%) did not have return of spontaneous circulation (ROSC) and were declared dead subsequently. Returns of spontaneous

circulation occurred in 25 patients (48%) and were admitted to the ICU. Fifteen of these 25 died subsequently, 10 patients were discharged (survival rate of 40%).The outcome of CPA patients was shown in table 1.

Table: 1: Demographic data and out- come of patients with CPA

Parameter	
Total Number of Patients	52
Percentage of Male Patients	30(57.7%)
Percentage of Female Patients	22(42.3%)
Mean age of Patient group	58.13 years
Mean age of Male Patients	60.3years
Mean age of Female Patients	55.18
Mean Time to start Cardiopulmonary Resuscitation	1.52 Minutes
Mean Response Time of Code blue team	3.35 Minutes
Mean Time to shift the patient to ICU	23.36Minutes
Mean Time of CPR	13 Minutes
Percentage of Patients who achieved ROSC	25(48%)
Percentage of Patients who were discharged alive from ICU	10(19.23)%

Table: 2: Table showing survivors and non survivors.

Parameter	Survivors	Non-Survivors
Number	**10**	**42**
Mean Code Blue Response time	2.9 Minutes	3.476 Minutes
Mean Time of Resuscitation	9.6 Minutes	16.4 Minutes
Mean Time to shift the patient to ICU	22.9	23.46
Mean age of Patient group	64.4	56.64

Table 3: The initial cardiac rhythm

Pulseless electrical activity	23
Asystole	17
Ventricular fibrillation/tachycardia	9
Bradycardia	2

The cause of CPA in non survivors and survivors was shown in figure 1 and 2. Periarrest rhythm was shown in figure 3. Retun of spontaneous circulation was shown in figure 4.Time of cardio pulmonary arrest was shown in figure 5. Outcome after successful resuscitation was shown in figure 6.
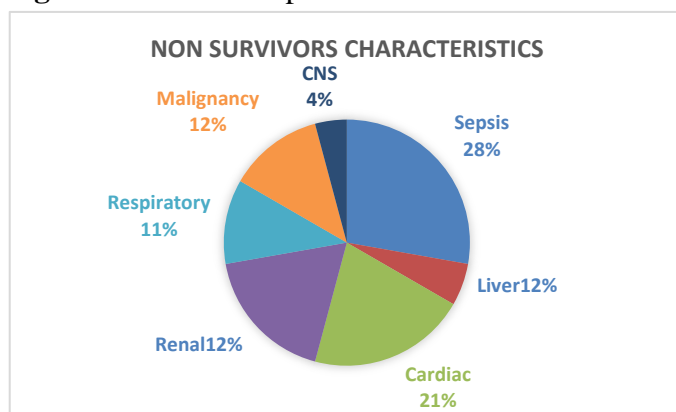
Fig:1: Non survivors patient characters
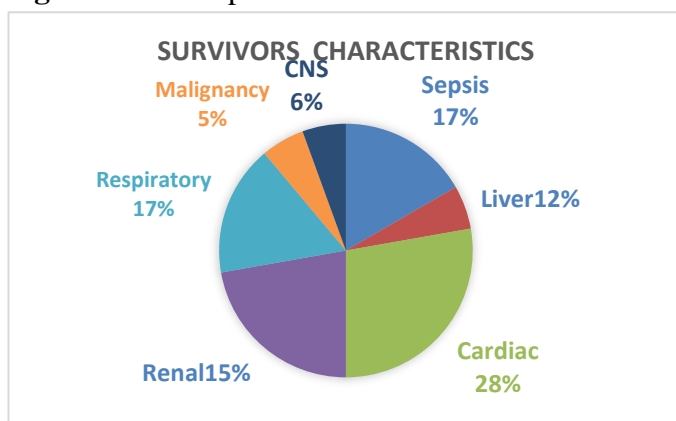

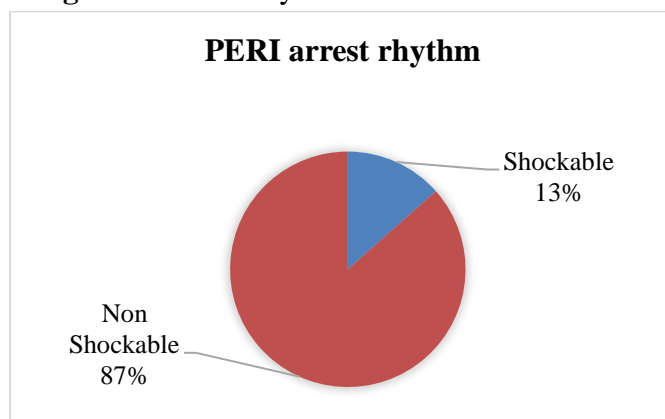**Fig:2:** Survivors patient characters

Fig: 3. Periarrest rhythm
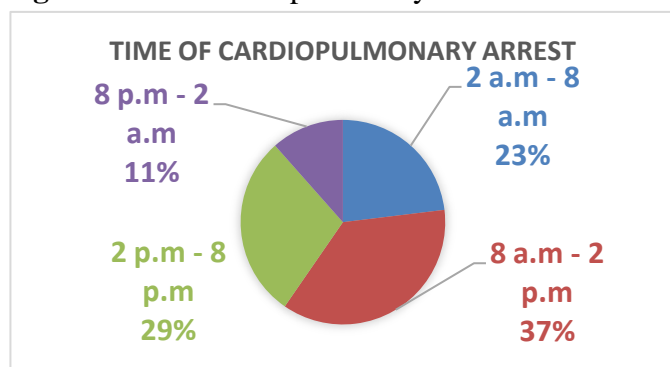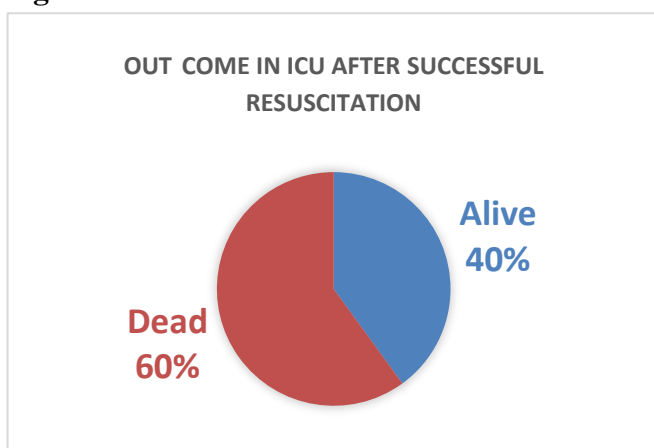

Fig .4. Return of spontaneous circulation
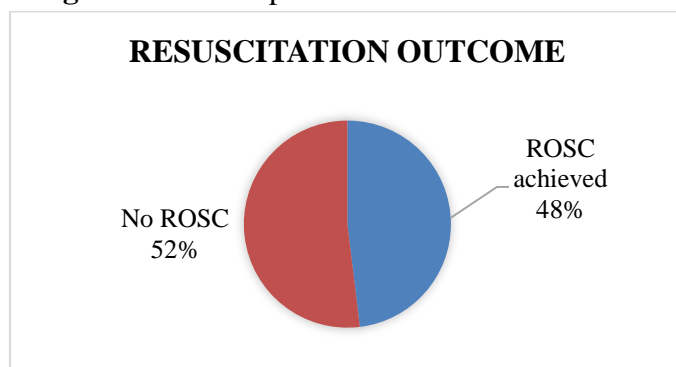
Fig:5. Time of cardio pulmonary arrest

TIME OF CARDIOPULMONARY ARREST

8 p.m - 2 a.m 11%
2 a.m - 8 a.m 23%
2 p.m - 8 p.m 29%
8 a.m - 2 p.m 37%

Fig.6. Outcome after successful resuscitation

OUT COME IN ICU AFTER SUCCESSFUL RESUSCITATION

Alive 40%
Dead 60%

Discussion

This study retrospectively analysed 52 cases of cardiac pulmonary arrest. This hospital consists of Emergency response teams. The ERT managed the 'code blue' services 24 hours daily and all 7 days of the week.

Cardiopulmonary resuscitation is a frequently performed medical intervention in healthcare facilities. Successful cardiopulmonary resuscitation after in-hospital cardiac arrest depends on basic and advanced life support systems, the ability to immediately defibrillate the arrested heart, and the quality of the CPR intervention. But studies show a wide range of 'survival on discharge' (3–27%), which could be due to differences in the settings in which the CPR is performed and differences in inclusion/exclusion criteria.[8-10]

In our study out of 52 patients had cardiopulmonary arrest, survived patients were 10(19.28%) who were discharged alive to their homes. The cardiac rhythm most frequently observed was pulseless electrical activity (23cases), asystole (17 cases), ventricular fibrillation (9 cases) and bradycardia (2 cases). Patients with ventricular tachycardia/fibrillation were more likely to survive to hospital discharge than those with asystolic or pulseless electrical activity[11,12].

In a study conducted at AIIMS, Delhi, A total of 102 numbers of cardiac arrests were treated by the residents of the department and 7 of these patients survived to leave hospital. The cardiac rhythm most frequently observed was asystole (40 cases), followed by ventricular fibrillation (VF) (36 cases) and pulse less ventricular tachycardia (VT) (18 cases). The least observed rhythm was pulse less electrical activity (PEA) (8 cases). Among all these rhythms, the revival rate was highest in patients with VF (26 cases, 72). Survival from cardiac arrest depends on the most important factor like the interval between 'arrest to initiation of CPR' and 'arrest to defibrillation'[11]. Cohn et al.[12] also identified a few predictors of survival after cardiac arrest. 'Predictors of successful resuscitation included a primary cardiac admission diagnosis, monitoring at the time of the arrest, a longer duration of resuscitation and the absence of the need for endotracheal intubation.

Survival rates were in different studies were 2-27%[13-14] Some papers quote the incidence of low survival rates in cardiac arrests on general wards[13] others, however, quote low survival rates in the ICU [15]. In critical care areas, the response time is expectedly faster compared to wards. This is due to the constant presence of doctors and other paramedical staff in these areas. In our study the survival rates were higher compared to some studies due to Response Time of Code blue teams working in hospitals.

The male: female distribution in our study was 30:22. But Ahmed et al. reported a ratio of 18:24; this observation suggests absence of any particular gender preference when cardiac arrest occurs.[16]

Return of spontaneous circulation occurred in 48% of the patients who suffered cardiac arrest in our study. Murali et al[17] reported 65% and Peters et al.[18] have reported 76% of ROSC in their studies .

The survival was inversely related to the age. Similar observation can be found in the literature[19] ,but in our study there is no significant difference was observed.

Mean Time to start Cardiopulmonary Resuscitation was 1.52 min. The presence of a qualified resuscitation team in every ward and floor of the hospital, so that victims of cardiac arrest could be attended in haste and decreases the death rates[20]. Mean Time of Resuscitation in survivors and non survivors was 9.6min and 16.4min. Mortality among patients who are revived following a CPR is high[21]. In this study it was 60%. This figure varies from 54% to 83% in other studies[13-15]. Similarly, a large proportion (52%) dies within 24 hours of the arrest[22].

Conclusion

Most of the cardiopulmonary arrest were during the 8AM to 2PM. Patients who had Cardiac, renal disease and sepsis as a primary diagnosis had more mortality. Majority of the patients had non shockable peri arrest rhythm which has poor prognosis. Up to 48% of patients had successful initial resuscitation which shows the importance of code blue team and short response time. Out of 25(48%) patients who achieved successful ROSC, only 10(19.23%) could be discharged alive from ICU which shows the importance of good intensive care of post cardiac arrest patients.

The study impresses upon the need for further studies in avoiding the cardiopulmonary arrest in non ICU settings and to improve the outcome of such patients.

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