



THE EPIDEMIOLOGY AND OUTCOMES OF IN- HOSPITAL CARDIAC ARREST AT OUR HOSPITAL

Internal Medicine

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ABSTRACT

Background: In-hospital cardiac arrest (IHCA) represents a critical medical emergency with substantial mortality rates worldwide. While developed nations report survival rates of 25-30%, data from developing countries indicate significantly poorer outcomes (4.2-6.9%). Understanding the factors influencing IHCA outcomes in resource-limited settings is crucial for improving patient survival. **Objective:** This study aimed to evaluate the epidemiology, management outcomes, and prognostic factors of IHCA at a tertiary care center in India, with particular focus on survival rates and associated clinical variables. **Methods:** We conducted a 3-month retrospective observational study (January-March 2023) at Mahatma Gandhi Medical College, Jaipur, analyzing 64 IHCA cases. Data collection included patient demographics, arrest characteristics (rhythm type, witnessed status), timing variables (weekday/weekend, work/off-hours), and clinical outcomes (ROSC, survival to discharge). Statistical analysis was performed to identify significant associations. **Results:** Among 64 patients (mean age 68 years), 67.18% achieved ROSC and 34.37% survived to discharge. Shockable rhythms (18.75% of cases) showed better survival (58.33%) compared to non-shockable rhythms (28.85%). Cardiac (29%) and respiratory (15%) etiologies were most common. Arrests occurred more frequently during weekends (59.37%) and off-hours (65.62%), with 46% being unwitnessed. **Conclusion:** This study confirms lower IHCA survival rates in our setting compared to developed nations, with outcomes significantly influenced by initial rhythm, witnessed status, and event timing. The findings emphasize the need for improved monitoring systems, staff training programs, and optimized rapid response protocols in resource-limited hospitals to enhance IHCA outcomes.

KEYWORDS

In-hospital cardiac arrest, resuscitation outcomes, developing country, cardiac rhythm, survival predictors.

INTRODUCTION

In- Hospital Cardiac Arrest (IHCA) is an acute emergency, affecting any hospitalized patient, resulting in loss of circulation and ventilation, requiring delivering effective chest compressions and defibrillation for resuscitation (1). It is associated with a high risk of mortality (2). The incidence of IHCA varies between different hospitals and between different countries around the world. In developed countries like the USA, the incidence of IHCA in 2017 was more than 290000 of all hospital admissions, with survival of 25% (3), whereas the survival rates in Denmark and Sweden were as high as 30% (4).

The data regarding incidence and outcome of IHCA from developing countries is limited, reporting worse outcomes (5). The survival rate ranges between 4.2% and 6.9% (6). Despite the poor outcomes, data suggests that there has been improvements in the last twenty years (7). This is attributable to the formation of Rapid Response Team and to an increased awareness of the influence the prompt recognition and clinical management can have on the outcome (1).

Data from the USA shows that the most common rhythm observed in non-shockable rhythm, either, asystole or Pulseless Electrical Activity (PEA) (1). However, those who survived, presented with a shockable rhythm (8). The most common underlying cause of IHCA is cardiac, followed by respiratory (5,9). The key components during management include high quality chest compressions, ventilation, defibrillation (if needed) and promptly identifying and managing the underlying reversible causes of cardiac arrest (1,10). Post cardiac arrest management includes correction of underlying reversible cause, hemodynamic and respiratory support and neuroprotective strategies like Targeted Temperature management (TTM) (11).

Here, we present the factors associated with survival and the outcomes for patients with IHCA at our hospital, a tertiary care center in a developing country.

MATERIALS AND METHODS

A Retrospective Observational Study was conducted over a period of 3 months (January 2023 – March 2023), followed by data analysis, in the Department of Critical Care medicine, Mahatma Gandhi Medical College, Jaipur. Approval was taken from the Institutional ethical

Committee.

The Inclusion Criteria:

- Age -18 years and above age
- In hospital cardiac arrest

The Exclusion Criteria:

- All patients who do not come under inclusion criteria.
- patients below 18 years,
- traumatic cardiac arrests,
- ER location and critical care area and
- duplicate entries due to multiple arrests.

All patients who fulfilled the inclusion and exclusion criteria were enrolled in the study. We defined IHCA as an admitted patient who became unresponsive with an absent central pulse and breathing. We studied the epidemiology and factors determining outcomes of in-hospital cardiac arrest in our hospital. Patients characteristics like age, sex, personal medical history, comorbidities, shockable/unshockable rhythm, witnessed/unwitnessed event, location of event were recorded. Probable causes of cardiac arrest were identified. Our hospital has a code blue team to attend to emergencies in non ICU areas. The Advanced Cardiac Life support (ACLS) guidelines by American Heart Association are followed at our hospital for managing IHCA patients.

RESULTS

The total number of cardiac arrest events that occurred during the study period were 72, of which 8 patients were excluded. Mean age was 68. Of the 64 patients, 43 patients (67.18%) achieved Return of Spontaneous Circulation (ROSC) and 22 patients (34.37%) survived until discharge home. The number of IHCA events were more on weekends (38, 59.37%) as compared to weekdays (26, 40.63%). The number of IHCA events were more during off hours (42, 65.62%) as compared to working hours (22, 34.38%). Twelve patients (18.75%) had shockable rhythm. The primary etiology was cardiac in 29%, respiratory in 15% and the rest had other causes. 46% IHCA events were unwitnessed.

Table 1: Patient Characteristics

	Number
Total IHCA patients	64
Mean Age	68
CPR outcome	
• ROSC	• 43 (67.18%)
• Survived until discharge	• 22 (34.37%)
No. of IHCA events on	
• Weekdays	• 26 (40.63%)
• Weekends	• 38 (59.37%)
No. of IHCA events during	
• Work hours	• 22 (34.38%)
• Off hours	• 42 (65.62%)
No of IHCA events with shockable rhythms	12 (18.75%)
Etiology	
• Cardiac	• 29%
• Respiratory	• 15%
• Others	• 56%
Location	
• ICU / HDU	• 18
• CCU	• 11
• Ward	• 35
No of witnessed IHCA events	35 (54%)
No of unwitnessed IHCA events	29 (46%)

DISCUSSION

The incidence of IHCA reported from the USA is 9-10 per 1000 hospital admissions (12). Cardiac arrest remains one of the most unexpected and life threatening events. The most common electrical rhythm identified is asystole followed by pulseless electrical activity and ventricular fibrillation (13). The survival rate and neurological outcome depend upon the fact whether the IHCA event was witnessed or not and on the presence of shockable rhythm initially. Patients with a shockable rhythm have a good prognosis as compared to patients with non shockable rhythm (13). In our study, 52 patients had a non shockable rhythm, out of which 35 achieved ROSC, but only 15 survived until discharge. Of the 12 patients who had shockable rhythm, 8 achieved ROSC and 7 survived until discharge.

The cardiac causes and respiratory causes accounted for 44 % of cases in our study. Studies from USA and Italy have shown that cardiac etiology accounts for 50 – 60 % and respiratory etiology is 15 – 40 % (9,14). Factors related to outcome include advanced age, which is associated with poor outcome (15). Association of other factors like sex and race with IHCA management and outcome is less clear, however, studies have shown the incidence of IHCA to be higher among men with similar outcomes among men and women (16). Pre existing conditions like sepsis, hypotension, renal and hepatic dysfunction and malignancy may lead to poor outcome (15). A cardiac event leading to IHCA has better prognosis as compared to non cardiac event (1). A witnessed IHCA event, occurring in a monitored location is associated with improved outcome (17).

Similar results have been quoted in a recent meta analysis (18). The factors associated with poor outcome include advanced age, especially more than 70 years, malignancy, male age and renal disease. Improved survival was linked to witnessed IHCA event in monitored settings.

The number of IHCA events that occurred during the off hours and during the weekends was more in our study, which is similar to findings in other studies (19,20).

The quality of care during IHCA has improved in the recent years owing to increased knowledge to improve post cardiac resuscitation perfusion and emphasis on post resuscitation care.

The limitations of the present study include retrospective design and a small sample size.

CONCLUSION

A combination of patient and system-related factors, may explain the reduced survival rate in our setting. We recommend introducing immediate intervention teams and devoting time to training hospital staff in in-hospital CA. There is a need for studies and research on cardiac arrest from countries with different economic and developmental indices

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