SURVIVAL AFTER IN HOSPITAL CARDIAC ARREST AND CODE BLUE INITIATION

Medicine

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ABSTRACT

Objective: To assess the survival rates immediately after - in Hospital Cardiac Arrest (IHCA) & code blue initiation & cardiopulmonary resuscitation (CPR)

Methods: By evaluating the Code blue forms at a tertiary care hospital during the 3 year period 2013-16

Results : 130 of 442 patients survived (29.41%) immediately after CPR or obtained Return of spontaneous circulation (ROSC). Immediate survival rates were comparable to other studies

Conclusion: Code blue initiation is an effective method to tackle In Hospital Cardiac Arrest (IHCA).

KEYWORDS:

Cardiac arrest, Code blue, survival rates

INTRODUCTION

Cardiac arrest both In Hospital Cardiac Arrest (IHCA) & Out of Hospital Cardiac Arrest (OHCA) continue to be a major public health challenge. Even though scientific knowledge about arrest patho-physiology & resuscitative mechanisms with Advanced Cardiac Life Support (ACLS) interventions have improved survival rates the mortality remains substantially high. The estimated incidence of in-hospital cardiac arrest is 3 to 6 / 1000 admissions.[1]

Even though resuscitation is not always appropriate, there are many lives lost because appropriate resuscitation is not attempted. The vast majority of cardiac arrest victims are adults, but thousands of infants & children suffer either an in hospital or out of hospital cardiac arrest each year.

Cardiopulmonary resuscitation (CPR) is a series of life saving actions that improve the chance of survival following cardiac arrest. Although the optimal approach to CPR may vary, depending on the rescuer, patient and the available resources, the fundamental challenge remains how to achieve early & effective CPR. Advanced Cardiac Life Support- American Heart Association (ACLS-AHA)

Successful resuscitation following cardiac arrest requires an integrated set of coordinated actions represented by the links in the adult chain of survival. [1]The links in hospital cardiac arrest (IHCA) as per AHA protocol includes the following:

1. Surveillance
2. Immediate recognition of cardiac arrest & activation of the emergency response system (code blue)
3. Early CPR with an emphasis on chest compressions
4. Rapid defibrillation
5. Effective advance life support

The use of codes in hospital is to alert the hospital staff to an emergent situation but at the same time to avoid panic among other patients or visitors in the hospital [2]. In-Hospital Cardiac Arrest (IHCA) Response team or Code blue team' is generally used in the situation of a -to indicate a patient requiring resuscitation or otherwise in need of immediate medical attention, most often as the result of a respiratory or cardiac arrest [2]. Though in general any medical personnel can respond to a code, in practice dedicated team members who have received ACLS training attend the call. They are generally comprised of emergency physician, anesthetist & general physician along with the support team. The team leader is said to "run the code"[3].

In 1960 Kouwenhoven, Knickerbocker & Jude documented 14 patients who survived closed chest cardiac massage [4,5]. That same year, at the meeting at Maryland the combination of closed chest cardiac massage & rescue breathing was introduced. How your community can improve survival from sudden cardiac arrest [6].Two years later, in

1962, direct monophasic wave form defibrillation was introduced [7]. In 1966 AHA developed the first CPR guidelines, which have been followed with regular updates [8].

MATERIALS & METHODS

Code blue was initiated at MES Medical College Hospital a tertiary care centre with 600 beds in 2013. The code blue team which received training consisted of the Emergency resident or physician, Emergency Medicine Service (EMS) personnel, anaesthesia resident or MO on call, physician or medicine resident on call, the nurses from the ward & other supporting staff like the attenders, & security personnel. All the phones in the hospital are connected to the public announcement system & the code was announced through any phone in the hospital which was accessible to the nursing staff.

This retrospective analytical study was undertaken to look at the demographics of patients who had cardiac arrest & those who survived or attained return of spontaneous circulation (ROSC) after Code blue activation during the period 2013-2016. Code blue forms were filled up by the EMS personnel with data which consisted of the patient's age, sex, ward, time code was called diagnosis & outcome. All data was filled & analysed using Microsoft excel format **Survival** was defined as attaining ROSC lasting for 20 minutes. No attempt was made to analyse the appropriateness of the 'code blue call'. Survival at discharge & ROSC figures were not compared.

RESULTS

SEX	TOTAL (442)	SURVIVED 130 (29.41%)	EXPIRED 312 (70.59%)
MALE	285 (64.79%)	80 (28.07 %)	205 (71.93%)
FEMALE	157 (35.21 %)	50 (31.83%)	107 (68.17%)

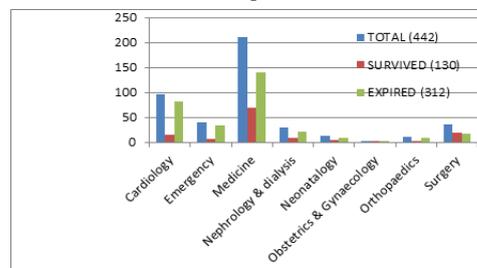**Table-1 Survival rates after in hospital Cardiac Arrest**

FIGURE 1- Distribution of In hospital Cardiac Arrest

RESULTS

- Of the 442 Code blue calls alerted, 285 were males (64.79%) & 157 females (35.21%)

- Of the 130 who attained ROSC 80 were males (28.07 %) & 50 females (31.83%)
- The majority of the cardiac arrest victims were of the middle age & elderly groups as shown in figure 1.
  - Age group 41-65 yrs-191 of 442 (43.21%)
  - Age group > 65 yrs-206 of 442 (46.60 %)
- The maximum number of code blues were announced from the general medicine ward
  - 168-(37.66%) followed by cardiology 96 (21.52%)
- Immediate Survival (ROSC) rate was 29.4%. Of which 28.07% were males & 31.84% females as shown in table 1

DISCUSSION

Cardiac arrest was defined as cessation of cardiac mechanical activity as conformed by lapse in circulation, which was determined by the absence of a palpable central pulse, unresponsiveness & respiratory arrest defined as apnoea. Cardiac arrest both IHCA & OHCA continue to be a major public health challenge.

Effective resuscitation requires an integrated response known as a system of care (ACLS-AHA).Return of spontaneous circulation (**ROSC**) is resumption of sustained perfusing cardiac activity. ROSC is defined as a palpable pulse & recordable BP & if monitored in ETCO2 of >40 mmHg. ROSC is also defined as at least 20 minutes with a palpable pulse & this is the definition which we used.

'Code blue team' or in hospital cardiac arrest (IHCA) response team is called when a patient requiring resuscitation or otherwise in need of medical attention, most often as the result of respiratory or cardiac arrest In theory any medical personnel may respond to a code, but in practice the team make up is limited to those who had advanced cardiac life support or other equivalent resuscitation training.

Cardiac arrest & survival rates

Cardiac arrest were mostly found in the middle age (41-65yrs) & elderly (>65yrs) group as in most studies. . Immediate survival after CPR or those who achieved ROSC in our series was 29.4% as shown in Table-1.

There are varied reports on initial survival after CPR which may exceed 50% but survival at discharge can be much lower. Although survival rates following IHCA have improved over the past decade, currently, approximately half of all adult patients achieve ROSC following an IHCA, and less than one-quarter survive to hospital discharge [9, 10]. In the series reported by Masoud Saghafinia et al CPR following IHCA was associated with 30.4% success . However only 12% were alive at discharge [11]. Survival at discharge was not evaluated in our study

Factors affecting survival- The degree of comorbid illness can be used to help predict mortality following cardiac arrest. In general the more pre-existing co morbidities a patient has, the less likely they are to survive. The presences of hepatic insufficiency, acute stroke, immunodeficiency, renal failure or dialysis were associated with low survival rates [12]. There were many patients who had comorbid disease in our study & some of them were in terminal care. However no attempt was made to analyse the appropriateness of the 'code blue call'.

Although the code blue team was standardised, many calls were attended only by part of the designated team due to various reasons as not hearing the call or not free to attend the call

There are many opportunities to improve and optimize care for cardiac arrest patients within hospitals, and to increase the likelihood of survival with good neurologic outcomes for all cardiac arrest patients. However improvement programs requires prioritisation & standards to be set, the measurement and collection of patient data, and the development of hospital-based resuscitation systems of care with an aim to improve quality continually. This will allow us to assess our performance and benchmark against other similar institutions and will drive improvements in quality of care.

CONCLUSION:

Code blue initiation is an effective method to tackle In Hospital Cardiac Arrest (IHCA).

Even though Survival rates immediately after CPR were comparable to other studies, various other parameters like survival at discharge & neurologic outcomes need to be assessed further in detail.

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