Original article

Outcome of in-hospital resuscitation in a tertiary level teaching hospital in Nepal

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Abstract

Introduction: Cardiopulmonary resuscitation (CPR) is being used extensively in the hospital settings for life saving purposes. Resuscitation guidelines are reviewed and published frequently for better outcome of the patient. The objective of this study was to identify predictors of outcome of CPR and compare the outcome of CPR with other centers.

Method: This is a retrospective analytical study of one year duration carried out in tertiary level teaching hospital. Data were collected and then entered in Microsoft excel software with all the variables. Statistical analysis was done using Statistical Package for Social Sciences 17 software.

Results: There was no influence of gender, age, time of call and site of call on outcome of CPR. Strong correlation was observed with primary rhythm of the patient at the time of CPR, with better outcome for ventricular fibrillation (VF) & pulseless ventricular tachycardia (VT) (survival 65%), and worse for asystole (survival 25%) and pulseless electrical activity (survival 54%).

Conclusion: In this study it was found that primary rhythm at the time of CPR is strong predictor of survival. Outcome of CPR in this centre is comparable to other centres following standard protocols for CPR.

Key words: asystole, pulseless, resuscitation, ventricular fibrillation

Introduction

Cardiopulmonary resuscitation (CPR) is used extensively in hospitals since the demonstration of efficacy of closed chest cardiac massage 50 years ago. Resuscitation guidelines for Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS) are updated frequently and adhered to internationally.

In our hospital, when a patient is found pulseless, the central paging office is telephoned and a hospital-wide overhead announcement is made. At least one duty doctor from the anesthesia and related departments attends the call and they form the resuscitation team. First responders are usually staff nurses who commence CPR before arrival of the resuscitation team. The team usually arrives at the resuscitation location within 5 minutes. Crash carts with devices for airway management, a monitor-defibrillator and emergency drugs are present on each ward. American Heart Association BLS and ACLS protocols are applied by the nurses and resuscitation team. Survivors of resuscitation are transferred to an intensive or coronary care bed. If beds

are unavailable, patients are transferred to other centres. Survival outcome in this study is defined as presence of signs of life for at least 6 hours after CPR.

Outcome of CPR may depend on many factors including age, gender, underlying pathology, cardiac rhythm, time of day, and hospital location. The objective of this study was to identify predictors of outcome of CPR and compare the outcome of CPR with other centers.

Methods

This was a retrospective study of all the CPR calls attended by physicians from the Department of Anesthesiology at the tertiary level teaching hospital in one year (April 14 2010 to April 13 2011) after ethical approval from Institution Review Board (IRB).

Data were extracted from patient charts; entered on a predesigned form in a Microsoft Excel file; and verified using various registries of the emergency, general and critical care wards, and from notes made after CPR. Statistical analysis was done using Statistical Package for Social Sciences version 17 software.

Results

The Department of Anesthesiology responded to 214 calls and resuscitation was attempted on 176 patients. Rest of the patients were managed with other medical interventions. Locations of resuscitation calls are shown in Table 1. Most calls came from medical and surgical wards.

Table 1. Location of CPR

Location	Surgical ward	Medical ward	ICU	Emergency	Radiology Suite
Total (%)	39 (22)	79 (45)	33 (19)	23 (13)	2 (1)

Gender differences of patients and outcome of CPR are shown in Table 2. Differences in survival between genders were not significant.

Table 2. Gender and outcome of CPR

	Total (%)	Survived (%)	Deceased (%)
Gender Distribution	176	69 (39)	107 (61)
Male	104 (59)	38 (37)	66 (63)
Female	72 (41)	31 (43)	41 (57)
p = 0.4335 (Fisher exact test, 2-tailed)			

Age distribution of patients and outcome of CPR are shown in Table 3(a) & 3(b). Patients ranged in age from 9 months to 96 years. Survival was not related to age.

Table 3 (a). Age and outcome of CPR

Age (yrs)	Total (%)	Survived (%)	Deceased (%)
≤ 40	53 (30)	22 (42)	31 (58)
41 - 60	60 (34)	23 (38)	37 (62)
> 60 yrs	63 (36)	24 (38)	39 (62)
P ≥ 0.8 for ≤ 40 yrs vs 40-60 yrs; ≤ 40 yrs vs > 60 yrs; 40-60 yrs vs > 60 yrs (Fisher exact test, 2-tailed)			

Table 3 (b): Age and outcome of CPR

	Survived	Deceased	P value (Chi sq test)
Mean age in yrs ((± SD)	49.81 ± 20.61	52.24 ± 20.76	0.148

Presenting cardiac rhythm was defined as asystole, pulseless electrical activity (PEA) or ventricular fibrillation / pulseless ventricular tachycardia (VF/pulseless VT). Rhythm and outcome of CPR are shown in Table 4. Probability of survival in patients with PEA or VF/ pulseless VT was at least double that in those with asystole. Survival was not different between patients with PEA and VF/pulseless VT. When patients with asystole and PEA were combined, their survival was lower than that of patients with VF/pulseless VT.

Table 4. Presenting cardiac rhythm and outcome of CPR

Rhythm at onset of CPR	Total (%)	Survived (%)	Deceased (%)
Asystole	90 (51)	22 (25)	68 (75)
PEA	51 (29)	28 (54)	23 (46)
Asystole or PEA	141 (80)	50 (35)	91 (65)
VF/Pulseless VT	35 (20)	23 (65)	12 (35)
Asystole vs PEA or Asystole vs VF/VT p ≤ 0.0004 (Fisher exact test, 2-tailed)			
Asystole or PEA vs VF/VT p = 0.002 (Fisher exact test)			
PEA vs VF/VT p = 0.375 (Fisher exact test, 2-tailed)			

Time of day and outcome of CPR are shown in Table 5. Regular working hours are 0900-1700 when CPR calls are most common. After regular hours only the on-call physicians of the different departments attend the calls. There were no significant differences in success of CPR related to time of day.

Table 5. Time of day and outcome of CPR

Time of Call	Total (%)	Survived (%)	Deceased (%)
A 0900-1659	70 (40)	30 (43)	40 (57)
B 1700-2359	46 (26)	18 (39)	28 (61)
C 2400-0859	60 (34)	21 (35)	39 (65)
A vs B; A vs C; B vs C: p ≥ 0.37 (Fisher exact test, 2-tailed)			

Discussion

Cardiopulmonary resuscitation is one of the most frequently performed life-saving medical interventions in the world. Clinical guidelines for CPR have been developed by the American Heart Association and many other organizations. Many studies have been published on the outcome of in-hospital resuscitation. Endpoint times for success of CPR outcome vary from immediate to 24 hours, hospital discharge, 3 months and so on. [1,2,3,4] In this study, immediate outcome has been reported and compared to various possible predictors.

The Utstein Template for reporting in-hospital resuscitation was instituted following the Utstein Symposium held in Norway in June 1995. This symposium achieved consensus of major resuscitation councils from the United States, United Kingdom, Europe, Australia, and Canada.[1] The Utstein Template identified four categories of variables for the reporting and comparison of in-hospital resuscitation, namely: hospital, patient, arrest situation and outcome. Our results are discussed according to these categories below.

CPR was performed in 176 (82%) of the patients, resulting in immediate survival in 69 (39%) patients. This immediate survival rate is comparable with other studies including the BRESUS Study. In the BRESUS Study survival was: immediate - 39%; 24 hours - 28%; hospital discharge - 17% and one year - 12.5% [2]. In the studies of Cooper and Saklayen, immediate survivals were 38.6% and 44%, respectively [3, 4]. Immediate survival rate of this study is the same as that in these studies; performed in the hospitals following standard protocols of CPR. I feel that this reflects favourably on the application of resuscitation guidelines in our hospital setting.

Despite differences in the management of coronary disease in women versus men, our finding that gender did not predict survival is consistent with other studies.[4,5,6,7,8] Our results are also in agreement with other studies failing to show an impact of age on immediate survival. [9, 10, 11, 12, 13] Cooper did show higher survival among patients less than 60 years of age. [3]

In our study, survival with VF / pulseless VT was 65%, versus 35% in patients with either asystole or PEA. This is consistent with the findings of almost all similar studies. [3, 4, 14, 15] Outcome with asystole was worst of all in ours and all other studies.

Contrary to the results of Mayete, we did not show an impact of time of day on the outcome of CPR. [16]

Conclusion

We report on the results of resuscitation using CPR led by members of the Department of Anesthesiology in our tertiary teaching hospital. Our rate of successful immediate resuscitation is comparable to that resulted by others in developed countries, and supports our success in application of CPR guidelines to our setting. Our results are also in general agreement with other studies regarding predictors of successful resuscitation including gender, age, presenting rhythm and time of day. To make our work more meaningful, in future studies we must further detail the underlying conditions of the patients, and extend the post – resuscitation follow-up to hospital discharge and longer term survival.

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