Survival Outcome after Cardiopulmonary Resuscitation of Medicine Patients in Maharat Nakhon Ratchasima Hospital

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Abstract

We retrospectively reviewed the 293 patients on whom cardiopulmonary resuscitation (CPR) was performed for the cardiac arrest patients who were admitted to the Department of Medicine from July 1, 2003 to September 30, 2003. There were female for 11.3%. Mean age of our patients were 57.6 years. Most patients were admitted to normal, 94.5%. More than 60% of the patients were seriously ill including pneumonia with respiratory failure (13.7%), cerebrovascular disease (10.9%), chronic obstructive pulmonary disease (8.9%), septic shock (8.2%), sepsis (6.5%), upper gastrointestinal bleeding (6.5%), congestive heart failure (6.1%) and acute coronary syndrome (4.8%). Asystoly was found to be the most common initial rhythm at the cardiac arrest (95.5%). Cardiac arrest occurred within 72 hours for 65.5%. Survival outcome of arrested patients at the first hour after successful cardiopulmonary resuscitation in our study was 37.9%, at 24 hours was 6.1%. Only 7 patients in this study could survive and discharged from the hospital. There were several factors that may influence the survival outcome after CPR including age, underlying disease and the severity of the disease, initial rhythm at the cardiac arrest and the skill of CPR performance of the physicians.

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บทคัดย่อ อัตราการรอดชีวิต ภายหลังการช่วยฟื้นคืนชีพในหอผู้ป่วยอายุรกรรม โรงพยาบาลมหาราชนครราชสีมา

พินิจ แก้วสุวรรณะ, พ.บ.

กลุ่มงานอายุรกรรม โรงพยาบาลมหาราชนครราชสีมา นครราชสีมา 30000

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เป็นการศึกษาย้อนหลังในผู้ป่วยที่รับไว้รักษาตัวในกลุ่มงานอายุรกรรม โรงพยาบาลมหาราชนครราชสีมา ระหว่างวันที่ 1 กรกฎาคม ถึงวันที่ 30 กันยายน 2546 จำนวน 293 ราย พบผู้ป่วยผู้หญิงเพียง 33 ราย คิดเป็นร้อยละ 11.3 อายุเฉลี่ยของผู้ป่วยทั้งหมดเท่ากับ 57.6±14.9 ปี ผู้ป่วยส่วนใหญ่นอนอยู่ในหอผู้ป่วยอายุรกรรมสามัญ (ร้อยละ 94.5) ส่วนมากเป็นผู้ป่วยหนักมาก พบโรคปอดอักเสบชนิดที่มีการหายใจล้มเหลวร่วมด้วยจำนวนร้อยละ 13.7 โรคหลอดเลือดสมอง ร้อยละ 10.9 โรคหลอดลมอุดกั้นเรื้อรัง ร้อยละ 8.9 ภาวะช็อกจากการติดเชื้อ ร้อยละ 8.2 ภาวะติดเชื้อในกระแสเลือด ร้อยละ 6.5 ภาวะหัวใจล้มเหลว ร้อยละ 6.1 และภาวะหลอดเลือดหัวใจอุดตันเฉียบพลัน ร้อยละ 4.8 จังหวะของการเต้นของหัวใจขณะหัวใจหยุดเต้นที่พบบ่อยที่สุดในการศึกษานี้คือ ภาวะ asystoly พบถึง ร้อยละ 95.5 ระยะเวลาในการเกิดภาวะหัวใจหยุดเต้น ส่วนมากเกิดขึ้นภายในระยะเวลา 72 ชั่วโมงหลังจากนอน โรงพยาบาล (ร้อยละ 65.5) ผลของการช่วยฟื้นคืนชีพในผู้ป่วยจากการศึกษานี้ พบอัตราการรอดชีวิตภายหลัง 1 ชั่วโมง แรกเท่ากับร้อยละ 37.9 ภายหลัง 24 ชั่วโมงแรกเท่ากับร้อยละ 6.1 มีผู้ป่วยเพียง 7 ราย จากจำนวน 293 ราย ที่สามารถ มีชีวิตรอดกลับบ้านได้ ปัจจัยที่อาจจะมีผลต่ออัตราการรอดชีวิตคือ อายุของผู้ป่วย โรคที่เป็นและความรุนแรงของ โรค จังหวะของหัวใจขณะเกิดภาวะหัวใจหยุดเต้น และความชำนาญในการช่วยฟื้นคืนชีพในผู้ป่วยที่เกิดภาวะหัวใจ หยุดเต้น

Introduction

Cardiac arrest is a devastating event that affects most patients in hospital especially in medicine ward because of the severity of diseases. The arrested-patients can be saved with prompt treatment by using early basic cardiopulmonary resuscitation (CPR), early defibrillation and advance cardiac life support (ACLS). The most important determinant of survival from cardiac arrest for patients with ventricular fibrillation (VF) is the speed with which defibrillation is applied. However, if the patient dose not have VF or a defibrillator is not readily available for patients with VF, CPR is necessary to improve the chances of successful resuscitation and survival from cardiac arrest. Providing high-quality CPR improves the chances for successful resuscitation and survival[1].

Because of the high mortality rate of medicine patients and effective CPR could improve the survival of these patients. We determined the first hour and 24-hour survival of in-patient in medicine ward of Maharat Nakhon Ratchasima Hospital to assess the effectiveness of CPR in our hospital. The result of this study could help our department to improve the quality of CPR maneuver.

Materials and Methods

This is a pilot study to determine the survival outcome after cardiopulmonary resuscitation by retrospectively reviewed the survival outcome after CPR in patients who were admitted to the Department of Medicine, Maharat Nakhon Ratchasima Hospital. We started to collect data from July 1, 2003 to September 30, 2003 and analysis for this pilot study. We still continue to collect the data for further analysis. Patients who had cardiac arrest would be treated and performed standard cardiopulmonary resuscitation and advanced cardiac life support. For each patients, these data, baseline characteristics, diagnosis, initial electrocardiography (ECG), initial treatment, procedures of cardiopulmonary resuscitation and the result of the treatment were collected in a case record form. From the statistical recorded of medicine department in the time of our study, 4,734 patients were admitted to our department and 467 died during their admission, but only 331 CPR record form could be collected and finally 293 CPR record form that were completed and reviewed for the first hour, 24 hour and in-hospital survival outcome.

Physicians who performed CPR were already trained in the performance of both basic life support and advance cardiac life support according to the guideline 2000 for cardiopulmonary resuscitation and emergency cardiac care by the American heart association[1]. Training in performing CPR was conducted in every physicians before they came to practice in medicine department.

Results

A total of 293 patients (male 260 and female 33) with mean age 57.6 ± 14.9 years who had cardiac arrest after admitted to the Department of Medicine and had cardiopulmonary resuscitation in the hospital during their admission. There were diabetes mellitus and hypertension for 28 and 29 cases, respectively (9.6% and 9.9%). Table 1 show patients characteristic. Our patients were rather seriously and critically ill. Most common diagnosis of the patients were pneumonia with respiratory failure, cerebrovascular disease (CVD), chronic obstructive pulmonary disease (COPD), septic shock, sepsis, upper gastrointestinal bleeding (UGIB) and congestive heart failure (CHF), 178 patients (60.7%). Acute coronary syndrome were diagnosed in 14 patients. Chronic renal failure and organophosphate poisoning were found for 11 patients equally.

ECG was the most important finding for arrested patient because it could guide for the initial treatment to support the patients before definite treatment would be given. In case of VF and ventricular tachycardia (VT), the most effective treatment to terminated VF and VT was defibrillation and cardioversion respectively, before the specific treatment for the patients would be started later. In this study, 4 patients did not be performed ECG at the initial of cardiac arrest. Most initial rhythm of our patients was asystoly that revealed for 95.5%. The high incidence of asystoly may be due to the delay in achieved performing ECG at the beginning of the arrested event. Delaying in detect the initial ECG after cardiac arrest made the ECG change finally to asystoly.

Table 1 Patients characteristics and initial diagnosis

Patients characteristic	Number (%) N=293
Patients	
male	260 (88.7)
female	33 (11.3)
Mean age (years)	57.6±14.9
male	57.9
female	59.3
Basic disease	
DM	28 (9.6)
HT	29 (9.9)
Ward	
Non-ICU ward	277 (94.5)
ICU ward	16 (5.5)
Diagnosis	
Pneumonia	40 (13.7)
Cerebrovascular disease	32 (10.9)
Chronic obstructive pulmonary disease (COPD)	26 (8.9)
Septic shock	24 (8.2)
Sepsis	19 (6.5)
Upper GI bleeding	19 (6.5)
Congestive heart failure	18 (6.1)
Acute coronary syndrome	14 (4.8)
Chronic renal failure	11 (3.7)
Organophosphate poisoning	11 (3.7)
Hematological disease	9 (3.1)
Pulmonary tuberculosis (TB)	8 (2.7)
Alteration of conscious	7 (2.4)
Post cardiac arrest	7 (2.4)
Cardiac arrhythmia	6 (2.0)
Rheumatic heart disease	5 (1.7)
Seizure	5 (1.7)
Cirrhosis	5 (1.7)
Meningitis	3 (1.0)
Electric shock	2 (0.7)
Encephalitis	2 (0.7)
Hemoptysis	2 (0.7)
Diabetic ketoacidosis	2 (0.7)
Acute pancreatitis	2 (0.7)
Pleural effusion	2 (0.7)
Acute renal failure	2 (0.7)
CA lung	2 (0.7)
Others	8 (2.7)

Only 3.9% of arrested patients were VT/VF (11 patients). In our study, only 6 patients from 11 patients with VT/ VF who were performed cardioversion and defibrillation. Table2 showed the detail of ECG finding at the initial of cardiac arrest.

Most cardiac arrest in this study occurred in the first 24 hours of hospital admission. 106 patients experienced cardiac arrest within the first 24 hours. 65.5% of the patients had cardiac arrest within 72 hours after their admission. Only 33 patients in this study had cardiac arrest after day 7th of admission as show in table 3.

Despite seriously ill patients, but only 16 patients could be admitted to intensive care unit (ICU). 94.5% of patients had cardiac arrest at non-ICU ward. Survival outcome of arrested patients at the first hour after successful cardiopulmonary resuscitation in our study was 37.9%, at 24 hours was 6.1%. Only 7 patients in this study could survive and discharged from the hospital. Survival outcome of this study was shown in Table 3.

Among patients who survived for the first 24 hours after successful CPR, mean age of these patients was 55 years that did not differ from all patients of

Table 2 ECG findings

ECG Finding	Number (%) N=289
Asystoly	276 (95.5)
Ventricular fibrillation	8 (2.9)
Ventricular tachycardia	3 (1.0)
Pulseless electrical activity	1 (0.3)
Bradycardia	1 (0.3)

Table 3 Duration of hospital stay before having Cardiac Arrest and Patients survival

	Number (%) N=293
Timing	
One day	106 (36.2)
2 days	63 (21.5)
3 days	23 (7.8)
4 - 7 days	68 (6.5)
8 - 14 days	30 (8.5)
> 14 days	3 (1.0)
Survival	
First hour survival	111 (37.9)
24 hour survival	18 (6.1)
Hospital discharge survival	7 (2.4)

Table 4 Patients Data of 18 Patients Who Survive For 24 Hours

Patients characteristic	Number (%) N=18
Male	14 (77.8)
Female	4 (22.2)
Mean age	55 Yr (range 23-80 Yr)
No. of cardiac arrest, 1	13 (72.2)
2	4 (22.2)
5	1 (5.6)
Initial ECG - VT	2 (11.1)
- Asystoly	16 (88.9)
Mean duration of CPR	13 min (range 5-50 min)

VT: ventricular tachycardia,

CPR: cardio-pulmonary resuscitation

this study. Most rhythm of these patients was asystoly with only 2 patients with VT (table 4). Mean duration of performing CPR was shorter than the whole group (13 vs. 18.3 minutes). Diagnosis of these patients were 4 sepsis, 3 organophosphate poisoning, 2 COPD with acute exacerbation, 2 septic shock and 1 for CVA, AMI, UGIB and acute pancreatitis. 7 of 18 patients could survive and discharge from the hospital (3 females and 4 males).

Discussion

This study evaluated 24-hour survival outcome after cardiopulmonary resuscitation (CPR) of medicine patients in Maharat Nakhon Ratchasima Hospital. Although the number of patients was small, but data from this study did show some interesting results.

Demographic data of the patients demonstrated that most patients were elderly with age range 16 to 91 years, mean age 57.6 years and more than 60% of patients had 55 years of age or over. More than 60% of our patients were rather seriously ill, most were pneumonia with respiratory failure, CVD, COPD with acute exacerbation, sepsis, septic shock syndrome, UGIB, CHF and ACS. We also noted that most patients had cardiac arrest within 72 hours (65.5%).

Although our patients were seriously ill, but only 5.5% (16 patients) could be transfer to ICU due to the limitation of quantity of ICU bed. Most patients were performed CPR at normal ward that lack of personnel and equipment. Duration for performing CPR range from 5 minutes to 98 minutes with mean duration of 18.3 minutes.

Another factor that may influence the survival outcome of the patients was the initial ECG result. The percentage of patients with an initial rhythm of asystoly was high in our study, 95.5%. This result was differ from the study in patient who had cardiac arrest out of hospital. Patient who had cardiac arrest out of the hospital usually had the sudden cardiac arrest from cardiac problem and the initial ECG mostly were VF or VT[2]. Asystoly is though to be a rhythm with a very poor prognosis especially as compared with VF or VT[3]. Prolonging CPR may be particularly important for patients found in asystoly[4]. The reason why we found most percentage of asystoly because most patients in our study were not cardiac disease. Delaying in performed ECG at the initial of cardiac arrest may be the another reason that make the high percentage of asystoly. As we knew that VT and VF could be effectively treated by electrical cardioversion or defibrillation but in our study, 6 patients from 11 patients with ECG of VT and VF received cardio-version or defibrillation.

As we discuss earlier that survival of arrested patient would not only depend on the disease and severity of the disease but it also depend on the quality of CPR maneuver. In our study, all physician who performed CPR for the arrested patients would be trained for technique of CPR following the guidelines 2000 for cardiopulmonary resuscitation and emergency care by the American heart association.

·   Our study had several limitations. This study had a small number of patients that could not represent for the whole medicine patients. Although CPR training for the physicians in performing of CPR and

ACLS technique, there were still some difference between the physicians who performed CPR that may make the difference result.

In summary, we retrospectively investigated the survival outcome after cardiopulmonary resuscitation in patients who admitted to the Department of Medicine. The first 24 hours survival outcome after successful CPR was 6.1% in our study that quite low. There were several factors that may influence the survival outcome after CPR including age, underlying disease and the severity of the disease, initial rhythm at the cardiac arrest and the skill of CPR performance of the physicians.

References

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