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Prospective study on the effect and outcome of injection adrenaline administration during cardiopulmonary resuscitation

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ABSTRACT

Adrenaline is a recommended drug in advanced life support protocol algorithm. This study is to find out the effect and outcome of adrenaline administration during cardiac resuscitation in a tertiary care centre. This study was carried out over a period of two months. Fifty one patients in the intensive care unit were included in this study. During cardiac resuscitation after defibrillation inj.adrenaline 1mg was given intravenously in 3 to 5 minutes of interval with maximum of two doses. Only two patients were revived successfully with cardiac resuscitation .This prospective observational study concludes diabetes and hypertension are the high risk factors for coronary artery disease. Males are predominantly affected and sedentary life style in females are under high risk. Earlier administration of adrenaline in shockable rhythm resulted in a worst outcome. Large study group population in future would clarify the reasons for poor outcome.

Keywords: Adrenaline, Cardiac Resuscitation

INTRODUCTION

Adrenaline is a century old drug. It is a non-selective catecholamine which was initially used for many therapeutic conditions like bronchial asthma, epistaxis, anaphylaxis and cardiac resuscitations. Though it is not a designed drug for cardiac resuscitations it has been used as a cardiac stimulant since 1960 and it is consider as one of the emergency drug for cardiac resuscitations [1]. During cardiac resuscitation if it is given intravenously, it stimulates α_1 receptor and enhances Coronary blood flow that results in early return of spontaneous circulation [2] . Now the therapeutic uses are restricted due to its β receptor stimulant effects (palpitation, tachycardia ,

cardiac arrhythmias) . Still this drug comes under essential medical drugs list and its being used in cardiac resuscitation protocol recommended by AHA guidelines 2015 [3].

AIM

To find out the effect and outcome of injection adrenaline administration during cardiopulmonary resuscitation in a tertiary care hospital.

METHODOLOGY

Prospective Cross sectional observation study. Sample size 51. The study was carried out in an

intensive care unit of a tertiary care hospital MGMGH , Tiruchirapalli, Tamilnadu over a period of two months (June, July 2016). Permission to conduct the study was obtained from the Institutional Ethics Committee. Data were collected twice daily by visiting the intensive care unit in the morning and evening. The data collected include the following patient demographics, significant comorbidity, provisional diagnosis, initiation of resuscitation and

outcome of inj.adrenaline administration. All the patients who received inj.adrenaline during cardiac resuscitation were included in this study. As per AHA guidelines 2015, after defibrillation 1 mg dose of IV adrenaline administered every 3 to 5 minutes (two doses) interval during cardiac resuscitation along with other resuscitative protocol measures. Response was observed.

RESULTS

In this study fifty one patients who received inj.adrenaline during cardiac resuscitation were included. Demographic data analysis done.

Table 1: CPR Resuscitation - Age Group

50 ≤		≥50	
MALES	FEMALES	MALES	FEMALES
5	3	26	17

Among the study group five males and three female patients were below fifty age group. Twenty six males and seventeen females were above fifty.

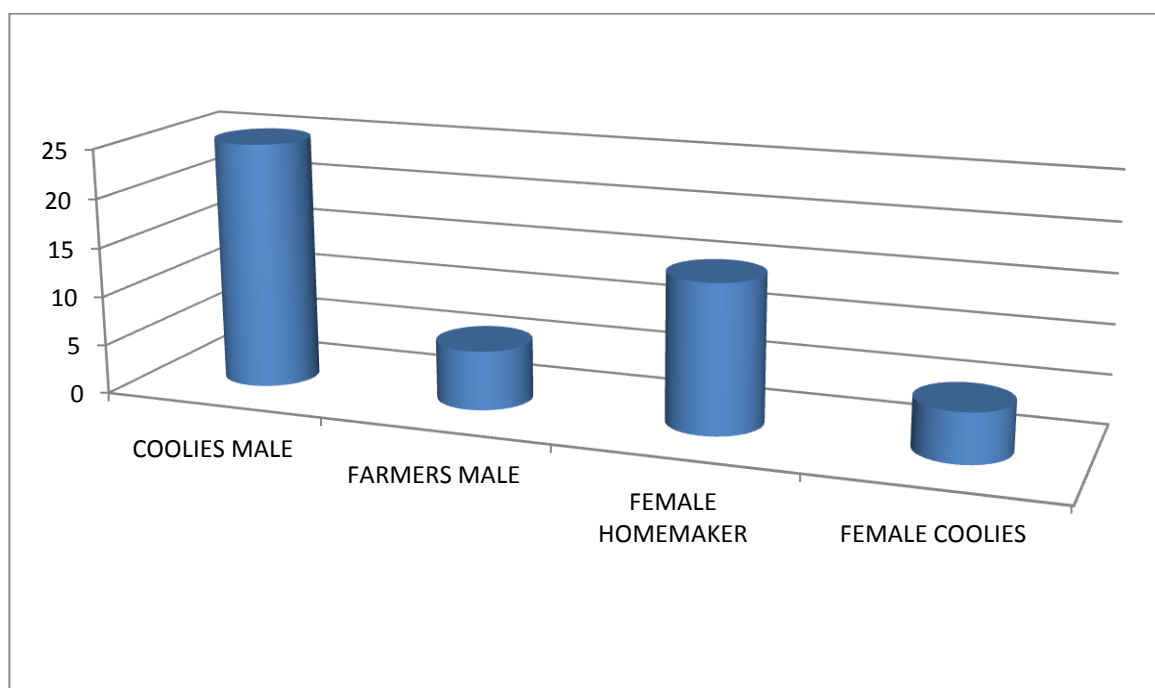


Chart 1: CPR Resuscitation Occupation

25 males and 5 females were coolie by occupation. 6 males were farmers, 15 females were homemakers.

Table 2. CPR resuscitation in males

S.NO	CAUSE OF DEATH	NUMBER
1.	Coronary artery disease	17
2.	OPC poisoning	2
3.	Road traffic accident	2
4.	Burns	2
5.	Cerebrovascular accident	1
6.	Hanging	1
7.	Aspiration pneumonia	1
8.	COPD	1
9.	Head injury	1
10.	Septic shock	1

19 males and 12 females were diabetic and hypertensive developed cardiac arrest due to myocardial infarction.

One male and one female suffered due to cerebral stroke.

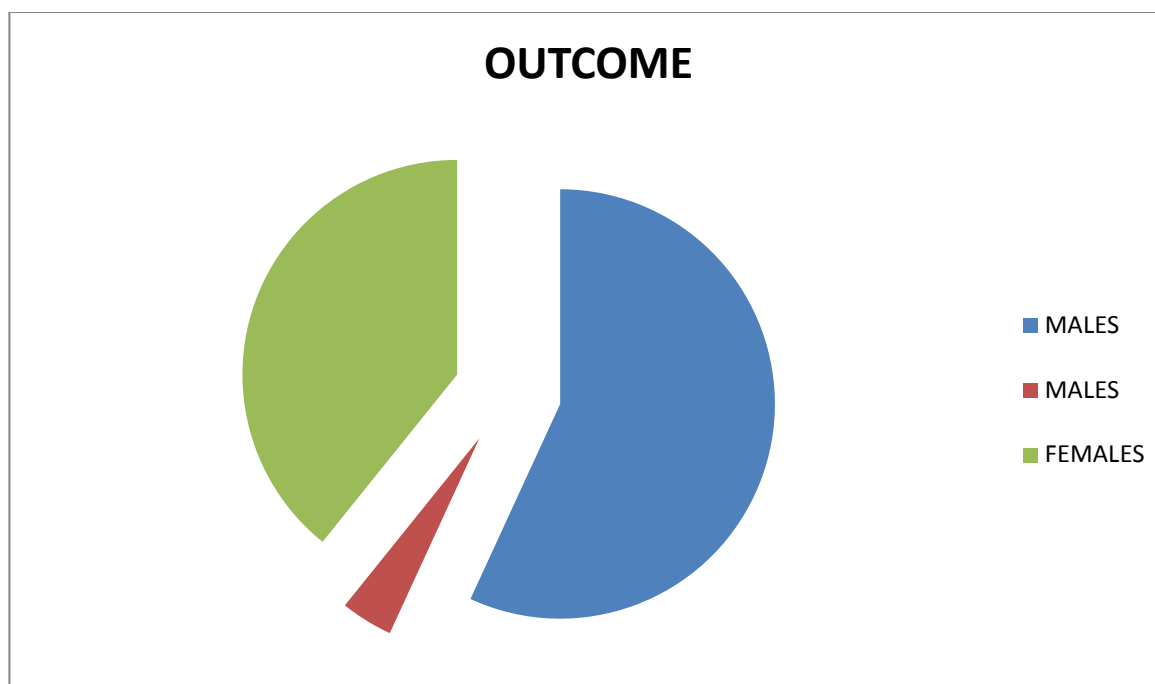
In males 1 patient was admitted for aspiration pneumonia, 1 case of hanging , 1 head injury, 1 Cerebro vascular accident , 1 COPD, 1 case of septic shock , 2 cases of burns with sepsis 2 cases of road traffic accidents and 2 cases of OPC poisoning were resuscitated with inj. Adrenaline.

Table 3: CPR Resuscitation In Females

S.NO	CAUSE OF DEATH	NUMBER
1.	Coronary artery disease	12
2.	Chronic renal failure	2
3.	Road traffic accident	1
4.	septicemia	2
5.	Cerebrovascular accident	1
6.	Meningoencephalitis	1
7.	Accidental fall	1

In females 2 cases of Chronic renal failure, 1 Road traffic accident ,2 cases of septicemia , 1 Cerebrovascular accident,1 case of

meningoencephalitis and 1 accidental fall were resuscitated.



Pie Chart 1: CPR Resuscitation Out Come

Two male patients admitted for myocardial infarction were revived with resuscitative measures. They were farmers by occupation, known diabetic, hypertensive and chronic smokers.

There was no response to CPR in female patients.

DISCUSSION

Cardiac arrest is defined as sudden cessation of cardiac mechanical function as evidenced by the absence of pulse, blood pressure, respiration and loss of consciousness [4]. Prompt attempt and initiation of cardiopulmonary resuscitation determines the outcome. Coronary heart disease is a major cause of mortality in India [5].

We have conducted a prospective observational study to determine the use of inj. adrenaline administration during cardiopulmonary resuscitation in the intensive care unit.

In our study population males were predominant than females [6]. More than fifty percent were known diabetic and hypertensive [7]. Occupation wise more males were coolies and females were housemakers. This study also confirms that physical inactivity is higher in women in urban areas [8]. Our study also can be compared with many studies reported in India as well as other countries. [7, 8, 9, 10].

American Heart Association guidelines clearly states that inj.adrenaline administration during cardiac resuscitation is a key component of advanced life support. Adrenaline increases coronary perfusion pressure (CPP) and cerebral perfusion pressure (CePP) which results in return of spontaneous circulation. The animal studies also confirms inj.adrenaline administration 20 – 30ug bolous dose every 3 minutes increases the mean aortic pressure and improves the coronary perfusion pressure [11].

During cardiac arrest patients may be in a transition from one rhythm to another which results in higher chance of achieving return of spontaneous circulation [12]. Some studies suggested that more patients who received adrenaline before hospital arrival survived hospital admission [13]. It confirms that adrenaline administration in non shockable rhythm increases the return of spontaneous circulation. But unadjusted rate of spontaneous circulation lower in those with an initial shockable rhythm [14]. In our study also may be comparable with this study group. In the intensive care unit adrenaline administration after defibrillation showed a poor outcome.

Few studies reported that delayed administration of inj.adrenaline during cardiac resuscitation beyond five minutes have significantly lower survival rates

[15]. This study also showed low outcome of results after adrenaline administration in 3 to 5 minutes of defibrillation. Smaller single centre study in Taiwan also found an association between shorter adrenaline dosing intervals and worse outcome [16].

Our study suggested that adrenaline administration after defibrillation during cardiac resuscitation results in poor outcome. The possible reasons could be adrenaline increases the heart rate and force of contraction due to β receptor stimulant effect which increases oxygen demand and myocardial workload.

CONCLUSION

This prospective observational study also concludes that diabetes and hypertension are the high risk factors for coronary heart disease. Males are predominantly affected than females. Sedentary

lifestyle in urban women also under high risk for coronary heart disease. In the intensive care unit defibrillation followed by inj. adrenaline administration resulted in a very poor outcome. Maximum two doses of adrenaline was given in 3 to 5 minutes of interval. Compare with other studies that less adrenaline dose during CPR improves the return of spontaneous circulation, our study showed a poor response [17]. The probable contributory factors could be poor quality of CPR and associated pathological illness. Other possibilities are increased myocardial oxygen demand and workload in the presence of shockable rhythm. However further studies may be conducted in large number of patients to find out the use and outcome of inj. adrenaline administration during cardiac resuscitation protocol and should take appropriate measures to improve the outcome.

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