

Retrospective Evaluation of Resuscitation Medication Utilization in Hospitalized Adult Patients with Cardiac Arrest



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Background and Importance

- Early administration of epinephrine (< 5 minutes) in patients with non-shockable rhythms is associated with increased return of spontaneous circulation (ROSC) and survival, while poor compliance to the Advanced Cardiovascular Life Support (ACLS) guidelines leads to poor patient outcomes¹⁻³
- The presence of a pharmacist on the resuscitation team is associated with increased ACLS compliance. Integration of a pharmacist into the resuscitation process is not the current practice in Hong Kong⁴⁻⁶

Aim and Objectives

- Primary objective: Evaluate the association between time of adrenaline administration for in-hospital cardiac arrest (IHCA) patients with non-shockable rhythm and patients' survival outcomes
- Secondary objectives: Assess the compliance of adrenaline and amiodarone administration to the ACLS guideline

Materials & Methods

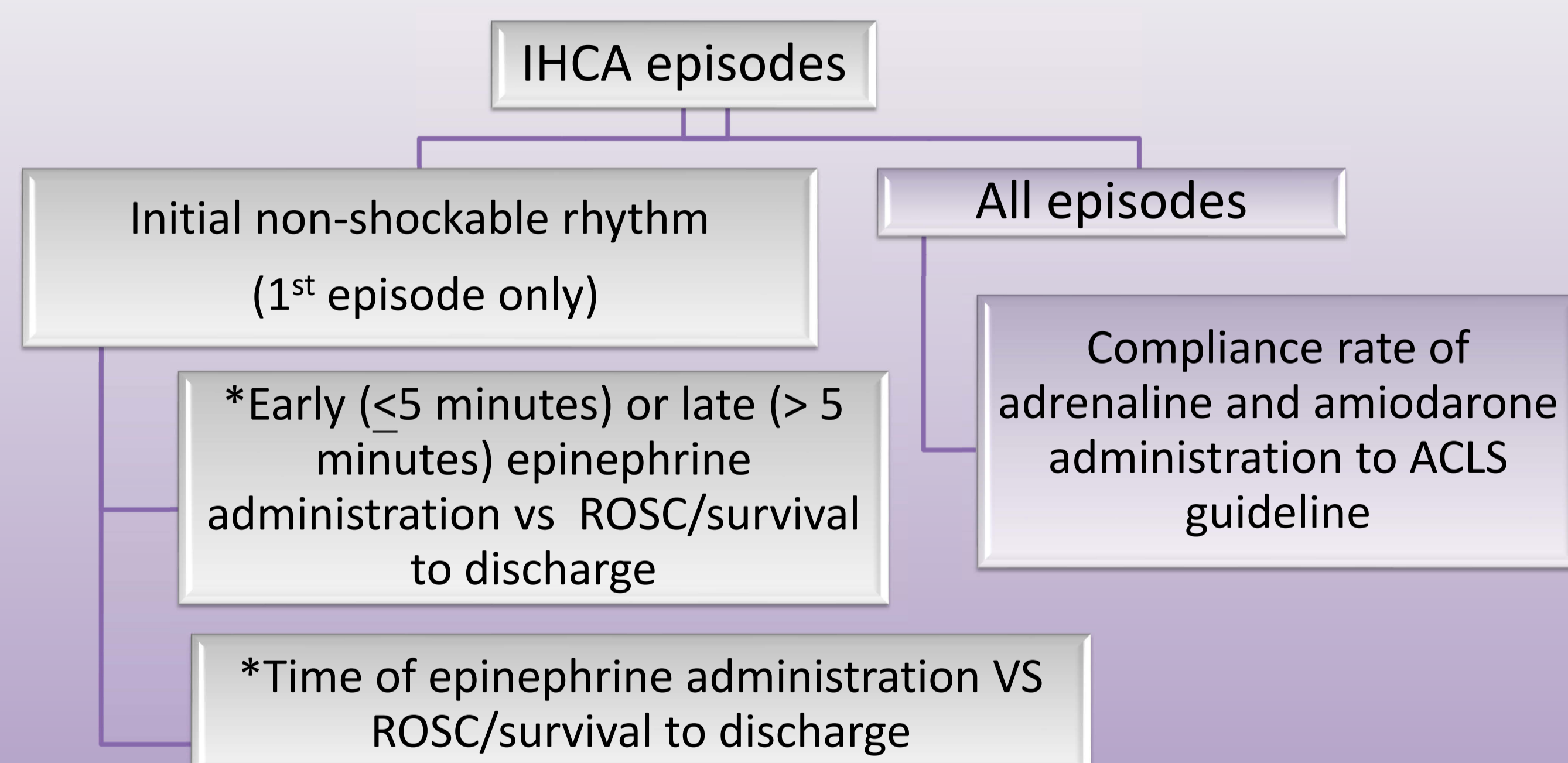
- Design: Retrospective observational study
- Location: Pamela Youde Nethersole Eastern Hospital (PYNEH) and Prince of Wales Hospital (PWH), Hong Kong
- Study period: 1 January 2016 to 31 December 2016

Inclusion criteria

All patients aged 18 or above with the onset of cardiac arrest during an inpatient hospital stay with a shockable (VT or VF) or non-shockable rhythm (asystole or PEA)

Exclusion criteria

Patients with no cardiopulmonary resuscitation (CPR) attempt
 Patients with a 'Do Not Resuscitate' agreement
 Patients who had ROSC prior to adrenaline administration
 Patients with missing or incomplete key process information



*Association analysed by logistic regression with adjustment of potential confounding factors

Table 1. Compliance assessment criteria

Drug	Compliance assessment criteria
Adrenaline	<ul style="list-style-type: none"> ➤ Dose: Standard dose 1 mg IV/IO ➤ Time: every 3 to 5 minutes (except patients with documented pulse/blood pressure between doses), after defibrillation and a 2-minute CPR period (for shockable rhythm)
Amiodarone	<ul style="list-style-type: none"> ➤ Indication: for shockable rhythm only ➤ Dose: 1st dose 300 mg IV/IO, 2nd dose 150mg IV/IO ➤ Time: after CPR, defibrillation and epinephrine administration

References

1. Link MS, et al. Circulation. 2015;132(suppl 2):S444-S464.
2. Donnino MW, et al. BMJ. 2014;348:g3028.
3. Khera R, et al. Circulation. 2016;134:2105-2114.
4. Draper HM, Eppert JA. Ann Pharmacother. 2008;42(4):469-74.
5. Yap HY, et al. Hong Kong Med J. 2007;13(4):258-65.
6. Chan JC, et al. Am J Emerg Med. 2013;31(5):883-5.

Results

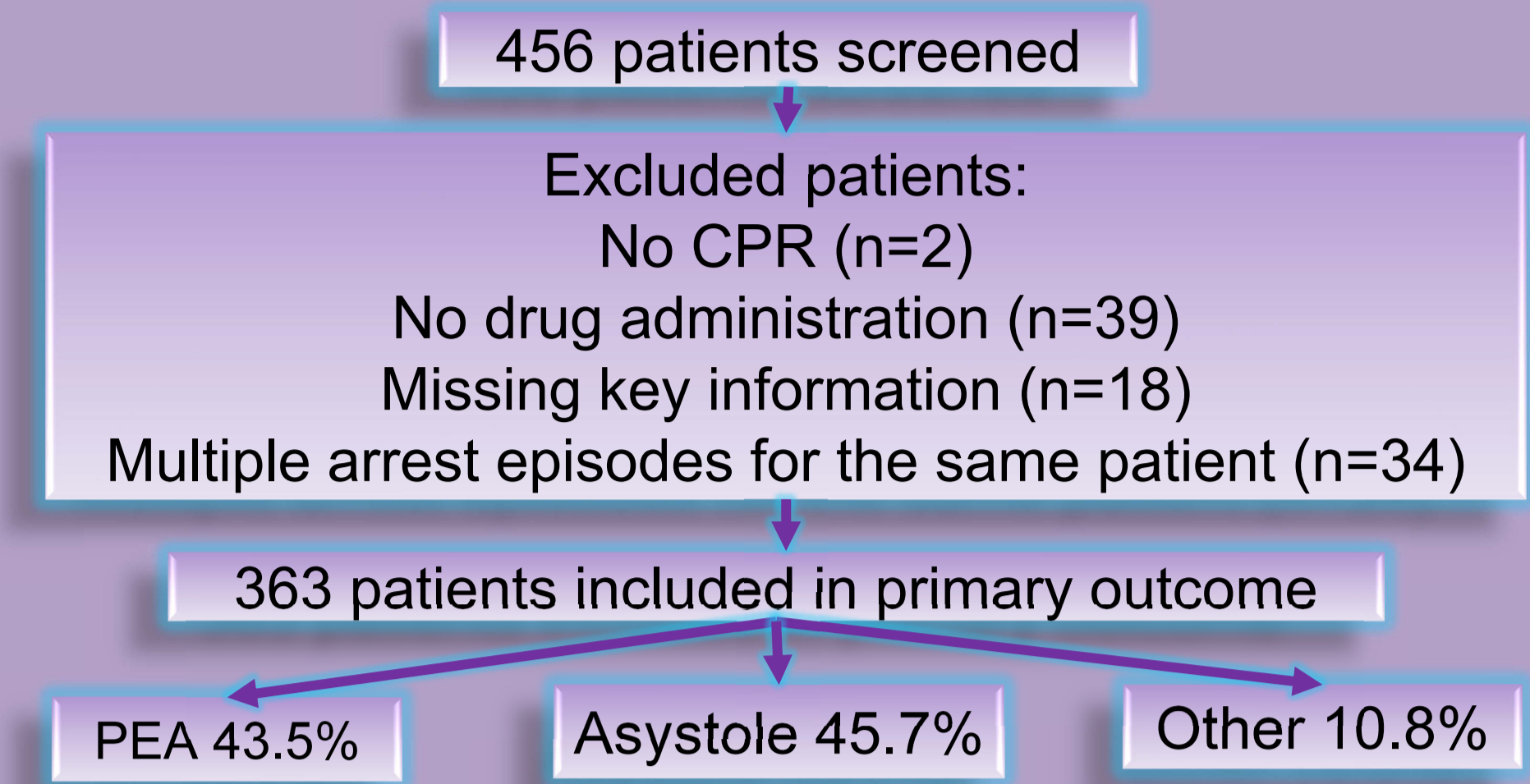


Table 2. Demographics and outcomes after adjustment of confounding factors in patients with early and late adrenaline administration

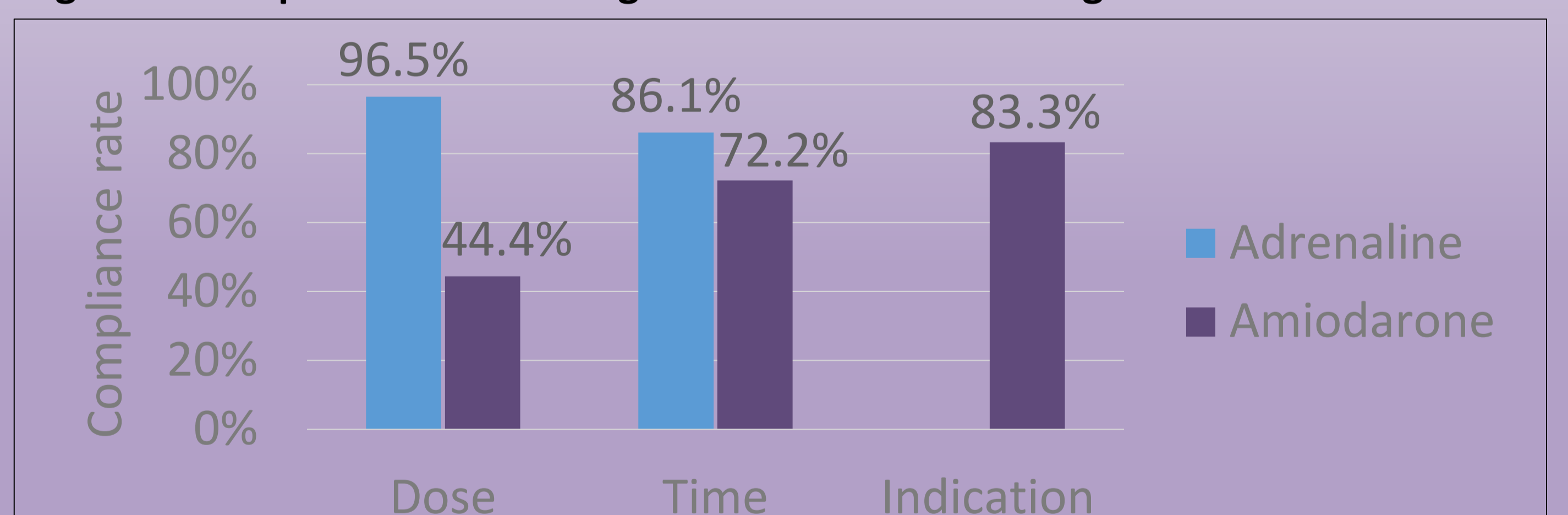
Demographics & Outcomes	Epinephrine administration in ≤ 5 mins (n=240)	Epinephrine administration in > 5 mins (n=109)	p-value
Mean age ± SD	75.0 ± 13.2	75.7 ± 13.3	0.618
Gender			0.005
Male	161 (67.1%)	56 (51.4%)	
Female	79 (32.9%)	53 (48.6%)	
ICU/CCU/HDU Care	51 (21.3%)	4 (3.7%)	<0.001
Mean time to CPR ± SD (min)	0.15 ± 0.55	1.10 ± 5.13	0.005
Mean Charlson Comorbidity Index ± SD	3.55 ± 2.33	3.28 ± 2.37	0.327
Outcomes			
ROSC	118 (49.2%)	38 (34.9%)	0.013
Survival to discharge	10 (4.2%)	2 (1.8%)	0.281

- After adjusting with the confounding effect of ICU/CCU/HDU care, early administration of adrenaline was significantly associated with increased rate of ROSC (adjusted OR= 1.630; 95% CI = 1.008-2.635, p=0.046), but not survival to discharge (p=0.265). A shorter time to adrenaline administration (as continuous interval) was significantly associated with increased rate of ROSC (p=0.002) and survival to discharge (p=0.029).
- Median time to epinephrine: 3 minutes (IQR = 1-6 minutes)

Secondary Outcomes:

- Compliance of drug administration to ACLS guideline (n=397)
- Overall compliance rate for adrenaline: 83.6% (331 out of 396)
- Overall compliance rate for amiodarone: 33.3% (6 out of 18)

Figure 2. Compliance rate of drug administration to ACLS guideline



Key non-compliance findings

Adrenaline (N = 396):

- Non-standard dosages given (N = 14)
- Not given every 3 to 5 minutes (N = 47)
- Early administration in patients with a shockable rhythm (N = 9)

Amiodarone (N = 18):

- Omission of 300 mg loading dose (N = 9)
- Early administration (N = 5)

Conclusion and Relevance

- Our study found that time of epinephrine administration was significantly associated with better results in ROSC and survival to discharge in IHCA patients with non-shockable rhythm
- After adjusting for potential confounding factors, early epinephrine administration was associated with significantly improved ROSC, but not survival to discharge
- Overall compliance rate of drug administration to ACLS guidelines was 81.1%



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