Is Early Epinephrine Administration Still Effective when The Response Time Takes Longer?

Hiroki UETA¹, Hideharu TANAKA², Ryo SAGISAKA², Hiroshi TAKYU², Shota TANAKA²

1. Meiji University of Integrative Medicine 2. Kokushikan University

Background

For out-of-hospital cardiac arrest (OHCA) cases, we can expect a favorable cerebral function if the time between the first contact to patients and epinephrine administration is shorter. However, there were no previous studies reported the association with the time between 119-call to the first contact (Response time), as well as the initial ECG rhythm.

Purpose

We examined how cerebral function is affected by administering epinephrine as following cardiac arrest protocol, regardless of the initial ECG rhythm and response time.

Fig.1 Definition study cohort

Method

We analyzed 13,326 OHCA cases from Utstein-style data between 2011 and 2014 in Japan. We stratified into Early Response time (≤ 8 min) and Late Response time (>8 min, ≤ 16 min).

The multivariate logistic regression analysis was performed to see the relationship between epinephrine time and cerebral function in the each of response time group.

Results

Table 1 Shockable Patients Background

Response time (min)	≤ 8 (n=1387)	$8 < \text{to} \leq 16$ (n=1781)	P-value
Age(years),mean(SD),	65.5 (0.4)	65.1 (0.4)	0.52
Gender,No.(%)	1479 (83.1)	1152 (83.1)	0.99
Bystander CPR,No.(%)	839 (47.1)	819 (59.1)	<.0001
Bystander AED,No.(%)	72 (4.1)	71 (5.1)	0.15
Defibrillation,No.(%)	1734 (97.4)	1360 (98.1)	0.20
Airway device,No.(%)	954 (53.6)	791 (57.0)	0.05
Contact to first adrenaline administration time,mean(SD),min	13.3 (0.1)	14.0 (0.2)	0.002
Contact to arrival hospital time,mean(SD),min	27.3 (0.2)	28.6 (0.2)	<.0001

Abbreviations:SD,standard deviation;CPR,cardiopulmonary resuscitation;AED,automated defibrillator

Table 2 Non-Shockable Patients Background

Response time (min)	≤ 8 (n=5175)	$8 < \text{to} \leq 16$ (n=4983)	P-value
Age(years),mean(SD),	77.1 (0.2)	76.9 (0.2)	0.46
Gender,No.(%)	3105 (60.0)	3062 (61.5)	0.14
Bystander CPR,No.(%)	2316 (44.8)	2463 (49.4)	<.0001
Bystander AED,No.(%)	76 (1.5)	126 (2.5)	0.0001
Defibrillation,No.(%)	519 (10.0)	621 (12.5)	0.0001
Airway device,No.(%)	3189 (61.6)	3117 (62.6)	0.33
Contact to first adrenaline administration time,mean(SD),min	14.2 (0.1)	14.9 (0.1)	<.0001
Contact to arrival hospital time,mean(SD),min	27.6 (0.1)	29.2 (0.1)	<.0001

Abbreviations:SD,standard deviation;CPR,cardiopulmonary resuscitation;AED,automated defibrillator

Table3 Multivariable logistic regression on outcomes.

Response time (min)	ROSC				CPC1,2			
	≤ 8	$8 < \text{to} \leq 16$	≤ 8	$8 < \text{to} \leq 16$	≤ 8	$8 < \text{to} \leq 16$	≤ 8	$8 < \text{to} \leq 16$
Contact to epinephrine administration time (min)	≤ 10 (n=2271)	>10 (n=4685)	≤ 10 (n=1914)	>10 (n=4456)	≤ 10 (n=2271)	>10 (n=4685)	≤ 10 (n=1914)	>10 (n=4456)
No.(%)	645(28.4)	934(19.9)	520(27.2)	722(16.2)	136(6.0)	114(2.4)	80(4.2)	63(1.4)
Shockable								
COR(95%CI)	2.07 (1.68-2.55)	1	2.18 (1.86-2.56)	1	2.61 (1.94-3.53)	1	2.64 (1.78-3.94)	1
AOR(95%CI)	2.06 (1.66-2.54)	1	2.35 (1.81-3.04)	1	2.37 (1.74-3.25)	1	2.66 (1.76-4.05)	1
Non-Shockable								
COR(95%CI)	1.37 (1.19-1.58)	1	1.56 (1.40-1.72)	1	1.55 (0.87-2.71)	1	3.15 (1.60-6.31)	1
AOR(95%CI)	1.38 (1.19-1.59)	1	1.78 (1.53-2.07)	1	1.96 (1.06-3.56)	1	3.22 (1.59-6.63)	1

ROSC Adopted factor : Age, Gender, BystanderCPR, Bystander AED, Defibrillation, Airway device

CPC1,2 Adopted factor : Age, Gender, BystanderCPR, Bystander AED, Initial ECG, Defibrillation, Airway device, Response time, Contact to 10min

Conclusion

For the epinephrine administration in OHCA cases, early administration of epinephrine will improve the ratio of favorable cerebral function regardless of the initial ECG rhythm and response time.

Contact

Address: h-ueta@meiji-u.ac.jp

Hiroki Ueta

Meiji University of Integrative Medicine