Association between coronary artery stenosis and survival outcomes after successfully resuscitation from cardiac arrest

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PURPOSE

To investigate the association between coronary artery stenosis and survival outcomes in patients successfully resuscitated from cardiac arrest

METHODS

From 2011-2017, we recorded 3132 non-traumatic adult cardiac arrest patients with CPR attempt at emergency department, including in hospital cardiac arrest (IHCA) and out-of hospital cardiac (OHCA). There were 1734 patients with sustained ROSC, and 320 patients were sent to cardiac catheterization room for emergent coronary angiography (CAG). Finally, we enrolled total 273 cardiac arrest survivors who received emergent coronary angiography (CAG). The patients were categorized into four groups according to the severity of coronary artery stenosis.

Result

Among the enrolled patients, there were 201 patients (73.62%) had at least 1-vessel coronary artery severe stenosis ($\geq 70\%$ stenosis). Baseline characteristics between different coronary artery stenosis groups were listed in Table 1. There is significantly increase number of coronary artery with severe stenosis in male ($p<0.001$). Pre-comorbidities including hypertension ($p= 0.136$), diabetes mellitus ($p=0.021$), dyslipidemia ($p=0.869$) and myocardial infraction ($p=0.188$) among these group were no significant difference.

Resuscitation events between different coronary artery stenosis groups were listed in Table 2. There was no significant difference between each group about the resuscitation events. The post-resuscitation events was mostly no significant difference excepts patients with coronary artery stenosis had more prevalence to receive IABP then the patient without coronary artery stenosis.

The number of coronary artery with severe stenosis was significantly associated with survival to discharge after multiple logistic regression analysis (Table 3). The increase number of coronary artery with severe stenosis contributed to a higher risk of in-hospital mortality as compared to those without severe coronary artery stenosis (1-vessel: adjusted HR 2.27, 95% CI 1.43–4.04, $p = 0.021$; 2-vessel: adjusted HR 5.49, 95% CI 2.17–13.89, $p = <0.001$; 3-vessel: adjusted HR 11.05, 95% CI 4.20–29.04, $p < 0.001$).

CONCLUSIONS

The increased number of coronary artery with severe stenosis is associated with in-hospital mortality after successfully resuscitation from cardiac arrest.

DECLARATION OF INTEREST

The authors declared that they have no conflict of interest, including relevant financial interests, activities, relationships, and affiliations.

Fig 1. Patient Selection

Table 1. Baseline Characteristics

	Vessel number of coronary artery stenosis					p
	total patients	0	1	2	3	
	n(%)	n(%)	n(%)	n(%)	n(%)	
	273	72 (26.37%)	74 (27.116%)	57 (20.88%)	70 (25.64%)	
Age (years)	60.84±13.27	56.69±15.54	61.05±13.15	61.84±11.86	63.67±10.97	0.012
Gender(Male)	208 (76.19%)	41 (56.94%)	59 (79.73%)	46 (80.70%)	62 (88.57%)	<0.001
Smoking	68 (24.91%)	21 (29.17%)	17 (22.97%)	10 (17.54%)	20 (28.57%)	0.417
Hospital						0.103
NTUH	197 (72.16%)	46 (63.89%)	55 (74.32%)	48 (84.21%)	48 (68.57%)	
HCH	49 (17.95%)	14 (19.44%)	14 (18.92%)	5 (8.77%)	16 (22.86%)	
FEMH	27 (9.89%)	12 (16.67%)	5 (5.76%)	4 (7.02%)	6 (8.57%)	
Pre-comorbidities						
Hypertension	154 (56.41%)	35 (48.61%)	38 (51.35%)	37 (64.91%)	44 (62.86%)	0.136
Diabetes mellitus	108 (39.56%)	23 (31.94%)	24 (32.43%)	23 (40.35%)	38 (54.29%)	0.021
Dyslipidemia	57 (20.88%)	13 (18.06%)	15 (20.27%)	13 (22.81%)	16 (22.86%)	0.869
Coronary artery disease	97 (35.53%)	14 (19.44%)	33 (44.95%)	22 (38.60%)	28 (40.00%)	0.006
Myocardial infarction	10 (3.66%)	3 (4.17%)	2 (2.70%)	0 (0.00%)	5 (7.14%)	0.188
Heart failure	32 (11.72%)	17 (23.61%)	6 (8.11%)	6 (10.53%)	3 (4.29%)	0.003

Table 2. Resuscitation events

	Vessel number of coronary artery stenosis					p
	total patients	0	1	2	3	
	n(%)	n(%)	n(%)	n(%)	n(%)	
	273	72 (26.37%)	74 (27.116%)	57 (20.88%)	70 (25.64%)	
Resuscitation events						
Witnessed collapse	222 (81.92%)	61 (84.72%)	63 (85.14%)	44 (77.19%)	54 (79.41%)	0.526
Bystander CPR	199 (73.43%)	56 (77.78%)	52 (70.27%)	44 (77.19%)	47 (69.12%)	0.649
Initial shockable rhythm	114 (41.76%)	36 (50.00%)	26 (35.14%)	27 (47.37%)	25 (35.71%)	0.193
Shockable rhythm ever	169 (62.13%)	49 (68.06%)	45 (60.81%)	36 (63.16%)	39 (55.71%)	0.548
CPR duration (mins)	20±22	18±35	18.5±22	20±35	25±31	0.074
Post-ROSC events						
Heart rate at ROSC (BPM)	101±26	100±29	99±28	103±25	102±23	0.707
Inotrope use	204 (75.56%)	50 (69.44%)	48 (64.86%)	46 (80.70%)	60 (85.71%)	0.034
Therapeutic hypothermia	98 (39.84%)	29 (40.28%)	22 (29.73%)	19 (38.00%)	28 (46.67%)	0.564
ECMO	102 (37.36%)	17 (23.61%)	27 (36.49%)	27 (47.37%)	31 (44.29%)	0.018
IABP	96 (35.29%)	6 (8.33%)	29 (39.19%)	27 (47.37%)	34 (48.57%)	<0.001

Table 3. The association of stenosis of coronary artery with in-hospital mortality

	Inhospital mortality	Unadjusted HR (95% CI)	p	Adjusted HR (95% CI)	p
Vessel number of coronary artery stenosis					
0	13/72 (18.06%)	Reference		Reference	
1	20/74 (27.27%)	1.74 (0.79, 3.84)	0.016	2.27 (1.43, 4.04)	0.021
2	27/57 (47.37%)	4.15 (1.88, 9.19)	<0.001	5.49 (2.17, 13.89)	<0.001
3	45/70 (64.29%)	8.31 (3.83, 18.01)	<0.001	11.05 (4.20, 29.04)	<0.001

Graph 1. Survival curve