AP 165: Study on Quantification of the Risk of Aging in Patients with Out-of-hospital Cardiac Arrest (OHCA)

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Aim: To quantify the risk of aging in patients with out-of-hospital cardiac arrest (OHCA).
Methods: We used the OHCA Registry of the Japanese Association for Acute Medicine (JAAM) using data on patients who suffered OHCA between June 2014 and December 2015. Exclusion criteria were patients under 18 years old, patients whose etiology of OHCA was extrinsic, patients who did not receive advanced life support (ALS) after arrival, and those with insufficient data. Patients were divided into two groups according to their age (L group was under 80 years old, and H group was 80 years old and over). We analyzed the rates of male, witnessed, citizen cardiopulmonary resuscitation (CPR), shockable rhythm as initial rhythm, tracheal intubation, coronary arteriography and percutaneous coronary intervention, and assisted circulation, the time between phone call and arrival at hospital (T), and rates of establishment of intravenous line (IL), injection of adrenaline (IA) and defibrillation before arrival between the two groups. The primary outcomes were 90 days survival and good neurological situation, and the secondary outcome was return of spontaneous circulation (ROSC). In this study, good neurological situation was defined as 1 and 2 in cerebral performance categories (CPC). Statistical significance was set at $p < 0.05$.

Table 1 Characteristics of the patients.

	L group (N=5227)	H group (N=3631)	p
Age (year old)	66±18	85±7	<0.01
Gender; Male {N (%)}	3701 (70.8)	1796 (49.5)	<0.01
Witnessed {N (%)}	2292 (43.8)	1383 (38.1)	<0.01
Citizen CPR {N (%)}	2026 (38.8)	1672 (46.0)	<0.01
Shockable rhythm as initial rhythm {N (%)}	775 (16.3)	143 (4.2)	<0.01
Defibrillation before arrival {N (%)}	1028 (19.7)	255 (7.0)	<0.01
Establishment of intravenous line {N (%)} :IL	1901 (36.4)	1371 (37.8)	0.183
Injection of adrenaline {N (%)}: IA	1268 (24.3)	909 (25.0)	0.404
Time between phone call and arrival (min): T	36±16	34±17	0.622
Tracheal intubation {N (%)}*	4032 (81.0)	2596 (71.5)	<0.01
Coronary angiography {N (%)}	670 (12.8)	81 (2.2)	<0.01
Percutaneous coronary intervention {N (%)}	321 (6.1)	38 (1.0)	<0.01
Intra-aortic balloon pumping {N (%)}	293 (5.6%)	25 (0.7%)	<0.01
Extracorporeal membrane oxygenation {N (%)}	329 (6.3)	19 (0.5)	<0.01

*Regardless of whether it was performed prehospital or after arrival

Table 2 Cox's proportional hazards analysis

	PRC	p	HR	95% CI (Lower-Upper)
Age	0.002	0.01	1.002	1.000 1.004
ECMO	0.533	<0.01	1.705	1.469 1.978
CAG	-1.518	<0.01	0.219	0.186 0.258
IA	0.053	0.04	1.055	1.002 1.110
Shockable rhythm	-0.276	<0.01	0.759	0.689 0.835
Witnessed	-0.089	<0.01	0.915	0.873 0.960

Model Chi square test : $p < 0.001$

Table 3 Logistic regression analysis

	PRC	p	OR	95% CI (Lower-Upper)
Age	-0.046	<0.01	0.955	0.949 0.961
Tracheal intubation	-0.726	<0.01	0.484	0.349 0.670
ECMO	-2.149	<0.01	0.117	0.073 0.186
CAG	3.069	<0.01	21.5	14.913 31.077
PCI	0.653	<0.01	1.922	1.305 2.831
Shockable rhythm	1.308	<0.01	3.698	2.676 5.111
T	-0.025	<0.01	0.975	0.965 0.986

Model Chi square test : $p < 0.001$, Hosmer-Lemeshow test: $p = 0.577$

Predictive accuracy 96.4%

Table 4 Secondary outcome.

ROSC {N (%)}	L group	H group	P
	1839 (35.2)	939 (25.9)	<0.01

Results: Among the 13491 patients in the OHCA Registry during the study period, 8858 patients met the study criteria (L group: 5227, H group: 3631) (Figure 1). There were no significant differences in the time between phone call and arrival at the hospital, rate of establishment of intravenous line, and rate of injection of adrenaline between the L and H groups; however, there were significant differences in other factors. Only the rate of citizen CPR was lower in the L group; however, the rates of other treatments were higher in the L group (Table 1). The primary outcomes were also better in the L group than H group {L vs. H: estimated mean survival (days) 14.2 vs. 5.4, CPC 1+2 6.5% vs. 1.4% (Figure 2). On Cox's proportional hazards analysis, the hazard ratio of age was 1.002 [95% confidence interval (CI) 1.000-1.004, $p = 0.01$] (Table 2). On logistic regression analysis to predict good neurological outcome, the odds ratio of age was 0.955 (95%CI 0.949-0.961, $p < 0.01$) (Table 3). The rate of ROSC was significantly higher in the L group (L vs. H: 35.2% vs. 25.9%, Table 4).

Conclusion : We found that the HR and OR of aging is not so bad in patients with OHCA. However, elderly patients over 80 years of age were less likely to be treated by invasive procedures.

Figure 2

Abbreviations: CPR, cardiopulmonary resuscitation; PRC, partial regression coefficient; CI, confidence interval; HR, hazard ratio; ECMO, extracorporeal membrane oxygenation; CAG, coronary angiography; PCI; percutaneous coronary intervention, IA, injection of adrenaline before arrival; OR, odds ratio; T, time between phone call and arrival at hospital