

An Interaction Effect Analysis of Thermodilution-Guided Hemodynamic Optimization, Patient Condition, and Mortality after Successful Cardiopulmonary Resuscitation

Supplementary material

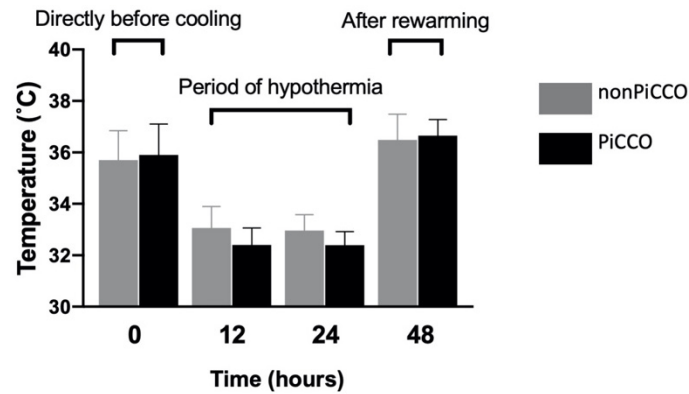


Figure S1. Changes of temperature during target temperature management in PiCCO™ and nonPiCCO™ groups.

0: initiation of cooling; 12: 12th hour of hypothermia; 24: 24th hour of hypothermia; 48: 48 hours after the initiation of cooling. Values are presented as median with interquartile range.

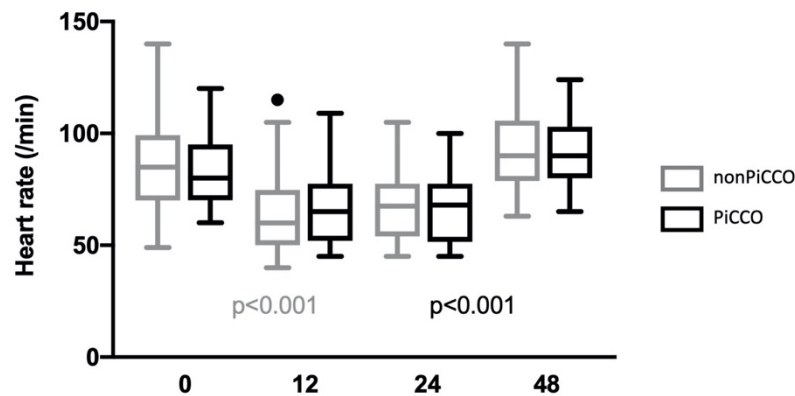


Figure S2. Changes of heart rate during target temperature management in PiCCO™ and nonPiCCO™ groups.

0: initiation of cooling; 12: 12th hour of hypothermia; 24: 24th hour of hypothermia; 48: 48 hours after the initiation of cooling. P values show the changes of heart rate during TTM within nonPiCCO™ (grey) and PiCCO™ (black) group (Friedman test). Mann-Whitney test was performed to compare PiCCO™ and nonPiCCO™ groups. Box-Whisker plot: Values are presented as Box-Whisker plot by Tukey method.

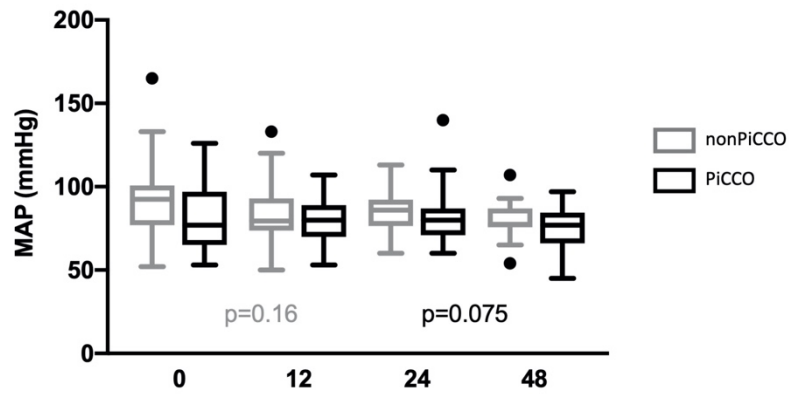


Figure S3. Changes of mean arterial pressure (MAP) during target temperature management in PiCCOTM and nonPiCCOTM groups.

0: initiation of cooling; 12: 12th hour of hypothermia; 24: 24th hour of hypothermia; 48: 48 hours after the initiation of cooling. P values show the changes of MAP during TTM within nonPiCCOTM (grey) and PiCCOTM (black) group (Friedman test). Mann-Whitney test was performed to compare PiCCOTM and nonPiCCOTM groups. Box-Whisker plot: Values are presented as Box-Whisker plot by Tukey method.

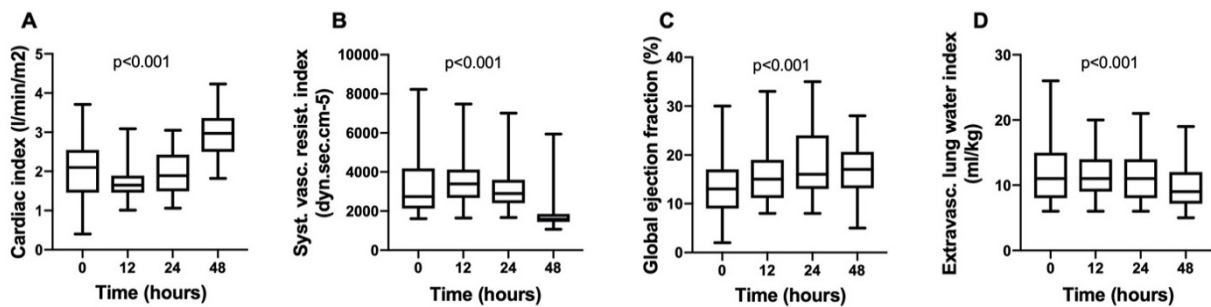


Figure S4. Changes of cardiac index, systemic vascular resistance index, global ejection fraction and extravascular lung water index during target temperature management in PiCCOTM group.

0: initiation of cooling; 12: 12th hour of hypothermia; 24: 24th hour of hypothermia; 48: 48 hours after the initiation of cooling. P values show the changes of hemodynamic parameters during the different phases of target temperature management (Friedman test).

Box-Whisker plot: the box extends from the 25 to 75 percentile and interprets median, while the whiskers show minimum and maximum values.

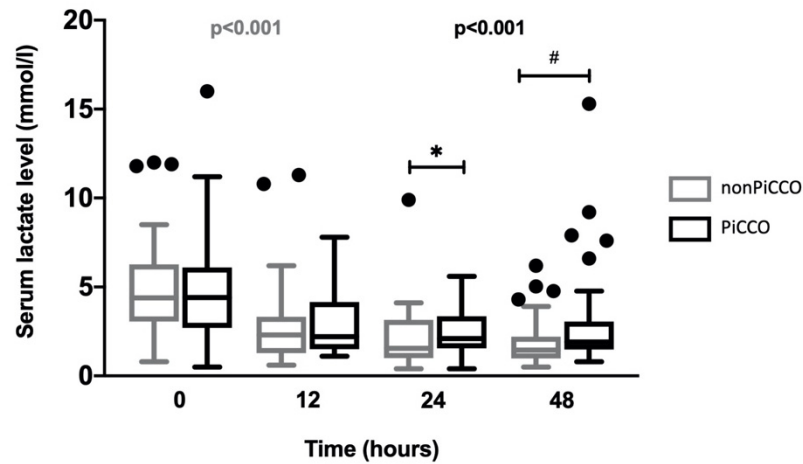


Figure S5. Changes of serum lactate level during target temperature management in PiCCO™ and nonPiCCO™ groups.

0: initiation of cooling; 12: 12th hour of hypothermia; 24: 24th hour of hypothermia; 48: 48 hours after the initiation of cooling. P values show the changes of serum lactate level during TTM within nonPiCCO™ (grey) and PiCCO™ (black) group (Friedman test). Values are presented as Box-Whisker plot by Tukey method. Mann-Whitney test was performed to compare PiCCO™ and nonPiCCO™ groups (*: $p < 0.05$; #: $p > 0.05$ and < 0.2).

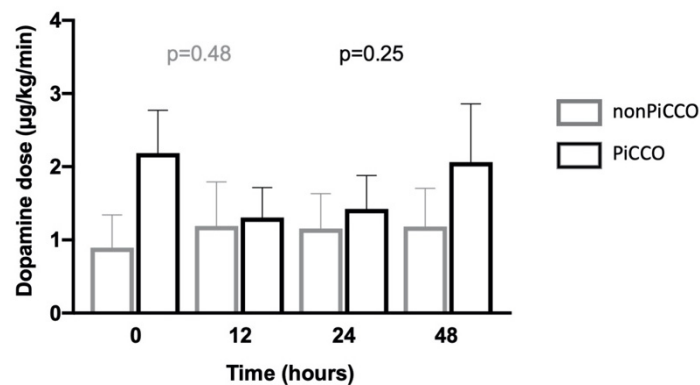


Figure S6. Changes of dopamine dosage during target temperature management in PiCCO™ and nonPiCCO™ groups.

0: initiation of cooling; 12: 12th hour of hypothermia; 24: 24th hour of hypothermia; 48: 48 hours after the initiation of cooling. P values show the changes of dopamine doses during TTM within nonPiCCO™ (grey) and PiCCO™ (black) group (Friedman test). Values are presented as mean and standard error of mean. Mann-Whitney test was performed to compare PiCCO™ and nonPiCCO™ groups.

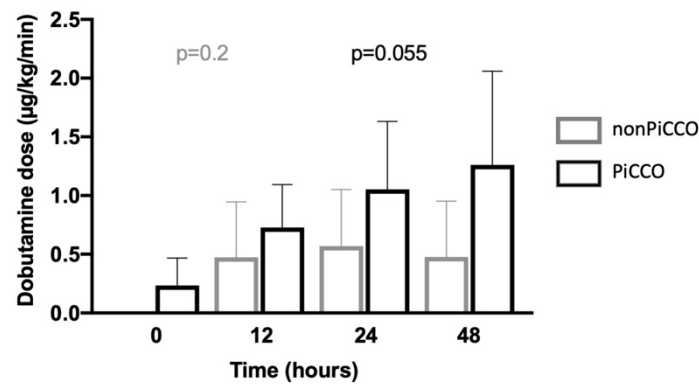


Figure S7. Changes of dobutamine dosage during target temperature management in PiCCO™ and nonPiCCO™ groups.

0: initiation of cooling; 12: 12th hour of hypothermia; 24: 24th hour of hypothermia; 48: 48 hours after the initiation of cooling. P values show the changes of dobutamine doses during TTM within nonPiCCO™ (grey) and PiCCO™ (black) group (Friedman test). Values are presented as mean and standard error of mean. Mann-Whitney test was performed to compare PiCCO™ and nonPiCCO™ groups.

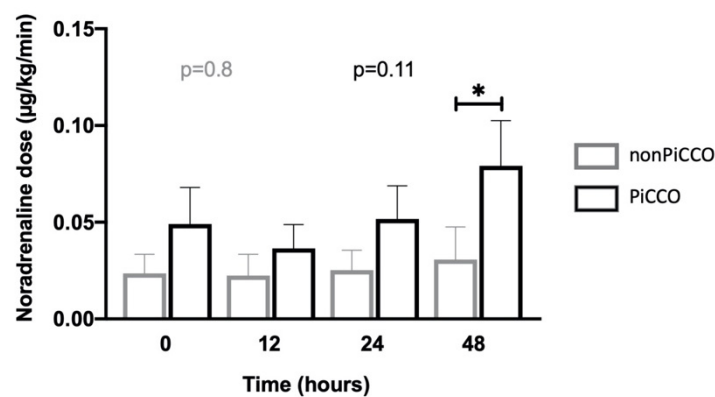


Figure S8. Changes of noradrenaline dosage level during target temperature management in PiCCO™ and nonPiCCO™ groups.

0: initiation of cooling; 12: 12th hour of hypothermia; 24: 24th hour of hypothermia; 48: 48 hours after the initiation of cooling. P values show the changes of noradrenaline doses during TTM within nonPiCCO™ (grey) and PiCCO™ (black) group (Friedman test). Values are presented as mean and standard error of mean. Mann-Whitney test was performed to compare PiCCO™ and nonPiCCO™ groups (*: $p < 0.05$).

Table S1. Characteristics of patients and initial therapy regarding PiCCO® use, 30 day and 1 year mortality.

	Total n (%) or Median (IQR)	nonPiCCO Group n (%) or Median (IQR)	PiCCO Group n (%) or Median (IQR)	<i>p</i>	Alive at 30d n (%) or Median (IQR)	Died at 30d n (%) or Median (IQR)	<i>p</i>	Alive at 1y n (%) or Median (IQR)	Died at 1y n (%) or Median (IQR)	<i>p</i>
Total	63 (100%)	30 (100%)	33 (100%)		39 (100%)	24 (100%)		27 (100%)	36 (100%)	
Age	64 (56, 69)	64 (56, 71)	65 (56, 69)	1.000	64 (56, 71)	65 (55, 69)	0.773	64 (53, 70)	65 (57, 69)	0.576
Gender (female in %)	19 (30%)	13 (43%)	6 (18%)	0.030	27 (69%)	17 (71%)	0.893	19 (70%)	25 (69%)	0.937
IHCA	11 (17 %)	2 (7%)	9 (27%)	0.030	6 (15%)	5 (21%)	0.409	5 (19%)	6 (17%)	0.553
<i>Prior history:</i>										
HT	45 (71%)	15 (50 %)	30 (91%)	>0.001	26 (67%)	19 (79%)	0.219	20 (74%)	25 (69%)	0.687
DM	18 (29%)	8 (27%)	10 (30%)	0.750	13 (33%)	5 (21%)	0.219	8 (30%)	10 (28%)	0.872
HLP	30 (48%)	11 (37%)	19 (58%)	0.100	15 (38%)	15 (63%)	0.064	11 (41%)	19 (53%)	0.344
AMI	15 (24%)	5 (17%)	10 (30%)	0.170	9 (23%)	6 (25%)	0.862	5 (19%)	10 (28%)	0.55
Stroke	6 (10%)	0 (0%)	6 (18%)	0.016	6 (15%)	0 (0%)	0.048	3 (11%)	3 (8%)	1.000
<i>Circumstances of CPR:</i>										
Patient on monitor when collapsed	9 (14%)	2 (7%)	7 (21%)	0.090	5 (13%)	4 (17%)	0.470	2 (7%)	7 (19%)	0.279
BLS performed by bystanders	49 (78%)	23 (77%)	26 (79%)	0.840	33 (85%)	16 (67%)	0.096	24 (89%)	25 (69%)	0.077
Time to ROSC (minutes)	20 (15, 30)	20 (11, 30)	20 (16, 33)	0.770	20 (12, 30)	20 (18, 34)	0.173	17 (11, 30)	20 (20, 34)	0.056
<i>Initial rhythm:</i>										
VF	42 (67%)	20 (67%)	22 (67%)	1.000	30 (77%)	12 (50%)	0.028	23 (85%)	19 (53%)	0.008
VT	2 (3%)	0 (0%)	2 (6%)	0.270	1 (3%)	1 (4%)	0.620	0 (0%)	2 (6%)	0.502
PEA	10 (16%)	6 (20%)	4 (12%)	0.300	6 (15%)	4 (17%)	0.579	3 (11%)	7 (19%)	0.494

Asy	9 (14%)	4 (13%)	5 (15%)	0.560	2 (5%)	7 (29%)	0.012	1 (4%)	8 (22%)	0.066
<i>Cause of cardiac arrest</i>										
Rate of STEMI	38 (60%)	14 (47%)	24 (73%)	0.035	26 (67%)	12 (50%)	0.189	19 (70%)	19 (53%)	0.158
Rate of NSTEMI	8 (13%)	5 (17%)	3 (9%)	0.300	5 (13%)	3 (13%)	0.645	3 (11%)	5 (14%)	1.000
<i>Cardiac condition after ROSC</i>										
Rate of cardiogenic shock (clinical signs)	14 (22%)	4 (13%)	10 (30%)	0.090	4 (10%)	10 (42%)	0.005	1 (4%)	13 (36%)	0.002
EF after ROSC (%)	36 (29, 48)	36 (30, 50)	35 (27, 45)	0.420	36 (30, 48)	36 (26, 47)	0.486	36 (29, 48)	36 (28, 47)	0.809
<i>Therapy after ROSC:</i>										
Catecholamine therapy	39 (62%)	14 (47%)	25 (76%)	0.018	18 (46%)	21 (88%)	0.001	11 (41%)	28 (78%)	0.003
Acute PCI	51 (81%)	22 (73%)	29 (88%)	0.130	34 (87%)	17 (71%)	0.109	23 (85%)	28 (78%)	0.531
Levosimendan	7 (11%)	2 (7%)	5 (15%)	0.250	4 (10%)	3 (13%)	0.543	2 (7%)	5 (14%)	0.689
IABP use	16 (25%)	3 (10%)	13 (39%)	0.007	6 (15%)	10 (42%)	0.019	3 (11%)	13 (36%)	0.039
Time to reach target temperature (hours)	3,8 (2.0, 5.1)	4.0 (2.8, 5.1)	3.8 (2.0, 5.0)	0.350	4.0 (2.5, 5.1)	3.8 (2.0, 5.1)	0.569	4.0 (3.0, 5.1)	3.8 (1.3, 5.1)	0.254

Significant differences are expressed. Mann-Whitney's U test and Chi-square test (or Fisher's exact test in cases of small sample size) are applied. Bold *p*-values: $p < 0.05$, italic *p*-values: $p < 0.2$ and $p > 0.05$. alive at 30d: patients who survived 30 days; died at 30d: patients who did not survive first 30 days after ROSC; alive at 1y: patients who survived one year; died at 1y: patients who did not survive one year after ROSC; AMI: acute myocardial infarction; Asy: asystole; BLS: basic life support; CPR: cardiopulmonary resuscitation; DM: diabetes mellitus; HLP: hyperlipidemia; HT: hypertension; IABP: intra-aortic balloon pump; IHCA: in-hospital cardiac arrest; n: number of patients; NSTEMI: non-ST segment elevation myocardial infarction; OHCA: out-of-hospital cardiac arrest; PCI: percutaneous coronary intervention; PEA: pulseless electrical activity; PiCCO: Pulse index Continuous Cardiac Output; ROSC: return of spontaneous circulation; SD: standard deviation; STEMI: ST segment elevation myocardial infarction; VF: ventricular fibrillation; VT: ventricular tachycardia.