Supplementary

Table S1. Characteristics of excluded patients due to missing values for blood gas analysis.

	Total	Favorable neurological outcome	Poor neurological outcome	
	N (%)	N (%)	N (%)	p–value
Total	3,317	177	3,140	
Sex, female	2,076 (62.6)	143 (80.8)	1,933 (61.6)	<0.01
Age, year				<0.01
18–49	447 (13.5)	69 (39.0)	378 (12.0)	
50–59	508 (15.3)	47 (26.6)	461 (14.7)	
60–69	557 (16.8)	40 (22.6)	517 (16.5)	
70–79	882 (26.6)	17 (9.6)	865 (27.5)	
80–120	923 (27.8)	4 (2.3)	919 (29.3)	
Median (IQR)	72 (57-81)	54 (45-64)	73 (59-81)	<0.01
Past medical history				
Diabetes mellitus	788 (23.8)	24 (13.6)	764 (24.3)	<0.01
Hypertension	1,323 (39.9)	64 (36.2)	1,259 (40.1)	0.30
Dyslipidemia	155 (4.7)	11 (6.2)	144 (4.6)	0.32
Residence of patient				<0.01
Metropolitan	942 (28.4)	19 (10.7)	923 (29.4)	
Place of arrest				<0.01
Public	832 (25.1)	87 (49.2)	745 (23.7)	
Private	2,123 (64.0)	56 (31.6)	2,067 (65.8)	
Others	362 (10.9)	34 (19.2)	328 (10.4)	
Witnessed	1,836 (55.4)	154 (87.0)	1,682 (53.6)	<0.01
Bystander CPR	1,643 (49.5)	113 (63.8)	1,530 (48.7)	<0.01
Bystander defibrillation	20 (0.6)	5 (2.8)	15 (0.5)	<0.01
Initial shockable rhythm at the scene	525 (15.8)	135 (76.3)	390 (12.4)	<0.01
EMS time, minutes				
Response time interval, median (IQR)	7 (6–10)	7 (5–10)	8 (6–10)	<0.01
Scene time interval, median (IQR)	12 (8–18)	10 (6–13)	12 (8–19)	<0.01

Transport time interval, median (IQR)	9 (6–14)	11 (8–18)	9 (6–13)	<0.01
Prehospital treatment				
EMS defibrillation	768 (23.2)	143 (80.8)	625 (19.9)	<0.01
Mechanical CPR device	236 (7.1)	4 (2.3)	232 (7.4)	<0.01
Epinephrine	451 (13.6)	6 (3.4)	445 (14.2)	<0.01
Prehospital ROSC	298 (9.0)	153 (86.4)	145 (4.6)	<0.01
Post–resuscitation care				
TTM	158 (4.8)	42 (23.7)	116 (3.7)	<0.01
Reperfusion therapy	251 (7.6)	123 (69.5)	128 (4.1)	<0.01
ECMO	11 (0.3)	0 (0.0)	11 (0.4)	0.40
Survival to discharge	248 (7.5)	-	-	
Favorable neurological outcome	177 (5.3)	-	-	

Abbreviations: IQR, interquartile range; CPR, cardiopulmonary resuscitation; EMS, emergency medical services; ROSC, return of spontaneous circulation; TTM, targeted temperature management; ECMO, extracorporeal membrane oxygenation.

Table S2. Characteristics of external validation cohort population.

	Total	Favorable neurological outcome	Poor neurological outcome	
	N (%)	N (%)	N (%)	p–value
Total	3,528	289	3,239	
Sex, female	2,344 (66.4)	234 (81.0)	2,110 (65.1)	<0.01
Age, year				<0.01
18–49	494 (14.0)	105 (36.3)	389 (12.0)	
50–59	587 (16.6)	90 (31.1)	497 (15.3)	
60–69	663 (18.8)	58 (20.1)	605 (18.7)	
70–79	880 (24.9)	27 (9.3)	853 (26.3)	
80–120	904 (25.6)	9 (3.1)	895 (27.6)	
Median (IQR)	70 (57–80)	54 (47–63)	71 (58–80)	<0.01
Past medical history				
Diabetes mellitus	924 (26.2)	50 (17.3)	874 (27.0)	<0.01
Hypertension	1,397 (39.6)	100 (34.6)	1,297 (40.0)	0.04
Dyslipidemia	141 (4.0)	28 (9.7)	113 (3.5)	<0.01
Residence of patient				0.66
Metropolitan	992 (28.1)	78 (27.0)	914 (28.2)	
Place of arrest				<0.01
Public	848 (24.0)	114 (39.4)	734 (22.7)	
Private	2,143 (60.7)	112 (38.8)	2,031 (62.7)	
Others	537 (15.2)	63 (21.8)	474 (14.6)	
Witnessed	2,055 (58.2)	229 (79.2)	1,826 (56.4)	<0.01
Bystander CPR	1,754 (49.7)	179 (61.9)	1,575 (48.6)	<0.01
Bystander defibrillation	43 (1.2)	19 (6.6)	24 (0.7)	<0.01
Initial shockable rhythm at the scene	645 (18.3)	211 (73.0)	434 (13.4)	<0.01
EMS time, minutes				
Response time interval, median (IQR)	7.5 (6–10)	7 (5–9)	8 (6–10)	<0.01
Scene time interval, median (IQR)	13 (9–18)	10 (7–16)	13 (9–18)	<0.01
Transport time interval, median (IQR)	10 (6–14)	12 (7–17)	9 (6–13)	<0.01
Prehospital treatment				
EMS defibrillation	861 (24.4)	227 (78.5)	634 (19.6)	<0.01
Mechanical CPR device	316 (9.0)	6 (2.1)	310 (9.6)	<0.01
Epinephrine	542 (15.4)	19 (6.6)	523 (16.1)	<0.01
Prehospital ROSC	433 (12.3)	207 (71.6)	226 (7.0)	<0.01
Initial blood gas analysis				
pH, median (IQR)	6.93 (6.8.–7.09)	7.27 (7.16–7.34)	6.91 (6.80–7.04)	<0.01
pCO2, median (IQR)	75.8 (51.4–98.7)	37.9 (32.3–46.1)	78.7 (56.0–101.0)	<0.01

pO2, median (IQR)	44.0 (21.6–77.3)	87.4 (63.6–144.0)	40.5 (20.6–71.0)	<0.01
lactate, median (IQR)	13.7 (9.9–16.4)	5.3 (2.4–10.2)	14.6 (10.5–17.0)	<0.01
Post–resuscitation care				
TTM	301 (8.5)	85 (29.4)	216 (6.7)	<0.01
Reperfusion therapy	433 (12.3)	207 (71.6)	226 (7.0)	<0.01
ECMO	78 (2.2)	6 (2.1)	72 (2.2)	0.03
Survival to discharge	450 (12.8)	-	-	
Favorable neurological outcome	289 (8.2)	-	-	

Abbreviations: IQR, interquartile range; CPR, cardiopulmonary resuscitation; EMS, emergency medical services; ROSC, return of spontaneous circulation; TTM, targeted temperature management; ECMO, extracorporeal membrane oxygenation.

Table S3. Comparison of blood gas analysis components between before and after multiple imputation for the external validation cohort.

Parameter	Before imputation Median (IQR)	After imputation Median (IQR)	Imputation, N (%)
pH	6.93 (6.80–7.09)	6.93 (6.80–7.08)	246 (3.0)
pCO2, mmHg	72.1 (48.1–96.3)	76.7 (52.2–99.8)	255 (3.1)
pO2, mmHg	48.2 (23.3–82.7)	44.7 (21.0–79.5)	287 (3.5)
Lactate, mmol/L	11.8 (8.3–15.0)	13.6 (6.8–20.0)	3,263 (39.6)

Abbreviations: IQR, interquartile range.