

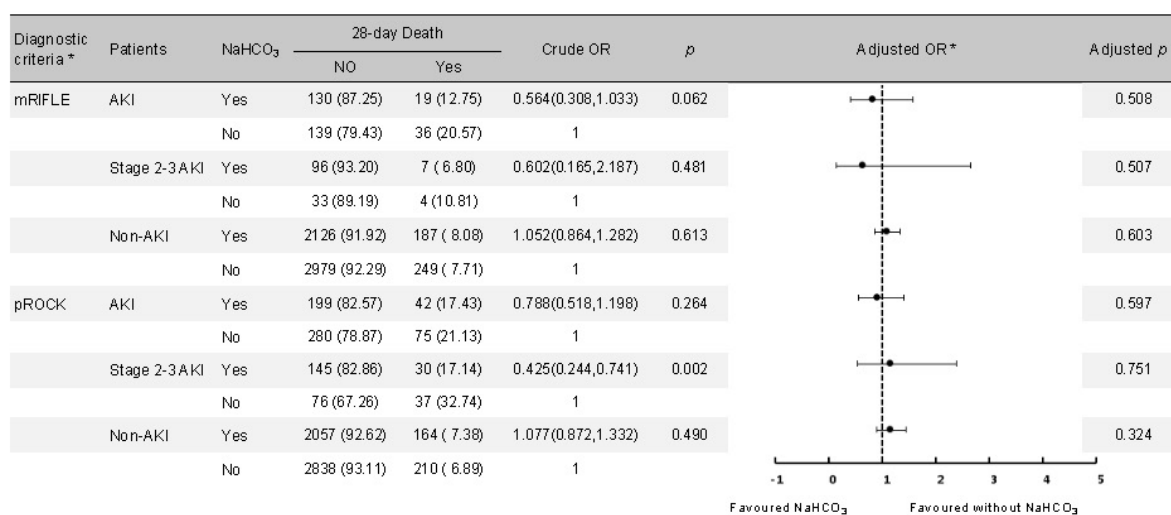


Figure S1 Risk of 28-day death for children with sodium bicarbonate therapy stratified by AKI. *, a binary logistic multivariate regression model was used with death as the dependent variable, adjusted for factors such as age, sepsis, pneumonia, meningoen­cephalitis, disease diagnosis, grade of metabolic acidosis, HCO₃⁻, Ca₂⁺, K⁺, Cl⁻, Na⁺, PaCO₂, lactate, total bilirubin, triglyceride, total protein, hemoglobin, red blood cell, and white blood cell, as applicable. AKI, acute kidney injury; HCO₃⁻, bicarbonate; mRIFLE, modified RIFLE; NaHCO₃, sodium bicarbonate; OR, odds ratio (28-day death for children treated with sodium bicarbonate as compared to those without); PaCO₂, arterial partial pressure of carbon dioxide; pROCK, pediatric reference change value optimized for AKI; RIFLE, Risk, Injury, Failure, Loss, and End-Stage Kidney Disease.

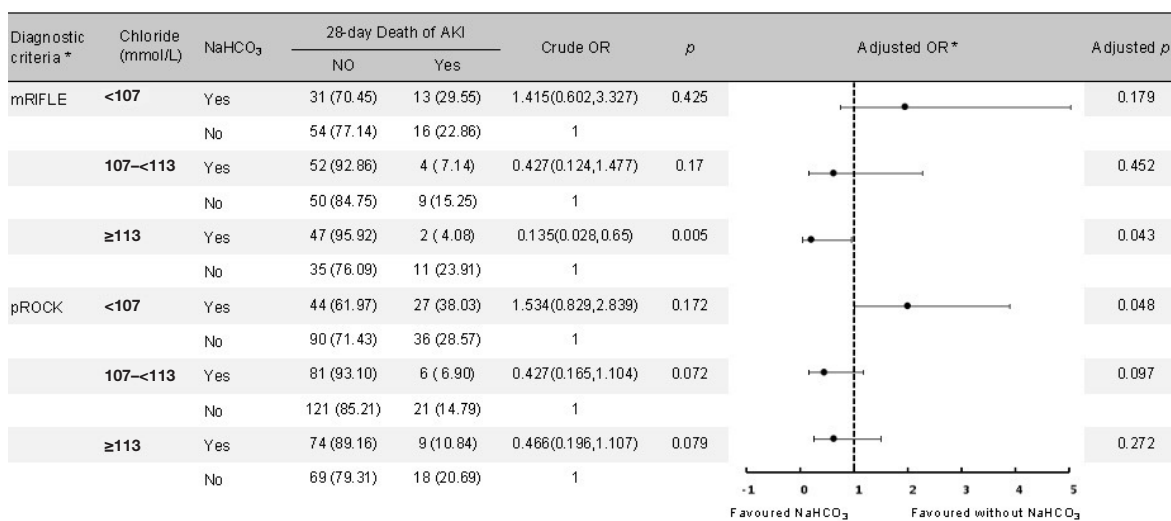


Figure S2 Risk of 28-day death for AKI children with sodium bicarbonate therapy stratified by chloride level. *, a binary logistic multivariate regression model was used with death as the dependent variable, adjusted for factors such as age, sepsis, pneumonia, meningoen­cephalitis, disease diagnosis, grade of metabolic acidosis, HCO₃⁻, Ca₂⁺, K⁺, Cl⁻, Na⁺, PaCO₂, lactate, total bilirubin, triglyceride, total protein, hemoglobin, red blood cell, and white blood cell, as applicable. AKI, acute kidney injury; HCO₃⁻, bicarbonate; mRIFLE, modified RIFLE; NaHCO₃, sodium bicarbonate; OR, odds ratio (28-day death for AKI children treated with sodium bicarbonate as compared to those without); PaCO₂, arterial partial pressure of carbon dioxide; pROCK, pediatric reference change value optimized for AKI; RIFLE, Risk, Injury, Failure, Loss, and End-Stage Kidney Disease.

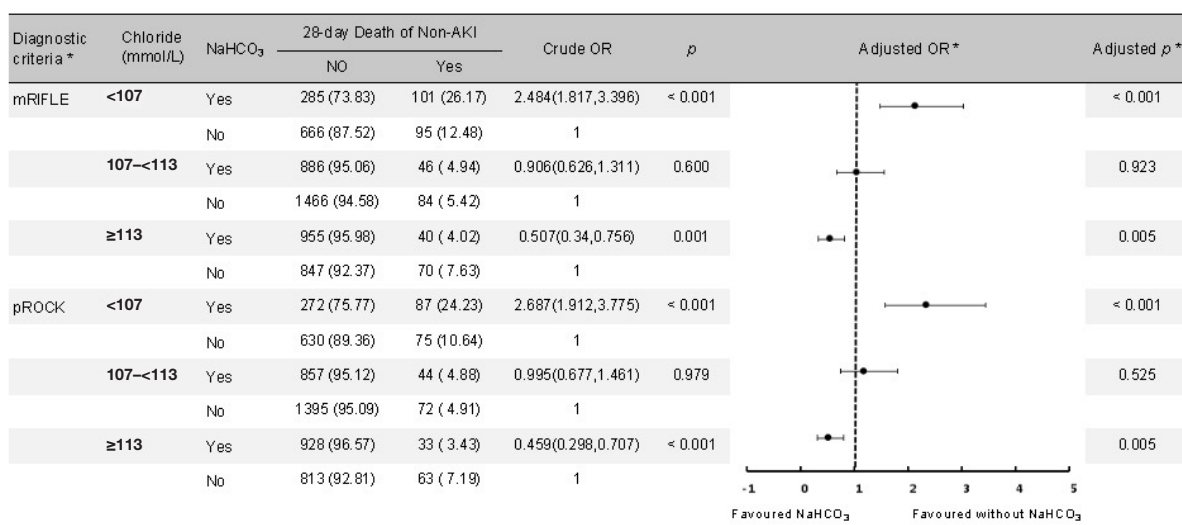


Figure S3 Risk of 28-day death for non-AKI children with sodium bicarbonate therapy stratified by chloride level. *, a binary logistic multivariate regression model was used with death as the dependent variable, adjusted for factors such as age, sepsis, pneumonia, meningoencephalitis, disease diagnosis, grade of metabolic acidosis, HCO_3^- , Ca_2^+ , K^+ , Cl^- , Na^+ , PaCO_2 , lactate, total bilirubin, triglyceride, total protein, hemoglobin, red blood cell, and white blood cell, as applicable. AKI, acute kidney injury; HCO_3^- , bicarbonate; mRIFLE, modified RIFLE; NaHCO_3 , sodium bicarbonate; OR, odds ratio (28-day death for non-AKI children treated with sodium bicarbonate as compared to those without); PaCO_2 , arterial partial pressure of carbon dioxide; pROCK, pediatric reference change value optimized for AKI; RIFLE, Risk, Injury, Failure, Loss, and End-Stage Kidney Disease.

Table S1 Characteristics of AKI (mRIFLE criteria) children treated with sodium bicarbonate or not

Variables	NaHCO ₃ (n=249)	Without NaHCO ₃ (n=175)	P
Male	100 (67.11)	102 (58.29)	0.102
Age (days)	672.0 (167.6, 2,574.6)	250.8 (3.5, 1,154.2)	<0.001
Blood/immune disease	10 (6.71)	3 (1.71)	0.022
Circulation system disease	7 (4.70)	19 (10.86)	0.042
Digestive system disease	12 (8.05)	24 (13.71)	0.106
Genitourinary disease	63 (42.28)	6 (3.43)	<0.001
Congenital disease	16 (10.74)	31 (17.71)	0.076
Mental disorder	6 (4.03)	12 (6.86)	0.268
Musculoskeletal and hoof disorder	13 (8.72)	2 (1.14)	0.001
Perinatal disorder	3 (2.01)	31 (17.71)	<0.001
Tumor	13 (8.72)	4 (2.29)	0.010
Injury or poisoning	8 (5.37)	21 (12.00)	0.037
Sepsis	4 (2.68)	11 (6.29)	0.124
Pneumonia	7 (4.70)	10 (5.71)	0.683
Meningoencephalitis	4 (2.68)	9 (5.14)	0.261
Surgery	28 (18.79)	51 (29.14)	0.031
Grade of metabolic acidosis			0.075
Mild	86 (57.72)	89 (50.86)	
Moderate	52 (34.90)	59 (33.71)	
Severe	11 (7.38)	27 (15.43)	
pH	7.27±0.10	7.24±0.13	0.024
HCO ₃ ⁻ (mmol/L)	17.12±3.83	16.89±4.36	0.929
Ca ²⁺ (mmol/L)	2.21±0.37	2.07±0.37	<0.001
Cl ⁻ (mmol/L)	109.64±7.36	108.30±7.96	0.030
K ⁺ (mmol/L)	4.01±0.91	4.01±1.13	0.597
Na ⁺ (mmol/L)	137.16±7.15	136.66±8.79	0.211
Lactate (mmol/L)	3.47±4.00	4.89±5.39	0.003
PaCO ₂ (mmHg)	38.55±11.12	40.43±13.61	0.268
Total bilirubin (μmol/L)	9.30 (5.20, 21.00)	13.20 (5.90, 57.00)	0.001
Triglyceride (mmol/L)	1.27 (0.79, 1.89)	0.93 (0.58, 1.61)	0.001
Total protein (g/L)	58 (50.20, 66.6)	70 (19.7, 89.8)	<0.001
Hemoglobin (g/L)	113.0 (97.0, 128.0)	116.0 (100.0, 142.0)	0.046
Platelet (×10 ⁹ /L)	277.0 (160.0, 361.0)	232.0 (158.0, 334.0)	0.113
Red blood cell (×10 ¹² /L)	4.26 (3.32, 4.69)	4.11 (3.23, 4.70)	0.629
White blood cell (×10 ⁹ /L)	8.86 (6.37, 12.77)	11.66 (7.10, 17.96)	0.003

Data are presented as n (%), median (IQR), or mean ± SD. AKI, acute kidney injury; HCO₃⁻, bicarbonate; IQR, interquartile range; mRIFLE, modified RIFLE; NaHCO₃, sodium bicarbonate; PaCO₂, arterial partial pressure of carbon dioxide; RIFLE, Risk, Injury, Failure, Loss, and End-Stage Kidney Disease; SD, standard deviation.

Table S2 Characteristics of non-AKI (mRIFLE criteria) children treated with sodium bicarbonate or not

Variables	NaHCO ₃ (n=2,313)	Without NaHCO ₃ (n=3,228)	P
Male	1,330 (57.50)	1,868 (57.87)	0.785
Age (days)	305.5 (69.1, 1,038.6)	111.9 (5.4, 646.2)	<0.001
Blood/immune disease	83 (3.59)	27 (0.84)	<0.001
Circulation system disease	213 (9.21)	295 (9.14)	0.929
Digestive system disease	343 (14.83)	352 (10.90)	<0.001
Genitourinary disease	175 (7.57)	15 (0.46)	<0.001
Congenital disease	811 (35.06)	1,143 (35.41)	0.790
Mental disorder	156 (6.74)	157 (4.86)	0.003
Musculoskeletal and hoof disorder	172 (7.44)	127 (3.93)	<0.001
Perinatal disorder	301 (13.01)	892 (27.63)	<0.001
Tumor	137 (5.92)	117 (3.62)	<0.001
Injury or poisoning	170 (7.35)	197 (6.10)	0.066
Sepsis	120 (5.19)	85 (2.63)	<0.001
Pneumonia	210 (9.08)	203 (6.29)	<0.001
Meningoencephalitis	76 (3.29)	59 (1.83)	0.001
Surgery	1,272 (54.99)	1,665 (51.58)	0.012
Grade of metabolic acidosis			<0.001
Mild	1,595 (68.96)	2,394 (74.16)	
Moderate	613 (26.50)	704 (21.81)	
Severe	105 (4.54)	130 (4.03)	
pH	7.28±0.09	7.28±0.09	0.545
HCO ₃ ⁻ (mmol/L)	18.51±3.12	18.95±2.97	<0.001
Ca ²⁺ (mmol/L)	2.29±0.28	2.26±0.29	<0.001
Cl ⁻ (mmol/L)	111.31±6.71	109.91±6.39	<0.001
K ⁺ (mmol/L)	3.89±1.14	4.01±1.38	<0.001
Na ⁺ (mmol/L)	137.44±6.69	137.14±6.30	0.001
Lactate (mmol/L)	3.29±3.55	3.44±3.67	0.001
PaCO ₂ (mmHg)	40.81±9.90	41.84±10.56	<0.001
Total bilirubin (μmol/L)	8.50 (5.20, 28.20)	13.85 (6.20, 58.35)	<0.001
Triglyceride (mmol/L)	1.04 (0.67, 1.61)	0.95 (0.57, 1.49)	<0.001
Total protein (g/L)	59.9 (51.1, 67.1)	56.50 (47.0, 65.4)	<0.001
Hemoglobin (g/L)	117.0 (102.0, 131.0)	123.0 (108.0, 144.0)	<0.001
Platelet (×10 ⁹ /L)	297.0 (208.0, 388.0)	292.0 (211.0, 380.0)	0.379
Red blood cell (×10 ¹² /L)	4.23 (3.56, 4.68)	4.28 (3.67, 4.74)	0.003
White blood cell (×10 ⁹ /L)	9.40 (6.89, 13.11)	10.32 (7.47, 14.71)	<0.001

Data are presented as n (%), median (IQR), or mean ± SD. AKI, acute kidney injury; HCO₃⁻, bicarbonate; IQR, interquartile range; mRIFLE, modified RIFLE; NaHCO₃, sodium bicarbonate; PaCO₂, arterial partial pressure of carbon dioxide; RIFLE, Risk, Injury, Failure, Loss, and End-Stage Kidney Disease; SD, standard deviation.

Table S3 Characteristics of AKI (pROCK criteria) children treated with sodium bicarbonate or not

Variables	NaHCO ₃ (n=241)	Without NaHCO ₃ (n=355)	P
Male	155 (64.32)	200 (56.34)	0.051
Age (days)	578.4 (161.5, 1,951.5)	325.3 (33.8, 1,154.2)	<0.001
Blood/immune disease	15 (6.22)	8 (2.25)	0.014
Circulation system disease	18 (7.47)	38 (10.70)	0.184
Digestive system disease	25 (10.37)	45 (12.68)	0.392
Genitourinary disease	79 (32.78)	10 (2.82)	<0.001
Congenital disease	39 (16.18)	75 (21.13)	0.132
Mental disorder	16 (6.64)	28 (7.89)	0.567
Musculoskeletal and hoof disorder	22 (9.13)	17 (4.79)	0.035
Perinatal disorder	10 (4.15)	46 (12.96)	<0.001
Tumor	23 (9.54)	12 (3.38)	0.002
Injury or poisoning	16 (6.64)	48 (13.52)	0.008
Sepsis	9 (3.73)	12 (3.38)	0.818
Pneumonia	21 (8.71)	20 (5.63)	0.145
Meningoencephalitis	12 (4.98)	18 (5.07)	0.960
Surgery	60 (24.90)	135 (38.03)	0.001
Grade of metabolic acidosis			0.531
Moderate	130 (53.94)	203 (57.18)	
Severe	90 (37.34)	117 (32.96)	
Mild	21 (8.71)	35 (9.86)	
pH	7.27±0.10	7.26±0.12	0.058
HCO ₃ ⁻ (mmol/L)	17.45±3.60	17.66±3.82	0.202
Ca ²⁺ (mmol/L)	2.23±0.32	2.14±0.31	<0.001
Cl ⁻ (mmol/L)	109.74±8.48	108.84±7.70	0.015
K ⁺ (mmol/L)	3.99±1.40	3.96±0.99	0.883
Na ⁺ (mmol/L)	136.84±8.44	137.07±8.23	0.426
Lactate (mmol/L)	3.83±4.39	4.48±4.75	0.016
PaCO ₂ (mmHg)	39.62±11.67	41.65±13.57	0.039
Total bilirubin (μmol/L)	9.1 (5.1, 22.1)	11.5 (5.9, 46.3)	0.001
Triglyceride (mmol/L)	1.22 (0.76, 1.95)	0.91 (0.58, 1.53)	<0.001
Total protein (g/L)	59.0 (50.0, 66.1)	54.5 (46.6, 62.7)	0.001
Hemoglobin (g/L)	114.0 (99.0, 128.0)	116.0 (102.0, 136.0)	0.024
Platelet (×10 ⁹ /L)	277.0 (173.0, 359.0)	251.0 (179.0, 349.0)	0.499
Red blood cell (×10 ¹² /L)	4.19 (3.40, 4.65)	4.11 (3.42, 4.66)	0.840
White blood cell (×10 ⁹ /L)	9.01 (6.41, 13.16)	11.03 (6.86, 15.90)	0.009

Data are presented as n (%), median (IQR), or mean ± SD. AKI, acute kidney injury; HCO₃⁻, bicarbonate; IQR, interquartile range; NaHCO₃, sodium bicarbonate; PaCO₂, arterial partial pressure of carbon dioxide; pROCK, pediatric reference change value optimized for AKI; SD, standard deviation.

Table S4 Characteristics of non-AKI (pROCK criteria) children treated with sodium bicarbonate or not

Variables	NaHCO ₃ (n=2,221)	Without NaHCO ₃ (n=3,048)	P
Male	1,275 (57.41)	1,770 (58.07)	0.630
Age (days)	296.9 (68.3, 1,023.6)	103.2 (4.6, 604.6)	<0.001
Blood/immune disease	78 (3.51)	22 (0.72)	<0.001
Circulation system disease	202 (9.10)	276 (9.06)	0.960
Digestive system disease	330 (14.86)	331 (10.86)	<0.001
Genitourinary disease	159 (7.16)	11 (0.36)	<0.001
Congenital disease	788 (35.48)	1,099 (36.06)	0.666
Mental disorder	146 (6.57)	141 (4.63)	0.002
Musculoskeletal and hoof disorder	163 (7.34)	112 (3.67)	<0.001
Perinatal disorder	294 (13.24)	877 (28.77)	<0.001
Tumor	127 (5.72)	109 (3.58)	<0.001
Injury or poisoning	162 (7.29)	170 (5.58)	0.011
Sepsis	115 (5.18)	84 (2.76)	<0.001
Pneumonia	196 (8.82)	193 (6.33)	0.001
Meningoencephalitis	68 (3.06)	50 (1.64)	0.001
Surgery	1,240 (55.83)	1,581 (51.87)	0.004
Grade of metabolic acidosis			<0.001
Moderate	1,551 (69.83)	2,280 (74.80)	
Severe	575 (25.89)	646 (21.19)	
Mild	95 (4.28)	122 (4.00)	
pH	7.28±0.09	7.28±0.09	0.423
HCO ₃ ⁻ (mmol/L)	18.54±3.12	18.98±2.97	<0.001
Ca ²⁺ (mmol/L)	2.29±0.29	2.26±0.30	<0.001
Cl ⁻ (mmol/L)	111.36±6.53	109.94±6.32	<0.001
K ⁺ (mmol/L)	3.89±1.09	4.02±1.41	<0.001
Na ⁺ (mmol/L)	137.49±6.50	137.12±6.21	0.001
Lactate (mmol/L)	3.24±3.47	3.40±3.65	0.002
PaCO ₂ (mmHg)	40.79±9.78	41.78±10.37	<0.001
Total bilirubin (μmol/L)	8.50 (5.20, 28.50)	14.60 (6.30, 59.65)	<0.001
Triglyceride (mmol/L)	1.04 (0.67, 1.60)	0.96 (0.57, 1.49)	<0.001
Total protein (g/L)	60.00 (51.20, 67.20)	56.45 (46.90, 65.45)	<0.001
Hemoglobin (g/L)	117.0 (102.0, 131.0)	124.0 (109.0, 145.0)	<0.001
Platelet (×10 ⁹ /L)	299.0 (210.0, 388.0)	293.0 (212.0, 381.0)	0.353
Red blood cell (×10 ¹² /L)	4.24 (3.57, 4.68)	4.29 (3.68, 4.74)	0.002
White blood cell (×10 ⁹ /L)	9.41 (6.92, 13.09)	10.32 (7.52, 14.75)	<0.001

Data are presented as n (%), median (IQR), or mean ± SD. AKI, acute kidney injury; HCO₃⁻, bicarbonate; IQR, interquartile range; NaHCO₃, sodium bicarbonate; PaCO₂, arterial partial pressure of carbon dioxide; pROCK, pediatric reference change value optimized for AKI; SD, standard deviation.

Table S5 Characteristics of 2–3 grade AKI (pROCK criteria) children treated with sodium bicarbonate or not

Variables	NaHCO ₃ (n=175)	Without NaHCO ₃ (n=113)	P
Male	110 (62.86)	69 (61.06)	0.759
Age (days)	607.5 (169.7, 2,466.8)	280.0 (13.2, 1,907.2)	0.001
Blood/immune disease	11 (6.29)	4 (3.54)	0.306
Circulation system disease	9 (5.14)	13 (11.50)	0.047
Digestive system disease	11 (6.29)	10 (8.85)	0.414
Genitourinary disease	78 (44.57)	6 (5.31)	<0.001
Congenital disease	27 (15.43)	15 (13.27)	0.613
Mental disorder	6 (3.43)	9 (7.96)	0.091
Musculoskeletal and hoof disorder	13 (7.43)	2 (1.77)	0.035
Perinatal disorder	3 (1.71)	17 (15.04)	<0.001
Tumor	13 (7.43)	2 (1.77)	0.035
Injury or poisoning	9 (5.14)	12 (10.62)	0.081
Sepsis	4 (2.29)	7 (6.19)	0.117
Pneumonia	12 (6.86)	8 (7.08)	0.942
Meningoencephalitis	4 (2.29)	7 (6.19)	0.117
Surgery	40 (22.86)	21 (18.58)	0.386
Grade of metabolic acidosis			<0.001
Moderate	98 (56.00)	37 (32.74)	
Severe	66 (37.71)	49 (43.36)	
Mild	11 (6.29)	27 (23.89)	
pH	7.27±0.10	7.23±0.15	0.010
HCO ₃ ⁻ (mmol/L)	17.48±3.69	16.17±4.64	0.043
Ca ²⁺ (mmol/L)	2.26±0.31	2.03±0.38	<0.001
Cl ⁻ (mmol/L)	109.77±7.28	107.66±9.01	0.002
K ⁺ (mmol/L)	3.98±0.87	4.03±1.07	0.832
Na ⁺ (mmol/L)	136.83±6.92	135.73±10.17	0.018
Lactate (mmol/L)	3.23±3.88	5.34±5.39	<0.001
PaCO ₂ (mmHg)	38.99±11.13	40.25±14.42	0.650
Total bilirubin (μmol/L)	8.60 (5.10, 19.80)	13.30 (5.80, 48.00)	0.002
Triglyceride (mmol/L)	1.27 (0.79, 1.98)	1.02 (0.66, 1.87)	0.050
Total protein (g/L)	59.40 (50.50, 67.10)	50.40 (42.20, 59.00)	<0.001
Hemoglobin (g/L)	114.0 (101.0, 128.0)	111.0 (90.0, 137.0)	0.696
Platelet (×10 ⁹ /L)	287.0 (183.0, 375.0)	223.0 (154.0, 314.0)	0.005
Red blood cell (×10 ¹² /L)	4.22 (3.43, 4.70)	3.80 (3.01, 4.46)	0.012
White blood cell (×10 ⁹ /L)	9.01 (6.54, 13.22)	11.46 (6.89, 16.58)	0.039

Data are presented as n (%), median (IQR), or mean ± SD. AKI, acute kidney injury; HCO₃⁻, bicarbonate; IQR, interquartile range; NaHCO₃, sodium bicarbonate; PaCO₂, arterial partial pressure of carbon dioxide; pROCK, pediatric reference change value optimized for AKI; SD, standard deviation.