

Supplementary Table 1: Baseline characteristics of patients with or without AKI in the training set (*n* = 341).

Variables	AKI (<i>n</i> = 108)	Without AKI (<i>n</i> = 233)	<i>P</i>-value
Age (years)	46.9 ± 13.6	48.5 ± 14.3	0.329
Male	75 (69.4)	150 (64.4)	0.391
Causations of AP			
Hyperlipidemia	23 (21.3)	53 (22.7)	0.889
Cholelithiasis	12 (11.1)	30 (12.9)	0.725
Full fed	21 (19.4)	47 (20.2)	0.876
Alcohol	19 (17.6)	26 (11.2)	0.122
Others	27 (25.0)	57 (24.5)	1.000
White blood cell (×10 ⁹ /L)	14.2 ± 7.1	12.6 ± 6.8	0.044
Neutrophil count (×10 ⁹ /L)	12.0 ± 6.3	10.4 ± 6.2	0.024
Monocyte (×10 ⁹ /L)	0.50 (0.33–0.79)	0.49 (0.31–0.70)	0.442
Hemoglobin (g/L)	121.8 ± 42.7	117.6 ± 35.7	0.375
Platelet (×10 ⁹ /L)	164.9 ± 106.0	200.2 ± 130.8	0.015

Total bilirubin (μmol/L)	23.1 (13.8–39.1)	16.8 (10.7–28.1)	<0.001
Albumin (g/L)	33.7 ± 14.0	35.0 ± 7.5	0.250
Creatinine (μmol/L)	190 (92–336)	72 (52–122)	<0.001
Uric acid (μmol/L)	376.1 ± 169.0	291.8 ± 165.7	<0.001
Cystatin C (mg/L)	1.8 (1.1–3.1)	0.9 (0.8–1.4)	<0.001
Amylase (IU/L)	534 (84–1104)	182 (56–780)	0.003
Lipase (IU/L)	558 (91–1215)	174 (50–878)	0.001
ALT (IU/L)	34 (16–71)	28 (16–54)	0.293
AST (IU/L)	64 (30–161)	40 (24–70)	<0.001
Troponin (ng/L)	59 (27–171)	53 (17–149)	0.161
BNP (ng/L)	1530 (410–3006)	1210 (332–2675)	0.119
CK-MB (ng/mL)	5.5 (2.7–14.2)	4.1 (1.7–11.7)	0.255
APTT (s)	42.1 ± 24.4	33.7 ± 12.4	<0.001
Prothrombin time (s)	15.9 ± 10.4	14.5 ± 5.9	0.106
Thrombin time (s)	18.6 (17.3–21.2)	17.5 (16.5–19.1)	0.003
FDP (mg/L)	4.9 ± 2.1	4.7 ± 1.9	0.392
D-dimer (mg/L)	7.7 (4.5–12.4)	4.9 (2.6–9.6)	0.019

Procalcitonin (ng/mL)	6.0 (1.4–19.3)	1.1 (0.3–3.7)	<0.001
Interleukin-6 (pg/mL)	223 (113–466)	140 (46–277)	0.069
C-reaction protein (mg/L)	188 (132–278)	155 (86–244)	0.021
Potassium (mmol/L)	4.43 ± 0.84	4.04 ± 0.78	<0.001
Calcium (mmol/L)	1.88 ± 0.31	1.93 ± 0.33	0.179
Mechanical ventilation time (h)	171 (48–450)	96 (0–263)	0.001
ICU days (days)	17 (9–30)	12 (6–23)	0.005
Hospitalized days (days)	24 (15–38)	24 (16–39)	0.695
28-day mortality	43 (39.8)	37 (15.9)	<0.001

Data are presented as *n* (%), mean ± standard deviation or median (interquartile range). AKI: Acute Kidney Injury; ALT: Alanine aminotransferase; APTT: Activated partial thromboplastin time; AST: Aspartate aminotransferase; BNP: Brain natriuretic peptide; FDP: Fibrin degradation products; ICU: Intensive care unit.

Supplementary Table 2: Univariable and multivariate logistic regression analysis in the training set.

Variables	Univariable analysis			Multivariate analysis		
	OR	95% CI	<i>P</i> -value	OR	95% CI	<i>P</i> -value
Platelet	0.997	0.995–1.000	0.017	1.000	0.997–1.002	0.685
CRP	1.002	1.000–1.004	0.021	1.001	0.999–1.004	0.269
Procalcitonin	1.035	1.018–1.051	<0.001	1.024	1.007–1.040	0.004
Ln BNP	1.201	1.023–1.410	0.025	1.010	1.005–1.031	0.013
Uric acid	1.003	1.001–1.004	<0.001	1.000	0.998–1.002	0.972
Creatinine	1.005	1.004–1.007	<0.001	1.004	1.003–1.006	<0.001
APTT	1.036	1.014–1.059	0.001	1.013	0.993–1.033	0.196
Thrombin time	1.061	1.007–1.118	0.027	1.035	0.992–1.080	0.112

APTT: Activated partial thromboplastin time; BNP: Brain natriuretic peptide; CRP: C-reaction protein.

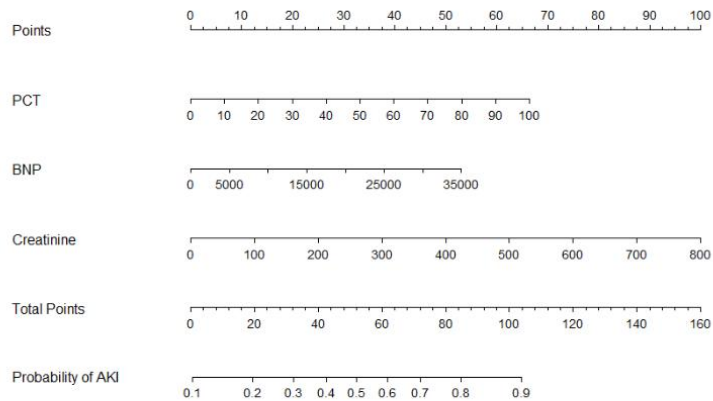
Supplementary Table 3: Comparison between machine learning models and LR model.

Items	LR	GB	RF	XGB
AUC (95% CI)	0.763	0.828	0.812	0.809
<i>P</i> [*]	Ref	0.083	0.173	0.156
NRI+	Ref	0.140	0.116	0.116
NRI-	Ref	0.201	0.125	0.115
NRI	Ref	0.341	0.241	0.231
<i>P</i> [†]	Ref	<0.001	0.024	0.013
IDI	Ref	0.084	0.064	0.049
<i>P</i> [‡]	Ref	0.015	0.024	0.041
AKI				
Upward	Ref	8	11	8
No	Ref	33	26	32
Downward	Ref	2	6	3
Without AKI				
Upward	Ref	9	8	11
No	Ref	65	75	70

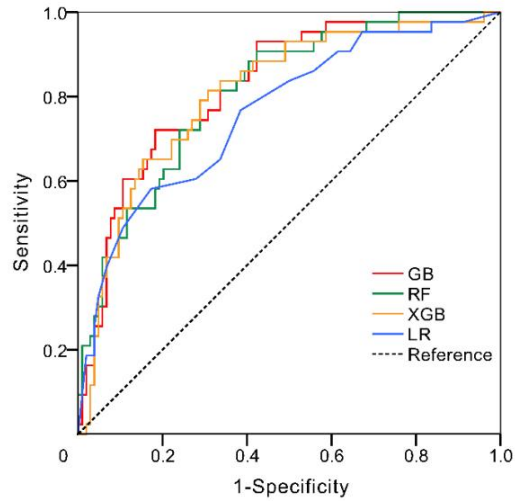
Downward Ref 30 21 23

*AUC comparison with LR model. †NRI comparison with LR model. ‡IDI comparison with LR model.

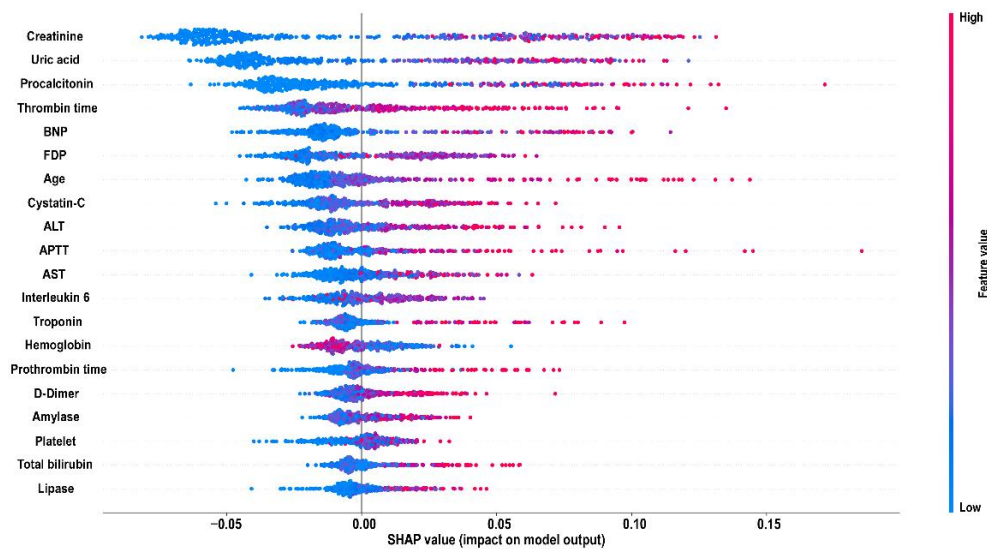
AUC: Area under the curve; AKI: Acute kidney injury; GB: Gradient boosting; IDI: Integrated discrimination improvement; LR: Logistic regression; NRI: Net reclassification index; RF: Random forest; XGB: Extreme gradient boosting.



Supplementary Figure 1: Nomogram for assessing the risk of AKI in patients with acute pancreatitis in the LR model. AKI: Acute kidney injury; BNP: Brain natriuretic peptide; LR: Logistics regression.



Supplementary Figure 2: The area of the receiver operating characteristic curve (AUC) for evaluating the discrimination performance machine learning and LR models in the testing set. GB: Gradient boosting; LR: Logistic regression; RF: Random forest; XGB: Extreme gradient boosting.



Supplementary Figure 3: The SHAP value of the top 20 important features in the GB model; a higher SHAP value represents a higher probability of AKI development. AKI: Acute Kidney Injury; ALT: Alanine aminotransferase; APTT: Activated Partial Thromboplastin Time; AST: Aspartate aminotransferase; BNP: Brain natriuretic peptide; FDP: Fibrin degradation products; GB: Gradient boosting; SHAP: SHapley additive explanations.