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Abstract

Objective: To analyze the predictive value of Renal Resistance Index (RRI) and Plasma Cystatin C (pCysC) in Pregnancy-Related Acute Kidney Injury (PR-AKI).

Methods: This study included 182 pregnant women admitted to the Intensive Care unit (ICU) between May

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RRI measurement

First, two intensivists who participated in the study were trained to determine RRI using bedside ultrasound. e instruments used were M8 Super by the Mindray Company (Shenzhen, China). Within 12 h of admission to the ICU, breathing and circulation were relatively stable a er the initial treatment. Patients were placed in the supine position, and a convex array probe was used to perform a two-dimensional ultrasound examination. Color Doppler was used in selecting the arch artery or the interlobular artery to determine the peak systolic ow velocity and the minimum diastolic ow velocity from the posterior side of the abdomen. e RRI was calculated according to the following formula: RRI=(peak systolic ow velocity-minimum diastolic ow velocity)/ peak systolic ow velocity. e average RRI of the le and right kidneys was taken as the RRI of each patient (reference range, 0.58-0.64; upper limit: 0.70). Before the start of the study, 20 ICU patients were randomly selected. Two intensivists performed RRI measurements on these patients. e results of the two measurements were compared and analyzed using SPSS version 23.0. e Intra-class Correlation Coe cient (ICC) was used to evaluate the inter-rater reliability. e ICC of this study was 0.980 [95% CL (0.951-0.992)], and

Groups	D1			D2			D3		
	Scr	pCysC	RRI	Scr	pCysC	RRI	Scr	pCysC	RRI
A	184.63 ± 27.44	1.91(1.82-2.11)	0.76(0.72-0.78)	153.25 ± 25.18	1.48(1.37-1.66)	0.7(0.65-0.72)	110 ± 11.38	1.18 ± 0.2	0.64(0.61-0.66)
B	93.12 ± 10.78	0.83(0.76-0.92)	0.63(0.6-0.68)	93.16 ± 8.11	0.84(0.78-0.91)	0.61(0.6-0.65)	90.64 ± 8.09	0.84 ± 0.12	0.61(0.6-0.64)
t/z	18.55	-8.32	-6.2	13.35	-8.04	-5.72	-11.64	8.909	-3.29
P-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table 2: Comparison of basic clinical and blood biochemical data between group A and group B after ICU admission.

Groups	Compliance rate			Increase of pCysC/RRT		
	Scr	UO	pCysC	RRI	pCysC or RRI	pCysC and RRI
	(n,%)	(n,%)	(n,%)	(n,%)	(n,%)	(n,%)
A	32(100)	11(34.4)	28(87.5)	26(81.3)	31(96.9)	23(71.9)
B	-	-	23(15.6)	34(23.1)	41(27.9)	16(10.9)
X^2	179	48.05	66.6	39.84	52.01	57.37
p-value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Table 3: Comparison of the proportion of Scr or UO reaching the diagnostic criteria of AKI and the increase in pCysC/RRI between the two groups according to D1 monitoring results.

Variables	Multivariate analysis	
	Odds ratio (95% CI)	p-value
pCysC	0.002(0,0.018)	<0.05
RRI	0.003(0,8.932)	<0.05
combination of the two	4.026(10.06,15.46)	<0.05

Table 4: Multiple logistic regression analysis of AKI related factors.

T pCysC/RRI	Sensitivity (%)	Specificity (%)	OR-value	95% CI
pCysC	87.50%	84.35%	37.739	12.091-117.792
RRI	81.25%	76.87%	0.433	0.324-0.579
combination of the two	96.88%	72.11%	80.146	10.593-606.401

Table 5: The sensitivity and specificity of D1 pCysC/RRI in the diagnosis of AKI according to D1 monitoring Scr value.

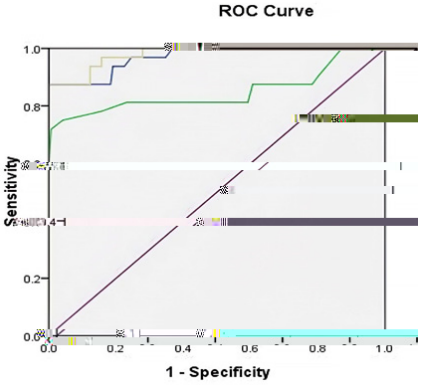

Figure 2: ROC curve of pCysC, RRI, and combined detection in the diagnosis of PR-AKI. **Note:** (——) pCysC; (——) RRI; (——) Combination; (——) [illegible]

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