

## **Combination of creatinine with inflammatory biomarkers (PCT, CRP, hsCRP) for predicting postoperative ICU admission for elderly patients**

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## Supplementary materials

**Supplementary table 1.** The incidence of complications within 30 days after surgery (n = 413).

<b>Variable</b>	<b>Value</b>
Complications $\geq$ CDC grade 3	22 (5.33%)
Major complications	120 (29.06%)
Mortality	1 (0.24%)
ICU admission	10 (2.42%)
Cardiovascular events	14 (3.39%)
AKI	7 (1.69%)
POD	10 (2.42%)
Infection	96 (23.24%)

Values are expressed as numbers (percent).

AKI, Acute kidney injury; CDC, Clavien-Dindo Classification; ICU, intensive care unit; POD, postoperative delirium.

**Supplementary table 2.** The clinical characteristics between the positive and negative patients with Complications  $\geq$  CDC grade 3.

<b>Variable</b>	<b>Positive patients (n = 22)</b>	<b>Negative patients (n = 391)</b>	<b>P value</b>
<b>Characteristics</b>			
Age (years)	71.73 $\pm$ 4.1	71.57 $\pm$ 5.2	0.364
Sex			0.175
Male	17 (77.27%)	238 (60.87%)	
Female	5 (22.73%)	153 (39.13%)	
Height (cm)	161.4 $\pm$ 6.5	160.8 $\pm$ 8.3	0.129
Weight (kg)	56.9 $\pm$ 8.7	59.8 $\pm$ 10.0	0.259
BMI	21.8 $\pm$ 2.4	23.1 $\pm$ 3.3	0.095
Current or recent smoker	3 (13.64%)	60 (15.35%)	1.000
<b>Frailty</b>			0.070
I	17 (77.27%)	334 (85.42%)	
II	3 (13.64%)	20 (5.12%)	
III	0 (0)	7 (1.79%)	
IV	1 (4.55%)	2 (0.51%)	
V	1 (4.55%)	6 (1.53%)	
VI	0 (0)	22 (5.63%)	
Hypertension			0.736
I	3 (13.64%)	51 (13.04%)	
II	4 (18.18%)	60 (15.35%)	
III	1 (4.55%)	41 (10.49%)	
Ischaemic heart disease	3 (13.64%)	25 (6.39%)	0.180
Arrhythmias	2 (9.09%)	15 (3.84%)	0.227
Valvular heart disease	0 (0)	7 (1.79%)	1.000
Diabetes mellitus	10 (45.46%)	151 (38.62%)	0.522
COPD	3 (13.64%)	11 (2.81%)	<b>0.033</b>
Cerebrovascular disease	1 (4.55%)	8 (2.05%)	0.392
<b>ASA physical status</b>			0.401
II	8 (36.36%)	178 (4.52%)	
III	14 (63.64%)	213 (54.48%)	

<b>NYHA cardiac functional class</b>			0.315
1	11 (50.00%)	239 (61.13%)	
2	10 (45.45%)	143 (36.57%)	
3	1 (4.55%)	9 (2.30%)	
<b>Motion equivalent</b>			0.213
< 3 MET	5 (22.72%)	51 (13.04%)	
3–6 MET	16 (72.73%)	277 (70.84%)	
> 6 MET	1 (4.55%)	63 (16.11%)	
<b>Type of surgery</b>			<b>&lt; 0.001</b>
Orthopedic	1 (4.55%)	72 (18.41%)	
Hepatobiliary	4 (18.18%)	112 (28.64%)	
Gastrointestinal	3 (13.64%)	149 (38.11%)	
Pancreatic	6 (27.27%)	36 (9.21%)	
Thoracic	8 (36.36%)	22 (5.63%)	
Open surgery	13 (59.09%)	276 (70.59%)	0.252
Endoscopy surgery	9 (40.91%)	115 (29.41%)	
Surgery time (min)	239 ± 101	188 ± 89	0.480
Anesthesia time (min)	309 ± 106	261 ± 102	0.722

Values are expressed as the mean ± SD or as numbers (percent).

ASA, American Society of Anesthesiologists; COPD, chronic obstructive pulmonary disease; MET, metabolic equivalent; NYHA: New York Heart Association.

**Supplementary table 3.** The comparison of preoperative PCT, CRP, hsCRP and Scr concentrations between positive and negative patients with AKI and POD.

<b>Variable</b>	<b>Positive patients</b>	<b>Negative patients</b>	<b>P value</b>
<b>AKI</b>	(n = 7)	(n = 406)	
Scr ( $\mu\text{mol L}^{-1}$ )	79.00 (66.00 to 99.00)	75.00 (63.00 to 86.00)	0.348
PCT ( $\text{ng mL}^{-1}$ )	0.05 (0.05 to 0.05)	0.05 (0.05 to 0.05)	0.898
CRP ( $\text{mg L}^{-1}$ )	2.50 (2.50 to 2.50)	2.50 (2.50 to 2.50)	0.817
hsCRP ( $\text{mg L}^{-1}$ )	1.10 (0.25 to 4.70)	1.20 (0.25 to 3.63)	0.978
Scr · PCT	3.95 (3.30 to 4.95)	3.90 (3.25 to 4.65)	0.715
Scr · CRP	227.50 (165.00 to 280.00)	202.50 (167.50 to 258.13)	0.677
Scr · hsCRP	72.60 (24.75 to 395.00)	90.00 (22.00 to 260.25)	0.742
<b>POD</b>	(n = 10)	(n = 403)	
Scr ( $\mu\text{mol L}^{-1}$ )	76.00 (63.50 to 79.50)	75.00 (63.00 to 87.00)	0.733
PCT ( $\text{ng mL}^{-1}$ )	0.05 (0.05 to 0.07)	0.05 (0.05 to 0.05)	0.416
CRP ( $\text{mg L}^{-1}$ )	2.50 (2.50 to 11.78)	2.50 (2.50 to 2.50)	0.344
hsCRP ( $\text{mg L}^{-1}$ )	2.90 (0.25 to 4.10)	1.20 (0.25 to 3.60)	0.421
Scr · PCT	3.93 (3.39 to 7.16)	3.90 (3.25 to 4.65)	0.581
Scr · CRP	192.50 (169.38 to 943.80)	202.50 (167.50 to 257.50)	0.884
Scr · hsCRP	212.10 (28.50 to 271.70)	85.80 (22.00 to 260.00)	0.480

Values are expressed as median (interquartile range).

AKI, Acute kidney injury; CRP, C-reactive protein; hsCRP, high-sensitivity C-reactive protein; PCT, procalcitonin; POD, postoperative delirium; Scr, serum creatinine.

**Supplementary table 4.** The comparisons involved preoperative concentrations of Scr, PCT, CRP, and hsCRP between patients over 75 years old who were positive and negative in terms of ICU admission, cardiovascular events, complications of CDC grade 3 or higher, major complications, or infections.

<b>Variable</b>	<b>Positive patients</b>	<b>Negative patients</b>	<b>P value</b>
<b>ICU admission</b>	(n = 5)	(n = 111)	
Scr ( $\mu\text{mol L}^{-1}$ )	91.00 (85.00, 112.50)	76.00 (65.00, 89.00)	<b>0.020</b>
PCT ( $\text{ng mL}^{-1}$ )	0.05 (0.05, 0.05)	0.05 (0.05, 0.05)	0.618
CRP ( $\text{mg L}^{-1}$ )	6.00 (2.50, 17.45)	2.50 (2.50, 2.50)	0.051
hsCRP ( $\text{mg L}^{-1}$ )	2.20 (0.25, 5.00)	1.10 (0.25, 3.50)	0.358
Scr · PCT	4.55 (4.25, 5.63)	4.00 (3.35, 4.90)	0.074
Scr · CRP	546.00 (238.75, 1518.85)	210.00 (175.00, 267.50)	<b>0.006</b>
Scr · hsCRP	200.20 (28.13, 425.00)	85.20 (24.75, 250.00)	0.162
<b>Cardiovascular events</b>	(n = 8)	(n = 108)	
Scr ( $\mu\text{mol L}^{-1}$ )	84.50 (72.25, 99.25)	76.00 (65.00, 89.75)	0.121
PCT ( $\text{ng mL}^{-1}$ )	0.05 (0.05, 0.05)	0.05 (0.05, 0.05)	0.442
CRP ( $\text{mg L}^{-1}$ )	2.50 (2.50, 5.20)	2.50 (2.50, 2.50)	0.823
hsCRP ( $\text{mg L}^{-1}$ )	1.05 (0.25, 2.50)	1.15 (0.25, 3.95)	0.634
Scr · PCT	4.23 (3.61, 4.96)	4.03 (3.35, 4.90)	0.477
Scr · CRP	230.00 (182.50, 634.38)	213.75 (175.63, 279.38)	0.410
Scr x hsCRP	89.70 (26.56, 198.40)	86.15 (25.00, 263.05)	0.994
<b>Complications <math>\geq</math> CDC grade 3</b>	(n = 6)	(n = 110)	
Scr ( $\mu\text{mol L}^{-1}$ )	99.50 (71.75, 150.50)	76.00 (65.75, 89.00)	0.059
PCT ( $\text{ng mL}^{-1}$ )	0.05 (0.05, 0.05)	0.05 (0.05, 0.05)	0.336
CRP ( $\text{mg L}^{-1}$ )	2.50 (2.50, 11.78)	2.50 (2.50, 2.50)	0.456
hsCRP ( $\text{mg L}^{-1}$ )	0.48 (0.25, 3.28)	1.20 (0.25, 3.85)	0.405
Scr · PCT	4.98 (3.59, 7.53)	4.03 (3.43, 4.81)	0.239
Scr · CRP	408.75 (216.88, 1140.68)	211.25 (175.00, 270.00)	0.089
Scr · hsCRP	83.13 (24.94, 217.93)	86.15 (25.50, 257.15)	0.965
<b>Major complications</b>	(n = 38)	(n = 78)	
Scr ( $\mu\text{mol L}^{-1}$ )	77.50 (69.75, 91.00)	77.50 (63.00, 89.25)	0.413

PCT (ng mL <sup>-1</sup> )	0.05 (0.05, 0.05)	0.05 (0.05, 0.05)	0.308
CRP (mg L <sup>-1</sup> )	2.50 (2.50, 2.50)	2.50 (2.50, 2.50)	0.748
hsCRP (mg L <sup>-1</sup> )	1.70 (0.51, 3.58)	0.95 (0.25, 4.40)	0.334
Scr · PCT	4.10 (3.49, 4.86)	4.03 (3.29, 4.96)	0.834
Scr · CRP	213.75 (175.00, 303.25)	215.00 (177.50, 286.25)	0.954
Scr · hsCRP	125.70 (38.86, 292.85)	61.60 (24.31, 238.00)	0.164
<b>Infection</b>	(n = 26)	(n = 90)	
Scr (µmol L <sup>-1</sup> )	77.50 (69.75, 90.25)	77.50 (64.75, 90.25)	0.579
PCT (ng mL <sup>-1</sup> )	0.05 (0.05, 0.05)	0.05 (0.05, 0.05)	0.882
CRP (mg L <sup>-1</sup> )	2.50 (2.50, 6.18)	2.50 (2.50, 2.50)	0.580
hsCRP (mg L <sup>-1</sup> )	1.85 (0.25, 4.25)	1.00 (0.25, 3.58)	0.338
Scr · PCT	4.13 (3.49, 4.96)	4.03 (3.35, 4.86)	0.648
Scr · CRP	221.25 (176.88, 450.38)	213.75 (175.00, 278.12)	0.566
Scr · hsCRP	124.30 (29.69, 324.15)	82.05 (24.69, 223.50)	0.212
<b>AKI</b>	(n = 5)	(n = 111)	
Scr (µmol L <sup>-1</sup> )	79.00 (67.50, 95.00)	77.00 (65.00, 90.00)	0.744
PCT (ng mL <sup>-1</sup> )	0.05 (0.05, 0.05)	0.05 (0.05, 0.05)	0.618
CRP (mg L <sup>-1</sup> )	2.50 (2.50, 15.65)	2.50 (2.50, 2.50)	0.800
hsCRP (mg L <sup>-1</sup> )	1.10 (0.43, 3.60)	1.20 (0.25, 3.80)	0.962
Scr · PCT	3.95 (3.38, 4.75)	4.05 (3.45, 4.90)	0.825
Scr · CRP	227.50 (168.75, 1261.35)	215.00 (177.50, 280.00)	0.872
Scr · hsCRP	72.60 (33.08, 297.60)	87.10 (25.00, 254.20)	0.835
<b>POCD</b>	(n = 6)	(n = 110)	
Scr (µmol L <sup>-1</sup> )	76.00 (63.50, 90.50)	78.50 (65.75, 90.25)	0.763
PCT (ng mL <sup>-1</sup> )	0.05 (0.05, 0.07)	0.05 (0.05, 0.05)	0.840
CRP (mg L <sup>-1</sup> )	2.50 (2.50, 11.78)	2.50 (2.50, 2.50)	0.456
hsCRP (mg L <sup>-1</sup> )	2.40 (0.25, 4.10)	1.10 (0.25, 3.63)	0.730
Scr · PCT	3.88 (3.18, 7.16)	4.05 (3.45, 4.90)	0.920
Scr · CRP	190.00 (158.75, 1140.68)	215.00 (176.88, 278.13)	0.791
Scr · hsCRP	176.55 (26.75, 315.35)	84.60 (24.94, 238.00)	0.664

Values are expressed as median (interquartile range).

CDC, Clavien-Dindo Classification; CRP, C-reactive protein; hsCRP, high-sensitivity C-reactive protein; ICU, intensive care unit; PCT, procalcitonin; Scr,

serum creatinine.