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Predictive value of serum albumin-to-globulin ratio for incident chronic kidney disease

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Introduction: Inflammation plays a pivotal role in the pathogenesis of chronic kidney disease (CKD). Significant association between serum albumin-to-globulin (AG) ratio and inflammation led us to investigate the prognostic value of serum AG ratio for incident CKD. Furthermore, we compared the relative discriminative value of serum AG ratio with other inflammatory markers for predicting incident CKD. **Methods:** The predictive value of serum AG ratio, white blood cell (WBC), and C-reactive protein (CRP) for CKD development was assessed in 8,057 non-CKD participants from a community-based prospective cohort. Serum AG ratio was calculated with the following equation: serum albumin (mg/dL)/[serum total protein (mg/dL)-serum albumin (mg/dL)]. **Results:** The median serum AG ratio was 1.38 (interquartile range, 1.28-1.52). During a mean follow-up duration of 9.1±3.7 years, 1,732 participants (21.5%) developed CKD. In a multivariable Cox analysis, a low serum AG ratio was significantly associated with an increased risk of incident CKD (Q1, serum AG ratio <1.26: hazard ratio [HR]=1.651, 95% confidence interval [CI]=1.406-1.938, Q5 as reference; per 1 standard deviation increase, HR=0.855, 95% CI=0.810-0.902). Serum AG ratio was the only indicator to improve the predictability of CKD development (net reclassification index, 0.158, P <0.001; integrated discrimination improvement, 0.005, P <0.001), compared with WBC or CRP. **Conclusion:** This study is the first study to demonstrate that low serum AG ratio is an independent predictor for CKD development and exhibits a stronger predictive value than other inflammatory markers. These findings suggest that determining serum AG ratio may be more valuable for predicting adverse kidney outcomes in non-CKD populations.

Keywords: chronic kidney disease; C-reactive protein; inflammation; serum albumin-to-globulin ratio; white blood cell.

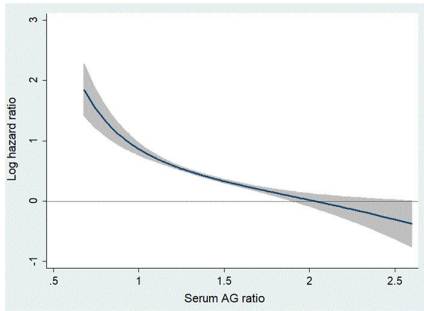

Table 3. Predictability of serum AG ratio, WBC, and CRP for CKD development using NRI and IDI

Models	NRI (SEM; 95% CI)	P	IDI (SEM; 95% CI)	P
*Base model	Reference		Reference	
Base model + AG ratio	Reference	<0.001	0.005 (0.003-0.007)	<0.001
Base model + WBC	0.041 (-0.011, 0.094)	0.13	0.001 (0, 0.001)	0.07
Base model + CRP	-0.002 (-0.050, 0.047)	0.9	0.001 (-0.001, 0.001)	0.75

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Postoperative blood transfusion predicts acute kidney injury in patients with rectal cancer.

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Background/Aims: Preoperative anemia and perioperative transfusion are associated with postoperative acute kidney injury in cardiovascular surgery, but little is known about their relationship in patients with rectal cancer surgery. Thus, we investigated whether postoperative blood transfusion may predict postoperative acute kidney injury in patients with rectal cancer. **Methods:** We collected 1328 patients who underwent rectal cancer surgery from a single-center prospective cohort between 2003 and 2017. Postoperative acute kidney injury (AKI) was determined according to the serum creatinine criteria of the Kidney Disease: Improving Global Outcomes classification. **Results:** Among 1328 patients, 134 patients (10.1%) received blood transfusions and 1194 patients (89.9%) did not receive. American Society of Anesthesiologists (ASA) score (p<0.001), preoperative hemoglobin (p<0.001), albumin (p<0.001), operation time (p<0.001), amount of intraoperative bleeding (p<0.001) showed differences in the two groups. Overall AKI incidence was 12.6% and severe AKI incidence was 1.2%. The incidence of postoperative AKI in the transfused group was significantly higher than in no blood transfusions group (10.2% vs 2.3%, p<0.001, respectively) and similar result was observed in severe AKI (1.1% vs 0.4%, p=0.007, respectively). Cox proportional hazard models revealed that the AKI incidence was different according to preoperative hemoglobin concentration (HR, 0.894; 95% 0.827-0.968; p=0.05) and transfusions (HR, 2.692; 95% 1.822-3.976; p<0.001). But, there was no difference in perioperative changes in hemoglobin. Two of category of preoperative hemoglobin concentrations (> 12 and 10.1-12.0) were associated with a risk of postoperative AKI, whether patients was received transfusions or not (OR, 3.676; 95% 1.703-7.933; p=0.01 and OR, 2.589; 95% 1.209-5.545; p=0.014, respectively). **Conclusions:** This study showed that postoperative blood transfusions may increase postoperative AKI in patients with rectal cancer. It is also possible that close monitoring of blood transfusions after surgery may improve AKI outcomes in patients with rectal cancer.

	No Transfusion	Transfusion	P-value
Total=1328	**N=1194**	**N=134**	
Intrinsic			
Age, y	61.7 (12.2)	61.7 (12.1)	0.998
SEX			0.723
Male, n (%)	767 (64.2%)	84 (62.7%)	
Female, n (%)	427 (35.8%)	50 (37.3%)	
BMI			0.175
≤25	333 (27.9%)	30 (22.4%)	
>25	861 (72.1%)	104 (77.6%)	
ASA grade			<0.001
I	431 (36.1%)	32 (23.9%)	
II	702 (58.8%)	83 (61.9%)	
III-IV	61 (5.1 %)	19 (14.2%)	
Hypertension, n (%)	264 (22.1%)	27 (20.1%)	0.603
Diagebtes mellitus, n (%)	131 (11.0%)	13 (9.7%)	0.654
Clinical classification, n (%)			<0.001
Stage I	341 (28.6%)	14 (10.4%)	
Stage II	335 (28.0%)	40 (29.9%)	
Stage III	371 (31.1%)	43 (32.1%)	
Stage IV	147 (12.3%)	37 (37.6%)	
Preoperative CTx, n (%)	469 (39.3%)	56 (41.8%)	0.657
Drug use, n (%)	703 (58.9%)	72 (53.7%)	0.252
Preoperative			
Baseline Cr (mg/dL)	0.8 (0.2)	0.8 (0.2)	0.240
Preoperative Hemoglobin (g/dL)	13.1 (1.8)	10.9 (2.0)	<0.001
Albumin (g/dL)	4.1 (0.4)	3.7 (0.6)	<0.001
Intraoperative			
Operation time (min)	238.3 (95.0)	307.0 (139.5)	<0.001
Intraoperative bleeding (ml)	207.2 (294.9)	498.4 (749.5)	<0.001
Laparoscopy-assisted surgery, n (%)	802 (67.2%)	52 (38.8%)	<0.001