Association of Serum Anion Gap and Risk of Long-term Mortality in Patients Following Coronary Artery Bypass Grafting: A Propensity Score Matching Study

Xiaochun Ma[1], Diming Zhao[1], Yi Li[1], JunJie Huang[2], Zheng Zheng[2], Xiangxi Zhang[2], Yilin Liu[2], Huibo Ma[3], Feng Ji[4], Yan Yun[5], Congshan Ji[2], Zhenqiang Xu[2], Xiaomei Yang[2], Hechen Shen[1], Shanghao Chen[1], Shijie Zhang[1], Haizhou Zhang[1], and Chengwei Zou[1]

[1]Shandong University Cheeloo College of Medicine
[2]Shandong Provincial Hospital
[3]The Affiliated Hospital of Qingdao University
[4]Dongying City PPL's Hospital Dongying 257000 Shandong China
[5]Qilu Hospital of Shandong University

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Abstract

Background: The present study aimed to explore the relationship between serum anion gap (AG) and long-term mortality in patients undergoing coronary artery bypass grafting (CABG). **Methods:** Clinical variables were extracted among patients undergoing CABG from Medical Information Mart for Intensive Care III (MIMIC III) database. The primary outcome was four-year mortality following CABG. An optimal cut-off value of AG was determined by receiver operating characteristic (ROC) curve. The Kaplan-Meier (K-M) analysis and multivariate Cox hazard analysis were performed to investigate the prognostic value of AG in long-term mortality after CABG. In order to eliminate the bias between different groups, propensity score matching (PSM) was conducted to validate the findings. **Results:** The optimal cut-off value of AG was 17.00 mmol/L. Then a total of 3,162 eligible patients enrolled in this study were divided into a high AG group ([?]17.00, n=1,022) and a low AG group (<17.00, n=2,140). A lower survival rate was identified in the high AG group based on K-M curve (p<0.001). Compared with patients in the low AG group, patients in the high AG group had an increased risk of long-term mortality [One-year: HR 2.309, 95% CI (1.672-3.187), P<0.001; two-year: HR 1.813, 95% CI (1.401-2.346), P<0.001; three-year: HR 1.667, 95% CI (1.341-2.097), P<0.001; four-year: HR 1.710, 95% CI (1.401-2.087), P<0.001] according to multivariate Cox hazard analysis. And further validation of above results were consistent in the matched cohort after PSM. **Conclusions:** The AG is an independent predictive factor for long-term all-cause mortality in patients following CABG, where a high AG value is associated with an increased mortality.

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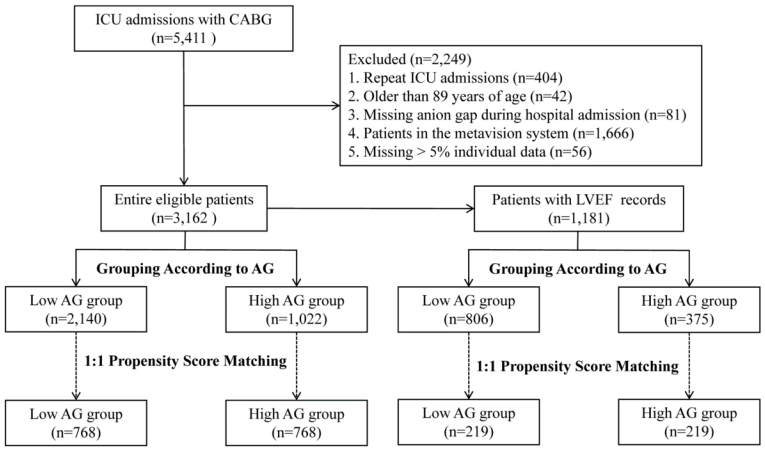
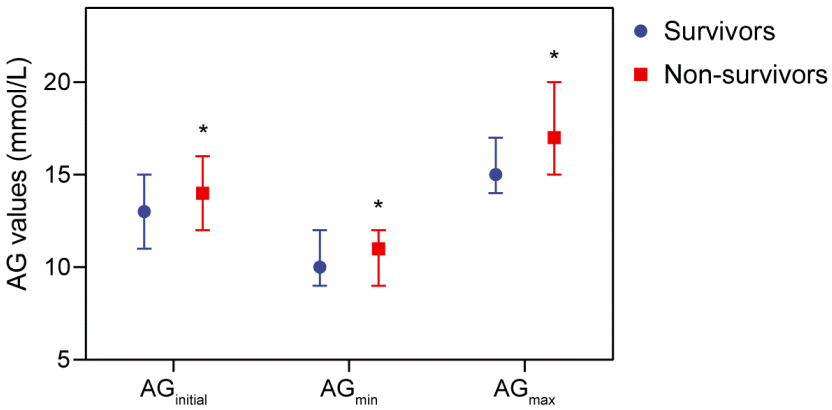
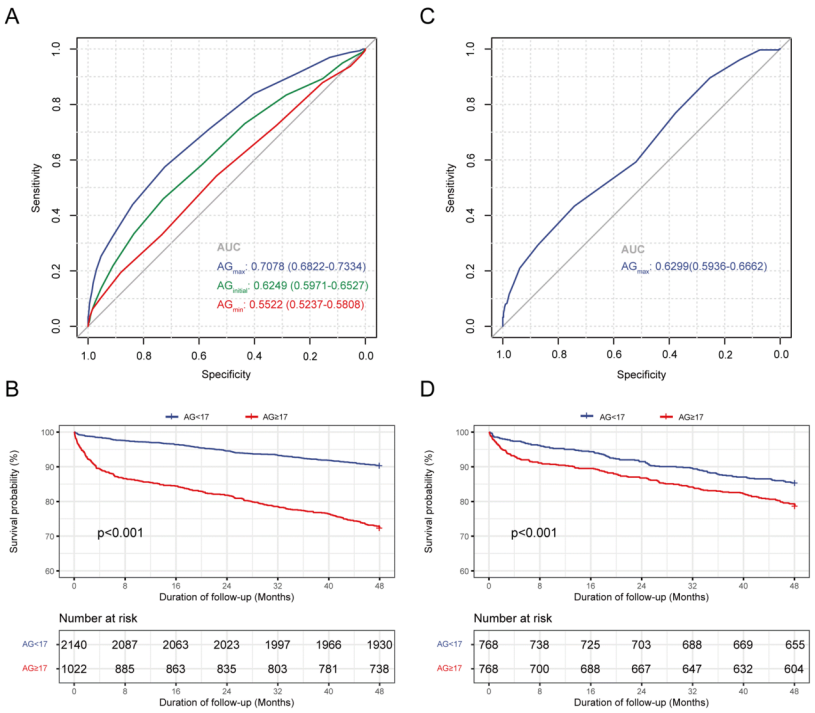
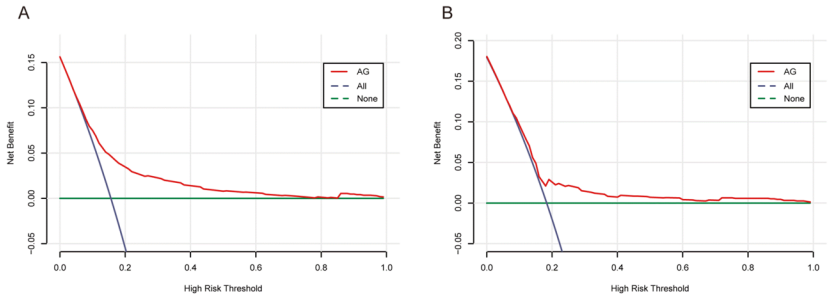






Characteristics	No. of patients	Mortality (%)	HR (95%CI)	P value	P for interaction
Age (years)					
≤ 70	1758	9.10	1.565 (1.082, 2.265)	0.017	0.681
> 70	1404	23.79	1.763 (1.387, 2.242)	<0.001	
Gender					
Female	829	19.42	1.703 (1.199, 2.418)	0.003	0.514
Male	2333	14.27	1.684 (1.315, 2.155)	<0.001	
Hypertension					
Yes	2100	12.10	1.682 (1.280, 2.211)	<0.001	0.184
No	1062	22.60	1.780 (1.316, 2.407)	<0.001	
Chronic pulmonary disease					
Yes	400	24.50	1.567 (0.990, 2.479)	0.055	0.206
No	2762	14.34	1.753 (1.401, 2.193)	<0.001	
Diabetes					
Yes	1198	17.20	1.035 (0.752, 1.425)	0.832	0.941
No	1964	14.66	1.685 (1.303, 2.180)	<0.001	
Hyperlipidemia					
Yes	1806	10.30	2.063 (1.509, 2.820)	<0.001	0.136
No	1356	22.71	1.633 (1.262, 2.114)	<0.001	
Heart failure					
Yes	815	30.31	1.454 (1.097, 1.937)	0.011	0.052
No	2347	10.52	2.014 (1.525, 2.660)	<0.001	
Chronic kidney disease					
Yes	150	33.33	2.825 (1.304, 6.118)	0.003	0.303
No	3012	14.74	1.614 (1.308, 1.991)	<0.001	
Atrial fibrillation					
Yes	1190	21.43	1.614 (1.228, 2.120)	0.001	0.374
No	1972	12.12	1.971 (1.468, 2.647)	<0.001	
Acute myocardial infarction					
Yes	808	21.91	1.387 (0.976, 1.970)	0.068	0.137
No	2354	13.47	1.909 (1.493, 2.441)	<0.001	



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