

The role of RDW/albumin and CRP/albumin ratios in long term outcomes after transcatheter aortic valve implantation

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Introduction: Chronic inflammation has been associated with adverse long-term outcomes in transcatheter aortic valve implantation (TAVI) patients, however no specific markers have yet been validated.¹ Previous research has shown a potential impact of RDW/albumin (RAR) and CRP/albumin (CAR) on mortality and complications in diseases such as myocardial infarction and COVID-19. Research on these parameters is scarce in chronic diseases, and so far RAR and CAR have not been studied in TAVI patients. The aim of our research is to determine if RAR and CAR have effects on survival and complications post-TAVI.

Patients and Methods: Our study included 547 patients who underwent TAVI at Dubrava University Hospital from 2012 to 2024, followed to present date. RDW, CRP and albumin were collected through routine blood samples drawn at admission. Using ROC analysis, we determined cut-off values for RDW/albumin (0.35) and CRP/albumin (0.08). Primary outcome of the study was all-cause death in follow up and secondary outcome was major adverse cardiac event (MACE) in follow up. Data was collected through in-person visits and telephone check-ups.

Results: Sociodemographic and clinical characteristics of the patients are shown in **Table 1**. Median RAR was 0.35 (IQR 0.32-0.40), while median CAR was 0.08 (IQR 0.03-0.17). Our analysis showed a significant difference in survival post-TAVI in patients with elevated RAR (14 vs 45 months, $P < 0.001$; HR 2.61, 95% CI 1.79-3.82) and CAR (15 vs 23 months, $P < 0.017$; HR 1.55, 95% CI 1.08-2.24). There was no difference in MACE during follow-up in either group.

Conclusion: CAR and RAR are derived from parameters used in routine practice that can be easily utilized and have the potential to be used as predictive markers of survival post-TAVI. Further research is necessary to establish exact cut-off values for TAVI patients, allowing for use in clinical practice, which in turn could impact how we treat patients at risk.

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LITERATURE

1. Hoffmann J, Mas-Peiro S, Berkowitsch A, Boeckling F, Rasper T, Pieszko K, et al. Inflammatory signatures are associated with increased mortality after transfemoral transcatheter aortic valve implantation. *ESC Heart Fail.* 2020 Oct;7(5):2597-2610. <https://doi.org/10.1002/ehf2.12837>

TABLE 1. Patient characteristics.

Variable	All patients	CRP/albumin <0.08	CRP/albumin >=0.08	P value	RDW/albumin <0.35	RDW/albumin >=0.35	P value
Age (years)	80 (76-83)	80 (77-84)	80 (75-83)	0.016*	80 (76-83)	80 (76-84)	0.308
Male	289 (51.6%)	161 (53.3%)	119 (49.4%)	0.363	147 (56.5%)	133 (47.2%)	0.029*
Diabetes mellitus	207 (37%)	106 (35.1%)	97 (40.4%)	0.204	88 (33.8%)	115 (40.9%)	0.090
Arterial hypertension	489 (87.3%)	261 (86.4%)	211 (87.6%)	0.699	230 (88.5%)	242 (85.8%)	0.359
Cerebrovascular insult	55 (9.8%)	26 (8.6%)	27 (11.3%)	0.304	25 (9.6%)	28 (10%)	0.891
COPD	68 (12.1%)	29 (9.6%)	39 (16.2%)	0.021*	27 (10.4%)	41 (14.5%)	0.145
eGFR (ml/min/1.73m2)	56.8 (41.2-73.0)	60.3 (44.8-73.5)	52.6 (36.2-71.9)	0.001*	59.7 (44.9-72.8)	53 (36.7-72.7)	0.015*
Atrial fibrillation	228 (40.7%)	111 (36.8%)	112 (46.5%)	0.022*	88 (33.8%)	135 (47.9%)	0.001*
Hemoglobin (mg/dl)	128 (116-138)	130 (119-139)	125 (112-136)	0.003*	133 (124-143)	121 (109-133)	0.001*
Hematocrit (%)	39 (35-42)	39 (36-42)	38 (34-41)	0.011*	40 (37-43)	37 (34-41)	0.001*
Platelets (10 ⁶)	206.5 (166.5-252.0)	193 (164-230)	224 (172-279)	0.001*	207 (168-248)	206 (166-258)	0.770
CRP (mg/L)	2.9 (1.3-7.0)	1.5 (0.9-2.4)	8.00 (4.88-16.00)	0.001*	2.1 (1.0-4.5)	4.0 (1.9-11.2)	0.001*
RDW (%)	14.4 (13.7-15.7)	14.2 (13.6-15.3)	14.9 (14.1-16.2)	0.001*	13.8 (13.4-14.3)	15.7 (14.6-16.9)	0.001*
Serum albumin (g/L)	41 (39-44)	42 (40-44)	39 (37-43)	0.001*	43 (42-45)	39 (37-41)	0.001*
NtproBNP (pg/ml)	2280 (761-5508)	1452 (561-3873)	3919 (1169-8854)	0.001*	1372 (546-3569)	3164 (1015-8036)	0.001*
PAD	197 (35.2%)	103 (34.2%)	91 (37.8%)	0.393	99 (38.2%)	95 (33.7%)	0.272
Coronary artery disease	106 (20.3%)	60 (21.4%)	43 (19%)	0.505	53 (21.7%)	50 (19.2%)	0.475
LVEF (%)	55 (45-60)	58 (50-63%)	55 (40-60)	0.001*	59 (50-65)	54 (40-60)	0.001*
meanPG (mmHg)	47 (38-59)	47 (40-59)	46 (36-59)	0.2844	48 (40-59)	46 (37-58)	0.106
RDW/albumin	0.35 (0.32-0.40)	0.34 (0.32-0.37)	0.38 (0.34-0.44)	0.001*	0.32 (0.31-0.34)	0.40 (0.37-0.82)	0.001*
CRP/albumin	0.07 (0.03-0.17)	0.04 (0.02-0.06)	0.19 (0.12-0.41)	0.001*	0.05 (0.02-0.11)	0.10 (0.05-0.28)	0.001*

Numerical values are displayed as median and interquartile range. Categorical values are displayed as numbers and percentages. *Denotes statistical significance, P<0.05; COPD-Chronic obstructive pulmonary disease; eGFR-estimated glomerular filtration rate; CRP-C reactive protein; Red cell distribution width; PAD-Peripheral atherosclerotic disease; LVEF-Left ventricular ejection fraction; meanPG-Mean pressure gradient.