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C-reactive protein as a predictor of posttraumatic stress induced by acute myocardial infarction

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Abstract: **BACKGROUND:** Acute coronary syndrome (ACS) may cause clinically relevant posttraumatic stress disorder symptoms (PTSS). An inflammatory state might be one mechanism linking PTSS with poor prognosis after ACS. We tested the hypothesis that a change in C-reactive protein (CRP) between hospital admission and 3-month follow-up is an independent predictor of ACS-triggered PTSS. **METHODS:** We assessed 183 patients (median age 59 years; 84% men) with verified myocardial infarction (MI) within 48 h of an acute coronary intervention and three months post-MI for self-rated PTSS. 14 (7.7%) patients fulfilled definition criteria for PTSS caseness. CRP values were categorized according to the predicted risk of cardiovascular disease (CVD) at hospital admission (acute inflammatory response): 0 to <5 mg/L, 5 to <10 mg/L, 10 to <20 mg/L, and ≥ 20 mg/L; and at 3-month follow-up (low-grade inflammation): 0 to <1 mg/L, 1 to <3 mg/L, and ≥ 3 mg/L. Additionally, in a subsample of 84 patients with CRP levels below 20 mg/L at admission, CRP values were log-transformed. **RESULTS:** After adjustment for covariates, less of a reduction or an increase of log CRP values between admission and 3-month follow-up predicted PTSS caseness (OR 6.25, 95% CI 1.25, 31.38), and continuous PTSS (unstandardized B = 0.21, 95% CI 0.07, 4.19; p = 0.043). Less reduction in CRP risk categories predicted both PTSS caseness (OR 4.14, 95% CI 1.89, 9.06) and continuous PTSS (B = 1.80, 95% CI 1.09, 2.51; p < 0.001). **CONCLUSIONS:** Persistently heightened inflammation seems to be predictive for the development of PTSS three months after ACS, so interventions to lower inflammation might be warranted.

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Table 1: Characteristics of all 190 patients admitted with acute myocardial infarction

	All (n=190)	≤ medCRP (n=103)	> medCRP (n=87)
Age, yrs, M (SD)	59.9 (11.2)	59.26 (60.68 (12.02)
Ethnicity (Caucasian), n (%)	190 (100)	103 (100)	87 (100)
Sex (men), n (%) ; c)**	157 (82.6)	78 (75.7)	79 (90.8)
Intervention group, n (%)	97 (51.1)	57 (55.3)	40 (46)
Pain during myocardial infarction, M (SD)	7.92 (1.66)	7.83 (1.61)	8.02 (1.72)
Social support, M (SD)	19.5 (4.9)	19.2 (4.1)	19.9 (4.8)
ASDS sum score (SD)	16.2 (8.8)	15.4 (9.3)	17.2 (8.2)
Education level			
High, n (%)	36 (18.9)	25 (24.3)	11 (12.6)
Medium, n (%)	136 (71.6)	71 (68.9)	65 (74.7)
Low, n (%)	18 (9.5)	7 (6.8)	11 (12.6)
Body mass index, kg/m², M (SD); a)*	27.7 (4.6)	27 (4.2)	28.5 (5.0)
Smoking status			
Current smoker, n (%)	83 (43.7)	42 (40.8)	41 (47.1)
Former smoker, n (%)	50 (26.3)	27 (27.2)	22 (25.3)
Never smoker, n (%)	57 (30.0)	33 (32)	24 (27.6)
CVD-risk of alcohol consumption (drinks per week)			
Moderate drinkers, n (%)	135 (71.1)	72 (69.9)	63 (72.4)
Abstainers, n (%)	34 (17.9)	19 (18.4)	15 (17.2)
Heavy drinkers, n (%)	21 (11.1)	12 (11.7)	9 (10.3)
Physical activity (number of times per week)			
3-7, n (%)	49 (25.8)	31 (30.1)	18 (20.7)
1-2, n (%)	53 (27.9)	31 (30.1)	22 (25.3)
<1, n (%)	88 (46.3)	41 (39.8)	47 (54)
ST-elevation myocardial infarction, n (%) ; c)*	136 (71.6%)	67 (65)	69 (79.3)
White blood cell count; b)*	9.2 (2.4)	8.4 (1.8)	10.1 (2.8)

Troponin T (peak level); b)*	19.2 (240.8)	1.1 (2.4)	40.6 (355.7)
GRACE score, M (SD); a)**	107 (26)	102 (23.4)	113 (28.2)
LVEF; b)*	47.2 (11.7)	50.3 (10.9)	44.2 (11.9)
Medication			
Aspirin, n (%)	190 (100)	103 (100)	87 (100)
Clopidogrel, n (%)	54 (28.4)	25 (24.3)	29 (33.3)
Prasugrel, n (%) *	100 (52.6)	47 (45.6)	53 (60.9)
Ticagrelor, n (%)	79 (41.6)	49 (47.6)	30 (34.5)
Unfractionated heparin, n (%)	145 (76.3)	77 (74.8)	68 (78.2)
Fondaparinux, n (%)	155 (81.6)	84 (81.6)	71 (81.6)
Low molecular weight heparin, n (%)	13 (6.8)	6 (5.8)	7 (8.0)
Bivalirudin, n (%)	2 (1.1)	1 (1.0)	1 (1.1)
Abciximab, n (%)	45 (23.7)	20 (19.4)	25 (28.7)
Tirofiban, n (%)	190 (100)	103 (100)	87 (100)
Eptifibatid, n (%)	190 (100)	103 (100)	87 (100)
Trombolytic therapy, n (%)	2 (1.1)	1 (1.0)	1 (1.1)
Benzodiazepine	70 (36.8)	40 (38.8)	30 (34.5)
Betablocker, n (%)	173 (90.9)	91 (88.3)	82 (94.3)
Morphine, n (%)	139 (73.2)	75 (72.8)	64 (73.6)
Antidepressant, n (%)	15 (7.9)	7 (6.8)	8(9.2)

Notes: Significant differences between groups of equal to or below versus above the median level of C-reactive protein (medCRP = 19.7mg/L) are displayed in **bold**: *P<0.05; **P<0.01; ***P≤0.001

Abbreviations: M, Mean; SD, standard deviation; ASDS, acute stress disorder scale; GRACE, Global Registry of Acute Coronary Events risk score; LVEF, Left ventricular ejection fraction.

