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The impact of modifiable life style risk factors on inflammation in patients with coronary artery disease: modelling a target population for anti-inflammatory treatment

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Introduction: Modifiable lifestyle risk factors (modRF) of coronary artery disease (CAD) such as smoking, lack of physical activity (PA) and poor diet are associated with high inflammatory burden. An optimisation of modRF might significantly affect the target population for pharmacological anti-inflammatory treatment (AIT) as determined by a hsCRP $\geq$2 mg/l.

Aim: To analyse the influence of modRF on hsCRP in a contemporary CAD cohort and model the effect of modRF optimisation on hsCRP in a target population with high inflammatory burden.

Methods: We included all patients with angiographically documented CAD from an observational cohort study ongoing since 2015 and excluded patients with recent myocardial infarction, malignancy, infectious disease, and immunosuppressive medication. ModRF were assessed by questionnaire at enrolment. Lack of PA was defined as PA $<$1.5 h/week and poor diet as $\leq$12 points of an established Mediterranean diet score (MDS, range 0–28 points). The Kruskall-Wallis Test was used to compare hsCRP levels depending on the number of modRF. We performed univariate and multivariate linear regression with log(hsCRP) as the dependent variable. Based on the latter we recalculated hsCRP for each patient assuming optimisation of individual modRF.

Results: Of the 1003 patients (mean age 69 years, 72% male) included, 48% (N=479) had a hsCRP $\geq$2 mg/l. HsCRP increased with the incremental number of modRF (median hsCRP-values for 0–3 modRF: 1.1, 1.6, 2.1, 2.7 mg/l, p$<$0.001). Univariate and multivariate linear regression showed a significant association between log(hsCRP) and each of PA $\geq$1.5 h/week, MDS $>$12, and smoking (Table 1). Recalculation of hsCRP levels identified 21% (N=102/479) of patients with hsCRP $\geq$2 mg/l who could achieve a hsCRP $<$2 mg/l assuming optimisation of present modRF.

Conclusion: Modifiable lifestyle risk factors are independently associated with hsCRP levels in CAD patients. A relevant portion of patients with high inflammatory burden might achieve a hsCRP $<$2 mg/l by lifestyle changes alone. This should be considered in view of the cost and side-effects of pharmacological AIT and for the design of future intervention studies in this field.

Table 1. Linear regression results

	Univariate		Multivariate	
	exp(β) (95% CI)	p-value	exp(β) (95% CI)	p-value
PA $\geq$1.5 h/week	0.63 (0.54, 0.72)	$<$0.001	0.76 (0.66, 0.88)	$<$0.001
MDS $>$12	0.74 (0.65, 0.86)	$<$0.001	0.83 (0.73, 0.96)	$<$0.010
Smoking	1.16 (1.01, 1.34)	$<$0.040	1.19 (1.03, 1.36)	$<$0.017

Impact of modifiable lifestyle risk factors on hsCRP in 1003 CAD patients. Multivariate analyses are adjusted for age, sex, diabetes, body mass index and intake of cholesterol lowering drugs.