Smoking and smoking cessation

The renin-angiotensin-aldosterone system in smokers and non-smokers of the Ludwigshafen Risk and Cardiovascular Health (LURIC) Study

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Introduction: Cardiovascular diseases (CVD) are an important cause of morbidity and mortality worldwide. Enhanced activation of the renin-angiotensin-aldosterone system (RAAS) by cigarette smoking has been reported. Aim of our study was to analyze the effect of cigarette smoking on parameters of the RAAS in active smokers (AS) and life-time non-smokers (NS) of the Ludwigshafen Risk and Cardiovascular Health (LURIC) Study as well as the utility of RAAS parameter for risk prediction.

Materials and methods: We determined the concentration of aldosterone, renin, angiotensin-I and angiotensin-II in participants of the LURIC study. Smoking status was assessed by a questionnaire and measurement of plasma cotinine concentration. Biomarkers were log transformed before entering analyses. Cox regression was used to assess the effect of parameters on mortality.

Results: From 3316 LURIC participants 777 were AS and 1178 NS. Within an observation period of 10 years (median) 221 AS and 302 NS died. Renin concentration was higher in AS while angiotensin-I was lower in unadjusted analyses. After adjustment for age, gender and the use of anti-hypertensive medication only log transformed angiotensin-I was significantly different in AS compared to NS with an estimated marginal mean (95% CI) of 1607 (1541-1673) nmol/L and 1719 (1667-1772) nmol/L, respectively (Figure 1). For both NS and AS log transformed renin and angiotensin-II were directly associated with mortality. For angiotensin-I we found an association only for NS with a HR (95% CI) of 0.66 (0.51-0.85) per increase of one unit log transformed angiotensin-I in a model adjusted for age, gender, anti-hypertensive medication and other cardiovascular risk factors.

Conclusions: Increased renin and angiotensin-II are independent predictors of mortality in AS and NS while angiotensin-I was associated with reduced risk of death in NS only.

Figure 1