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Cardiovascular and inflammatory biomarkers in cancer patients and their impact on mortality

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Background: Cardiovascular (CV) blood biomarkers are considered prognostic markers of CV dysfunction during anti-cancer treatment. It is largely unknown, whether they are also prognostic markers for mortality.
Purpose: To investigate the prognostic impact of CV and inflammatory biomarker levels in cancer patients without significant CV disease at baseline on all-cause mortality.
Methods: We enrolled 138 unselected cancer patients without significant CV disease from November 2017 until December 2018 (age 63±14yrs, 45%male, body mass index (BMI) 25.5±7.7kg/m^2) and 25 healthy controls (age 57±10yrs, 36% male, BMI 25.1±3.4kg/m^2). The cancer group consisted of 85 lymphoma (62%), 25 breast cancer (18%), 10 colorectal cancer (7%), 11 non-small cell lung cancer (8%) and 7 other types of cancer (5%) patients. All cancer stages were represented (25% I/II, 76% III/IV). For biomarker analyses, blood samples were taken from an antecubital vein.
Results: N-terminal pro brain natriuretic peptide (NT-proBNP), high-sensitive Troponin T (hsTnT) and C-reactive protein (CRP) were significantly increased in cancer patients vs. healthy controls (90 ng/L [85–94] vs. 40 ng/L [35–45], $p<0.0001$; 89 ng/L [IQR 85–93] vs. 44 ng/L [39–48], $p<0.0001$; 84.3 mg/L [78.8–89.7] vs. 27.9 mg/L [22.5–33.4], $p<0.0001$). 29 cancer patients (21%) died during a mean follow-up time of 172 days (range 1–405) (6-month mortality 23% [95% CI 15–32]). In univariable Cox analyses all biomarkers predicted survival: NT-proBNP (per 100ng/L, HR 1.049 [1.013–1.085], p=0.0082), hsTnT (per 1ng/L, HR 1.017 [95% CI 1.006–1.029], p=0.0017) and CRP (per 1mg/L, HR 1.019 [1.009–1.030], $p<0.0001$). Including the two CV biomarkers and the inflammatory biomarker, cancer entity, cancer stage and other clinical variables in multivariable Cox analysis, all three biomarkers remained significant prognostic markers of mortality (NT-proBNP per 100ng/L, HR 1.044 [1.007–1.082], p=0.021; hsTnT per 1ng/L, HR 1.017 [1.005–1.030], p=0.0067; CRP per 1ng/L, HR 1.017 [1.005–1.029], p=0.0047). To predict survival, the best cut-offs for the highest product of specificity and sensitivity were 260ng/L for NT-proBNP, 12ng/L for hsTnT and 9mg/L for CRP.
Conclusion: In cancer patients without significant CV disease, plasma levels of the CV biomarkers NT-proBNP, hsTnT and the inflammatory biomarker CRP are elevated compared to healthy controls. All three blood biomarkers are independent prognostic markers of short-term mortality.