Extracellular vesicles isolated from patients with heart failure retain proinflammatory features

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Aim: Heart failure (HF) is a clinical syndrome involving structural and/or functional cardiac abnormalities, classified as reduced (HFrEF) or preserved (HFpEF) based on the ejection fraction percentage of the left ventricle. As extracellular vesicles (EVs) reflect onset and severity of cardiac diseases, they attract interest as potential liquid biopsies. Aim of the present project was to characterize EVs in HF patients, investigating their potential as biomarkers and tools to discriminate between HFrEF and HFpEF clinical phenotypes.
Methods: The study included 39 HF patients (13 HFpEF and 26 HFrEF) and 28 volunteers (CTR). EVs were isolated from plasma by size-exclusion chromatography and ultracentrifugation, then characterized using nanoparticles tracking analysis, transmission electron microscopy (TEM), Western blot (WB) and flow cytometry (FACS). Functional assays using patient-derived EVs were performed on cellular models of monocyte (THP-1) and cardiomyocyte (H9C2).
Results: Diagnosis of HF relied on echocardiographic (e.g. E/e' ratio) and biochemical parameters (e.g. NT-proBNP). Isolation of EV was confirmed by FACS and WB analyses (e.g. the presence of CD63, CD9, CD81, Alix and β1 integrin), while integrity by TEM. EV size was increased in HF (nm: 202 vs 181). Among different subpopulations of EVs, those from monocytes (CD14+), macrophages (CD206+), neutrophils (CD66b+), endothelial cells (CD202b+), activated endothelial cells (CD62E+), cardiomyocytes (CD172a+), platelets (CD41a+), were significantly reduced in HF. Conversely, EVs released by T helper lymphocytes (CD4+) were significantly increased in HF patients when compared to controls. Treatment of THP-1 and H9C2 cells with EVs derived from HF patients led to an increased expression of proinflammatory cytokines (i.e. IL-1α, IL-1β, IL-6), when compared to cells treated with EVs isolated from CTR subjects. This change was mostly driven by EVs derived from HFpEF patients.
Conclusions: EVs derived from HF patients exhibit a distinct profile that reflects the hemodynamic characteristics of the condition and possess proinflammatory properties.

Achievement of LDL cholesterol targets in HIV-positive patients

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Background and objectives: People living with HIV (PLWH) face an increased cardiovascular (CV) risk due to the interaction of traditional risk factors, chronic inflammation and cumulative antiretroviral therapy (ART) adverse metabolic effects. However, standard risk models often underestimate this burden, limiting effective prevention. This study evaluates LDL cholesterol target achievement in PLWH, based on European Society of Cardiology guidelines, and explores its association with clinical, immunological, and therapeutic HIV-related variables.
Methods: A retrospective analysis was conducted on 246 HIV-positive patients, aged ≥40, on ART at Niguarda Hospital. Clinical, laboratory, and therapeutic data were extracted from the hospital's electronic registries, while ten-year CV risk was assessed using SCORE2 from which each patients LDL cholesterol target was defined.
Results: Only 27.2% of the analyzed cohort achieved the recommended LDL cholesterol targets; a significantly higher prevalence of uncontrolled profiles was observed among patients belonging to the "high" or "very high" SCORE2 risk categories (29.3 and 14.6% of the population, respectively). 35.4% of the patients take statins, 12.2% ezetimibe while only the l'11.4% take their association. Univariate analysis showed that lower value of total cholesterol (r=-0.490, p<0.0001), triglycerides (r=-0.188, p=0.003), systolic blood pressure (r=-0.190, p=0.003), and SCORE2 risk class (r=0.270, p<0.0001) were significantly associated with an increased likelihood of achieving the LDL cholesterol target, whereas no significant relation was found with HIV-specific variables.
Conclusions: LDL cholesterol target achievement in PLWH remains suboptimal. A refined predictive model integrating HIV-specific variables, could be useful to enhance individualized risk stratification and to optimize therapeutic strategies tailored to PLWH.