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Effects of immunoabsorption on endothelial function, circulating endothelial progenitor cells and circulating microparticles in patients with inflammatory dilated cardiomyopathy.

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Abstract

BACKGROUND: Immunoabsorption (IA) is used in patients with chronic inflammatory dilative cardiomyopathy (iDCM) to remove cardiotoxic autoantibodies, and to improve myocardial function. We examined the effects of IA on endothelial function, circulating endothelial progenitor cells, and circulating microparticles, including endothelial-derived microparticles, in patients with chronic iDCM.

METHODS: Thirteen patients (10 males, 3 females, mean age 52.3 years) with advanced congestive heart failure (NYHA III and IV) secondary due to chronic iDCM (with signs of myocardial inflammation in biopsies, but without persistence of virus genome), and reduced left ventricular ejection fraction (EF < 35%) underwent IA. Blood samples were drawn before an IA course of 5 days, and 6 months after IA. Blood levels of endothelial progenitor cells (EPCs as defined as VEGFR2(+)/CD34(+) cells), of microparticles (MPs as defined as Annexin V(+) particles with a diameter between 0.1 and 1 μ m), and of endothelial-derived MPs (eMPs as defined as CD31(+)/bright CD42b(-)/Annexin V(+) particles) were analyzed by flow cytometry. Endothelial function (expressed as reactive hyperemia index (RHI)) and arterial stiffness were assessed by PAT-technology (peripheral arterial tone) using fingertips.

RESULTS: Left ventricular systolic function (EF%) improved on average at 6 months from 26.3 ± 4.8 to $37.9 \pm 9.6\%$ (mean \pm SEM; $p < 0.05$). The LV end-diastolic diameter reduced after 6 months from 68.4 ± 8.2 to 61.6 ± 7.9 mm; $p < 0.05$). Endothelial function improved from 1.53 ± 0.09 to 1.80 ± 0.12 ($p < 0.05$). The arterial stiffness index remained unchanged. Number of total MPs decreased on average by 36.8% ($p < 0.05$), the number of eMPs by 39.6% ($p < 0.05$), respectively. The level of circulating EPC remained unchanged (EPC/PMNC 0.26 ± 0.07 vs. 0.27 ± 0.05 %, $p = n.s.$).

CONCLUSIONS: IA treatment improves endothelial function in patients with chronic iDCM. This effect is associated with a significant drop in circulating microparticles. The causal relationship between circulating microparticles and endothelial function is discussed.

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