The use of statins is associated with a reduction of endothelial dysfunction markers in patients with chronic kidney disease

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Background:

Chronic kidney disease (CKD) associates high cardiovascular (CV) risk due to atherosclerosis, endothelial dysfunction and chronic inflammation[1].

Statins reduce CV morbidity and have shown pleiotropic effects on endothelium. Previous studies suggest a potential role of circulating microparticles (MP) in endothelial dysfunction[2].

Objective:

To analyze the role of EMPs and the expression of serum markers of endothelial dysfunction, oxidative stress and inflammation such as advanced oxidation protein products (AOPP) and vascular endothelial growth factor (VEGF), as well as the effects of statins in a cohort of patients with CKD.

Material and method:

A cross-sectional study was performed in 41 patients with CKD 3b-4 and 8 healthy volunteers were used as control group. Patients with systemic disease (lupus or vasculitis), glomerulonephritis or active neoplasm were excluded. EMPs were measured by flow cytometry, serum AOPP and VEGF were analyzed by ELISA.

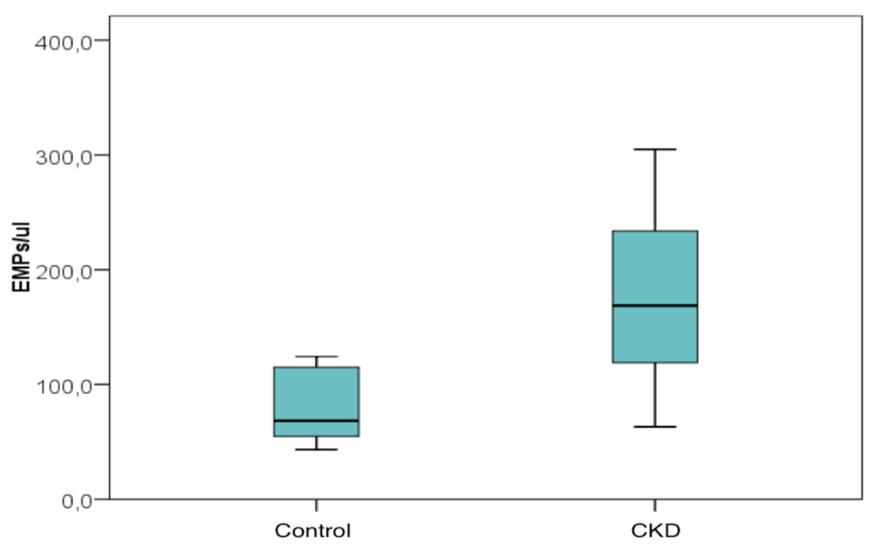
Results:

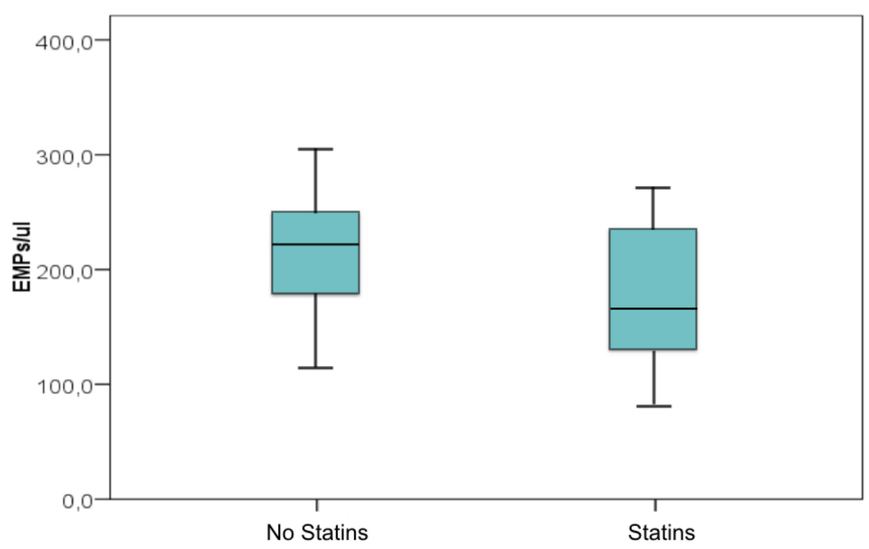
The 39% of all patients had CKD secondary to diabetic nephropathy and the 48% were on statins. CKD patient median GFR was 31,9 ml/min and had higher EMPs counts than controls (171,1 vs 68.3 EMPs/µl, p< 0.001). Diabetic CKD patients showed less increase on EMPs than the rest. We did not find any effect of GFR or age on EMPs levels. Statin therapy significantly decreased the amount of circulating EMPs in all CKD patients (185,3 vs 225,6 MPE/µl).

We have also found a relationship among EPMs and total cholesterol levels. Patients with cholesterol < 200 mg/dl treated with statins presented lower EMPs (191,0 vs 119,8 MPE/µl p= 0,032).

Patients with CKD had also a trend toward higher serum AOPPs (7,5 ng/ml vs 9.9 ng/ml). Statins seems to have no effect on serum AOPPs.

Diabetic-CKD patients showed a slight decrease on serum VEGF when compared with other causes of CKD. Statins had a similar effect on VEGF than observed on EMPs.





Conclusions:

Patients with CKD 3–5 had elevated EMPs, AOPP and VEGF suggesting endothelial dysfunction, chronic inflammation and oxidative stress. Treatment with statins reduced EMPs levels in CKD patients. This effect could be understood by mechanisms that prevent the release of EMPs from the damaged endothelium or by a direct effect on circulating EMPs. However, further studies are needed to clarify the EMPs role.

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