Reduction of Common Carotid Artery Compliance in CAPD Patients is Related to Serum Albumin Concentration

Department of Internal Medicine, College of Medicine, Chung-Ang University

Soo-Jung Yu · Dong-Jin Oh · Kwang-Jae Lee · Suk-Hee Yu

Purpose : Recent prospective studies have demonstrated that arterial stiffness and early wave reflections are independent predictors of all-cause and cardiovascular mortality in ESRD patients and in general population. Arterial stiffness in ESRD patients may be associated with many factors including nonspecific factors such as age, gender, smoking, blood pressure and diabetes, as well as alterations more specific to ESRD, such as flow overload, hyperphosphatemia, PTH activity, increased endothelin-1 and ADMA concentration, microinflammation, and alterations in blood lipids. The aim of this study is to investigate the effects of above risk factors on wall properties of the elastic common carotid artery (CCA) as well as the medium-sized muscular brachial artery (BA) in CAPD patients.

Patients and Methods : 20 CAPD patients [male:female (n)=10:10, mean age=54±12 years, mean CAPD duration=16±12 months, DM:non-DM (n)=10:10] and 20 age-, sex- matched controls were included on the study. Arterial wall properties [arterial compliance (AC) and intima-media thickness (IMT)] of the right CCA and brachial artery (BA) within 1cm of the bifurcation were measured three times after 15 minutes of supine rest at room temperature using a high-resolution B-mode (7.5-MHz transducer) echocardiography. AC was calculated using Hayoz formula in CAPD patients. Blood samples were obtained to assess hemoglobin, phosphorus, total calcium concentration, total-CO_2, serum albumin and C-reactive protein, Lipid profiles including serum total cholesterol , LDL-cholesterol, HDL-cholsterol and triglyceride levels.

Results :

1) CCA compliance (CCA-AC) was 0.2680.127 mm^2/kPa in control group, 0.163±0.082 mm^2/kPa in CAPD group ($p<0.05$ versus control group). BA compliance (BA-AC) was 0.118±0.063 mm^2/kPa in control group, 0.070±0.061 mm^2/kPa in CAPD group ($p<0.05$ versus control group).

2) In the CAPD group, CCA-AC was significantly correlated to serum albumin concentration ($r=0.443$; $p<0.05$), but there was no correlation with other parameters.

3) In the CAPD group, BA-AC was significantly correlated to Age ($r=-0.474$; $p<0.05$) and serum ca x p product ($r=-0.387$; $p<0.05$), but there was no correlation with other parameters.

4) Stepwise regression analysis showed that Serum albumin concentration ($r=0.467$, $p<0.05$) was independently related to CCA-AC and Age ($r=0.592$, $p<0.05$) was independently related to BA-AC.

Conclusion : the present study shows that CCA-AC is independently associated with serum albumin concentration. This suggests that hypoalbuminemia itself reflects vascular events and mortality in CAPD patients.