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## **The relationship between plasma blood viscosity and renal function in patients with coronary artery disease**

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**Objectives:** Increased blood viscosity, which is one of the important factors that determine hemorheological abnormalities, has been found to be related with many chronic illness including hypertension, metabolic syndrome, cardiovascular disease, and stroke. However, it has not been elucidated yet how blood viscosity affects renal hemodynamics and renal function. Therefore, we investigated the association of plasma blood viscosity with renal function in patient with coronary artery disease (CAD).

**Methods:** In 572 patients with CAD who underwent coronary angiography, plasma blood viscosities were determined using a scanning capillary tube viscometer at a low and high shear rate, and were referred to as diastolic blood viscosity (DBV) and systolic blood viscosity (SBV), respectively. Correlation between blood viscosity and estimated glomerular filtration (eGFR) and the association of blood viscosity with risk of chronic kidney disease (CKD) defined as eGFR less than 60 ml/min/1.73m<sup>2</sup>, were investigated.

**Results:** Blood viscosity correlated positively with eGFR levels (SBV;  $r=0.135$ ,  $P=0.001$ , DBV;  $r=0.173$ ,  $P<0.001$ ). The blood viscosity levels were significantly lower in patients with CKD than in patients without CKD (SBV;  $36.6\pm 5.6$  mP vs.  $40.5\pm 9.1$  mP,  $P<0.001$ . DBV;  $104.2\pm 24.7$  mP vs.  $120.2\pm 29.6$  mP,  $P<0.001$ ). Multivariate analysis showed significant association of blood viscosity with CKD (SBV; OR, 0.951; 95% CI 0.909-0.994, DBV; OR, 0.987; 95% CI 0.977-0.998). The subgroup analysis, in which study patients were divided into CKD group and non-CKD group, showed that the positive correlation between blood viscosity and eGFR was still significant in CKD group (SBV;  $r=0.272$ ,  $P=0.005$ , DBD;  $r=0.326$ ,  $P=0.001$ ) whereas no significant correlation in non-CKD group.

**Conclusions:** Decreased blood viscosity was associated with reduced renal function in patients with CAD, and the relationship was more prominent in patients with pre-existing renal insufficiency.