Blood viscosity in subjects with normoglycemia and prediabetes

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AIM: Increased Blood Viscosity (BV) has been reported to represent a risk factor for the development of type 2 diabetes. However, data in subjects with normal glucose or prediabetes are missing. We have therefore evaluated the relationship between BV and blood glucose in subjects with normal glucose or prediabetes.

METHODS: We have enrolled 264 subjects who were divided in three groups according to blood glucose: Group A (n=74): blood glucose < 90 mg/dl; Group B (n=96): blood glucose ranging 90-99 mg/dl; Group C (n=94): blood glucose ranging 100-125 mg/dl. BV was measured at 37° C with a cone-plate viscometer at shear rates ranging 225–22.5 s⁻¹.

RESULTS: Blood pressure, blood lipids, fibrinogen and plasma viscosity were similar in the three groups. BMI and waist were higher in Group C. Hematocrit (p<0.05) and BV (p between 0.01 and 0.001) were significantly higher in Group B and C, compared to Group A. Blood glucose was significantly and inversely correlated with HDL cholesterol and directly with BMI, waist, hematocrit (r=0.134), and BV (from 225 sec⁻¹ to 22.5 sec⁻¹, r ranging from 0.162 to 0.131). BV at shear rate 225 sec⁻¹ resulted independently associated with blood glucose.

CONCLUSIONS: The present findings demonstrate a direct relationship between BV and blood glucose in non-diabetic subjects. Furthermore, in subjects with normal blood glucose values, individuals with higher blood sugar levels have increased BV comparable to that observed in subjects with prediabetes.