
Dehydration Shown to Increase Blood Viscosity

Research published in the journal *Aviation, Space, and Environmental Medicine* demonstrated that dehydration increases systolic blood viscosity by 9.3% and diastolic blood viscosity by 12.5%.

The results are from a study of 12 healthy men who sat for 4 hours at a dry-bulb temperature of 23.0-23.5°C and a relative humidity of 18-36%. The purpose of the study was to assess the effects of prehydration with water and an electrolyte-glucose beverage (EGB) in comparison with controls subjects, who did not ingest either fluid prior to the study. Blood viscosity and plasma volume were tested every hour (including baseline prior to hydration), and routine laboratory hematological tests, urine volume, and body weight were recorded at 2 and 4 hours.

At time points 1, 2, 3, and 4 hours from baseline, control subjects had systolic blood viscosity increases of 3.3, 9.3, 6.8, and 9.3% and diastolic blood viscosity increases of 3.0, 10.9, 6.8, and 12.5%. These increases were slightly attenuated in the subjects given water, demonstrating systolic increases of 1.9, 4.6, 4.7, and 3.0% and diastolic increases of 4.6, 4.9, 7.3, and 5.4%. The EGB was more effective than water in mitigating the effects of dehydration, almost negating any viscosity increases at all. These subjects had systolic increases of -0.7, 1.1, -1.1, and 3.1% and diastolic increases of 4.2, 1.4, 1.0, and 5.6% from baseline.

The study was of interest to the authors because dehydration is a common condition that can exacerbate the potential for developing deep vein thrombosis and/or pulmonary embolism. Factors that can cause dehydration during air travel include consumption of diuretic beverages containing alcohol or caffeine, mild hypoxia, and increased evaporative water loss due to low humidity of the air in the cabin.

The authors of the study concluded, “ECB and water prevented the increase of blood viscosity that occurred without prehydration. ECB was better than water for maintaining body fluid balance and preventing hypovolemia.”

Important Information

The Blood Viscosity Test is performed at Meridian Valley Lab using a calibrated glass capillary system that is classified as a Class I device under 21 CFR § 862.2920. The Blood Viscosity Test is not covered by insurance plans. Doctors must bill their patients or their patients’ caregivers for this service.

Reference

T. Doi, et al. Plasma Volume and Blood Viscosity During 4 h Sitting in a Dry Environment. *Aviation, Space, and Environmental Medicine*, 75, 6 (2004) 500-504.