

Atherosclerosis and Inflammation

1.9 Circulating Vascular Endothelial Growth Factor and Cell Adhesion

Molecule Levels are Increased in 'Non-Dipper' Patients

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Introduction. Blood pressure (BP) normally declines at night. Individuals who fail to dip their night-time BP relative to their average day-time BP are defined as 'non-dippers'. A non-dipping pattern is found more frequently in hypertensive patients. The underlying pathogenetic mechanisms potentially linking non-dipping with cardiovascular disease are largely unclear. In particular, the relationship between nocturnal BP dipping and inflammatory alterations has not been investigated. Proinflammatory alterations play a crucial role in atherosclerosis initiation and progression. Similarly, the proinflammatory state observed in hypertension might contribute to adverse cardiovascular outcome in patients with essential hypertension. Recently, some authors reported increased plasma levels of Vascular Endothelial Growth Factor (VEGF) in hypertensive patients and, therefore, they emphasized the presence of abnormal angiogenesis. The atherosclerotic risk associated with non-dipping may essentially related to relatively greater BP load throughout the day and night on endothelial cells of non-dipping individuals.

Aim. To investigate whether plasma levels of Intercellular Adhesion Molecule-1 (ICAM-1) Vascular Cell Adhesion Molecule-1 (VCAM-1), E-Selectin and VEGF (ELISA) would be relatively higher in non-dippers.

Methods. We examined 190 never treated hypertensive patients and 108 healthy subjects matched for age and sex. Blood sample for the measurements of soluble ICAM-1, VCAM-1, E-Selectin and VEGF were collected overnight fast. Measurements were performed in duplicate by commercially available enzyme-linked immunosorbent assay kits. Outpatient ambulatory monitoring was performed for a 24-hour period using the SpaceLabs model 90207. We defined non-dippers as those subjects whose average BP dipped at night < 10% as compared with their average daytime BP.

Results. Plasma levels of ICAM-1, VCAM-1, E-Selectin and VEGF were higher in hypertensive patients as compared with the normotensives ($p < 0.01$). Soluble cell adhesion molecules and VEGF levels were all higher in non-dipper than in dipper subjects ($p < 0.05$).

Conclusions. Our study provides evidence that subjects who fail to dip their BP at night experience elevated levels of molecule related to endothelial dysfunction and angiogenesis. This finding provides one possible mechanism linking non-dipping with cardiovascular disease.