Nocturnal Blood Pressure Dipping Relates to Insulin Sensitivity but not Vascular Function in Metabolic Syndrome

N.R. Stewart1,2, E.M Heiston2, S.L. Miller2, A.C. Ballantyne2, U.S. Cheema2, S.K. Malin (FACSM)1,2
Rutgers University, New Brunswick, NJ 08901; University of Virginia, Charlottesville, VA 22904

Blunted dips in nocturnal systolic blood pressure (sBP) are independently related to cardiovascular disease. However, the role of metabolic and/or vascular insulin sensitivity in explaining nocturnal sBP regulation is unclear. **PURPOSE:** To test the hypothesis that nocturnal sBP dipping relates to metabolic insulin sensitivity as well as endothelial function. **METHODS:** Twenty-eight adults with metabolic syndrome (MetS) (53.2 ± 6.5y; 35.8 ± 4.5kg/m²) according to ATP III criteria were categorized as “dippers” (>10% change in sBP; n=11; 6F) or “non-dippers” (<10%; n=18; 13F). Twenty-four hour ambulatory blood pressure monitoring was recorded to assess percent sBP dipping status. A 2-hr euglycemic-hyperinsulinemic clamp (40 mU/m²/min, 90 mg/dl) was performed to test metabolic (glucose infusion rate/insulin) and vascular (brachial artery FMD) insulin sensitivity. Augmentation index (AIx; arterial waveforms), VO2max (indirect calorimetry) and body composition (DEXA) were also measured. **RESULTS:** Dippers had a significantly higher drop in sBP than non-dippers (17.82±5.25 vs. 1.78±6.17 %, P<.001). There were no significant differences in ATP III criteria, age, or body composition between dippers and non-dippers, but VO2max tended to be higher in dippers (24.23±4.44 vs. 21.17±3.52 mL/kg/min, P=0.059). Although fasted FMD (6.85±0.94% vs 7.39±1.05%, P=0.28), insulin-stimulated FMD 2-hr (6.94±0.85% vs 6.76±0.66%, P=0.63), AIx fasted (26.7±8.0% vs 26.3±8.6, P=0.90), and AIx 2-hr (21.4±10.8% vs 21.5±9.5, P=0.97) did not differ between groups, non-dippers had higher metabolic insulin sensitivity (0.035±0.017 vs 0.020±0.008, P=0.04) and LDL concentrations (146.39±28.56 vs. 110.20±21.11 mg/dL, P=0.002) than dippers. sBP dipping correlated with lean body mass (r=0.44, P<0.001), LDL (r=0.59, P=0.001), fasting insulin levels (r=0.57, P=0.01), and metabolic insulin sensitivity (r=-0.49, P=0.04). **CONCLUSION:** There are no differences in endothelial function between dippers and non-dippers with MetS. However, metabolic insulin sensitivity, LDL and lean body mass appear to be important factors contributing to nocturnal SBP regulation.

Funding by NIH RO1-HL130296.