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

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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/m^2) 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/m^2/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.

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