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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 ± 6.5 y; 35.8 ± 4.5 kg/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.

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