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Nighttime average and dipping blood pressure can differ based on the temporal distribution of ambulatory measurements at nighttime

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Keywords

Ambulatory Blood Pressure Monitoring, Cardiovascular System, Blood Pressure

Abstract

Introduction:

Nighttime ambulatory (BP) and dipping% (nighttime/daytime BP of <0.9; non-dipping ≥0.9) are independent predictors of adverse cardiovascular events. Standard guidelines recommend at least ≥20/7 daytime/nighttime measurements for reliable ambulatory BP monitoring, but newer reports suggest ≥8/4 daytime/nighttime measurements are sufficient. Considering BP oscillates across the night, the temporal distribution of measurements across the night may impact nighttime BP and dipping%. To test whether this new recommendation holds for extreme examples of temporal distribution, we compared average nighttime BP and dipping% when using BP measurements only in the first (1st-half) vs. only in the second half (2nd-half) of the night.

Methods:

Seventeen females and twenty-six males (50±10 years [mean±SD]) without cardiovascular disease or severe sleep disorders wore an ambulatory BP monitor for 24 hours, programmed to measure BP every 20 minutes when awake and every 30 minutes during a self-selected 8-hour time-in-bed for nighttime. We compared the nighttime BP averages and the calculated dipping% when using the first four measurements from the 1st-half of the nighttime, from the 2nd-half of the nighttime, and all measurements during the nighttime (All nighttime, AN). Repeated measures ANOVA was conducted with significance set as p<0.05.

Results:

Systolic BP was higher using 1st-half than 2nd-half but similar to AN (111±9 vs.107±11 vs. 109±9 mmHg, p<0.01), while systolic BP dipping% using 1st-half was lower than 2nd-half and AN (9.7±7.4 vs.13.0±7.6 vs. 11.4±6.7 %, p<0.01, respectively). Diastolic BP and diastolic dipping%were similar among the 1st-half, 2nd-half, and AN segment (63±6 vs. 63±7 vs. 62±7 mmHg, p=0.19) and (17.2±7.6 vs. 17.2±8.8 vs. 18.4±8.8 %, p=0.16), respectively.

Conclusion:

In adults without cardiovascular disease or severe sleep disorders, nighttime BP and dipping% may depend upon when BP measurements are taken. The minimum threshold of 4 measurements for a reliable nighttime BP readout should be used cautiously. Support: NIH F32-HL131308, R01HL163232, R01HL125893, R35HL155681, Medical Research Foundation, and OHSU OFDIR fellowship.