Abstract

Reverse dipping has been associated with target organ damage and cardiovascular risk, with hypertension being its most common risk factor. It has been clearly attributed to be a predictor of cardiovascular mortality and to present with a poor clinical prognosis. However, its clear effect and etiology on cardiovascular (CV) target organ damage has not been sufficiently investigated, especially in the black community. In the present study we measured pulse wave velocity (PWV), conventional blood pressure (BP), ambulatory BP, anthropometric measurements, intima media thickness, and 24-hour urinary excretion in 796 black South Africans. Echocardiographic assessment was also performed, and blood samples were collected to assess plasma hormone concentrations. The prevalence of dipping, non-dipping and reverse dipping was 48.0%, 39.0%, and 13.0% respectively. Dippers had the lowest average 24-hour systolic and diastolic BP of 114.8/70.3 mmHg, followed by non-dippers at 119.3/73.7 mmHg, with the reverse dippers having the highest 24-hour systolic and diastolic BP of 128.2/78.7. mmHg. All the groups (dippers, non-dippers, and reverse dippers) had normal 24-hour and daytime BP. The night-time blood pressures of the dippers and non-dippers were within normal range even though these pressures were significantly different between the two groups. On the other hand, the nighttime BP of the reverse dippers (132.2/77.7 mmHg) was above the threshold of 120.0/70.0 mmHg indicating that they were on the nighttime hypertensive range.

The plasma renin concentrations of the three groups were not significantly different. However, the plasma aldosterone concentrations of the reverse dippers were higher than those of the dippers and non-dippers. Urine electrolyte excretion of sodium and potassium was not significantly different between the three groups. However, the sodium-to potassium ratio of the reverse dippers was significantly different than that of the dippers. Similarly, the urinary magnesium of the reverse dippers was significantly different than that of the dippers.

Investigations of the cardiovascular target organs show that the pulse wave velocity of the reverse dippers was significantly higher than that of the dippers and non-dippers. The

left ventricular mass index (LVMI) of the dippers and non-dippers was not significantly different while the LVMI index of reverse dippers was significantly increased when compared to both the dippers and non-dippers.

In conclusion, our results show that despite the normal daytime BP of the reverse dippers, their nighttime BP is high, and this translates to preclinical cardiovascular pathology. The mechanisms that drive the increased nighttime BP may be mediated by the high plasma aldosterone and aldosterone-to-renin ratio in this group.