Arterial blood pressure (BP) follows a circadian type rhythm. Most people present a decline in arterial BP between 10%–20% during nighttime intervals which is called a dipper pattern (1).

It has been reported that the lack of nocturnal BP fall which is called non-dipping is associated with more serious end organ damages when compared to hypertensives with dipping pattern (1-2).

Heart rate recovery (HRR) after graded exercise is one of the commonly used techniques that reflect autonomic activity. An attenuated HRR, which is defined as the decrease in heart rate immediately after exercise, reflects reduced parasympathetic nervous system activity (3).

The aim of the present cross-sectional study was to evaluate HRR in normotensive and hypertensive individuals with either non-dipper or dipper type circadian rhythm of BP.

**Methods**

Eighty-five patients were divided into 4 groups according to the presence of hypertension and pattern of circadian blood pressure as follows: a) normotensive / dipper; n=20, b) normotensive / non-dipper; n=21, c) hypertensive / dipper; n=22, and d) hypertensive / non-dipper; n=22.

Ambulatory BP monitoring studies were carried out using a Tracker NIBP2 (Del Mar Reynolds Medical Ltd, Hertford, UK) monitoring device. The first hour was discarded from analysis. The percentage decline in nighttime BP was calculated as follows: (mean daytime BP – mean nighttime BP)/mean daytime BP. Patients with a decline in mean nighttime BP of less than 10% were accepted as nondippers.

Treadmill exercise testing was conducted in all patients using modified Bruce protocol. After achieving peak workload, all patients spent at least 3 minutes recovery without cool-down period. HRR indices were calculated by subtracting first, second, and third minute heart rates from the maximal heart rate obtained during stress testing and designated as HRR1, HRR2, and HRR3.

**Results**

Mean HRR1 values (29.7 ± 4.0 vs. 26.6 ± 3.7, p=0.016) were significantly higher in normotensive / dipper than the normotensive / non-dipper group.

Mean HRR2 values (28.6 ± 4.0 vs. 24.8 ± 4.6 bpm, p=0.007) were higher in hypertensive / dipper group than the hypertensive / non-dipper group.

Spearman’s correlation analyses revealed a positive correlation between degree of night-time dipping and HRR1 (r=0.600, p=0.001).

The correlation coefficient between degree of night-time dipping and HRR1 was higher in hypertensive group than the normotensive group (r=0.676, p=0.001 and r=0.575, p=0.001, respectively).

**Conclusions**

The blunting of the nocturnal fall in BP was associated with a delayed recovery of heart rate after graded maximal exercise in both normotensive and hypertensive groups.

This relationship was more prominent in the hypertensive group. When the prognostic significance of HRR is considered, hypertensives and normotensives with a nondipping pattern should be followed closely for adverse cardiovascular outcomes.

**References**