



ORIGINAL ARTICLE

## Relationship between nocturnal blood pressure profiles and the presence and severity of hypertensive retinopathy<sup>☆</sup>



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### KEYWORDS

Dipper profile;  
Ambulatory blood  
pressure monitoring;  
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### Abstract

**Introduction:** Non-dipper and extreme dipper blood pressure (BP) profiles are associated with a worse cardiovascular prognosis. The relationship between nocturnal BP profile and hypertensive retinopathy (HR) is not fully established.

**Aim:** To assess the association between the prevalence and severity of HR and nocturnal BP.

**Methods:** We prospectively studied hypertensive patients who underwent 24-hour ambulatory BP monitoring. The population was divided into two groups according to the presence or absence of lesions and compared according to baseline characteristics, nocturnal BP profile (dippers, non-dippers, inverted dippers/risers and extreme dippers) and mean nocturnal systolic (SBP) and diastolic (DBP) BP values. The presence and severity of HR were assessed using the Scheie classification. The relationship between nocturnal SBP and DBP values (and nocturnal BP profile) and the prevalence and severity of HR was determined.

**Results:** Forty-six patients (46% male, aged 63±12 years) were analyzed, of whom 91% (n=42) were under antihypertensive treatment. Seventy percent (n=33) had uncontrolled BP. HR was diagnosed in 83% (n=38). Patients with HR had higher mean systolic nocturnal BP (151±23 vs. 130±13 mmHg, p=0.008). Patients with greater HR severity (Scheie stage ≥2) had higher nocturnal BP (153±25 vs. 140±16 mmHg, p=0.04). There was no statistically significant association between DBP and nocturnal BP patterns and HR.

**Conclusions:** The prevalence and severity of HR were associated with higher nocturnal SBP. No relationship was observed between nocturnal BP profile and the presence of HR.

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**PALAVRAS-CHAVE**

Perfil dipper;  
MAPA;  
Retinopatia  
hipertensiva

**Relação entre o perfil tensional noturno e a prevalência e gravidade da retinopatia hipertensiva****Resumo**

**Introdução:** Os perfis tensionais noturnos *non-dipper* e *extreme-dipper* têm sido associados a lesões de órgão-alvo. A relação entre a pressão arterial (PA) e retinopatia hipertensiva (RH) está pouco esclarecida.

**Objetivo:** Avaliar em doentes (dts) hipertensos a relação entre os valores noturnos de pressão arterial em ambulatório de 24 h (MAPA) e prevalência e a gravidade da RH.

**Métodos:** Foram avaliados prospectivamente dts hipertensos submetidos à realização de MAPA de 24 h. Foram determinadas características basais, PA sistólica (PAS) e diastólica (PAD) médias noturnas, e os dts classificados pelo perfil tensional noturno em *dipper*; *non-dipper*; *inverted-dipper* e *extreme-dipper*. O diagnóstico de RH foi estabelecido por fundoscopia e a gravidade definida pela classificação de Scheie. Foi estabelecida a relação entre valores de PAS e PAD noturnos e o perfil tensional noturno com a prevalência e gravidade da RH.

**Resultados:** Foram avaliados 46 dts (46% sexo masculino [n=21]; idade média 63±12 anos). Noventa e um por cento dos dts estavam sob terapêutica anti-hipertensiva (n=42); destes, 30% apresentavam PA controlada (n=13). A presença de RH foi observada em 83% dos dts (n=38). Os dts com RH apresentaram níveis de PAS noturna mais elevados (151±23 versus 130±13, p=0,008). A PAS noturna esteve ainda associada a uma maior gravidade de RH (153±25 versus 140±16, p=0,04). Não existiu relação entre a PAD noturna ou o perfil tensional noturno e presença de RH.

**Conclusão:** Níveis mais elevados de PAS noturna estiveram associados a RH. Não se verificou relação entre o perfil tensional noturno e a presença de RH.

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**Introduction**

Hypertension is a common disease, with a prevalence in the general population of 30-45% and a significant burden of morbidity and mortality.<sup>1</sup>

Various studies have demonstrated a better correlation between 24-hour ambulatory blood pressure monitoring (ABPM) values and the degree of target organ damage and overall cardiovascular prognosis compared to casual blood pressure (BP) values.<sup>2</sup>

According to various studies, the non-dipper profile is associated with more target organ damage, particularly left ventricular (LV) hypertrophy, microalbuminuria and kidney injury, and sleep disorders, as well as a worse cardiovascular prognosis and higher risk for cardiac and cerebrovascular events.<sup>2-6</sup> The extreme dipper profile has also been shown to have an important impact on cardiovascular prognosis.<sup>2</sup>

Hypertensive retinopathy (HR) is the main ocular manifestation of hypertension, 50-80% of hypertensive individuals developing abnormalities in retinal microvasculature.<sup>8</sup> The signs of HR are important indicators of risk for cardiovascular morbidity and mortality<sup>7</sup> and according to some authors, retinal assessment is crucial for stratifying vascular risk in hypertension.<sup>7</sup>

The relationship between circadian BP variation and the prevalence and severity of HR is not fully established. According to some studies, HR is more frequent and more severe in non-dipper patients.<sup>3</sup>

In this study we aimed to analyze the relationship between nocturnal values from 24-hour ABPM and the prevalence and severity of HR in hypertensive patients.

**Methods****Population and sample**

The population consisted of hypertensive patients who underwent ABPM between January and December 2013. Patients were invited by telephone to undergo funduscopy at the hospital with the aim of identifying target organ damage. Of a total of 355 patients, only 46 agreed to undergo the test, and these constitute the study sample; the remainder refused or could not be contacted by telephone.

**Study variables**

The sample was characterized according to demographic (age and gender), clinical (personal history, comorbidities and cardiovascular risk factors, and duration and control of hypertension), laboratory (serum creatinine), and echocardiographic (concentric LV hypertrophy) variables, and treatment (antihypertensive drug class). These variables were assessed through a questionnaire given to the patients (Appendix A) and by reviewing electronic medical records.

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