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## ORIGINAL ARTICLE

## Central pressures and central hemodynamic values in white coat hypertensives are closer to those of normotensives than to those of controlled hypertensives for similar age, gender, and 24-h and nocturnal blood pressures<sup>☆</sup>

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**KEYWORDS**

White coat hypertension;  
Aortic stiffness;  
Central aortic pressures;  
Wave reflection;  
Nocturnal blood pressure

**Abstract**

**Introduction:** There is disagreement whether white coat hypertensives (WCH) have different hemodynamic and structural characteristics compared to normotensives (NT) and hypertensives (HT).

**Methods:** We compared cardiovascular prognostic markers (pulse wave velocity [PWV] and aortic stiffness index [ASI]) and data on central hemodynamics and central pressures (augmentation index [AIx], augmentation pressure [AugP] and pulse pressure amplification [PPA]) from aortic pulse wave analysis between NT (n=175), WCH (n=315) and treated HT (n=691), all with 24-h blood pressure (BP) <130/80 and nocturnal BP <120/70 mmHg after matching for age, gender, body mass index (BMI) and nocturnal BP. The groups were also compared separately in terms of 24-h systolic BP <120 mmHg and 120-129 mmHg.

**Results:** The percentage of non-dippers was 40.1% in NT, 34.5% in WCH and 38.3% in HT. For similar 24-h and nocturnal systolic BP (NT 109/64±7/5, WCH 110/66±7/6, HT 109/64±7/5 mmHg), aortic stiffness was greater in HT (n=691, PWV 10.8±2.6 m/s and ASI 0.33±0.16, p<0.01) than in WCH (n=316, PWV 9.7±2.4 m/s and ASI 0.28±0.17) and NT (n=175, PWV 9.5±2.0 m/s and ASI 0.29±0.15); AugP and AIx were higher (p<0.01) in HT (13.9±8.2 and 29.6±12.6 mmHg) than in WCH (11.5±8.5 mmHg and 24.9±15.2) and NT (11.0±6.4 mmHg and 26.6±11.5). PPA was lower

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( $p < 0.01$ ) in HT ( $11.3 \pm 5.5$  mmHg) than in WCH ( $13.2 \pm 7.1$  mmHg) and in NT ( $12.4 \pm 4.9$  mmHg). The findings were similar when the 24-h systolic BP  $< 120$  mmHg and 120-129 mmHg subgroups were analyzed separately.

**Conclusion:** Our data suggest that for similar age, gender distribution, BMI, and 24-h and nocturnal BP, aortic stiffness, central aortic pressures and wave reflection in WCH are closer to those of NT than to those with treated HT. This supports the idea that white coat hypertension may be a more benign condition than treated hypertension for similar 24-h and particularly nocturnal BP levels.

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## PALAVRAS-CHAVE

Hipertensão da bata branca;  
Rigidez aórtica;  
Pressão central;  
Ondas refletidas;  
Pressão arterial noturna

## Os valores da pressão arterial aórtica e índice de aumento central em indivíduos com hipertensão da bata branca são mais próximos dos indivíduos normotensos do que dos hipertensos tratados para idênticas idades, género e pressão noturna

### Resumo

**Introdução:** Permanece controverso se os indivíduos com hipertensão da bata branca (HBBs) exibem alterações hemodinâmicas e estruturais diferentes dos indivíduos normotensos (NTs) e hipertensos (HTs).

**Métodos:** Comparamos marcadores de prognóstico cardiovascular (CV): velocidade da onda de pulso (VOP), índice rigidez aórtica (AASI) e as alterações da onda de pressão aórtica (índice de aumento [Alx], pressão de aumento [AugP] e amplificação central periférica da pressão de pulso [PPA]) entre NTs ( $n=175$ ), HBBs ( $n=315$ ) e HTs tratados ( $n=691$ ) todos com pressão arterial (PA) de 24 h  $< 130/80$  e PA noturna  $< 120/70$  mm Hg, após emparelhamento para idade, género e IMC. Os grupos foram ainda comparados para PA 24 h  $< 120$  mm Hg e PA 24 h de 120-129 mm Hg.

**Resultados:** A percentagem de *non dippers* foi 40,1% nos NTs, 34,5% nos HBBs e 38,3% nos HTs. Para idêntica PA sistólica de 24 h e PA sistólica noturna (NT 109/64+7/5, HBB 110/66+7/6, HT 109/64+7/5 mm Hg), a rigidez aórtica foi mais elevada nos HTs ( $n=691$ , VOP=10,8+2,6 m/s e AASI 0,33+0,16,  $p < 0,01$ ) do que nos HBBs ( $n=316$ , PWV=9,7+2,4 m/s e AASI 0,28+0,17) e NTs ( $n=175$ , VOP=9,5+2,0 m/s e AASI 0,29+0,15); AugP e Alx foram mais elevadas ( $p < 0,01$ ) nos HTs (13,9+8,2 mm Hg e 29,6+12,6) que nos HBBs (11,5+8,5 mm Hg e 24,9+15,2) e NTs (11,0+6,4 mm Hg e 26,6+11,5). A PPA foi mais baixa  $p < 0,01$  nos HTs 11,3+5,5 do que nos HBBs 13,2+7,1 e do que nos NTs 12,4+4,9 mm Hg. Os dados foram semelhantes quando os subgrupos de PA 24 h  $< 120$  mm Hg ou entre 120-129 mm Hg foram analisados separadamente.

**Conclusões:** Os resultados sugerem que, para valores semelhantes da idade, IMC, género, PA ambulatória de 24 h e PA noturna, os HBBs apresentam valores da rigidez aórtica, da pressão central e das ondas refletidas mais próximos dos NTs do que dos HTs controlados. Estes dados permitem sugerir que a HBB constitui uma entidade relativamente benigna face à hipertensão sustentada para idênticos valores da PA de 24 h e, particularmente, da PA noturna.

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## Introduction

It is accepted that 24-h ambulatory blood pressure (BP) monitoring (ABPM) is superior to office BP measurement in predicting cardiovascular risk.<sup>1</sup> Individuals not taking anti-hypertensive medication who have persistently elevated office BP readings ( $> 140$  systolic and/or 90 mmHg diastolic) but normal BP otherwise have what is known as white coat hypertension (WCH).<sup>2</sup> The European<sup>3</sup> and American<sup>4</sup> guidelines on hypertension state that a diagnosis of WCH requires such values to be observed on at least three

occasion, together with average daytime or home measurements of  $< 135/85$  mmHg. Although these are the criteria<sup>3,5</sup> most often used in studies, as shown in a recent meta-analysis,<sup>6</sup> some authors suggest that confirmation of WCH requires two ABPM readings.

WCH, which appears to occur in at least 20% of the population with office hypertension,<sup>7,8</sup> is the subject of heated debate with regard to its prognostic significance compared to normotension or sustained hypertension. Several studies<sup>9-15</sup> have shown that WCH is associated with low prevalences of metabolic disturbances and target-organ

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