

# White Coat Hypertension: Diagnosis and Management

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White coat hypertension (WCH) is defined as elevated in-office blood pressures with normal out-of-office blood pressures in individuals who are not on anti-hypertensive therapy.<sup>1</sup> It is quite common with a prevalence of 23% worldwide.<sup>2</sup> It is prudent to diagnose WCH to avoid the unnecessary cost and adverse effects associated with anti-hypertensives. However, it is important not to dismiss WCH as benign, as it may be associated with increased risk of progression to sustained hypertension and cardiovascular morbidity and mortality.

Although WCH has been extensively researched since it was first reported in 1988, there is variability between studies.<sup>1</sup> The diagnosis, monitoring, treatment, and associated cardiovascular risk of WCH are all controversial. For example, the cutoff values for when to

suspect WCH vary among experts. The American College of Cardiology and American Heart Association define WCH as office blood pressures between 130/80 and 160/100 and out-of-office blood pressures of <130/80.<sup>1</sup> In most studies, the cutoff values are  $\geq 140/90$  for in-office blood pressures and <135/85 for out-of-office blood pressures.<sup>1</sup>

After WCH is suspected, it is diagnosed with ambulatory blood pressure monitoring (ABPM). There are differing opinions on when to use ABPM after the first instance of elevated in-office blood pressure. Canadian guidelines recommend using ABPM immediately after the first visit for early detection.<sup>1,3</sup> The Task Force of the Eighth International Consensus Conference on Blood Pressure Monitoring does not recommend ABPM until office blood pressures are  $\geq 140/90$  on 3 separate occasions and  $\geq 2$  out-of-office blood pressures are <140/90.<sup>4</sup> This accounts for blood pressure variability, as the blood pressure of patients with mild elevation at their first visit decreases by an average of 15/7 by their third visit.<sup>4</sup>

Traditionally WCH was thought to be benign, however patients with WCH have a higher risk of sustained hypertension than normotensive individuals.<sup>1</sup> ABPM can also be used to monitor progression of WCH to sustained hypertension. Risk factors include older age, high-normal daytime blood pressure, and nighttime blood pressure elevation which is often seen with obstructive sleep apnea, diabetes mellitus, and chronic kidney disease.<sup>4</sup> The European Society of Hypertension Working Group



on Blood Pressure Monitoring recommend using ABPM 3-6 months to reconfirm after initial diagnosis, and then annually to monitor for progression to sustained hypertension.<sup>4</sup> In contrast, the National Institute for Health and Care Excellence do not endorse follow-up or monitoring at all.<sup>1</sup>

There is increasing evidence that WCH is associated with target organ damage. A meta-analysis of 25 studies including 7382 individuals with normotension, WCH, and untreated hypertension showed that WCH is associated with increased left ventricular mass index, decreased mitral E/A ratio (the ratio of early (E) to late (A) peak of mitral inflow velocity, a measure of left ventricular diastolic function), and larger left atrial diameter intermediate between normotensive and hypertensive patients.<sup>5</sup> The pathogenesis is likely increased sympathetic activity, which has been documented in WCH.<sup>1,6</sup> WCH is also associated with microalbuminuria and elevated cystatin C, which are markers for renal damage.<sup>7</sup> Even transient stress-induced elevations in blood pressure may induce pathologic remodeling.<sup>5</sup>

Although it is becoming increasingly apparent that WCH is associated with target organ damage, it is less clear whether this leads to an increased rate of cardiovascular events, and whether this is attributable to WCH alone or independent risk factors. In a meta-analysis of 27 studies including 25,786 people with WCH or WCE (white coat effect) and 38,487 people with normotension or controlled hypertension, WCH was associated with an increased risk of coronary artery disease, myocardial infarction, peripheral arterial disease, and hospitalization for congestive heart failure.<sup>8</sup> Interestingly, WCH has not been associated with stroke. On the other hand, a retrospective cohort study of 653 subjects with WCH and 653 subjects with normal blood pressure found that the incidence of cardiovascular events was only higher among WCH patients who were older and had risk factors such as male sex, current smoking, dyslipidemia, and obesity.<sup>9</sup> Therefore, it is possible that WCH is associated with increased cardiovascular risk only in the presence of specific cardiometabolic risk factors.<sup>1</sup>

Perhaps the only clear takeaway from these studies is to recommend lifestyle modifications as opposed to antihypertensives for most patients with WCH. In the Syst-Eur trial, antihypertensives reduced both office and ambulatory blood pressures in patients with essential hypertension but only reduced office blood pressures in patients with WCH.<sup>10</sup> Antihypertensive treatment reduced the incidence of cardiovascular events in patients with sustained, but not white coat, hypertension.<sup>10</sup> Treatment for WCH could be considered in individuals who have elevated out-of-office blood pressure, signs of target organ damage, and high cardiovascular risk based on independent risk factors.<sup>1</sup>

In conclusion, although recommendations vary, we advise counseling patients with white coat hypertension that the diagnosis is not benign, and that lifestyle modifications may reduce their risk of cardiovascular events especially if they have concomitant risk factors.

## Endnotes

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