

EDITORIAL COMMENT

Masked Hypertension and White-Coat Hypertension

Therapeutic Navigation Between Scylla and Charybdis*

Franz H. Messerli, MD, FACC, FACP,
Delia Cotiga, MD
New York, New York

Blood pressure (BP) is a very labile hemodynamic parameter; it varies from heartbeat to heartbeat, from morning to evening, from winter to summer, from sleeping to awake, and from sitting to standing (1). The same holds true for any other cardiovascular hemodynamic parameter such as heart rate, cardiac output, ejection fraction or pulmonary wedge pressure (1). However, information that is based on invasively obtained measurements is often considered more reliable than information based on simple BP recording. Numerous studies have documented that BP measured by cuff carefully under standardized conditions in physicians' offices (2) is a powerful and reliable predictor of morbidity and mortality. Recent studies have documented that 24-h ambulatory BP monitoring is even a closer surrogate end point for heart attack and stroke than is office BP (3,4). Because the correlation between 24-h ambulatory BP measurement and office BP measurement is moderate at best, not unexpectedly there will be a significant number of people who are truly hypertensive but in whom the diagnosis is missed by office BP measurements (*masked hypertension*). Conversely, BP may be elevated in the office but not on ambulatory BP monitoring—an entity known to most clinicians as *white-coat hypertension*.

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The paper of Ohkubo et al. (5) in the present issue of the *Journal* deals with the prognosis of masked hypertension and white-coat hypertension. The investigators followed a group of 1,332 subjects from the general population of a small Japanese community for an average of 10 years. Patients were subdivided into normotensive, white-coat hypertension, masked hypertension, and sustained hypertension. Patients with white-coat hypertension had normal ambulatory BP monitoring values, although these were somewhat higher than in the normotensive group. Similarly, both cardiovascular mortality and morbidity were somewhat ele-

vated in subjects with white-coat hypertension, although these levels did not reach statistical significance. In contrast, patients with masked hypertension had a risk that was double that of normotensive subjects and close to patients with sustained hypertension. These results were independent of gender, use of antihypertensive medication, and risk-factor score.

White-coat hypertension is a clinical entity familiar to most physicians. Various studies (6–10), including the present one, have shown that the risk of patients with white-coat hypertension is somewhat elevated but distinctly lower than in patients who do have sustained hypertension. Despite being common, little is known how to best manage white-coat hypertension. Out of fear of overtreatment, some physicians are taking a “wait and see approach” in patients with white-coat hypertension. Conversely, fearing litigation, some physicians may take an overaggressive therapeutic approach, which might result in hypotension and orthostatic symptoms.

In contrast, masked hypertension is a much less well-known (but not necessarily a less common) entity that seems to carry a distinctly more serious prognosis. This was not only documented in the study by Ohkubo et al. (5) but also by Pickering et al. (11) who were the ones who proposed the term “masked hypertension.” The same entity has been described occasionally as “reversed white-coat hypertension” (12,13). It was initially regarded as rare but was recently found to be present, to some extent, in as many as one-third of the hypertensive population (12,14). Risk factors for masked hypertension are the use of alcohol, tobacco, and caffeine as well as physical inactivity (11,15). In the PAMELA population, patients with masked hypertension had a prevalence of echocardiographic left ventricular hypertrophy that was much greater than that of normotensive subjects (16). Inappropriate target organ disease (i.e., inappropriate for office BP levels), therefore, should trigger suspicion of masked hypertension and motivate physicians to expose a susceptible patient to 24-h ambulatory BP monitoring. In the study by Ohkubo et al. (5), the fact that as many patients had masked hypertension as had white-coat hypertension clearly documents that this entity is often overlooked. This is also the first prospective study that assesses the risk of white-coat hypertension and masked hypertension in a representative sample of a general population.

The clinician should remember that it is much easier to suspect the diagnosis of white-coat hypertension, as patients will usually state that their BP is normal at home. In contrast, masked hypertension needs to be looked for and there are very few clinical hints as to its presence. A normal BP in the clinical setting does not mean that a patient is not at risk from an elevated BP, which can occur at other times of the day. This is particularly true in patients who are treated with antihypertensive drugs that do not encompass a full 24-h period. Because the patient takes the medication in the morning, BP values in the physician's office most often

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From the Hypertension Program and Division of Cardiology, St. Luke's-Roosevelt Hospital Center and Columbia University College of Physicians and Surgeons, New York, New York.

are normal but may be substantially elevated at the end of the dosing interval (i.e., during the night and early morning hours). Thus, in many hypertensive patients, clinic BP is seemingly well controlled, but early morning BP, before the patients take the medication, may be elevated, thereby accelerating the risk of cardiovascular events (17). For many clinicians, masked hypertension has unfortunately become a blind spot (18) in antihypertensive therapy. Although we certainly cannot make a sweeping recommendation that all patients with high BP (or normal BP on therapy) should undergo 24-h ambulatory BP monitoring, we believe that the presence of inappropriate target organ disease such as left ventricular hypertrophy or microalbuminuria should arouse suspicion of masked hypertension and motivate physicians to initiate a further work-up. As to the therapeutic approach, we should remember that white-coat hypertension has a benign prognosis and can only be overtreated; therefore, a conservative approach is probably justified. Conversely, masked hypertension has a much more serious prognosis and can only be undertreated; it deserves, therefore, a thorough evaluation and a more aggressive therapeutic approach.

Reprint requests and correspondence to: Dr. Franz H. Messerli, Division of Cardiology, St. Luke's-Roosevelt Hospital Center, 1000 Amsterdam Avenue, New York, New York 10019. E-mail: fmesserli@aol.com.

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