Ambulatory Blood Pressure Monitoring to Assess Cardiovascular Risk in Women

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The precise mechanisms whereby nighttime BP is abnormal is not yet fully understood, and several hypothesis have been proposed, including increased sympathetic nerve activity, an inability to excrete sodium during the daytime, endothelial dysfunction, and small- and large-artery disease.7,8 Noteworthy is the fact that very few of those mechanistic studies assessed whether there was a sex difference in the association of nighttime BP and target-organ damage. One retrospective case-control study suggested an association between the reduction or absence of the usual nocturnal fall in BP and future cardiovascular morbid events in white women with essential hypertension compared with men.9 Thus, the difference in the relation of nighttime BP to cardiovascular complications in women reported by Boggia et al2 remains largely unexplained. Apparently, there was no difference in the dipping pattern of women and men,

Women live longer than men. The longer life expectancy of women is commonly attributed to their lower cardiovascular risk profile and to the fact that they develop cardiovascular complications at a lower rate and a later age than men. A number of population studies have indeed shown that, at comparable age, women are characterized by a lower incidence of angina pectoris, myocardial infarction, and stroke than men.1 This has contributed to the general medical belief that women are at low cardiovascular risk at least until they reach the menopause. One of the issues with this concept is this: do we potentially underestimate the real cardiovascular risk of women and thereby miss an opportunity to improve our ability to prevent cardiovascular complications in women?

In this issue of Hypertension, Boggia et al2 report the results of a comparison of the cardiovascular risk associated with office and ambulatory systolic blood pressure (BP) measurements in a large cohort of women and men from the general population of 11 different countries. As reported previously, women were at lower risk of cardiovascular events than men in this international cohort followed up for a median of 11.2 years. However, when assessing the association of cardiovascular complications with 24-hour ambulatory BP and nighttime BP, the authors found that the relation of all cardiovascular events and stroke and cardiac events with nighttime BP were much steeper in women. Thus, the percentage of preventable cardiovascular events in relation to nighttime BP was significantly higher in women than in men. These data first reemphasize the importance of considering nighttime BP in the assessment of the cardiovascular risk profile of hypertensive patients. To date, nighttime BP has been largely ignored, although previous studies have reported that BP during the night is a stronger predictor of cardiovascular outcome than daytime ambulatory BP.3–5 Moreover, several studies have indicated that an abnormal dipping pattern of BP at night (either an excessive drop or an increase in BP during the night) is associated with increased development of target-organ damage.6

The data presented by Boggia et al2 are interesting in several respects. First, one has to acknowledge the fact that the authors were able to follow up a large cohort of subjects for more than a decade and to collect data from subjects recruited from 11 countries from Europe, Asia, Russia, and South America by using a standardized protocol that included ambulatory BP monitoring (ABPM). Although this may complicate the statistical analysis, it also enables one to generalize the results to different populations. One must also emphasize that this is the first analysis specifically addressing the specific sex differences in the association between outcome and ambulatory BP. Interestingly, although the study confirms the lower incidence of total, cardiovascular, and noncardiovascular mortality and of cardiovascular morbidity in women and the better cardiovascular risk profile of women, they do not appear to be underdiagnosed or undertreated for hypertension. Indeed, the percentage of untreated persons in this cohort was lower among women than men, and the number of treated and adequately controlled cases was slightly better in women. Thus, labeling of women as being in a low cardiovascular risk group does not appear to have a major impact on their clinical management.

Another important observation of the present study is the association between nighttime systolic ambulatory BP and cardiovascular outcomes and the difference observed between daytime ambulatory BP in women and men for this association. Surprisingly, the risk of cardiovascular events in relation to nighttime BP was significantly higher in women than in men. These data first reemphasize the importance of considering nighttime BP in the assessment of the cardiovascular risk profile of hypertensive patients. To date, nighttime BP has been largely ignored, although previous studies have reported that BP during the night is a stronger predictor of cardiovascular outcome than daytime ambulatory BP.3–5 Moreover, several studies have indicated that an abnormal dipping pattern of BP at night (either an excessive drop or an increase in BP during the night) is associated with increased development of target-organ damage.6

The precise mechanisms whereby nighttime BP is abnormal is not yet fully understood, and several hypothesis have been proposed, including increased sympathetic nerve activity, an inability to excrete sodium during the daytime, endothelial dysfunction, and small- and large-artery disease.7,8 Noteworthy is the fact that very few of those mechanistic studies assessed whether there was a sex difference in the association of nighttime BP and target-organ damage. One retrospective case-control study suggested an association between the reduction or absence of the usual nocturnal fall in BP and future cardiovascular morbid events in white women with essential hypertension compared with men.9 Thus, the difference in the relation of nighttime BP to cardiovascular complications in women and men reported by Boggia et al2 remains largely unexplained. Apparently, there was no difference in the dipping pattern of women and men,
and one does not have enough information on the hormonal profile of women enrolled in this large cohort to propose any conclusions on the potential role of hormone-associated changes linked to the menopause.

The last important message that can be drawn from this cohort analysis is the potential benefits of ABPM to improve the cardiovascular risk assessment of hypertensive patients. Today, BP measurements outside the office that use either home or ABPM is essentially devoted to confirm the diagnosis of hypertension or to monitor the control of BP under therapy, as recommended by widely accepted hypertension guidelines.\textsuperscript{10–12} ABPM has not yet been taken into consideration for the evaluation of a patient’s cardiovascular risk. This is, in our point of view, unfortunate. ABPM appears particularly attractive for patients exhibiting close to normal clinic BP values, such as those with high-normal (systolic BP 130 to 139 mm Hg and/or diastolic BP 85 to 89 mm Hg) or grade 1 (systolic BP 140 to 159 mm Hg and/or diastolic BP 90 to 99 mm Hg) hypertension, according to the classification of BP levels proposed conjointly by the European Society of Hypertension and the European Society of Cardiology.\textsuperscript{11} For a given clinic BP, a patient might be at low, high, or very high added risk, depending on the possible coexistence of additional risk factors, target-organ damage, metabolic syndrome, diabetes, or established cardiovascular or renal disease. Taking ABPM into account in the total risk stratification should help clinicians avoid overtreatment in patients who have a low cardiovascular risk and, conversely, undertreatment in those at high cardiovascular risk. According to the European guidelines for the management of hypertension, being a women age ≥65 years represents an independent risk factor. There is nowadays ample evidence indicating that an abnormally elevated BP during ABPM is associated with a heightened risk of experiencing target-organ damage. The study of Boggia et al\textsuperscript{2} shows that this is particularly true for nighttime BP in women. It therefore appears justified to implement ABPM in the risk-stratification strategy, even if ABPM admittedly can hardly be performed in every hypertensive patient. No doubt the wide use of ABPM in risk stratification would have important implications for the cost-effective diagnosis and treatment of hypertension.

Disclosures

None.

References

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