Given the increase in prevalence of obesity, survival to older age, and urbanization, the projected global number of people with diabetes mellitus will double within decades (http://www.eatlas.idf.org/Prevalence). Physicians care for an ever-increasing load of elderly patients with diabetes mellitus. As a matter of fact, quality of care of patients with diabetes mellitus has become a measure of quality in internal medicine, and diabetes mellitus practice improvement modules are part of the American Board of Internal Medicine recertification program (http://www.abms.org/Maintenance_of_Certification). Recently it became clear that a major (and most reachable) intersection on the road to improving prognosis of patients with diabetes mellitus is the successful lowering of their blood pressure to levels well below those previously considered the goal for subjects without diabetes mellitus.

The vast body of research regarding blood pressure of patients with (as well as without) diabetes mellitus relies on office blood pressure measurements. However, it is now clear that 24-hour ambulatory blood pressure (ABP) monitoring provides data that are more closely linked to patients’ daily behavior.1 Compared with office blood pressure, the 24-hour ABP average may be closer to the individual’s “true” blood pressure. This is the basis for the overall stronger links of the latter with target organ damage, cardiovascular events, and, ultimately, survival.

Can we apply the vast knowledge generated from hypertensive and general populations with 24-hour ABP monitoring to patients with diabetes mellitus? Are 24-hour ABP monitoring patterns such as white coat effect, masked hypertension, nocturnal hypertension, and nondipping (the lack of the sleep-associated blood pressure or heart rate decline) represented in patients with diabetes mellitus as in the general hypertensive population? Surprisingly there are relatively few data to answer such questions. Nevertheless, there is good reason to suspect that some of the established patterns of sleep-associated blood pressure or heart rate decline (notably related to mortality. This is difficult to comprehend.
because blood pressure differences of this magnitude are usually associated with mortality. There are several mutually inclusive explanations. First, in this cohort with multiple comorbidities and a mortality rate of 37 per 1000 patient-years, the possibility of reverse epidemiology and biphasic relationships between blood pressure and mortality, eg, J- or U-curve pattern, might have been overlooked. Second, multiple interrelations between measures of blood pressure, age, metabolic abnormalities, medications, and comorbidities might have confounded the serious effects of high blood pressure in a way that cannot be fully adjusted for. Indeed, removal of only one of these parameters from the model, urinary albumin:creatinine ratio, resulted in significant association between pulse pressure and mortality. It also could be that all-cause mortality represents an insensitive end point, and perhaps analysis of nonfatal cardiovascular events would have been more revealing.

Interestingly, the number of patients designated as having their blood pressure controlled was low at the office (32%) and even lower by ABP (17%). This finding of office masking of ambulatory hypertension, confirms our previous findings on the specific importance of masked hypertension in diabetes mellitus. Also, the very high prevalence of nondipping, ~70%, points to its significance in diabetes mellitus, because it was indeed associated with predicting mortality in this and in other cohorts of patients with hypertension.

Another finding of Palmas et al is the association with mortality, of not only office pulse rate, but also nondipping of pulse rate, recorded by 24-hour ABP monitoring. This may represent a variety of pathophysiologic processes: preferential parasympathetic denervation in the autonomic neuropathy of long-standing diabetes mellitus; heart failure; the increased sympathetic activity of chronic kidney disease; and obstructive sleep apnea, as well as nocturnal awakenings for a variety of reasons as discussed above. Indeed, nocturia in the elderly was found to be associated with mortality, especially in the presence of coronary disease.

The ambulatory arterial stiffness index derived from the regression of diastolic to systolic ABP, a promising although as-yet poorly understood arterial characteristic that is, however, readily available from 24-hour ABP, predicted mortality in this study. Interestingly, ambulatory arterial stiffness index was not a significant predictor once 24-hour pulse pressure was entered into the model, evidence for its representation of an arterial property, as well as a reminder that it may be artificially elevated in nondippers.

This important study re-emphasizes the importance of using 24-hour ABP monitoring if we want to reduce misclassification (masked hypertension) and be able to use the unique variables easily derived from 24-hour ABP monitoring, such as blood pressure and pulse rate nondipping, important for proper prognostication of this high-risk population.

Disclosures

None.

References

Diabetes Mellitus and 24-Hour Ambulatory Blood Pressure Monitoring: Broadening Horizons of Risk Assessment
Michael Bursztyn and Iddo Z. Ben-Dov

Hypertension. 2009;53:110-111; originally published online January 5, 2009;
doi: 10.1161/HYPERTENSIONAHA.108.119123
Hypertension is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2009 American Heart Association, Inc. All rights reserved.
Print ISSN: 0194-911X. Online ISSN: 1524-4563

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://hyper.ahajournals.org/content/53/2/110

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Hypertension can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Hypertension is online at:
http://hyper.ahajournals.org//subscriptions/