Implementing Home Blood Pressure Into Practice
What More Do We Need?

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The growing worldwide epidemic of high blood pressure in both developed and developing nations is a challenge on many levels. The need for better prevention of cardiovascular disease through control of hypertension is clear. Public awareness of the need to treat hypertension is partly reflected by the widespread purchases of home blood pressure devices in several of the developed countries. In the United States, Japan, and Finland, the estimates are that 55% to 75% of hypertensive patients already have a home device. Research studies have provided a robust epidemiological basis for supporting the greater accuracy of home blood pressure monitoring (HBPM) compared with clinic pressures for prognosis of fatal and nonfatal cardiovascular disease in long-term follow-up surveys and in cross-sectional designs. There is a general consensus that HBPM is more convenient, available, and less costly than ambulatory blood pressure monitoring, but the superiority of ambulatory blood pressure monitoring for special clinical problems (ie, detection of nondippers or need for sleep pressures in chronic renal disease, autonomic neuropathies, and sleep apnea) is also clearly recognized. Surveys of both physicians and patients suggest that HBPM is both appreciated and recognized as a valuable strategy. Several experts in the field of hypertension research and care have published appeals to expand the use of HBPM for routine care and to have it supported by health care systems.

HBPM, like home monitoring of glucose, weight, and temperature, is an empowering method for patients to assist in giving themselves control over their own management. Recent studies have incorporated self-management of antihypertensive medications with HBPM; the results are promising. Those who manage their own pressure together with HBPM have significantly lower average pressures compared with controls when measured by an objective method. With all of the evidence summarized above, what are we, as practicing providers of preventive cardiovascular medicine, waiting for? Is it time to advise all of our hypertensive patients to have a home pressure device, use it, report the results in one way or another, begin adjusting their own medication, and, with a few telephone calls or e-mails, reduce the burden for providers and patients of unneeded clinic visits? In either evidence-based guidelines or expert advice, what message should be put forth to those on the front lines of primary care in this regard? The report published in this issue of Hypertension by Nissen et al11 is directly relevant to this question.

The Finn-Home Study is a prospective survey that links home blood pressure measurement at its baseline with long-term outcomes. It is one of the more robust studies for establishing the superiority of HBPM for prognosis of cardiovascular disease compared with clinic pressures. In the current report, measurements of HBPM at the start of the Finn-Home Study have been dissected to answer a very practical question: how many home blood pressure measurements are needed to establish an accurate prognosis? Is time of day, morning or evening, a factor in this regard? By having a full week’s measurements taken both in the morning and the evening, the Finn-Home investigators could parse these issues and arrive at conclusions that are applicable to clinical practice.

The protocol for the Finn-Home baseline assessment of HBPM called for 7 days of measurements, twice in the morning and twice in the evening, for a maximal total of 28. The analysis evaluated 1 to 7 days and morning and evening measurements together and separately in arriving at the best correlation with eventual cardiovascular events. The optimal risk relationship was found for the highest number of measurements, but the risk relation calculated after only 3 days (12 measurements) was almost as accurate. Eliminating the first day had little effect, and comparison of morning and evening pressures likewise had no effect on the accuracy of prognosis. These results are consistent with a variety of epidemiological studies using clinic pressure with correction for regression dilution because of small sample size and from ambulatory blood pressure research in which more measurements per patient are available. It is the usual or average blood pressure that best predicts long-term event rates. When HBPM is used for initial risk evaluation, clinicians need a minimum of 3 days of measurement; the full 7 days would seem to add little to the prediction. Is that the whole story?

Multiple measurements of blood pressure permit calculation of an average, and that average is used for diagnosis and treatment, but what of the variation between pressures that is reflected by the SD or coefficient of variation (SD/average)? Past studies suggested that the variation in pressure added little to prognosis. However, recent reports suggest that this issue needs reconsideration. A retrospective look at within-subject variability of blood pressure and heart rate in the
Japanese prospective Ohasama Study of home blood pressures found that day-to-day higher variability (SD) in systolic and diastolic blood pressures was independently correlated with increased cardiovascular mortality and stroke mortality. The same pattern was observed whether variability was defined by the SD or the coefficient of variation. The average age at entry in the Finn-Home Study was similar to that of the Ohasama Study, 56 to 58 years, so that the 2 may be compared if the analysis of variability in Finn-Home can be conducted. If variability of home pressures is indeed an important prognostic measure, enough pressure measurements will be needed for an accurate SD, as well as for the average pressure.

Another reason for a second look at variability of blood pressure and prognosis comes from retrospective analysis of visit-to-visit differences in blood pressure from 2 large clinical trials. Increased visit-to-visit variability in pressure was highly correlated with occurrence of stroke in the United Kingdom Transient Ischemic Attack Aspirin Trial and stroke and coronary heart disease in the Anglo-Scandinavian Cardiac Outcomes Trial-Blood Pressure Lowering Arm. A weaker relationship was found for variability and risk as assessed by ambulatory blood pressure monitoring and event rates in the Anglo-Scandinavian Cardiac Outcomes Trial-Blood Pressure Lowering Arm. There are many good reasons for not considering visit-to-visit variability as providing the same information as variability in 24-hour ambulatory recording or 3- to 7-day HBPM. Increased variability in visit-to-visit pressures may simply be a surrogate for poor adherence to treatment. Nonetheless, variability in blood pressure has become a suspect risk factor for prediction of risk and for assessment during treatment as well.

HBPM may well be ready for “prime time” in management of many hypertensive patients by using average pressures over a 3- to 7-day period, as suggested by results from the Finn-Home Study. However, the ability to obtain multiple measurements of blood pressure during short periods of weeks to months in large numbers of participants might provide definitive information on whether blood pressure variability itself should be added to the list of important cardiovascular risk factors for both diagnosis and possible treatment.

Disclosures

None.

References

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