Home Blood Pressure Monitoring
A Tool for Better Hypertension Control

Giuseppe Mancia, Gianfranco Parati

Home blood pressure (BP) measurements enjoy a growing popularity in medical practice for several reasons. One, self-measured BP in the home environment is much less affected by the so-called white coat effect than BP values obtained by a doctor or a nurse in the clinic environment.1,2 This makes home BP closer to BP values prevailing in daily life. By minimizing the highly variable cardiovascular effects of emotion, it also makes it more reproducible than clinic BP,3 particularly when a suitable number of values are made available,4 which can be achieved rather easily. Two, although home BP cannot provide information on BP phenomena of prognostic significance identifiable by ambulatory BP monitoring (nighttime BP fall, BP variability, and morning BP rise),5 its relationship with the risk of cardiovascular morbidity and mortality has been documented in several observational studies.6 These studies also have shown that the relationship with cardiovascular risk is steeper for home than for clinic BP (Figure, left panel),7 and that home BP changes by treatment are also prognostically superior to clinic BP changes,8 at least when prognosis is inferred by the ability to predict the effect of treatment on a clinically relevant organ damage such as left ventricular hypertrophy9 (Figure, right panel). Finally, in several studies, the addition of home BP to routine patient management has been shown to improve compliance to treatment, in particular when home BP monitoring is coupled with teletransmission of BP values self-measured by patients at home.10,11 This is an advantage of paramount importance because in real life, low compliance to treatment is a phenomenon of devastating proportions,12 which can be held as majorly responsible for the poor rate of BP control that characterizes the hypertensive population13 and makes hypertension still the first cause of death worldwide.14

The last advantage receives important support from the results of the study of Agarwal et al published in this issue of Hypertension.15 In this study, the effect of antihypertensive treatment on clinic or ambulatory BP was compared between patients randomized to have or not to have home BP measurements during the treatment period via a meta-analysis of the data provided by 37 trials. The results show that in patients in whom home BP measurements were used, treatment-induced BP reductions were slightly but significantly greater (systolic, about $-2.7$ mm Hg; diastolic, about $1.7$ mm Hg) and so was the percentage of patients achieving BP control, although the difference fell short of statistical significance. This greater therapeutic success was associated with more frequent reductions in antihypertensive medications as well as with more frequent medication changes in the presence of uncontrolled BP values. Thus, including home BP in the management of treated hypertensive patients favors the therapeutic effect in several ways, ie, through an improvement of compliance to treatment, an avoidance of overtreatment, and a reduction of clinical inertia as defined by the lack of therapeutic modifications when such modifications are needed. The last finding is of special interest because in the last few years, clinical inertia has been reported to be extremely common in cardiovascular preventive medicine.15,16

Several other aspects of the study by Agarwal et al15 deserve comment. Just to quote a few, a merit of the study is that it is based on a large number of patients ($n=9446$), which gives its conclusion unquestionable strength. In addition, the advantages of including home BP in the patient management was similar in older and younger patients but much greater in those undergoing dialysis compared with the remaining patients. This suggests that we should expect the advantages offered by home BP to the treatment strategy to extend over a wide age range (including the age at which hypertension is most common) but also to differ in different clinical conditions. Finally, the results of Agarwal et al15 that the advantages of home BP measurements were particularly pronounced when telemonitoring allowed transmission of the measured values to the physician supports a combined use of these 2 approaches,10,11 presumably because this combination may further favor timely modifications of treatment and reduce clinical inertia.

The meta-analysis of Agarwal et al15 also has limitations. For example, the studies included in the meta-analysis were highly heterogeneous for design, duration, number and type of BP measurements, and clinical characteristics of the patients. The authors coped with the problem by performing an extensive subgroup analysis of the data, which led, as mentioned above, to additional interesting findings. However, subgroup analysis reduced (sometimes to a marked degree) the number of studies and patients on which comparisons were based and often made the subgroups that were compared highly unbalanced. Thus, it appears prudent to regard some

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From the Department of Clinical Medicine and Prevention (G.M., G.P.), University of Milano-Bicocca, Milan, Italy; Department of Cardiology (G.P.), S. Luca Hospital, Istituto Auxologico Italiano, IRCCS, Milan, Italy; and Clinica Medica (G.M.), University of Milano-Bicocca and Ospedale S. Gerardo, Monza, Italy.

Correspondence to Giuseppe Mancia, Clinica Medica, University of Milano-Bicocca and Ospedale S. Gerardo, via Pergolesi, 33, Monza, Italy. E-mail giuseppe.mancia@unimib.it

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results of the present study as useful suggestions for future investigations rather than firm conclusions from the preceding ones. Further, in several studies included in the meta-analysis, the group in which home BP was used made use of a home BP target for treatment that was identical to the clinic BP target, despite the evidence that home BP is lower than clinic BP. This presumably made the in-treatment clinic BP values of this group systematically higher, underestimating the advantage of home BP measurements for BP-lowering interventions. Finally, the meta-analysis included studies in which the advantage of using home BP measurements was assessed by ambulatory BP reductions. However, treatment-induced changes in the 24-hour mean BP are smaller than clinic BP changes, with a much steeper relationship with events. This may be another reason for underestimating the extent to which inclusion of home BP measurements can increase the BP-lowering effect of treatment, indeed quite small in the present study.

The study of Agarwal et al helps clarify some issues to be addressed by future research on the advantages of home BP measurements for improving the effect of antihypertensive treatment. For example, based on the diversity of the results on dialysis and nondialysis patients, it will be important to more extensively study different clinical conditions to see whether these advantages are different in relation to factors such as a patient’s motivation to treatment, need of quick treatment adjustment, frequency of medical visits, doctor’s commitment to patient care, etc. In addition, more information is needed, via suitable study designs, on the extent of the advantage brought about by adding telemonitoring to home BP measurements. Finally, and outside the scope of the study by Agarwal et al, research should continue on the prognostic value of home BP monitoring, keeping in mind that this approach has a chance to transfer to clinical practice the recent interesting finding that during treatment, visit-to-visit BP variability has an important prognostic value, over and above the value provided by average in-treatment BP. By extending home BP measurements long enough to determine day-to-day, week-to-week, or month-to-month BP, this information can be made available to the physician soon after treatment is implemented, offering a new tool to judge whether reduction in risk has been achieved.

Disclosures

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References


Figure. The left panel shows the increase in the risk of cardiovascular (CV) death during a follow-up period of ~12 years associated with a 10-mm Hg increase in clinic or home systolic BP (SBP) from different initial SBP values in a sample representative of the population of Monza, a town in the northeast outskirts of Milan. The right panel shows the relationship between regression of echocardiographic left ventricular hypertrophy and clinic or home SBP or diastolic BP (DBP) reduction in hypertensive patients treated for 1 year with a combination of a diuretic and an angiotensin-converting enzyme inhibitor (modified by references 17 and 18, with permission). LVMi indicates left ventricular mass index.


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