On Treatment Blood Pressures
Which Can Be Trusted, Home or Clinic?

Lawrence R. Krakoff

High arterial pressure is clearly related to risk of future cardiovascular disease and reduction of high pressure is effective for prevention. These concepts are now thoroughly familiar to physicians, other health care providers, and many of those who consume health care (patients) as well. Most of the epidemiology relating cardiovascular risk and the outcome trials demonstrating benefit of drug treatment were, in past decades, based on measurement in clinics using the ancient methods that were developed at the end of the 19th century. We are now at the end of the first decade of the 21st century, and times are changing. Clinical science has clearly shown that blood pressures measured in the clinic are inferior to those measured outside the clinic in “real life” for predicting future cardiovascular mortality and morbidity. Two strategies have been widely studied in this regard: 24-hour ambulatory blood pressure monitoring and home blood pressure recording.1,2 Both have also been assessed for their role in determining the effectiveness of antihypertensive treatment. Most reports have assessed one or the other modality, but not both.

It might be assumed that the daytime component of 24-hour blood pressure monitoring would be similar to home blood pressure recording. However, this need not be so, as home recordings omit the effects of other environments, in particular the work site and other out-of-the home settings (shopping, classes, visiting others, etc). An orderly and comprehensive comparison of clinic pressures, ambulatory monitoring pressures, and home blood pressures during antihypertensive treatment may yield important insights for understanding treatment effects in the day-to-day activity of patients. The meta-analysis by Ishikawa et al then provides a valuable survey of these issues.3 Moreover, the increasing use and acceptance of home blood pressures for monitoring control of hypertension make this meta-analysis quite timely. We who treat hypertension and rely on home recording for assessing response to treatment need to know how these measurements are related to clinic measurement (that will still be widely used, even if it is an anachronism4).

The authors of this meta-analysis culled 30 articles that met their criteria for inclusion, which included both clinic and home pressures. Of these 7 also assessed 24-hour ambulatory pressure monitoring. Clinic pressures were measured by various methods; some used the sphygmomanometer, others used the same device that was chosen for home measurement. Recording of home pressures varied from self reports to device recorded reports with or without transmission to central sites (telemetry). Average ages ranged from 46 to 70 years. The fraction of men varied from 28% to 76%. Sample sizes varied from 19 to 1395 for the individual studies; 50% of the studies had <100 participants. Many of the studies were conducted in Japan, where home blood pressure recording is widespread. Several of the larger studies took place in Europe.

The meta-analysis clearly demonstrates that overall reductions in blood pressure attributable to treatment are well correlated between clinic and home pressures, with regression coefficients that convey a high degree of statistical significance for group trends. Looking at the individual studies, there is often substantial discrepancy between clinic and home pressures. One can easily predict that there were much greater differences for individual patients, not shown in the pooled results for each study. Are there individual treated patients with a fall in clinic pressure, but no fall or an increase in home pressure? Do they benefit from treatment?

On treatment clinic pressures clearly fell more than home pressures. The baseline levels for systolic and diastolic pressure were lower for home pressures than for clinic pressures in nearly all studies (a white coat effect), so that the greater fall on treatment for clinic pressures is best explained by the choice to achieve a lesser reduction in pressure by the treating provider if the same goal pressures were accepted. It is not clear from the analysis, however, whether the home pressure goals were lower or the same as the clinic goal across all studies, an important consideration.5 At this time, no evidence based standard for on treatment pressures at home is well established, but expert written guidelines advocate a lower goal than for clinic pressures.

The added comparisons for ambulatory blood pressure monitoring to clinic and home blood pressure measurement increase the complexity of this meta-analysis, but the descriptive results should generate creative and needed hypotheses. Each reader may chose their own interpretation, but I am intrigued most by the difference between home pressures and awake-daytime pressures (Figure 5 in the article by Ishikawa et al). The trend for home pressures to be lower than daytime pressures, in the populations studied, suggests that life at home is less stressful than life elsewhere such as the work site. This pattern has been suggested for untreated subjects in a previous study which included a younger population with average pressures in the high-normal (now “prehypertensive”)

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range). More research is needed to characterize these patterns for both risk and for treatment effects.

Which blood pressures matter most for defining baseline risk and for determining treatment effect? This meta-analysis cannot answer those questions. Epidemiological surveys emphasize the greater precision for predicting risk when measures are taken to reduce regression dilution, most simply obtained by more measurements (usual blood pressure). Ambulatory monitoring and home pressure recording can offer these measurements and have improved risk prediction. Home blood pressures on treatment assist in determining usual pressure but omit the entire spectrum that occurs outside the home or during sleep. Perhaps home pressures can be combined with work-site measurements for a better average daytime pressure than either alone, without the cost and inconvenience of 24-hour ambulatory pressure monitoring. Telemetry-based systems could provide such information. Such studies might then reveal whether antihypertensive treatment is equally effective regardless of the daytime setting (eg, home=work) or unequal (eg, work>home or home>work) and which daytime pressures and patterns are best related to outcomes.

For the time being, as home pressure measurements become widely used to assess the effect of treatment, even perhaps replacing clinic measurement, clinicians need to know the strengths and limitations of this advance for better management of hypertension.

Disclosures

None.

References

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