Triage for Out-of-Office Blood Pressure

Lawrence R. Krakoff

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Several strategies for defining WCH and MH at a single clinic visit have been described. The Mayo Clinic has studied the value of a 6-hour recording during the day by the ABPM device for calculation of the average pressures.\(^1\) The BpTru is a desktop unit that measures arm pressure in seated patients. Six blood pressure measurements were taken 1 to 2 minutes apart. The first one was discarded, and the subsequent 5 were averaged for the final determination. Myers et al compared the BpTru average pressure with the first pressure and awake ABPM pressures in Canadian general practices. BpTru average pressures correlated far better with day-time ABPM pressures compared with first office pressures.\(^6\) Furthermore, there was a clear reduction from the first measurement to the subsequent ones.

When more measurements of blood pressure are taken at one visit, the average and trend (difference from first to subsequent) can be calculated. Blood pressure measurement alone, however, omits use of patient characteristics in triaging to the prediction of WCH or MH. Yet studies have suggested that some are more or less likely to have WCH or MH on the basis of other additional traits: sex, age, and others.\(^7\) A comprehensive model including pressure and relevant traits might improve triage classification into the 3 categories: normal pressure, sustained high pressure (hypertension), and need for out-of-office pressure. This sensible approach has been evaluated in a large number of adults enrolled in several surveys from the United Kingdom and Canada presented in this issue of *Hypertension* as the Predicting Out-of-Office Blood Pressure in the Clinic (PROOF-BP) study.\(^4\)

The PROOF-BP investigators approached the triage problem by developing a prediction model based on information from 991 participants in 2 trials (the derivation cohort) in which multiple clinic pressures, taken with a suitable device, and relevant traits were combined to generate model systolic and diastolic pressures. The validation cohort consisted of 1172 participants from 4 separate trials. The final version of the model included age, first clinic pressure, difference between first and last clinic pressure (of 3–5 readings), pulse pressure, body mass index, alcohol consumption (unit/week), years of hypertension, sex, use of prescribed medication (yes/no), smoking status, and history of cardiovascular disease. The model-derived systolic and diastolic pressures proved to be highly accurate for predicting measured out-of-office pressures as a guide to whether ABPM or home blood pressure monitoring are needed. Those with model-calculated pressures >140/90 mmHg were confidently predicted to be hypertensive, whereas those with model-calculated pressures <130/80 mmHg were predicted to be normal. Those with model-predicted pressures <145/90 mmHg and >130/80 mmHg would be referred for out-of-office monitoring (Figure). For those

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From the Center for Cardiovascular Health, Icahn School of Medicine at Mount Sinai, New York, NY.

Correspondence to Lawrence R. Krakoff, Icahn School of Medicine at Mount Sinai, New York, NY 10029. E-mail Lawrence.krakoff@mountsinai.org


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Figure. The triage strategy for classifying into 3 options for office-based use of the predicting out-of-office blood pressure in the clinic (PROOF-BP) model. The prediction model requires use of an automated blood pressure device and 3 to 5 measurements of blood pressure. The first pressure and change to the last pressure are recorded along with the traits described in the text for calculation of the model-based pressure. Classification is then made for the 3 categories. Those with model-based pressures 130 to 140/80 to 90 mm Hg would be referred for ambulatory blood pressure monitoring (ABPM). HBPM indicates home blood pressure monitoring, MH, masked hypertension; and WCH, white coat hypertension.

with office hypertension based on a single reading, the model-based triage would reduce the demand for out-of-office pressures by nearly 50%. The equations can easily be programmed for a smart phone or laptop computer; an app is likely to become available.

The importance of this new information lies in the size and diversity of the cohorts and the clear indication that several traits add precision to the blood pressures alone for predicting who would be most likely to benefit from out-of-office pressures were they available. Where out-of-office pressures are not available or feasible, model-predicted pressures would then become the basis for decisions to observe and follow or begin or intensify anti-hypertensive treatment.

The populations used to derive the PROOF-BP equations were from the United Kingdom and Canada, but diverse including significant numbers of UK-White, Afro-Caribbean, and South Asian participants. These subgroups are apparently similar with regard to patterns of out-of-office blood pressure. However, more populations need to be assessed to determine whether the parameters used in the PROOF-BP model will apply more generally. African American groups should be studied. Their blood pressure patterns may be different from those with limited healthcare resources and uncertain healthcare literacy, the PROOF-BP approach may make a major addition to the worldwide imperative for better and affordable management of hypertension.

Disclosures

None.

References

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