VII. Home BP Measurement

DIAGNOSIS AND ASSESSMENT

http://guidelines.hypertension.ca/diagnosis-assessment/home-measurement/

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Recommendations

1. HBPM can be used in the diagnosis of hypertension (Grade C).
2. The use of HBPM on a regular basis should be considered for patients with hypertension, particularly those with:
    i.   Diabetes mellitus (Grade D);
    ii.   CKD (Grade C);
    iii. Suspected nonadherence (Grade D);
    iv.   Demonstrated white coat effect (Grade C);
    v.   BP controlled in the office but not at home (masked hypertension) (Grade C).
3. When white coat hypertension is suggested by HBPM, its presence should be confirmed by repeat HBPM (see Recommendation 7 in this section) or ABPM before treatment decisions are made (Grade D).
4. Patients should be advised to purchase and use only HBPM devices that are appropriate for the individual and have met standards of the Association for the Advancement of Medical Instrumentation, the most recent requirements of the British Hypertension Society protocol, or the International Protocol for validation of automated BP-measuring devices. Patients should be encouraged to use devices with data recording capabilities or automatic data transmission to increase the reliability of reported HBPM (Grade D).
5. Home SBP values of ≥135 mm Hg or DBP values ≥85 mm Hg should be considered to be increased and associated with an increased overall mortality risk (Grade C).

6. Health care professionals should ensure that patients who measure their BP at home have adequate training and, if necessary, repeat training in measuring their BP. Patients should be observed to determine that they measure BP correctly and should be given adequate information about interpreting these readings (Grade D).
7. HBPM for assessing white coat hypertension or sustained hypertension should be based on duplicate measures, morning and evening, for an initial 7-day period. First-day home BP values should not be considered (Grade D).

Background

1. HBPM can be used in the diagnosis of hypertension (Grade C).

Home blood pressure monitoring (HBPM), which is one type of self-measured blood pressure (SMBP) is useful for the diagnosis of sustained hypertension, white coat hypertension and masked hypertension. As white coat hypertension (i.e., elevated office blood pressure and normal out-of-office blood pressure findings) is associated with a better cardiovascular prognosis compared with those with elevated BP at the office and in non-office settings (1) its identification is not only important to guide therapeutic decision-making, but it relies on comparing an office blood pressure reading with results of out-of-office blood pressure measures. Observational data show that HBPM has the the best reproducibility when compared with office and ambulatory monitoring (2). Within-person variability improved with longer self-monitoring duration and lower intervals between successive home monitoring periods; the lowest coefficient of variation (2.7 %) was achieved after 4 successive weeks of monitoring, and the highest (6.1%) was observed when the week long monitoring periods were separated by a monitoring hiatus of 10 weeks. Despite moderate diagnostic agreement between HBPM and ABPM patients with white coat hypertension diagnosed by either HBPM or awake-ABPM have more favourable risk profiles and less target organ damage than those diagnosed with sustained hypertension (3). Furthermore, longitudinal evidence suggests that HBPM has better prognostic accuracy than OBPM; the incidence of cardiovascular events in patients with white coat syndrome was low and not significantly different from the incidence of cardiovascular events in patients with controlled hypertension (hazard ratio [HR], 1.18, 95% confidence interval [CI], 0.67-2.10) (4).

The existing data strongly suggest that levels of blood pressure at home are lower than those in the office (5-7), with home values above 135/85 mm Hg considered elevated (5-8).

2. The use of HBPM on a regular basis should be considered for patients with hypertension, particularly those with:

I. DIABETES MELLITUS (GRADE D);

II. CKD (GRADE C);

III. SUSPECTED NONADHERENCE (GRADE D);

IV. DEMONSTRATED WHITE COAT EFFECT (GRADE C);

V. BP CONTROLLED IN THE OFFICE BUT NOT AT HOME (MASKED HYPERTENSION) (GRADE C).

In studies of patients with CKD (9,10), home monitoring independently predicted the development of end-stage renal failure. The use of home blood pressure monitoring can increase patient compliance in those suspected of being noncompliant (11,12) and can increase compliance among diabetic patients (13). Using population-based home BP measurements from the Ohasama cohort (14), a recent study reported that patients with white coat hypertension were more likely to develop home hypertension than normotensive patients without white coat hypertension. In this study of 128 subjects followed for eight years, 47% of patients with white coat hypertension (elevated office readings and normal home readings) developed home hypertension compared with 22% of patients with normal home and office readings at baseline (OR 2.86; 95% CI 1.90 to 4.31).

The term 'masked hypertension' is applied to patients with normal office BP measurements but elevated home BP readings (15-17). The cardiovascular prognosis of individuals with masked hypertension is similar to that of individuals with BP readings elevated both in the office and at home (4).

3. When white coat hypertension is suggested by HBPM, its presence should be confirmed by repeat HBPM (see Recommendation 7 in this section) or ABPM before treatment decisions are made (Grade D).

The need to further assess patients using 24 h ambulatory blood pressure monitoring when a home BP based white coat effect is suspected has been supported by baseline data from the Treatment of Hypertension According to Home or Office Blood Pressure (THOP) trial (18). In this study of 257 hypertensive patients, home blood pressure was specific (89%), but not sensitive (68%), in its ability to detect white-coat hypertension.

Alternatively, a repeat home BP series can be performed to confirm the presence of white coat hypertension. This recommendation is supported by studies demonstrating that home BP is associated with lower variability than clinic or ABPM and multiple studies demonstrating that home BP can predict white coat hypertension and end-organ damage (1-3).

4. Patients should be advised to purchase and use only HBPM devices that are appropriate for the individual and have met standards of the Association for the Advancement of Medical Instrumentation, the most recent requirements of the British Hypertension Society protocol, or the International Protocol for validation of automated BP-measuring devices.

Patients should be encouraged to use devices with data recording capabilities or automatic data transmission to increase the reliability of reported HBPM (Grade D).

Accurate BP results from home/self BP monitors require that validated devices are used (19,20). Devices capable of recording BP readings or transmitting readings to the health care provider may help ensure that clinical decision-making is based on the most accurate data (21).

Only some automated home blood pressure monitoring devices meet rigorous standards for accuracy and reliability, and many devices become less accurate over time (22,23). Fully automated devices may be preferable for some elderly patients who may have difficulty handling semi-automated devices (24). Various studies, using different of experimental approaches have reported that patient log books of blood pressure readings may differ from data obtained from the device memory (25-28). Although these differences may arise for a variety of reasons, accurate data are required for the best clinical decision-making. For each office visit, patients should be advised to bring in all recorded blood pressure data so it can be reviewed and the importance of accurate recording can be discussed or demonstrated.

5. Home SBP values of ≥135 mm Hg or DBP values ≥85 mm Hg should be considered to be increased and associated with an increased overall mortality risk (Grade C).

The threshold above which home/self BP values should be considered elevated is 135/85 mmHg. This is supported by prognostic studies showing an increased risk of cardiovascular events above or near this threshold (29-37).

6. Health care professionals should ensure that patients who measure their BP at home have adequate training and, if necessary, repeat training in measuring their BP. Patients should be observed to determine that they measure BP correctly and should be given adequate information about interpreting these readings (Grade D).

Patients measuring blood pressure at home should be trained by a qualified health care professional and should be provided with adequate information for interpretation (38,39).

7. HBPM for assessing white coat hypertension or sustained hypertension should be based on duplicate measures, morning and evening, for an initial 7-day period. First-day home BP values should not be considered (Grade D).

Despite varied measurement protocols, home BP monitoring has been shown to predict health outcomes (40,41) better than office BP measurements. Although single home readings were shown to be predictive of stroke in a large population (42), multiple BP readings are required for risk prediction within individuals. BP readings taken on the first day in a series of measurements (43,44) are higher than those on subsequent days, and with respect to duplicate readings, first readings are consistently higher than second readings in both the morning and the evening (44,45).

Expert opinion suggests that in patients with stable normotensive BP averages, "long term observation" can be achieved by one week of BP monitoring every three months (46). Patients who have difficulty remembering to take medication may benefit from daily home BP measurement (47) and diabetic patients can benefit from frequent home BP monitoring (48).

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