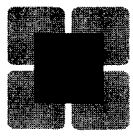

Finding the right role for home blood pressures

It has been 60 years since Brown[1] reported self-measurement of blood pressure outside of a medical environment and 50 years since Ayman and Goldshine[2] documented that clinic blood pressures were generally higher than those measured by the patient at home. With the advent of effective antihypertensive therapy, physicians came to value self-measured blood pressures in the establishment of effective therapeutic regimens, often basing clinical decisions on the integration of the patient's observations with office measurements.

■ *See Vidt and associates, (pp 28–32).*

Gould and colleagues[3] documented the correlation between simultaneous readings by patients and physicians. Engel and associates[4] demonstrated the feasibility of daily self-monitoring. Self-measurement devices permit recording several awake blood pressure measurements daily, in different positions and in various environments.[4–7] Home blood pressures are valuable for testing antihypertensive drug efficacy[8] and they correlate better with target organ damage (such as electrocardiographic evidence of left ventricular hypertrophy) than office blood pressures do.[9]

Mejia and co-workers[10] used self-determination of blood pressure in a community-wide survey lasting longer than 1 year; they concluded that in Tecumseh, Mich., the upper limit of normal for home blood pressures (two standard deviations above the mean) was 142/92 mmHg for men and 131/85 mmHg for women.

SOME LIMITATIONS

Some problems are associated with home blood pressure determinations. A variety of mercury, manual, aneroid, and electronic blood pressure devices are available for self-monitoring, but the development of a consistently accurate instrument has been a challenge. Frequent re-evaluation (at least annually) of equipment is necessary in a continuing care program that uses home blood pressure determinations.[11–15]

The act of inflating the blood pressure cuff has some potential for artifacts. Veerman and associates[16] and Mejia and co-workers[17] (but not Parati and associates[18]) demonstrated an instantaneous, significant rise in systolic pressure in some hypertensive and normotensive subjects during cuff inflation. Systolic pressures increased by as much as 20 mmHg and diastolic pressures by 15 mmHg, as determined by simultaneous intra-arterial pressures. The return to baseline may take up to 21 seconds after stopping cuff inflation. This phenomenon also has been documented during passive cuff inflation. The frequency of the cuff inflation artifact needs to be further investigated.

The potential for subjective bias remains a problem when the measurement is fully automated but the values are recorded by the observer.[19]

SEMI-AUTOMATED MONITORING

In this issue of the *Cleveland Clinic Journal of Medicine*, Vidt and colleagues present their evaluation of a new semi-automated auscultatory device, Telelab, that corrects many of the difficulties of other home blood pressure devices. On average the Telelab records a diastolic pressure 3.5 mmHg lower than that obtained simultaneously by trained observers, but systolic pressures are identical. This accuracy is maintained after prolonged home use.

The device is easy to use. After the patient initiates the recording, the remainder of the measurement is automatic and the result can be blinded to the ob-

server. The data are stored and transmitted by telephone at a convenient time. The device is lightweight and can be taken to work and other locations outside the home.

James and associates[20] analyzed the same equipment and concluded that the device, while accurate, became less so as the blood pressure increased. Even with this limitation, the accuracy is superior to most other home blood pressure monitors.

A recent consensus document[21] lists clinical problems in which 24-hour noninvasive ambulatory blood pressure may be useful. Accurate self-monitoring over a more prolonged period may also be helpful in the management of some of these problems, including borderline hypertension with target organ damage, evaluation of drug resistance, episodic hypertension, hypotensive symptoms related to antihypertensive medications, and office or "white coat" hypertension. Abrupt changes in blood pressure (either hypertension or hypotension), evaluation of blood pressure changes during sleep, autonomic dysfunction, carotid sinus syncope, and pacemaker syndromes cannot be addressed satisfactorily by self-measurement of blood pressure.

THE DEBATE OVER OFFICE *V* HOME MEASURES

Debate continues over the significance of the difference between standardized office or clinic blood pressures and those obtained in other environments. Two elements of that debate deserve mention.

Pickering and co-workers[22] reported that from 12% to 21% of adults with mild hypertension in the office may be normotensive under all other circumstances (as shown by 24-hour ambulatory blood pressure monitoring). A much smaller percentage of subjects have higher blood pressure when outside of a medical environment. Office or white coat hypertension may persist for months or years despite the individual's growing familiarity with office procedures and personnel. On the other hand, Siegel and associates[23] could not distinguish patients considered to have white coat hypertension from those with more sustained elevations in blood pressure, despite the use of a battery of clinical, demographic, emotional, and reactivity measures.

Although standardized office blood pressure has been the measure used to guide trials of antihypertensive therapy, there is some concern at present that too marked a reduction in office blood pressure by drug therapy may be associated with an increase in mortality.[24–26] It is unknown whether patients who have high blood pressure only in the office are particularly at risk of overtreatment.

The Telelab device is a distinct improvement over previous devices for self-measurement of blood pressure. Future research may demonstrate whether self-measurement of blood pressure and ambulatory monitoring yield better information regarding morbidity, mortality, and the selection of patients for therapeutic intervention. Interpretation of these measurements for the diagnosis and control of hypertension at present is based on enlightened empiricism.

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