Ambulatory blood pressure monitoring in primary care: a comment

Continuing our focus on ambulatory blood pressure monitoring, Professor Eoin O'Brien considers the uses for this technique in primary care.

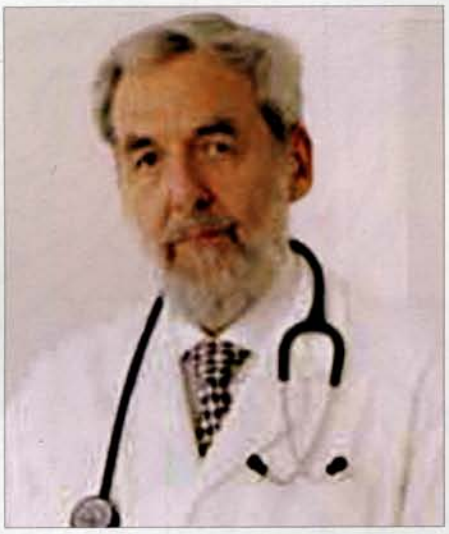
Abstract

This article reviews ambulatory blood pressure measurement, discussing different monitors used in its measurement and also which patients most benefit from having their blood pressure monitored in this way. Its role in guiding drug treatment is also briefly described

Key words: ambulatory blood pressure measurement, hypertension, ambulatory blood pressure measurement monitors.

Introduction

The accuracy of the conventional Riva-Rocci/Korotkoff technique of blood pressure measurement has been questioned over the last 20 years, and efforts have been made to improve the technique with automated devices.[1] In the same period, recognition of the phenomenon of white coat hypertension (whereby some subjects with apparent elevation of blood pressure have normal, or reduced, blood pressures when measurement is repeated away from the medical environment) has focused attention on methods of measurement which provide profiles of blood pressure behaviour rather than relying on isolated measurements under circumstances that may in themselves influence the level of blood pressure that is recorded.[2-4] Ambulatory blood pressure measurement (ABPM), which provides a profile of blood pressure behaviour over a 24-hour period, is now accepted as a valuable investigation in the diagnosis and management of hypertension. The technique is being used increasingly in primary care.[1] The British Hypertension Society has published recommendations for the use and interpretation of ABPM in clinical practice,[5] and recently the European Society of Hypertension published recommendations on blood pressure measuring devices, including devices for ABPM.[6] For the primary care physician contemplating the use of ABPM, the first issue is that of purchasing a device.



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Which monitor to buy?

Many ABPM devices are now available and the number will increase as its measurement becomes more widespread.[6] A number of factors should influence this choice; it is most important to ensure that the device has been validated independently according to either the protocol of the British Hypertension Society[7] and/or that of the Association for the Advancement of Medical Instrumentation.[9] ABPM devices that fulfil the criteria of these protocols are shown in table 1.

Presenting the data

ABPM devices are usually sold with individual software packages, which pre-

Table 1. Ambulatory blood pressure measuring devices which have fulfilled validation criteria of the BHS and AAMI protocols and are recommended for general clinical use

A & D TM-2420 Model 6	Meditech ABPM-04
A & D TM-2420 Model 7	Profilomat I
A & D TM-2421	QuietTrak
A &D Takeda 2430	Save 33, Model 2
CH-DRUCK	Schiller BR-102
Daypress 500	SpaceLabs 90202
DIASYS Integra	SpaceLabs 90207
ES-H531	SpaceLabs 90217

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Figure 1. Computer-generated 24-hour ABPM report (DABL program) which indicates white coat hypertension. Pressures in the first hour average 162/90 mmHg, but thereafter day- and night-time blood pressures are within normal limits

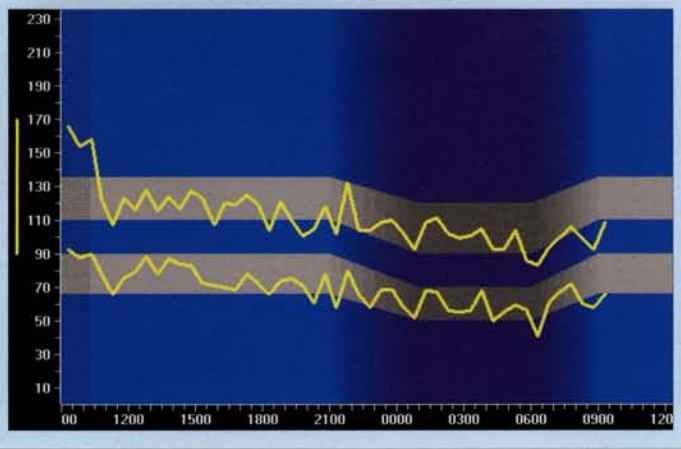
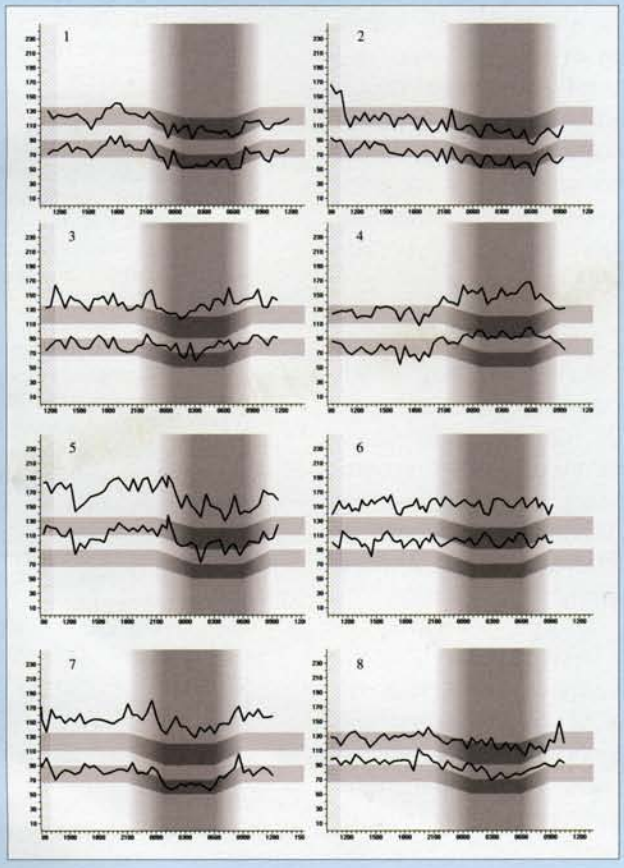


Figure 2. Examples of ambulatory blood pressure patterns plotted by the DABL program. Vertical axis - blood pressure level; horizontal axis – 24-hour clock times; horizontal bands – normal levels for 24-hour systolic and diastolic blood pressures; shaded vertical area – night-time; vertical bar on left – office blood pressures. Pattern examples: (1) normotension; (2) white coat hypertension; (3) borderline hypertension; (4) nocturnal hypertension; (5) systolic and diastolic hypertension, dippers; (6) systolic and diastolic hypertension, non-dippers; (7) isolated systolic hypertension; (8) isolated diastolic hypertension



sent data in a variety of ways. It would facilitate practice if the graphic presentation of ABPM data were standardised, much as is the case for ECG recordings, so that the presentation of data would be independent of the type of monitor used. The DABL™ program (ECF Medical Ltd, Blackrock, Co. Dublin) can provide a graphic display of ABPM data (on screen or printout) with a visual time/pressure graph; blood pressure is plotted on the vertical axis and time on the horizontal axis. Levels of normality can also be shown.[9,10] The program also provides a printed report derived from the ambulatory blood pressure measurement data (figure 1).

Clinical indications for ambulatory blood pressure measurement

Though in practice the average day-time (or night-time) blood pressures are used to govern decisions, the clinical use of ABPM has allowed a number of phenomena in hypertension to be more clearly identified than is possible with other methods of blood pressure measurement (figure 2).[10,11] ABPM is recommended in the following categories of hypertension.[5]

'Recent reviews have highlighted the potential of 24-hour recordings of blood pressure in guiding antihypertensive medication'

White coat hypertension

The most popular definition is that blood pressure measured by conventional techniques in the office, clinic or surgery is above 140/90 mmHg; but when ABPM is performed, blood pressures are normal throughout the 24-hour period, except perhaps during the first hour of the 24-hour recording when the patient is under the pressor influence of the medical environment while having the monitor fitted (as in figure 1).[5,12] This type of hypertension is

Key messages

- ABPM is an invaluable investigation in the diagnosis and management of hypertension
- Standardising the graphic presentation of ABPM would facilitate practice
- ABPM is particularly beneficial in certain categories of hypertension
- Its use in guiding antihypertensive medication is being evaluated

common, being present in about a quarter of people who appear to have hypertension with conventional measurement.[2,13]

Clinic borderline hypertension

The same reasoning applies to patients with borderline elevation of blood pressure, especially young subjects, in whom life-long drug therapy may be inappropriately prescribed and who may be penalised for insurance or employment if the diagnosis of 'hypertension' is misapplied.

The elderly

The results of the ambulatory study of the Systolic Hypertension in Europe (Syst-Eur) Trial show that systolic blood pressure measured conventionally in the elderly may average 20 mmHg higher than day-time ambulatory blood pressure,[14] leading to inevitable overestimation of isolated systolic hypertension in the elderly and probable excessive treatment of the condition. Moreover, results from this study also show that ambulatory systolic blood pressure was a significant predictor of cardiovascular risk over and above conventional systolic blood pressure.

A number of ambulatory patterns are found in the elderly, among which are a number of hypotensive states due to baroreceptor or autonomic failure. As the elderly can be particularly susceptible to the adverse effects of blood pressure-lowering drugs, identification of hypotension becomes particularly important,[15] though its management may present a considerable therapeutic challenge.

Nocturnal hypertension

ABPM is the only non-invasive blood pressure measuring technique that permits measurement of blood pressure during sleep. The relevance of nocturnal hypertension is still controversial, but there is increasing evidence that night-time blood pressure may provide important information. Nocturnal blood pressure levels, for example, are independently associated with end-organ damage,[16,17] over and above the risk associated with day-time values. It has also been shown that absence of nocturnal 'dipping' of blood pressure to lower levels than during the day is associated with target organ involvement. This may be a useful (though non-specific) clue as to the presence of secondary hypertension.

Resistant hypertension

In patients whose conventional blood pressure remains consistently above 150/90 mmHg in spite of treatment with three antihypertensive drugs, ABPM may indicate that the apparent lack of response is due, in fact, to the white coat phenomenon, or the presence of a non-dipping nocturnal pattern may suggest secondary hypertension.

Pregnancy

The main use for ABPM in pregnancy is the identification of white coat hypertension, which may occur in nearly 30% of pregnant women.[18] Its recognition is important so that pregnant women are not admitted to hospital or given antihypertensive drugs unnecessarily or excessively.

Ambulatory hypotension

Reference has already been made to the clinical use of ABPM in identifying hypotensive episodes in the elderly, but it may also be used in young patients in whom hypotension is suspected of causing symptoms.[15] ABPM may also demonstrate drug-induced drops in blood pressure in treated hypertensive patients, which may have untoward effects in patients with a compromised arterial circulation, such as those with coronary and cerebrovascular disease.[19]

As a guide to drug treatment

The role of ABPM in guiding drug treatment is currently the subject of much research and has not yet been fully established. Recent reviews of the clinical value of ABPM have highlighted the potential of 24-hour recordings of blood pressure in guiding antihypertensive medication.[20,21] Furthermore, a recent well-controlled study showed that when ambulatory blood pressure measurement, rather than clinic blood pressure, was used as the basis for prescribing, significantly less antihypertensive medication was prescribed.[3]

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Eoin O'Brien
Professor of Cardiovascular Medicine
Blood Pressure Unit, Beaumont Hospital, Dublin 9, Ireland
(email: eobrien@iol.ie)