The value of patterns of 24-hour ambulatory BP

Prof Eoin O’Brien writes that patterns of 24-hour ambulatory blood-pressure are very valuable in clinical practice.

Since Riva-Rocci and Korotkoff gave us the technique of conventional blood-pressure (BP) measurement over a century ago, we have lived on the moon, encircled Mars, invented the automobile and aeroplane and, most importantly, revolutionised the technology of science with the microchip. Why, we might ask, has medicine ignored scientific evidence for so long as to perpetuate a grossly inaccurate measurement technique in both clinical practice and hypertension research? It is generally accepted that traditional clinic or office blood-pressure measurement (OBPM) is limited in the amount of information it can provide for the adequate management of hypertension – as the common practice post-practice must turn to out-of-office measurement to obtain additional information to guide the diagnosis and management of hypertension.

There can be little argument about ambulatory blood-pressure management (ABPM) being superior to OBPM. The ‘white-coat’ effect gives OBPM levels considerably higher than those measured away from the medical environment in as many as 20 per cent of individuals with suspected hypertension and in most patients with hypertension. It is my firm belief that ABPM should be available to all primary-care physicians, where the responsibility for the management of the majority of hypertensive patients lies.

It is important for physicians using ABPM to ensure that the device being used has been recommended for clinical use by checking with www.dabl-dcnational.org, which provides the latest accuracy data on all BP-measuring devices.

Developments in software and electronic transmission of data have been used to make the technique of ABPM more accessible to clinical practice.

The dabl ABPM program generates a graphic presentation of ABPM data in a standardised format, demarcates the bands of normality and provides a one-page computer-generated interpretative report (Fig 1, above). Because ABPM has been shown to significantly improve BP control in primary care, advances have been made in central hosting in primary care, advances have significantly improved BP control in ABPM in primary care was one of the first studies of ABPM in primary care was wide project to promote the use of ABPM in primary care settings is being established. In this study clinic, BP in patients cat-egorised as being at low-to-mod-erate added risk with a greater difference (12/21 mmHg) in those categorised as being at high risk. Moreover, 60 per cent of high-risk patients had a non-dipping nocturnal pattern. As in the Irish RAMBLER study, BP control was better when assessed by ABPM than by OBPM, indicating that ‘white-coat’ effect with OBPM is leading to an underestimation of BP control in the community. However, BP was uncontrolled by both methods of measurement in 43 per cent of patients.

Windows of the 24-hour circadian profile
In contemporary clinical prac-tice, the mean daytime and nighttime BP levels are generally taken as being the most valu-able parameters of ABPM, but ongoing research indicates that there is much more information to be gleaned from the analysis of ABPM data (see box, next page).

The largest study to date on ABPM in primary care comes from Spain, where a nation-wide project to promote the use of ABPM in primary care settings is being established. In this study clinic, BP in patients were approximately 13/9 mmHg higher than ABPM in patients categor-ised as being at low-to-mod-erate added risk with a greater difference (12/21 mmHg) in those categorised as being at high risk. Moreover, 60 per cent of high-risk patients had a non-dipping nocturnal pattern. As in the Irish RAMBLER study, BP control was better when assessed by ABPM than by OBPM, indicating that ‘white-coat’ effect with OBPM is leading to an underestimation of BP control in the community. However, BP was uncontrolled by both methods of measurement in 43 per cent of patients.

Many patterns of BP behaviour can be discerned from ABPM. By far the most common pattern is systo-diastolic hypertension. Usually, daytime BP levels are lower than clinic readings – the ‘white-coat’ effect. Mean day-time levels of BP are superior to OBPM but it can be overestimated and ABPM allows for confirmation of the diagnosis as well as predicting outcome more accurately (Fig 4, next page).

Nocturnal patterns: The ‘dip/ no-dip’ classification was first introduced in 1998 by the European Society of Hypertension. In a retrospective analysis of ABPM data collected in Spain, the authors suggested that non-dipping hypertensive patients had a greater risk of stroke than the majority of patients with a dipping pattern.

Large-scale prospective studies currently support the concept that a diminished nocturnal BP fall is associated with a worse prognosis.

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Figure 1: Schema for dabl one-page interpretative report

The ABPM suggests borderline 24-hour systolic hypertension (130 mmHg/daytime, 116 mmHg/night-time) and normal 24-hour diastolic blood pressure (90 mmHg/daytime, 59 mmHg/night-time) with a white-coat effect (175 mmHg/95 mmHg).

White-Coat Window

Dipping Pattern

Night-time Window

Morning Surge

Systolic BP

Normal Bands

Diastolic BP

Optimal Bands

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Blood pressure

Conclusion
There is a wealth of information to be obtained from ABPM in identifying forms and patterns of hypertension, which then allows for the more rational use of BP-lowering drugs. We must remind ourselves that the prevention of the cardiovascular consequences of hypertension is dependent on not merely prescribing antihypertensive drugs, but ensuring that drugs are prescribed in sufficient dosage or combinations to bring I Ps within the normal bands throughout the day and nighttime periods.

References
This article is based on the following papers in which full references may be obtained:

Legends for figures

Figure 1: ‘White coat’ hypertension (see ‘Legend’ in box, lower left)

Figure 2: White coat hypertension. The ABPM suggests severe 24-h ambulatory systolic blood pressure (200/130 mm Hg) with white coat effect (200/102 mmHg), moderate night-time systolic and diastolic hypertension (154/89 mm Hg) with white coat effect (200/102 mmHg). The ABPM suggests low daytime systolic blood pressure (100 mm Hg) and normal daytime diastolic blood pressure (81 mm Hg) and moderate night-time systolic and diastolic hypertension (154/89 mm Hg) with white coat effect (200/102 mmHg).

Isolated systolic hypertension: The ABPM suggests severe 24-h isolated systolic hypertension (176/68 mm Hg daytime, 119/59 mm Hg nighttime).

Figure 3: Ambulatory hypertension: The ABPM suggests low daytime systolic blood pressure (100 mm Hg) and normal daytime diastolic blood pressure (81 mm Hg) and moderate night-time systolic and diastolic hypertension (154/89 mm Hg) with white coat effect (158/90 mm Hg). The ABPM suggests severe 24-h isolated systolic hypertension (176/68 mm Hg daytime, 119/59 mm Hg nighttime).

Figure 4: Isolated systolic hypertension (see ‘Legends for figures’ box, lower left)

Figure 5: Hypertensive dipper (see ‘Legends for figures’ box, lower left)

Figure 6: Hypertensive non-dipper (see ‘Legends for figures’ box, lower left)

Figure 2: "White coat" hypertension (see ‘Legends’ in box, lower left)