Managing blood pressure using ABPM

Ambulatory blood pressure measurement should be an integral part of good clinical practice, writes Prof Eoin O’Brien

Ambulatory Blood Pressure Measurement (ABPM) should be available in primary care to improve the diagnosis, to guide treatment, and to facilitate achievement of optimal control of blood pressure in all patients with hypertension, as well as in those with suspected hypertension. One sometimes has to ponder what it takes to make a technique as indispensable to practice as ABPM, to determine it must indeed be, become the rule rather than the exception. And yet nothing is new under the sun; it seems to me that ABPM is much in the same historical position at the start of the twenty-first century as conventional measurement with the mercury sphygmomanometer and stethoscope was at the end of the 19th century when one scopic, while acknowledging that “the middle-aged and successful physician may slowly and imperceptibly lose the exquisite sensitivity of his fingers through repeated attacks of gouty neuritis,” went on to express his sincere doubts that the sphygmomanometer would ever be welcomed by “the overworked and underpaid general practitioner, already loaded with thermometers, stethoscopes, etc.”

ABPM is not new to medicine; in fact it has been with us in one form or another for nearly half a century. In 1946, Sir George Pickering showed for the first time the profound fall in blood pressure recorded during sleep and the fluctuations in pressure during the course of 24 hours. Pioneering group went on to develop an ambulatory technique whereby pressure could be measured directly from the brachial artery with a small plastic catheter and the first intra-arterial blood pressure measuring device was introduced in 1966. In 1962, Himan and his colleagues described the first truly portable ambulatory system for the non-invasive measurement of blood pressure, which was subsequently developed commercially by the Riketer Company in California. So began non-invasive measurement of ambulatory blood pressure (ABP), which first used ABPM in 1979, and as an early plot from this period bearing the diagnosis “anxiety then normotension”, which clearly recognised what is now known as white coat hypotension. It is interesting to contrast this plot with a contemporary computerised presentation to appreciate how much software development can add to the diagnostic process. Writing in the ABC of Hypertension series in the British Medical Journal in the same year (1979), it is timely therefore to review the evidence that justifies the title of this review.

Diagnostic role for ABPM

In clinical practice the most common use of ABPM is to identify patients with suspected white coat hypertension, who constitute at least 20 per cent of hypertensive patients. The problem is that there are no clinical characteristics that permit the practicing physician to “suspect” the condition. Indeed on has to agree with the conclusion from the European Society of Hypertension statement on “When to Suspect White Coat Hypertension” “In truth, it must be admitted that it is difficult to escape the conclusion that all patients in whom a diagnosis of hypertension is being contemplated based on office clinic blood pressure, should have ABPM to exclude white coat hypertension.”

Identification of masked hypertension: ABPM can also identify patients with the recently recognised phenomenon of masked hypertension, which occurs in at least 10 per cent of the adult population (estimated to be as many as 10 million people in the US), in whom conventionally measured blood pressure in the clinic setting is normal but ABPM is increased. Clearly ABPM cannot be performed on everyone, but there is not a strong case for performing ABPM in patients who have had a cardiovascular event, because the consequence of not prescribing antihypertensive medication to a patient with, for example, a history of cardiovascular disease, will clearly be detrimental. By contrast, it is deny that patient the most potent medication to prevent stroke recurring? it is a salutary thought if white coat hypertension is present in 20 per cent of the population when blood pressure is measured conventionally in primary care and if masked hypertension is present in 10 per cent of patients whose blood pressure is measured in similar circumstances, it follows that the diagnosis of hypertension is being missed in as many as a third of all patients attending for routine blood pressure measurement.

Figures 1 (left): A sample of a graph used before the advent of ABPM in 1979. Figure 2 (right): A recent example of a modern ABPM chart

ABPM as a guide to treatment

The evidence for ABPM as a methodology to guide drug treatment is now compelling. The technique provides evidence for efficacy of blood pressure lowering over 24 hours, allows resistant hypertension to be differentiated from a white coat reaction that misleadingly suggests a need for therapy, and provides evidence of over-treatment, particularly in the elderly, who are prone to hypertension.

Nighttime blood pressure

ABPM is the only accurate means of monitoring nocturnal blood pressure, which has been largely ignored in clinical practice despite many studies showing that nocturnal phenomena such as non-dipping, reverse dipping, extreme dipping, nocturnal hypertension, and a morning surge are associated with a poor prognosis. Pharmacotherapy for hypertension is now being directed towards ways of modifying the nocturnal patterns of blood pressure so as to improve prognosis.

Special populations

ABPM is also valuable in special populations, such as the elderly, who may have complicated circadian patterns with, for example, daytime hypertension alternating with nocturnal hypertension due to baroreceptor dysfunction. Diabetic patients are in need of more effective control of both day and nighttime blood pressure so as to prevent the premature onset of cardiovascular complications and ABPM must now be considered a mandatory investigation in such patients, and the same is true for patients with renal disease. In pregnancy, both mother and foetus may be spared unnecessary medication by using ABPM to diagnose white coat hypertension, which is present in as many as 30 per cent of pregnant women.

Indices of blood pressure

Recently ABPM has been used to achieve more subtle insights into circadian hypertension. The Ambulatory Arterial Stiffness Index (ASI), which has been shown to predict cardiovascular mortality, particularly stroke even in normotensive subjects, in a large cohort of hypertensive individuals in the Dublin Outcome Study, may prove to be a readily applicable index that can be derived from ABPM to predict outcome. In this study nighttime blood pressure as well as daytime pressure, allows resistant hypertension to be differentiated from a white coat reaction that misleadingly suggests a need for therapy, and provides evidence of over-treatment, particularly in the elderly, who are prone to hypertension.

Conclusion

What are the messages from this review and to whom should they be addressed? First, ABPM should be an integral part of good clinical practice. Second, patients must now be aware of the importance of such an index, which has been shown to be an accurate predictor of outcome. In this study, patients with white coat hypertension had a higher risk of cardiovascular events.

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