

Twenty-four hour ambulatory blood pressure monitoring: Pediatricians still lagging behind

by Bruce Alpert, MD

Twenty-four hour ambulatory blood pressure monitoring (ABPM) has become a routine procedure in adult medicine over recent years. It provides physicians with the best estimate of true blood pressure and blood pressure variability. In the February 1997 issue of the *Journal of Pediatrics*, I wrote an editorial with Stephen Daniels, M.D., Ph.D., expressing the opinion that pediatricians needed to “catch-up” with adult physicians in their awareness of the uses and benefits of 24-hour ABPM.¹ In that same issue, the largest series of children undergoing ABPM research to date, including 1141 adolescents was published by Soergel et al.² This article presented guidelines for classifying normal and elevated systolic and diastolic BP levels during awake, asleep, and 24-hour time periods for children and adolescents. With these published guidelines, it was our hope that ABPM would become the standard of care for identifying and managing hypertension in pediatric patients. Unfortunately, eleven years after my original editorial, ABPM is still widely under-utilized by the pediatric healthcare community.

With a rapidly increasing percentage of children and adolescents becoming overweight or obese, particularly in the US, it is now even more important than ever for ABPM to become a routine diagnostic test for children and adolescents with or at high risk for elevated BP. In September 2008, I co-authored the American Heart Association Scientific Statement³, “Ambulatory Blood Pressure Monitoring in Children and Adolescents: Recommendations for Standard Assessment.” The writing committee headed by Elaine Urbina, M.D. summarized the current state of ABPM use in children and adolescents and discussed appropriate procedures and equipment for pediatric patients. This article should assist pediatric physicians to better understand the use, analysis, and clinical value of ABPM.

ABPM is the optimal diagnostic test for numerous clinical applications, many of which are discussed in the AHA Statement. The most common application is screening for white-coat hypertension, which is defined as high BP readings in the physician’s office with normal readings outside the clinical setting. It is surprisingly prevalent in young patients. 24-hour ABPM is the ideal tool for making this diagnosis and is currently reimbursed by both Medicare and private insurance for this purpose. Other common uses for ABPM include the diagnoses of secondary hypertension and masked hypertension. Masked hypertension is the opposite of white-coat, with values in the non-clinical setting being those which are elevated. Additionally, ABPM can be

used to evaluate success of antihypertensive therapy which is most efficiently done by comparing data from sequential 24-hr ABPM studies are compared. In some cases, private insurance companies will reimburse ABPM for these additional indications since accurate diagnosis and management of hypertension in pediatric patients can reduce future medical costs.

Because pediatric and adult patients have different needs, it is important to use equipment and procedures designed specifically for children and adolescents. Regardless of whether for adult or pediatric use, any ABPM device should have clinical accuracy proven by validation to either the US standard (AAMI) or British standard (BHS) protocols. As technology and equipment have improved over the past decade, some ABPM device manufacturers now include pediatric-specific features. An ABPM device for pediatric use must be lightweight, so children can comfortably wear the device for 24 hours. Children and adolescents are generally self-conscious when wearing the device on a school day, which is the ideal setting for accurate assessment, so a quiet and inconspicuous device is needed. The device should be sturdy and worn with a protective pouch to withstand wear and tear from children’s daily activities. An ABPM device designed with these characteristics should help improve pediatric patient compliance.

A pediatric-specific ABPM device and software should also ease the workload for the clinician. The 95th percentile thresholds presented by Soergel et al. should be used to identify elevated ABPM readings. Programming these thresholds within the software by patient gender and height categorization can significantly improve workflow efficiency for pediatric analysis and interpretation. The analysis software must also easily allow the adjustment of awake and asleep times as reported by the patient diary. The mechanism and accessories for wearing the ABPM device should reduce the creativity needed if the clinician would need to fit an adult device onto a small child. Finally, a full range of cuffs to accommodate the wide range of arm sizes seen in children and adolescent patients must be available for use with the monitor.

The association between elevated childhood BP and elevated adulthood BP combined with the growing obesity-related health epidemic in children and adolescents indicates the critical importance to identify and manage pediatric hypertension as early as possible. In this way, there will be maximal reduction of hypertension-related

morbidity and mortality. An ABPM with pediatric-specific features can be easily integrated into Pediatric or Family general practice by following the recommendations described in the AHA Scientific Statement. I believe the AHA Statement should be required reading not only for pediatric nephrologists and cardiologists, but also for pediatricians and primary care physicians who will see children on a regular basis. Given the improvements to technology, the growing health epidemic, and the proven value of ABPM studies, it is my hope that ABPM will soon be the standard of care.

References

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