CLIN. CHEM. 37/10(B), 1809–1810 (1991)

Introduction

Alan H. B. Wu

The prevalence of hypertension has been documented by the 1976–1980 National Health and Nutrition Examination Survey (NHANES II) (*1*). For a blood pressure threshold of 140/90 mmHg, obtained as an average of three measurements per subject, and including all subjects currently taking antihypertensive medication, 30% of the U.S. population between the ages of 18 and 74 years have hypertension. Blacks have a higher prevalence than whites (38% vs 29%), and men have a higher prevalence than women (33% vs 27%). Based on data from the 1990 census, therefore, more than 65 million Americans have hypertension, ranging from mild to severe. The vast majority of these individuals have essential hypertension, for which the underlying cause is unknown.

These figures make it evident that hypertension is a very common disorder. Because it is one of the important risk factors for cardiovascular diseases such as stroke and acute myocardial infarction, this presents a major health problem in the U.S. Fortunately, public education programs conducted by the Surgeon General, the American Heart Association, and others have led to increased awareness about hypertension. As a result, there has been a 50% decline in the national age-adjusted stroke mortality rate since the first report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure in 1972 (*2*).

When I was asked to chair the program committee for the 14th Annual Arnold O. Beckman Conference and learned that the topic would be hypertension, I was initially reluctant to accept the invitation. Except for renovascular and adrenal hypertension, I was not certain that the laboratory had a major role in diagnosis and management. It was my perception that most physicians treat their hypertensive patients with drug therapy by the "trial and error method": when one drug fails to reduce blood pressure after a while, another is added to the regimen or given in its place. The lack of a major laboratory role was even promoted in the 1988 Report of the Joint National Committee, which stated that only basic laboratory tests (urinalysis, and chemistry, hematology, and lipid profiles) were recommended before initiating therapy (*2*). On the basis of the practically nonexistent outpatient test volume for plasma renin activity in my own laboratory, I had no reason to believe otherwise.

However, when I began to review this subject more thoroughly, I realized that the theories on the pathophysiology and epidemiology of essential hypertension are indeed directly related to key laboratory measurements of electrolytes and the plasma renin activity. Because essential hypertension is a disease of diverse etiologies, the laboratory is important in identifying which form of hypertension is present in any given patient. The renin/urine sodium profile is paramount in determining not only the type of hypertension present, but also the accompanying risk factors for cardiovascular disease and the strategy for its treatment. Brunner, Laragh, et al. (*3*) suggested almost 20 years ago that hypertensive patients with normal and high concentrations of renin had higher incidences of stroke or myocardial infarction than did low-renin hypertensive patients. For blood pressure control, anti-renin drugs are most effective for hypertensive patients in the normal or high-renin groups, whereas diuretics are most effective for hypertensive patients in the low-renin group.

Thus there is a dichotomy in the approach to this problem. Some specialized centers use what appear to be sound scientific and medical approaches to the treatment and management of essential hypertension based on laboratory data, whereas others maintain that drug therapy should be initiated only after secondary hypertension has been ruled out with routine laboratory and diagnostic procedures. Because I believe that the laboratory should play a more central role in the management of these patients, I accepted the invitation to organize this Conference so that I could invite speakers who could address the laboratory issues in hypertension, even though this approach is not the prevailing view among clinicians.

To assist me with the organization of the program, I enlisted the aide of John Laragh, who pioneered the relationship between the renin–aldosterone axis and blood pressure. Unlike previous A. O. Beckman Conferences in Clinical Chemistry, where opposing opinions on a topic were presented, we selected speakers who could deliver the single message that more laboratory measurements were needed for the management of essential hypertension. Because of this, many of the faculty selected to speak were colleagues or former students of Dr. Laragh. To invite others with an opposing view, i.e., that laboratory data are not important for management of hypertension, seemed to me to be counter to the objectives of the A. O. Beckman Conferences and to the missions of the clinical chemistry profession.

This A. O. Beckman Conference was divided into five sessions. In the first session, the pathophysiology of essential hypertension was given by Drs. Jean Sealey and John Laragh, who present a joint paper on this subject in these Proceedings. Dr. Harry Gavras was also scheduled to speak but was unable to attend because of a sudden illness; however, his manuscript on the role of

Department of Pathology and Laboratory Medicine, University of Texas Medical School, P.O. Box 20708, Houston, TX 77030.

vasopressin is included. Secondary hypertension was presented in the next two sessions. Renovascular hypertension was first discussed, including the role of renin measurements, the captopril test, and urinary albumin for diabetic nephropathy. This was followed by adrenal cortical and medullary hypertension, where each lecture on the clinical aspects of these secondary hypertensive disorders was followed by discussions of the key laboratory measurements of renin and the catecholamines, respectively. In the fourth session, the laboratory markers of paracrine hormones and atrial natriuretic factors, as they pertain to clinical hypertension research, were presented; unfortunately, these papers were unavailable at press time for inclusion in the Proceedings. The discussions in the final session centered on monitoring and treatment. Papers were given on approaches to treating the essential hypertensive patient through the use of laboratory tests, the use of 24-h blood pressure monitors for diagnosis and for evaluation of drug treatments, and the use of the renin/urine sodium axis to stratify the risk factors and prognosis of hypertension for cardiovascular disease. These latter three talks provided the foundation for future participation by the clinical chemistry profession.

Given the importance of the plasma renin activity, a theme repeated by many of the speakers, I feel it is the responsibility of clinical chemists to ensure that accurate measurements for this assay are made available and that they are appropriately used in management of the hypertensive patient. For example, results for plasma renin activity should be presented with a result for 24-h urine sodium. Samples for determination of plasma renin activity should not be stored under refrigeration, because of cryodegradation.

Dissemination of the information presented at this Conference will require a more active interaction between the laboratory and primary-care physician than is currently being practiced. Improvements in the turnaround time for the assay of plasma renin activity must be made to make this assay more available for routine use. This will require measurement of angiotensin I with a higher degree of sensitivity.

I am pleased to acknowledge the assistance of the members of my program committee, Drs. John Laragh, Martin Fleisher, and Michael Spiekerman. I also thank Virginia S. Marcum, Managing Editor, *Clinical Chemistry*, for editorial assistance, Ms. Deborah Woodcock and Pam Magnini, AACC Meetings Management Department, for administrative assistance, and Rochelle Katz, New York University–Cornell University.

References

1. Hypertension prevalence and the status of awareness, treatment, and control in the United States. Final report of the subcommittee on definition and prevalence of the 1984 Joint National Committee. Hypertension 1985;7:457–68.
2. The 1988 report of the Joint National Committee on detection, evaluation, and treatment of high blood pressure. Arch Intern Med 1988;148:1023–38.
3. Brunner HR, Laragh JH, Baer L, et al. Essential hypertension: renin and aldosterone, heart attack and stroke. N Engl J Med 1972;286:441–9.