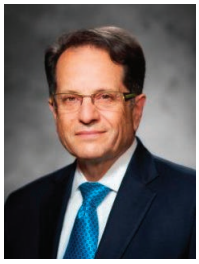

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EMERGING CONCEPTS IN THE DIAGNOSIS AND TREATMENT OF HYPERTENSION IN THE SPRINT ERA

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Emerging concepts in the diagnosis, management, and treatment of hypertension is the focus of this special issue of the *Methodist DeBakey Cardiovascular Journal*. Hypertension is often the most frequently recorded diagnostic code for a cardiology consultation,[1] yet up to one-third of patients in a cardiology practice do not have adequate blood pressure control.[2] With this in mind, our goal is to highlight emerging diagnostic and therapeutic strategies that will enable cardiologists and cardiovascular surgeons to better manage and control blood pressure in their patients. Given the group of experts we assembled as contributors, we are confident that we will achieve this goal.

The issue begins with **"**Current and Future Treatments of Hypertension in the SPRINT era,"[3] a review in which I critically assess the management of hypertension in patients with uncomplicated essential hypertension, diabetes, chronic kidney disease (CKD), coronary artery disease (CAD), and in the elderly and African Americans. Recommendations are provided for first-line and combination antihypertensive therapy. The level to which blood pressure should be lowered in these groups is explored and critiqued, providing the reader with a guide to the current controversy in this area. Based on the results of the Systolic Pressure Intervention Trial (SPRINT), a prediction is made that future guidelines will recommend a treatment goal of < 130/80 mm Hg in patients aged 50 and older who do not have diabetes.[4]

The premise of the article entitled "Practical Aspects of Home and Ambulatory Blood Pressure Monitoring" is that these two modalities are superior to office blood pressure measurements for both the diagnosis of hypertension and for assessing risk of future cardiovascular and renal events. Author Aldo Peixoto reviews the indications for these two modalities, including the need to rule out white coat and masked hypertension—blood pressure that is normal in the clinic but elevated outside of the office. Of note, it is recommended that home blood pressure monitoring be obtained in all patients because it is relatively inexpensive and associated with greater patient engagement and better blood pressure control. Cost and technical aspects of both modalities are reviewed, including instructions to give patients on the proper use of and recording of blood pressure measurements with home devices.

Although much information is gleaned from measurement of systolic and diastolic blood pressure at the brachial artery, there is emerging evidence that the intrinsic status of the vasculature can be assessed from office-based, noninvasive analysis of radial artery pulse contours. Furthermore, these pulse contours can be more precisely related to future cardiovascular outcomes than standard blood pressure measurements. The physiological basis of this type of analysis is explored in the paper by Raymond Townsend entitled "Novel Uses of Office-Based Measures of Arterial Compliance." Townsend demonstrates that abnormalities of these contours reflects pathology and stiffening of the vasculature, resulting in elevated central aortic pressure, distorted central aortic pressure profiles, and increased load on the heart. Several longitudinal studies that have incorporated measures of central aortic hemodynamics are reviewed, and the literature shows that these measures predict outcomes such as heart failure better than standard brachial artery blood pressure measurements.

Resistant hypertension affects up to 15% of hypertensive patients and is associated with poor outcomes. In the past decade, mechanical approaches have been explored to modulate the sympathetic and parasympathetic control mechanisms for blood pressure. Two articles in this issue address this topic. "Resistant Hypertension and Renal Nerve Denervation" by Drs. Matthew Denker and Debbie Cohen describes the blood pressure elevating consequence of sympathetic nervous system hyperactivity, its impact on end-organ damage, and the anatomic basis of RDN ablation therapy. The authors review the two initially promising clinical trials, Symplicity HTN-1 and 2, and then discuss the Symplicity HTN-3 trial, a sham controlled study conducted in the United States that unexpectedly failed to show efficacy of RDN. They also present a critical and sober analysis of the potential reasons for this result and future avenues that might be explored to demonstrate efficacy of RDN. The second article, "Carotid Baroreceptor Stimulation and Arteriovenous Shunts for Resistant Hypertension," reviews the trials that have targeted mechanical activation of the carotid baroreceptors as a mechanism to lower blood pressure by decreasing sympathetic outflow and increasing vagal tone. Authors Nicholas Paivanas and colleagues present the promising but mixed results that have been achieved to date with this therapy as well as the ongoing studies that are being conducted with new devices, and they conclude with a review of new devices that lower blood pressure by creating arteriovenous shunts.

It is becoming increasingly clear that the association between hypertension and atrial fibrillation is causal. The pathophysiological basis of this relationship as well as supporting epidemiological and clinical data is presented in the article entitled "Atrial Fibrillation and Hypertension: Mechanistic, Epidemiologic, and Treatment Parallels." Authors Adedotun Ogunsua and colleagues catalogue the macro (left atrial chamber size increase) and micro (ion-channel disruption, fibrosis) structural and electrical changes that are induced by

hypertension and promote initiation and propagation of atrial fibrillation. They then review data linking activation of the renin angiotensin aldosterone system (RAAS) to the development of atrial fibrillation and the observational studies suggesting that RAAS blockade is associated with reduced incidence of atrial fibrillation. Finally, they examine the interaction between hypertension, stroke risk, and intracranial hemorrhage and suggest large-scale randomized trials to define the role of blood pressure reduction in preventing the development of atrial fibrillation.

This issue concludes with a comprehensive assessment and practical guide regarding the use of aldosterone antagonists. These agents have gained a secure foothold in the treatment of hypertension and congestive heart failure over the past 15 years due to their success in improving patient outcomes. Author Domenic Sica provides an overview of the pharmacological properties and class differences of aldosterone antagonists, examines the impact of their use in controlling blood pressure and reducing end-organ damage in essential and resistant hypertension, and reviews the studies demonstrating improved outcomes in heart failure.

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