

Optimal Medical Treatment versus Timely Intervention Therapy for Resistant Hypertension

Tzung-Dau Wang(王宗道), MD, PhD

Associate Professor of Medicine, Cardiovascular Center and Division of Cardiology,
Department of Internal Medicine, National Taiwan University Hospital

Despite the numerous available drugs and resources for lifestyle modification, approximately half of all hypertensive patients do not achieve their blood pressure targets. Whether a result of physiological resistance to the pharmacological agents or to patients' reluctance to adhere to lifelong pharmacological treatments, the prevalence of drug-resistant hypertension is clearly a problem.

Sympathetic overactivity is one of the essential mechanisms of hypertension. Several studies show that renal sympathetic nerves contribute to the development and perpetuation of hypertension. Efferent sympathetic outflow stimulates renin release, increases tubular sodium reabsorption, and reduces renal blood flow. Afferent signals from the kidney modulate central sympathetic outflow and thereby directly contribute to neurogenic hypertension. Efforts to overcome resistance to pharmacotherapy have generated interests into the role of the renal sympathetic nervous system as a therapeutic target for non-pharmacologic approaches.

Recently developed endovascular catheter technology enables selective denervation of the human kidney, with radiofrequency energy delivered in the renal artery lumen, accessing the renal nerves located in the adventitia of the renal arteries. A first-in-man study of this approach showed successful renal denervation with reduction of sympathetic activity and renin release in parallel with reductions of central sympathetic outflow. Safety and feasibility trials of this procedure identified substantial reductions of blood pressure (in general ~30/15 mmHg in office blood pressure, response rate ~85% within 12 months) without significant procedure-related complications. The blood pressure-lowering effects remained up to 3 years according to the current evidence.

Although the initial results of renal denervation are quite promising, the current indication of this novel technology is limited to patients with their office systolic blood pressure >160 mmHg with at least 3 antihypertensive drugs at maximally tolerated doses. This criterion is stricter than the current definition of resistant hypertension. Whether renal denervation will provide similar efficacy in patients with resistant hypertension (office systolic blood pressure >140 mmHg with at least 3 antihypertensive drugs at maximally tolerated doses including diuretics) is under study. Given that uncontrolled hypertension could cause cardiovascular complications in a timely manner, the rapidity of blood pressure reduction achieved by renal denervation versus that of pharmacological treatment in the clinical scenario of resistant hypertension is of clinical significance. It is still not certain which treatment strategy should be advocated first and further trials, particularly head-to-head trials, are desperately needed to solve this critical unmet need.