HOT OFF THE PRESS: BASIC

Catheter-based radiofrequency and renal denervation in the treatment of systemic arterial hypertension in patients with progressive chronic kidney disease

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One of the major problems in public health is non-adherence to antihypertensive medications in cases of severe or resistant hypertension. Catheter-based renal denervation has emerged as a novel approach to decrease BP and is in the centre of significant discussion[1,2] .

In the initial trials, a large body of evidence suggests it to be safe and effective in lowering BP in subjects with resistant hypertension via reduction in renal and central neural sympathetic activity[3]. I will concentrate on a set of recent articles from Kiuchi and their collaborators that focused on denervation in hypertension associated with progressive chronic kidney disease (CKD)[3-5]. Denervation of efferent and afferent renal nerves has long been reported to attenuate systemic arterial hypertension, thus preventing progressive deterioration of renal function[6]. Extending from this, catheter-based renal denervation, which targets the renal afferent and efferent sympathetic nerves, is an alternative treatment option for CKD patients with resistant hypertension.

In CKD patients, the disruption of sympathetic hyperactivity and the interruption of the renin-angiotensin-aldosterone system (RAAS) feedback loop might be of particular benefit. For example, in a renovascular hypertension model, Lopes et al.[7] showed that chemical afferent renal denervation reduced BP, renal sympathetic nerve activity and reactive oxygen species in both kidneys. Beneficial effects on renal function were also observed including decreased proteinuria, reduced serum creatinine/urea, and attenuated intrarenal RAAS activation.

Kiuchi et al. has studied a series of CKD resistant hypertensive patients who were followed up for 2 years after renal denervation. Their results indicate that renal denervation in patients with resistant hypertension and CKD (stages 2-4) provided a significant reduction in BP, and even associated with a long-term increase in glomerular filtration

rate and decrease in albumin excretion[5]. Recently, they extended these work with a cohort study that evaluated different patterns of ablation placement spots along the renal artery vasculature.

Interestingly, they found that the sum of ablations performed in distal segment and branches presented a significant correlation to the systolic BP lowering effect after renal denervation. This correlation was not seen between the total number of ablated spots and ABPM. Taken together these data suggest that a beneficial effect may be achieved by targeted radiofrequency treatment on the distal elements of the renal artery leading to significant and relatively uniform reductions in catecholamine and renal cortical sympathetic axon density.

Such observations may partially explain the variability in response to renal ablation therapy that has been seen to date. Although encouraging, the data are from a post hoc analysis and must be validated in a larger and properly designed study to address this specific aim.

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