RENAL DENERVATION IN PATIENTS WITH ACCESSORY RENAL ARTERIES: RENAL MASS IS DIRECTLY PROPORTIONAL TO TOTAL RENAL ARTERY CROSS SECTIONAL AREA AND IMPLICATIONS FOR THERAPY

Poster Contributions
Hall C
Saturday, March 29, 2014, 3:45 p.m.-4:30 p.m.

Session Title: Renal Denervation and Critical Limb Ischemia: The Hottest Topics in Vascular Medicine
Abstract Category: 31. Vascular Medicine: Endovascular Therapy
Presentation Number: 1140-82

Authors: Naohiko Nemoto, Jason Hamann, John Lesser, Robert Schwartz, The REDUCE-HTN Investigators, Minneapolis Heart Institute Foundation at Abbott Northwestern Hospital, Minneapolis, MN, USA

Background: Renal denervation is a prominent, emerging therapy for resistant hypertension. However, it is associated with a non-response rate of 10-40%. Recent data suggest that accessory renal arteries may play a causative role in non-response, though mechanisms are uncertain. A highly relevant question concerns the relationship, if any, between renal mass and total renal arterial cross-sectional area including accessory vessels. The existence of such a relationship has not been established, though an analogous strong relationship holds for myocardial mass and coronary artery area. Using 3-D computed tomography, we evaluated renal mass and total arterial cross-sectional area in the kidneys of patients undergoing renal denervation.

Methods: High resolution CT scans from 12 patients undergoing renal denervation as participants in the REDUCE-HTN clinical study were measured for total kidney volume and total renal artery area (TRAA), including all visible accessory arteries. Standard linear regression was used to determine the quantitative relationship among these parameters.

Results: Total renal volume and TRAA did not differ between left and right kidneys. A strong relationship was found between TRAA and kidney volume (Volume = 12.07 +3.8*TRAA), R=0.726 p=0.0075. Assuming a renal tissue density of 1.0 g/cm3, each square millimeter of renal artery lumen perfuses an average of 15.8 grams of renal parenchyma.

Conclusions: Total renal artery area is strongly correlated with renal volume, and renal mass by implication. These results have implications for renal denervation strategy in patients with multiple renal arteries. If non-response is due to accessory renal arteries, a threshold for denervating accessory vessels could be established using this quantitative information.