Radiofrequency Renal Nerve Denervation Decreases Blood Pressure, Sympathetic Activity and Renal Norepinephrine Content in Spontaneously Hypertensive Rats (SHR)

Juan Gao[1], Edmund K Kerut[2], Frank Smart[2], Daniel R Kapusta[1]

1. Department of Pharmacology, LSU Health Sciences Center, New Orleans, LA 70112; 2. Department of Cardiology, LSU Health Sciences Center, New Orleans, LA 70112

Radiofrequency renal denervation (RF-RDN) decreases blood pressure (BP) in patients with drug-resistant hypertension. This study investigated the effects of RF-RDN on sympathetic activity and BP (Systolic, SBP; Diastolic, DBP) in SHR. **Methods** Nineteen-week old male SHR were instrumented with radio-telemetry probes for chronic measurement of BP and BP variability (BPV). After 1-week, control BP was measured in rats for 3 days. The next day SHR (n=6/group) were anesthetized and randomly received either bilateral Sham-RDN or RF-RDN of the renal arteries (Biosense Webster Stockert 70 generator and RF-probe). BP was then measured in SHR for 8 weeks. **Results** Following RF-RDN, SBP/DBP was significantly decreased the day after (153±8/102±4 mmHg) and throughout the post-RDN study (4-week SBP/DBP, 173±7/120±5; 8-weeks, 171±6/116±4 mmHg) compared to pre-RDN control levels (SBP/DBP, 187±9/130±5 mmHg). RF-RDN significantly decreased the low frequency component of BPV in SHR with the peak attenuation observed at 8 weeks (LF/HF 2.2±0.2 vs 0.9±0.2); this correlated with a blunting of the hypotensive response to i.p. chlorisondamine in RF-RDN rats. Finally, at the end of week 8, kidney norepinephrine (NE) levels in RF-RDN rats (left, 10±10; right, 0.0±0.0 ng/g kidney) were dramatically decreased compared with levels from sham SHR (left, 130±10; right, 110±10 ng/g kidney). **Conclusions** These data demonstrate that in hypertensive SHR, bilateral RF-RDN of the renal arteries decreases BP in part by chronic inhibition of sympathetic neural pathways and a decrease in renal tissue NE levels. (Biosense Webster grant IIS-175 to DRK and FS; NIH NIGMS P20 GM103514 to DK)