

中文題目：腎動脈去神經術透過自主神經逆再重塑減少肥胖與心衰竭引發之心室顫動風險

英文題目：Renal Denervation Ameliorates the Risk of Ventricular Fibrillation in Obesity and Heart Failure Through Autonomic Reverse Remodeling

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Abstract

Background: Both obesity and heart failure (HF) are associated with sudden cardiac death. The current study aimed to investigate the effects of obesity and HF on the substrate for ventricular fibrillation (VF), and the mechanism of renal denervation (RDN) in protecting the heart from sympathetic activation and cardiac remodeling in HF rabbits fed with high-fat diet (HFD).

Methods: Twenty-four rabbits, randomized into control group fed with regular diet (Control), HFD, HFD-HF and HFD-HF-RDN groups. Rapid ventricular pacing of 400 bpm for four weeks was applied in HFD-HF and HFD-HF-RDN. Surgical and chemical RDNs were approached through bilateral retroperitoneal flank incisions in HFD-HF-RDN. All rabbits received electrophysiological study and a VF inducibility test. The ventricular myocardium was harvested for trichrome stain and the stellate ganglion was harvest for immunohistochemistry to evaluate autonomic remodeling.

Results: After three months, mean body weight was heavier in HFD, compared with control (3.5 ± 0.1 kg vs. 2.6 ± 0.1 kg, $p<0.01$). No differences in body weight among the three groups fed with HFD were observed. The ventricular refractory periods were longer in HFD-HF and HFD-HF-RDN than in control. An extension of ventricular fibrosis was observed in HFD and HFD-HF compared with control, and the degree of ventricular fibrosis was suppressed in HFD-HF-RDN compared to HFD-HF. The level of tyrosine hydroxylase staining was reduced in HFD-HF-RDN compared with HFD and HFD-HF. Importantly, VF inducibility was lower in HFD-RDN-HF ($10\pm 4\%$), when compared to those in HFD-HF ($58\pm 10\%$, $p<0.01$) and HFD ($42\pm 5\%$, $p<0.05$), respectively. TH (Tyrosine hydroxylase) staining of the stellate ganglion supported that sympathetic neuron marker densities were significantly higher in the HFD and HFD-HF rabbits compared with those of the control rabbits, respectively (Figure 1A and B). However, there were no significant differences in sympathetic neuron marker densities between the control and HFD-HF-RDN rabbits.

Conclusions: Our results suggest that obesity and HF increase sympathetic activity, structural and autonomic remodeling and VF inducibility, but RDN prevents them.

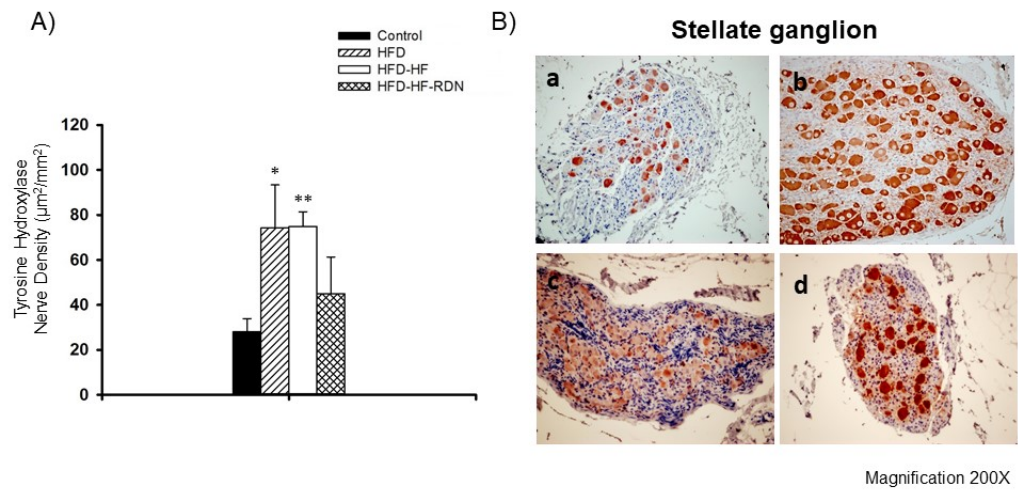


Figure 1.