

KSN 2016 Abstract Submission

Acute Kidney Injury

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Catheter-based renal sympathetic denervation induces reversible acute kidney injury and myocardial damage through the activation of caspase-1 and NLRP3 inflammasome

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Background: Catheter-based renal sympathetic denervation (RDN) is implemented as a strategy for the treatment of resistant hypertension, and is currently under clinical investigation. In the aspect of chronic safety, renal function, as assessed by serum creatinine, estimated glomerular filtration rate, and cystatin C, was reported to be unchanged from baseline at 6 months, and cardiac function was improved after RDN. To further determine the safety of RDN procedure, we investigated whether RDN might cause inflammatory subclinical damage in the kidneys and myocardium.

Methods: Fifteen female swine were divided into 5 groups: Normal control, Sham-operated control, and RDN groups subdivided into 3 groups according to the time of sacrifice: immediately (RDN-0), 1 week (RDN-1), and 2 weeks (RDN-2) after RDN.

Results: There were no significant changes between normal control and Sham-operated group using contrast-media. Serum creatinine and cystatin C were increased from the first week after RDN with no statistical significance. Serum LDH was increased immediately after RDN until the first week, and then decreased at the second week. In the kidneys, IL-1 β , -18, -6, TNF- α , and IL-10 were increased immediately, and then decreased at the second week after RDN. IL-1 α was increased at the first week, and decreased at the second week after RDN. Caspase-1 was increased immediately after RDN until the second week. ASC and NLRP3 expressions were increased immediately, and then decreased at the second week after RDN. In the myocardium, IL-1 β and TNF- α were increased at the first week, and then decreased at the second week after RDN. IL-10 was increased immediately, and decreased at the second week after RDN. Caspase-1 activity and ASC expression were increased immediately after RDN until the second week. However, NLRP3 expression in the myocardium did not show any significant differences between groups.

Conclusion: RDN procedure is safe, however, transiently can cause acute kidney injury and myocardial damage through the activation of pro-inflammatory cytokines, caspase-1 and NLRP3 inflammasome.

Keywords: acute kidney injury, Renal sympathetic denervation