

Distant Organ Effects of Acute Kidney Injury

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Despite the availability of renal replacement therapy, acute kidney injury (AKI) is associated with high mortality and morbidity. In humans, it is difficult to determine whether AKI is a cause or consequence of excess morbidity. In animal models, however, it is increasingly clear that AKI induces distant organ dysfunction. Identified pathways include inflammatory cascades, apoptosis, the induction of remote oxidative stress, and differential molecular expression. Specifically, growing evidence implicates renal injury as an instigator and multiplier of pulmonary, cardiac, hepatic, and neurologic dysfunction. Accurate identification of these pathways will be critical in developing targeted therapies to improve outcomes in AKI. This lecture will summarize both clinical and preclinical studies of AKI and its role in distant organ injury. There will be particular emphasis on AKI effects on lung and brain, with a focus on molecular and cellular changes caused by inflammation and microvascular dysfunction. Novel data will be presented on intestinal microbiota cross talk with kidney during AKI. The importance of heart and kidney interactions in the critically ill patient will also be highlighted.

Select reviews

Noel S, Martina-Lingua MN, Bandapalle S, Pluznick J, Hamad AR, Peterson DA, Rabb H. Intestinal microbiota-kidney cross talk in acute kidney injury and chronic kidney disease. *Nephron Clin Pract.* 2014;127(1-4):139-43

McCullough PA, Kellum JA, Haase M, Miller C, Damman K, Murray PT, Cruz D, House AA, Schmidt-Ott KM, Vescovo G, Bagshaw SM, Hoste EA, Briguori C, Braam B, Chawla LS, Costanzo MR, Tumlin JA, Herzog CA, Mehta RL, Rabb H, Shaw AD, Singbartl K, Ronco C. Pathophysiology of the cardiorenal syndromes: executive summary from the eleventh consensus conference of the Acute Dialysis Quality Initiative (ADQI). *Contrib Nephrol.* 2013;182:82-98.

Grams ME, Rabb H. The distant organ effects of acute kidney injury. *Kidney Int.* 2012 May;81(10):942-8.