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ACUTE KIDNEY INJURY

NEW APPROACH TO MEASURE RBF

Reduced renal perfusion is thought to have a major role in the pathogenesis of septic acute kidney injury (AKI); however, few measurements of renal blood flow (RBF) have been made in patients with septic AKI owing to the invasive or inaccurate nature of current approaches. John Prowle and colleagues have now conducted a proof-of-concept pilot study showing that cine phase-contrast MRI (CPC-MRI) is a safe and noninvasive approach to effectively measure RBF in these patients. "CPC-MRI is a well-established technique for the noninvasive measurement of blood flow in major vessels but has not been used for measurement of RBF in critically ill patients with AKI," explains Prowle.

The researchers used CPC-MRI to measure RBF and cardiac output in 10 patients with established septic AKI and 11 healthy individuals. Measurements were made 1–7 days after a diagnosis of AKI; no adverse reactions to CPC-MRI were reported.

The median RBF in patients with septic AKI was 482 ml/min, and, although variable, was significantly lower than RBF in healthy controls (1,260 ml/min). No association was found between RBF and renal function in patients with septic AKI, as assessed by creatinine clearance; however, RBF was consistently reduced as a fraction of cardiac output (median 7.1% compared with a normal value of ~20%). This relationship was observed in patients at different time points after diagnosis of AKI and despite a wide range in levels of cardiac output, leading the authors to conclude that "RBF reduction in patients with septic AKI may be a consequence, rather than a cause, of renal injury."

The researchers now plan to determine whether this approach can be used to measure RBF in patients with other diseases in which renal function might be altered, such as hepatorenal syndrome, and to characterize the importance of reduced RBF in the pathogenesis of these diseases. Of note, Prowle cautions that this approach only measures whole organ blood flow and does not assess intrarenal blood flow distribution, shunting or microvascular perfusion. "As such, any global assessment of renal circulation requires the use of multiple techinques, of which CPC-MRI could be one", he explains.

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Original article Prowle, J. R. *et al*. Measurement of renal blood flow by phase-contrast magnetic resonance imaging during septic acute kidney injury: a pilot investigation. *Crit. Care Med*. doi:10.1097/CCM.0b013e318246bd85