Simple ultrasound treatment may help protect the kidneys

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Ultrasound treatments may prevent acute kidney injury that commonly arises after major surgery, according to a study appearing in an upcoming issue of the *Journal of the American Society of Nephrology* (*JASN*). The findings suggest that this simple and noninvasive therapy may be an effective precaution for patients at risk.

Acute kidney injury, an abrupt decline in kidney function, is an increasingly prevalent and potentially serious condition in hospitalized patients. Sometimes acute kidney injury arises after major surgery because the kidneys can be deprived of normal blood flow during the procedure. Once the injury develops, patients have few established treatment options besides supportive care.

Mark Okusa, MD, Joseph Gigliotti, PhD (University of Virginia), and their colleagues found that a drug-free, noninvasive, ultrasound-based treatment could prevent acute kidney injury in mice. When they exposed anesthetized mice to ultrasound with a routine clinical imaging system 24 hours prior to blood disruption to the kidneys, the mice exhibited preserved kidney health after blood flow was restored. In contrast, sham-treated mice exhibited significant kidney injury. Further analyses revealed that the ultrasound treatment likely stimulated an anti-inflammatory response that originated from the spleen and was responsible for protecting the kidneys.

"Our studies using noninvasive ultrasound now provide us with an active treatment that appears to be simple, effective, and nontoxic for the

prevention of acute kidney injury," said Dr. Okusa. "To our knowledge this has never been described for the prevention of tissue or organ injury. Interestingly, we suspect that similar mechanisms that lead to kidney injury may also lead to lung, heart, and liver damage and that this form of therapy might be effective for prevention of injury in other organs as well."

In an accompanying editorial, Alain Le Moine, MD, PhD (Erasme Hospital, in Belgium) and his colleagues noted that opportunities arising from the work are numerous and promising because many procedures that carry a very high risk of AKI are planned. "In searching for novel approaches to prevent and even cure AKI, we believe that splenic ultrasound stimulation has a bright future ahead," they wrote.

More information: The article, entitled "Ultrasound Prevents Renal Ischemia-Reperfusion Injury by Stimulating the Splenic Cholinergic Anti-Inflammatory Pathway," will appear online on August 1, 2013, doi: 10.1681/ASN2013010084

The editorial, entitled "Ultrasonic Stimulation of the Cholinergic Anti-Inflammatory Pathway for Renal Protection," will appear online on August 1, 2013, doi: 10.1681/ASN.2013060603

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