Patients who survive an episode of acute kidney injury (AKI) and have persistently diminished kidney function are infrequently referred to a nephrologist, according to a recent study in the Journal of the American Society of Nephrology. The findings indicate that efforts are needed to identify and treat kidney injury patients who require subsequent care.

“This study is the first of its kind to demonstrate that patients who experience an acute decline in kidney function during hospitalization may not be receiving adequate attention paid to their future risk for developing kidney problems or its complications,” said Michael Matheny, MD, of the Vanderbilt University Medical Center and the Tennessee Valley Healthcare System Veterans Administration. “It also highlights an opportunity to improve communication between primary care providers and nephrologists to provide a more integrated approach in caring for the kidney health of these patients.”

The seriousness of AKI
AKI is increasingly common and often arises as a result of medical or surgical complications that deprive the kidneys of a normal blood flow for extended periods of time. This is why AKI is most common in people who are already hospitalized, particularly in critically ill patients who need intensive care.

The kidneys can often recover from AKI, and most patients can resume a normal life after treatment; however, they may remain at increased risk for various complications. Even mild injury, resulting in small changes in acute kidney function, can have significant short-term and long-term consequences.

For example, AKI is becoming increasingly recognized as an important determinant of incident chronic kidney disease, progression to ESRD, and long-term mortality. In fact, the current thinking regarding AKI is that it encompasses an entire spectrum of kidney disease, from its early onset as an injury, to its progression.

Salt in the Diet: Too Much, Too Little, Just Right?
More Data, More Questions on Sodium and Cardiovascular Risk

Questions continue to plague recommendations for daily sodium intake. Recently, both high and low sodium levels have been linked to increased cardiovascular risk in patients with established cardiovascular disease.

“We know that high sodium is certainly bad for you,” said Andrew Mente, PhD, assistant professor of clinical epidemiology and biostatistics at McMaster University in Hamilton, Ontario, Canada. “What’s interesting is that we also found that too little sodium was also a significant predictor of increased cardiovascular events.”

Mente and Martin J. O’Donnell, MB, PhD, associate professor of medicine at McMaster, published their findings in The Journal of the American Medical Association (JAMA).

High risk at both ends of the sodium range
Mente and McDonnell found a “J-shaped” relationship that included a fairly

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wide range of high but “normal” sodium levels without excess cardiovascular event rates. The findings may have implications for the management of patients at high cardiovascular risk, including those with kidney disease.

The researchers analyzed observational data on nearly 29,000 participants from two population-based European Project on Genes in Hypertension study—published in *JAMA* last spring—which also linked lower sodium to higher cardiovascular morbidity.

“Some people saw that study and said, ‘Well, these are people that are healthy. If we were to look at patients with cardiovascular disease, we’re not going to find low sodium puts them at higher risk,’” said Batlle. “But indeed, we found actually that same relationship.”

Lowering sodium intake is a major focus of medical efforts to reduce cardiovascular risk. The current World Health Organization recommendation is less than 2 g/day. The American Heart Association advises the public, “Aim to eat less than 1500 milligrams of sodium per day.” It’s especially important to clarify optimal sodium intake for patients with existing cardiovascular disease—many of whom also have chronic kidney disease—who may be more vulnerable to the effects of high and low sodium.

While most experts emphasize the importance of reinforcing advice not to eat too much salt, the evidence raises the possibility that current recommendations for sodium restriction could be causing patient harm. “Do we keep people doing what they are doing anyhow?” asked Batlle. “One could interpret the data in this way: why put a low-sodium diet when better results are seen with what we consider a normal-salt diet in the first place?”

“I am not ready to conclude at all that what doctors should be recommending for their patients, but this is one potential explanation.”

A key limitation of the most recent *JAMA* study was that sodium and potassium excretion were estimated from spot urine samples. “We all would agree that the way sodium was measured in the urine is not precise,” said Batlle. “But having said that, the results are very thought-provoking and should be the impetus for further study, including dietary intake of sodium and potassium assessed with a timed urine collection over 24 hours.”

Intriguing speculations on mechanisms

The increase in heart failure may provide a clue as to one possible mechanism by which low sodium might lead to high cardiovascular risk. “There is some evidence that low sodium intake can trigger activation of the renin-angiotensin-aldosterone system and increase sympathetic nervous system activity—which is not a favorable response from a cardiovascular standpoint,” said Mente. Other studies suggest that low sodium intake can affect lipoproteins and insulin resistance and lead to a negative balance of macro- and microcalcium. “So there are all these other potential unintended consequences,” Mente said. So what’s the next step on sodium and cardiovascular risk?

“Certainly to answer the question definitively, we eventually need to do a randomized controlled trial,” said Mente. “And not with surrogate measures like blood pressure, but with ‘hard’ cardiovascular disease events. But that’s a challenging study in itself, because you need to get people to eat a very low sodium diet for a long period of time.”

He added, “Taking the evidence in its totality, perhaps instead we should be focusing on improving the overall quality of the diet, rather than focusing on a single nutrient like sodium. Also, a high-quality diet is much more palatable and easier to maintain in the long term, and would have universal benefits beyond cardiovascular disease.”

Letters

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