Intensive insulin therapy protects kidneys in critically ill patients

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For critically ill patients, intensive insulin therapy (IIT) to keep blood sugar (glucose) at normal levels reduces the risk of acute kidney injury, reports a study in the March Journal of the American Society of Nephrology.

The new research builds on previous randomized trials, including more than 2,700 patients, which reached the "startling" conclusion that IIT reduces the risk of death in critically ill patients, according to lead author Dr. Miet Schetz of University of Leuven, Belgium. In those studies, one group of patients received IIT, with insulin given continuously to maintain normal glucose levels. The other group received conventional insulin therapy, in which blood glucose levels are allowed to rise above normal.

Dr. Schetz and colleagues re-analyzed the trial data, focusing on differences in the rates of acute kidney injury (AKI) between the two treatment groups. Acute kidney injury is a common and serious complication among patients admitted to the intensive care unit (ICU). It occurs in five to 30 percent of patients, with death rates exceeding 40 percent.

The re-analysis showed that AKI developed in 4.5 percent of patients assigned to IIT, compared to 7.6 percent of those receiving conventional insulin therapy. The reduction in AKI was greatest when glucose levels remained within the normal range.

Intensive insulin therapy was more effective in protecting against AKI in patients admitted to the ICU after surgery (surgical ICU), compared to critically ill patients who did not undergo surgery (medical ICU). "This difference can be explained by the fact that IIT is a preventive strategy that cannot heal damage that is already present," explains Dr. Schetz. “The medical ICU patients were much sicker to begin with and may have already had kidney damage.”

For many years, the medical community has considered high blood sugar levels in critically ill patients—called "stress diabetes"—as a beneficial reaction of the body to ensure adequate energy supply to the organs during severe illness. The new research grew out of studies led by Dr. Greet Van den Berghe, exploring the hormonal changes induced by critical illness. Subsequent trials found that strict glucose control with IIT reduced the risk of death in both surgical and medical ICU patients. Rates of organ failure were also lower with IIT compared to conventional insulin therapy. (Dr. Van den Berghe is a co-author of the new study.)

The new analysis builds on these results by confirming that IIT reduces the risk of AKI in critically ill patients, especially after surgery. “This finding is especially important, because intensive insulin therapy is the first medical treatment that has been clearly shown to protect the kidney of critically ill patients," Dr. Schetz adds.

More research is needed to clarify how IIT acts to protect the kidneys—whether by preventing direct kidney damage caused by high blood sugar, or through indirect effects. Regardless of the mechanism, Dr. Schetz concludes, "Since AKI is associated with increased morbidity and mortality, the goal should be to prevent its development."

Source: American Society of Nephrology