

Low Kidney Function and Proteinuria Separately Linked to Adverse Outcomes After Stroke

In patients with ischemic stroke, the decreased estimated glomerular filtration rate (eGFR) and proteinuria are separately and independently associated with stroke recurrence and death, reports a study in *Stroke*.

The researchers analyzed prospective follow-up data on 12,576 patients with ischemic stroke (41.3% women; mean age, 73 years). Data were drawn from the Japanese Fukuoka Stroke Registry from 2007 to 2019. Patients were classified into groups based on eGFR values of ≥ 60 , 45–59, or < 45 mL/min/1.73 m², and with proteinuria classified as –, $\pm/1+$, or 2+ or greater.

The measurements of kidney function and kidney damage were evaluated as predictors of recurrent stroke and all-cause mortality. At a median follow-up of 4.3 years, recurrent stroke incidence was 48.0 per 1000 patient-years, and mortality was 67.3 per 1000 patient-years. Chronic kidney disease (CKD), defined as decreased eGFR or the presence of proteinuria, was associated with increased risks of recurrent stroke and death, independent of traditional cardiovascular risk factors.

For recurrent stroke, adjusted hazard ratios (HRs) were 1.22 for patients with an eGFR < 45 mL/min/1.73 m² (compared with ≥ 60 mL/min/1.73 m²) and 1.25 for those

with proteinuria of 2+ or greater (compared with absent proteinuria). For all-cause mortality, HRs were 1.45 and 1.62, respectively.

The association of proteinuria with recurrent stroke tended to decrease on analysis considering competing causes of death. The mortality effect of proteinuria was stronger for patients younger than age 75 compared with older patients and for those with non-cardioembolic versus cardioembolic stroke.

Decreasing eGFR and increasing proteinuria are “mutually independent risk factors” for long-term stroke recurrence and death, the findings suggest. The associations are heterogeneous for proteinuria, indicating possible differences in the pathophysiologic mechanisms of the two risks. “Further studies are needed to determine whether interventions targeting CKD can offer additional benefits to poststroke outcomes following ischemic stroke,” the researchers write [Ueki K, et al. Decreased estimated glomerular filtration rate and proteinuria and long-term outcomes after ischemic stroke: A longitudinal observational cohort study. *Stroke* 2023; 54:1268–1277; doi: 10.1161/STROKEAHA.122.040958]. ■



Expressed Values of Patients Receiving Dialysis May Not Match End-of-Life Care

Patients receiving dialysis who say they value, comfort-based care often end up with advance care planning and end-of-life care that focuses on prolongation of life, reports a study in *JAMA Internal Medicine*.

The survey study included patients receiving maintenance dialysis at centers in the Seattle and Nashville metropolitan areas between 2015 and 2018. Participants responded to a question about the value they would place on comfort-based care and pain relief compared with longevity-focused care, even if it entailed more pain and discomfort if they were to become seriously ill. These expressed values were compared with patient-reported engagement in advance care planning and end-of-life care received through 2020, based on linked kidney registry and Medicare claims data.

The analysis included 933 respondents (mean age, 63 years; 56% male; and 27% Black) with linked registry data. Nearly half of participants (48.4%) said they would value comfort-focused care, whereas 19.2% valued longevity-based care. The remaining 28.1% were unsure about which intensity of care they would value. Those who valued comfort-based care were more likely to say they had not completed an advance directive: estimated probability, 47.5%, compared with 28.1% of those who valued longevity-focused care or were unsure.

Patients who valued comfort-based care were also more likely to report that they had not had discussions about stopping dialysis (estimated probability, 33.3% versus 21.9%) or hospice (28.6% versus 18.2%). Most patients indicated they would want to receive cardiopulmonary resuscitation: estimated probability, 78.0% in those who valued the comfort-based care group and 93.9% in those who valued longevity or were unsure. For mechanical ventilation, estimated probabilities were 52.0% and 77.9%, respectively.

Among patients who died during follow-up, expected probabilities of intensive procedures during the last month of life were 23.5% for those who valued comfort-based care and 26.1% for those who valued longevity-focused care or were unsure. The findings were similar for dialysis discontinuation: 38.3% versus 30.2% and hospice enrollment: 32.2% versus 23.3%, respectively.

The study adds new evidence of a “disconnect” between expressed values for care versus actual care received by patients receiving hemodialysis. Although patients are more likely to express a value for comfort-based care, advance care planning and end-of-life care often reflect a focus on longevity. “These findings suggest important opportunities to improve the quality of care for patients receiving dialysis,” the researchers conclude [Wong SPY, et al. Value placed on comfort vs life prolongation among patients treated with maintenance dialysis. *JAMA Intern Med* 2023; 183:462–469; doi: 10.1001/jamainternmed.2023.0265]. ■

AKI Linked to Increased Mortality and Rehospitalization, With or Without CKD

Patients hospitalized with acute kidney injury (AKI) are at elevated risk of rehospitalization and death, whether or not they have chronic kidney disease (CKD), reports a study in the *American Journal of Kidney Diseases*.

The analysis included 471,176 patients with a discharge diagnosis of AKI, propensity score-matched to the same number of patients hospitalized without AKI. Patients were identified from a national claims database (Optum Clinformatics). All were continuously enrolled throughout a 2-year lookback period, during which they were free of AKI hospitalization.

All-cause and selected-cause rehospitalization and mortality were assessed at 90 and 365 days after hospitalization, including possible interactions between AKI and pre-existing CKD. Fifty-one percent of patients hospitalized with AKI were men; the mean age was 73 years. Before index hospitalization, approximately 56% of patients had CKD, 47% had coronary artery disease, and 42% had diabetes.

On propensity score-matched analysis, AKI was associated with an increased rate of all-cause rehospitalization within 90 days: hazard ratio (HR), 1.62. Analysis of specific causes showed significant increases for end stage

kidney disease: HR, 6.1; heart failure: HR, 2.81; sepsis: HR, 2.62; pneumonia: HR, 1.47; myocardial infarction: HR, 1.48; and volume depletion: HR, 1.64. Similar patterns were found for 365-day rehospitalization.

All-cause mortality was more than doubled for the AKI group: HR, 2.66 at 90 days and 2.11 at 365 days. Associations of AKI with rehospitalization were similar for patients with and without CKD. The association with mortality was weaker in patients with CKD.

The findings lend new insights into short- and long-term risk of adverse outcomes of AKI in a diverse US patient population. Rehospitalization and mortality risks are elevated at 3 months and 1 year after discharge for patients with AKI compared with matched patients without AKI. “[T]hese results underscore the immediate need for close posthospitalization monitoring of individuals with AKI,” the researchers write [Schulman IH, et al. Re-admission and mortality after hospitalization with acute kidney injury. *Am J Kidney Dis*, published online ahead of print April 19, 2023. doi: 10.1053/j.ajkd.2022.12.008; [https://www.ajkd.org/article/S0272-6386\(23\)00067-7/fulltext](https://www.ajkd.org/article/S0272-6386(23)00067-7/fulltext)]. ■

More States Provide Kidney Care for Undocumented Immigrants

The number of states providing access to dialysis for undocumented immigrants has increased substantially over the past few years, according to a brief research report in *Annals of Internal Medicine*.

Using Medicaid and Emergency Medicaid (EM) manuals and other sources, the researchers analyzed the inclusion of undocumented immigrants for kidney failure, dialysis, and transplantation between March and October 2022. Data also included interviews with clinicians in each state who had provided kidney replacement therapy to at least two undocumented immigrants over the past 5 years.

The study found that 20 states and the District of Columbia provided statewide coverage for standard outpatient hemodialysis for undocumented immigrants. Hemodialysis was provided through EM in 17 states and through Medicaid or state insurance pools in the rest.

Five states—California, Illinois, Massachusetts, Minnesota, and New Mexico—provided coverage for kidney transplantation.

A 2019 study reported that 12 states and the District of Columbia offered coverage for dialysis by including kidney failure as a qualifying condition under EM. In 2022, the number of states providing statewide coverage for hemodialysis in undocumented immigrants increased to 20. “The expansion of dialysis coverage may be due to increasing awareness of poor outcomes with emergency hemodialysis and heightened advocacy efforts,” the researchers write [Rizzolo K, et al. Access to kidney care for undocumented immigrants across the United States. *Ann Intern Med*, published online ahead of print April 25, 2023. doi: 10.7326/M23-0202; <https://www.acp-journals.org/doi/10.7326/M23-0202>]. ■