

## Action Points

Patients on dialysis faced a higher incidence of cardiopulmonary resuscitation (CPR) and had far worse long-term survival afterward than the general population, a new study found.

Researchers looked at the Medicare records of more than 600,000 patients with end-stage renal disease and found that in-hospital CPR use was 20 times more common for the cohort than for a sample of other hospitalized patients (6.3% versus 0.3%).

In the group, the overall annual incidence of CPR was 1.4 per 1,000 hospital days (95% CI 1.3-1.4) from 2000 to 2011. Only 21.9% of patients who received CPR survived until they were let out of the hospital (95% CI 21.4-22.3), and the median post-discharge survival was 5 months (interquartile range 0.7-16.8 months).

The researchers published their results on April 27 in [JAMA Internal Medicine](#).

"The incidence of in-hospital CPR among patients receiving dialysis is high despite poor long-term survival after an episode of CPR," wrote the authors, who were led by [Susan Wong, MD](#), at the Kidney Research Institute in Seattle. "These findings support the relevance of advance care planning and setting realistic expectations regarding resuscitation treatment in this population."

There was an increase in incidences of CPR from 2000 to 2011, from 1.0 events per 1,000 hospital days (95% CI 0.9-1.1) to 1.6 events per 1,000 hospital days (95% CI 1.6-1.7;  $P<0.001$ ).

In addition, the proportion of CPR recipients who survived to discharge increased during the study interval, from 15.2% (95% CI 11.1-20.5) to 28% (95% CI 26.7-29.4;  $P<0.001$ ), as did the proportion of in-hospital deaths preceded by CPR (from 9.5%, 95% CI 8.4-10.8, to 19.8%, 95% CI 19.2-20.4;  $P<0.001$ ).

There was no significant change in post-discharge survival, said the researchers.

"Reasons for an increase in the rates of in-hospital CPR are not clear, but the increase coincides with increases in the rates of hospital and intensive care unit admissions and the use of mechanical ventilation near the end of life among the wider population of Medicare beneficiaries, suggesting broad trends toward more intensive patterns of care during this same period," noted the researchers.

All of the patients were 18 or older and had not received a kidney transplant. They all started dialysis at some point from January 2000 to December 2010, and the analysis was limited to those with for whom Medicare was the primary payer from within 3 months of beginning dialysis. The patients were tracked until their time of death, first kidney transplantation, or end of follow-up in December, 2011.

The average follow-up time was 2.9 years, according to the authors. CPR events that happened in the emergency departments weren't included, and if a patient had multiple events in one hospital stay, they were counted as separate incidents if they happened at least 1 day apart.

More than 80% of the patients in the large cohort were admitted to the hospital at least once during the follow-up, and of those, 6.3% underwent at least one episode of CPR while in the hospital. And 4.4% of that group received CPR more than once.

The incidence of CPR was higher among men than women, among black patients compared with white patients, among patients under 65 compared with those over 65, and among patients with coronary artery disease, congestive heart failure, hypertension, and diabetes. Those who had a listed cause of diabetes or hypertension for end stage renal disease also had higher CPR rates compared with those with other listed causes, found the researchers.

On average, patients stayed in the hospital for 8 days after receiving CPR. The proportion of patients who survived up to 1 year after receiving CPR was less than a third, at 31.3% (95% CI 30.3-32.4), and about two-thirds were readmitted at least once.

For those patients who survived until they were discharged, but died during follow-up, cardiovascular causes were reported as the primary or secondary cause of death for 43.0% of them (95% CI 41.9-44.1).

Limitations of the study included a lack of verification for the CPR codes used on Medicare claims. In addition, the authors didn't have information about factors that could have affected post-CPR survival, including details about the cardiac arrest and how it was initially treated, and hospital-level characteristics.

There was also a lack of information about patient outcomes like disability, hospice, and nursing homes, and the lack of reliable information on comorbidities also limited the findings, said the authors.

Researchers disclosed no relevant relationships with industry.

- Reviewed by [F. Perry Wilson, MD, MSCE](#) Assistant Professor, Section of Nephrology, Yale School of Medicine

[...](#)