Are Ambulatory Care–Sensitive Conditions the Fulcrum of Hospitalizations for CKD Patients?

Jeffrey C. Fink

Clin J Am Soc Nephrol 11: 1927–1928, 2016. doi: 10.2215/CJN.09160816

Department of Medicine, University of Maryland School of Medicine, Baltimore, Maryland

Correspondence: Dr. Jeffrey C. Fink, Department of Medicine, University of Maryland School of Medicine, Room N3e03, 22 South Greene Street, Baltimore, MD 21201. Email: jfink@medicine.umaryland.edu

With ever–increasing medical costs and expectations for health systems to become more cost effective, strategies to reduce hospitalization are needed. Inpatient stays for ambulatory care–sensitive conditions (ACSCs), defined as illnesses or conditions that might not require hospitalization if successfully managed in the outpatient setting, have declined over the last several years (1,2). Greater declines have been seen for acute relative to chronic conditions and in patients with higher versus lower socioeconomic status (1,2). However, concurrent with the observed decline in preventable hospitalizations due to ACSC has been an increase in the rate of "treat and release" emergency department visits also for ACSC (1). Although the most costly patients have high rates of preventable hospitalizations, lower-cost patients have a larger proportion of their health costs related to ACSC, leading to unplanned emergency department visits and hospitalizations (3).

Patients with CKD stand out for their high rate of hospitalization, which along with cost of their care, increases with disease severity (4,5). The frequent coexistence of diabetes, cardiovascular disease, and hypertension with CKD and even moderate degrees of renal impairment are associated with increased hospitalization along with polypharmacy and high service utilization, including laboratory tests and clinic visits (6,7). The common safety hazards and associated adverse events with CKD admissions are a strong impetus to avoid hospitalization in this vulnerable population. Hospitalized patients with CKD are subject to a variety of safety events defined as harm from medical care, including hyperkalemia, hypoglycemia, drug-related problems, and an array of Agency for Healthcare Research and Quality–defined general safety events (8). In–hospital CKD–specific safety events, including acquired congestive heart failure (CHF), AKI, and other electrolyte disturbances, are also more common in patients with CKD than in patients without CKD admitted to the hospital (8).

Optimal CKD management emphasizes outpatient care; however, patients with CKD have a high rate of hospital admission related to ACSC. About one quarter of New York State nursing residents with CKD were reported to be admitted to the hospital with general ACSC in 2007, with risk factors for hospitalization including CHF as a comorbidity, excessive medication use, and failure of nursing home staff to communicate details of medical illness to physician staff (9). Given the complexity of CKD care, it is important to identify the most common ACSCs in CKD and focus on these in outpatient management.

Consensus-based proceedings enlisting the input of 12 nephrologists in Alberta, Canada identified a set of four disease–specific ACSCs that predominate in diabetic and nondiabetic CKD (10). The agreed on CKD–specific ACSCs in order of reported frequency include CHF, hyperkalemia, volume overload (nonattributable to cardiac dysfunction), and malignant hypertension. The incidence rates of hospital admissions for these ACSCs in Alberta, Canada between 2002 and 2009 were higher in patients with CKD versus those without, and they increased with declining renal function and in the presence of albuminuria (11). Factors associated with admissions for CHF, hyperkalemia, and volume overload included a prior diagnosis of CHF, diabetes, older age, and chronic liver disease. Prior hypertension, Aboriginal ethnicity, and peripheral vascular disease were risk factors for malignant hypertension; furthermore, distance from a medical facility was a risk factor for a CHF or malignant hypertension admission.

In this issue of the *Clinical Journal of the American Society of Nephrology*, Ronksley *et al.* (12) examined a nondialysis–requiring CKD cohort from the Alberta Kidney Disease Network, which included patients 18 years of age or older in 2009 who were hospitalized at least once over the next 3 years in that Canadian province. Patients with their first prehospitalization serum creatinine in 2009 corresponding to an eGFR of 15–59 ml/min per 1.73 m^2 were included in the study sample and retrospectively observed until death or December 31, 2012. Slightly less than one half of the Alberta cohort who met the GFR study criteria for CKD were hospitalized over the study period. Each cohort participant was classified on the basis of his/her timing and frequency of hospitalization over the follow-up period in one of three groups. Persistent high users included patients with at least three hospitalizations in 2 or more years of follow-up, episodic high users included patients with at least three hospitalizations in only 1 year of follow-up, and nonhigh users included those individuals with less than three hospitalizations in any year. Most of the 57,007 study

participants (86%) were nonhigh hospital users, and only 1.7% of the cohort were persistent high users. The cumulative number of hospital admissions in the cohort was 118,671, and the persistent and episodic high users (14% of the cohort) accounted for 34% of hospitalizations and 30% of all hospital days.

Factors associated with membership in the persistent high–user group included more severe CKD, younger age, minority ethnicity (predominately Aboriginal), more comorbidities, and a higher proportion living in rural areas compared with the episodic or nonhigh hospital users. Of note, a higher proportion of persistent high users had one or more visits with a nephrologist over the 2 years before cohort entry versus the episodic or nonhigh hospital users. Mortality in the study was high, with 35% of the cohort dying over the 3 years of observation and death rates of 52% and 33% in the persistent high users and nonhigh hospital users, respectively; >90% of persistent high users were readmitted within 30 days of a hospitalization versus 11% in the nonhigh hospital users.

The investigators found that about 20% of all hospitalizations were due to the previously defined CKD–specific ACSCs, and whereas the majority of hospitalizations attributable to CKD-specific ACSCs were in the nonhigh hospital users, the persistent high users had a higher proportion of their hospitalizations due to CKD-specific ACSCs (12). About one in four of all hospitalized patients had an admission due to a CKD-specific ACSC, with the most common, as previously reported, being CHF followed by hyperkalemia. Factors associated with an ACSC included older age, advanced stage of CKD, registered First Nation status, lower income, lack of primary care provider, contact with a nephrologist, and increasing comorbidity.

Although the study offers insight into the burden of illness among patients with CKD and points to several previously recognized social determinants likely to contribute to the high service utilization of this population, the results should be interpreted with its limitations in mind (12). The authors reaffirm the prominence of a set of previously established CKD–specific ACSCs in the cohort, and although these were endorsed *a priori* by a quorum of specialists, the analysis may have overlooked the possible high incidence of other ACSCs (12). The categorization of cohort participants with a high mortality rate into groups on the basis of the annual frequency of hospitalization left the survivors with a greater opportunity for more events and membership in the persistent high–user group, and it could have skewed the study findings. It is important to recognize the contributions of Ronksley *et al.* (12) and the contributions of others who have studied the Alberta Kidney Disease Network to the clinical epidemiology of CKD, but these findings may have limited generalizability to other national health systems, most notably that found in the United States.

A key message offered by Ronksley *et al.* (12) is that a minority of patients with CKD accounts for a disproportionate amount of health service utilization in this disease, which is likely with many chronic medical conditions. An important step in the improvement of health care in patients with CKD is to identify the high-risk patients who are the high utilizers. Revealing that one fourth of CKD hospital admissions are due to ACSCs lends support to the notion that the quality of ambulatory care can have an effect on hospitalization. However, <2% of patients with CKD in Alberta are persistent high users, and viewed in another way, only one fourth of admissions are due to ACSCs. Moreover, is it enough to identify demographic characteristics and social determinants leading to high hospitalization rates in CKD? I laud the work of our colleagues in the Alberta Kidney Network who continue to work in this area and look forward to the next leap forward in identifying high-effect innovations that will improve the wellbeing and outcome of patients with CKD who are high health service users.

Disclosures

None.

References

1. Fingar KR, Barrett ML, Elixhauser A, Stocks C, Steiner CA: Trends in potentially preventable inpatient hospital admissions and emergency department visits: Healthcare Cost and Utilization Project statistical brief #195. Agency for Healthcare and Research Quality, Rockville, MD, November 2015. Available from: http://www.hcup-us.ahrq.gov/reports/statbriefs/sb195-Potentially-Preventable-Hospitalizations.pdf
2. Moy E, Chang E, Barrett M; Centers for Disease Control and Prevention (CDC): Potentially preventable hospitalizations - United States, 2001-2009. *MMWR Suppl* 62: 139–143, 2013
3. Joynt KE, Gawande AA, Orav EJ, Jha AK: Contribution of preventable acute care spending to total spending for high-cost Medicare patients. *JAMA* 309: 2572–2578, 2013
4. Go AS, Chertow GM, Fan D, McCulloch CE, Hsu CY: Chronic kidney disease and the risks of death, cardiovascular events, and hospitalization. *N Engl J Med* 351: 1296–1305, 2004
5. Honeycutt AA, Segel JE, Zhuo X, Hoerger TJ, Imai K, Williams D: Medical costs of CKD in the Medicare population. *J Am Soc Nephrol* 24: 1478–1483, 2013
6. Nissenson AR, Collins AJ, Hurley J, Petersen H, Pereira BJ, Steinberg EP: Opportunities for improving the care of patients with chronic renal insufficiency: Current practice patterns. *J Am Soc Nephrol* 12: 1713–1720, 2001
7. Khan SS, Kazmi WH, Abichandani R, Tighiouart H, Pereira BJ, Kausz AT: Health care utilization among patients with chronic kidney disease. *Kidney Int* 62: 229–236, 2002
8. Hartley IR, Ginsberg JS, Diamantidis CJ, Zhan M, Walker L, Rattinger GB, Fink JC: Consideration of ICD-9 code-derived disease-specific safety indicators in CKD. *Clin J Am Soc Nephrol* 8: 2123–2131, 2013
9. Mathew R, Young Y, Shrestha S: Factors associated with potentially preventable hospitalization among nursing home residents in New York State with chronic kidney disease. *J Am Med Dir Assoc* 13: 337–343, 2012
10. Gao S, Manns BJ, Culleton BF, Tonelli M, Quan H, Crowshoe L, Ghali WA, Svenson LW, Ahmed S, Hemmelgarn BR; Alberta Kidney Disease Network: Access to health care among status Aboriginal people with chronic kidney disease. *CMAJ* 179: 1007–1012, 2008
11. Wiebe N, Klarenbach SW, Allan GM, Manns BJ, Pelletier R, James MT, Bello A, Hemmelgarn BR, Tonelli M; Alberta Kidney Disease Network: Potentially preventable hospitalization as a complication of CKD: A cohort study. *Am J Kidney Dis* 64: 230–238, 2014
12. Ronksley PE, Hemmelgarn BR, Manns BJ, Wick J, James MT, Ravani P, Quinn RR, Scott-Douglas N, Lewanczuk R, Tonelliet al: Potentially preventable hospitalization among patients with chronic kidney disease and high inpatient use. *Clin J Am Soc Nephrol* 11: 2022–2031, 2016

Published online ahead of print. Publication date available at www.cjasn.org.

See related article, "Potentially Preventable Hospitalization among Patients with CKD and High Inpatient Use," on pages 2022–2031.