

Comparative analysis of cardiovascular event rates in dialysis, CKD, transplant, and general populations

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Introduction

- Cardiac disease remains the leading cause of mortality in end-stage renal disease (ESRD) patients.
- This study describes the associations between cardiovascular events and the presence and severity of chronic kidney disease (CKD).
- We compared inpatient cardiovascular event rates in four patient cohorts: ESRD patients (dialysis and transplant) and non-ESRD Medicare patients (with and without CKD).

Methods

- We studied adult dialysis, transplant, chronic kidney disease (CKD), and non-CKD patients (N = 191,287, 22,673, 44,941, and 1,378,122, respectively) who were prevalent on January 1, 2002.
- The CKD and non-CKD cohorts
 - were obtained from the 5% Medicare database,
 - excluded patients with ESRD, with HMO coverage, or without continuous Medicare coverage, and,
 - used diabetic and CKD status as defined during 2001.

- A limitation is that among CKD and non-CKD groups younger than age 65, only disabled or Railroad Retirement Board patients have Medicare coverage and therefore were included.
- Patients with a cause-specific hospitalization that spanned the start of followup were excluded.
- Patients were followed for up to two years, from January 1, 2002, to December 31, 2003.
 - ESRD patients were censored at the earliest of death, loss to followup, end of status as Medicare as a primary payor, 12/31/03, transplant (dialysis patients only), or three years after transplant (transplant patients only).
 - CKD and non-CKD patients were censored at the earliest of death, end of Medicare coverage, or 12/31/03.
- Events were identified by the first inpatient ICD-9-CM diagnosis code during followup.
 - Events included acute myocardial infarction (AMI), congestive heart failure (CHF), stroke, and peripheral vascular disease (PVD).

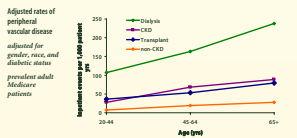
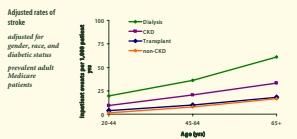
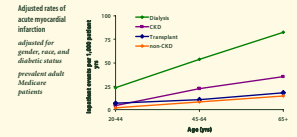
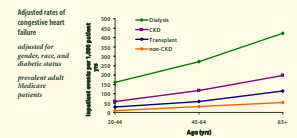
- Event rates by age were calculated with the model-based adjustment method.
- Rates were adjusted for gender, race, and diabetic status.
- The reference cohort consists of all included patients (CKD, non-CKD, and ESRD).

Results

- Within each age group, event rate patterns showed:
 - non-CKD < transplant < CKD < dialysis.
- Rates were strikingly higher in dialysis patients than in the other cohorts, and this disparity increased with older age.
- Rates of CHF, AMI, stroke, and PVD were 2 to 5 times higher in dialysis than CKD patients.
- In each of the four cohorts, CHF was the event with the highest rates.
- Among 65+ year olds, compared to non-CKD patients, CHF rates were 2, 4, and 8 times higher for transplant, CKD, and dialysis patients, respectively.
- Rates among transplant patients were generally lower than those of CKD patients, and for AMI and stroke, were close to the non-CKD cohort.

Prevalent patient characteristics, 2002

	non-CKD (N=1,378,122)	CKD (N=44,941)	dialysis (N=191,287)	transplant (N=22,673)
Age (yrs)	20 to 44	4.2	1.7	15.6
	45 to 64	9.6	8.7	35.7
	65+	86.3	89.6	48.9
Sex	male	42.1	49.1	52.1
	female	57.9	50.9	47.9
Race	white	86.6	81.4	54.8
	black	8.9	13.4	39.3
	other	4.5	5.2	5.9
Diabetic status	diabetes	16.2	46.2	41.1
	non-diabetes	83.8	53.8	58.9



Conclusions

- Both the presence and the severity of CKD appear to be risk multipliers for cardiovascular events.
- High cardiovascular event rates among dialysis patients, followed by CKD patients, support continuous efforts to reduce the cardiovascular disease burdens of these groups.
- These results may help to explain the challenge of achieving lower all-cause mortality with a single intervention.