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Comparing five comorbidity indices to predict mortality in chronic kidney disease

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Introduction

Many reports which use healthcare databases adjust the results for patient comorbidity. Several different indices were developed in the general population to summarize patient comorbidity. How well these indices predict one-year all-cause mortality in individuals with chronic kidney disease (CKD) is not well known.

Conclusion/Implications

Existing comorbidity indices do not accurately predict one-year mortality in patients with CKD. Current indices could be modified with additional risk factors to improve their performance in CKD, or a new index could be developed for this population.

Objectives and Approach

We accrued three groups of patients in Ontario, Canada between the years 2004 and 2014, at the time they first received a kidney transplant, received maintenance dialysis, or were confirmed to have an estimated glomerular filtration rate (eGFR) less than 45 mL/min per 1.73 m². We compared five comorbidity indices: Charlson comorbidity index, end-stage renal disease-modified Charlson comorbidity index, Johns Hopkins' Aggregated Diagnosis Groups score, Elixhauser score, and Wright-Khan index. Each group was randomly divided 100 times into derivation and validation samples. Model discrimination was assessed using median c-statistics from logistic regression models, and calibration was evaluated graphically using calibration plots.

Results

We identified 4,111 kidney transplant recipients, 23,897 individuals receiving maintenance dialysis, and 181,425 individuals with moderate CKD. Within one year, 108 (2.6%), 4,179 (17.5%), and 17,898 (9.9%) in each group had died, respectively. In the validation sample, model discrimination was inadequate for all five comorbidity indices, with median c-statistics less than 0.7 for all three groups. Calibration was also poor for all models.