Reviewer’s report

Title: Can billing codes accurately identify rapidly progressing chronic kidney disease patients: A diagnostic test study

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Reviewer: Eduardo Araújo Oliveira

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Jalal et al. presented an observational study in order evaluate the diagnostic accuracy of CKD-staging ICD codes among CKD patients from a large insurer database in identifying individuals rapidly progressing towards end stage renal disease (ESRD). The manuscript type is an "original article" with 14 pages, 2 Tables, 3 Figures, 1 Supplemental Figure, and 21 references.

Outpatient serum creatinine measurements collected from 2007 through 2014 of 216,529 patients were examined. The progression of CKD using a serum creatinine based longitudinal mixed-model was contrasted with that documented by CKD-staging ICD codes. Rapid progressors (yearly eGFR loss greater than 4 ml/min/1.73m²) were identified. The results showed that of 10,927 clinically identified CKD patients qualifying for inclusion in the progression analysis, 323 were clinically identified as rapid progressors. CKD-staging ICD codes identified 83 of these, for a sensitivity of 25.7% with positive predictive value (PPV) of 13.74%, and specificity 95.09% with negative predictive value (NPV) of 97.68%. Of 28,762 laboratory confirmed CKD patients, 9,249 had a qualifying ICD code, for a sensitivity of 16% with PPV of 63.10%; Of 187767 patients without laboratory-confirmed CKD, 182,359 also did not have a qualifying ICD code, for a specificity of 97.12% with NPV of 90.33%. They concluded that ICD-codes display poor capacity to identify rapidly progressing CKD patients when compared to gold standard KDOQI guidelines, and further demonstrates the limitations of coding in CKD diagnosis. This analysis further defines the limitations of ICD codes in addressing diagnosis of disease severity or disease progression or clinical or epidemiological purposes.

In conclusion, Jalal et al. presented a relevant study on the relevant issue of the diagnosis rapidly progressing CKD patients. The study has some interesting and original aspects and thus can potentially contribute to the approach of patients with CKD. Nevertheless, the study has some limitations that should be addressed by the authors

Specific Comments

The Background section is too long. The Method section is the most important aspect of a research paper because it provides the information by which the validity of a study is ultimately judged. In this regard, in this study this section is well-described with detailed information
concerning the study protocol, population, definitions of variables, outcome, and data analysis. Particularly, the statistical analyses are extensively reported, and the approach adopted persuasively justified. The Results section is well-presented. I suggest including a table with clinical and demographic data if available. The Discussion section is well structured, including the following elements: explanation of the meaning and importance of the findings; correlation with the findings of similar studies; acknowledging the study's limitations; and suggestions for further research. The conclusion is in according with findings of the analysis, appropriately addressing only the main aim of the study.

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