Reviewer's report

Title: Survival prognosis after the start of a renal replacement therapy in the Netherlands: a retrospective cohort study

Version: 2 Date: 24 March 2013

Reviewer: Damian Fogarty

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This paper aims to develop a prognostic tool ideally for clinicians initially to understand the outlook of such patients at 90 days into renal replacement therapy. A prediction model was thus developed to estimate survival probabilities based on a basic set of patient characteristics at that time point—just 4 variables: age, sex, PRD and therapy. In this they recognise that PRD and therapy are also surrogate measures of comorbidity.

The findings are that the calibration and discrimination showed reasonable results for the prediction model (C-index = 0.720 and calibration slope for the prognostic index = 1.037).

Major Compulsory Revisions

1. The authors note the lack of external validation in the discussion (not entirely surprising as the random allocation of patients to a development and validation group results in 2 very similar groups which come from a similar health care system). This lack of external validation should be noted in the abstract too.

2. Authors should consider if a better approach would be to allocate patients on a geographical basis that would reduce similarity between the 2 groups. Another approach would be internal-external cross-validation (see Royston, Construction and validation of a prognostic model across several studies, with an application in superficial bladder cancer, STATISTICS IN MEDICINE, 2004; 23:907–926.

3. In addition to evaluating discrimination by looking at the c-statistic, discrimination should also be evaluated and plotted in prognostic groups, for instance quartiles of predicted survival. Also provide the confidence intervals around the c-statistic.

4. In addition to the calibration plot, calibration should also be evaluated by looking at survival curves at fixed time points by grouping patients in risks groups (for instance quartiles) and comparing and plotting observed survival with predicted survival from the prognostic model.

5. In calibrating the model mortality risk was split & investigated across 10 risk strata. Results are shown for 10 year survival. Please provide plots for 3 & 5 year survival which have greater utility given the overall annual mortality.

6. The authors should comment on whether non-linearity of continuous variables was investigated during the variable selection process.
7. The authors need to comment on whether interactions between prognostic risk factors were considered in the variable selection process.

8. Numbers of patients at risk per year should be included in a table to enable interpretation of the Cox model results and to ensure that there are adequate patient numbers past 5 years of follow-up. Provide information on whether the Cox proportional hazards model was tested for proportionality and describe the method used for testing the proportionality assumption.

9. Provide information on: censoring in the survival analysis, follow-up time (mean, median, minimum and maximum) and number of events (deaths).

10. The sensitivity analysis regarding listed status for transplantation should be mentioned in the abstract too.

Minor Essential Revisions
We appreciate that comorbidity is not always available but can the authors provide some analysis or comments on why this is not the case. If this is further work in progress please state as such. This would be valuable and thus would support (or not) their use of a simpler model.

Previous work from the UK and elsewhere should be compared in the discussion. In the case of the UK data (Wagner 2011) the C statistic rose from 0.69 to 0.75 by adding comorbid condition data and laboratory measurements mainly because of the latter.

Discretionary Revisions
1. Delete use of ‘nowadays’ on page 3.
2. Spelling mistake on p6, paragraph3: de instead of the.

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests in companies connected with healthcare or dialysis.