Author's response to reviews

Title: Incidence and outcomes of acute kidney injury after cardiac surgery using either criteria of the RIFLE classification

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Author's response to reviews: see over
Reviewer: Linda Rydén

This is a retrospective cohort study concerning 443 patients undergoing any cardiac surgery at a single center during one year. The exposure was AKI defined by RIFLE sCr or UO and the primary outcome was to evaluate the incidence of postoperative AKI according to RIFLE and compare the sCr and UO criteria in the RIFLE classification. Secondary outcomes were to compare the length of ICU-stay and 1-year mortality for patients in the RIFLE groups. This is indeed a well written manuscript. I believe it addresses an important question; whether to use the UO-criteria or not, since the conclusions differs in other studies. I do have some comments.

**Major comments:**
- There would be interesting to perform a ROC-analysis to evaluate the sensitivity of RIFLE sCr compared to UO to predict mortality within one year.

A ROC-analysis to evaluate the sensitivity of RIFLE SCr compared to RIFLE UO to predict mortality at one year was drawn (Figure Reviewer). The area under the curve (AUC) for AKI UO was 0.52 (Standard Error = 0.09 - 95% CI = 0.33 - 0.70), whereas AUC for AKI SCr was 0.56 (Standard Error = 0.13 - 95% CI = 0.31 - 0.81). In our study, this type of statistical analysis appears less clinically relevant than the Cox proportional hazard (PH) model proposed in Figures 1 and 2 of the manuscript. Indeed, AKI diagnosis (particularly based on SCr elevation) helps identify patients at increased risk for one-year mortality, but should not be regarded as a diagnostic test to predict one-year mortality. The ROC analysis is provided for Reviewer L. Rydén, but has not been added to the manuscript.

- In Figure 1 (or an additional figure) it would be interesting to see how the patients in RIFLE stages R, I, F survive over time.

An additional figure (Figure 1) was generated illustrating survival according to AKI severity (Risk, Injury or Failure) diagnosed on the basis of elevated SCr or decreased UO. The scale of y axis was adapted in order to increase the intelligibility of the figure.
Minor comments

- Table 4 would be improved by some more explanatory text to clarify for an example; increasing age or age over 80y, increasing BMI or BMI>25… Are all ORs calculated in comparison to CABG-patients, this is quite unclear in the table.

- In table 4, Sex is spelled sexe.

Corrections in text and tables were made accordingly.
Reviewer: Juan Carlos Lopez-Delgado

Authors describe the incidence of AKI after cardiac surgery and predictors of AKI in their population. From my point of view, the main original contribution is to compare the different AKI incidence by means of UO or sCr. The authors should emphasize that since from my knowledge, this is not done before in cardiac surgery patients.

Major Compulsory Revisions

- **Abstract:** Authors state that AKI patients were significantly older…etc. Please correct this point since multivariate analysis revealed only significance for high BMI, lower GFR and combined surgery as risk factors for AKI. Please correct this concept within the text, especially when authors associate older age with AKI without any statistical proof in the multivariate analysis. Only the results of the multivariate analysis are absolutely valid to establish associations. “Heavier” may be changed for “high BMI”. The expression is not appropriate for scientific manuscripts. Please correct.

  Abstract was modified accordingly. Only the results of the multivariate model were described. «Heavier» was changed by «higher BMI».

- **Introduction:**

  Line 16-17: Authors state they look for “…the preoperative risk factors…”. However they state in the abstract (background) “. Pre and per-operative risk factors…”. Please state what is the correct aim of this particular part of the study.

  Introduction was corrected accordingly. «Preoperative risk factors» was replaced by «pre- and per-operative risk factors» since this is indeed the aim of our study.

- **Methods:** State why authors use sCr 7 days before surgery or if this is arbitrary. Please state what kind of Kaplan-Meier test authors used. A question: Why any patient was staged on Loss(L) or End(E) of the RIFLE classification? (I presume no patient fulfill those criteria). Were the patients treated with diuretics? What is the policy regarding diuretic treatment and RRT at your institution and does it influence RIFLE staging?
The baseline serum creatinine was systematically assessed at the time of preoperative consultation of anaesthesia, i.e. 7 days before surgery.

The Cox proportional hazard method was used for the Kaplan-Meier test and specified in text.

No patient fulfilled “Loss” or “End” stage kidney disease in our cohort. This was stated in text.

The use of diuretic and/or renal replacement therapies was at the discretion of the physicians in charge. This was stated in text.

- **Discussion:** Please explain briefly why you choose RIFLE for evaluating AKI (see Crit Care. 2013 Dec 13;17(6):R293. doi: 10.1186/cc13159 and Crit Care. 2011;15(1):R16. doi: 10.1186/cc9960). The main original contribution is to compare the different AKI incidence by means of UO or sCr. Please emphasize that. Please show results and statistical analysis regarding the sentence “Patients presenting with impaired kidney function before surgery were significantly older”.

Two references were added in the discussion to support our choice of RIFLE classification:


We’ve emphasized that the original contribution of our study was to compare AKI incidence and outcomes according to SCr versus UO RIFLE criteria.

We’ve added results and statistical analysis to the sentence concerning the age of patients presenting with or without preoperative impaired kidney function.
Minor Essential Revisions:

- **Results:** Please, report in results section the % 1-year mortality rate and the $P$ between survivors and non-survivors. Delete isolate valve surgery OR since does not add anything relevant (line 25).

- **Table 4:** Change “Sexe” for “male or female gender”. Please do the same within all the tables.

- **Figure 1:** Please add survival of non-AKI patients. Please, report the % 1-year mortality rate.

Corrections were made accordingly in text, tables and figures.

Discretionary Revisions:

**Results:**

If possible, it would add good value to the manuscript to know the cause of in-hospital and long-term mortality.

It would be interesting if authors can report mean UO and mean sCr with Standard deviation during the 7 days in all the population

We’ve listed the causes of in-hospital mortality. Unfortunately, we were unable to consistently establish the causes of long-term mortality. On the basis of available data for our study, we could not reliably report on mean UO and mean SCr with Standard deviation during the 7 days in all the population.