Peer Review File

Reviewer A

Comment 1: This paper demonstrates a large number of variables that are significant (Table 1&2), including just being female, albeit not in the top 5. Thus, it is questionable how novel these conclusions are, or whether all patients should really be monitored for AKI. This could be a point to further discuss.

Reply 1: In tables 1 and 2, univariate and multivariate analyses were employed to compare demographics and comorbidities between the two cohorts. Multivariate analyses only controlled for age and sex. These two tables were shown to provide baseline comorbid data that those who are getting AKIs after surgery carry a larger comorbidity profile, which has been established in the literature. However, instead of monitoring all patients, machine learning tools allow us to parse through which variables are most connected to influencing AKI. Thus, the results are novel by providing clinicians with important data that can be utilized for determining treatment trajectories especially in the postoperative period.

Changes in the text: Added these points to the discussion (page 13, lines 259-268)

Comment 2: If possible, analysis of these variables with anesthesia used or time of operation could strengthen the results. Perhaps analyzing whether patients with certain variables may benefit from a smaller construct, or different anesthesia type, to minimize operative time and thus AKI.

Reply 2: The authors agree with the reviewer that these variables are important for better determining risk factors for AKI. Unfortunately, these variables do not exist in the MarketScan database, as it is an insurance claims database that does not provide operative details such as anesthesia used or time of operation. The authors have added this to the limitations section of the study.

Changes in the text: Limitations added (page 13, lines 273-277)

Comment 3: AUROC was 0.75 for LR and Linear Support Vector Machine models. These models found different variables (ie age and DM with complications). Why do you report the LR ones as the greatest prediction factors? I understand it had a high diagnostic odds ratio, but maybe just saying diabetes ± complications in abstract may be better representative of findings? This is how it is mentioned in discussion paragraph 1.

Reply 3: The authors agree with the reviewer's suggestions and have made the appropriate changes in the text.

Changes in the text: Changed "uncomplicated diabetes" to diabetes +/- complications, also mentioned linear support vector machine as an accurate model due to AUROC of 0.75.

Comment 4: A figure describing the complex model building in the methods would be helpful to understanding your results.

Reply 4: The authors would like to thank the reviewer for this suggestion. We have incorporated a figure that displays the work-flow for how the models were built and how validation was applied

Changes in the text: New Figure 1 added to manuscript, described on Page 7 lines 162-163

Comment 5: Small sample size of AKI comparatively to control sample size could be discussed as limitation.

Reply 5: We have added the small sample size of AKI to the limitations section.

Changes in the text: Page 13 lines 282-284

Comment 6: Figure showing AUC model may be beneficial.

Reply 6: ROC curve has been added to the text

Changes in the text: New figure 2 added to manuscript, described on Page 10 lines 215-216

Reviewer B

Comment 1: If an author can provide an external validation of the proposed model, it would further affirm its applicability across different populations.

Reply 1: The authors appreciate the suggestion for incorporating external validation of the proposed model. Our study only utilizes one national database for the training and testing of our models, and external validation would require another database to be utilized, which the authors are not able to do. We have ensured internally validation of our models, and made sure to compare our results in the literature within the discussion. Overall, we have acknowledged the lack of external validation within the limitations, and have suggested that further studies incorporate our models utilizing different datasets.

Changes in the text: See Page 14 lines 285-286