A machine learning approach to develop a prediction score for in-hospital mortality in COVID-19 patients with acute kidney damage.

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Introduction

Acute kidney injury (AKI), which is linked to COVID-19 can be a sign of the severity of the disease. The objective of this study was to create a predictive score for COVID-19 patients with AKI to predict in-hospital mortality.
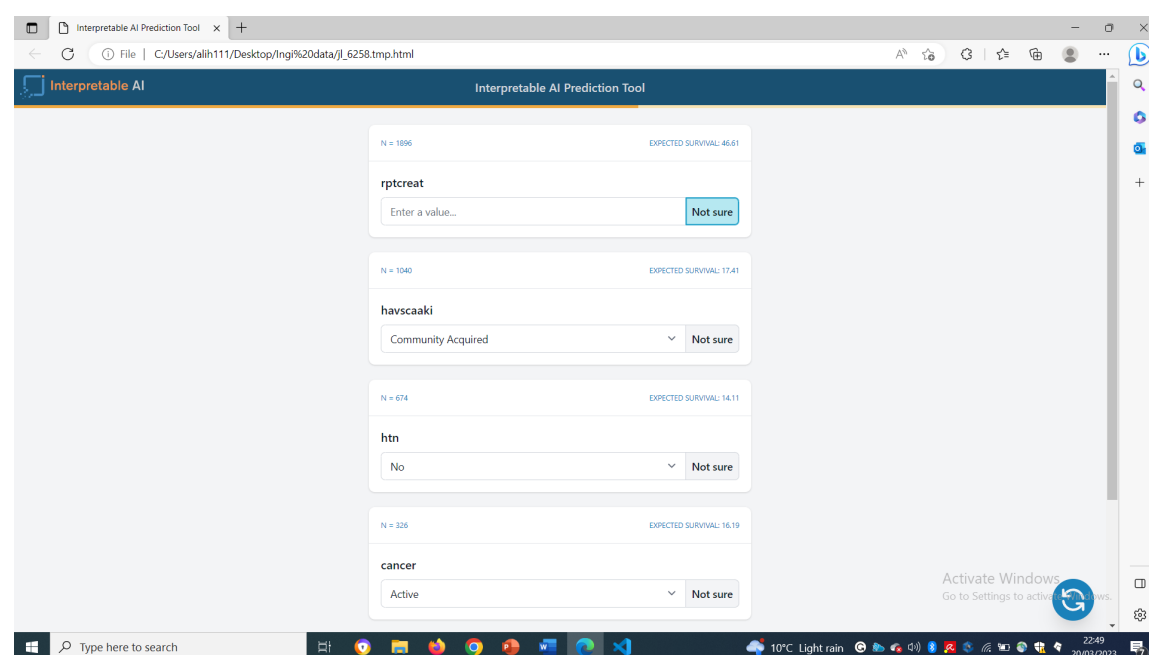
Methods and Materials

All patients who were admitted to our hospital between January 2020 and November 2022 with COVID-19 infection, associated with AKI stage II or III were included in our analysis. Data about age, sex, ethnicity, comorbid conditions, length of hospital stay, and mortality were collected. We performed a survival decision tree-based analysis to create our prediction model. We divided the data into training and test dataset with a ratio 80:20. The model was trained on the training dataset and was evaluated on the test dataset. The evaluation criteria were Harrell C-Statistic for discrimination and integrated Brier score for calibration.

Results

2370 patients were included in our study. Harrell C statistic was 0.82, indicating adequate discriminative power, integrated Brier score was 0.09, indicating adequate calibration. AUCQ was 0.9, indicating adequate overall performance. The key player in our model was degree of acute kidney injury (importance factor=0.89).

Conclusions

Our predictive model may help medical professionals identify COVID-19 hospitalised patients with AKI who may need more intensive monitoring and can be used to determine resource allocation. We developed a user friendly web application using our predictive model to facilitate its use.

N = 1896   EXPECTED SURVIVAL: 46.61

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N = 326   EXPECTED SURVIVAL: 16.19

cancer

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