

## Diabetes Mellitus and Blood Glucose Variability Increases the 30-day Readmission Rate after Kidney Transplantation

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**Abstract :** Background: Inpatient hyperglycemia is an established independent risk factor among several patient cohorts with hospital readmission. This has not been studied after kidney transplantation. Nearly one-third of patients who have undergone a kidney transplant reportedly experience 30-day readmission. Methods: Data on first-time solitary kidney transplantations were retrieved between September 2015 to December 2018. Information was linked to the electronic health record to determine a diagnosis of diabetes mellitus and extract glucometeric and insulin therapy data. Univariate logistic regression analysis and the XGBoost algorithm were used to predict 30-day readmission. We report the average performance of the models on the testing set on five bootstrapped partitions of the data to ensure statistical significance. Results: The cohort included 1036 patients who received kidney transplantation, and 224 (22%) experienced 30-day readmission. The machine learning algorithm was able to predict 30-day readmission with an average AUC of 77.3% (95% CI 75.30-79.3%). We observed statistically significant differences in the presence of pretransplant diabetes, inpatient-hyperglycemia, inpatient-hypoglycemia, and minimum and maximum glucose values among those with higher 30-day readmission rates. The XGBoost model identified the index admission length of stay, presence of hyper- and hypoglycemia and recipient and donor BMI values as the most predictive risk factors of 30-day readmission. Additionally, significant variations in the therapeutic management of blood glucose by providers were observed. Conclusions: Suboptimal glucose metrics during hospitalization after kidney transplantation is associated with an increased risk for 30-day hospital readmission. Optimizing the hospital blood glucose management, a modifiable factor, after kidney transplantation may reduce the risk of 30-day readmission.

**Keywords :** kidney, transplant, diabetes, insulin

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