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Development and Validation of a 1-year post-nephrectomy eGFR Prediction Model using Preoperative factors

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The purpose of this study was to develop a prediction model to estimate the post-nephrectomy 1 year estimated glomerular filtration rate (eGFR) of living kidney donors based on preoperative factors and aid physicians in evaluating donor suitability. The preoperative factors included were baseline characteristics, laboratory results and kidney volume measured through an auto-segmentation program using predonation contrast computer tomographic images. Data was collected from a multicenter retrospective cohort of 1219 living kidney donors. A generalized additive model (GAM) with spline functions was used to capture potential nonlinear relationships and interactions between the predictors and outcome variable. The patient data from two tertiary hospitals (n=1041) were split into a 9:10 ratio for training and testing. The mean absolute error (MAE) of the model created was 7.41. The model was applied to a third tertiary hospital (n=178) for external validation. The MAE of the external validation cohort was 7.47. The prediction model demonstrated significant accuracy in estimating the 1-year post-nephrectomy eGFR in living kidney donors. Preoperative calculation using this model may promote better informed decision-making and ensure safety of living donors. Further validation and prospective testing of the model in diverse populations are warranted to consolidate its utility and broaden its applicability in clinical settings.