KSN SEOUL, KOREA 2023
April 27(Thu) - 30(Sun), 2023
Coex, Seoul, Korea

**Abstract Type : Oral**
**Abstract Submission No. : 1143**

# Prediction tool of renal adaptation after living kidney donation using interpretable machine learning

**Junseok Jeon**[1], Yong Yu Jae[2], Yeejun Song[2], Weong Jung[3], Kyungho Lee[1], Jung-Eun Lee[1], Wooseong Huh[1], Yoon-Goo Kim[1], Won Chul Cha[3], Hye Ryoun Jang[1]
[1]Department of Internal Medicine-Nephrology, Samsung Medical Center, Sungkyunkwan University School of Medicine, Korea, Republic of
[2]Department of Department of Digital Health, Samsung Advanced Institute for Health Sciences and Technology (SAIHST, Sungkyunkwan University School of Medicine, Korea, Republic of
[3]Department of Smart Health Lab, Research institute of Future Medicine, Samsung Medical Center, Korea, Republic of

**Objectives:** Post-donation renal outcome is a crucial issue in living kidney donors for careful judgement of donation eligibility and overall management for better renal outcome. We aimed to develop a prediction model for renal adaptation after living kidney donation through interpretable machine learning.

**Methods:** A total of 823 living kidney donors who received donor nephrectomy in Samsung Medical Center from 2009 to 2020 were included. AutoScore, a machine learning-based clinical score generator, was used for developing a prediction model and 'shiny' R package for easy web application. Fair renal adaptation and good renal adaptation were defined as post-donation estimated glomerular filtration rate (eGFR) ≥ 60 mL/min/1.73 $m^2$ and ≥ 65% of pre-donation eGFR, respectively.

**Results:** Mean age was 45.2 years and 51.6% was female. Pre-donation eGFR, age, sex, body mass index, GFR of remaining kidney measured with DTPA, CT volume percentage of remaining kidney, and the CT volume of remaining kidney/body weight were selected as significant factors. Cystatin C eGFR were added for fair renal adaptation. Creatinine clearance, 24-hour urine volume, and serum creatinine were added for good renal adaptation as significant factors. Areas under the receiver operating characteristic were 0.847 (95% confidence interval, 0.769–0.924) and 0.632 (0.546–0.718), and areas under the precision-recall curve were 0.967 (0.946–0.979) and 0.708 (0.656–0.781) for fair and good renal adaptation, respectively. An interactive clinical decision support system entitled 'Renal Adaptation Prediction Tool prior to Operation (RAPTO)' was developed.

**Conclusions:** Our prediction tool of post-donation renal adaptation showed good predictive capability and may help clinical decision through web-based easy application.