香港泌尿外科學會
Hong Kong Urological Association

30TH ANNUAL SCIENTIFIC MEETING 2025

Abstract no.:

Predicting Post-operative Renal function after Partial Nephrectomy using Artificial Intelligence: Model building and Clinical Validation with local patient cohorts

HM Cheng, WH Lau, HYJ Chan, TO Yu, HS So
Division of Urology, Department of Surgery, United Christian Hospital

Objective

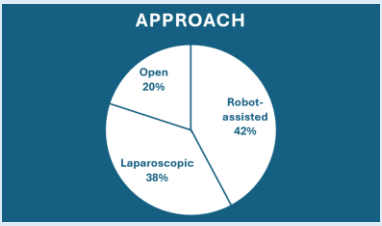
- To develop and validate an artificial intelligence learning model that predicts post-operative creatinine clearance (CrCl) in patients undergoing partial nephrectomy
- To assess the accuracy of model compared to actual clinical outcomes

Patients and Methods

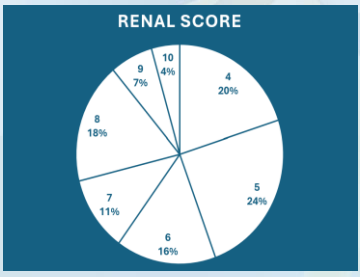
- Retrospective dataset of patients (N=45) who underwent partial nephrectomy in our cluster
- Assessment of clinical, demographic, perioperative features (eg pre-operative CrCl, renal score, surgical variables , tumor and renal volume)
- Dataset was used to train a Random Forest regression model using artificial intelligence
- Model was evaluated using independent test cohort (N=15)
- The predicted outcomes were compared to actual post-operative CrCl values
- Model performance was assessed using R2 , mean absolute error

Results - Data set

- Data set : N=45
- Mean age : 63.4 years
- Surgical approach

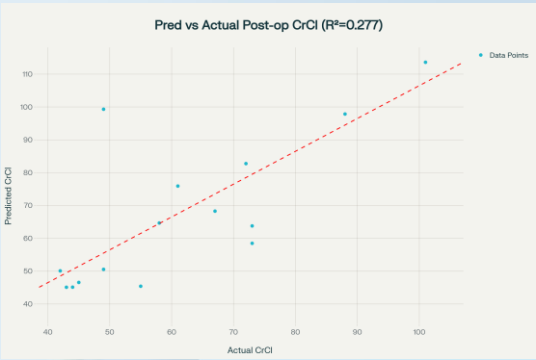


- Male : female = 62.2% : 37.8%
- Left : right = 64.4% : 35.6%
- Mean operative time was 253.8 mins
- Mean blood loss : 203.3 ml
- Warm ischemic time : 35.9 mins (10-75 mins)
- Tumor complexity



Results

- Scatter plot curve showing comparison between predicted vs actual post-operative creatinine clearance



- R2 (coefficient of determination) = 0.28
- Mean absolute error = 9.70

Conclusion

- The developed AI model for predicting post-operative CrCl was only able to predict CrCl with R2 value of 0.28
- The low accuracy is likely limited by the small database
- Further refinement and validation are necessary to improve the predictive performance of the model