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Prediction of bleeding complication after percutaneous renal biopsy

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Objectives: Percutaneous renal biopsy (PRB) is essential for the diagnosis of many renal diseases. However, PRB is an invasive procedure requiring hospitalization for bleeding complicatoin. The aim of this study was to derive a simple risk scoring system that predicts the individual risk of major bleeding complications in patients.

Methods: The risk score was derived from a cohort of patients who underwent ultrasound-guided native PRB at single center from 2009 to 2019. Major complications were defined as intrarenal arteriovenous fistula (AVF), transfusion, renal artery embolization, nephrectomy, and death after PRB. Factors associated with major complications were derived using logistic regression. Weights were assigned based on the ratio of significant predictor odds ratios to significant minimum odds ratios. The risk score was calculated from the sum of the integers.

Results: There were 2,673 patients who underwent PRB. Of these, 1,131 patients were finally enrolled after excluding transplanted kidney percutaneous biopsy cases (n=66), emergent PRB cases (n=503), patients aged under 20 years (n=141), and those with incomplete medical records (n=832). The average age of patients was 49.3±15.8 years and 530(46.9%) were male. Overall, the rate of major complications was 9.1%(n=103),. In all, 42 patients(3.7%) showed intrarenal AVF after PRB, 60 patients(5.3%) required transfusion, 17 patients(1.5%) underwent renal artery embolization, and no patient required nephrectomy after PRB. After regression analysis, nine factors (age, body mass index, admission type, diabetes mellitus, kidney puncture count, systolic blood pressure, prothrombin time, hemoglobin, and urine PCR) were identified as complication predictors and recalibrated weights as odds ratios. The predictive score for major complications demonstrated good discriminative power (AUC=0.703) in 1,758 patients aged > 20 years in the same cohort.

Conclusions: The prediction of major complications after a PRB can be analyzed using a simple risk score calculated from readily available patient's medical information.