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A risk scoring model to predict progression of renal dysfunction in patients with chronic kidney disease complicated with contrast-induced nephropathy

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**Objectives :** The contrast-induced nephropathy (CIN) occurs more frequently in patients with lower estimated glomerular filtration rate. As CIN is associated with renal progression, it would be important to predict the risk of progression prior to contrast-enhanced CT in CKD patients.

**Methods :** In a development dataset, 18,278 enhanced CT scans were performed in 9,097 CKD patients. We investigated 1-year renal outcome in CKD patients complicated by CIN (increase  $\geq 25\%$  and/or  $\geq 0.5$  mg/dL in serum creatinine within 3 days after CT). A risk score of 4, 4, 6, 6, 7, or 6 was assigned to diabetes, baseline estimated GFR  $< 45$  mL/min/1.73 m<sup>2</sup>, hypertension, repeated contrast exposure, congestive heart failure, and persistent CIN, respectively. Using the sum of risk scores, we developed and validated a risk scoring model to predict progression of renal dysfunction in CKD patients who were complicated by CIN.

**Results :** The overall occurrence of CIN was 5.8% (1,051/18,278) of all enhanced CTs performed, in 7.6% (689/9,097) of the total CKD patients. Among 689 patients, 465 were excluded due to incomplete data, follow-up loss, or death. Among the remaining 224 patients, 70 (31.3%) patients had progression of renal dysfunction at 1 year (defined as reduction of estimated GFR  $\geq 25\%$  at 1 year). The aggravation of azotemia at 3 months later after CIN compared with baseline serum creatinine level, was more severe in the progression group ( $1.81 \pm 0.72$  mg/dL at baseline vs.  $2.38 \pm 1.18$  mg/dL at 3 months,  $p < 0.001$ ) than in the non-progression group ( $1.65 \pm 0.61$  vs.  $1.55 \pm 0.84$ ,  $p = 0.198$ ). In the validation dataset, the model demonstrated fair discriminative power (c statistic = 0.632).

**Conclusions :** Our study suggested the possibility of predicting the risk of progression of renal dysfunction in CKD patients complicated by CT contrast administration. Non-recovery after CIN imposed renal progression.

**Keywords :** contrast-induced nephropathy, renal progression