External Validation and Comparison of Prognostic Models for Renal Cell Carcinoma Recurrence in a Japanese Population

Introduction and Objective: The aim of the present study is to compare the accuracy of three prognostic models in predicting recurrence-free survival among Japanese patients who underwent nephrectomy for non-metastatic renal cell carcinoma (RCC).
Materials and Methods: Patients originated from two centers: Chiba University Hospital (*n* = 152) and Chiba Cancer Center (*n* = 65). The following data were collected: age, sex, clinical presentation, Eastern Cooperative Oncology Group performance status, surgical technique, 1997 tumor–node–metastasis stage, clinical and pathological tumor size, histological subtype, disease recurrence, and progression. Three western models, including Yaycioglu's model, Cindolo's model and Kattan's nomogram, were used to predict recurrence-free survival. We externally validated the predictive accuracy of these models, which was assessed using the Harrell's concordance-index.
Results: The concordance-indexes were 0.795 and 0.745 for Kattan's nomogram, 0.700 and 0.634 for Yaycioglu's model, and 0.700 and 0.634 for Cindolo's model, respectively (Table 1). The comparison of the c-index values at each institution showed a statistically significant difference between Kattan's nomogram and the other mathematical models ($p < 0.05$). On the other hand, the c-index values were not significantly different between Yaycioglu's model and Cindolo's model. Furthermore, we confirmed that the constructed calibration plots of Kattan's nomogram overestimated the predicted probability of recurrence-free survival after 5 years compared with the actual probability.
Conclusions: While the current prognostic models for patients treated with nephrectomy for non-metastatic RCC were developed and validated based entirely on Western populations, there were no established prognostic models for Japanese patients. As a result, when we investigated the general applicability of the models for Japanese patients, Kattan's nomogram was a powerful decision-making aid for Japanese patients under certain cautious condition.

Table 1: The concordance-indexes

Models	Concordance-index (95% CI)	
	Chiba University Hospital	Chiba Cancer Center
Yaycioglu	0.70 (0.59–0.81)	0.63 (0.49–0.77)
Cindolo	0.70 (0.59–0.81)	0.63 (0.49–0.77)
Kattan	0.80 (0.71–0.88)	0.75 (0.62–0.88)