KSN 2022
SEOUL, KOREA MAY 26 - 29

Abstract Submission No. : 1052

Pathologic Validation of Japanese Renal Pathology Society (JRPS) Classification and New Challenges on Predicting Renal Prognosis in Patients with Diabetic Nephropathy

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Objectives: Diabetic nephropathy (DN) is a representative disease that accounts for about half of chronic kidney disease (CKD) and end-stage kidney disease worldwide. The Renal Pathology Society (RPS) classification introduced in 2010 has been used generally as the pathological classification that can predict the renal prognosis of DN. However, there was a limitation in evaluating only glomerular changes in kidney. Meanwhile, the Japanese Renal Pathology Society (JRPS) recently proposed a further comprehensive DN classification system, J-score, including pathologic changes in all components of kidney. Therefore, the clinical significance of JRPS DN classification system was comparatively evaluated in this study.

Methods: A total of 93 cases diagnosed with DN from 2009 to 2019 were enrolled. J-score was confirmed by scoring the JRPS DN pathological findings, and compared with the clinical parameters.

Results: J-score (0-19) and JRPS grade (1-4) had a significant correlation with CKD stage and were inversely correlated with estimated glomerular filtration rate (eGFR). Most of the pathological prognostic factors constituting the J-score were also significantly correlated with clinical factors. In addition, lamellated nodule (Fig.1), another pathologic feature of DN was compared with clinical findings and showed a clear inverse correlation with eGFR. After adjustment of age, sex, body mass index, HbA1c, diabetes duration, and hypertension, CKD stage was significantly correlated with JRPS grade, nodular lesion, and exudative lesion by multivariate logistic regression analysis (Table 1). The result of ROC curve analysis revealed the J-score (AUC=0.595) had slightly lower clinical significance than the traditional RPS classification system (AUC=0.640).

Conclusions: In summary, a comprehensive pathologic classification system (J-score) was clinically significant in predicting the renal prognosis of DN patients, and among the factors, JRPS grade, nodular lesion, and exudative lesion were confirmed to be important pathologic prognostic factors. Additionally, lamellated nodule was identified as an important pathological factor in predicting the renal prognosis of DN.

Figure 1. Lamellated nodules (yellow arrows) predict a poor renal outcome of DN (Jones methenamine silver, x200).

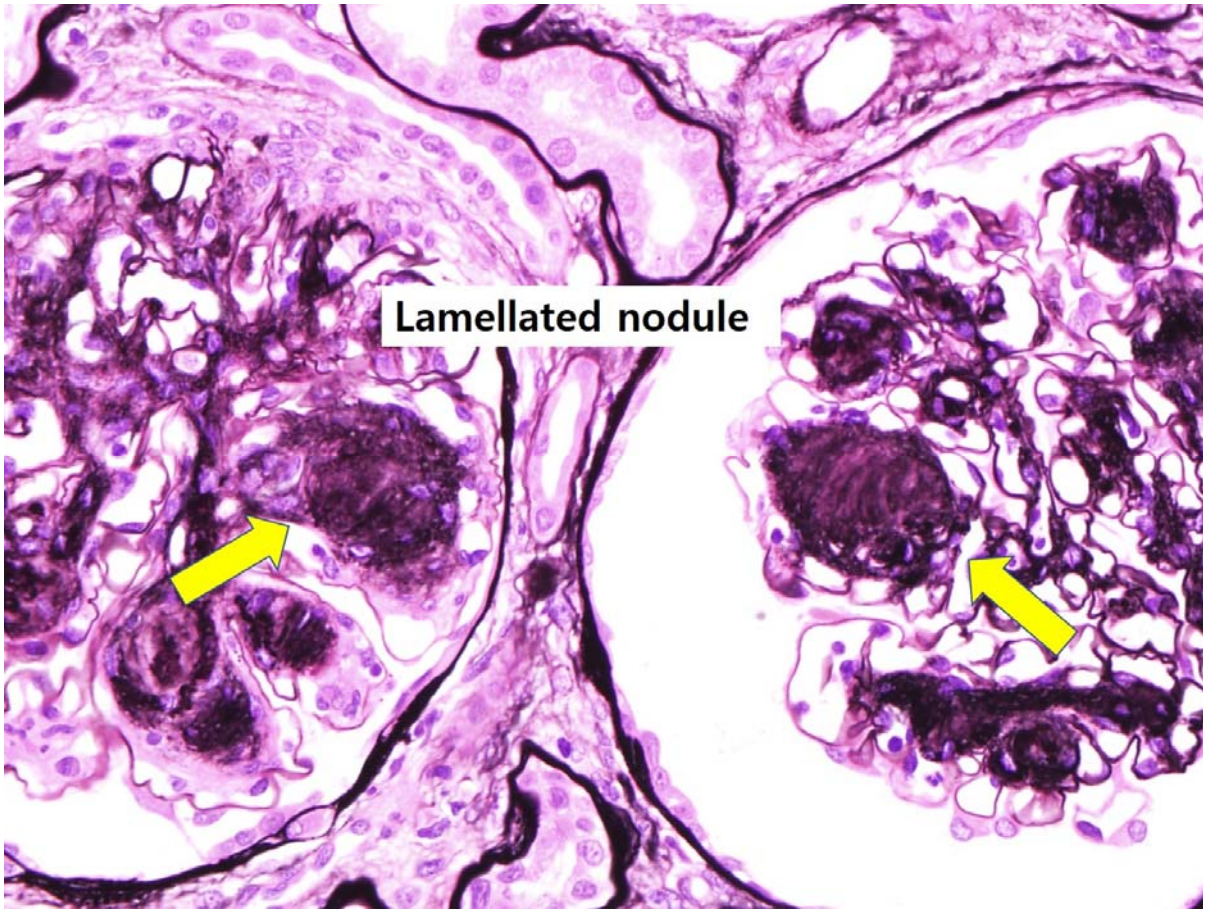

Table 1. Assessment of risk for incident CKD stage 3 according to JRPS grade, nodular and exudative lesions by multivariate logistic regression.

Parameters	Odds ratio	95% Confidence interval		*p*-value
		Lower limit	Upper limit	
JRPS Grade (1-4)	20.443	2.822	148.099	0.003
Nodular lesion	4.979	1.397	17.746	0.013
Exudative lesion	11.258	2.878	44.045	0.001

* The following parameters were adjusted in this analysis: age, sex, BMI, HbA1c, duration of diabetes mellitus, and hypertension