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Predictive factors of non-diabetic kidney disease in patients with Type 2 diabetes mellitus and kidney disease

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Objectives : Distinguishing non-diabetic kidney disease (NDKD) from diabetic kidney disease (DKD) in Type 2 diabetes mellitus (T2DM) patients with kidney disease is crucial for better renal outcomes. We aimed to identify the predictive factors of NDKD in T2DM patients with kidney disease to aid the development of a predictive model to facilitate clinical decision making.

Methods : Three hundred and nineteen T2DM patients underwent kidney biopsy at Singapore General Hospital (SGH) from 1st January 2017 to 31st July 2022. T2DM patients with mixed forms (NDKD+DKD) diagnoses (n=31), non-diagnostic results or missing data (n=10) were excluded. Predictive variables for NDKD were identified from univariate and multivariate analyses. Univariate analyses were performed using Pearson chi-square test for categorical variables and Mann-Whitney U test for non-normally distributed continuous variables. Multivariate analyses were performed using backwards stepwise logistic regression.

Results : The final cohort consists of 278 patients including 157 males (56.5%) with a mean age at biopsy of 59.6 years (± 12.8). Sixty-four patients (23.0%) were diagnosed with NDKD on kidney biopsy. Mean estimated glomerular filtration rate (eGFR) was 39.9 ml/min/1.73m² (± 24.6). Majority of patients (64.4%) had diabetic duration >5 years. Hematuria was present in 41.7%. Subnephrotic range proteinuria, nephrotic range proteinuria and nephrotic syndrome were present in 24.5%, 52.2% and 26.2% of patients respectively. The most common diagnoses among NDKD patients was IgA nephropathy (29.7%), followed by membranous nephropathy (20.3%) and ANCA-associated vasculitis (15.6%). In multivariate analyses, older age, absence of hypertension, absence of diabetic retinopathy, low HbA1c, low albumin, presence of haematuria, absence of insulin therapy and presence of autoimmune markers were shown to be predictive variables of NDKD.

Conclusions : We identified eight clinical and laboratory predictive factors for NDKD. These predictors can be incorporated in a predictive model to inform the probability of NDKD to guide kidney biopsy decisions.