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Subtyping Chronic Kidney Disease with Diabetes: Multicenter Cohort of Diabetic Kidney Disease Study

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Objectives : Chronic kidney disease (CKD) with diabetes is a heterogeneous condition with multiple underlying causes, risk factors, and polypharmacy, leading to a wide range of clinical outcomes. However, there is no classification system that appropriately captures the diversity of diabetic CKD, or predicts its outcomes.
Methods : A total of 11,925 CKD patients with diabetes were included from the Multicenter Cohort of Diabetic Kidney Disease Study (MEET DKD) between 2000 and 2023. Subtypes of diabetic CKD were identified using K-means clustering based on 34 factors, and their associations with clinical endpoints were evaluated for the composite outcome of cardiovascular diseases, progression to end-stage kidney disease (ESKD), and mortality.
Results : Three distinct diabetic CKD subgroups were identified as the most representative of the baseline characteristics. Cluster 1 (n = 5,191), obese type, included patients with a higher prevalence of obesity, fewer comorbidities, and favorable laboratory findings. Patients with lower renal function, and a moderate burden of comorbidities and medication were classified as cluster 2 (n = 2,240), renal failure type. Patients who were older, had multiple comorbidities and the highest use of medication formed cluster 3 (n = 4,494), multiple comorbidity type. The obesity type was associated with the highest risk of the future composite outcome of cardiovascular events (adjusted hazard ratio [HR] 1.40, 95% confidence interval [CI] 1.27–1.54). The risk of ESKD progression was highest in the renal failure subtype (HR 1.30, 95% CI 1.15–1.46), whereas all-cause mortality risk was greatest in the multiple comorbidity subtype (HR 1.45, 95% CI 1.44–1.46).
Conclusions : Our study identified three distinct diabetic CKD subtypes, which were associated with markedly different risks of cardiovascular events, progression to ESKD, and all-cause mortality. These

subtypes potentiate the individualized approaches to improve clinical outcomes in diabetic CKD patients.