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The Role of Urinary Complement Factor Ba as a Biomarker for Disease Activity and Prognostic Prediction in IgA Nephropathy

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Objectives : Immunoglobulin A nephropathy (IgAN) is one of the most common primary glomerulonephritis, characterized by a broad spectrum of clinical and pathological features. As the complement system, particularly the alternative and lectin pathways, plays a central role in IgAN pathogenesis, numerous complement-targeting agents are under development and reliable biomarkers are increasingly needed.
Methods : We prospectively enrolled 49 patients with biopsy-confirmed IgAN with a minimum follow-up of one year and assessments at 6-month to 1-year intervals. Patients were stratified by urine protein-to-creatinine ratio (uPCR); high-proteinuria group, uPCR ≥1 g/g; low-proteinuria group, uPCR <1 g/g. Complement-related biomarkers will be quantified by enzyme-linked immunosorbent assay (ELISA), including urinary and serum Factor Ba and Bb (alternative pathway), urinary C4d and mannose-binding lectin (lectin pathway), and C5-9/membrane attack complex (terminal pathway). The primary outcome was a ≥40% decline in estimated glomerular filtration rate (eGFR). Associations between urinary Factor Ba and histopathological findings, and its prognostic value for renal outcomes, will be assessed using Cox regression analysis.
Results : The cohort comprised 17 patients (34.7%) in the low-proteinuria group and 32 (65.3%) in the high-proteinuria group. The two groups were largely comparable at baseline such as comorbidities, other laboratory parameters, and immunosuppressive therapy, but serum albumin was significantly higher in the low-proteinuria group (p=0.031). Over the follow-up period, seven patients (14.9%) reached the primary endpoint of ≥40% eGFR decline (high-proteinuria group 16.1% vs. low-proteinuria group 12.5%; p=1.000).
Conclusions : We have established a prospective IgAN cohort with detailed clinical, pathological, and follow-up data. With ELISA-based complement biomarker quantification ongoing, these findings provide the foundation for evaluating urinary Factor Ba as a prognostic biomarker and may inform the use of complement-targeted therapies in IgAN.