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Urinary cytokines/chemokines as noninvasive biomarkers predicting renal outcome in crescentic glomerulonephritis

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Objectives: Urgent kidney biopsy and prompt treatment are usually required to prevent end-stage kidney disease in crescentic glomerulonephritis (CrGN). Although immunosuppressive treatment is the standard management, serious complications such as fatal infection and even death could occur in some patients. To evaluate the clinical relevance of noninvasive biomarker reflecting intrarenal immunologic milieu, we analyzed urinary cytokines/chemokines and intrarenal leukocytes in patients with CrGN.

Methods: A total of 82 patients with biopsy-confirmed CrGN in 2002~2015 and followed up for 5 years were included. Random urine samples were collected in 36 patients on the day of the kidney biopsy for measuring regulated upon activation in normal T cells (RANTES), fractalkine, monocyte chemoattractant protein-1 (MCP-1), interleukin (IL)-10, IL-4, interferon (IFN)- γ , tumor necrosis factor (TNF)- α , and vascular endothelial growth factor (VEGF). According to changes in estimated glomerular filtration rate (eGFR) and urinary protein-creatinine ratio (uPCR) at 1 year after kidney biopsy, good prognosis was defined as increased or maintained eGFR and a 1-year uPCR decrement of > 50%. The infiltration degree of intrarenal leukocytes was analyzed with immunohistochemistry for cluster of differentiation (CD) 45, CD3, and CD20 followed by tissueFAXS analysis.

Results: Baseline eGFR and tubulointerstitial histopathological findings at diagnosis were important predictors of renal outcome. Patients with a high level of urinary IL-10 showed better renal outcome independently of baseline eGFR and interstitial fibrosis and tubular atrophy (IFTA) scores. High levels of MCP-1 and fractalkine tended to be associated with good prognosis. However, the infiltration degree of intrarenal leukocytes did not correlate with urinary cytokines/chemokines or histologic features.

Conclusions: Our study suggests potential clinical usefulness of urinary IL-10, MCP-1, and fractalkine as noninvasive biomarkers predicting renal outcome of CrGN.