

The Relationship between MMP-9 Expression in Glomerulus and the Number of Podocytes in Urine and Glomerulus in IgA Nephropathy

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OBJECTIVES

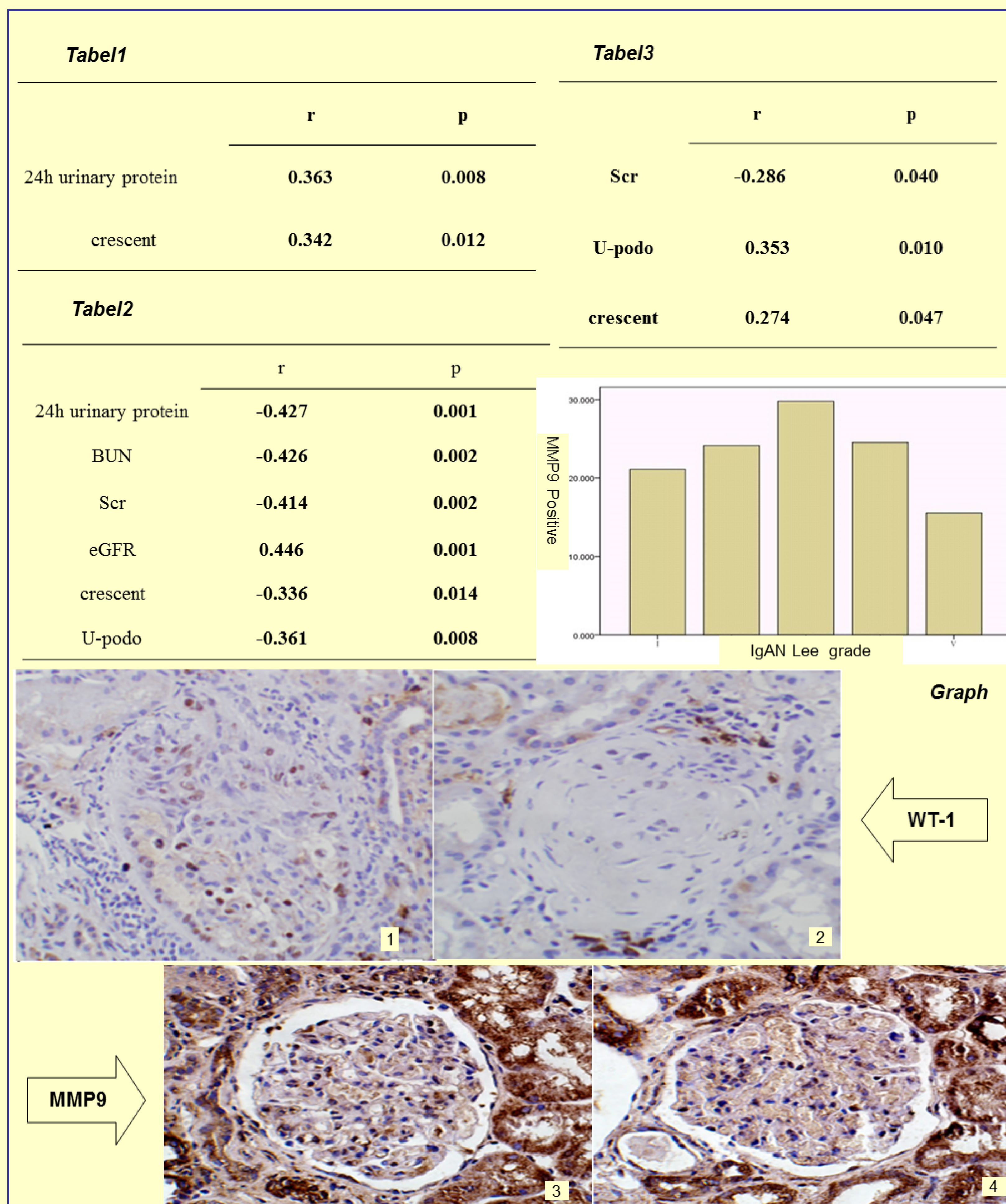
To study the correlation between the abnormal expression of MMP-9 and the injury of podocytes, clinical and pathological indicators in patients with IgA nephropathy .

METHODS

Morning urinary samples and renal tissue of 53 patients with primary IgAN were collected on the day of kidney biopsy. Anti-Wilm's tumor (WT-1) monoclonal antibody was used to detect podocytes and Anti-matrix metalloproteinase-9(MMP-9) monoclonal antibody was used to detect the positive area in renal tissue slide of patients with IgAN by immunohistochemistry. The density of podocytes and the positive area ratio of MMP-9 were calculated by computer image analysis software. Anti-Podocalyxin (PCX) monoclonal antibody was used to detect urinary podocyte by indirect immunofluorescence and calculated using microscope. The relationship between MMP-9 expression in glomerulus and podocytes in renal tissue and urine as well as clinical, pathological indicators was analyzed.

RESULTS

- Podocyte was not found in the urine in the healthy control group. The rate of positive urinary podocytes was 83.02% in IgAN patients. The positive rates of urinary podocytes were higher in Lee group III and IV (90% and 100% respectively), and lowest in group V (40%). There was statistically significant difference between the number of urinary podocyte in each group by Lee grade ($P < 0.01$). The number of urinary podocytes was significantly positively correlated with 24-hour urinary protein ($P = 0.008$) and crescent ($P = 0.012$) (Table 1), while it was significantly negatively correlated with the density of renal podocytes ($P = 0.008$).
- The density of podocytes in glomerulus decreased with increasing pathological grade. There was statistical significance in the differences between the density of podocytes in each group by Lee grade ($P < 0.01$). It was significantly negatively correlated with 24-hour urinary protein, BUN, Scr, the number of podocytes in urine ($P < 0.01$) and crescent ($P = 0.014$), whereas significantly positively correlated with eGFR ($P = 0.001$) (Table 2).
- There was a statistically significant difference in the ratio of MMP-9 positive area in each group by Lee grade ($P < 0.01$), with the highest ratio in Lee group III and the lowest in Lee group V (Graph).
- The ratio of MMP-9 positive area was negatively correlated with Scr ($P = 0.04$), and positively correlated with the number of podocytes in urine and the ratio of crescent in glomerular of IgAN patients ($P < 0.05$). (Table 3)



CONCLUSIONS

- In IgAN patients, the number of urinary podocytes may reflect disease activity and progression in IgAN. Detecting the number of urinary podocytes may be useful to determine the patients' condition, guide the treatment and evaluate therapeutic effect.
- With the developing of nephropathy, the density of podocytes in glomerulus decreased and was correlated with protein in urine, crescent and the number of urinary podocytes in patients with IgAN. These results suggest the degree of podocytes loss in glomerulus reflects disease activity and progression in IgAN, and was consistent with the number of podocytes in urine.
- There was statistically significant difference between the expression of MMP-9 in each group by Lee grade, indicating that the abnormal expression of MMP-9 may cause podocytes loss from GBM and thus increase the urinary count of podocytes.
- The abnormal expression of MMP-9 could be one of the factors that cause injury the podocytes, and was closely related with the inflammatory condition of the disease.

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