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The comparison of C3 glomerulonephritis with Non-C3 glomerulonephritis in Primary glomerulonephritis

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Objectives: C3 glomerulonephritis (C3GN) is characterized by considerable complement C3 accumulation in renal glomeruli. We evaluated whether C3GN in primary GN affect the pathologic and clinical features compared with non-C3GN.

Methods: From the Korean Glomerulonephritis sTudy (KoGNET), which is database with 18 centers in Korea, we extracted primary GN data. C3GN was defined as C3 is stained 2 grade more than C1q, C4 and immunoglobulin (Ig) in immunofluorescence (IF). We matched the data to C3GN (n=62) and non-C3GN (n=62) based on age, sex.

Results: The age was 39.19 ± 18.58 years in non-C3GN and 39.53 ± 19.49 years in C3GN. The proportion of male was 58.1% and 59.7% in order. The underlying diseases, body mass index and blood pressure were not different. In C3GN, serum creatinine was higher (1.17 ± 0.66 mg/dl vs 2.13 ± 2.98 mg/dl, $p = 0.017$) and group with estimated glomerular filtration (eGFR) below 60 ml/min/1.72m² is more (15 (24.2%) vs 31 (50.0%), $p= 0.010$). The c-reactive protein was higher in C3GN (0.51 ± 0.81 mg/dl vs 1.65 ± 3.83 mg/dl, $p=0.038$). Serum C3 level was lower in C3GN (104.04 ± 23.5 mg/dl vs 89.22 ± 37.44 mg/dl, $p=0.014$). Serum albumin and urine protein/creatinine ratio were similar. The patients who progressed to end stage renal disease and mortality were similar. C3GN appeared in MPGN (30.6%), FSGS (25.%), IgAN (12.9%), MCD (8.1) and MN (6.5%). Glomeruli showed no distinction. Interstitial fibrosis and tubular atrophy were more in C3GN ($p=0.016$, $p=0.03$). IF finding showed C1q, IgM and Lamda deposited more in C3GN ($p=0.011$, $p=0.035$, and $p=0.018$). In electron microscopy (EM), sub-endothelial deposit was more in C3GN ($p=0.003$).

Conclusions: The C3GN in primary GN showed more progressed renal function and inflammation. C3GN is known to slow progressive disease, but its inflammation seems to be aggressive as a result of abnormal alternative complement pathway.