10.5152/turkjnephrol.2023.22500

Turkish Journal of Nephrology

Steroid-Sensitive Complement 3 Glomerulopathy and Coronavirus Disease 2019

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Received: January 02, 2023 **Accepted:** May 25, 2023

Cite this article as: Eser B, Avcı A, Bilge BA, Doğan I, Aydemir N, Çolak A. *Turk J Nephrol.* 2023;32(4):370-371.

Dear Editor,

Complement 3 glomerulopathy (C3 GP) may present with nephrotic/nephritic syndrome, and its pathogenesis is known to result from the dysregulation of the alternative complement pathway.[1] New data are presented that coronavirus disease 2019 (COVID-19) may cause C3 GP with abnormal activation of the alternative complement pathway.[2,3] In this article, C3 GP, which responded well to steroids and relapsed after COVID-19 infection, is discussed.

A 21-year-old male patient presented with complaints of swelling in the face, eyes, and legs. He had no history of acute or chronic disease and drug or harmful substance use. There was no abnormal finding except bilateral periorbital and pretibial edema in his examination. Following are the laboratory evaluations: urea 75 mg/dL, creatinine 1.3 mg/dL, serum total protein 40 g/L, serum albumin 22 g/L, and hemogram was normal. In urine analysis, dysmorphic erythrocytes were not seen, there were hyaline and granular casts, and +1 erythrocyte and +3 protein were detected. Proteinuria was14.6 g/day. Serum complement C3 and C4 levels were 0.95 g/L (0.9-1.8) and 0.24 g/L (0.1-0.4), respectively. Serum anti-neutrophil cytoplasmic antibodies were negative. Serological markers of human immunodeficiency virus, hepatitis B virus and hepatitis C virus, antinuclear antibody, and anti-dsDNA were negative. There was no finding in favor of monoclonal gammopathy. Chest x-ray findings were normal. Intraabdominal organs including kidneys were normal with ultrasonography evaluation. In the evaluation of the kidney tissue sample by light microscopy, enlargement of some glomeruli and a mild increase in mesangial cellularity and mesengiolysis were detected. In the immunofluorescence evaluation, fine granular +3 staining with C3 and focal fine granular +1 staining with immunoglobulin M were observed only in the mesangial region. Kidneybiopsy was accepted as C3 dominant glomerulonephritis. We administered prednisolone at 1 mg/kg/day. Proteinuria levels at first and second months of treatment were 548 mg/day and 150 mg/day, respectively. Steroid therapy was tapered and discontinued in the fourth month

and the patient was in remission at sixth month.During the 11th month of his follow-up, he presented with a complaint of edema in the feet and had a history of COVID-19 episode 1 month prior to the last hospital admission. There was no finding in the physical examination of the patient other than bilateral pretibial edema. Kidney functions were normal, serum albumin was 20 g/L, and proteinuria was 14.4 g/day. Due to recurrent Complement 3 glomerulopathy1 mg/kg/day prednisolone was started again. On the 10th day of treatment, the serum albumin level was 38 g/L and proteinuria was 250 mg/day. Steroid therapy gradually was tapered and discontinued within 4 months.

In the differential diagnosis of C3 GP, almost all causes of nephritic/nephrotic syndrome should be considered, including immunoglobulin Anephropathy, lupus nephritis, fibrillary glomerulonephritis, vasculitis, infection-related glomerulonephritis, atheroembolic disease, and hemolytic uremic syndrome.[4] The patient had none of these conditions. Recently, it has been reported that COVID-19 infection can cause C3 GP.[2,3] In our case, COVID-19 infection may have contributed to C3 GP recurrence.

Currently, mycophenolate mofetil with or without prednisolone is recommended as an immunosuppressive treatment in moderately severe cases in the treatment of C3 GP.[5] In this case, remission was achieved with prednisolone. In conclusion, COVID-9 infection as well as any other infection may be effective in the development and recurrence of C3 GP.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – B.E.; Design – B.E.; Supervision – B.E.; Resources – B.E.; Materials – B.E., A.A., B.A.B., A.Ç.; Data Collection and/or Processing – B.E., A.A., B.A.B., A.Ç., İ.D., N.A.; Analysis and/or Interpretation – B.E., İ.D., N.A., A.Ç.; Literature Search – B.E., A.A., B.A.B.; Writing Manuscript – B.E., A.A., B.A.B.; Critical Review – İ.D., N.A.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: The authors declared that this study has received no financial support.

REFERENCES

1. Zipfel PF, Skerka C, Chen Q, et al. The role of complement in C3 glomerulopathy. *Mol Immunol*. 2015;67(1):21-30. [CrossRef]
2. Khan J, Bukhari SW, Alam MG. Does SARS-cov-2 activate the alternative complement pathway a case report of c3-dominant proliferative GN in a patient with SARS-CoV-2 infection. *J Am Soc Nephrol*. 2021;32:466-467.
3. Daneshgar N, Liang PI, Michels CJ, Nester CM, Harshman LA, Dai DF. Case report: clinical and pathological findings of a recurrent c3 glomerulopathy with superimposed membranoproliferative glomerulonephritis pattern and cryoglobulinemia associated with Covıd-19. *Front Pediatr*. 2022;10:827466. [CrossRef]
4. Smith RJH, Appel GB, Blom AM, et al. C3 glomerulopathy – understanding a rare complement-driven renal disease. *Nat Rev Nephrol*. 2019;15(3):129-143. [CrossRef]
5. Kidney Disease: Improving Global Outcomes (KDIGO) Glomerular Diseases Work Group. KDIGO 2021 Clinical Practice Guideline for the Management of Glomerular Diseases. *Kidney Int*. 2021;100(4S): S1-S276. [CrossRef]