Erciyes Med J 2022; 00(0): 00–00 • DOI: 10.14744/etd.2022.47701
CASE REPORT – OPEN ACCESS

A Rare COVID-19 Presentation; Relapse of Nephrotic Syndrome in a Pediatric Patient

Kübra Çeleğen, Mehmet Çeleğen, Ayşegül Bükülmez

ABSTRACT

Background: In early 2020, severe acute respiratory syndrome-corona virus 2 (SARS-CoV-2) pandemics caused previously unheard of health, social, and economic problems worldwide. The disease can affect different organs such as the lungs, heart, pancreas, kidney, and unusual symptoms can be seen. Information on the clinical impact of SARS-CoV-2 infection on renal function among pediatric age groups is scarce.

Case Report: In this report, we presented a 13-year-old boy who was admitted to our hospital with the relapse of nephrotic syndrome caused by COVID-19. The patient had mild upper respiratory tract symptoms, eyelid edema and progressive swelling of the lower extremities. Clinical remission was achieved with oral prednisolone therapy without the use of any antiviral drugs.

Conclusion: Patients with nephrotic syndrome presenting with relapse should be evaluated for potential COVID-19 infection during the pandemic. The use of routine doses of prednisolone appears to be safe in mild disease.

Keywords: COVID-19, nephrotic syndrome, relapse, proteinuria, children, immunosuppression

INTRODUCTION

Severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) was identified in China in late December 2019 and rapidly caused a pandemic in early 2020. The primary target organ of SARS-CoV-2 is the lung, but other organs such as the kidney may be involved. Coronavirus disease (COVID-19) usually manifests itself with symptoms, including myalgia, cough, fever, and dyspnea (1). Although COVID-19 is more common and devastating in adults, the disease manifestation is peculiar in the pediatric population, such as multisystem inflammatory disease (MIS-C) (2). Autopsy reports of COVID-19 patients from China and the USA have identified renal tubular injury associated with SARS-CoV-2 (1). Knowledge on COVID-19-associated nephropathy in children is still insufficient. Some pediatric patients with chronic kidney disease who were admitted to hospitals with respiratory symptoms have reported worsening of kidney function (3). Hematuria and albuminuria have also been reported concurrently with the disease without renal failure (4). There are limited case reports about the management of childhood nephrotic syndrome with COVID-19 (5, 6). Here, we report a rare presentation of a pediatric patient with COVID-19 and concomitant relapse of nephrotic syndrome.

CASE REPORT

A 13-year-old boy with a known history of steroid-induced nephrotic syndrome presented with eyelid edema and progressive swelling of lower extremities for one week in December 2020. He was in drug-free remission for over one and a half years. He had subjective fatigue and nasal congestion; however, he had no fever, shortness of breath, and microscopic or macroscopic hematuria. Vital signs at presentation were body temperature of 36.7°C, blood pressure 122/84 mmHg, heart rate 91/min and regular, respiratory rate 20/min, body temperature 36.7°C, oxygen saturation 97% as measured using pulse oximetry on room air. The patient's weight was five kilograms higher than his last known dry weight. On his physical examination, he wasn't ill-appearing; he had periorbital and pretibial edema (2+). There was mild tenderness with no rigidity on abdominal palpation. No pathological sound was auscultated in the lung examination. The rest of his physical examination was unremarkable.

In the hematological examination, hemoglobin was 14 g/dL, white blood cell count was $6.93*10^3$/µL, absolute lymphocyte count was 600/µL (<1200/µL), and platelet count was $357*10^3$ µL. Serum electrolytes sodium (135 mmol/L), potassium (4.1 mmol/L), and chloride (101 mmol/L) were within the normal range. There was no metabolic acidosis; pH 7.38, PCO_2 38 mmHg, PO_2 86 mmHg, bicarbonate 22.5 mmol/L and lactate 2 mmol/L. Serum BUN (10.42 g/L) and creatinine (0.31 g/L) were normal. Albumin was decreased significantly (1.63 g/L).

Cite this article as: Çeleğen K, Çeleğen M, Bükülmez A. A Rare COVID-19 Presentation; Relapse of Nephrotic Syndrome in a Pediatric Patient. Erciyes Med J 2022; 00(0): 00-00.

Department of Pediatrics, Afyonkarahisar Health Sciences University Faculty of Medicine, Afyonkarahisar, Turkey

Submitted 12.07.2021

Accepted 08.02.2022

Available Online 25.02.2022

Correspondence Kübra Çeleğen, Afyonkarahisar Health Sciences University Faculty of Medicine, Department of Pediatrics, Afyonkarahisar, Turkey
Phone: +90 272 246 33 01
e-mail: kubractf@hotmail.com

In the urinalysis, proteinuria (+++) was detected without red blood cells. The urine protein to creatinine ratio was 16 mg/mg. SARS-CoV-2 infection was suspected in the patient due to the pandemic, who had a mild clinical course but had significant lymphopenia. There was no close contact with a suspected or known symptomatic COVID-19 patient. Prior to steroid initiation, a nasopharyngeal swab with reverse transcription-polymerase chain reaction (RT-PCR) for SARS-CoV-2 was performed and the result was positive. Because of the absence of tachypnea, subcostal or suprasternal retraction, hypoxia, and consolidation in the chest radiography, chest computed tomography imaging was not performed. The patient, who had a higher probability of developing hypoalbuminemia-related complications, did not have obvious infection symptoms, so steroid treatment was initiated by interviewing his parents. Two milligrams/kg (maximum 60 mg per day) oral steroid was given, according to the nephrotic syndrome guideline (7). The patient's edema and urinary findings gradually improved, with remission occurring five days after steroid therapy initiation without any worsening of respiratory symptoms. In addition, lymphopenia got back to the normal range within a week. Antiviral treatment was not prescribed to the patient who had no signs of COVID-19 disease other than mild upper respiratory tract symptoms. His SARS-CoV-2 PCR test was negative on day 14. After remission, the steroid reduction was planned. During the two-month follow-up, the patient was still in remission with alternate-day steroids without any complication or any late effect of COVID-19.

DISCUSSION

Various glomerular and tubular involvement have been reported in patients infected with SARS-CoV-2 (8). Acute kidney injury and proteinuria are the common findings in patients with COVID-19 (9). SARS-CoV-2, like other viral respiratory infections, can cause kidney damage (10). SARS-CoV-2 uses angiotensin-converting enzyme 2 (ACE-2) as its entry receptor to invade cells. ACE-2 has high expression in the lungs, myocardium, endothelium, gastrointestinal tract, pancreas, and kidney (10). Although other viral upper respiratory tract infections are known to trigger relapses of nephrotic syndrome, the effect of COVID-19 on nephrotic syndrome is unclear (8).

SARS-CoV-2 infection is often asymptomatic or mild in pediatric patients. The most common laboratory finding is leukopenia/lymphopenia (10). Our patient had remarkable lymphopenia with a mild disease course. His blood count was normal in his previous examinations and the lymphocyte count got back to normal after one week in the follow-up. We thought that temporary lymphopenia developed due to infection. We were unable to test the patient for possible viral infections other than SARS-CoV-2. The nephrotic syndrome relapse in this patient could be either a coincidence or a rare presentation of COVID-19. We did not perform a kidney biopsy in the patient who had a good steroid response, did not have GFR reduction and atypical features, since there was no indication for renal biopsy (8). We do not know exactly what happened in the kidney, but the patient responded well to the treatment with other relapses. There are few case reports of relapse of the nephrotic syndrome and concomitant mild SARS-CoV-2 infection. Prednisone was used in the relapse treatment of three patients without any complications. None of them had a kidney biopsy (3).

The recurrence rate of the nephrotic syndrome during the pandemic period does not seem to be different from before (8). Fortunately, COVID-19 causes mild disease in pediatric patients using immunosuppressive agents for chronic kidney diseases such as nephrotic syndrome.

To our knowledge, this is one of the rare pediatric case reports of relapse of nephrotic syndrome caused by COVID-19. Patients with nephrotic syndrome presenting with relapse should be assessed for potential COVID-19 infection during a pandemic, and routine doses of prednisolone appear to be effective for treatment and can be used safely in mild disease courses. Comprehensive studies are needed to elucidate the pathophysiology.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – KÇ; Design – MÇ; Supervision – AB; Data Collection and/or Processing – KÇ; Analysis and/or Interpretation – KÇ; Literature Search – MÇ; Writing – KÇ; Critical Reviews – KÇ.

Conflict of Interest: The authors have no conflict of interest to declare.

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

REFERENCES

1. Chao JY, Derespina KR, Herold BC, Goldman DL, Aldrich M, Weingarten J, et al. Clinical characteristics and outcomes of hospitalized and critically ill children and adolescents with Coronavirus disease 2019 at a Tertiary Care Medical Center in New York City. J Pediatr 2020; 223: 14–9.e2.
2. Feldstein LR, Rose EB, Horwitz SM, Collins JP, Newhams MM, Son MBF, et al. Multisystem ınflammatory syndrome in U.S. children and adolescents. N Engl J Med 2020; 383(4): 334–46.
3. Melgosa M, Madrid A, Alvárez O, Lumbreras J, Nieto F, Parada E, et al; Spanish Pediatric Nephrology Association. SARS-CoV-2 infection in Spanish children with chronic kidney pathologies. Pediatr Nephrol 2020; 35(8): 1521–4.
4. Nasr SH, Kopp JB. COVID-19-Associated collapsing glomerulopathy: An emerging entity. Kidney Int Rep 2020; 5(6): 759–61.
5. Enya T, Morimoto Y, Oshima R, Miyazaki K, Miyazawa T, Okada M, et al. Nephrotic syndrome relapse in a boy with COVID-19. CEN Case Rep 2021; 10(3): 431–4.
6. Alvarado A, Franceschi G, Resplandor E, Sumba J, Orta N. COVID-19 associated with onset nephrotic syndrome in a pediatric patient: coincidence or related conditions? Pediatr Nephrol 2021; 36(1): 205–7.
7. Lombel RM, Gipson DS, Hodson EM; Kidney Disease: Improving Global Outcomes. Treatment of steroid-sensitive nephrotic syndrome: new guidelines from KDIGO. Pediatr Nephrol 2013; 28(3): 415–26.
8. Kudose S, Batal I, Santoriello D, Xu K, Barasch J, Peleg Y, et al. Kidney biopsy findings in patients with COVID-19. J Am Soc Nephrol 2020; 31(9): 1959–68.
9. Cheng Y, Luo R, Wang K, Zhang M, Wang Z, Dong L, et al. Kidney disease is associated with in-hospital death of patients with COVID-19. Kidney Int 2020; 97(5): 829–38.
10. Liguoro I, Pilotto C, Bonanni M, Ferrari ME, Pusiol A, Nocerino A, et al. SARS-COV-2 infection in children and newborns: a systematic review. Eur J Pediatr 2020; 179(7): 1029–46. Erratum in: Eur J Pediatr 2021; 180(7): 2343.