Open Access Epidemiology and Prevention

Journal of Renal Endocrinology

J Renal Endocrinol 2020;6:e08.

http://www.jrenendo.com

Nickan Research Institute

COVID-19 and nephrology; a letter to the editor on current concepts

Mohammad Bahadoram[1,2*], Bijan Keikhaei[2], Mohammad-Reza Mahmoudian-Sani[2], Bhaskar VKS Lakkakula[3]

Implication for health policy/practice/research/medical education: COVID- 19 involves the kidneys and causes acute renal failure, but the effect of the virus in patients with CKD, is not yet fully known. However, CKD appears to be associated with severe COVID-19.

Citation: Bahadoram M, Keikhaei B, Mahmoudian-Sani M, Lakkakula BVKS. COVID-19 and nephrology; a letter to the editor on current concepts. J Renal Endocrinol. 2020;6:e08.

Coronavirus disease (COVID-19) is a recent disease that originated in China in late 2019 (1). Previous coronavirus infections, such as SARS-CoV and MERS-Co-V, have infected more than 10,000 people in the past two decades, with mortality rates of 10% and 37%, respectively (2). COVID-19 is more contagious and has a lower mortality rate than MERS-Co-V and SARS-CoV. COVID-19 likely to cause more severe disease, in patients with chronic kidney disease (CKD), in patients on chronic dialysis (HD), and those living with a kidney transplant (KT) (3). Renal abnormalities associated with the COVID-19 include proteinuria, hematuria, elevated serum creatinine, elevated blood urea nitrogen, and reduced glomerular filtration rate (GFR <60 mL/min/1.73 m^2) (4). Another major problem in COVID-19 patients is impaired renal function. Hence, about two-thirds of expired patients have renal dysfunction, and about one-fourth of patients discharged after recovery from COVID-19 had impaired renal function. It is also documented that only 15% of the kidney function remained in COVID-19 patients (5). COVID- 19 involves the kidneys and causes acute renal failure, but the effect of the virus in patients with CKD, is not yet fully known (6). However, CKD appears to be associated with severe COVID-19 (7). In a cohort study of 1591 patients admitted to intensive care units in Lombardy, Italy, with laboratory-confirmed COVID-19, CKD was observed in 3% of patients (8). In addition, CKD was reported in 268 (5%) study participants and end-stage renal disease (ESRD) was reported in 186 (3.5%) study participants, out of a total of 5700 admissions with confirmed COVID-19 infection who were admitted to 12 New York City hospitals, at baseline (9).

The pathogenesis of acute kidney injury (AKI) in COVID-19 patients remains to be fully elucidated (10). Previous reports of SARS-CoV and MERS-CoV infections indicated that the AKI developed in 5% to 15% cases and mortality on AKI was high (60%–90%). But other reports suggest that in COVID-19 infection, the incidence of AKI is lower (3%–9%) (11). The occurrence of kidney dysfunction and subsequent AKI among COVID-19 patients has been discussed elsewhere (12,13). However, because SARS-CoV-2 is an emerging virus, more studies need to be explored to assess the extent of AKI in COVID-19 patients (14). Reports of COVID-19 in kidney transplant recipients are now emerging. In line with the experience in the general population, elderly kidney transplant recipients are at increased risk of developing severe disease (15). According to a study, kidney-transplant recipients with COVID-19 showed a very high early mortality rate of 28% at 3 weeks as compared with the reported 1% to 5% mortality among patients with COVID-19 in the general population (15). Additionally, patients on chronic hemodialysis are at higher risk of developing COVID-19 compared to the general population (16). Thus, patients with kidney diseases (chronic kidney disease, acute kidney injury, kidney transplant, and hemodialysis) are at a much higher risk of serious illness, complications and mortality during the COVID-19 pandemic. For this reason, we propose that the forthcoming World Kidney

Received: 19 October 2020, Accepted: 1 December 2020, ePublished: 17 December 2020

[1]Department of Radiation Oncology, Firoozgar Hospital, Firoozgar Clinical Research Development Center (FCRDC), Iran University of Medical Sciences (IUMS), Tehran, Iran. [2]Thalassemia and Hemoglobinopathy Research Center, Research Institute of Health, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran. [3]Department of Zoology, Guru Ghasidas Vishwavidyalaya, Bilaspur, India.
***Corresponding Author:** Mohammad Bahadoram, Email: mohammadbahadoram@yahoo.com

Day on 11 March 2021 must emphasize the critical role of the nephrologist in managing kidney health during the COVID-19 pandemic.

Authors' contribution

Primary draft by MB and BVSKL. Further edits by BK and MRMS. All authors read and signed the final manuscript.

Conflicts of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical issues

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the authors.

Funding/Support

This study was supported by grants from vice chancellor for research affairs, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

References

1. Lai, C-C, Shih T-P, Ko W-C, Tang H-J, Hsueh P-R. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges. Int J Antimicrob Agents. 2020;55:105924. doi: 10.1016/j.ijantimicag.2020.105924.
2. WHO. Middle East respiratory syndrome coronavirus (MERS-CoV). https://www.who.int/emergencies/disease-outbreak-news/item/2021-DON317.
3. Yi, Y, Lagniton PNP, Ye S, Li E, Xu R-H. COVID-19: what has been learned and to be learned about the novel coronavirus disease. Int J Biol Sci. 2020;16:1753-66. doi: 10.7150/ijbs.45134.
4. 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;97:829-38. doi: 10.1016/j.kint.2020.03.005.
5. Pei G, Zhang Z, Peng J, Liu L, Zhang C, Yu C, et al. Renal Involvement and Early Prognosis in Patients with COVID-19 Pneumonia. J Am Soc Nephrol. 2020;31:1157-1165. doi: 10.1681/ASN.2020030276.
6. Ma, Y, Diao B, Lv X, Zhu J, Liang W, Liu L, et al. 2019 novel coronavirus disease in hemodialysis (HD) patients: report from one HD center in Wuhan, China. MedRxiv. 2020. doi: 10.1101/2020.02.24.20027201.
7. Zaim, S, Chong JH, Sankaranarayanan V, Harky A. COVID-19 and Multiorgan Response. Current problems in cardiology. 2020;45:100618. doi: 10.1016/j.cpcardiol.2020.100618.
8. Grasselli, G, Zangrillo A, Zanella A, Antonelli M, Cabrini L, Castelli A, et al. Baseline characteristics and outcomes of 1591 patients infected with SARS-CoV-2 admitted to ICUs of the Lombardy Region, Italy. Jama. 2020;323:1574-81.
9. Richardson, S, Hirsch JS, Narasimhan M, Crawford JM, McGinn T, Davidson KW, et al. Presenting characteristics, comorbidities, and outcomes among 5700 patients hospitalized with COVID-19 in the New York City area. JAMA. 2020;323:2052-9. doi: 10.1001/jama.2020.6775.
10. Gabarre, P, Dumas G, Dupont T, Darmon M, Azoulay E, Zafrani L. Acute kidney injury in critically ill patients with COVID-19. Intensive Care Med. 2020;46:1339-48. doi: 10.1007/s00134-020-06153-9.
11. Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, et al. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med. 2020;382:1708-20.
12. Lai CC, Ko WC, Lee PI, Jean SS, Hsueh PR. Extra-respiratory manifestations of COVID-19. Int J Antimicrob Agents. 2020;56:106024. doi: 10.1016/j.ijantimicag.2020.106024.
13. Mohamed MM, Lukitsch I, Torres-Ortiz AE, Walker JB, Varghese V, Hernandez-Arroyo CF, et al. Acute Kidney Injury Associated with Coronavirus Disease 2019 in Urban New Orleans. Kidney360. 2020;1:614-622. doi: 10.34067/KID.0002652020.
14. Nadim MK, Forni LG, Mehta RL, Connor MJ Jr, Liu KD, Ostermann M, et al. COVID-19-associated acute kidney injury: consensus report of the 25th Acute Disease Quality Initiative (ADQI) Workgroup. Nat Rev Nephrol. 2020;16:747-64. doi: 10.1038/s41581-020-00356-5.
15. Kronbichler A, Gauckler P, Windpessl M, Shin JI, Jha V, Rovin BH, et al. COVID-19: implications for immunosuppression in kidney disease and transplantation. Nat Rev Nephrol. 2020;16:365-7. doi: 10.1038/s41581-020-0305-6.
16. Basile C, Combe C, Pizzarelli F, Covic A, Davenport A, Kanbay M, et al. Recommendations for the prevention, mitigation and containment of the emerging SARS-CoV-2 (COVID-19) pandemic in haemodialysis centres. Nephrol Dial Transplant. 2020;35:737-41.