Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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COVID-19 in dialysis patients: outlasting and outsmarting a pandemic

Caroline M. Hsu and Daniel E. Weiner

Coronavirus disease 2019 (COVID-19) has affected the care and outcomes of patients treated with dialysis worldwide. In this issue of *Kidney International*, 3 reports highlight the disproportionately severe impact of COVID-19 on patients on dialysis, noting its high prevalence, particularly among patients receiving in-center dialysis. This likely reflects patients’ limited ability to physically distance as well as community exposures, including residence in areas with high rates of infection. Patients on dialysis are at extremely high risk should they develop COVID-19, with short-term mortality of 20% or higher. Accordingly, it is imperative that the kidney community intervenes to reduce the threat of COVID-19 in this vulnerable population by focusing on modifiable factors, including universal masking of patients and staff and enhanced screening, including testing for COVID-19 in the patients who are asymptomatic during times of high local prevalence.

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[See clinical investigations on pages 1519, 1530, and 1540](#)

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**References**

1. Gross O, Beirowski B, Koepke ML, et al. Prevention of Alport syndrome delays renal failure and reduces renal fibrosis in COL4A3 knockout mice with Alport syndrome. *Kidney Int*. 2003;63:438–446.

2. Gross O, Licht C, Anders HJ, et al. Early angiotensin-converting enzyme inhibition in Alport syndrome delays renal failure and improves life expectancy. *Kidney Int*. 2012;81:494–501.

3. Kashtan CE, Ding J, Gregory M, et al. Clinical practice recommendations for the treatment of Alport syndrome: a statement of the Alport Syndrome Research Collaborative. *Pediatr Nephrol*. 2013;28:5–11.

4. Yamamura T, Horinouchi T, Nagano C, et al. Genotype-phenotype correlations influence the response to angiotensin-targeting drugs in Japanese patients with male X-linked Alport syndrome. *Kidney Int*. 2020;98:1605–1614.

5. Jais JP, Knebelmann B, Giatras I, et al. X-linked Alport syndrome: natural history in 195 families and genotype-phenotype correlations in males. *J Am Soc Nephrol*. 2000;11:649–657.

6. Omachi K, Miner JH. Alport syndrome therapeutics: ready for prime-time players. *Trends Pharmacol Sci*. 2019;40:803–806.

7. Weinstock BA, Feldman DL, Fornoni A, et al. Clinical trial recommendations for potential Alport syndrome therapies. *Kidney Int*. 2020;97:1109–1116.

8. Gross O, Tonshoff B, Weber LT, et al. A multicenter, randomized, placebo-controlled, double-blind phase 3 trial with open-arm comparison indicates safety and efficacy of nephroprotective therapy with ramipril in children with Alport syndrome. *Kidney Int*. 2020;97:1275–1286.

9. Yamamura T, Horinouchi T, Adachi T, et al. Development of an exon skipping therapy for X-linked Alport syndrome with truncating variants in COL4A5. *Nat Commun*. 2020;11:2777.

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**References**

1. Gross O, Beirowski B, Koepke ML, et al. Prevention of Alport syndrome delays renal failure and reduces renal fibrosis in COL4A3 knockout mice with Alport syndrome. *Kidney Int*. 2003;63:438–446.

2. Gross O, Licht C, Anders HJ, et al. Early angiotensin-converting enzyme inhibition in Alport syndrome delays renal failure and improves life expectancy. *Kidney Int*. 2012;81:494–501.

3. Kashtan CE, Ding J, Gregory M, et al. Clinical practice recommendations for the treatment of Alport syndrome: a statement of the Alport Syndrome Research Collaborative. *Pediatr Nephrol*. 2013;28:5–11.

4. Yamamura T, Horinouchi T, Nagano C, et al. Genotype-phenotype correlations influence the response to angiotensin-targeting drugs in Japanese patients with male X-linked Alport syndrome. *Kidney Int*. 2020;98:1605–1614.

5. Jais JP, Knebelmann B, Giatras I, et al. X-linked Alport syndrome: natural history in 195 families and genotype-phenotype correlations in males. *J Am Soc Nephrol*. 2000;11:649–657.

6. Omachi K, Miner JH. Alport syndrome therapeutics: ready for prime-time players. *Trends Pharmacol Sci*. 2019;40:803–806.

7. Weinstock BA, Feldman DL, Fornoni A, et al. Clinical trial recommendations for potential Alport syndrome therapies. *Kidney Int*. 2020;97:1109–1116.

8. Gross O, Tonshoff B, Weber LT, et al. A multicenter, randomized, placebo-controlled, double-blind phase 3 trial with open-arm comparison indicates safety and efficacy of nephroprotective therapy with ramipril in children with Alport syndrome. *Kidney Int*. 2020;97:1275–1286.

9. Yamamura T, Horinouchi T, Adachi T, et al. Development of an exon skipping therapy for X-linked Alport syndrome with truncating variants in COL4A5. *Nat Commun*. 2020;11:2777.
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have COVID-19 can strain health care systems beyond capacity. In the United States, this has been magnified by the high prevalence of COVID-19 in nursing homes and rehabilitation facilities, resulting in prolonged hospitalizations and greater inpatient demands for dialysis. Even beyond a surge, dialysis providers must ensure sufficient availability of resources and vigilance regarding COVID-19 risk as dialysis-dependent patients transition across health care settings.

In conclusion, the studies published in this issue of *KI* highlight not only the high risk of developing COVID-19 among patients receiving in-center hemodialysis but also the severe consequences of COVID-19 in this population, with 20% mortality among patients receiving maintenance dialysis who have COVID-19. Until the pandemic is controlled, the kidney community needs to aggressively pursue infection control and appropriate resource management to optimize outcomes in this vulnerable population.

**DISCLOSURE**

DEW is a medical director at Dialysis Clinic, Inc., Boston. He is a member of the American Society of Nephrology’s Dialysis COVID Task Force. The views expressed here are his own. All the other authors declared no competing interests.

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**REFERENCES**

1. World Health Organization. WHO coronavirus disease (COVID-19) dashboard. 2020. Available at: https://covid19.who.int/. Accessed October 2, 2020.

2. GBD Chronic Kidney Disease Collaboration. Global, regional, and national burden of chronic kidney disease, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2020;395:709–733.

3. Basile C, Combe C, Pizzarelli F, 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;35:737–741.

4. Rombola G, Heidemperger M, Pedrini L, et al. Practical indications for the prevention and management of SARS-CoV-2 in ambulatory dialysis patients: lessons from the first phase of the epidemics in Lombardy. J Nephrol. 2020;33:193–196.

5. Kliger AS, Silberzweig J. Mitigating risk of COVID-19 in dialysis facilities. *Clin J Am Soc Nephrol.* 2020;15:707–709.

6. Couchoud C, Bayer F, Ayac C, et al. Low incidence of SARS-CoV-2, risk factors of mortality and the course of illness in the French national cohort of dialysis patients. *Kidney Int.* 2020;98:1519–1529.

7. Jager KJ, Kramer A, Chesnaye NC, et al. Results from the ERA-EDTA Registry indicate a high mortality due to COVID-19 in dialysis patients and kidney transplant recipients across Europe. *Kidney Int.* 2020;98:1540–1548.

8. Ng JH, Hinch JS, Wanchoo R, et al. Outcomes of patients with end-stage kidney disease hospitalized with COVID-19. *Kidney Int.* 2020;98:1530–1539.

9. Weiner DE, Watnick SG. Hemodialysis and COVID-19: an Achilles’ heel in the pandemic health care response in the United States. *Kidney Med.* 2020;2:227–230.

10. Centers for Disease Control and Prevention. Interim additional guidance for infection prevention and control recommendations for patients with suspected or confirmed COVID-19 in outpatient hemodialysis facilities. 2020. Available at: https://www.cdc.gov/coronavirus/2019-ncov/hcp/dialysis.html. Accessed October 2, 2020.

11. Bhayani S, Sengupta R, Markossian T, et al. Dialysis, COVID-19, poverty, and race in greater Chicago: an ecological analysis. *Kidney Med.* 2020;2:552–558.

12. Liu CK, Ghai S, Waikar SS, Weiner DE. COVID-19 infection risk among hemodialysis patients in long-term care facilities [e-pub ahead of print]. *Kidney Med.* https://doi.org/10.1016/j.kxme.2020.07.005. Accessed October 2, 2020.

13. Mogul F. Shortage of dialysis equipment leads to difficult decisions in New York ICUs. National Public Radio. April 19, 2020. Available at: https://www.npr.org/sections/health-shots/2020/04/19/838103327/shortage-of-dialysis-equipment-leads-to-difficult-decisions-in-new-york-icus. Accessed October 2, 2020.

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**A Kidney International “journal of the COVID-19 year” in kidney transplantation**

P. Toby Coates

The global coronavirus disease 2019 pandemic’s impact on kidney transplant recipients and transplantation programs in the calamitous months of February to June 2020, spring to summer in the Northern Hemisphere, is represented in articles published in the December issue of *Kidney International*. Writing about another pandemic in the year of 1665 over 300 years ago, the author Daniel Defoe describes the same period of time in London and gives a remarkably familiar description of how a pandemic affects populations, including the unproven treatments, epidemiology of infection, and human response to restrictions on freedom of city lockdowns that occurred during that time. The risks, outcomes, epidemiology, and potential treatments for the kidney transplant population worldwide during the past 12 months have been thankfully studied in detail by multiple investigators and form the subject of papers in *KI* this month.

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**see basic research on page 1502 and clinical investigations on pages 1540, 1549, 1559, and 1568**

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**F**irst, from Europe comes the registry experience of Calliard et al. who describe the clinical presentations of 279 kidney transplant recipients reported to the French nationwide registry of Solid Organ Transplant COVID Recipients. Risk