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COVID-19 and the Kidney Community: Coalescing in Crisis



The coronavirus disease 2019 (COVID-19) pandemic has led to significant changes to the practice of kidney medicine. The ability to provide acute dialysis is strained due to high rates of acute kidney injury (AKI), which occurs in up to 30% to 40% of hospitalized patients. The presence of AKI in the setting of COVID-19 is associated with high morbidity and mortality.¹ Figure 1 illustrates various manifestations of COVID-19 in the kidney. The need for social distancing has resulted in a shift to outpatient telemedicine for many patients with kidney disease. Research findings, hypotheses, and oftentimes rumors and innuendos spread quickly through various channels of communication, including traditional peer-reviewed journals, social media, blogs, and preprint servers. Never has the need for accurate and sound science been more important than now.² COVID-19 has even altered how we communicate and teach nephrology, spanning the spectrum of learners³; virtual learning is more important than ever. Moreover, the virus that causes COVID-19, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), uses a key enzyme of the renin-angiotensin system—angiotensin-converting enzyme 2 (ACE2)—to gain entry into host cells.⁴ Thus, COVID-19 has become firmly entrenched into nephrology, dominating conversations in social and traditional media, and garnering wide coverage in our journals. The lasting effect of COVID-19 will continue to impact all aspects of kidney care. For example, telehealth had been a discussion point that was tied up in policy and infrastructure issues.³ In a matter of days, telehealth became commonplace, as policy abruptly shifted and technology requirements were dramatically relaxed. Patients with kidney disease, particularly those with end-stage kidney disease (ESKD) undergoing dialysis and individuals receiving immunosuppression (secondary to kidney transplantation or glomerulonephritis), are at a higher risk for severe COVID-19.^{5,6} In the current issue of *Advances in Chronic Kidney Disease*, we provide an overview of several of the important ways in which COVID-19 has impacted the nephrology community.

In overseeing the development of this “Kidney Health and COVID-19” issue of *Advances in Chronic Kidney Disease*, we attempted to provide a comprehensive overview by highlighting topics spanning education, clinical care, potential therapies, research, and health care disparities. Dr Shaikh and colleagues (pp 377-382) review how AKI and the need for kidney replacement therapy (KRT) in patients with COVID-19 have resulted in several challenges. The high prevalence of KRT in the intensive care unit setting necessitated alternative ways to provide dialysis, including acute peritoneal dialysis, and methods to

make dialysate secondary to heightened consumption of fluids. The pathophysiology and etiology of AKI is a rapidly emerging area of interest. Dr Ng and colleagues (pp 365-376) review the literature and discuss the spectrum of kidney pathology that has been identified in patients with COVID-19. Kidney transplantation has resulted in unique issues for both patients and transplantation centers. Dr. Abu Jawdeh (pp 383-389) discusses the outcomes, immunosuppression management, and operational challenges related to kidney transplantation during the COVID-19 pandemic. Dr. Novick and colleagues (pp 427-433) highlight how the COVID-19 pandemic has disproportionately affected marginalized populations with kidney disease. Higher rates of severe COVID-19 have been observed in older populations, minorities, and immigrants. Blacks, Hispanics, and Native Americans are more heavily impacted by COVID-19, with higher age-adjusted mortality in Black patients compared to White or Asian patients. The socioeconomic effects of the COVID-19 pandemic have had an inequitable effect on women due to loss of employment and childcare needs. Pregnant women are a particularly vulnerable population, requiring the need for a multidisciplinary team consisting of a nephrologist and a neonatologist to provide clinical care to this high-risk group. Drs Bajpai and Shah (pp 397-403) review the clinical course, maternal and fetal outcomes, and management of pregnancy in women with kidney disease during COVID-19.

The COVID-19 pandemic has changed how we deliver care to our patients with CKD and ESKD, with an emphasis on accessibility, flexibility, and patient autonomy. Dr Truong and colleagues (pp 390-396) highlight the changing practice of nephrology during the COVID-19 pandemic, with relaxation in the administrative burden of quality reporting and telehealth waivers to increase access of care for patients with CKD and ESKD. Patients on home dialysis present unique challenges during the COVID-19 pandemic. Drs Yerram and Misra (pp 442-446) discuss how COVID-19 has impacted various aspects of clinical care for patients undergoing home dialysis therapies (hemodialysis and peritoneal dialysis). This includes effects on clinical protocols, disruption of dialysis supply chains, alteration to dialysis prescriptions, modification of patient training protocols, and management of dialysis staff. While ongoing randomized controlled clinical trials examine potential therapeutics for COVID-19 treatment and prophylaxis, Dr Miller-Handley and colleagues (pp 434-441) summarize the current data for use in patients with diminished or absent kidney function.

Hypertension emerged as a potential risk factor for severe COVID-19 early in the pandemic. However, many of these studies did not adjust for age, which represents an important confounder driving severe COVID-19. One of the links between hypertension and COVID-19 was how SARS-CoV-2 enters host cells through a potent

Manifestations of COVID-19 in the kidney



Figure 1. Manifestations of coronavirus disease 2019 (COVID-19) in the kidney. (Original artwork by Tiffany Caza, MD, PhD.)

negative regulator of the renin angiotensin system angiotensin-converting enzyme 2 (RAS-ACE2), thus putting RAS inhibitors in the spotlight and spurring a debate on whether to start or stop angiotensin-converting enzyme inhibitors or angiotensin receptor blockers. Dr Edmonston and colleagues (pp 404-411) review the putative pathophysiology and summarize the literature and recommendations regarding RAS inhibition in COVID-19.

With adaptation of social distancing guidelines and increases in clinical demands, the COVID-19 pandemic has affected medical education for both learners and educators alike. To optimize medical education in these uncertain times, there has been widespread adaptation to virtual learning platforms, but this comes with its own challenges of limited in-person interaction, which is critical for learning. Dr Hilburg and colleagues (pp 412-417) discuss the influence of the pandemic on the structure and delivery of medical education. They explore challenges and potential solutions that can be employed in the future with the likely continuation of distant learning. The exponential rise of information focusing on all aspects of SARS-CoV-2 and COVID-19 poses unique challenges and opportunities. Several grassroots and society-based efforts in the nephrology community were quickly put into place with the goal of providing accurate, vetted, and real-time updates. Examples of these efforts include the NephJC website,⁷ as well as sites from the American Society of Nephrology⁸ and the National Kidney Foundation,⁹ among others. Importantly, the proliferation of papers and the emergence of preprints during the COVID-19 pandemic provided another challenge. How do we all read and interpret these findings? Dr Vlasschaert and colleagues (pp 418-426) summarize the use of social media during COVID-19 and discusses how preprint servers and pre-publication peer review can be an important part of the scientific discourse.

The "Kidney Health and COVID-19" edition of *Advances in Chronic Kidney Disease* will help guide the nephrology community in determining best practices and preparing for our collective "new normal" in optimizing care for high-risk patients in the setting of the COVID-19 pandemic. As we pull together during these times of great uncertainty, it will be our continued responsibility to move the needle forward on the inequities faced by marginalized populations that have been unheeded far too long. We thank the authors and reviewers of the "Kidney Health and COVID-19" issue of *Advances in Chronic*

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