

Moving beyond COVID-19 Surge—Caring for Patients with Kidney Disease throughout the Pandemic

Sharina Belani,¹ Leonid Pravoverov,² Nelson B. Goes,³ Sijie Zheng,² Anna V. Asovskaya,⁴ Paul Kroupa,⁴ and Ali Poyan Mehr³

KIDNEY360 1: 1124–1127, 2020. doi: <https://doi.org/10.34067/KID.0005452020>

Introduction

As nephrologists, we have early on recognized the current coronavirus disease 2019 (COVID-19) pandemic to be particularly threatening to the patients we care for in our clinics. Many observations have shown older patients and those with chronic medical comorbidities to be disproportionately at risk for excess morbidity and mortality due to COVID-19 infection (1,2). As a medical subspecialty, nephrologists not only see the most substantial proportion of patients age ≥ 80 years but also care for the most complex patient population with the highest number of comorbidities (3). Therefore, extensive discussions have been carried out in our community about the potential fallout of COVID-19 infection and the observed or anticipated adverse outcomes. These adverse outcomes include hospitalizations, critical care admission, ESKD, and death in patient's kidney disorder (4–6). Further, several reports have shown that a high number of patients with COVID-19 infection experience AKI and may require dialysis, potentially increasing demand for available resources beyond capacity (7–9). Several surge-mitigation protocols and COVID-19–related best practice guidelines are now available to nephrologists (10,11).

Moving beyond the surge, however, there is substantial uncertainty about the chronic management of patients with kidney disease in the near-term future. When should we time dialysis access placement? Do we place patients at unnecessary risk for “nosocomial” COVID-19 infection by requiring routine laboratory assessment or dialysis access surveillance for primary prevention? Or do we risk a rise in preventable adverse outcomes by dialing back on care considered not essential and thus, failing to identify early signs of medical complications?

Answers to some of these questions were already hotly debated before. The COVID-19 pandemic has considerably increased their complexity and uncertainty.

Here, we share the Kaiser Permanente Northern California (KPNC) strategy for population-wide management strategies of patients with kidney disease, beyond the acute surge and mitigation plans. We anticipate the necessity of adapting to a new norm of

providing medical care, which is likely to last until an effective therapy or vaccine becomes widely available.

The KPNC is an integrated health care delivery system with approximately 4.5 million members who live in the greater metropolitan San Francisco Bay area. Approximately 90 nephrologists at 22 medical centers care for approximately 11,000 patients with advanced CKD (eGFR < 45 ml/min per 1.73 m²), approximately 3000 patients with a functioning kidney transplant, approximately 5500 patients on dialysis, and approximately 6000 patients with GN.

Elimination of Avoidable Health Care Exposure

Because of patients' comorbidities and chronic conditions, nephrology has historically been a “follow-up”–intense medical specialty. Further, in-person patient evaluation and physical examinations are essential parts of a new assessment of most patients who present with a new diagnosis of kidney disease. However, this level of close physical interaction will also increase individual patient's risk of COVID-19 infection and the spread of the disease throughout the health care environment. Therefore, the overarching goal in our region-wide approach to mitigation and suppression strategy is the safe elimination of close physical encounters between patients and the health care setting to the extent acceptable. In Table 1, we provide a summary of approaches. These guides are not definite and require tailoring to any given patient's needs, and they are subject to ongoing change.

New Outpatient Consultation and CKD Management

Here, we have implemented a telehealth first strategy. Although each nephrology clinic is always staffed with at least one nephrologist to accommodate any need for urgent in-person evaluations, the overwhelming number of visits are conducted remotely by phone or video. In August, 95% of new patient evaluations were conducted through telehealth, with 52% performed through video and 42% performed through telephone appointments.

¹Department of Nephrology, Kaiser Permanente San Rafael Medical Center, San Rafael, California

²Department of Nephrology, Kaiser Permanente Oakland Medical Center, Oakland, California

³Department of Nephrology, Kaiser Permanente San Francisco Medical Center, San Francisco, California

⁴Department of Nephrology, Kaiser Permanente Northern California Regional Offices, Oakland, California

Correspondence: Ali Poyan Mehr, Kaiser Permanente Northern California, 2238 Geary Boulevard, 2nd Floor, San Francisco, CA 94115. Email: ali.x.poyanmehr@kp.org

Table 1. Summary of opinion-based local management guides for patients with kidney diseases during the pandemic

Domain	Guidance
New patient referrals	Virtual pre-evaluation through telehealth
CKD	Advance assessment Home BP and weight diaries Small group webinars for CKD education, nutrition, and option teaching Office-based 1:1 option counseling combined with follow-up telehealth visit Mail-order pharmacy Home ESA injection Office-based ESA injections: increase dose of ESA and decrease frequency Space out monthly laboratory tests to every 6 wk and quarterly laboratory tests to every 4 mo Increased frequency of telehealth check-ins in between laboratory assessments
ESKD	Monthly telehealth visit for home modalities Preserve in-center dialysis rounds Strong collaboration with adoption of testing and cohorting strategies according to CDC and dialysis vendor guidelines
Kidney transplant	Prioritize pretransplant testing for patients with approved living donors and higher chance to receive a deceased donor offer (longer waiting times and high HLA cPRA) Reduce testing frequency, especially after second year post-transplantation Maximize virtual care with preference of video over telephone visits
Glomerular diseases	Hold protocol biopsies during peak of pandemic Minimize IS to the extent allowable without risking relapse Leverage serology-based diagnosis instead of tissue biopsy whenever possible (<i>e.g.</i> , PLA2R titers in nephrotic syndrome, ANCA titers in RPGN) Consider using reduced-dose steroids regimens for indications where reduced-dose steroid has shown to be equally effective (<i>e.g.</i> , ANCA GN, lupus nephritis)

ESA, erythropoiesis-stimulating agent; CDC, Centers for Disease Control and Prevention; cPRA, calculated panel reactive antibody; IS, immunosuppression; PLA2R, phospholipase A2 receptor; RPGN, rapid progressive GN.

For a large proportion of new patient referrals, we schedule a telehealth visit within 3 days of consult request to assess the nature and urgency of patient presentation and preorder laboratory and imaging tests if indicated; with this, eliminate unnecessary returns to the clinic for follow-up testing or secondary referrals.

Patients with known CKD and established relationships with a nephrologist are evaluated through video or phone check-ins instead of in-person visits if their condition is stable. A higher frequency of interval check-ins combined with home BP and weight diaries are leveraged to compensate for less frequent office evaluations. Further, population-based systematic screening for “high-risk” patients through an electronic CKD and kidney transplant dashboard provides clinical teams the opportunity to set frequency and timing of in-person visits according to patients’ ESKD risk (12). In August, >4500 such visits were conducted, 90% of which were through telehealth.

Laboratory Evaluations

Serum chemistries, complete blood count, and urine analysis are the cornerstone of routine nephrology care. Several clinical guidelines by the Kidney Disease Improving Global Outcomes provide recommendations about the type and frequency of laboratory evaluations in AKI, CKD, and other associated medical conditions (13,14). The individual

application of these guidelines according to a given patient’s needs is now more critical than ever. A reassessment of laboratory orders and adjustment of their frequency may not make much of a difference to an individual patient who otherwise is stable and well cared for. However, on a population level, a decrease in routine laboratory evaluation (for example, from quarterly to every 4 months) can translate to a tremendous reduction of COVID-19 transmission risk.

Anemia Management

Strategies to decrease nosocomial transmission risks of COVID-19 include support for home erythropoiesis-stimulating agent injection and when not possible, a decrease in injection frequency (*e.g.*, from every 4 weeks to every 6 or 8 weeks), which is compensated for by higher injection doses. Where allowable, oral iron supplementation replaced infusions, as did iron formulations, which can be infused at a higher dose and lower frequency.

Mail-Order Pharmacy

Similar to the Kaiser Permanente Pharmacy service, many commercial pharmacies provide the option of online orders of prescription medication. Leveraging the mail-order pharmacy options, nearly all prescription medications are now

being provided through mail-order pharmacy, substantially decreasing in-person contacts.

Option Counseling and Education of Patients with CKD

Patients with advanced CKD who need to initiate RRT are a particularly vulnerable subpopulation that may not readily be cared for through telehealth. These patients are offered online group seminars for general education. However, they are also scheduled for 1:1 option counseling and advanced CKD teaching to enforce emotional support, maintain a healthy relationship with the care team, and ensure a detailed understanding of options and next steps.

Dialysis Access

The Centers for Medicare and Medicaid Services has classified dialysis access placement as an essential procedure (15). We have created a consensus approach to triaging dialysis access care (Table 2). Considering preexisting controversy and lack of strong evidence, we have significantly reduced or eliminated elective access surveillance solely for primary prevention.

Pretransplant Evaluation and Preparation

We almost wholly stopped pretransplant testing during the peak of the pandemic. However, shortly after, we decided to prioritize testing for patients with accepted living donors and patients awaiting deceased donor offers with a high likelihood of receiving an offer: high degree of HLA sensitization and long wait times. Our affiliated transplant surgical centers also maximized telemedicine for evaluation and education.

In-Center ESKD Care

We found that virtual physician visits cannot readily replace in-person rounding on the inpatient dialysis units. The nephrologist is a central anchor in the dialysis unit, and patients and staff value his or her physical presence. Therefore, we reserved telehealth visits for monthly rounds on otherwise stable patients on home modalities, including peritoneal dialysis and home hemodialysis. In coordination with outside dialysis vendors, we have adopted a triage and placement strategy, similar to other regions across the United States, that is cohorting patients with confirmed or suspected COVID-19 infection into dedicated dialysis facilities.

Inpatient Acute Service Care

We are now expecting the resumption of services at the level and routine of the prepandemic time. For this phase, we have not implemented uniform protocols for acute inpatient services across all medical centers given the number of COVID-19–positive patients, and rates of hospitalization for not COVID-19–related indications highly vary among centers currently. Contingency plans remain in place for the potential of a “third wave” toward the end of the year, which is feared to be more calamitous due to concurrent regional wildfires and a flu pandemic resulting from record low flu vaccination rates.

We anticipate that many of these guides will require modifications as we adapt to an evolving pandemic and gain experience along the way. Although we expect that with the resolution of the pandemic, our approach to the care of patients with kidney disorders will be restored to their prepandemic standards, we also believe that certain elements may remain and influence our practice for beyond the era of COVID-19. Nephrology is a data-driven specialty,

Table 2. Dialysis access care plan

Procedure	Recommendation
AVF/AVG for CKD 4	Multidisciplinary patient review Postpone if patient is stable and deemed low risk for AVF maturation failure
AVF/AVG for CKD 5 and ESKD	Proceed
Ulceration/erosion/bleeding of vascular access	Proceed
Thrombectomy of access (not salvageable by IR)	Proceed
Complications of current AV access (steal, malfunction, <i>etc.</i>)	Proceed
Removal of tunneled HD catheter—no longer needed	Proceed
Thrombosis of AVF/AVG	Proceed
Placement of tunneled HD catheter for immediate dialysis	Proceed
Routine or follow-up fistulogram	Multidisciplinary patient review Postpone if purely elective
Malfunction/infected HD catheter	Proceed
Suboptimal AVF/AVG	Proceed
PD catheter embedded procedure	Postpone
PD catheter emergent <48 h	Proceed
PD catheter urgent <2 wk	Proceed
PD catheter elective <4–6 wk	Multidisciplinary patient review Proceed versus postpone on the basis of individual patient and local resources
Revision of PD catheter to ensure patient safety and ability to continue PD	Proceed

Adaptations and modifications must be considered on the basis of individual patients' needs and local variations in the fallout of the pandemic (opinion based). AVF, arteriovenous fistula; AVG, arteriovenous graft; IR, interventional radiology; AV, arteriovenous; HD, hemodialysis; PD, peritoneal dialysis.

heavily relying on laboratory studies for the diagnosis and follow-up of kidney disorders. Leveraging telehealth strategies to evaluate and provide counseling to patients who do not require physical examinations is one example of a new practice pattern that is likely to remain if regulatory requirements and financial incentives do not change back to prepandemic time.

Disclosures

All authors have nothing to disclose.

Funding

A. Poyan Mehr is receiving funding from the American Society of Nephrology Foundation for Kidney Research and Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute grant R01 HL151996-01.

Acknowledgments

This consensus strategy has been developed through dedicated work by The Permanente Medical Group nephrologists, nurses, and support staff across KPNC.

Author Contributions

S. Belani and L. Pravoverov conceptualized and led the regional implementation of the work; N. Goes was responsible for the transplant methodology; A. Poyan Mehr was responsible for the glomerular disease methodology; A. Asovskaya and P. Kroupa were responsible for data curation; A. Asovskaya, S. Belani, N. Goes, P. Kroupa, A. Poyan Mehr, and L. Pravoverov were responsible for project administration; S. Belani and L. Pravoverov provided supervision; A. Poyan Mehr wrote the original draft; and A. Asovskaya, S. Belani, N. Goes, P. Kroupa, A. Poyan Mehr, L. Pravoverov, and S. Zheng reviewed and edited the manuscript.

References

- Guan WJ, Ni ZY, Hu Y, Liang WH, Ou CQ, He JX, Liu L, Shan H, Lei CL, Hui DSC, Du B, Li LJ, Zeng G, Yuen KY, Chen RC, Tang CL, Wang T, Chen PY, Xiang J, Li SY, Wang JL, Liang ZJ, Peng YX, Wei L, Liu Y, Hu YH, Peng P, Wang JM, Liu JY, Chen Z, Li G, Zheng ZJ, Qiu SQ, Luo J, Ye CJ, Zhu SY, Zhong NS; China Medical Treatment Expert Group for Covid-19: Clinical characteristics of coronavirus disease 2019 in China. *N Engl J Med* 382: 1708–1720, 2020. Available at: <https://doi.org/10.1056/NEJMoa2002032>
- Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, Wang B, Xiang H, Cheng Z, Xiong Y, Zhao Y, Li Y, Wang X, Peng Z: Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA* 323: 1061–1069, 2020. Available at: <https://doi.org/10.1001/jama.2020.1585>
- Tonelli M, Wiebe N, Manns BJ, Klarenbach SW, James MT, Ravani P, Pannu N, Himmelfarb J, Hemmelgarn BR: Comparison of the complexity of patients seen by different medical subspecialists in a universal health care system. *JAMA Netw Open* 1: e184852, 2018. Available at: <https://doi.org/10.1001/jamanetworkopen.2018.4852>
- Henry BM, Lippi G: Chronic kidney disease is associated with severe coronavirus disease 2019 (COVID-19) infection. *Int Urol Nephrol* 52: 1193–1194, 2020. Available at: <https://doi.org/10.1007/s11255-020-02451-9>
- Ng JJ, Luo Y, Phua K, Choong AMTL: Acute kidney injury in hospitalized patients with coronavirus disease 2019 (COVID-19): A meta-analysis. *J Infect* 81: 647–679, 2020. Available at: <https://doi.org/10.1016/j.jinf.2020.05.009>
- Cheng Y, Luo R, Wang K, Zhang M, Wang Z, Dong L, Li J, Yao Y, Ge S, Xu G: Kidney disease is associated with in-hospital death of patients with COVID-19. *Kidney Int* 97: 829–838, 2020. Available at: <https://doi.org/10.1016/j.kint.2020.03.005>
- Hirsch JS, Ng JH, Ross DW, Sharma P, Shah HH, Barnett RL, Hazzan AD, Fishbane S, Jhaveri KD; Northwell COVID-19 Research Consortium: Acute kidney injury in patients hospitalized with COVID-19. *Kidney Int* 98: 209–218, 2020. Available at: <https://doi.org/10.1016/j.kint.2020.05.006>
- Naicker S, Yang CW, Hwang SJ, Liu BC, Chen JH, Jha V: The novel coronavirus 2019 epidemic and kidneys. *Kidney Int* 97: 824–828, 2020. Available at: <https://doi.org/10.1016/j.kint.2020.03.001>
- Abelson R, Fink S, Kulish N, Thomas K: An overlooked, possibly fatal coronavirus crisis: A dire need for kidney dialysis. *New York Times*, April 18, 2020. Available at: <https://www.nytimes.com/2020/04/18/health/kidney-dialysis-coronavirus.html>. Accessed September 10, 2020
- Kliger AS, Silberzweig J: Mitigating risk of COVID-19 in dialysis facilities. *Clin J Am Soc Nephrol* 15: 707–709, 2020. Available at: <https://doi.org/10.2215/CJN.03340320>
- Burgner A, Iklizler TA, Dwyer JP: COVID-19 and the inpatient dialysis unit: Managing resources during contingency planning pre-crisis. *Clin J Am Soc Nephrol* 15: 720–722, 2020. Available at: <https://doi.org/10.2215/CJN.03750320>
- Tangri N, Stevens LA, Griffith J, Tighiouart H, Djurdjev O, Naimark D, Levin A, Levey AS: A predictive model for progression of chronic kidney disease to kidney failure. *JAMA* 305: 1553–1559, 2011. Available at: <https://doi.org/10.1001/jama.2011.451>
- Kidney Disease: Improving Global Outcomes (KDIGO): KDIGO 2012 clinical practice guideline for the evaluation and management of chronic kidney disease. Available at: https://kdigo.org/wp-content/uploads/2017/02/KDIGO_2012_CKD_GL.pdf. Accessed August 1, 2020
- Kidney Disease: Improving Global Outcomes (KDIGO): KDIGO clinical practice guideline for acute kidney injury. Available at: <https://kdigo.org/wp-content/uploads/2016/10/KDIGO-2012-AKI-Guideline-English.pdf>. Accessed August 1, 2020
- Centers for Medicare and Medicaid Services (CMS): Centers for Medicare and Medicaid Services (CMS) guidance on dialysis access procedures, 2020. Available at: https://www.kidneynews.org/sites/default/files/Critical_CMS_announcement_3-20.pdf. Accessed September 10, 2020

Received: September 14, 2020 Accepted: September 16, 2020