

Home Dialysis in the Time of COVID-19: Reflections on Rapidly Changing Policies



Mala Sachdeva, Kenar D. Jhaveri, and Steven Fishbane

On March 1, 2020, New York City had its first case of coronavirus disease 2019 (COVID-19) as a result of infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).¹ New York City and its surrounding areas of Long Island and Westchester became the epicenters for this rapidly spreading viral infection. Risk factors for severe illness with COVID-19 were soon found to include advanced age, diabetes mellitus, hypertension, chronic kidney disease, heart disease, obesity, and malignancy.^{2,3} Due to their underlying comorbid conditions, as well as immunosuppressed status, patients with end-stage kidney disease (ESKD) were a vulnerable population with potentially increased susceptibility for this virus.⁴ Reports of hospitalized maintenance hemodialysis (HD) patients having poor outcomes and high mortality emerged across the United States, China, and Europe.⁵⁻⁸

Outpatient in-center HD and home dialysis centers, both peritoneal dialysis (PD) and home HD units, immediately began to take appropriate infection control measures to decrease exposure and community spread of COVID-19. International and national societies recommended best practices in taking care of patients with ESKD during the COVID-19 pandemic.⁹⁻¹¹ The American Society of Nephrology in conjunction with the Centers for Disease Control and Prevention established a COVID-19 Response Team that informed in-center dialysis units of best practices as this pandemic took its course.^{12,13}

We discuss many of the policies and procedures that were implemented in our outpatient home HD and PD units to deal with the emerging COVID-19 pandemic. Our goals included the following: decrease community risk to our patients and staff, allow patients to stay at home as much as possible by managing them remotely, stay abreast of the new and changing statistics in the region so that care can be tailored accordingly, and continue to provide quality and safe care to our patients.

Revised Policies and Procedures

In-Center Visits

In an effort to flatten the curve, New York was issued “stay at home” orders and residents were advised to practice “social distancing.” In contrast to patients receiving HD who dialyze in-center 3 times a week, patients receiving home HD and PD dialyze at home. This itself makes it easier to self-isolate; however, these patients often need to make visits to the outpatient center for blood draws, administration of medications such as intravenous iron or erythropoiesis-stimulating agents (ESAs), procedures such

as transfer set changes, and their monthly in-person visit with the physician.

We immediately cut down the visits for patients to a maximum of 1 visit per month. During this monthly visit, they had a quick visit with the registered nurse (RN) and had their monthly laboratory test specimens drawn. Some patients receiving PD chose to get their laboratory specimens drawn at a nearby community laboratory, which was allowable. They were advised to call the laboratory ahead of time to schedule the laboratory draw, to try to be the first patient on the schedule to avoid exposure, and to wear a face mask for their protection. For patients receiving PD who were clinically stable, at their physician’s discretion they were exempt from their monthly laboratory draw. One elderly immunocompromised patient who had difficulty coming to the center was allowed to wait until the following month for his monthly laboratory specimen to be drawn. This patient had stable hemoglobin levels over time and had been receiving a steady ESA dose, which he was already self-administering. No subsequent adverse consequences were noted as a result of skipping the monthly laboratory draw. Careful consideration must be taken when deciding to continue medications without monthly laboratory tests. Both the patient’s clinical and laboratory history and trends should be taken into account when deciding to skip a laboratory draw for a respective month. In addition, safely administering medication without recent laboratory work may not be possible. Patients receiving home HD continued to send in their monthly laboratory specimens from home directly to their laboratory.

Patients who were previously receiving ESA injections at the center were taught to self-inject in an effort to continue this medication at home and limit their clinic visits. The decision of whether to teach self-injections was based on the patient’s ability and adherence history. There was no hemoglobin threshold that influenced this decision. Appropriate numbers of vials and syringes were provided to the patient. Still, some had to come to the dialysis unit because they could not self-inject or due to their need for intravenous iron. In those who were receiving multiple subcutaneous ESA injections and who could not self-inject, their ESA dosing was changed to the best possible equivalent monthly dosing so that the number of visits to the clinic were reduced. Home intravenous iron infusions were avoided due to safety concerns. However, if iron infusions could be skipped for a particular month they were because these infusions were not considered emergent. We recommend teaching select patients to self-inject before a pandemic is expected. Although it is unclear as to

what the best practice is if a patient has COVID-19, withholding the ESA dose and/or the intravenous iron dose may be of benefit.

Scheduled in-center PD visits were purposely spaced to allot ample time for patients to maintain distance from other patients and allow time for appropriate disinfection of the rooms. We were unable to provide separate entrances and exits for HD and PD patients; however, PD patients were not scheduled at the times when HD shifts were expected to change, thus allowing more social distancing and less overlap of patients in the waiting room. Waiting rooms were set up to maintain social distancing and were monitored by staff to make sure this was followed. For the most part, visitors were not allowed to accompany patients to their appointments. Immunosuppressed or elderly were prioritized as the first appointments of the day to decrease their exposure risk. All staff and patients who entered the dialysis center had temperature screening and were again screened for symptoms by a designated staff member on arrival. For their visit, PD patients were seen 1 at a time and there was 1 RN assigned to 1 patient to minimize exposure risk. Contact with PD effluent was minimized. However, if handled, the RN used full universal precautions and all personal protective equipment (PPE), consistent with previous practice.

Telehealth

In March 2020, the Centers for Medicare & Medicaid Services encouraged telehealth visits between patients with ESKD and providers. Since March 1, all our patients were offered the option of doing telehealth visits, which served to replace the in-person encounter with the physician. Patients initially were consented over the telephone; however, written consents were later obtained when the patient came for their visit. Written and verbal instructions were provided to all patients on how to use the telehealth platform. Telehealth visits were well received by physicians, staff, and patients. All but 5 of 47 patients agreed to use telehealth. Barriers included either patient preference (3 patients) or patient inability to accommodate telehealth visits because they had flip telephones that did not have the ability to download the application required for the visit and did not have a camera for the virtual visit (2 patients).

Patients were instructed to check their vital signs and weight before the televisit. During the visit, limited yet useful visual examinations were performed, monitoring the patient's general appearance and respiratory rate and effort and observing for edema. Access was visualized virtually: for the PD patient, we visualized the exit site, and for the home HD patient, we visualized the vascular access. Thorough review of systems was performed, looking for any symptoms of peritonitis or exit-site infections. Patients were screened for any viral signs, symptoms, or possible exposure to SARS-CoV-2. For PD patients, flowsheets were brought by the patient at their RN appointment and then subsequently uploaded by patients onto the telehealth

platform. These were all reviewed at the telehealth visit. For the home HD patient, flowsheets were faxed or emailed to the RN on a daily basis, as was usually done. The RN, physician, dietician, and/or social worker were present at the monthly telehealth visit from their respective work spaces, making these visits multidisciplinary. Monthly laboratory results were reviewed during this visit and prescriptions were sent electronically to the patient's pharmacy. Pharmacies that provided home delivery were preferred by the patient and physician. Average visits lasted 20 to 30 minutes per patient.

Telehealth visits were also used to perform 30-day, 90-day, or yearly interdisciplinary care plan meetings. In addition, for patients with suspected symptoms or with other acute issues, telehealth visits were performed to further assess and triage these active issues. We were able to triage a patient with peritonitis through telehealth, which necessitated an immediate in-person visit shortly thereafter to obtain an effluent cell count and culture.

Education and Triage

All RNs and staff were educated on COVID-19 and its symptoms. Patients received continued education on how to recognize and report symptoms of COVID-19. Patients were contacted within 24 hours of a scheduled visit to screen for any symptoms of acute viral illness. In addition, they were questioned on possible exposure, sick contacts, or recent travel to a high-risk area. If illness was suspected in any patient, they were encouraged to get tested for COVID-19 and/or quarantine themselves accordingly. Symptomatic patients were followed up daily with telephone calls by the RN.

Through telephone triage, we were able to identify 4 patients with possible COVID-19 symptoms. Of these, 2 were tested at an urgent care and were positive for COVID-19, one tested negative and likely had another viral illness, and one was not tested at the discretion of her nephrologist. However, subsequent antibody testing later turned up positive, confirming our suspicion and rightful suggestion to quarantine at triage. Similarly, telephone call triage identified 1 patient who returned from foreign travel from an endemic area. We successfully quarantined anyone coming from foreign travel for at least a 14-day period.

There was a designated COVID-19–positive cohort in-center unit in the vicinity where COVID-19–positive home patients could go; however, we managed not to use the services of this additional outpatient unit. Patients were allowed back to the center if they had 2 negative nasopharyngeal swab tests performed after resolution of fever, without being on antipyretic treatment and if they showed improvement in their respiratory symptoms. Due to initial difficulty obtaining 2 swabs, we used a time-based approach in which patients were allowed to return to the clinic if they were afebrile for 72 hours without the use of antipyretics such as acetaminophen, their respiratory symptoms such as cough or shortness of breath had

improved, and it had been 14 days since the first symptom appeared. The medical director and nurse manager decided on the appropriate return of these patients to the center.

Similarly, staff were to report any developing acute symptoms. Staff who were not feeling well were advised to stay home until symptoms resolved or they were tested. They were discouraged from foreign travel.

Procedures

Only essential procedures were performed during patient visits. Nonessential procedures such as transfer set changes were postponed unless urgent. To minimize patient time in the center, peritoneal equilibration testing was postponed because this requires the patient to be in the PD unit for more than 4 hours.

New Trainings

New PD trainings were suspended in March 2020 for a brief period during the height of the pandemic to decrease prolonged patient-RN contact. However, due to the accumulating demand for training, it was restarted within 4 weeks. One patient was in training at the time of the pandemic and this training was continued. New home HD trainings were postponed due to prolonged contact time and number of days of training required. No new training was performed virtually. We suspended any acceptance of foreign admissions for a brief period.

Home Visits

Physical home visits were avoided. New patient home visits and postperitonitis home visits were successfully performed through telehealth.

Staff

No shortages in staff were noted. RNs were rotated so that if they had no patient visits scheduled they were able to work from home.

Staff Meetings

Monthly quality meetings were done with telehealth services over a webinar platform called WebEx and/or telephone. Likewise, weekly core team meetings were performed in the same way.

Personal Protective Equipment

Appropriate use of PPE was taught to staff. All staff wore surgical masks and/or N95 masks, face shields, hair caps, disposable gowns, and gloves when encountering a patient. All patients were provided surgical masks. Patients were not allowed to bring an additional person to the center with them unless absolutely necessary. Neither patients nor staff had a shortage of surgical masks.

Delivery of PD Supplies

In early April, home dialysis supply companies in New York left home supplies outside patients' homes. This was

soon changed to allow select patients who were not COVID-19 positive and who needed assistance carrying supplies into their home to be assisted by the delivery service as long as social distancing was upheld. For the most part, the timely delivery of PD or home HD supplies seemed uninterrupted.

Surgical Procedures

Elective nonurgent surgeries were cancelled during the pandemic. At our institution, PD catheter placements were not considered elective procedures because they were necessary to initiate PD. We found that many patients who were scheduled for this procedure cancelled it themselves due to personal fear, and that at times the surgeon involved in catheter placement was deployed to work in the hospital and hence was not immediately available. As a consequence of these postponements, we later noted a surge of patients who needed to be trained for PD and home HD when the pandemic reached low numbers. New arteriovenous fistula or graft creations were postponed during the pandemic. HD catheter placements were allowed if emergent. Other access procedures such as declotting were done on a case-by-case basis.

Our Experience

Collectively from March to June 2020, of our 47 patients receiving long-term PD, 5 developed COVID-19 illness. Four were symptomatic, 2 of whom were hospitalized, and 1 was asymptomatic. None of the 6 patients in our home HD program contracted the virus or had symptoms of COVID-19. We were able to screen all 4 symptomatic PD patients appropriately with the described measures of triage using telephone and telehealth capabilities. One PD patient was asymptomatic; however, antibody testing later was positive. A total of 89% of our PD patients agreed to remote telehealth visits and all our home HD patients agreed.

After about 3 to 4 months, when the pandemic reached low numbers, telehealth visits were switched back to in-person visits with appropriate use of PPE by staff and patients. Patients, RNs, and physicians welcomed the face-to-face visit, and there was no hesitancy in the switch. No one expressed preference of one visit type over the other, however, should the pandemic numbers increase again, staff and patients are prepared to switch back to telehealth visits. The virtual visit seemed to be a good substitute of the in-person visit in the setting of necessity, however, most of our physicians, RNs, and patients prefer the face-to-face encounter.

We have learned that during a pandemic, outpatient home dialysis centers must be quick to adopt new policies and procedures and must be ready to change on a daily basis as the course of the pandemic changes. With our home dialysis units in the epicenter of the pandemic, we were able to successfully manage our patients remotely as much as possible with a low number of incident COVID-19 cases. To date, no staff member has become ill, due

Box 1. Changes Implemented in the Home Dialysis Program

Pre-COVID-19	Changes Implemented During the Pandemic
Multiple in-center visits	Decrease number of in-center visits with a goal of 1 visit/mo
In-person monthly face-to-face encounter with physician	Use telehealth to replace the in-person physician encounter
ESA injections	Select patients taught to self-inject; others who had multiple injections were changed to equivalent monthly dosing
Intravenous iron administration	Continued or withheld depending on necessity
Monthly laboratory draw	Potential to skip if history and laboratory trends had been stable
Timing of dialysis unit visit scheduled according to patient convenience	Patient visits were spaced; visits were scheduled around HD shift changes to avoid crowding in the waiting room; elderly and immunocompromised patients were given earlier appointments; all patients received temperature and symptom screening on arrival; all staff and patients wore appropriate PPE
PPE used depending on situation	PPE mandatory for staff and patients
Transfer set changes	Postponed unless urgent
PET testing	Postponed to avoid contact with dialysate and time patient spent in the dialysis unit
In-person visits	Telehealth used for: <ul style="list-style-type: none"> - Monthly face-to-face physician encounter - Triage for acute issues - Interdisciplinary team meetings - Screening for symptoms via telephone triage
Home visits for new patients	Home visits were converted to virtual visits
In-person staff meetings	Monthly quality meetings and weekly core team meetings changed to virtual
All staff present at the dialysis unit	Those with no patient responsibilities were allowed to work from home
Monthly patient education	Educate patients on signs, symptoms, reporting of the illness, and good hygiene during telephone calls to patient and in-person visit with RN

Abbreviations: COVID-19, coronavirus disease 2019; ESA, erythropoiesis-stimulating agent; HD, hemodialysis; PET, peritoneal equilibration testing; PPE, personal protective equipment; RN, registered nurse.

to PPE use, education, and the policies that were implemented. We recommend having full discussions and plans in place before a pandemic hits an area and discussing potential changes ahead of time with patients and staff, especially the potential need for telehealth and the specifics required, including obtaining consents and downloading the applications needed for the visit. [Box 1](#) summarizes the changes made in the home dialysis unit at the time of the pandemic.

This pandemic has affected the ESKD population, with high mortality rates being reported among patients receiving HD. Although data for hospitalized patients receiving HD are emerging, 1 large study reported that of 419 hospitalized patients with ESKD, 11 (2.6%) receiving long-term PD were hospitalized.^{8,14,15} Our hospitalization rate for our COVID-19–infected patients was 4.3% in PD patients (2 of 47) and zero in home HD patients, while our outpatient in-center HD units had hospitalization rates of 5% (4 of 80, with no deaths), 11% (17 of 156 patients, with 6 deaths), and 15% (27 of 178 patients, with 7 deaths). This smaller number of inpatient PD and home HD hospitalizations, together with our low number of outpatients receiving PD and home HD who tested positive for COVID-19, perhaps points to the protective effect of home therapies.^{8,14} Although more needs to be studied

comparing PD with HD in the outpatient setting, we believe that patients receiving PD or home HD are at an advantage in this pandemic or any other due to their ability to dialyze at home, among other reasons. We also noted an increase in the interest in home therapies in both patients with chronic kidney disease and those with ESKD receiving HD as a consequence of the pandemic, which needs to be examined further.

During the COVID-19 pandemic, there was an effort made to treat patients at home. Safety was established from several sites in the United States, suggesting that home dialysis might be advantageous during a pandemic.¹⁶ In addition, shortages in supplies, staffing, and available equipment for HD and a continuous form of renal replacement therapy among critically ill patients with COVID-19, particularly in the New York City area, have demanded implementation of alternative strategies such as acute PD treatment for acute kidney injury.¹⁷ Given the interest in acute PD and the increased safety of long-term PD and home HD, the nephrology community has an opportunity to further embrace home modalities. We urge all training programs and community nephrologists to examine this in their practice and to promote and increase the transition to home modalities for our patients.

ARTICLE INFORMATION

Authors' Full Names and Academic Degrees: Mala Sachdeva, MD, Kenar D. Jhaveri, MD, and Steven Fishbane, MD.

Authors' Affiliation: Division of Kidney Diseases and Hypertension, Department of Medicine, Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, Great Neck, NY.

Address for Correspondence: Mala Sachdeva, MD, Division of Kidney Diseases and Hypertension, Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, Northwell Health, 100 Community Dr, Great Neck, NY 11021. E-mail: msachdeva@northwell.edu

Support: None.

Financial Disclosure: Dr Jhaveri is a consultant for Astex Pharmaceuticals and Natera and receives fees from Uptodate.com unrelated to this work.

Acknowledgements: We acknowledge and thank our nursing staff, which includes Myung Cho, Virginia Crosby, Jennifer Koczko, Denise McDermott, Joanne Muccio, Jennie Wilson, and all other teammates for their hard work and commitment to our home dialysis programs.

Peer Review: Received July 13, 2020. Evaluated by 2 external peer reviewers, with direct editorial input by the Editor-in-Chief. Accepted in revised form September 7, 2020.

Publication Information: © 2020 The Authors. Published by Elsevier Inc. on behalf of the National Kidney Foundation, Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>). Published online November 24, 2020 with doi [10.1016/j.xkme.2020.09.008](https://doi.org/10.1016/j.xkme.2020.09.008)

REFERENCES

- Goldstein J, McKinley J. Coronavirus in NY: Manhattan woman is first confirmed case in state. *The New York Times*. March 2, 2020. Accessed June 25, 2020, <https://www.nytimes.com/2020/03/01/nyregion/new-york-coronavirus-confirmed.html>.
- Guan W-J, Ni Z-Y, Hu Y, et al. China Medical Treatment Expert Group for Covid-19. Clinical characteristics of coronavirus disease 2019 in China. *N Engl J Med*. 2020;382:1708-1720.
- Richardson S, Hirsch JS, Narasimhan M, et al. Presenting characteristics, comorbidities, and outcomes among 5700 patients hospitalized with COVID-19 in the New York City Area. *JAMA*. 2020;323(20):2052-2059.
- Kato S, Chmielewski M, Honda H, et al. Aspects of immune dysfunction in end-stage renal disease. *Clin J Am Soc Nephrol*. 2008;3:1526-1533.
- Fisher M, Yunes M, Mokrzycki MH, Golestaneh L, Alahiri E, Coco M. Chronic hemodialysis patients hospitalized with COVID-19 - short-term outcomes in Bronx, New York. *Kidney360*. 2020;1:755-762.
- Alberici F, Delbarba E, Manenti C, et al. A report from the Brescia Renal COVID Task Force on the clinical characteristics and short-term outcome of hemodialysis patients with SARS-CoV-2 infection. *Kidney Int*. 2020;98(1):20-26.
- Li J, Xu G. Lessons from the experience in Wuhan to reduce risk of COVID-19 infection in patients undergoing long-term hemodialysis. *Clin J Am Soc Nephrol*. 2020;15(5):717-719.
- Valeri AM, Robbins-Juarez SY, Stevens JS, et al. Presentation and outcomes of patients with ESKD and COVID-19. *J Am Soc Nephrol*. 2020;31:1409-1415.
- International Society for Peritoneal Dialysis (ISPD). Strategies regarding COVID-19 in PD patients. Accessed June 28, 2020, <https://ispd.org/strategies-covid19/>.
- The American Society of Nephrology. Resources and recommendations. Accessed June 25, 2020, https://www.asn-online.org/covid-19/ASN#ASN_Recommendations.
- National Kidney Foundation. Dialysis and COVID-19. Accessed June 28, 2020, <https://www.kidney.org/professionals/clinical-digest>.
- Centers for Disease Control and Prevention. Special considerations for patients on home dialysis. Accessed June 23, 2020, <https://www.cdc.gov/coronavirus/2019-ncov/hcp/dialysis/home-dialysis.html>.
- Kliger AS, Silberzweig J. Mitigating risk of COVID-19 in dialysis facilities. *Clin J Am Soc Nephrol*. 2020;15(5):707-709.
- Sachdeva M, Uppal NN, Hirsch JS, Malieckal D, Fishbane S, Jhaveri KD. COVID-19 in hospitalized patients on chronic peritoneal dialysis: a case series. *Am J Nephrol*. 2020;51(8):669-674.
- Ng JH, Hirsch JS, Wanchoo R, et al. Outcomes of patients with end stage kidney disease hospitalized with COVID-19. *Kidney Int*. 2020;98:1530-1539.
- El Shamy O, Sharma S, Winston J, Uribarri J. Peritoneal dialysis during the coronavirus disease-2019 pandemic: acute inpatient and maintenance outpatient experiences. *Kidney Med*. 2020;2(4):377-380.
- Srivatana V, Aggarwal V, Finkelstein F, Naljayam M, Crabtree JH, Perl J. Peritoneal dialysis for acute kidney injury treatment in the United States: brought to you by the COVID-19 pandemic. *Kidney360*. 2020;1(5):410-415.