Challenges in Setting Up Point-of-Care Hemodialysis in a COVID-19 Care Facility: Lessons From a Limited-Resource Setting

To the Editor: Dialysis care is among the many health care activities to be severely affected by coronavirus disease 2019 (COVID-19). Further, health care facilities in limited-resource settings are challenged with unique problems warranting distinct strategies to combat this crisis.1 Our administrator was summoned to set up a state-of-the-art facility for managing infected patients in a jiffy. A newly constructed block that otherwise housed 3 departments was vacated to make way for a 250-bed COVID-care facility in March. Considering the renal complications of COVID-19 and susceptibility of the end-stage renal disease population to COVID-19, a decision to provide point-of-care hemodialysis (HD) in the COVID-care facility was taken, both intermittent and sustained low-efficiency dialysis for stable and critically ill patients, respectively. As there was no time for setting up a water treatment plant, we used the feed water pipes of the water sinks to connect to the inlet pipe of a locally made portable reverse-osmosis device having sand, carbon, micron cartridge filter, and ultraviolet light in addition to reverse-osmosis module. With this, we could initiate dialytic therapy in a couple of hours. Securing the water inlet source was not the end of the problem, as we encountered unexpected hurdles hampering optimal dialysis delivery in this makeshift facility.

Technical Issues and Troubleshooting

- A 45-year-old patient with end-stage renal disease on maintenance dialysis presented with fluid overload and was found to be COVID-19 positive. The patient was initiated on dialysis with an ultrafiltration target of 2 liters. After 15 minutes of dialysis, there were repeated water alarms due to low water supply, causing an interrupted dialysis session. The overhead water tank did not have a dedicated supply to the dialysis water port; it typically supplies multiple areas with interconnections, resulting in a decline in water pressure and disrupting the dialysate flow. The machine was in the bypass mode during the times of low water supply. To tackle the low pressures, we added 2 booster pumps, one on the feed water line and the second to the portable reverse-osmosis device. The on-off cycle (of the booster pumps) provided the requisite pressures leading to uninterrupted water flow.

- A 23-year-old woman with rheumatic heart disease was admitted with severe COVID-19 complicated by acute kidney injury. She was commenced on sustained low-efficiency dialysis for fluid overload. Soon after, the machine began alarming due to high dialysate temperature. The COVID-care facility of the hospital consisted of an environment-friendly solar heating panel. Without ensuring the functionality of the water mixtures attached, the solar panel was inadvertently switched on. In the background of Indian summer and nonfunctioning mixtures, the water lines, including the dialysis water port, were supplied with overheated water, resulting in dialysate temperature of 40°C. Although the patient did not manifest any consequence of overheated dialysate, as dialysis stopped, the interrupted session led to inadequate dialysis. The heating panel was disconnected from the main water line to ensure cold water for dialysis. Awareness and prompt response to issues pertaining to temperature of feed water is crucial.

Human Resource Issues and Troubleshooting

- The technical officers primarily operate the HD unit; however, with the pandemic unfolding, the workforce was quickly overwhelmed owing to simultaneous posting of 2 teams, 1 for dialysis in the main unit and 1 in the COVID-care unit. We employ high-school pass outs (“laboratory attendants”) to assist the technical officers in the HD unit. They are provided short-term yet intensive informal training. During the COVID-19 crisis, the department allowed the laboratory attendants to manage the COVID-care dialysis unit along with a nephrology fellow. They were tele-supervised, and they successfully delivered dialysis along with troubleshooting in the COVID-care facility. The efficient delivery of dialysis services was a testimonial to their skill.

- One of our dialysis technicians with no prior psychiatric illness who was posted in COVID-care HD complained of fear and anxiety during duty at the wee hours of the day. Posting of our dialysis staff in
COVID-care facility set off apprehension and fear owing to an estranged environment and unfamiliar precautions. We deduced and shifted to the “buddy system”; 1 nephrology fellow and 1 dialysis technician were teamed up to cover COVID-care duties together. On 2 occasions, 1 of the buddies had pre-syncpe and was immediately resituated by the other. This boosted their morale and helped them troubleshoot quickly.

To conclude, we highlight the challenges and their solutions while delivering point-of-care HD amidst the COVID-19 pandemic in a limited-resource setting. Despite limitations, prompt troubleshooting by a motivated team could provide the requisite dialytic facilities. In fact, these measures can be replicated in any far-flung area to provide urgent point-of-care hemodialysis, at times other than the COVID-19 pandemic.

1. Bharati J, Ramachandran R, Kumar V, Kohli HS. COVID-19 pandemic in limited-resource countries: strategies for challenges in a dialysis unit. Nephrology (Carlton). 2020;25:803.

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Letter Regarding “Fibrillary Glomerulonephritis Is Associated With HLA-DR7 and HLA-B35 Antigens”

To the Editor: We read with interest the research letter entitled “Fibrillary Glomerulonephritis Is Associated With HLA-DR7 and HLA-B35 Antigens,” by Andeen et al.,¹ published on May 20, 2020. The letter reports the association between fibrillary glomerulonephritis (FGN) and specific human leukocyte antigens (HLAs), namely DR7 and B35, in a cohort of 26 patients from 3 institutions. The cases were composed of transplant recipients with FGN, de novo FGN in an allograft, and a donor with FGN.

We have recently reported on the long-term outcomes of our cohort of kidney transplant recipients with FGN² (n = 14) and have further identified 2 cases of donor-related FGN, totaling 16 cases of FGN with available HLA typing, including DQ data, which is detailed in Table 1. The most common class I and class II antigens in our cohort also included A2 (10/16, 62.5%), DR7 (8/16, 50%), and DQ2 (10/16, 62.5%). In addition, B7 (6/16, 37.5%) was frequently identified. The proportion of B35 was much lower in our cohort, 6.25% (1/16), and DR4 was moderately prevalent at 18.75% (3/16). Compared with the US white population,³ the proportion of each of the A2 (P = 0.41), B7 (P = 0.32), DR7 (P = 0.03), and DQ2 (P = 0.08) alleles was higher in FGN; however, using the χ² test, a significant difference was only identified for DR7. In contrast, the proportion of B35 (P = 0.26) and DR4 (P = 0.36) was lower in FGN, although not statistically significant.

Similar to the previously studied cohort, 87% of subjects in our cohort with the DR7 antigen had DQ2 antigens (7/8) and of the DQ2 subjects, 70% (7/10) had DR7 antigens. Our data provide additional support for the association of DR7 but not B35 with FGN and support the hypothesis for possible underlying genetic cause, which will require further collaborative research studies.

Table 1. HLA typing of kidney transplant recipient with FGN and donor-related FGN

| Patient | HLA-A | HLA-B | HLA-DR | HLA-DQ |
|---------|-------|-------|--------|--------|
| 1       | 1     | 2     | 51     | 65     | 17     | 11     | 2       | 7       |
| 2       | 2     | 2     | 56     | 57     | 12     | 7      | 6       | 9       |
| 3       | 2     | 3     | 35     | 35     | 35     | 7      | 2       | 5       |
| 4       | 1     | 1     | 8      | 8      | 17     | 17     | 2       | 2       |
| 5       | 2     | 11    | 7      | 51     | 4      | 11     | 7       | 8       |
| 6       | 2     | 2     | 57     | 61     | 7      | 8      | 2       | 4       |
| 7       | 2     | 3     | 51     | 60     | 11     | 13     | 6       | 7       |
| 8       | 11    | 11    | 18     | 60     | 4      | 7      | 2       | 8       |
| 9       | 29    | 31    | 27     | 44     | 1      | 7      | 2       | 5       |
| 10      | 2     | 3     | 7      | 44     | 15     | 15     | 6       | 6       |
| 11      | 2     | 29    | 8      | 44     | 17     | 7      | 2       | 2       |
| 12      | 1     | 24    | 7      | 44     | 1      | 7      | 2       | 5       |
| 13      | 1     | 11    | 8      | 38     | 17     | 13     | 2       | 6       |
| 14      | 2     | 3     | 7      | 7      | 4      | 15     | 6       | 8       |
| 15      | 1     | 3     | 7      | 13     | 7      | 15     | 2       | 6       |
| 16      | 2     | 2     | 7      | 49     | 103    | 13     | 5       | 6       |

FGN, fibrillary glomerulonephritis; HLA, human leukocyte antigen

¹Donor-related FGN.