Efficacy and safety of hospital-based group medical quarantine for dialysis patients exposed to coronavirus disease 2019

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To the Editor: The coronavirus disease 2019 (COVID-19) outbreak developed into a pandemic.[1] Patients undergoing hemodialysis (HD) are more susceptible to COVID-19, and isolating patients undergoing HD after exposure are extremely challenging since they frequently travel between their homes and dialysis centers, during which they share a hall for dialysis sessions that may last for hours. We successfully quarantined one infected HD patient and other potentially exposed patients. This experience might serve as an important reference for dialysis centers or for people in similar situations across the country to reduce the spread of COVID-19.

This study was approved by the Medicine Ethics Committee of Peking University People’s Hospital (No. 2020PHB064-01), and written informed consent was waived by the institutional review board. The present study was triggered by a 78-year-old female inpatient with uremia who had been undergoing HD regularly for over 6 months. The patient developed a fever on January 30, 2020, but was not diagnosed with COVID-19 until her daughter and son-in-law were diagnosed on February 17, 2020, after having visited her in the hospital without facemasks. We realized that 143 patients in our dialysis center might have had direct or indirect contact and required medical quarantine. Exposed patients were graded based on whether they were adjacent to the infected individual during a dialysis session. It was recommended that the exposed patients be isolated for at least 14 days based on the virus incubation period as per local regulations.[2,3] Although patients and medical staff had worn masks before the patients’ symptoms appeared, whether anyone was still in the incubation period was uncertain. HD patients are not suitable candidates for self-quarantine at home, as they must frequently commute to dialysis centers for treatment. Hotel-based group quarantine is also not recommended because these patients usually have severe comorbidities, and their health and safety may not be guaranteed in these locations. A hospital-based group medical quarantine (H-GMQ) was
implemented for this exposed patient cohort. H-GMQ
enables early detection and intervention to avoid further
spread of COVID-19, similar to Fangcang shelter hospi-
tals.[4]

An H-GMQ taskforce (TF) was established to quarantine
the dialysis population immediately. Several workgroups
(WGs) were organized under the leadership of these TFs.
WG5 created a series of emergency response plans and
flow charts to guide the following procedures: prevention
of COVID-19 cross-infection in quarantine areas during
transportation and in dialysis halls, screening of new
COVID-19 cases, responding to medical emergencies,
handling of psychological problems, provision of nutri-
tional diets for patients undergoing maintenance hemodi-
alys (MHD), etc. The working missions, plans, and flow
charts were updated to fulfill unmet needs over the
quarantine period, and challenges that arose during this
time were managed accordingly.

Each of the 143 dialysis patients was isolated in separate
rooms in a branched area of the hospital. Patients were
required to wear masks during transportation and dialysis
sessions. Medical staff were required to use appropriate
personal protective equipment in accordance with local
requirements.[5]

Nasopharyngeal swab specimens were collected from all
individuals who possibly had contact with the infected
patient. Coronavirus nucleic acid assays were used to test the
samples in the referral laboratory. The patients’ body
temperatures and respiratory symptoms were monitored twice
and once daily, respectively, during the quarantine period. If
a patient had any suspected symptoms, they were retested,
and chest computed tomography (CT) was performed
according to the recommendations of the expert team.

Ward rounds were performed daily. The medical team
members would offer assistance if patients had concerns
or felt unwell. All patients underwent psychological evalua-
tions on the 12th day of medical quarantine. The self-
rating anxiety scale (SAS) and self-rating depression scale
(SDS) were used to evaluate mental health, and we compared these scores with the results from December, 2019.

Continuous variables were expressed as mean ± standard
deviation or median (interquartile range), and categorical
variables were expressed as numbers and percentages.
Differences in continuous variables with normal distribu-
tion were analyzed by t test. P value of < 0.05 was
considered to be statistically significant. All statistical
analyses were performed using SAS 9.4 (SAS Institute Inc.,
Cary, NC, USA).

The median age of HD patients was 61 years, and 65.7%
(94/143) were men [Table 1]. The median dialysis vintage
was 6.5 years, and 62.9% (90/143) had been undergoing
MHD for 5 years or longer. Twelve dialysis patients were
considered heavily exposed as they were adjacent to the
original patient dialysis station; all other patients in the
dialysis center were indirectly exposed. Coronavirus
nucleic acid assays were conducted by reverse-transcrip-
tion polymerase chain reaction (RT-PCR) with nasopha-
ryngeal swabs from quarantined patients; all results were
negative. One patient developed acute congestive heart
failure and one myocardial infarction, but both improved
quickly after receiving appropriate treatment.

The clinical status and laboratory values of the chronic
HD patients were relatively stable. Their dry weights were
slightly below baseline (65.5 ± 12.1 kg vs. 65.7 ± 12.2 kg,
P < 0.01), while their heart rates (78.7 ± 10.7 beats per
minute [bpm] vs. 74.4 ± 10.1 bpm, P < 0.001) and systolic
(155.8 ± 18.4 mmHg vs. 153.7 ± 17.8 mmHg, P = 0.03)
diastolic (77.3 ± 13.6 mmHg vs. 76.0 ± 12.6 mmHg, P = 0.03)
blood pressures were slightly elevated above
baseline, which may have been due to their fear of being
infected. Our data suggest that patients’ anxiety and
depression were not exacerbated during the quarantine
period (SAS score: 41.0 ± 9.0 vs. 41.0 ± 9.0, P = 0.95; SDS
score: 47.1 ± 11.3 vs. 46.7 ± 11.9, P = 0.71). Timely and
effective psychological counseling may ameliorate possible
anxiety and depression. During the 14-day period, all
patients remained on their regular dialysis regimens, and
no new COVID-19 cases emerged.

Although the patient first infected with COVID-19
remained in our dialysis center for 14 days after initial
symptom presentation, no new cases emerged. We
attributed this result to two possible causes: (1) a relatively
comprehensive system for surveillance, prevention, and

| Table 1: Baseline demographics and comorbid conditions of the
dialysis patients exposed to a COVID-19 patient (n = 143). |
|-------------------------------------------------------------|
| **Items** | **Values** |
| Age (years), median (Q1, Q3) | 61 (48, 71) |
| Male, n (%) | 94 (65.7) |
| Dialysis vintage (years), median (Q1, Q3) | 6.5 (2.5, 11.3) |
| Assigned primary causes of ESKD, n (%) | | |
| Chronic glomerulonephritis | 65 (45.5) |
| Diabetic nephropathy | 27 (18.9) |
| Hypertension | 16 (11.2) |
| Others | 35 (24.5) |
| Patients with at least one comorbidity, n (%) | | |
| Coronary artery disease | 25 (17.5) |
| History of angina | 11 (7.7) |
| Chronic heart failure | 13 (9.1) |
| Necoplasm | 12 (8.4) |
| Arrhythmia | 6 (4.2) |
| Stroke | 6 (4.2) |
| Cirrhosis | 2 (1.4) |
| Peptic ulcer | 1 (0.7) |
| Patients with comorbidities, n (%) | | |
| No comorbidity | 96 (67.1) |
| One comorbid disease | 32 (22.4) |
| Two comorbid diseases | 12 (8.4) |
| Three or more comorbid diseases | 3 (2.1) |

COVID-19: Coronavirus disease 2019; ESKD: End-stage kidney disease.
control of nosocomial infections. We employ full-time infection control practitioners at our hospital; measures and procedures to prevent nosocomial infections have always been strictly followed. All patients undergoing HD and medical staff were asked to wear facemasks before they entered the dialysis center immediately after the first case of COVID-19 was reported. Everyone complied with this requirement. (2) The patient with COVID-19 was bedridden, and her activity was restricted; therefore, the chance of viral spread was limited.

Two major medical events, outlined above, occurred during quarantine. The preplanned procedures for responding to medical emergencies were followed, and the diagnoses and treatment processes ran smoothly. Being in a hospital with emergency plans in place allowed them to receive optimal treatment. Using a similar H-GMQ model may maximize clinicians’ ability to integrate resources and protect vulnerable patients.

In summary, the H-GMQ program was conducted successfully using preplanned flow charts. No new cases of COVID-19 were diagnosed, and all emergent medical events were managed successfully. H-GMQ was demonstrably feasible in practice, effective for containing COVID-19, and safe for the prevention of and response to medical emergency events when dealing with patients undergoing dialysis who were exposed to COVID-19.

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Conflicts of interest

None.

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