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### **Title: Core Principles for Infection Prevention in Hemodialysis Centers during the Pandemic Situation of COVID-19**

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### **Authors' contributions**

GC and YZ drafted the manuscript. LZ, YW, RH, XZ, DS, JX, YQ, LC, and XL reviewed and corrected the manuscript.

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### **Ethics approval and consent to participate**

Not applicable.

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Not applicable.

### **Competing interest**

The authors declare that they have no competing interests.

**To the editor:**

Since the outbreak of COVID-19, over 600,000 confirmed cases were reported worldwide till the end of March 2020. The World Health Organization has alarmed the global pandemic situation(1). The nosocomial transmission was severe in some centers and burdened the health system extremely(2). The hemodialysis center, featured with a crowded design and highly mobile dialysis patients, has an exceptionally high risk of exposure during this outbreak period. In a general tertiary hospital, dialysis centers routinely accept patients from outpatient clinics and emergency rooms, further adding to the difficulty in nosocomial infection prevention(3). Dialysis patients, commonly regarded as immune-compromised, are likely to develop into severe illnesses and endanger a medical unit in close contact.

Droplet spread and close contact are the main routes of COVID-19 transmission(4). Thus, the hemodialysis center in our hospital implements multiple strategies for infection prevention, including area management and integrated symptom monitoring.

Based on various exposure to the mobile population, our hospital environment is classified as low-risk, medium-risk, high-risk, and the extremely high-risk areas, in which the dialysis center belongs to the high-risk category. We avoid cross-area moving by designing a specific walking route for our patients to enter the hemodialysis center. The medical staff needs to wear protective measures when inter-area visits are inevitable. For example, N95 masks and protective glasses are required when entering the fever clinic. We advise the use of hand sanitizer whenever staff return to the hemodialysis center. In the dialysis center, a one-way route is followed by our patients, on which mask-wearing and hand sanitizing are ensured. During the dialysis session, we provide necessary educations on keeping social distances and self-protection. Between two dialysis shifts, we strictly leave at least 30 min for environmental and air disinfection and utilize a chlorine-containing disinfectant to clean our dialysis facilities(6-8).

We monitor and respond to our regular patients' symptoms in an integrated way. Between the dialysis sessions, we strictly contact our patients to help to record the body temperatures and suspicious respiratory symptoms. For patients referred by other departments in the hospital, we collect records of their contact history, temperature, and potential warning symptoms before admission. Based on this, all of our patients were classified into three categories (Table 1). Negative SARS-CoV-2 swab test is needed for patients in category C before their dialysis session could be arranged. In emergency cases, we perform continuous renal replacement therapy (CRRT) in a separate place, with negative pressure ward preferred, before completely ruling out COVID-19 for these patients (5, 6). Notably, patients with a positive swab test will be sent to designated hospitals for further treatment.

**Table 1:** High-risk / suspicious patient identification and classification management

Category	Definition	Management
A: temperature warning	temperature 37.0 ~ 37.2 °C in the past 14 days, without other symptoms	Close observation
B: symptom warning	suspicious symptoms (sore throat, cough, and diarrhea,etc.) in the past 14 days; but the temperature within the normal range	Separate dialysis and close observation
C: high-risk warning	temperature exceeds 37.3 °C within 14 days, together with suspicious history, or respiratory symptoms, or chest imaging abnormalities	Screen SARS-CoV-2 swab; send positive ones to the specific hospitals; arrange negative ones for separate dialysis and close observation.

Medical staff is strictly required to maintain hand hygiene and mask-wearing at work. N95 masks and protective goggles are used when operating CRRT for patients in category C. The equipment used should be disinfected, and medical wastes are packed and labeled separately to avoid potential contamination (7). The waste liquid generated during CRRT is discharged according to the requirements of the medical wastewater discharge standards(8).

Besides the strategies summarized above, we promote work-life balance for staff and encourage patients to take the initiative to participate. Our hemodialysis center strives to achieve zero infection during the COVID-19 outbreak.

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