



NURSE MANAGEMENT IN DIALYSIS CENTER IN COVID-19 TIME – SINGLE-CENTER EXPERIENCE

Bosiljka Devčić¹, Ivan Bubić¹, Vesna Babić¹, Božidar Vujičić¹ and Sanjin Rački¹

¹Department of Nephrology, Dialysis and Kidney Transplantation, Clinical Hospital Centre, Rijeka, Croatia

SUMMARY – COVID-19 infection in patients treated in dialysis centers is a particular challenge given that there is a significantly increased risk of transmitting the infection to medical staff, other staff of the institution, other patients, and family members of the patients.

The purpose of our work is to share our experiences in the implementation of preventive and epidemiological measures with reference to patients on a chronic outpatient hemodialysis program. Nurses play an important role in education and caring for the dialysis patient.

Key words: *COVID-19, hemodialysis, nurse*

Introduction

The first case of SARS-CoV-2 (COVID-19) in Croatia was confirmed on February 25, 2020, and it opened the question of the high possibility of a pandemic spreading, which is what happened in the following months. Older age, compromised immune system, and other diseases are, in addition to dialysis treatment, additional risk factors for the development of infectious diseases in chronic dialysis patients when compared to the general population¹. Dialysis treatment usually involves up to three visits weekly, for 4-5 hours procedure. Each individual treatment further increases the exposure (and likeliness of catching the virus), given the large number of contacts with other patients, employees, ambulance, and other².

COVID-19 infection in patients treated in dialysis centers is a particular challenge given that there is a significantly increased risk of transmitting the infection to medical staff, other staff of the institution, other patients, and family members of patients³. All of that places medical staff in a very high-risk group, making them not only a group of potential new patients but also possible vectors of infection.

Corresponding to: Bosiljka Devčić, MSN, RN, Department of Nephrology, Dialysis and Kidney Transplantation, Clinical Hospital Centre, Rijeka, Croatia, Tome Strižića 3., Rijeka 51 000, Croatia
E-mail: bosiljka.devacic@ri.t-com.hr

All these risk factors influenced the decision to implement additional preventive measures in early March of 2020. In the coming months, we were conducting a chronic dialysis program according to epidemiological guidelines that intensified during the spread of the pandemic^{4,5,6,7}.

The purpose of our work is to share our experiences in the implementation of preventive and epidemiological measures with reference to patients on a chronic outpatient hemodialysis (HD) program.

Nurses play an essential role in caring for the dialysis patient, and here we describe what that exactly involves.

Dialysis center organization

As part of the Department of Nephrology, the chronic outpatient HD program, Dialysis and Kidney Transplantation is housed in a stand-alone building and currently cares for 150 patients from rural, urban, and suburban areas, remote mountain areas as well as coastal. Our center's unique feature is the size and diversity of the regions under our jurisdiction.

This special geographical location puts our hospital and our dialysis center in a position for treating emergencies in 3 regions, including nearby islands. There are several smaller dialysis centers, but we take care of

all complications of various etiologies in our institution.

In addition to the above program, we have a daily nephrology hospital and a nephrology polyclinic with associated diagnostics and peritoneal dialysis. The stationary part of the Department with the unit for acute renal replacement is located in another building. The challenge of the organization is great, and during the pandemic, the importance of our center came to the fore even more.

Organization in COVID-19 time

At the beginning of March 2020, we limited the entrance to the ambulance HD building to a single entrance/exit. We have also organized a screening for all those who wish to enter, both patients and employees (health and non-health). With the exception of employees and patients, entry into the building was not allowed until the end of the prescribed measures. It is mandatory to wear a protective mask, protective footwear, and to disinfect hands throughout the stay. Given the then available literature and international guidelines, we organized a new way of working that was implemented in the coming months. In the following text, we provide customized protocols and rules that we implemented.

Protocol I. Patient triage screening – the role of the nurse

1. Ensure individual entry
2. Ensure that protective masks are worn (throughout the stay, replace immediately in case of damage)
3. Ensure that protective footwear is worn (throughout the stay, replace immediately in case of damage)
4. Ensure hand disinfection is carried out
5. Take anamnestic data (fever, shortness of breath, symptoms of respiratory infection, family history), documenting them
6. Measure the body temperature (using non-contact thermometers and ear thermometers), documenting the same. Body temperature must be measured at the beginning and the end of the dialysis procedure in all patients, and during the procedure, if there is an indication for it.

7. Provide accommodation in the waiting room with a distance of 2 meters with the shortest possible retention time
8. To ensure the escort of a nurse who is scheduled for dialysis, the patient is taken by a particular elevator to the dialysis room (independent and unaccompanied movement around the building is not allowed)
9. Ensure supervision of the nurse throughout the stay and the procedure until leaving the building and handing over the patient to the staff in the transport vehicle.

Protocol II. Patient care procedures – the role of the nurse

Step I – suspected COVID-19 patient at home or contact with an infected person on a non-dialysis day, phone notice

1. The nurse receives a phone notification, takes the anamnestic data of the patient or family/caregiver
2. Informs the nephrologist
3. In case the patient has not contacted the family doctor and the epidemiological service; informs them
4. Schedules the next dialysis procedure
5. Before the next HD checks by phone for a possible positive finding
6. In case of a negative finding, arranges an HD procedure with regular triage
7. In case of a positive finding, plans an HD procedure in isolation

Step II – suspected COVID-19 patient at home or contact with an infected person on the dialysis day, phone notification

1. The nurse receives a phone notification, takes the anamnestic data of the patient or family/caregiver
2. Informs the nephrologist
3. In case the patient has not contacted the family doctor and the epidemiological service; informs them
4. Organizes the transport of patients in a special vehicle equipped with protective equipment
5. The patient is referred to the emergency medical unit, organizes admission, sampling, and placement in isolation until the findings

6. Schedules the next dialysis procedure
7. In case of a negative finding, arranges an HD procedure with regular triage
8. In case of a positive finding, plans an HD procedure in hospital isolation.

Protocol III. COVID-19 suspected patients (respiratory symptoms, fever, or reported contact with an infected person during triage)

1. The triage nurse notices some of the symptoms of a possible COVID-19 infection or obtains information about the patient's contact with an infected person by taking a medical history.
2. Immediately takes the patient to a prepared isolation room located next to the triage area. Mandatory! Patients enter into triage one by one, which reduces the number of contacts. The nurse who received the patient in triage enters isolation with them. This way, we reduce the number of contacts of patients with suspected COVID-19 with other nurses).
3. The nurse who was not in contact with the alleged patient organizes the disinfection of the triage area and supervises the work of the cleaners, ventilation of the area, and plans the continuation of the triage.
4. Places the patient in the isolation room, puts on a protective suit, and informs the nephrologist.
5. Sampling for COVID-19 in isolation.
6. The nurse plans to perform the HD procedure until the test results arrive (the dialysis machine was previously prepared in the isolation room together with medical supplies, isolation device).
7. While waiting for the test results, the patient is placed in the isolation room under a nurse's supervision.
8. In case of a negative result, the next HD procedure is arranged with regular triage, and the patient is free to go home.
9. In case of a positive result, and the patient is symptom-free and without any complication, after consulting the nephrologist, the next HD procedure is planned in isolation for outpatients, and the patient is released for home treatment and self-isolation with special transport measures.

10. In case of a positive result and with visible symptoms or complications, the patient is hospitalized in COVID -19 isolation upon the nephrologist's decision.
11. After taking care of patients, the next step is taking care of the isolation space in the prescribed manner, organizing and supervision of the disinfection of the space and the work of the cleaners, the care of infectious waste and bed linen, ensuring the ventilation of the space.
12. According to the protocol, the nurse takes off their personal protective clothing, takes a shower procedure, and spends at least 30 minutes on self-ventilation outside the hospital building.
13. In hospitalized patients, the nurse plans the HD procedure in hospital isolation.

Protocol IV. COVID-19 suspected patients (respiratory symptoms, fever, or reported contact with an infected person during a dialysis procedure.

1. During HD, the nurse notices some of the symptoms of a possible SARS_CoV-2 infection or anamnestic information about the patient's contact with an infected person, which the patient did not report on arrival.
2. Informs the nephrologist.
3. Inside the dialysis room, the patient is then isolated by a physical barrier from other patients (antibacterial curtain/screen).
4. The nurse puts on personal protective clothing.
5. Only one nurse takes samples for SARS_CoV-2 and remains with the possibly infected patient.
6. After completing the HD procedure, the patient remains in the same room under constant supervision, waiting for the results to arrive.
7. Another nurse monitors patients in the same dialysis room. After completing the HD, they go home with recommendations on monitoring for possible symptoms and self-isolation until further notice.
8. In case of a negative test result, the next HD procedure is arranged with regular triage, and the patient is free to go home.

9. In case of a positive result, and the patient is symptom-free and without any complication, after consulting the nephrologist, the next HD procedure is planned in isolation for outpatients, and the patient is released for home treatment and self-isolation with special transport measures.
10. In case of a positive result and with visible symptoms or complications, the patient is hospitalized in COVID -19 isolation, upon the decision of the nephrologist.
11. After taking care of patients, the next step is taking care of the isolation space in the prescribed manner, organizing and supervision of the disinfection of the space and the work of the cleaners, the care of infectious waste and bed linen, ensuring the ventilation of the space.
12. According to the protocol, the nurse takes off their personal protective clothing, takes a shower procedure, and spends at least 30 minutes on self-ventilation outside the hospital building.
13. In hospitalized patients, the nurse plans the HD procedure in hospital isolation.

Guide for education

1. Education for nurses

Current knowledge and understanding of preventive epidemiological measures have not prepared us for the demanding and challenging task set before us. The ordinance on the minimum space and staffing requirements for dialysis determines the minimum education of nurses for a period of six months in hospital dialysis centers and the continuation of education with a mentor for up to one year in a home center. Education includes theoretical and practical knowledge of all methods of renal replacement and is a major task for nurses and mentors. The pandemic has expanded the need for new knowledge about the latest clinical cognition about the COVID-19 epidemic, infection prevention measures, and guidelines from the government, professional societies, and heads of medical institutions.

2. Education on taking samples for the detection of SARS-CoV-2

For testing, we take samples from the upper and lower respiratory system and the patient's serum. All

samples must be marked with the patient's name, type of sample, and date of collection. Marked and well-sealed containers, together with absorbent material (paper towels or cellulose), are stored in biohazard bags that are disinfected from the outside and placed on ice ("penguin"). They are stored at +4°C until shipment and must arrive at the diagnostic laboratory within 48 hours of sampling. We use swabs with a plastic handle and a sponge tip and tubes according to the prepared protocol⁸.

3. Education on wearing protective clothing and masks

We educated the nurses on the use of personal protective equipment; wearing a protective suit and mask with a higher level of filtration with at least an FFP2 mask (filters 95% of particles and aerosols in the inhaled air), changing gloves, wearing protective caps, as well as how to remove protective clothing and the manner of disposal.

4. Education on the procedure of cleaning, disinfection, and disposal of bed linen

Entry into the building is the same for everyone and is subject to the same principles. We record the time of entry and exit, name, and reason for entry. It is necessary to prepare the required material in advance, plan consumption, altogether avoid subsequent outings for forgotten material or funds.

Before removing the material, equipment from the premises, it is mandatory to decontaminate and dispose of disposable material in infectious waste. Carry out hand hygiene and change gloves. Space is disinfected by the nurse in charge of the patients, who disinfects all work surfaces and especially surfaces that are frequently touched on a daily basis, using previously prepared disinfection wipes. Thermometers, stethoscopes, medical devices, and more are disinfected using Incidin Foam or 70 % alcohol. The nurse in charge of the patients supervises the staff who performs cleaning and disinfection. The supervision tasks include: protection of the cleaning staff, proper dressing and undressing, respecting the agreed ways of clean and dirty, working in gloves. The area immediately around the patient is considered highly contaminated. As a disinfectant, we use Incidin Active, Incidin Pro, Incidin Foam, and Clinell Universal.

Bed linen in patients with suspected COVID-19 infection or confirmed infection is treated as infectious

and subject to a special procedure. The nurse oversees the care and work of the cleaning staff. Infectious laundry is collected in a half-filled canvas bag that is inserted into a red plastic bag with the clinic label, date and warning of the specified infectious disease. The prepared laundry is transported by special transport to the laundry with the announcement of the responsible nurse.

5. Education of all health and non-health employees

All dialysis center employees are educated on the prescribed epidemiological measures and are obliged to implement them. Staff should monitor their own symptoms. It is a personal obligation to contribute to one's own education by reviewing the available literature set up by professional societies and relevant institutions.

6. Patient education is lead by a nurse

6.1. Patients are advised to stay at home on non-dialysis days, it is recommended to reduce unnecessary contacts outside the family circle, refrain from traveling and public and/or private events (family meetings, weddings, funerals, etc.). It is recommended to reduce or avoid personal contact with children and grandchildren since the younger population can be a vector of the disease, often without symptoms. Reduce or avoid the use of public city transport.

6.2. Patients are educated on the proper use of protective masks that must cover the mouth and nose during transport, the entire stay in the dialysis center, and return home. It is recommended to wear masks in all situations where contact is possible.

6.3. Educate patients in an appropriate way on proper handwashing, mouth and nose protection when coughing and/or sneezing, using disposable paper towels and tissues, and disposing of them.

6.4. The nurse contacts people from the patient's family and living environment and advises on epidemiological measures. Counseling includes protocols that need to be taken in case of suspicion or occurrence of symptoms of a possible infection.

6.5. Patients should be advised to take care of hand hygiene on a daily basis, and this is mandatory on arrival at the dialysis center and on departure, and each time they are in contact with respiratory secretions.

6.6. Dialysis patients should be educated to inform staff of fever and/or respiratory symptoms before coming to the facility by phone or another way to prepare the staff for their arrival.

6.7. Education should be repeated by interviewing during the dialysis procedure.

6.8. If necessary, the nurse can arrange psychological counseling for a patient who is afraid of COVID-19.

Declaration of Conflicts of Interest: None

Declaration of Funding: None

References

1. Basile C, Combe B, Pizzarelli F. et al. on behalf of the EUDIAL Working Group of ERA-EDTA. Recommendations for the prevention, mitigation and containment of the emerging SARS-CoV-2 (COVID-19) pandemic in haemodialysis centres. *Nephrol Dial Transplant.* 2020;1–4. doi: 10.1093/ndt/gfaa069
2. Centers for disease control and prevention. Interim Additional Guidance for Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed COVID-19 in Outpatient Hemodialysis Facilities v 24.3.2020. (Accessed on 28.3.2020). Available on <https://www.cdc.gov/coronavirus/2019-ncov/healthcare facilities/dialysis.html>
3. NICE guideline. COVID-19 rapid guideline: dialysis service delivery. Published: 20 March 2020 (Accessed on 28.3.2020.). Available on www.nice.org.uk/guidance/ng160
4. CMS Gives Guidance. Guidance for Limiting the Transmission of COVID-19 for Dialysis Facilities. 2020. (Accessed on 01.04.2020.). Available on: <https://www.cms.gov/files/document/qso-20-19-esrd.pdf>
5. Ma Y, Diao B, Lv X. et al. 2019 novel coronavirus disease in hemodialysis (HD) patients: Report from one HD center in Wuhan, China. 2020. (Accessed on 18.3.2020.). Available on: <https://www.medrxiv.org/content/10.1101/2020.02.24.20027201v2>
6. Naicker S, Yang CW, Hwang SJ. et al. The Novel Coronavirus 2019 epidemic and kidneys.2020. (Accessed on 28.3.2020.). Available on: <https://doi.org/10.1016/j.kint.2020.03.001>
7. Northwest Kidney Centers. 2020. (Accessed on 28.3.2020.). Available on <http://nspa1.org/wp-content/uploads/2020/03/dialysisscreening.jpg>
8. Clinic for Infectious Diseases "Dr. Fran Mihaljević". Upute za prikupljanje uzoraka za testiranje na novi koronavirus (SARS-CoV-2) Klinike za infektivne bolesti „Fran Mihaljević“ 26.2. 2020. (Croatian language) (Accessed on 28.3.2020.). Available on http://bfm.hr/en_GB/page/koronavirus

Sažetak

ISKUSTVA JEDNOG CENTRA U SESTRINSKOJ SKRBI
ZA DIJALIZNE BOLESNIKE U COVID19 VREMENU

B. Devčić, I. Bubić, V. Babić, B. Vujičić i Sanjin Rački

Infekcija COVID-19 u bolesnika koji se liječe u dijaliznim centrima poseban je izazov s obzirom na to da postoji značajno povećan rizik od prenošenja infekcije na medicinsko osoblje, ostalo osoblje ustanove, druge pacijente i članove obitelji bolesnika.

Cilj našeg rada je podijeliti svoja iskustva u provedbi preventivnih i epidemioloških mjera u skrbi za bolesnike na kroničnom ambulantnom programu hemodijalize. Medicinske sestre igraju značajnu ulogu u edukaciji i skrbi za dijaliznog bolesnika.

Ključne riječi: *COVID-19, hemodijaliza, medicinska sestra*