

Special article

Protocol against coronavirus diseases in patients on renal replacement therapy: Dialysis and kidney transplant[☆]

Protocolo de actuación ante la epidemia de enfermedad por coronavirus en los pacientes de diálisis y trasplantados renales

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Introduction

Dialysis patients and kidney transplant receptors represent a group of patients at risk with significant epidemiological implications.

So far there is not much information regarding specific actions to be implemented in dialysis patients, dialysis facilities and kidney transplant patients. The American Society of

Nephrology (ASN) and the European Dialysis and Transplant Association (EDTA) have published a number of recommendations that are included in this protocol. The Spanish Society of Immunology and the Spanish Society of Infectious Diseases and Clinical Microbiology have also developed a series of recommendations for prevention and care of the virus infection in immunosuppressed patients that are extensible to kidney transplant recipients that are also included. This protocol will be exposed to continuous review based on the upcoming

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information that will be available in the following days and weeks.

Justification of the protocol

Dialysis patients have the risk of suffering complications in case of coronavirus infection because they are immunosuppressed. In addition as group, these patients present certain features with relevant epidemiological implications; especially patients on hemodialysis that constitute closed cluster that seek treatment regularly (two to six times weekly), staying an average of four hours per session in sites highly exposed to virus contamination. The kidney transplant receptors maintain a constant state of immunosuppression due to the chronic administration of immunosuppressive drugs and they must visit the hospital outpatients clinics regularly for routine follow up. Many of these patients use collective medical transport that can favor the spread of the infection. These are enough reasons that justify the necessity to elaborate standards of action for early identification and treatment of cases of viral infection and to contain, as much as possible, the contamination of other patients and health personnel.

Once infected, they are a mobile source of new infections. It can be assumed that a dialysis facility is a place that deserve especial consideration from an epidemiological point of view.

Definition of case

According to the definition, that is regularly updated by the Ministry of Health, a COVID-19 case under investigation is considered if he meet any of the following criteria.

- A- Anyone with clinical features of acute respiratory infection independent of the severity (sudden onset of any of the following symptoms: cough, fever, dyspnea)

PLUS

Meet any of the following epidemiological criteria (during the 14 day period prior to the onset of symptoms)

- Place of residence or traveling to **areas with evidence of community transmission**. (to be updated on every day)
 - Spain: the Autonomous Communities of Madrid, La Rioja and in the Basque country: La Bastida and Vitoria.
 - Italy (the whole country)
 - France: departments of Haut-Rhin (Grabd Est) and l'Oise (Hauts -de-France)
 - Germany: department of Heinsberg (North Rhine-Westphalia)
 - China (all provinces, including Hong Kong and Macao).
 - South Korea
 - Japan (Hokkaidō Island)
 - Singapore
 - Iran

Information on the whole definition of case and the geographical areas of transmission risk can be obtained at "Procedures against the disease SARS-CoV-2 (COVID-19)"

available at: <https://www.msccs.gov/en/professionals/publichealth/ccayes/alertsActual/nCov-China/home.htm>

- History of **close contact** with a potential case or with a confirmed case.
- Anyone hospitalized with **severe** acute respiratory infection (pneumonia, acute respiratory distress syndrome multiorgan failure, septic shock, ICU admission, or death) **after excluding other possible infectious etiologies** that could justify the symptoms (negative results for a panel of respiratory viruses, including influenza).
- Any person seen in the **hospital emergency room or admitted to the hospitalized**, with signs and symptoms of **acute lower respiratory infection** and one of the following **radiological findings**:
 - Bilateral infiltrates with interstitial or ground-glass opacities or bilateral alveolar pulmonary infiltrates compatible with ARDS.
 - Unilateral multilobar infiltrator of suspected viral etiology.

For the purposes of case definition, close contact is considered:

- Any person who has provided care to a probable or confirmed case while such a case had symptoms: health workers who have not used adequate protection measures, family members or people who had other type of physical contact or something similar.
- Any person who has been in the same place as a probable or confirmed case while the case had symptoms, within less than 2 m a distance (e.g., cohabitants, visits, etc.).
- In an airplane It considered close contact those passengers located within a 2-seat radius around the probable or confirmed case while the case had symptoms. Close contact are also considered the crew who had contact with the case.

Diffusion of information

A truthful and reliable information, oral and written, will be provided to the dialysis and transplant staff, and all patients. The information includes the procedure to be followed for prevention of infection and the action to be adopted when facing suspected or confirmed cases, according to the points to be exposed next.

It is essential an adequate training of all Hemodialysis and Transplantation professionals on measures of prevention and identification of COVID-19 patients.

Recommendations for patients on hemodialysis, peritoneal dialysis peritoneal and kidney transplant recipients

In your home and daily life

All dialysis and kidney transplant patients will be informed about the symptoms of coronavirus infection ([Annex 1: Information to the patient](#)). In the case that they present any of these symptoms they will be asked not go to the dialysis facility or any of the hospital outpatient clinics

without prior telephone notice. Once the patient contacts the assigned personnel, he will receive precise information about of the steps to follow.

Patients will be recommended:

- In the event of symptoms or the diagnosis of a case of coronavirus infection in the family, the first action to take is to contact by telephone the Personnel from Dialysis or Transplant Unit.
- If the patients have symptoms, do not go to the Hemodialysis facility or hospital clinics using public transport.
- If you are going to receive hemodialysis treatment, you must wash the arteriovenous fistula (AVF) before leaving home.
- In areas with the highest prevalence of infection these patients must stay at home. Dialysis patients may not leave home unless they have to move to receive dialysis sessions and they have to wear a mask.
- Do not use public transportation.
- If coughing or sneezing, cover the nose and the mouth with one tissue and then throw it away, if possible in a waste container; in the case of not having any handkerchief, coughing should be directed to the angle formed between arm and forearm by flexing the elbow.
- Wash your hands frequently with soap and water for at least 20s, or with an alcohol-based hand sanitizer (at least 60% alcohol), especially: after using the bathroom, before eating, after blowing your nose, coughing or sneezing and after direct contact with sick people or their surroundings. Avoid touching your eyes, nose, and mouth before washing your hands. Cleaning house/office surfaces should be done regularly. Do not share toothbrushes, glasses or other utensils with the family or cohabitants.
- Avoid contact or keep a distance of at least 2 m with people suffering from symptoms of respiratory infection (fever, cough, general muscle pain, sore throat or respiratory distress), and do not share personal belongings with them.
- Avoid greetings by hugging, kissing, or shaking hands.
- Avoid putting your hands to your face. Do not touch your eyes, nose or mouth.
- Suspected cases should be maintained, as much as possible, physically isolated from the rest of the occupants of the house. The ideal situation would be a room for exclusive use. Keep bedside tables, bathroom surfaces, door handles, telephones, computers, railings, handrails, and toys clean and disinfected. A solution of 1 liter of water with 10 ml. of bleach (1% sodium hypochlorite) can use for surface cleaning.
- Ventilate the rooms with fresh air – open the windows, without generating sudden changes in temperatures.
- The aforementioned document from the Spanish Society of Immunology and the Spanish Society of Infectious Diseases and Clinical Microbiology for immunosuppressed patients does not recommend the use of masks. The *Centers for Disease Control and Prevention* (CDC) does not recommend that healthy individuals to wear a face mask to protect themselves from respiratory diseases, including COVID-19. However, we consider that given the pandemic situation, this would apply to areas without evidence of community transmission. In Spain, in areas with evidence of community transmission, they should remain like the rest of the

population in their homes and if they have to leave home should use the surgical mask.

- However those individuals showing symptoms of being infected should wear masks to prevent the spread of the disease to others. The use of face masks is also crucial for healthcare workers and for people caring for someone affected in close surroundings (at home or in a healthcare facility).
- Avoid crowds. Do not attend places where there may be excessive contact with other people.
- Avoid smoking and alcohol. In addition to being harmful to health, these substances further weaken the immune system, making the body more vulnerable to infectious diseases.
- Avoid traveling if you have a fever and cough to prevent the infection other people. In addition, trips to the areas with the highest concentration of COVID-19 cases should be particularly avoided. These areas are regularly updated by the Health Authorities.

Suspected cases in the Hemodialysis facility. General measures of prevention

It is advisable to place devices with hydroalcoholic solution (preferably automatic to avoid contact) in the waiting room and instruct patients how to use it.

- If possible, all dialysis centers will activated one preventive Triage at the arrival of patients (symptoms and temperature).
- Patients with a suspected infection will be transferred in an individual ambulance that will be arranged in advance or they will be brought in their own vehicle if possible.
- In Suspected cases, the schedule of the session should be adjusted to avoid staying in the waiting room. If there is more than one case, they will scheduled in the same turn.
- In the hemodialysis facilities, the physically isolated rooms with an independent entrance, will be used for hemodialysis sessions of suspected and/or infected patients.
- In these patients, the dialysis procedure will be performed, preferably, in rooms or boxes if they are available, in conditions of contact and drop isolation.
- If the patient has a monitor of home hemodialysis with bags, he can be dialyzed in the place specifically designed for patients infected or suspected to have infection, always maintaining isolation.
- In hemodialysis centers that do not have isolated rooms with an independent entrance, infected or suspected patients will be dialyzed in an area of the general ward outside from the pathways, with a separation of >2 m between patients.
- If several patients suspected or infected with COVID-19 have to be dialyzed, it will be performed at nearby posts and by the same personnel with limited entry and just the necessary manipulation.
- It will be indicate “isolation of contact and drops”.
- Responsible of the infectious or preventive services in the hospital will be notified and will proceed according to their indications.

- These patients will be cared for by staff with the corresponding PPE (personal protective equipment).
- In rooms dedicated to suspected or infected patients, all accessory material not essential for the dialysis session will be removed.
- The material expected to be used during the HD session will be prepared before the session and will be left next to the dialysis monitor.
- Disposable material will be used as much as possible.
- Non-disposable material such as sphygmomanometer, pulse oximeter, infusion pumps . . . will be properly cleaned and disinfected.
- The material that is not essential and is not used routinely will be out of the direct environment of the patient. If case that such material becomes necessary it will be delivered to the nursing or medical staff by the auxiliary staff, to avoid unnecessary trips.
- The suspected case should not go to the room where that FAV is washed or the locker rooms. The patient must wash the member with the fistula at home and will complete the procedure with alcohol disinfection in the dialysis post.
- Environmental hygiene will be reinforced with disinfection of the room before and after the dialysis session.
- The hemodialysis machine used in a suspected or confirmed case may then be used for another patient, after an adequate external disinfection with sodium hypochlorite. It is desirable that these sessions be scheduled, if possible on the last turn.
- No spray during the hemodialysis session.
- Using masks: In areas with evidence of transmission in the community: use in all hemodialysis patients and during the entire sessions. In other areas: use in patients with respiratory symptoms. In the rest of patients apply the protocols of each center.
- Prevention is the main objective. The systematic and correct use of individual protection devices by staff and patients is encouraged but the material resources have to be managed wisely to avoid shortage.

Suspected cases in the peritoneal dialysis

Each case will be evaluated individually and if the patient does not require medical care, the clinical assistance or procedure will be postponed and the patient will be given the appropriate instructions to remain at home.

- If medical care is required, the transfer of suspected patients will be arranged in advance in individual ambulance or in their own vehicle.
- these patients will not stay in the waiting room; upon arrival they will be transferred directly to the consultation box specifically prepared for the care of these patients, or to the emergency department of the hospital according to the protocol of each center.
- Patients arriving after hours must follow the usual circuit of the hospital.
- These patients will be under "Contact and drop isolation" during the clinical care in the Dialysis Unit, according to the

measures designated by the Preventive Medicine Service of the Hospital.

- Environmental hygiene will be reinforced with disinfection of the room before and after the patient has received medical attention.
- The patient will or will not keep the mask on throughout their stay in the unit, depending on the instructions received from the healthcare personnel.
- These patients will be cared for by dedicated staff. To ensure protection the personnel will use masks if they are within 2 m of the patient. They must also have eye protection, a long-sleeved gown, hat and shoe covers.

Suspected cases in the Kidney Transplant Unit

Patients should phone the Transplant Unit/Nephrology Service to receive instruction on how to proceed.

Depending on the symptoms, patient will receive care at home or at the place designed depending on the organization of each center.

Collection and shipment of samples in suspected cases of dialysis patients

In suspected cases, samples will be obtained for diagnosis according to the protocol and specifications by each center:

Respiratory tract samples:

to. Superior nasopharyngeal/oropharyngeal exudate in outpatients.

b. Lower preferably bronchoalveolar lavage, sputum (if possible) and/or endotracheal aspirate especially in patients with severe respiratory disease.

Conflicts of interest

The authors have no conflicts of interest to declare.

Appendix A. Annex 1

A.1. Information on the symptoms of coronavirus infection

Given the situation generated by the epidemic infection by this virus and following institutional recommendations, we want to inform you about coronavirus infection with the objective to prevent as much as possible the spread of the infection and achieve better management of the disease.

What is coronavirus infection? Coronavirus infection is a respiratory infection caused by a flu-like virus for which we have not a vaccine.

What are the symptoms of coronavirus infection? Symptoms are similar to those of the flu, including fever, respiratory symptoms, cough, and malaise.

How is coronavirus infection transmitted? It is spread in the same way as the flu, mainly from person to person when a person with the flu coughs or sneezes. Contagion may also occur by touching something that has the virus and then putting the hands in mouth or nose.

To avoid contagion, the person with flu-like symptoms, should:

- Cover nose and mouth with a disposable tissue when coughing or sneezing and proceed to throw it away immediately. In cases of not having a disposable handkerchief, the individual should cough or sneeze at the angle between the arm and forearm when flexing the elbow. Then proceed to wash the hands with soap and water. Alcohol/gel can be used if not visibly dirty.
- Do not share toothbrushes, glasses or other utensils with family or cohabitants.
- Wash your hands with soap and water or alcohol gel very often.
- Avoid being closer than 1–2 m from other people.
- Avoid greetings by hugging, kissing, or shaking hands.
- Avoid putting your hands to your face.
- Ventilate the rooms with fresh air; open the windows, without generating sudden changes in temperatures.

How can you avoid the contagion and spread of the virus?

Prevention measures against coronavirus basically consist of personal hygiene and environmental sanitation measures.

As a dialysis patient we provide a series of additional recommendations: General rules:

1. While the situation lasts and until further notice, traveling with a companion in the transport intended for patients will be avoided.
2. All patients will perform hand hygiene before entering the ambulance and before accessing the Hemodialysis Center.

If you have symptoms:

- If you start with flu symptoms, or in your family or people living with you, a case of coronavirus is diagnosed, YOU SHOULD CONTACT THE DIALYSIS PERSONNEL. Dialysis patients should communicate this event BEFORE GOING TO THE HEMODIALYSIS SESSION. You should not use collective transportation with the rest of the patients.

As a kidney transplant patient we make additional recommendations: General rules:

1. While the situation lasts and until further notice, your Transplant Unit of the Nephrology Service may decide to follow up by telephone to avoid trips to hospitals as long as your clinical situation allows it.

If you have symptoms:

- If you start with flu symptoms, or in your family or people living with you, a case of coronavirus is diagnosed, YOU SHOULD CONTACT THE TRANSPLANTATION UNIT. They will give you instructions on how to proceed.

In case of suspicion of infection, a surgical mask will be placed and apply extreme measures of hygiene at home. In the telephone interview with the doctor from the Dialysis or Transplant Unit, it will be determined if there are data to think that it could be a COVID19 infection.

Thanks for your cooperation