

Organizational models in the management of COVID-19 in hemodialysis patients: The Genoa Experience

The current Coronavirus Disease-19 (COVID-19) pandemic represents a global challenge for citizens, health systems, local and national governments. Since no previous experience has prepared the scientific and medical community to face such as widespread and rapid clinical emergency, local experiences can be of help in defining management strategies.

In this commentary, we briefly report the approach to the management of COVID-19 in hemodialysis patients (HD), that we implemented at our Nephrology and Dialysis Unit, located in Genoa, Italy – Clinica Nefrologica Dialisi e Trapianto, Ospedale Policlinico San Martino-Italy). This document is the result of the work of all Medical Staff of San Martino Nephrology Unit.

General considerations:

- COVID-19 is caused by infection of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It is characterized by a variable clinical picture ranging from mild symptoms to severe pneumonia and multi-organ failure
- COVID-19 may involve adult patients of all ages, but it appears particularly severe in older subjects with pre-existent health problems
- At the beginning of the outbreak in Italy, COVID-19 was suspected when clinical and epidemiological (i.e. people from more active areas and/or direct contact with COVID positive subjects) criteria coexisted. Then, due to the spread of the disease, epidemiological criteria were excluded and now clinical criteria are considered sufficient for suspect COVID-19
- Current clinical criteria for COVID-19 suspicion include: fever, cough, dyspnea, myalgia and fatigue (while less commonly other signs, as diarrhea, anosmia and syncope have been reported)
- Currently, diagnosis of COVID-19 is made by reverse transcription polymerase chain reaction from nasopharyngeal swabs, which, actually, may give false negative results

Considerations for HD patients:

- Renal patients appear at high risk for COVID-19 and related complications because mostly of them are old, present multiple comorbidities and some of them may use immunosuppressive drugs (for treatment of immune diseases, transplantation, etc.)
- Maintenance HD patients present additional risk factors, that include: chronic immune dysfunction, need to go to the hospital for HD and undergo dialysis in shared rooms (so increasing the risk of contact with infected people)
- Each dialysis Unit should implement local strategies to early recognized patients affected by COVID-19, providing better available care, and prevent disease diffusion among the other patients and health staff. The individual approach should be defined according to local resources (including the availability of personal protective equipment-PPE)
- Dialysis patients should be instructed to stay at home while off dialysis. All the patients and medical staff should be advised to inform of fever or respiratory symptoms before arrival at the Dialysis Center by phone

Genoa Experience

- About 260 maintenance HD patients are followed in 2 different dialysis units, with 10 and 5 four rooms each, respectively
- On 23 of March, 8 out of the 23 nasopharyngeal swabs collected resulted positive (34%)
- The main Unit has 10 rooms with the possibility to have three additional isolated rooms, that currently have used as: 1) clean room, 2) COVID positive room (for suspected or confirmed

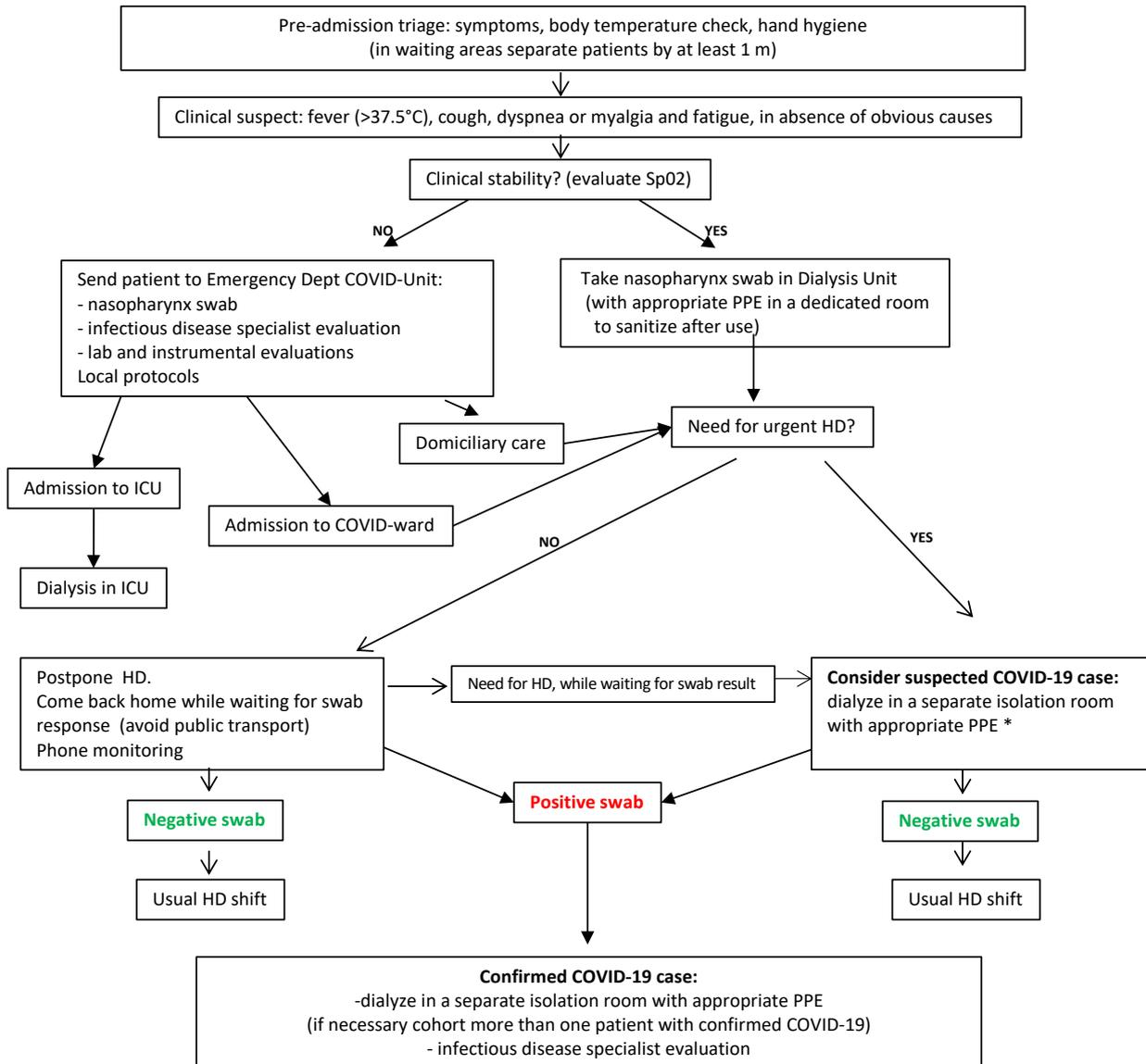
patients, to be dialyzed separately) and 3) room dedicated to collect nasopharyngeal swabs. All these rooms are sanitized after each use

- The results of nasopharyngeal swabs are mostly available within 24h
- In the following flow-charts we reassume our current approach to COVID management in HD patients, taking into account two possible scenarios (i.e. suspected patients in dialysis facility and at home).

Scenario 1.

ACCESS TO DIALYSIS UNIT (OUTPATIENTS AND HOSPITALIZED PATIENTS)

PATIENTS AND MEDICAL STAFF SHOULD WEAR A SURGICAL MASK ALL THE TIME AND WASH HANDS FREQUENTLY



* If possible isolated rooms for Suspected and Confirmed COVID-19 patients can be located at COVID-ward, by use of mobile dialysis water preparation devices

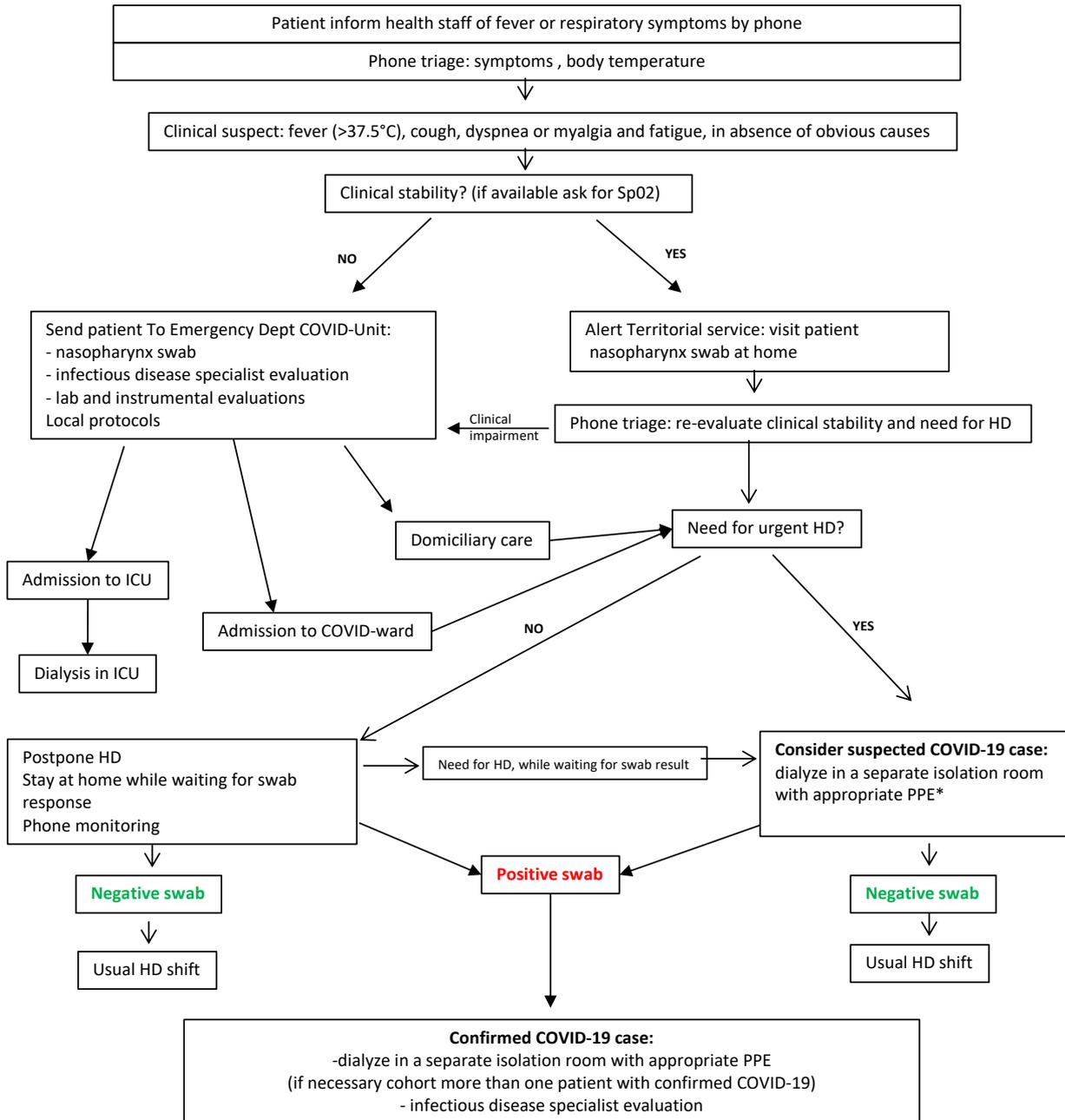
Management of suspected patients:

- While waiting for swab response, treat such patients as COVID confirmed cases (use separate rooms and appropriate PPE)
- Avoid mixing of suspected and confirmed cases (if mix is necessary, then consider suspected patients as confirmed cases)

Repeat this process for each patient before access to Dialysis Unit

Scenario 2.

MANAGEMENT OF SYMPTOMATIC HD PATIENT AT HOME



* If possible isolated rooms for Suspected and Confirmed COVID-19 patients can be located at COVID-ward, by use of mobile dialysis water preparation devices

Management of suspected patients:

- While waiting for swab response, treat such patients as COVID confirmed cases (use separate rooms and appropriate PPE)
- Avoid mixing of suspected and confirmed cases (if mix is necessary, then consider suspected patients as confirmed cases)

NOTES:

For specific procedures and preventive measures (hand washing, nasopharynx swab, use of PPE, etc.) see International Organizations and ERA-EDTA recommendations at: <https://www.era-edta.org/en/covid-19-news-and-information/#toggle-id-5>

Conclusions:

- COVID-19 pandemic is still evolving, so that it is conceivable that our way to face this situation will change over the time
- Many areas of uncertainty remain in general population, such as in HD patients. For example; i) the adequate duration and modality of isolation precautions for COVID-19 positive patients, ii) the suitability to cohort more than one patient with suspected or confirmed COVID-19, iii) the potential effects of immunomodulatory and antiviral drugs in HD patients
- In any case, an ideal approach to manage COVID-19 in dialysis patients does not exist and the flexibility of the management strategies is crucial in this moment. Organizational and clinical choices should be guided by local epidemiology of the disease, local (human and equipment) resources and growing knowledge on the pathophysiology of COVID-19 and its treatment