

## CASE REPORT

# COVID-19 IN A PATIENT WITH CHRONIC KIDNEY DISEASE: A CASE OF COINCIDENCE IN INDONESIA.

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### Abstract

**Background:** Chronic kidney disease (CKD) increases the risk of mortality during coronavirus disease 2019 (COVID-19) episodes. Patients with end-stage renal disease (ESRD) are highly vulnerable with the multiple comorbidities that make them susceptible to adverse outcomes with COVID-19. There is limited data about patients with ESRD who also suffer from COVID-19. We discuss the case of a hemodialysis patient who had comorbidities and developed COVID-19 pneumonia in the clinical course.

**Case descriptions:** A 40-year-old woman who had ESRD on regular hemodialysis, admitted to hospital for presented intermittent fever, dyspnea, and fatigability. The patient had comorbidities, Hepatitis C, Human Immunodeficiency Virus (HIV), and Hypertension. Patient had continuous renal replacement therapy (CRRT) three times a week. She was diagnosed with COVID-19 by the reverse-transcriptase polymerase chain reaction (RT-PCR), and her pharyngeal swab for severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) was positive. Chest X-ray showed bilateral pneumonia. She was intensively monitored and treated with antiviral drugs, oxygen, broadspectrum antibiotics, steroids, nutrition, and other supporting drugs. After 24 days, an RT-PCR assay for SARS-CoV-2 was negative, and pulmonary involvement improved significantly. The patient was discharged on day 28 after recovering from COVID-19 infection.

**Conclusion:** The disease courses and treatment options for the patient were significantly more complicated. The patient had through the deteriorating illness and recovered after following treatment and CRRT. It is essential to ensure the continuous of dialysis, and might be an important option for hemodialysis patients with COVID-19.

**Keywords:** COVID-19, SARS-CoV-2, Chronic kidney disease, CRRT, Pneumonia

## Background

Coronavirus disease 2019 (COVID-19) has caused significant morbidity and mortality worldwide, and has been declared a global pandemic by WHO.<sup>[1]</sup> Chronic kidney disease (CKD) increases the risk of mortality during COVID-19 episodes. Patients with end-stage renal disease (ESRD) are highly vulnerable with the multiple comorbidities that make them susceptible to adverse outcomes with COVID-19. There is limited data about patients with ESRD who also suffer from COVID-19.<sup>[2]</sup> Therefore, we discuss the case of a hemodialysis patient who had comorbidities and developed COVID-19 pneumonia in the clinical course.

## Case Presentation

A 40-year-old woman who had ESRD on regular hemodialysis, admitted to hospital for presented intermittent fever, dyspnea, fatigability and loss of appetite. The patient had comorbidities, Hepatitis C, Human Immunodeficiency Virus (HIV), and hypertension, and had been treated with antiretroviral regimen (abacavir-lamivudine-raltegravir) and amlodipin 5 mg once daily. She had never left the country and no history of smoking, alcohol or drug abuse. The patient took continuous renal replacement therapy (CRRT) three times a week. Her physical examination was general weakness on admission, heart rate was 112 per minute (pm), respiratory rate 26 pm, O<sub>2</sub> Sat 98% (with non-rebreathing oxygen mask (NRM)), temperature 38.3°C, and blood pressure was 140/70 mmHg. Clinical examination in our Internal Medicine Emergency Department revealed the patient had bilateral crackles in both lungs. She was diagnosed with COVID-2019 by the reverse-transcriptase polymerase chain reaction (RT-PCR), and her pharyngeal swab for severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) was positive.

## Investigations

Laboratory data at the time of admission showed hemoglobin 7.8 g/dL; leukocytes 6260/μL; platelets 298000/μL; MCV 80.2; MCH 24.5; Albumin 2.81 g/L; SGOT 46 IU/L; SGPT 47 IU/L; HBsAg non-reactive; Anti-HCV reactive, Anti-HIV reactive, urea 132.02 mg/dL; Creatinin 12.69 mg/dL; Na 131 mmol/L; K 5.0 mmol/L; Cl 98 mmol/L; blood glucose 92 mg/dl; CRP 53 mg/L. Urinalysis test showed no specific finding. Blood gas analysis showed pH 7.40; PO<sub>2</sub> 36.4 mmHg; PCO<sub>2</sub> 17.5 mmHg; HCO<sub>3</sub> 15.9 mmol/L; O<sub>2</sub> saturation 81.8%; BE -5.8 mmol/L. D-dimer 1010 ng/mL FEU, PT 11.3 second; APTT 36 second. Chest X-ray showed bilateral pneumonia (Fig. 1). Electrocardiography showed no significant abnormality.

## Diagnosis

Based on these findings in the Emergency Department, the diagnosis was CKD stage V on dialysis, COVID-19 with pulmonary involvement, Hepatitis C, HIV, and hypertension. The patient was immediately placed on maximum isolation precautions (negative pressure room, with anyone entering the room required to wear an N95 respirator, face shield, disposable gown, and gloves).

## Treatment

During hospitalisation, patient referred to isolation intensive care ward because the deteriorating of clinical condition, and also the nasopharyngeal swab which was sent for COVID-19 testing, reported positive (Table 1).

Based on these findings, as the patient met the diagnostic, she was initially treated with oxygen 12 liter per minute, azithromycin 1x250 mg, cotrimoxazole 1x960 mg, packed red cell transfusion, heparin injection, furosemide 40 mg three times a day by injection, proton pump inhibitor, antipiretic, antiviral remdesivir 100 mg once daily (for 10 days), folic acid, albumin transfusion, enteral and parenteral nutrition,

amlodipin 5 mg once daily. She was intensively monitored and treated in the intensive isolation ward. The patient also continued to undergo CRRT three times a week during hospitalization.

#### *Outcome and Follow-up*

During the course of the disease, the patient showed slow improvement and fluctuation of deteriorating condition. At day 15<sup>th</sup>, the chest X-ray evaluation showed improvement and the clinical condition of patient began recovered. Dyspnoea, fever, and fatigability substantially resolved after the second week of treatment along with all other symptoms. The laboratory findings were initially less than good, gradually improved. As the results of the patient's nasofaring swab PCR tested positive on first week, became negative after 3 weeks. The patient was discharged from the hospital and went home on forth week in well condition. One month after the discharge in follow up, the patient showed no recurrence of signs and symptoms, and continued CRRT when outpatient.

#### **Discussion**

Treatment of COVID-19 among patients with CKD or ESRD requires special pharmacotherapy considerations. CRRT provided benefits for this patient by removing potentially damaging toxins and stabilizing metabolic and hemodynamic status.<sup>[2,3]</sup> Fluid therapy, CRRT, and anticoagulant prophylaxis/treatment need special attention in CKD patients with COVID-19. CKD patients with COVID-19 are treated as other patients, with some dose modifications if needed.<sup>[3,4]</sup> Patients with moderate or severe COVID-19 can receive treatment of remdesivir duration of up to 5 days, which can be extended for up to 10 days if patients do not demonstrate clinical improvement.<sup>[5]</sup> Many novel treatments for COVID-19 are under investigation, and although some of these options are already being used in clinical practice (as in our patient), none are currently approved for routine use. Many

centres have started incorporating treatment with hydroxychloroquine and azithromycin based on a small study by Gautret *et al.*, that the combination decreased the duration of viral shedding and increased elimination of the virus. Several drugs such as hydroxychloroquine, remdesivir, and favipiravir are the treatment options for COVID-19 therapy but further research is still being done on their effects.<sup>[6]</sup>

Host and virus factors play a role in SARS-CoV-2 infection. Port d'entry of SARS-CoV-2 into human cells begins with the fusion of the viral membrane to the plasma membrane of the cell. Effect of the virus and its ability to conquer the immune response determine the severity of the infection. Immune system dysregulation caused in tissue damage in SARS-CoV-2 infection. An inadequate immune response results in viral replication and tissue destruction. Besides that, an excessive immune response also cause tissue damage. When the virus enters the human cell, the viral antigen will be presented to antigen presentation cells. The presentation of viral antigens is known to depend on the major histocompatibility complex (MHC) class I molecules. The presentation of these antigens will cause the body's humoral and cellular immune response mediated by T cells and B cells that are specific to the virus. In the humoral immune response, IgM and IgG will be formed against SARS-CoV-2. IgM against SAR-CoV-2 is lost by the end of week 12 and IgG can persist for a longer period of time.<sup>[7]</sup> The lung is the main organ affected, which can result in respiratory failure. The disease can also present with atypical symptoms in all patients, such as nausea, vomiting and diarrhoea.<sup>[8]</sup>

Management guidelines for coincidence of COVID-19 vary from country to country. WHO guidelines recommend the management of symptoms, in general the management of COVID-19 is to treat symptoms (antipyretics for fever, oxygen therapy for respiratory distress). WHO also recommends that in severe, co-

infected, superinfected, and immunocompromised cases, empiric antibiotic therapy with mechanical ventilation should be given depending on the clinical condition of the patients. Nutrition, antibiotic, antiviral, antipyretic, and fluid management was given to the COVID-19 patients for improved response.<sup>[9]</sup>

This case is a 40-year-old patient who had ESRD and comorbidities, and developed COVID-19 pneumonia in the clinical course. The patient had Chest X-ray showed bilateral pneumonia. The PCR of COVID-19 was positive, which showed coincidence together COVID-19 with CKD on CRRT. Our patient showed slow improvement in the first two weeks of treatment, but gradually improved after the second week.

### **Conclusion**

In conclusion, we report a case of an Indonesian female patient diagnosed as CKD on dialysis and COVID-19. The disease courses and treatment options for the patient were significantly more complicated. The patient had through the deteriorating illness and recovered after following treatment. It is essential to ensure special attention, drug modification, and the continuous of dialysis, which could be important options for hemodialysis patients with COVID-19.

### **Highlights**

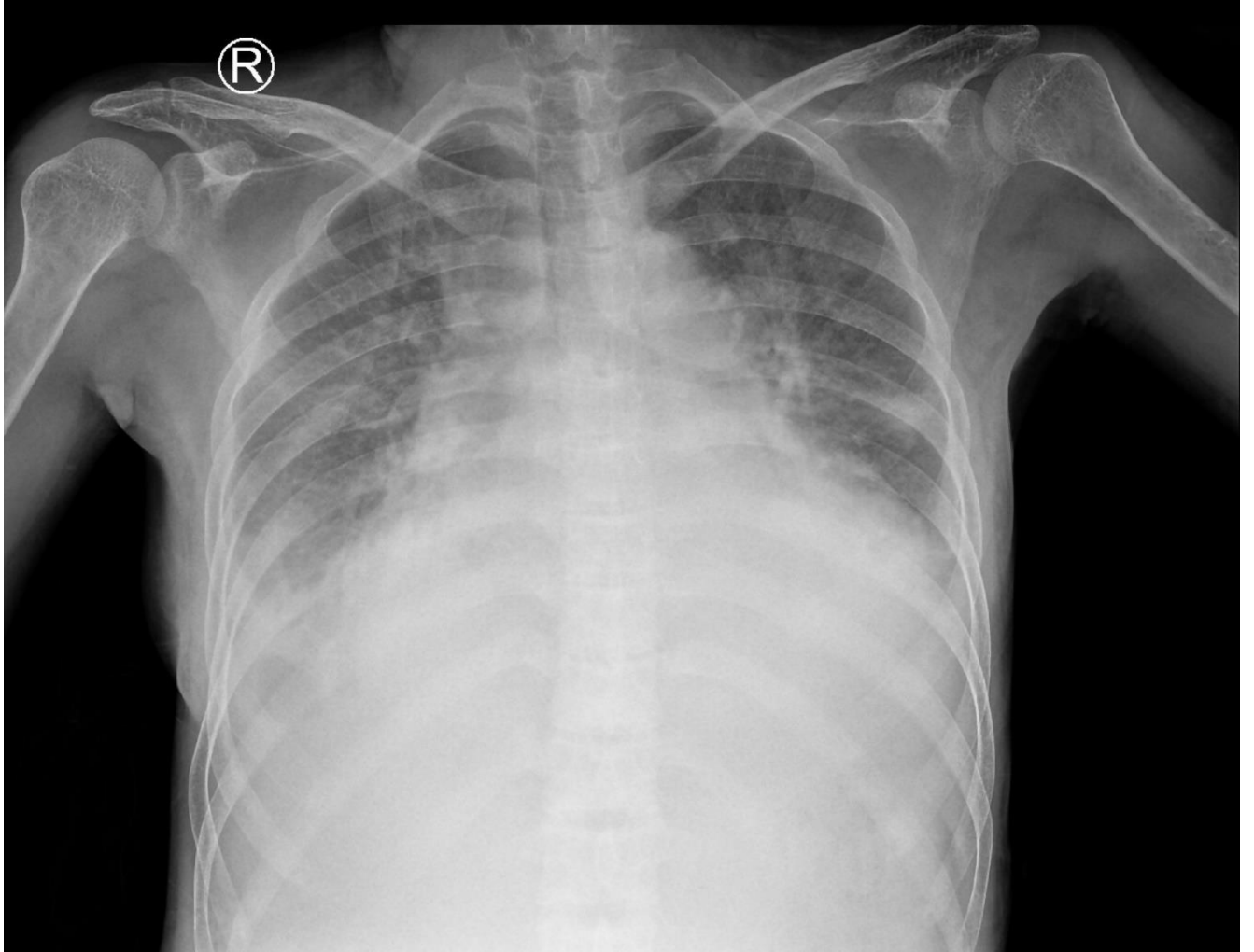
- Early recognition of COVID-19 coincidence and options of appropriate treatment is crucial in order to decrease the risk of severity and fatality.
- Many novel treatments for COVID-19 are under investigation, and some of these options are already being tried to use in clinical practice.
- Treatment of COVID-19 among patients with CKD or ESRD requires special pharmacotherapy considerations.

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### **Disclosures**

The authors declare that they have no relevant financial interests and no conflict of interest.



**Figure 1.** Chest X-ray of the patient showed bilateral pneumonia.

**Table 1.** Laboratory findings in a case of coincidence.

Parameter	Result	Reference
Hemoglobin	7.8 g/dL	11.7 – 15.5 g/dL
Leukocytes	6260/uL	3600 – 11000/uL
Hematocrit	26%	35 – 47%
Platelets	298000/uL	150000 – 440000/uL
PT	11.3 second	9.9 - 11.8 second
APTT	36 second	26.4 - 37.5 second
Sodium	131 mEq/L	134 – 146 mEq/L
Potassium	5.0 mEq/dL	3.4 - 4.5 mEq/dL
Urea	132.02 mg/dL	15.00 – 40.00 mg/dL
Creatinine	12.69 mg/dL	0.6 – 1.20 mg/dL
Blood Glucose	92 mg/dL	< 140 mg/dL
HBSAG	Non reactive	Non reactive
CRP	53 mg/L	<5 mg/L
Albumin	2.81 g/dL	3.5-5.2 g/dL
D-dimer	1010 ng/mL FEU	<500 ng/mL FEU
Anti HCV	Reactive	Non reactive
Anti HIV	Reactive	Non reactive
PCR SARS-CoV-2	Positive	Negative

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