Received: 6 July 2020 | Revised: 23 January 2021 | Accepted: 26 January 2021

DOI: 10.1111/nicc.12602

CASE STUDY

BACCN Nursing in Critical Care WILEY

Case study: An older COVID-19 patient in a Turkish intensive care unit with prolonged stay

Ayda Kebapcı PhD, Assistant Professor[1] | Kübra Kütük RN, MSn[2] | Emine Eker RN[2]

[1]Koç University School of Nursing, Istanbul, Turkey

[2]Koç University Hospital, Adult Intensive Care Unit, Istanbul, Turkey

Correspondence
Ayda Kebapcı, Assistant Professor, Koç University School of Nursing, Davutpaşa Street, No: 4, 34010, Topkapı, Istanbul, Turkey.
E-mail: akebapci@ku.edu.tr

Abstract

This paper reports the presentation and management of an older female patient who was diagnosed with Coronavirus disease (COVID-19) and discharged from an intensive care unit (ICU) after prolonged hospitalization. The patient's COVID-19 test was negative; therefore, she was monitored in the COVID-19 general clinic with normal levels of oxygen saturation (SpO_2). The patient had been taking Plaquenil for rheumatoid arthritis for a long time. Azithromycin was administered first, and then, the treatment continued with favipiravir according to the national treatment protocol in Turkey. On the third day in the COVID-19 general clinic, she was transferred to the ICU because of decreased saturation levels. Owing to worsening respiratory status and SpO_2 <70%, the patient was intubated on the sixth day in the ICU, and every day, she was nursed in a prone position for >16 hours. We believe that the treatment and care activities under qualified and effective nursing care, such as providing appropriate respiratory support at the right time, early initiation and maintenance of anticoagulant therapy, long-term prone positioning, maintaining sufficient fluid resuscitation, and early commencement of balanced enteral nutrition, contributed to the successful discharge of the patient from the ICU. The patient was finally extubated on the 23rd day. Respiratory support was continued with oxygen administered at 2 lt/min through a nasal canula with SpO_2 at 94%. We believe that by combining all these factors, the patient's results improved. She was discharged from the ICU after 25 days without any organ dysfunction. During the 25 days of care in the ICU, infectious disease protection and isolation rules were strictly adhered to, and personal protective equipment was worn.

KEYWORDS

COVID-19, intensive care, nursing, patient, SARS-CoV-2

1 | CASE PRESENTATION

A 71-year-old woman was admitted to a hospital in Istanbul, Turkey, with fever, cough, abdominal pain, and diarrhoea. Her oropharyngeal swab test was positive for the 2019 novel coronavirus (SARS-CoV-2), and hydroxychloroquine and azithromycin were prescribed to the patient according to the national treatment protocol in Turkey.[1] Then, she was required to return to the hospital for a check-up 5 days later. She had previously been diagnosed with hypertension, paroxysmal atrial fibrillation (PAF), hypothyroidism, and rheumatoid arthritis. Three days later, she was admitted to the emergency room with high-grade fever, cough, and respiratory distress. The patient had a body temperature of 37.5°C, blood pressure 130/70 mm Hg, heart rate (HR) 80 beats/min, respiratory rate 16 breaths/min, oxygen saturation 94%, and a Glasgow Coma Scale score (GCS) of 15. She was admitted to the COVID-19 general clinic. During her stay, the patient received

1 to 2 lt/min of oxygen support through a nasal cannula. Her treatment protocol included favipiravir, hydroxychloroquine (200-mg tab), verapamil hydrochloride (120 mg), irbesartan–hydrochlorothiazide (300 mg), doxazosin (4 mg), digoxin (0.25 mg), rivaroxaban (20 mg), and propafenone (150 mg). During hospitalization, hydroxychloroquine was continued without interruption because the patient had rheumatoid arthritis. On the third day, her oxygenation worsened, and 15 lt/min of oxygen was administered through a non-rebreather mask after her SpO_2 level decreased to 66%. As a result, she was transferred to the intensive care unit (ICU) because of hypoxia and a hemodynamically worsened status.

1.1 | Disease progression and care management

On the first day in the ICU, the patient was awake, alert, and able to respond appropriately to a stimulus. The patient was started on non-invasive ventilation (NIV) in continuous positive airway pressure (CPAP) mode with a face mask, and fraction of inspiration (FiO2) was set to 60%. Positive end-expiratory pressure (PEEP) was set to 5 cmH2O, and FiO2 was 60%. Her body temperature was >38°C, arterial blood pressure (ABP) 120/66 mm Hg, HR 82/min, respiratory rate 26/min, and oxygen saturation (SpO_2) 95%. Heart rhythm showed atrial fibrillation (AF), which had previously been diagnosed in the patient.

On days 2 to 5 since ICU admission, the patient was hemodynamically stable, co-operative, and had a GCS of 15. Her respiratory support continued with CPAP, and FiO_2 was between 60% and 65%. SpO_2 was between 95% and 96%. Daily urine output was between 1400 and 1590 mL, and fluid balance was between (+)1185 and (+) 115 mL (Table 1). On day 2, echocardiography was conducted, and the left ventricle ejection fraction was 57%, while the left ventricular chamber dimensions and volumes were normal. Right ventricular systolic functions were normal, and mild tricuspid regurgitation was observed. On day 3, C-reactive protein (CRP) and procalcitonin (PCT) levels were 278 mg/L and 0.27 ng/mL, respectively. Rivaroxaban administration was stopped, and enoxaparin sodium (low-molecular-weight heparin at 2 × 0.6 mL subcutaneously) and tazobactam (intravenously) were started. The patient could tolerate being weaned off of CPAP only for a very short time. On day 4, laboratory results revealed an increase in CRP (Table 1). The patient was given one unit of immune plasma. The patient's chest X-ray showed an increase in diffuse reticulonodular opacity in both lung parenchyma. On day 5, the patient had diarrhoea, and a stool sample was sent to the laboratory. Prone positioning was applied for >12 hours during NIV-CPAP. ICU nurses evaluated the risk of pressure injury development with the Braden Scale and provided appropriate prevention interventions, particularly for the face, especially the forehead, chin, and cheeks. Nurses used hydrocolloid dressing to help prevent pressure ulcers caused by NIV. In addition, the pressure areas were supported and checked frequently for redness. Nurses also used skin-protective barrier creams to protect the skin. High-flow nasal canula (HFNC) oxygen therapy was attempted; however, the patient could tolerate this for only a very short time. Until day 5, the patient was able to meet her nutritional requirements through the oral route with a salt-restricted (low sodium) diet.

WHAT IS KNOWN ABOUT THIS TOPIC?

- The mortality rate is high in older COVID-19 patients.
- The progression of COVID-19 is rapid, and early and appropriate respiratory support has positive effects on the improvement of ARDS and mechanical ventilation.
- Prolonged prone positioning improves pulmonary ventilation, increases oxygenation, and reduces mortality in patients with severe ARDS.
- Adherence to the rules for infectious disease protection, isolation, and wearing PPE should be strictly observed by the ICU staff.

WHAT DOES THIS PAPER CONTRIBUTE?

- Besides providing appropriate respiratory support, the combination of the early administration of anticoagulant therapy, prolonged prone positioning, sufficient fluid resuscitation, and early enteral nutrition was shown to improve the patient's progress.
- In addition to medical treatment, the quality of nursing care and interdisciplinary collaboration also directly contributed to successful patient outcomes in patients with COVID-19.

On day 6, the patient's oxygenation worsened, and SpO_2 decreased (70%), so the patient was intubated. Respiratory support was provided in pressure-controlled ventilation (PCV) mode with PEEP at 15 cmH_2O, FiO_2 80% (the inspiratory pressure: 18 cmH_2O), and a frequency of 15 breaths/min under midazolam, fentanyl, and ketamine sedation. CRP was 260.2 mg/L, and PCT was 4.79 ng/mL. The intensivist added meropenem to the treatment protocol. A prolonged prone position (>16 hours) was applied to the patient. ABP was 95/58 mm Hg, HR was 79/min with PAF rhythm, and SpO_2 was 93%. After intubation, a noradrenaline infusion was started in order to increase blood pressure and improve perfusion. On the chest X-ray, progression on the middle-lower zone opacity level on the right lung was observed. CRP values tended to decrease gradually; however, a sudden increase was observed in PCT (Table 1). The D-dimer level was >4000 μg/L. Urine output was within the normal range, and intake and output balance was negative. On days 7 and 8, the patient was placed under the same invasive mechanical ventilation mode and settings for respiratory support. On day 7, because the patient was intubated, she was switched from oral feeding to enteral feeding. Enteral nutrition was started via a nasogastric tube (NGT).

On days 9 to 11, the ratio of the partial pressure of arterial oxygen (PaO2) to FiO2 (PaO2:FiO2) was <100. FiO_2 was set at 80% (PCV

TABLE 1 Patient's daily laboratory results and oxygenation parameters

Days in intensive care unit	FiO_2	SpO_2	C-reactive protein (mg/L)	Procalcitonin (PCT) (ng/mL)	Urine output	Intake + output balance (daily)	D-Dimer (μg/L)
1	50	95					
2	60	96			1590	770	
3	65	92	278	0.27	1585	1185	
4	65	95	329		1460	640	>4000
5	60	95	289		1405	115	
6 (before intubation)	80	70	260.2	4.79	2000	−480	
6 (after intubation)	60	93	259.2	100	2900	1140	14 000
7	60	96	227	100	1510	1466	
8	60	96	72	71	2250	−405	
9	80	96	26	28	1470	68	12 750
10	80	98	14.7	13.8	1900	355	
11	80	96	9.8	5.6	1800	460	10 100
12	75	97	13.6	3.72	4710	−2810	8170
13	60	92	7.6	1.78	1800	−2000	
14	60	96	4.5	1.19	2200	−1200	
15	60	98	3.5		3500	−1266	
16	60	96	7.3	0.64	2420	−268	
17	60	98	5.9	0.48	3040	−846	4860
18	50	97	4.4		2500	5	
19	50	95	21	0.26	3040	−50	
20	45	98	2.3		2920	−244	
21	45	92	3	0.19	2690	−36	
22	40	96	13.2		3490	−490	
23	36	94	6.2		3500	−295	
24	32	94			3500	−970	
25	32	94	1.5	0.09	2700	−160	3910

was set to PEEP 14 cmH_2O, inspiratory pressure: 17 cmH_2O, frequency 17/min). Nurses continued the prolonged prone position (>16 hours) per day to increase oxygenation of the patient. The D-dimer level increased dramatically (12 750 μg/L), so enoxaparin sodium dose was increased to 2 × 0.8 mL. The patient was given one unit of erythrocyte transfusion because of low haemoglobin (9.2 g/dL). The urine output was sufficient; however, as a result of positive fluid balance (Table 1), a furosemide infusion was started. The urine and blood culture results were negative. Vital signs were ABP 140/64 mm Hg, HR 92/min with AF rhythm, body temperature 36.3°C, and SpO_2 96%. CRP, PCT, and D-dimer levels began to drop remarkably.

On days 12 to 15, the FiO_2 level was decreased to 60%, and the PEEP was 12 cmH_2O. The patient was sedated with midazolam, fentanyl, and ketamine. The SpO_2 level was 96%. The intake and output balances were between −1200 and −2000 mL. The patient was hemodynamically stable during these days. Intravenous immunoglobulin (160 mg) was added to the existing treatment protocol. The prolonged prone position and the pressure injury prevention strategies were continued.

On days 16 to 19, the patient was still under sedation with PCV mode support. Oxygen support was gradually reduced to 50% and PEEP to 10 cmH_2O. Hydroxychloroquine treatment was continued because of rheumatoid arthritis. Vital signs were stable, SpO_2 was 95%, and body temperature ranged between 36.3°C and 36.5°C. On day 18, a chest computerized tomography (CT) was taken, and bilateral diffuse infiltration was found. NGT feeding was continued without interruption during long-term prone positioning. There were no pressure injuries on the patient's face or other areas of the body. CRP, PCT, and D-dimer levels continued to decline. The intake and output balances were either negative or balanced. The chest CT scan showed bilateral diffuse infiltration.

On days 20 to 21, as a result of blood-stained secretions on suctioning, the dosage of enoxaparin sodium was decreased to 2 × 0.4 mL, and the first dose was skipped. As a result of increased ABP (140/80 mm Hg), amlodipine was added to the treatment. SpO_2 levels were between 96% and 98%, with 40% FiO_2 level. The patient was still hemodynamically stable, and intake and output balances were negative. Urine output was at a satisfactory level (2690-3490 mL). On day 21, the weaning process was initiated by reducing sedation, and mechanical ventilator mode was switched to pressure support ventilation (PSV) mode (setting PEEP to 6 cmH_2O, inspiratory pressure: 16 cmH_2O). CRP was 13.2 mg/L, and PCT was 0.19 ng/mL.

On day 22, the patient was extubated successfully because of sufficient oxygenation and meeting extubation criteria. After extubation, the patient was alert and co-operative, and the GCS score was 15. Supplemental oxygen was administered through a nasal cannula at 3 lt/min. Vital signs were ABP 121/67 mm Hg, HR 89/min with AF rhythm, SpO_2 94%, and body temperature 36.3°C.

On days 23 to 25, nutrition support was provided with both enteral nutrition through an NGT and an oral hyponatraemic diet. Oxygen support decreased to 2 lt/min. The patient was hemodynamically stable, SpO_2 level was 94%, and body temperature was 37°C. The urine output was satisfactory (between 2700 and 3500 mL per day), and the intake and output balances were negative. On day 24, desaturation was developed because of mobilization efforts of the patient. Therefore, out-of-bed mobilization was not planned for the following days. However, the patient was mobilized within the bed. There were no pressure injuries on the patient's body. On day 25, CRP and PCT levels were within the normal range, and D-dimer and international normalized ratio were 3910 μg/L and 0.98, respectively. As a result, the patient was finally transferred to the COVID-19 general clinic. She was discharged because of sufficient respiratory functions and general condition 8 days later. Before going home, the physiotherapist and psychiatrist consulted with the patient. The last two real-time reverse-transcriptase-polymerase chain reaction (rRT-PCR) tests were negative, and a sample was taken again before discharge, a few days after which the rRT-PCR turned positive, and the patient's treatment was continued at home.

2 | DISCUSSION

In Turkey, the same drugs (hydroxychloroquine, azithromycin, favipiravir, enoxaparin sodium, and furosemide) are administered to patients with COVID-19 in order to alleviate the effect of disease according to the national treatment protocol developed by the Republic of Turkey Ministry of Health.[1]

2.1 | Optimal respiratory support

In this case, the patient was provided supplemental oxygen through a nasal canula and a non-breather mask in the COVID-19 general clinic. After her admission to the ICU, respiratory support continued with NIV-CPAP. However, on day 6, as a result of decreased SpO_2 <90%, increased respiratory work (dyspnoea), use of accessory respiratory muscles, and respiratory alkalosis in the arterial blood gas sample, the patient was intubated and monitored under PCV mode until day 21. The patient could tolerate HFNC oxygen support only for a very short time before intubation.

Gattioni et al stated that increasing the FiO_2 for hypoxemia in patients without dyspnoea is a good solution and that patients respond well.[2] In these patients, >85% O_2 can be provided by using a non-breather mask with a reservoir. However, the nurse should be careful while using the non-breather mask with >60% O_2 for more than 6 hours because oxygen toxicity may occur.[2] For the patients with dyspnoea, 21% to 100% O_2 should be provided with the recommended respiratory support approaches, such as HFNC and CPAP or NIV. However, it is emphasized that the patient's response to the respiratory support approach and the continuous monitoring of oxygenation should be carefully observed in order to make a decision for invasive mechanical ventilation support without any delay. Although the study advises that the intensivist avoid early intubation, it does underline the importance of intubation at the right time in order to prevent lung injuries.[2] For this patient, the ICU nurses monitored the respiratory parameters closely and evaluated arterial blood gas results regularly. Thus, the intensivist made the correct and timely decision of the type of respiratory support approach necessary for the patient. During the invasive mechanical ventilation support with PCV and PSV modes, intensivists aimed to keep SpO_2 between 92% and 96% and prevent barotrauma by adjusting PEEP to as low as possible as recommended.[1,2] When necessary, endotracheal aspiration was conducted with closed aspiration in order to increase ventilation. The closed aspiration system was used in order to avoid drops in ventilation support and to reduce the risk of infection transmission to the health care providers.

2.2 | Prolonged prone positioning

On days 4 and 5, prone positioning was provided for >12 hours when the patient was under NIV-CPAP. After intubation on day 6, the patient remained in the prone position for a prolonged period (>16 hours). Enteral feeding was maintained during prone positioning. In intubated patients with severe acute respiratory distress syndrome (ARDS), early and long-term (at least 12 hours per day) prone positioning increases oxygenation and reduces mortality.[3,4] Prone positioning increases gas exchange by reducing alveolar collapse and improves the ventilation/perfusion ratio. The dorsal areas of the lungs have been found to be better ventilated, and oxygenation improves.[5] Elharar et al. (2020) found that 63% of patients with COVID-19 who were awake and needed oxygen support because of hypoxemic acute respiratory failure could tolerate more than 3 hours in the prone position, and their oxygenation increased by 25%.[6] In a systematic review and metanalysis, it was determined that 12-hours prone positioning reduced mortality in patients with moderate to severe ARDS.[4] In their randomized controlled study, Guerin et al. determined that over 17 hours of prone positioning provided a 17% reduction in mortality among intubated patients with severe ARDS (PaO_2/FiO_2 <150).[3] In the *Sepsis Survival Campaign 2019* guidelines published by the European Society of Intensive Care Medicine and the Society of Critical Care Medicine, prone positioning for 12 to 16 hours is recommended for intubated patients with COVID-19, especially for patients with PaO_2/FiO_2 <150.[7] It was also suggested that the combination of non-invasive respiratory support interventions and prone positioning may be used to decrease intubation and mortality.[8,9]

2.3 | Pressure injuries

In patients with COVID-19, the risk of pressure injury increases because of prolonged prone positioning (>12 hours). It occurs in soft tissues on bony prominences as a result of exposed pressure because of body weight and medical devices. In ARDS patients, pressure injuries may develop particularly in the face, especially the forehead, chin, and cheeks.[10] In addition, the ears, breasts, ribs (thorax), trochanter, knees, ankles, and feet are regions at a high risk of pressure injury development.[11] In patients with severe ARDS, the prevalence of pressure injury in prone positioning is 56.9%, which is higher than that for supine positioning.[12]

Nursing care interventions regarding the prevention of pressure ulcer development in the ICU are also valid and important approaches for patients with COVID-19. Therefore, intensive care nurses should evaluate the risks of pressure injury in patients using risk assessment scales (Braden Scale, Norton Scale, etc.) and identify risk factors.[13] Patients need continuous monitoring and prevention interventions in terms of pressure injury risk. It is important to ensure skin integrity, and the skin should be protected from dryness, moisture, friction, and contact with any hard surface. Skin-protective barrier creams can also be used to prevent skin contact with faeces or urine. It should be ensured that there are no wrinkles on the bed coverings and that the devices attached to the patient's body do not apply pressure to the skin during prolonged prone positioning. The selection of suitable support surfaces for the patient is helpful to prevent the development of facial injuries in patients. The pressure areas should be supported, and the areas of the body that touch each other should be checked frequently for redness. It should be ensured that the patient is not deficient in protein and receives sufficient fluids, especially older adults and underweight or overweight patients.[14]

2.4 | Early administration of anticoagulant therapy

In this case, the patient was already taking rivaroxaban because of persistent AF rhythm. On day 3 in the ICU, the anticoagulant treatment was replaced with low-molecular-weight heparin, and the drug dose was calculated according to the patient's D-dimer levels. Then, the D-dimer levels declined day by day after the ninth day. In patients with COVID-19, a coagulopathy-related thromboembolic event risk, which is very high, is associated with three causes: (a) endothelial damage because of the virus binding to angiotensin-converting enzyme 2, (b) endothelial damage because of sepsis and activation of inflammatory and microthrombotic mechanisms, and (c) venous stasis because of prolonged lying on the bed.[1] It was specified that the risk of coagulopathy is especially high in elderly patients with comorbidities. In Turkey, low-molecular-weight heparin prophylaxis is administered to all patients with COVID-19 in line with the treatment protocol determined by the Republic of Turkey Ministry of Health.[1] The dose of low-molecular-weight heparin is determined according to the level of D-dimer. In low-risk patients (D-dimer <500 μg/L), 40 mg is administered as 1×1 subcutaneously (SC). In high-risk patients (D-dimer >500 μg/L), heparin is administered as 0.5 mg/kg 2×1 SC, and if necessary, an antiaggregant drug is added to the treatment protocol. It was determined that mortality decreases significantly with the use of heparin and that heparin has positive effects, such as binding inflammatory cytokines.[1] Compression stockings also help improve circulation and prevent and alleviate symptoms of various thrombotic conditions, such as venous thromboembolism (VTE). In this case, besides the medical treatment, ICU nurses also provided an anti-embolic stocking and sequential compression devices (SCDs) in order to prevent the risk of deep venous thrombosis as well. Therefore, mechanical devices, such as SCDs, are the first choice for VTE prophylaxis. Enhancing patient outcomes with SCD therapy and administering anticoagulant agents prevent the risk of thromboembolic events and affect the patient's prognosis positively.

2.5 | Appropriate fluid resuscitation

During the patient's stay in the ICU, daily intake-output level was mostly kept either negative or balanced in order to improve patient's oxygenation and provide sufficient fluid resuscitation. The fluid balance was negative or balanced on majority of days, and it was positive for only a few days (2-4, 6, 7, and 10). For fluid resuscitation, crystalloid solutions were used, and in case of positive balance, furosemide was administered to the patient. As a result of decreased mean arterial pressure, a noradrenalin infusion was started in order to prevent hypotension and increase perfusion. In *Surviving Sepsis Campaign: Guidelines on the Management of Critically Ill Adults with Coronavirus Disease 2019 (COVID-19)*,[7] it is emphasized that, in patients with septic shock, avoiding hypervolemia reduces the duration of time on mechanical ventilation and ICU stay.[7] Septic shock is characterized by vasopressor requirement because of severe hypotension (mean arterial pressure [MAP] <65 mm Hg) and perfusion despite adequate fluid therapy. It is recommended that fluid treatment be carried out carefully and that a conservative approach be applied, especially in patients with ARDS. In fluid resuscitation, it is suggested that crystalloid fluids be used over colloids and that early vasopressor treatment be started.[14] It is stated that the risk of developing myocardial dysfunction and arrhythmia is high among elderly patients with COVID-19 with comorbidities.[15] Therefore, uncontrolled fluid resuscitation may worsen patients' oxygenation.[15,16] In this case, the patient's rhythm was AF before hospitalization. It is important that ICU nurses continuously monitor the rate of intravenous infusion, diuresis, capillary refill time, and body temperature to evaluate the patient's response to fluid infusion and perfusion. The fluid balance should be kept mostly negative or in balance. In addition, continuous monitoring of invasive ABP, MAP, central venous pressure, HR, and SPO_2 levels is important in the treatment and care management of patients with regard to the decision to start the noradrenaline infusion.[17]

2.6 | Quality of nursing care

It is stated that the viral load of patients with COVID-19 with high severity followed in the ICU is 60% higher than patients with moderate severity.[18] Patients are at high risk of contamination because of the high viral load, especially in the upper respiratory tract.[19,20] Accordingly, ICU nurses must comply strictly with all infection control measures during all essential nursing care interventions of critically ill patients, such as endotracheal aspiration, intubation, extubation oral care, and positioning. It is well known that intensive care nurses spend most of their working hours close to the patient while fulfilling their treatment and care responsibilities. Therefore, during the interventions performed especially close to the face of the patients, nurses must pay more attention when wearing full personal protective equipment (PPE) as recommended by the World Health Organization.[21] During the COVID-19 outbreak, the insufficient number of intensive care nurses was undoubtedly a very important problem not only for our country but also for many other countries. However, many national or international studies on number, quality, education, and experience of nurses have been conducted. In these studies, a relationship was found between the clinical indicators, including pressure injuries, catheter-related infections, ventilator-associated pneumonia (VAP), etc., and quality of nursing care.[22,23] Studies determined that qualified and sufficient intensive care nurses directly affect patient outcomes (length of stay in intensive care, complication rates, etc.).[24–26] Furthermore, in a study conducted among 422 730 patients in nine European countries, the availability of qualified and well-trained nurses was associated with a 7% reduction in patient mortality.[27] In this case study, the ICU nurses who cared for the patient had an average of 5 years of experience as an ICU nurse, and 50% of them had completed an intensive care nursing certification programme. They quickly adapted to the current conditions and the necessary precautionary measures to be taken with the essential trainings and effective teamwork. They put much effort into implementing all care needs using evidence-based best practice. It is recommended that, because of the risk of aerosol generation in patients with COVID-19, nursing care practices (treatment practices, nursing care, positioning, etc.) be combined if possible and that the number of entrances to the patient room be limited.[28] In this case, ICU nurses were careful not to leave the room without finishing all the necessary care and treatment interventions (sometimes by staying within the room for 3 hours) or not enter and exit unnecessarily. There is also a recommendation to apply oral care, which is a high-risk nursing intervention in aerosol formation, at least once in 12 hours in order to prevent VAP.[29] However, in this case, ICU nurses wore all necessary PPE without reducing the frequency of any nursing care. For example, they provided oral care with 0.2% chlorhexidine gluconate every 4 hours, and VAP development was not observed in the patient. They also used a closed aspiration system for endotracheal aspiration and checked endotracheal cuff pressure regularly to prevent aerosolization.[29,30] During NIV and intermittent mandatory ventilation, nurses used heat and moisture exchanger viral filters to filter the air.

Last but not least, interprofessional collegiality in the management and interprofessional shared decision-making on quality of care of patients had an important effect on patient outcomes in ICUs.[31,32] The ICU team is made up of respiratory therapists, intensive care medicine specialists, infectious disease specialists, and ICU nurses to deliver appropriate and effective treatment strategies to the patient. Interprofessional collegiality provides strong bonds and communications and helps keep the entire team motivated during such an extremely difficult and challenging period.[31] In this ICU, a multidisciplinary team discusses each patient on a case-by-case basis. Especially during daily rounds, it was vital to consider the nurses' judgements and thoughts regarding the patient's response to the existing mechanical ventilation mode adjustments and the patient's compliance, initiating sedation according to the patient's sedation level, the effect of prone positioning and the need to initiate and terminate prone positioning, and also the readiness for a spontaneous breathing trial. The nursing staff was able to decide on milestones for the patient's treatment and care and led the entire team. Having the whole ICU team present for daily rounds was essential for improving interactions. In this way, all care providers were able to effectively collaborate and set clear goals in order to achieve positive patient outcomes.

3 | CONCLUSION

In this case study, an older patient, with a history of hypertension, AF, and rheumatoid arthritis, developed severe ARDS because of COVID-19 and was monitored in the ICU for 25 days. CT images and CRP, PCT, and D-dimer results were valuable for monitoring the progression of COVID-19. It is thought that the treatment and care activities under qualified and effective nursing care, such as administering appropriate respiratory support at the right time, early initiation and maintenance of anticoagulant therapy, long-term prone positioning, maintaining sufficient fluid resuscitation, and early and balanced enteral nutrition, contributed to the successful discharge of the patient from the ICU without any organ dysfunction.

ACKNOWLEDGEMENTS

We are deeply grateful to the medical care team of the Adult Intensive Care Unit, Koç University Hospital. We also thank all the nurses and physicians for their contributions to this study.

ORCID

Ayda Kebapcı https://orcid.org/0000-0002-4549-0846

REFERENCES

1. Republic of Turkey Ministry of Health, General Directorate of Public Health. (2020). *COVID-19 (SARS-CoV-2 Infection) Guideline*. https://covid19bilgi.saglik.gov.tr/depo/rehberler/COVID-19_Rehberi.pdf. Accessed May 5, 2020.
2. Gattinoni L, Chiumello D, Caironi P, Busana M, Romitti F, Brazzi L, Camporota L. (2020). COVID-19 pneumonia: different respiratory treatments for different phenotypes? *Intensive Care Med*; 46: 1099–1102.
3. Guérin C, Reignier J, Richard JC, Beuret P, Gacouin A, Boulain T, et al. (2013). Prone positioning in severe acute respiratory distress syndrome. *New Engl J Med*; 368: 2159–2168.
4. Munshi L, Del Sorbo L, Adhikari NK, Hodgson CL, Wunsch H, Meade MO, et al. (2017). Prone position for acute respiratory distress

syndrome. A systematic review and meta-analysis. *Ann Am Thoracic Soc*; 14(Supplement 4): S280–S288.
5. Nyrén S, Radell P, Lindahl SG, Mure M, Petersson J, Larsson SA, et al. (2010). Lung ventilation and perfusion in prone and supine postures with reference to anesthetized and mechanically ventilated healthy volunteers. *Anesth J Am Soc Anesthesiol*; 112: 682–687.
6. Elharrar X, Trigui Y, Dols AM, Touchon F, Martinez S, Prud'homme E, Papazian L. (2020). Use of prone positioning in nonintubated patients with COVID-19 and hypoxemic acute respiratory failure. *JAMA*, 323(22): 2336–2338.
7. Alhazzani W, Møller MH, Arabi YM, Loeb M, Gong MN, Fan E, Du B. (2020). Surviving sepsis campaign: guidelines on the management of critically ill adults with coronavirus disease 2019 (COVID-19). *Intensive Care Med*, 46(5): 854–887.
8. Ding L, Wang L, Ma W, He H. (2020). Efficacy and safety of early prone positioning combined with HFNC or NIV in moderate to severe ARDS: a multi-center prospective cohort study. *Crit Care*; 24: 28.
9. Longhini F, Bruni A, Garofalo E, Navalesi P, Grasselli G, Cosentini R, et al. (2020). Helmet continuous positive airway pressure and prone positioning: a proposal for an early management of COVID-19 patients. *Pulmonology*, 26(4): 186–191.
10. Girard R, Baboi L, Ayzac L, Richard JC, Guérin C, Proseva Trial Group. (2014). The impact of patient positioning on pressure ulcers in patients with severe ARDS: results from a multicentre randomised controlled trial on prone positioning. *Intensive Care Med*; 40: 397–403.
11. Kim RS, Mullins K. (2016). Preventing facial pressure ulcers in acute respiratory distress syndrome (ARDS). *J Wound Ostomy Cont Nurs*; 43: 427–429.
12. EPUAP (European Pressure Ulcer Advisory Panel) and NPUAP (National Pressure Ulcer Advisory Panel) (2016). *Quick Reference Guide Treatment of Pressure Ulcer*. https://www.epuap.org/wp-content/uploads/2016/10/qrg_treatment_in_turkish.pdf. Accessed May 1, 2020.
13. Wound Care Association (2020). *Pressure Ulcer-Pressure (Pressure) Wound-Decubitus Ulcer-Bed Wound-Decubitus*. http://yarabakimidernegi.org.tr/sayfa-basi-yarasi-55.html. Accessed May 18, 2020.
14. Turkish Society of Intensive Care (TSIC). *COVID-19 İlişkili Septik Şok Tedavisi—TYBD Bilimsel Görüşü*. https://www.yogunbakim.org.tr/haberler/7670/COVID-19-İlişkili-Septik-Şok-Tedavisi—TYBD-Bilimsel-Görüşü. Accessed January 5, 2020
15. Macdonald SP, Keijzers G, Taylor DM, Kinnear F, Arendts G, Fatovich DM, et al. (2018). Restricted fluid resuscitation in suspected sepsis associated hypotension (REFRESH): a pilot randomised controlled trial. *Intensive Care Med*; 44: 2070–2078.
16. Cinel I, Kasapoglu US, Gul F, Dellinger RP. (2020). The initial resuscitation of septic shock. *J Crit Care*; 57: 108–117.
17. Kebapci A. (2020). Current approaches in treatment and care interventions of COVID-19 patients in intensive care unit. *J Turk Soc Crit Care Nurse*; 24(App-1): 46–56.
18. Liu Y, Yan LM, Wan L, Xiang TX, Le A, Liu JM, et al. (2020). Viral dynamics in mild and severe cases of COVID-19. *Lancet Infect Dis*; 20: 656–657.
19. Lescure FX, Bouadma L, Nguyen D, Parisey M, Wicky PH, Behillil S, et al. (2020). Clinical and virological data of the first cases of COVID-19 in Europe: a case series. *Lancet Infect Dis*; 20: 697–706.
20. Zou L, Ruan F, Huang M, Liang L, Huang H, Hong Z, et al. (2020). SARS-CoV-2 viral load in upper respiratory specimens of infected patients. *New Engl J Med*; 382: 1177–1179.
21. Health Organization (WHO) (2020). *Infection Prevention and Control of Epidemic- and pandemic-Prone Acute Respiratory Diseases in Health Care*. https://apps.who.int/iris/bitstream/handle/10665/69707/WHO_CDS_EPR_2007.6_eng.pdf;jsessionid=A26FCB384E84C04D03D1DC84FF90BBB9?sequence=1. Accessed May 20, 2020.
22. das Chagas Vieira FP, Garcia PC, Fugulin FMT. (2016). Nursing care time and quality indicators at a pediatric and neonatal Intensive Care Unit/Tempo de assistência de enfermagem e indicadores de qualidade em Unidade de Terapia Intensiva pediátrica e neonatal. *Acta Paulista de Enfermagem*; 29: 558–564.
23. Kıraner E, Terzi B, Ekinci AU, Tunalı B. (2016). Characteristics of patients with pressure wound in the intensive care unit, journal of the Turkish society of. *Crit Care Nurse*; 20: 78–83.
24. Topçu I, Türkmen E, Badır A, Göktepe N, Miral M, Albayrak S, Kebapçı A, Serbest Ş, Özcan D. (2016). Relationship between nurses' practice environments and nursing outcomes in Turkey. *Int Nurs Rev*; 63: 242–249.
25. Kocaman G, Yürümezoğlu HA, Uncu S, Türkmen E, Göktepe N, İntepeler ŞS. (2018). Türkiye'de hemşireler için sağlıklı çalışma ortamı standartlarının geliştirmesi. *Hemşire-likte Eğitim ve Araştırma Dergisi*; 15: 30–38.
26. Türkmen E. (2015). The relationship between nurse staffing and patient, nurse and organizational outcomes: nurse workforce planning at acute care hospitals. *J Hacettepe Univ Fac Nurs*; 2: 69–80.
27. Aiken LH, Sloane DM, Bruyneel L, Van den Heede K, Griffiths P, Busse R, et al. (2014). Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study. *Lancet*; 383: 1824–1830.
28. World European Society of Paediatric Neonatal Intensive Care (ESPNIC). *Practical guidance for nurses caring for covid-19 patients in the PICU*. https://dochub.com/info-espnic-online/2GQ1NXoKyj7mm4dVDkW6bx/final-espnic-nursing-webinar-7-april-2020-pptx?dt=a6V2EDrGC1Qe7GtHr7QY. Accessed April 30, 2020.
29. Turkish Intensive Care Nurses Association (TICNA)(2020). *Yoğun Bakım Ünıtesİnde Görev Alacak Hemşİreler İçİn Kaynak KİtapçıkCovıd-19 PandemİsI'ne Özel*. https://tybhd.org.tr/wp-content/uploads/2020/04/TYBHD_COVID19_Kitapçık-11.04.2020.pdf. Accessed May 15 2020.
30. Weingart S. (2020). *COVID Airway Management Thoughts*. https://emcrit.org/emcrit/covid-airway-management/. Accessed May 20 2020.
31. Griffin KM, Karas MG, Ivascu NS, Lief L. (2020). Hospital preparedness for COVID-19: a practical guide from a critical care perspective. *Am J Respir Crit Care Med*; 201: 1337–1344.
32. Michalsen A, Long AC, Ganz FD, White DB, Jensen HI, Metaxa V, Hartog CS, Latour JM, Truog RD, Kesecioglu J, Mahn AR (2019). Interprofessional shared decision-making in the ICU a systematic review and recommendations from an expert panel. *Crit Care Med*; 47(9): 1258–1266.

How to cite this article: Kebapcı A, Kütük K, Eker E. Case study: An older COVID-19 patient in a Turkish intensive care unit with prolonged stay. *Nurs Crit Care*. 2021;1–7. https://doi.org/10.1111/nicc.12602