



Nursing care to COVID-19 patients on hemodialysis and in prone position: an experience report

Cuidados de enfermagem ao paciente com a COVID-19 em hemodiálise e posição prona: relato de experiência

Cuidados de enfermería al paciente con COVID-19 en hemodiálisis y posición prona: informe de experiencia

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ABSTRACT

Objective: To describe the experience report of a nurse providing care to COVID-19 patients on hemodialysis and in prone position. **Method:** Experience report. This study was conducted in a philanthropic hospital in a Brazilian capital from May to August 2020 during the Coronavirus pandemic. **Results:** The nurse has faced several challenges concerning structure, material, human resources, and care when treating COVID-19 patients on hemodialysis and in prone position. Management based on dialogue and shared evidence-based information and implementation of a new care protocol were a foundation for care reorganization of the Nursing team for providing care to COVID-19 patients. **Conclusion:** This experience emphasizes the importance of nursing care to patients' responses, with actions based on care protocols, strengthening human relations. The conduction of different study designs is necessary to contribute to an improved nursing care and survival of patients experiencing COVID-19 complications.

DESCRIPTORS

Coronavirus Infections; Renal Dialysis; Nursing; Nursing Care; Prone Position; Patient Care Planning.

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INTRODUCTION

In the International Year of the Nurse and Midwife, nurses worldwide faced a major challenge: providing care to patients infected by the new human Coronavirus, SARS-CoV-2, globally known as COVID-19⁽¹⁾. The American continent is the most affected; Brazil, as of February 1st, 2021, had registered 9,176,975 cases and 223,945 deaths due to COVID-19⁽²⁾.

The COVID-19 pandemic originated from an epidemic in China in late December 2019. This virus presents high transmissibility, morbidity, and mortality; other than lungs, it may affect heart, gastrointestinal tract, and kidneys^(1,3).

A high incidence of Acute Kidney Injury (AKI) has been identified in COVID-19 patients, affecting up to 29% of patients with severe pneumonia in Wuhan, China⁽³⁾. The mortality rate of patients with COVID-19 and AKI is three times higher than in those with no AKI⁽⁴⁾. This data shows the possibility of direct damage to renal tubules caused by the virus and many patients will require Renal Replacement Therapy (RRT) to modulate clinical severity and mortality⁽⁴⁾.

The nurse as a professional is responsible for managing care of patients on hemodialysis, which requires knowledge and leadership and, in times of a pandemic, resilience and adequate management to respond efficiently to challenges and guarantee quality of care and the best results for patient health⁽⁵⁾.

However, many Nursing professionals recognize that knowledge of care to patients on hemodialysis is limited and often learned from co-workers⁽⁶⁾. Also, a study on the competences of nurses specializing in Nephrology does not mention the competences related to research, which reinforces the need for encouragement of developing scientific investigations searching for evidence for nurses' clinical practice in Nephrology⁽⁷⁾.

This study had thus the objective of describing the experience report of a nurse providing care to COVID-19 patients on hemodialysis and in prone position.

METHOD

TYPE OF STUDY

This is a nurse's experience report on providing care to a COVID-19 patient on hemodialysis and in prone position.

LOCAL

The study was conducted in a philanthropic hospital of a Brazilian capital from May to August 2020, during the COVID-19 pandemic. Before the pandemic, the institution offered a dialysis service composed of a multiprofessional team specializing in Nephrology, including a doctor, a coordinating nurse, and five Nursing technicians, one of whom worked in the morning shift, another one in the afternoon shift, whereas the rest of them provided care in the evening and night shift, abiding by a scale of twelve hours to forty-eight resting hours.

SERVICE CHARACTERISTICS

A mean of five to seven sessions of hemodialysis were performed daily, distributed between the two points of dialysis located in a private room in the insurance ward and other five points in the adult Intensive Care Unit (ICU).

The water consumed by the dialysis service was stored in specific reservoirs, monthly analyzed as recommended by Resolution n. 11, dated March 13th, 2014⁽⁸⁾, in addition to a portable reverse osmosis system for each of the five machines, conventional 4008S model, Fresenius. Two machines belonged to the institution, whereas the others belonged to an outsourced company, as did the reverse osmosis systems.

The nephrologist doctor assessed hospitalized patients suffering from acute or chronic kidney failure in the morning. The hemodialysis prescription models included conventional, daily, or intermittent sessions, lasting four to six hours depending on clinical assessment and laboratory results. Most patients used Shilley double or triple lumen catheters, 15 to 20 centimeters, 12 French, preferably in the internal jugular vein or femoral vein.

The head nurse, in turn, in addition to performing administrative work, such as schedule elaboration, Nursing personnel sizing, care planning, daily monitoring of vascular accesses, laboratory exams, water balance of each patient, supervision – with the outsourced service – of the maintenance of machines and clinical analysis of water, supervised the progress of each patient during the RRT sessions, providing the necessary support to the technical team during dialysis therapy.

RESULTS

Through the nurse's experience report on care of COVID-19 patients on hemodialysis and in prone position, it was possible to identify the challenges, which were classified in two major categories: (1) Structural, material, and human resources challenges and (2) Challenges in care to COVID-19 patients on hemodialysis and in prone position.

1) Structural, material, and human resources challenges to care to covid-19 patients on hemodialysis and in prone position.

The first case of COVID-19 in the State took place in 03/17/2020. The hospital started to admit COVID-19 patients in nursing wards and ICU in 05/22/2020 since public sector beds could not cope with the accelerated increase of patients with severe COVID-19 symptoms. From that moment onwards, the hospital and the professionals had to rearrange management of care to COVID-19 patients to guarantee safe and qualified care to patients and professionals.

Readjustment of physical structure and reading and discussion of manuals and guidelines directed at the management of COVID-19 patients on hemodialysis were necessary to provide directed and safe care, preventing virus propagation among professionals⁽⁹⁻¹²⁾. Patient evolution to severe COVID-19 conditions, named Severe Acute Respiratory Syndrome (SARS), required extra ICU beds, whose sector

was disputed among the young, adults, and mainly older adult patients.

From the start of the pandemic, a high incidence of AKI was observed among COVID-19 patients. The hospital had a surprising increase of patients for the conduction of dialysis therapy while many professionals were put on leave due to contamination by the new virus. An emergency selection process was thus required to hire twice the amount of Nursing technicians with expertise in Nephrology; however, the expected result was not achieved. Many professionals had no experience or refused the position due to insecurity about managing patients diagnosed with COVID-19. It was thus necessary to provide training to current hospital's employees.

There were up to fifteen dialysis sessions a day and it was still impossible to conclude all sessions within twenty-four hours. It was necessary to employ the newly opened adult ICU, composed of twenty beds, immediately named COVID-ICU, which was built as an access for patients with SARS caused by COVID-19.

In COVID-ICU, a new hemodialysis room was adapted with two new points to provide care only to COVID-19 patients. The dialysis points of the hydraulic part were increased from four to nine and seventeen new dialysis points were built in the COVID-ICU, totaling thirty points in the institution, avoiding patient transference and, consequently, minimizing risks of hemodynamic instability during transportation and contamination, which guaranteed increased patient safety⁽⁹⁾.

In relation to the number of machines, it was necessary to rent double the amount, which was still insufficient. As an alternative, transference of hemodialysis machines and portable osmosis from one bed to another was opted for, after its proper sanitation, which was performed by the team of Nursing technicians⁽⁸⁻⁹⁾.

2) Challenges in care to COVID-19 patients on hemodialysis and in prone position.

Patients with SARS caused by COVID-19 often develop acute kidney injury. Given the professionals' experience, concerning management during sessions of hemodialysis, a need for surveillance and planning of care to COVID-19 patients on hemodialysis was observed.

Hemodynamic instability, continuous monitoring, sedation, acid-base disorder, dependence on mechanical ventilation, high ventilation parameters, dysfunction in fluid excretion, use of vasoactive drugs, edema, coagulation disorder, and bed restriction were part of the challenges to uninterrupted care to COVID-19 patients received by the hospital's dialysis service.

The prescriptions of dialysis therapy started to differ and became extended, ranging from six to eighteen hours of treatment. The volume to be removed through ultrafiltration was small, considering the accumulated balance; even so, the patients presented complications in the interdialytic period. Pump flow from 150 to 200 ml per minute was hemodynamically acceptable among severe patients.

The predominant vascular accesses continued with short-term catheters 12 French, double or triple lumen, placed

in the jugular and femoral veins. However, some had no effective blood flow, mainly those of the agitated patient, demanding innumerable pauses during the RRT session to find an adequate position for the maintenance of catheter flow, which led to a higher risk of system coagulation.

Heparin was provided as an anticoagulant. Even with its use, practical ability and close attention to the hemodialysis information system were necessary, in addition to an increased surveillance of the extracorporeal circuit. The device presented visual and sound alarms for high vein pressure, transmembrane pressure (TMP), with blood clots and fibrin in the extracorporeal circuit (line and capillary).

All the employed material is single-use and disposed of into infectious material after the procedure. The institution's machines were destined to intermittent dialysis therapy and there was no machine for continuous dialysis therapy.

Another challenge which was posed and solved was Nursing care during extended hemodialysis therapy in three patients in prone position. The patients were placed in ventral decubitus for at least sixteen hours (with a maximum of 20 hours) due to recommendations to improve gas exchange, ventilation-perfusion ratio, and pulmonary and thoracic wall mechanics in patients with SARS due to COVID-19⁽¹⁰⁻¹¹⁾.

Nursing care had to be readjusted, discussed with the team, planned, and registered based on manuals and guidelines directed at COVID-19 patients on hemodialysis and in prone position; this is henceforth described^(7,9-14).

3) Care differences and care recommendations to COVID-19 patients on hemodialysis and in prone position.

The need for continuous assessment through invasive monitoring: non-invasive monitoring was worrying because patients were very swollen, using vasoactive medication, and due to the constant verification of vital signs, such as blood pressure, with a cuff, which might offer unreliable results. The recommendation for severe COVID-19 patients on hemodialysis is invasive monitoring. Monitoring is a direct care intervention which is indispensable to patient safety⁽⁹⁻¹⁰⁾.

Pupil assessment and corneal injury prevention: during hemodialysis, pupil assessment is necessary to measure neurological function due to the use of sedatives, vasoactive medication, mechanical ventilation, and risk of hemodynamic instability. Pupil assessment was hindered by prone position and it was common to find swollen eyelids, partially open and dry cornea, leading to a risk of corneal injury. The recommendations are prophylaxis for facial pressure injury, cornea hydration with eye drops or eye gel and closure of the patient's eyelids, aiming at corneal injury prevention⁽⁹⁻¹³⁾.

Collection of arterial blood for gasometry: routinely, collection takes place at the first hour after patient positioning for assessment for disorders and the best perfusion ratio to start the dialysis sessions, and every six subsequent hours, monitoring the risks of possible disturbances which may be associated to the employed kidney therapy. Collection through the dialysis catheter line is recommended, avoiding unnecessary punctions for the patient^(7,9-10).

Site and assessment of catheter insertion site: due to positioning either in jugular or femoral vein, catheter visualization is hindered by prone position. Thus, the catheter is recommended to be placed in the right internal jugular vein, as it favors inspection and bandage placement, which must be performed with chlorhexidine to minimize risk of infection⁽⁹⁾.

Anticoagulation: severe COVID-19 patients may evolve with hypercoagulation, which has been related to a worse prognosis⁽⁹⁾. This dyscrasia may reduce the lifespan of filters and extracorporeal circuits. Each service is recommended to follow its usual anticoagulation routine; upon identification of possible hypercoagulability, depuration procedures with repeated washing of the circuit with saline solution with no employment of anticoagulants are not recommended. The first measure is to verify whether vascular access is adequate and, if the problem persists, there may be the need of intensifying anticoagulation, increasing the dose of conventional or low molecular weight heparin^(9,14).

DISCUSSION

The COVID-19 pandemic had repercussion for all health systems around the world. Brazil, one of the epicenters of the pandemic, also had an urgent need for health service rearrangement to increase the number of nursing ward and ICU beds due to virus propagation and patient severity⁽¹⁵⁾.

The need for mechanical ventilators to assist patients with SARS due to COVID-19, estimated to be 5% of those infected, and for personal protective equipment for professionals who are on the frontline in the pandemic were points of major worry in the health system due to urgent and high demand and reduced offer⁽¹⁶⁻¹⁷⁾. In addition to the reported needs, others were demonstrated, such as structure and equipment for RRT, given that AKI has affected 5% of hospitalized patients and 50% of patients receiving critical care⁽¹⁸⁾.

In the presence of COVID-19 infection, the incidence of AKI may reach 36.6% of cases, and 14.3% will require RRT and lethality is up to 35%⁽¹⁹⁾. In addition, patients with Chronic Kidney Disease (CKD), in hospital admission, pose risk factors, regardless of mortality, requiring more surveillance to guarantee patient safety⁽²⁰⁾.

The demand for RRT among COVID-19 patients has surpassed hospital supply; the adoption of conservative measures to safely postpone the start of dialysis is of importance, as is the planning of the professional team to conserve current dialysis material, a procedure which is similar to that of the reported dialysis service^(9-10,21-24). However, conduction of RRT in prone position was a major challenge to the team.

Prone position, previously performed in rare moments in the ICU, even if its benefits were already known, became a routine due to its beneficial effect in improving severe hypoxia, possibly related to redistribution of blood flow and edema to the ventral side due to gravity, favoring alveolar opening, improving gas exchange and, consequently, reducing patient mortality⁽²⁴⁻²⁶⁾.

According to a statement by the Brazilian Society of Nephrology, in a partnership with the Brazilian Association of Intensive Care Medicine, there is no contraindication for dialysis in prone position, whose careful observation to avoid catheter traction or line twisting is recommended. However, the statement emphasizes that femoral access may be inadequate for patients in this position⁽⁹⁻¹¹⁾. In the reported unit, this access was used due to reducing risk of virus exposure for professionals during catheter insertion or dialysis sessions, in addition to helping blood flow. Nevertheless, this position has hindered inspection. The right internal jugular vein is preferably recommended for vascular access implantation; however, this access may be unavailable due to the need for multiple vascular accesses. The left internal jugular vein is the second option. Access through the subclavian veins is not recommended due to the risk of accident during puncture and residual stenosis⁽⁹⁾.

A review study on ventral decubitus among patients with severe hypoxemia has shown better results in the execution of this procedure between 12 and 24 hours from the diagnosis of respiratory discomfort, with hemodynamic stabilization and duration of at least 16 hours, similar to what was conducted in the unit, as described in the nurse's report⁽²⁷⁾.

It should be emphasized that prone position is not free of complications, and Nursing care includes: verifying the existence of the necessary devices during emergency support with long lines for the mechanical ventilator; caution with the orotracheal tube in order not to injure the mouth; eye care through cornea hydration and eyelid occlusion to prevent corneal lesion; preventing pressure lesion through protection of bony protuberances in previously unused sites, such as face, thorax, knees, and hip; inspection and change of dressing of the catheter to avoid infection and catheter loss. These challenges daily permeate the care provided by the Nephrology Nursing team to COVID-19 patients^(9-13,27).

An additional point is the use of the extended hemodialysis method, recognized for uniting the benefits of continuous and intermittent dialysis, a crucial point for adoption in places where equipment for continuous hemodialysis is scarce, favoring a decreased risk of contamination of professionals^(9,28). Many intensive care units are emphasized not to have a Nephrology team due to the recommendation that RRT should be conducted by the nurse in the ICU⁽⁹⁻¹⁰⁾. However, interaction and collaboration among nephrologists and intensivists in COVID-19 patient care are recommended, as is that each health institution should define its policy for bed allocation and choice of professionals who will be on the frontline, either by isolation in a specific physical area or a general hospitalization or intensive care unit, as in the reported unit⁽⁹⁻¹⁰⁾.

The team and the hospital deserve recognition for their resilience and adjustments in care, which was planned based on scientific evidence^(1,6,7,22). This emphasizes thus the importance of constantly updating the team, as well as clear, assertive, and careful communication among collaborators, aiming at reducing anxiety which may be generated by uncertainties of change in care practice due to the COVID-19 pandemic⁽²³⁾.

Finally, it should be emphasized that, considering the countless challenges, directed care must be provided to nurses working in the frontline during the COVID-19 pandemic in a Nephrology and Intensive Care Unit, who have a higher workload and are more stressed than usual. They require institutional support, stress monitoring and intervals for meals and rest to maintain their professional activity⁽²⁹⁻³⁰⁾.

One limitation is the disparity between services, which have no machines for performing continuous dialysis and, even so, perform extended dialysis. As a strength, the dissemination of professional experiences is believed to be fundamental to discuss challenges, the peculiarity of Nursing care, and the scientific recommendations, contributing thus with the Nursing area, particularly Nephrology, to provide care to COVID-19 patients on hemodialysis and in prone position⁽⁶⁻⁷⁾.

RESUMO

Objetivo: Descrever o relato de experiência de um enfermeiro no cuidado ao paciente com a COVID-19 em hemodiálise e posição prona. **Método:** Relato de experiência. O estudo foi realizado em um hospital filantrópico de uma capital brasileira, no período de maio a agosto de 2020, durante a pandemia do Coronavírus. **Resultados:** O enfermeiro enfrentou diversos desafios estruturais, materiais, de recursos humanos e assistenciais para o cuidado ao paciente com a COVID-19 em hemodiálise e posição prona. A gestão fundamentada no diálogo e no compartilhamento de informações baseadas em evidências e a implementação de um novo protocolo assistencial foram o alicerce para a reorganização assistencial da equipe de Enfermagem para o cuidado ao paciente com a COVID-19. **Conclusão:** Diante dessa experiência, destaca-se a importância da atenção de enfermagem às respostas dos pacientes, respaldando suas ações em protocolos assistenciais e fortalecendo as relações humanas. Faz-se necessária a condução de outros delineamentos de estudos de modo a contribuir para a melhoria da assistência de enfermagem e a sobrevivência de pacientes com complicações da COVID-19.

DESCRIPTORIOS

Infecções por Coronavírus; Diálise Renal; Enfermagem; Cuidados de Enfermagem; Decúbito Ventral; Planejamento de Assistência ao Paciente.

RESUMEN

Objetivo: Describir el informe de experiencia de un enfermero en el cuidado al paciente con COVID-19 en hemodiálisis y posición prona. **Método:** Informe de experiencia. El estudio fue realizado en un hospital filantrópico de una capital brasileña de mayo a agosto de 2020, durante la pandemia de Coronavirus. **Resultados:** El enfermero enfrentó varios retos estructurales, materiales, de recursos humanos y de asistencia para el cuidado del paciente con COVID-19 en hemodiálisis y posición prona. La gestión basada en el diálogo y en el intercambio de información basada en evidencias y la implementación de un nuevo protocolo asistencial fueron el fundamento para la reorganización asistencial del equipo de Enfermería para el cuidado del paciente con COVID-19. **Conclusión:** A partir de esta experiencia, se destaca la importancia de la atención de enfermería a las respuestas de los pacientes, respaldando sus acciones en los protocolos de asistencia y fortaleciendo las relaciones humanas. Es necesaria la realización de otros diseños de estudio para contribuir a la mejora de la asistencia de enfermería y la supervivencia de los pacientes con complicaciones de la COVID-19.

DESCRIPTORIOS

Infecciones por Coronavirus; Diálisis Renal; Enfermería; Atención de Enfermería; Posición Prona; Planificación de Atención al Paciente.

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