

Application of Abdellah's Nursing Process in Patient Care with ECMO: A Case Report

ECMO'lu Hasta Bakımında Abdellah'ın Hemşirelik Sürecinin Uygulanması: Olgu Sunumu

ABSTRACT

Despite its life-saving role, the care of patients undergoing extracorporeal membrane oxygenation (ECMO) presents unique challenges due to potential complications. Thus, a multidisciplinary approach is essential for effective patient management. Nursing theories can be beneficial in care practices in ECMO patients by facilitating multidisciplinary collaboration, applying scientific knowledge and principles, and implementing systematic approaches.

Keywords: Abdellah, extracorporeal membrane oxygenations, nursing care, nursing theories

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Hayat kurtarıcı rolüne rağmen, ekstrakorporeal membran oksijenasyonu (ECMO) uygulanan hastaların bakımı, potansiyel komplikasyonlar nedeniyle benzersiz zorluklar sunar. Bu nedenle, etkili hasta yönetimi için multidisipliner bir yaklaşım şarttır. Hemşirelik kuramları; multidisipliner bakımı destekleme, bilimsel bilgi ve ilkeleri uygulama, organize etme, sistematik yaklaşım sunma gibi fonksiyonlarıyla ECMO'lu hasta bakımında yarar sağlayabilir.

Anahtar Kelimeler: Abdellah, ekstrakorporeal membran oksijenasyonu, hemşirelik bakımı, hemşirelik kuramları, yirmi bir hemşirelik problemi

Introduction

Extra Corporeal Membrane Oxygenation (ECMO) is utilized to support circulation in conditions such as cardiopulmonary failure, Covid-19, and acute respiratory distress syndrome (ARDS) mechanically.^{1,2} Despite its life-saving role, ECMO can lead to various complications, including coagulation in cannulas, thrombocytopenia, separation of cannulas, embolism, oxygenation deficiency, bleeding, neurological complications, organ failure, infection, immobilization, and metabolic issues.² The nurse's approach to patients undergoing ECMO significantly impacts the overall process's success. In addition to managing and coordinating care provision, it is the nurse's responsibility to remain constantly vigilant, monitoring, controlling, and preventing complications.³

Nursing, as a professional discipline, can draw upon various theories to enhance caregiving. Incorporating theories, scientific knowledge, and principles into care planning, organizing, guiding, and adopting systematic approaches can facilitate the achievement of desired outcomes.

Abdellah's 21 Nursing Problems

Abdellah⁴ defined humans as beings with physiological, emotional, and social needs. Faye Glenn Abdellah's 21 Nursing Problem Theory, which serves as the foundation for nursing care practices, is a suitable model for addressing many chronic diseases. The theory discusses health needs and a problem-solving approach. Within this framework, which emphasizes meeting individual needs, unmet needs are identified as nursing problems, and a holistic approach is employed for their resolution.^{5,6}

CASE REPORT

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Abdellah categorized the 21 nursing problems into 4 levels:

- Level 1: Basic care needs
- Level 2: Sustenance care needs
- Level 3: Remedial care needs
- Level 4: Restorative care needs

This classification by Abdellah facilitates the identification of problems and their root causes, data collection, and targeted planning. It brings a systematic approach to care by addressing the patient comprehensively.⁶

A patient undergoing ECMO follow-up requires comprehensive care addressing all aspects—physiological, emotional, and social. Abdellah's theory is believed to be capable of meeting all nursing care needs for this patient population. In this case report, the care plan for a patient receiving ECMO support was developed by aligning with Abdellah's approach to nursing problems.

Case Presentation

The data were collected in the Cardiovascular Surgery Intensive Care Unit of Health Sciences University Ahi Evren Thoracic Cardiovascular Surgery Training and Research Hospital specializing in cardiovascular surgery between February 11th and November 22nd, 2021. Data were obtained through face-to-face interviews, and written informed consent was obtained from the patient. Care planning utilized "Abdellah's 21 Nursing Problems" and "NANDA Nursing Diagnoses."

Sociodemographic Characteristics: 59-year-old male, a primary school graduate, married with three children, covered by social security, and retired.

Physical Characteristics: 1.72 meters tall, weighs 56 kilograms, with a body mass index of 18.93 kg/m², consistent with his ideal body weight.

Medical History: The patient was diagnosed with hypertension eight years ago and has been under medication since then. He also has a history of previous pneumonia and underwent appendectomy surgery. In 2019, during an angiography procedure, a stent was placed in his right main coronary artery. He has no known food or drug allergies.

Habits: The patient used to smoke one pack of cigarettes every other day for 30 years but quit nine years ago.

Current Health History: He was admitted to the hospital due to respiratory distress. Following coronary angiography, surgical treatment was deemed necessary. On February 11th, 2021, he underwent CABG (Coronary Artery Bypass Grafting) along with Mitral Valve Ring placement and repair of a pseudoaneurysm in the cardiovascular surgery clinic. He was subsequently transferred to the intensive care unit with ECMO inserted during surgery.

Vital Signs: Blood pressure: 98/56 mmHg, Pulse: 118/min, Temperature: 36.5°C, Respiration rate: 18/min, Blood glucose level: 152 mg/dL

Patient Care with ECMO Using Abdellah's Approach to 21 Nursing Problems

Level 1: Basic Care Needs

Maintaining Good Hygiene and Physical Comfort

Nursing Diagnosis: Bleeding Risk

Objective: Preventing potential bleeding risks and associated complications.

Interventions: Blood pressure, heart rhythm, central venous pressure, oxygen saturation, and arterial blood gas levels were monitored. The integrity of drainage systems and monitoring drainage was ensured. Laboratory results including Activated Coagulation Time (ACT), hemoglobin, hematocrit, and platelet levels were monitored. Incision sites were assessed for signs of bleeding. Peripheral pulses, skin temperature, and color are checked. ECMO cannula sites were followed, and arterial and venous lines for proper coloration assessed.

Evaluation: The patient experienced drainage of 250-300 ml per day until drains were removed. Postoperative laboratory and blood gas values showed no abnormalities related to bleeding.

Promoting Optimal Activity, Exercise, Rest, and Sleep

Nursing Diagnosis: Activity Intolerance

Objective: Enhancing the patient's ability to move in bed without pain and dyspnea, thereby increasing activity tolerance, and ensuring adequate sleep and rest.

Interventions: The importance of movement was discussed with the patient and his participation in exercises were encouraged. Due to the restricted activity, in-bed exercises were planned together with the physiotherapist and applied provided that the safety of ECMO was ensured. Breathing and coughing exercises were conducted regularly while the patient was extubated. Vital signs were monitored to assess tolerance to movement. Sleep quality was evaluated and a calm, dark environment was created to facilitate adequate sleep.

Evaluation: The patient reported inadequate sleep. However, he demonstrated tolerance to minimal activity during care and exercise sessions.

Promoting Safety by Preventing Accidents, Injuries, and Infection Spread

Nursing Diagnosis: Risk of Infection

Objective: Preventing the occurrence of infections.

Interventions: Hand hygiene measures were provided. Aseptic techniques during invasive procedures were employed. Catheters, incision sites, and ECMO entry points were inspected daily for signs of infection. Laboratory results were monitored daily. Prophylactic cefazolin (4 times a day, 1 gram each) administered in the postoperative period. The necessity of catheters was assessed daily. Oral care was performed every 8 hours, and perineal and body care was performed twice a day.

Evaluation: The patient developed an infection in the central venous catheter and bloodstream. Consequently, antibiotic therapy was initiated under the guidance of the infectious disease physician.

Level 2: Sustenal Care Needs

Facilitating Oxygen Maintenance in All Body Cells

Nursing Diagnosis: Change in Tissue Perfusion

Objective: Providing oxygen to all tissues.

Interventions: Vital signs were monitored, including evaluation of extremities for color and temperature. Laboratory findings were closely monitored, along with ECMO blood gas exchange. Oxygen support was administered via mechanical ventilation (MV) until the third day postoperatively, and then switched to nasal high flow after extubation. However, due to worsening hemodynamics and blood gas values, the patient's oxygen support was deemed insufficient, leading to their re-intubation on the fourth postoperative day as per the physician's decision.

Evaluation: Confusion and respiratory distress developed.

Facilitating Nutrition Maintenance for All Body Cells

Nursing Diagnosis: Less Nutrition Than the Body Needs

Objective: Meeting the patient's metabolic needs.

Interventions: The nutritional and fluid intake status of the individual was assessed. The importance of a balanced diet was explained, and he was asked to describe situations that diminished his appetite. Upon initiation of oral intake, frequent feeding was implemented. Parenteral nutrition support was initiated for the patient upon reintubation.

Evaluation: Metabolic needs were fulfilled through parenteral nutrition.

Facilitating Maintenance of Elimination

Nursing Diagnosis: Risk of Impairment of Urinary Excretion

Objective: Maintaining elimination by ensuring the patient's urinary discharge.

Interventions: As the patient was bedridden, urine discharge was facilitated using a Foley catheter. The patient's intake and output were monitored closely. Renal function tests were conducted regularly. The integrity of bladder catheterization was assessed routinely.

Evaluation: As the patient exhibited elevated urea-creatinine levels and experienced a decline in spontaneous urine flow, dialysis was continued for his discharge.

Facilitating Maintenance of Fluid and Electrolyte Balance

Nursing Diagnosis: Risk of Fluid Volume Imbalance

Objective: Maintaining fluid and electrolyte balance.

Interventions: The patient's intake and output were monitored. Electrolyte levels were assessed through blood gas and biochemistry tests. Dehydration and fluid overload indicators were examined. Edema control in the extremities was performed. The mucosa was inspected.

Evaluation: Deficient electrolytes were replaced based on the results of blood gas and biochemistry tests to ensure the maintenance of fluid-electrolyte balance.

Recognizing Physiological Responses of the Body to Disease

Nursing Diagnosis: Impaired Body Consciousness

Objective: Enabling the patient's application of coping strategies and acceptance of his appearance.

Interventions: The patient was encouraged to express his self-perception. His feelings, such as fear and anxiety, were openly

discussed, and he was encouraged to ask questions about the treatment and recovery process, all of which were addressed. Information regarding ECMO was provided to him. A safe environment and patient privacy were ensured throughout.

Evaluation: The patient expressed fear of ECMO due to its impact on mobility.

Facilitating Maintenance of Regulatory Mechanisms and Functions

Nursing Diagnosis: Risk of Ineffective Respiratory Function

Objective: Maintaining respiratory functions.

Interventions: In-bed exercises were planned and implemented as part of the patient's care regimen. Breathing, coughing, and trifle exercises were performed with the patient in the semi-Fowler position every hour. Evaluation of breath sounds and depth was conducted. Secretion color and consistency were assessed. Due to insufficient respiratory function, the patient was reintubated on the fourth day after surgery.

Evaluation: Excessive secretion was noted. Following reintubation, he was aspirated when needed.

Facilitating Maintenance of Sensory Functions

Nursing Diagnosis: Sensory Perception Disorder

Objective: Alleviating symptoms of sensory perception deficit and preventing the onset of post-cardiotomy psychosis.

Interventions: Nursing practices were planned to maintain the patient's normal day-night cycle. Electrolytes, urea, and creatinine levels were monitored regularly. Efforts were made to minimize environmental stimuli that could disrupt sleep. The patient received frequent reminders regarding time and place orientation. Participation in self-care activities was encouraged based on the patient's tolerance level. Support systems and coping mechanisms were assessed. Evaluation included screening for perceptual disorders, hallucinations, and disorientation. Emotional support was provided to facilitate expression of feelings and thoughts. To offer comfort and orientation, the patient was permitted to meet with relatives, with appropriate infection precautions taken when his sister visited.

Evaluation: The patient experienced disorientation, but it was managed effectively without the need for medication, and the patient regained orientation to the environment.

Level 3: Remedial Care Needs

Identifying and Accepting Positive or Negative Expressions, Feelings, and Reactions

Nursing Diagnosis: Death Anxiety

Objective: Assisting the patient in expressing and alleviating anxiety related to death.

Interventions: The patient's feelings and thoughts were heard and acknowledged. He was encouraged to articulate his anxiety about death. Spiritual activities, such as prayer, were facilitated. Despite being unable to speak during the reintubation period, continuous communication was maintained, and procedures were explained to him.

Evaluation: The patient continued to experience anxiety about death, despite expressing his feelings. However, he reported feeling some relief from discussing it. Intravenous sedation was initiated for the patient who persisted in experiencing anxiety, even after reintubation.

Identifying and Acknowledging the Interrelatedness of Emotions and Organic Diseases

Nursing Diagnosis: Mental Distress

Objective: Identifying and managing risk factors while supporting the patient in accepting their current condition.

Interventions: The patient's sources of strength were assessed. An empathetic bond was established with the patient. He was encouraged to share his relaxation techniques. Family visits were permitted.

Evaluation: The patient experienced difficulty in relaxing due to dependency on ECMO. He expressed frustration with the device's limitation on his movement.

Facilitating Maintenance of Effective Verbal and Nonverbal Communication

Nursing Diagnosis: Impairment in Verbal Communication

Objective: Supporting respiratory function and maintaining communication in the patient despite verbal communication impairment due to dyspnea.

Interventions: The causes of the patient's dyspnea were assessed, and respiratory physiotherapy was administered. The patient was encouraged and assisted in verbal communication. Ample time was allotted to listen to the patient, despite difficulties in speaking due to respiratory distress, and communication was uninterrupted.

Evaluation: The patient's respiratory difficulties were managed with support from a nasal high-flow system and oxygen via a nebulizer mask. Respiratory problems were resolved. However, on the fourth postoperative day, the patient was reintubated due to deterioration in hemodynamics and blood gas values, leading to restricted verbal communication.

Facilitating Progress Toward Achievement of Personal Spiritual Goals

Nursing Diagnosis: Moral Distress

Objective: To raise the morale of the patient.

Intervention: The morale problem was identified, and the physician provided explanatory information about the clinical situation. The patient was encouraged to cope with the situation and to discuss any feelings of suffering and despair. The family interview provided relief to the patient.

Evaluation: The patient expressed thoughts of dying due to dependency on ECMO, questioning God and himself, and expressing feelings of why this situation happened to him.

Creating or Maintaining a Therapeutic Environment

Nursing Diagnosis: Pain

Objective: Patient verbal/non-verbal expression of pain relief.

Interventions: The location, severity, and onset of pain, as well as factors that alleviate or exacerbate it, were assessed. Using the Visual Analogue Scale (VAS), the patient's pain level was determined to be 7. Measures to alleviate pain included eliminating pain-inducing stimuli, dimming the lights around the patient, moderating monitor alarm sounds, and instructing staff not to disturb the patient during rest. The relationship between pain and pressure was examined, and in-bed exercises were performed. The affected areas were moistened with appropriate barrier creams. Analgesic medication was administered as per the physician's instructions.

Evaluation: The patient reported pain relief with a VAS score of 2.

Facilitating Self-awareness as an Individual with Varying Needs

Nursing Diagnosis: Readiness to Enhance Comfort

Objective: Alleviating patient discomfort related to ECMO-related limitations.

Interventions: The patient was encouraged to discuss areas where he perceived inadequacy. He was informed about his dependency on ECMO, with nurses being responsible for his care throughout this process, and assured that this dependency would diminish with nursing support. Additionally, the patient was educated that the ECMO device is not permanent and compliance with its use is crucial as it plays a significant role in treatment.

Evaluation: The patient complied with the process, and ECMO support was successfully terminated on the 18th postoperative day.

Level 4: Restorative Care Needs

Facilitating Self-awareness as an Individual with Varying Needs

Nursing Diagnosis: Ineffective Coping

Objective: Empowering the patient to express both positive and negative coping attitudes affecting their health and to utilize appropriate coping methods.

Interventions: The patient's positive and negative coping methods were assessed. Ensuring he employed healthy and suitable coping techniques was prioritized. The patient was encouraged to engage in activities he previously enjoyed. Resources to aid the patient were identified, and family visits were arranged accordingly.

Evaluation: Following a family visit, the patient reported feeling emotionally stronger.

Utilizing Community Resources to Address Illness-Related Problems

Nursing Diagnosis: Risk of Loneliness

Objective: Preventing the patient from feeling isolated.

Interventions: He was encouraged to share his thoughts and feelings. He was also encouraged to interact with other

patients in the intensive care unit. The nurses responsible for his care informed him about his condition. A family visit was permitted.

Evaluation: The patient expressed happiness after the family visit, indicating a positive impact on their emotional well-being.

Discussion

Nursing theories facilitate comprehensive patient evaluation across all care processes. In intricate and prolonged treatments like ECMO therapy, patients necessitate assessment from various angles, necessitating a holistic care approach. With Faye Glenn Abdellah's creation of 21 nursing care models tailored to ECMO patients, it is believed they serve as a cornerstone for delivering quality care. This case report is crafted in accordance with these models. The models provide a structured approach to patient care, particularly in addressing psychological and emotional needs and fostering patient expression. Thus, it is recommended as a guiding framework for nurses administering ECMO care in clinical settings.

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