



Nursing Care in Acute Renal Failure After the Diagnosis of Congestive Heart Failure According to Gordon's Functional Health Patterns Model: A Case Report

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Abstract: Congestive heart failure; it is characterized by the inability of the heart to pump blood to the periphery that cannot meet its metabolic needs. Increases in the workload of the heart occur due to deterioration of myocardial performance, dysrhythmias and filling defect in the heart. Complaints seen in congestive heart failure; shortness of breath, weakness, edema in the feet and legs, and cough. In the case, a 66-year-old female patient was admitted to the hospital with the complaint of shortness of breath. As a result of the examinations, she was diagnosed with congestive heart failure and admitted to the ward. In this process, the patient was evaluated according to the Functional Health Patterns Nursing Model and nursing care was given.

Keywords: Nursing, Nursing Care, Health

1. Introduction

Congestive heart failure (CHF); it is a complex clinical syndrome with symptoms such as shortness of breath, ankle edema and fatigue, increased jugular venous pressure, pulmonary rales, and peripheral edema, which occur as a result of a structural or functional defect in the filling of blood into the ventricle or decrease in the ejection fraction (EF) of the heart (1).

Symptoms are generally shortness of breath, fatigue, chest pain, edema of the hands and feet, sleep problems and dizziness (2). Individuals with a diagnosis of heart failure need long-term care because of their chronic disease and high mortality risk. In this context, the main principles of treatment; salt restriction, fluid intake/restriction, weight control, smoking and alcohol use, physical activity, protection and immunization against diseases, compliance with medical treatment (1). CHF care purposes in terms of nursing; to relieve anxiety and fatigue symptoms of individuals, to remove excess fluid volume, to increase exercise tolerance, to encourage physical activity, to evaluate the results of pharmacological treatment, to prevent complications, to detect signs and symptoms in the early period, patient and family education (3).

1.1. Case information

Ethical aspects: This case study is discussed according to Gordon's functional health patterns model. Verbal and written consent was obtained from the patient for the conduct of this case article within the framework of the principles of the Declaration of Helsinki.

Sociodemographic characteristics: H.T. is a 66-year-old female patient and retired. She started to live with her sister after the death of her husband and son.

1.2. Health history

Past health history: Chronic diseases diagnosed by H.T. 15 years ago are Diabetes Mellitus (DM) and Hypertension (HT). There is no history of alcohol and smoking, known drug or food allergies. H.T. also underwent prosthetic surgery on her right knee 20 years ago.

Drugs used: “Rocephin Injection 1gr 1x1 (IV), Beloc Zoc 50mg 1x1 (tb), Ecoprin 100mg 1x1 (tb), Plavix 75mg 1x1 (tb), Panto 40mg 1x1 (tb), Ator 40mg 1x1 (tb), Sutril Neo 10mg 1x1 (tb), Forziga™ 10mg 1x1 (tb), Norvasc® 10mg 1x1 (tb-As Needed (LH)), Hydration, Dopamine Perfusion, Lasix Perfusion, Potassium Perfusion and Zofer 4mg (IV).

Current health history: H.T. who had a known diagnosis of hypertension and DM, applied to a training and research hospital on 17 March 2022 with the complaint of shortness of breath. Ejection fraction (EF) was found to be 30% in the examinations and echocardiography (ECHO) and a diagnosis of CHF was made. H.T. was admitted to the service of the institution for medical treatment. Nephrology consultation was requested when creatinine values increased while she was lying in the service on 18-19-20 March 2022, her intake-output balance (IOB) was +1450cc, and the urine amount was 300 ml in 24 hours. Adding Sutril Neo 10mg and Forziga 10mg to the treatment plan of the physician who came for consultation resulted in an increase in creatinine (3.55 mg/dL) and a decrease in sodium (128 mmol/L). H.T., was hospitalized in the coronary intensive care unit for follow-up and follow-up with the diagnosis of acute renal failure.

Medical diagnoses: Congestive Heart Failure, Acute Renal Failure (ARF), Hypertension and Diabetes Mellitus.

2. Functional Health Patterns and Case Evaluation

2.1. Health perception – health management pattern

H.T. described her health as moderate. She stated that since her father passed away due to coronary artery disease (CAD), she regularly came for checkups. H.T. stated that she walks 1.5-2 hours a day in her normal life. H.T. was found to be overweight with a body mass index (BMI) of 28.73 kg/m². H.T. was evaluated and maintained on 22-23 March 2022. On the first day of her evaluation, she stated that she had pain due to the vascular access in her left arm. H.T. gave a score of 3 out of 10 for the degree of pain according to the visual analog scale (VAS). However, she stated that her pain subsided after the relocation of the vascular access and the vascular access dressing.

2.2. Nutritional-metabolic pattern

H.T. is fed 3 meals a day. However, it was observed that she only took a salt-free diet and did not have a diet suitable for DM. Oral intake of HT was found to be +600 cc in the last two days. In terms of the oral assessment guide (OAG), it was determined that the lips were dry and cracked, there was a dirty yellow layer on the upper layer of the tongue, and the OAG score was 11 due to the thick and sticky consistency of the saliva (OAG score ranges from 8-24). Oral care frequency is planned as 3x1 if OAG score is 8, 6x1 if 9-19 points, and 12x1 if 20 points and above). When examined in terms of skin, vital signs were evaluated in the morning and evening, and no distress was observed in terms of body temperature. In the evaluation of edema, the degree of edema was +2 on both days. Within the scope of diabetic foot examination, foot health, neuropathy, immunopathy, deformities, pain, presence of infection were evaluated. It was observed that there were deep cracks in the feet of H.T. She stated that she did not follow the doctor's recommendations for not wearing shoes. The nursing care plan of the nutritional and metabolic status pattern of H.T. is explained in Table 1.

2.3. Elimination pattern

Bowel sounds of H.T. were evaluated and it was observed to be 6 per minute. It was determined that HT performed bowel evacuation 3-4 times a week during her hospitalization. According to the physician's request, she takes Sutril Neo as diuretic treatment and Lasix perfusion as IV. The patient is evacuated with a foley catheter, and a 2-hour balance is followed due to ARF.

2.4. Activity-exercise pattern

Stating that she wanted help in her daily living activities (ADL), mostly in her self-care needs, H.T. stated that she could not take a bath for 2 weeks. H.T. stated that she could not both walk and talk in her daily life and that she often experienced dyspnea. When the joint patency (ROM) is evaluated, she has partial limitation due to the vascular access in her left arm. On the days of evaluation, the respiratory rate was generally measured as 16 per minute. When HT was asked about the degree of dyspnea according to VAS, she stated that it was 5, and as the oxygen saturation decreased to the range of 75-80%, oxygen inhalation treatment was started at 2lt/min with the help of a nasal cannula upon the physician's request. In the 2-hour follow-up, radial pulses and blood pressure were monitored with the cuff on the right arm while sitting, and it was between 107/48 mmHg and 140/72 mmHg in the morning and evening follow-ups. When the pulse was evaluated with palpation, the dorsalis pedis was felt weak. First degree AV block was observed on ECG and S3-S4 heart sounds were heard in heart sounds. It was determined that the capillary refill time was prolonged and there were returns in 3-4 seconds.

The nursing care plan of the activity-exercise pattern of H.T. is explained in Table 2.

2.5. Sleep-rest pattern

Expressing that she could not wake up rested in the morning, H.T. stated that she often woke up at night because of the groaning or snoring of other patients. In addition, it was observed that she took a nap 2-3 times after lunch due to frequent urination at night. H.T. stated that she had sleep apnea that had been going on for several months in his daily life, and that was why she woke up at night.

The nursing care plan for the sleep and rest pattern of H.T. is explained in Table 3.

2.6. Cognitive-perceptual pattern

It was not observed that the patient had any disturbance of consciousness or orientation problem on the days of evaluation. However, as time passed, she stated that she wanted to get out of the hospital frequently and that she was very overwhelmed.

The nursing care plan of the cognitive-perceptual state pattern of H.T. is explained in Table 4.

2.7. Self perception- self concept pattern

It was observed that H.T. was generally calm but hopeless due to the prolonged hospital stay. Statements such as "I will use more drugs", "I do not want to leave my sister alone" show that the individual is worried. **[Nursing diagnosis: hopelessness (see)]**

2.8. Role- relationship pattern

After losing her husband and son, H.T. stated that she started living with her sister and that her sister had a partial disability while walking. She plays the role of elder sister and caregiver.

2.9. Sexuality-reproductive pattern

In general, H.T. tried to change the subject when questions about sexuality were attempted to be moderated.

2.10. Coping-stress-tolerance pattern

While H.T.'s positive thoughts were that she was well cared for in the hospital, her negative thoughts were that she had new diagnoses and could not take care of her sister. **[Nursing diagnosis: hopelessness (see)]**

2.11. Value-belief pattern

Expressing that she is satisfied with her life, H.T. stated that she prayed to go to her sister's.

3. Discussion

Cardiogenic shock, acute pulmonary edema, myocardial infarction, dysrhythmia, thromboembolism, kidney and liver failure, anemia, and thyroid gland disorders are among the complications that can be seen in individuals diagnosed with congestive heart failure (4). It was found that ARF developed in H.T. due to the increase in serum creatinine level after the diagnosis of CHF, the presence of hypertension, and the presence of ACT values of +1450cc. Diagnoses of hypertension, DM and ARF require attention to nutritional status. Nutrition is important in controlling CHF and in the management of comorbid diseases. It is important in terms of nursing care that fluid consumption is not excessive, nutrition with unsaturated fats, balance monitoring and weight monitoring are important (5). Edema, one of the main findings of CHF, occurs as a result of diffuse fluid retention. The degree of edema was detected at +2 level of H.T. This is due to increased oral intake and less urine output. For this reason, the hands and feet of the individual were raised. Electrolyte values were checked regularly. Studies have shown that the sympathetic nervous system and renin angiotensin aldosterone system are suppressed while lying down, thus facilitating the removal of edema from the body, and bed rest also plays an important role (6). For this reason, bed rest is included in the treatment of edema in H.T. In case of edema in individuals with a diagnosis of CHF, hypertension should be controlled as a result of increased hydrostatic pressure; Since vitamin D deficiency, decreased functional capacity, inflammation and ventricular hypertrophy will exacerbate CHF, daily mineral and vitamin supplements should be made; Weight gain due to fluid accumulation or weight loss can be achieved with treatment (6). For this reason, daily weight monitoring should also be done. In addition, the patient has a high risk of developing bedsores due to the presence of edema, limitation of movement, and malnutrition. Therefore, in order to protect the skin integrity of the patient, regular skin care, adequate and balanced nutrition, position change in the form of left lateral, back and right lateral every 2 hours should be provided and frequent monitoring should be performed in terms of edema and skin integrity (7,8).

Oral health is important in individuals with cardiovascular disease. Risk of cardiovascular disease in individuals with poor oral hygiene It is stated that improvements in poor oral hygiene in patients with CHF will positively affect the systemic and hemodynamic status of the individual (9). Oral evaluation and oral care of the case were performed routinely. The patient was also informed about the importance of oral care.

Studies have shown that diaphragmatic breathing exercise strengthens respiratory muscles, increases endurance, increases ventilation and tissue oxygenation, reduces dyspnea, and increases exercise tolerance (10). Since H.T. has dyspnea, diaphragmatic breathing exercise was taught and applied in order to improve lung ventilation and relieve breathing, and it helped the individual in the management of dyspnea (11). When the oxygen saturation of H.T. decreased to 75%, oxygen therapy was started with a nasal cannula at 2lt/min upon the physician's request. It was determined that dyspnea complaint decreased and oxygen saturation increased to 95% after the treatment.

Advanced age, changes in respiratory pattern, decrease in physical activity, drug use and emotional states cause sleep problems in heart failure patients. It has been observed that the disease affects the prognosis negatively in individuals diagnosed with CHF with sleep problems (12). In this context, it was observed that interventions such as adjusting the treatment plans according to sleep hours, placing the appropriate position, turning off the lights at the head end were effective in ensuring the sleep pattern of the patient.

Studies have shown that individuals with a diagnosis of CHF experience hopelessness for the future or due to the disease. It has been explained that the reasons such as the prolongation of the diagnosis period of individuals with a diagnosis of CHF, such as HT, and the high number of comorbid diseases increase the burden of care (13). In chronic diseases such as CHF, life style changes, not having the necessary skills, loss of control in life, and not knowing what to do in stressful situations may cause

difficulties for the caregivers (14). In this context, H.T.'s concerns are understandable. In addition, the development of problem-solving skills to cope with problems such as deterioration in physical capacity as a result of the progression of heart failure and shortness of breath, fatigue, loss of muscle strength, dietary restrictions and gait disturbance, unemployment, poor economic situation, long hospitalizations, and the use of multiple drugs, lowers hopelessness (15). In our case, the fact that she was hospitalized in the intensive care unit, the complications caused by the disease, and new treatment attempts increased the sense of hopelessness. For this reason, it is important to monitor the individual in terms of depressive symptoms, to communicate frequently, and to teach coping methods about the disease (15).

Table 1. Nursing Care Plan by Nutrition and Metabolic Status Pattern

1.Nursing diagnosis: Risk of Oral Mucous Membrane Disruption (NANDA Area 11: Safety/Protection, Class 2: Physical Injury)

Expected result: To maintain the integrity of the oral mucous membrane, to maintain the necessary humidity and to ensure oral hygiene.

Interventions: Oral care in daily life of H.T. will be questioned; Oral evaluation will be done daily. At the physician's request, oxygen therapy will be started with the help of a nasal cannula at 2 lt/min, and then oral care will be applied. Oxygen delivery through the nasal cannula is applied as a result of the decrease in oxygen saturation. Nasal cannula is preferred because it is comfortable to use and less affected by movement. In addition, since the increase in oxygen flow rate may cause dryness in the mucous membrane, it should be planned to apply moisturizer and oral care afterwards (16) (Lewis et al., 2019).

Evaluation: H.T. stated that she does not attach much importance to oral hygiene in her daily life, and that she pays attention to brushing teeth at least once a day. Since OAG was evaluated as 11 points, the frequency of oral care was calculated as 6x1. Oral care was given in cooperation with the patient after nasal oxygen therapy given at the request of the physician. As a result of the oral care applied in this context, no change was observed in the OAG score during the days the patient was followed.

2.Nursing diagnosis: Fluid Volume Excess (NANDA Domain 2: Nutrition, Class 5: Hydration)

Expected result: Balancing the amount of intake and output, reducing edema, absence of signs of excess fluid.

Interventions: Oral intake will be restricted at the physician's request, and diuretic use will be started. The balance that it takes for 2 hours will be tracked. By attaching a Foley catheter, the color and amount of urine will be monitored. Daily edema, weight and blood pressure will be monitored. Laboratory findings will be followed regularly. Symptoms of hyponatremia (weakness, nausea-vomiting, decrease in sodium) and hypokalemia (ECG changes, decrease in blood pressure) will be evaluated. Hands and legs will be elevated to reduce edema. Attention will be paid to skin integrity to prevent bedsores (6).

Evaluation: After the oral intake was restricted at the request of the physician, the urine amount was observed as “-100 ml” in the 2-hour balance follow-up. After insertion of the Foley catheter, urine color did not change, but the amount of urine increased over time. Potassium chloride perfusion was started upon the physician's request, due to decreased potassium values in laboratory findings (March 22: 4.16 mEq/L; March 23: 4.23 mEq/L). Her ECG was followed as first-degree AV Block throughout the entire process. On both days, peripheral edema examination was +2, and elevation was achieved in the hands and feet. There was no change in the degree of edema, and the follow-up was continued. Attempts were made to preserve skin integrity (See Nursing Diagnosis 3: Deterioration of Skin Integrity).

Tablo 1 (Continued)

3.Nursing diagnosis: Deterioration of Skin Integrity (NANDA Area 11: Security/Protection, Class 2: Physical Injury)

Expected result: Maintaining skin integrity, absence of redness, edema, bleeding at intravenous (IV) catheter and pressure sites.

Interventions: Bed linen will be clean, wrinkle-free and dry. Pressure zones (perineum, sacrum, head and back of the ear, shoulder heads and elbows, heels) will be evaluated at each position change (7). The skin will be kept dry and clean to avoid pressure sores; position changes will be made regularly at intervals of two hours; nutritional status of the individual will be evaluated; balance will be followed (8). Although edema occurs due to fluid retention in CHF, daily edema will be followed up (dyspnea level and edema in the lower extremities (6). If necessary, an air mattress will be used. Every day, the vascular access area will be evaluated for deterioration in skin integrity. Diabetic foot care will be provided and training will be given on the importance of diabetic foot care.

Evaluation: The individual was given a full body bath and perineal care. After the maintenance, the mattress was changed to an air mattress, and the bedding was changed to ensure that it was dry and wrinkle-free. A position change was applied every 2 hours against decubitus formation. Her position in the bed was supported by placing a pillow under her right and left arms and between her legs. Edema evaluation was observed as +2 on both days. Due to the ecchymosis on her left arm, wet dressing was applied with Eau de Goulend every day. Diabetic foot care was demonstrated and training was given.

4.Nursing diagnosis: Nutrition More Than Body Requirements (NANDA Domain 2: Nutrition, Class 1: Eating)

Expected result: To ensure that H.T. is fed as much as the body needs, nutrition in accordance with chronic diseases and weight control.

Interventions: Daily weight monitoring will be done and BMI will be evaluated. An exercise program will be determined to help with weight loss as it includes continuous and regular muscle movements, which have positive effects in all age groups. Education about diabetic nutrition will be given and the individual will be encouraged to practice. She will be provided with liquids and soft foods to prevent nausea. Fasting blood sugar will be measured regularly before meals and at regular intervals in order to determine the individual's insulin needs. Nutritional status during the day will be monitored.

Evaluation: Her BMI value was calculated as 28.73 kg/m² and she was found to be overweight. Education was planned and applied to the individual who had a lack of knowledge about diabetic nutrition. H.T. was fed in accordance with hospital hours. Due to the nausea during the day, she was allowed to consume liquid and soft foods. Fasting blood sugar was monitored between 128 mg/dL and 162 mg/dL.

5.Nursing diagnosis: Lack of Knowledge-Diabetic Foot Care- (NANDA Domain 5: Perceptual/Cognitive, Class 4: Cognitive)

Expected result: To inform about diabetic foot care and to enable them to apply it on their own.

Interventions: Knowledge level about diabetic foot care will be questioned. Diabetes foot care, which is an important complication in individuals with diabetes mellitus, will be demonstrated in practice and the effectiveness of the training will be evaluated. It will be talked about the issues that should be considered in wearing shoes and choosing shoes. Situations in which a doctor should be consulted will be explained.

Evaluation: The patient's knowledge level about diabetic foot care was questioned and an appropriate training was planned and demonstrated according to her needs.

Table 2. Nursing Care Plan by Activity-Exercise Pattern

1.Nursing diagnosis: Decrease in Cardiac Output (NANDA Area 4: Activity/Rest, Class 4: Cardiovascular/Pulmonary Responses)

Expected result: To prevent complications, to reduce edema, to provide relief for the individual in terms of breathing.

Interventions: It will be monitored to monitor H.T.'s rhythm regularly. Vital signs will be evaluated hourly. Lung and heart sounds will be listened to. With head-to-toe palpation, pulses will be evaluated for fullness, speed, and abnormal rhythm. It will be avoid Valsalva maneuvers. By reducing the workload of the heart, the individual will be placed on absolute bed rest. Oxygen saturation will be monitored due to dyspnea complaint in H.T. and, if necessary, oxygen therapy will be initiated upon physician's request. The skin will be evaluated for moisture and pallor. Capillary refill will be evaluated in terms of tissue perfusion.

Evaluation: Lung and heart sounds of H.T. were listened, pulses were evaluated from head to toe, and no change was observed in symptoms (+2 edema, first degree AV Block on ECG, prolonged capillary refill time, dyspnea, S₃-S₄ heart sound, 30% EF). At the request of the physician, oxygen therapy was started at 2lt/min through the nasal cannula and the semi-fowler position was given. The patient's oxygen saturation increased to 95% under 2 lt/min oxygen inhalation, the complaint of dyspnea decreased, and the treatment was terminated after approximately 2 hours of oxygen therapy. H.T. was continued to be monitored, oxygen saturation continued between 95% and 100%.

2.Nursing diagnosis: Activity Intolerance (NANDA Domain 4: Activity/Rest, Class 4: Cardiovascular/Pulmonary Responses)

Expected result: To ensure that the activity is carried out without dyspnea or cyanosis, to know and report the negative symptoms of the exercise.

Interventions: Conditions that increase or decrease dyspnea will be questioned. A semi-fowler position will be placed in the bed and dyspnea will be evaluated in this position. Oxygen therapy will be administered according to the physician's request before, during and after the activity. ECG will be taken in terms of arrhythmia and it will be continuously evaluated by monitoring. If she complains of pulse irregularity, chest or leg pain, extreme weakness, and dyspnea during the activity, it will be stated that she should terminate the activity. ROM (range of motion-joint restriction) exercises will be done in the bed. Breathing exercises regulate cardiac parameters such as respiration, ejection fraction, aortic pressure, pulmonary artery pressure and tissue oxygenation. Diaphragmatic breathing, on the other hand, especially improves lung ventilation and is thus used to control breathing (11). For this reason, breathing will be discussed and diaphragmatic breathing training will be given if necessary.

Evaluation: H.T.'s complaint of dyspnea was questioned, and it was found that she had difficulty in breathing during activity and that she often woke up at night. She gave 5 points (1 with at least 10 very high points) when questioned about dyspnea. At the physician's request, oxygen therapy was started with a nasal cannula at 2 lt/min. After the treatment, the oxygen saturation increased from 75% to 95% and the complaint of dyspnea decreased. Diaphragmatic breathing exercise training was given because it reduced dyspnea and increased exercise tolerance. The patient continued to be followed. No change was observed in the EKG. During and after in-bed exercises, when there were conditions such as leg pain and pulse irregularity, the exercise was terminated and information was given to pay attention to these in daily life. The patient was provided with diaphragmatic breathing training.

Table 3. Nursing Care Plan According to Sleep-Rest Pattern

1.Nursing diagnosis: Sleep Pattern Disturbance (NANDA Domain 4: Activity/Rest, Class 1: Sleep/Rest)

Expected result: To wake up rested as a result of the improvement in the sleep pattern.

Interventions: Individuals with a diagnosis of CHF experience sleep problems due to various reasons such as not being able to breathe easily, coughing and snoring, and pain. For this reason, it is important to detect this problem and take precautions in the early period (12). In this context, treatment hours will be adjusted according to sleep patterns. The state of hopelessness will be tried to be reduced. ROM exercises will be done in bed during the day. It will be ensured that she does not nap during the day. If the individual has anxiety, relieving interventions will be planned. If the individual's condition is stable, she will not be awakened at night to check her vital signs. Sleep routine and habits will be questioned.

Evaluation: The latest treatment time of the patient was set as 22:00. Sleep routine and habits were questioned; She stated that she wakes up early in the morning and if she can't sleep, she does handwork. It was tried to chat and do in-bed exercises so that she would not sleep during the day. The patient did not wake up to urinate because a Foley catheter was inserted, so hier sleep was not interrupted. Expressing that she slept less during the day, H.T. stated that she was less tired the next day.

Table 4. Nursing Care Plan According to Cognitive-Perceptual Status Pattern

1.Nursing diagnosis: Hopelessness (NANDA Domain 6: Self-Perception, Class 1: Self-Concept)

Expected result: To enable the individual to cope with their hopeless thoughts and to eliminate their hopeless thoughts as much as possible.

Interventions: Frequent contact will be made with the individual. Methods of coping with hopeless situations will be questioned. Information gaps will be corrected. she will be allowed to meet or talk to her sister. If appropriate, the same nurse will be involved. Individuals will be allowed to participate in their own care. Appropriate positions will be given to the individual, her privacy will be taken care of and a quiet and comfortable environment will be provided.

Evaluation: Education (diabetic foot, diabetic nutrition and diaphragmatic breathing training) was given to the patient who was observed to have deficiencies in knowledge. There was talk about why she needed to stay in the hospital. All maintenance and applications were made with the participation of H.T. She was allowed to talk to her sister on the phone. Thus, learning that her sister is in good condition and chatting made it enjoyable for H.T. She was given a position every 2 hours and her privacy was protected by closing the curtains during each application since she was in the intensive care environment.

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