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ORIGINAL

Nursing Process for a Preschooler Post-Operative from Ventricular Septal Defect Closure in Cardiovascular Intensive Care at an Institute in Lima, 2022

Proceso de enfermería a preescolar pos operado de cierre de comunicación intraventricular en Cuidados Intensivos Cardiovascular de un Instituto de Lima 2022

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ABSTRACT

Congenital heart disease due to ventricular septal defect is a serious congenital defect most of the time and, although rare, can also be acquired following rupture of the interventricular septum during an acute myocardial infarction. The objective was to manage the nursing care process for a post-operative preschool patient. The study had a qualitative approach, focusing on a single case. The methodology followed the nursing care process. The assessment stage was conducted using the framework of the 11 functional health patterns of Marjory Gordon. The diagnostic stage was developed based on NANDA-I Taxonomy II, identifying nursing diagnoses and prioritizing three: decreased cardiac output, ineffective tissue perfusion, and dysfunctional ventilatory response to weaning, according to the SSPFR format (signs and symptoms, problem, related factor/risk factor/associated with). The planning stage was carried out considering the NOC and NIC taxonomies. During the implementation stage, care was administered, and the evaluation was based on the difference between baseline and final scores, respectively. The results showed a change score of +1, 0, +1. In conclusion, the nursing care process was successfully managed for the patient, providing high-quality care.

Keywords: Nursing Process; Preschooler; Ventricular Septal Defect.

RESUMEN

La Cardiopatía congénita por Comunicación interventricular es un defecto congénito grave, la mayoría de las veces, y aunque excepcional, puede también ser adquirido tras rotura del septo interventricular en un infarto agudo de miocardio. El objetivo fue gestionar el proceso de atención de enfermería en un paciente prescolar post operado. El estudio tuvo un enfoque cualitativo, tipo caso único, la

metodología fue el proceso de atención de enfermería, la etapa de valoración, fue realizada a través del marco de valoración de los 11 patrones funcionales de Maryori Gordon, la etapa diagnostica se elaboró en base a la taxonomía II de NANDA I, se identificaron diagnósticos de enfermería priorizándose tres de ellos: Disminución del gasto cardiaco, perfusión tisular ineficaz y respuesta ventilatoria disfuncional al destete según el formato SSPFR (signos y síntomas, problema, factor relacionado/factor de riesgo/asociado a); así mismo la etapa de planificación se realizó teniendo en cuenta la, Taxonomía NOC, NIC, en la etapa de ejecución se administraron los cuidados y la evaluación fue dada por la diferencia de puntuaciones final y basal respectivamente. En los resultados se obtuvo una puntuación de cambio +1, 0, +1. En conclusión, se gestionó el proceso de atención de enfermería en el paciente que permitió brindar un cuidado de calidad a la paciente.

Palabras clave: Proceso de enfermería; preescolar; comunicación intraventricular.

INTRODUCTION

A ventricular septal defect (VSD) is a hole in the ventricular septum that causes a short circuit between the ventricles. Large defects cause significant left-to-right shunting with dyspnea during feeding and poor growth during infancy. A loud, harsh holosystolic murmur is heard at the lower part of the left sternal border. Common respiratory infections and heart failure may occur. Echocardiography confirms the diagnosis. The defects may close spontaneously during infancy or require surgical repair (Beerman, 2023).

Regarding the etiology, Chen (2021) states that the cause of VSD is not yet known. This defect often occurs together with other congenital heart anomalies.

Regarding pathophysiology, Chen (2021) argues that Before the baby is born, the right and left ventricles of the heart are not separated. As the fetus grows, a septum (wall) forms to separate the two chambers. If the wall is not fully formed, a hole remains. This is called a ventricular septal defect or VSD. A hole can appear in different places in the partition. There can only be one or more holes. Malo and Insa (2017) also argue that, in the presence of a VSD, there is a shunt from the left ventricle to the right ventricle, which produces pulmonary hyperreflux and increased venous return, which the atrium and the left ventricle must control. This volume overload causes the left ventricle to dilate and compensatory mechanisms to prevent ventricular failure.

Minor defects are restrictive, shunts are rare, proper ventricular pressure is normal, and pulmonary vascular resistance does not increase. Interstitials allow a moderately significant shunt but are small enough to provide resistance to pressure; proper ventricular pressure may be higher but lower than systemic pressure, and there is rarely a significant increase in pulmonary resistance. In large defects, there is no resistance to flow through the orifice, and it is the relationship of resistances between the systemic and pulmonary circulation that regulates the hemodynamic situation; the pressure is similar in both ventricles, and the I-D shunt is important as long as the pulmonary vascular resistances do not increase (Malo & Insa, 2017).

Likewise, Beerman (2023) mentions that the symptoms depend on the communication size and the magnitude of the left-right shunt. Children with a minor ventricular septal defect are usually asymptomatic and have normal growth and development. In more severe cases, symptoms of heart failure occur: breathing difficulties, poor weight loss, and fatigue after eating in 4-6 weeks, when pulmonary vascular resistance decreases. Lower respiratory tract infections can occur frequently. Hearing findings vary depending on the size of the defect. Minor ventricular septal defects generally cause a murmur ranging from a brief, high-pitched systolic murmur of 1-2/6 degrees.

According to Malo and Insa (2017), it is medical through antibiotic prophylaxis of infective endocarditis in procedures that may cause bacteremia. Surgical treatment: early corrective surgery if symptoms persist despite medical treatment. It is recommended if you have uncontrolled congestive heart failure, pulmonary hypertension, significant deformity, and/or frequent respiratory infections. Large pulmonary

hypertension ligaments, even if asymptomatic, are operated on during the first year. Surgery is recommended in patients with normal pulmonary pressures if the ratio between pulmonary flow and systemic flow (Qp/Qs) is greater than 2 (more than 1.5 in some centers), and surgery can be performed in babies who respond to medical treatment: between 1 and 1.2 years and asymptomatic children, including parents.

The nursing process (NP) is the basic working methodology for nursing care in all aspects of professional activity. It ensures the integrity of care by emphasizing the biological, social, psychological, and spiritual aspects of human care. It is a dynamic and systematized way of providing nursing care, as it promotes humanistic care focused on results, provides continuity to nursing interventions, and becomes an instrument for continuously evaluating the quality of care provided by the nursing professional (Parra-Loya et al., 2017).

According to the World Health Organization (WHO), nurses are the first link and the strongest point of contact between the healthcare system and people. In this sense, they have a leading role in the strategy because they must have well-defined competencies to achieve their objectives. Their main objective is to provide care and quality care to the population that needs their services through communication, management of theoretical disciplinary knowledge, and management of resources with the community and other actors (Paulín & Gallegos-Torres, 2019). Nursing is a profession; as such, it is responsible for managing resources with the community and other bodies. This means providing patient care and meeting the highest standards of quality and health safety available (Castro & Simian, 2018).

METHODS

The present study had a qualitative approach, a single clinical case type; the methodology that was carried out was the nursing care process. The scientific discipline and the nursing process go hand in hand as a systematized method whose objective begins with the development of critical thinking, which consists of the provision of exceptional medical care aimed at providing the patient with maximum comfort and well-being, thus satisfying their basic needs (Freire Freire et al., 2021). The subject of the study was a 2-year-old preschooler diagnosed with PO closure of trans ventricular VSD, partial resection of the left atrial appendage, and acute renal failure, selected at the convenience of the researchers. The assessment techniques used were observation, interview, and documented review (clinical history). The instrument used was an assessment guide based on Marjorie Gordon's 11 functional patterns. Nursing diagnoses were formulated after critically analyzing the significant data, considering NANDA I taxonomy II. NOC and NIC taxonomy were used for the planning stage. After the nursing care implementation stage, the process was completed with the evaluation stage, which was carried out by comparing the final and baseline scores.

Nursing Care Process

Assessment

General Data.

Name: D.E.G.G.

Gender: Male.

Age: 2 years.

Nursing care days: 2 days.

Assessment date: 03/02/2020

Admission date: 02/04/2020 (Hospitalization) and 02/13/2020 (ICU)

Reason for admission: To complete an angiotomography study for the Ziemer campaign.

Medical diagnosis: Patent ductus arteriosus, Ventricular septal defect. Post-operative diagnosis: Closure of trans ventricular VSD + Conduit w/ RV-to-AP BPA (Hegar 16mm), Partial resection of left atrial appendage / Acute renal failure.

Assessment according to Functional Health Patterns.

Functional Pattern I: Perception - Health Control.
The patient under study has as sole antecedent hospitalization at 45 days of life for studies of cardiopathies due to atresia of the pulmonary valve CIA + CIV and admissions for dental cures and extractions. The mother reports no allergies or harmful habits, has incomplete vaccinations according to the vaccination calendar, does not take medication at home, and shares food from the standard pot.
Functional Pattern III: Metabolic Nutrition.
Patient pale, cold and sweaty skin, Temperature: 36.6 °C, with enteral nutrition (16% Polymeric Formula in continuous infusion at 30 cc/hr in 20 hours with gastric rest of 4 hours from 6 am to 10 am) through a SOG; soft, depressible abdomen, not painful on palpation; the presence of hydroaerial sounds; carrier of a Beckhoff catheter for peritoneal dialysis; weight: 11,400 kg; height: 84 cm, BMI: 24.98 (healthy weight). Braden scale: 13 points (Moderate Risk). According to laboratory results: RH group and factor: (O) positive (+), Hemoglobin 13.2, creatinine: 1.36, urea: 185.2. HCO3: 24.3 mEq/Lt, Na+ 136mEq/Lt, K+ 3.2 mEq/Lt, Ca+ 1.15 mEq/Lt., glucose 298 mg/lt.
Functional IV pattern: Activity - Exercise.
Respiratory activity: Patient with a No. 4.5 Endotracheal Tube (3rd time) set at 13.5 cm on mechanical ventilation in BIPAP/ASB mode with a fio2 of 0.40%; PI of 20 mm Hg; PEEP: 7 mm Hg; RR: 28 per minute; Ti: 0.70 seconds; PS: 10 mm Hg; I:E: 1:2.1.; on auscultation, rasping breath sounds in both lung fields. AGA: pH: 7.45, PCO2: 35 mm Hg PO2: 107 mm Hg, Sat O2: 99% EB 0.3.
Circulatory activity: blood pressure: 99/70 mm Hg, MAP: 77 mm Hg; heart rate 119 beats per minute, capillary filling > 3 seconds, with patent intravenous line in MSD.
Self-care activity: Patient sedated with decreased muscle strength, tolerates position changes, and has no pressure injuries—fall risk assessment according to the Humpy Dumpy Scale 12 points.
Functional Pattern V: Relationships - Role.
The pediatric patient lives with mom and dad and is an only child.
Functional Pattern VI: Perceptual - Cognitive.
Patient with sedation analgesia on RASS scale - 4; pupils isochoric, photoreactive 2/2 mm. With pain management.
Functional Pattern VII: Elimination.
The patient is in anuria with peritoneal dialysis and difficulty in defecating as he has been constipated for more than 3 days.
Functional Pattern VIII: Rest - Sleep.
The patient is under sedation and analgesia with RASS -4 with continuous infusion of fentanyl at 7mcg/kg/hr.
Functional Pattern X: Self-perception - Self-concept.
The mother reports that he was a cheerful, smiling, obedient, and attentive child at every appointment and when interacting with other children.
Functional Pattern XI: Adaptation - Tolerance to the situation and to stress.
The patient is under sedation and analgesia due to continuing with mechanical ventilation with a progressive weaning plan due to previous intubations. Parents are very concerned about the health of their youngest child.
Prioritized nursing diagnoses
First Diagnosis.
Label: (00029) Decreased cardiac output
Defining characteristics: pale, cold, and clammy skin; oliguria; blood pressure: 99/70 mm Hg; MAP: 77 mm Hg; heart rate 119 beats per minute; capillary filling > 3 seconds; anuria.
Related factors: heart rate and rhythm alteration and preload and afterload.

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Diagnosis: Decreased cardiac output related to abnormal heart rate and rhythm and abnormal preload and afterload, evidenced by pale, cold, and sweaty skin, oliguria; blood pressure: 99/70 mm Hg, MAP: 77 mm Hg; heart rate 119 beats per minute, capillary filling > 3 seconds, anuria.
Second diagnosis.
Collaborative problem: Acute renal failure.
Causes: Heart disease
Signs and symptoms: anuria, heart rate 119 beats per minute, 13.2, creatinine: 1.36 mg/dl, urea: 185.2 mg/dl.
Statement: Collaborative problem: Acute renal failure.
Third diagnosis.
Label: (00034) Dysfunctional ventilatory response to weaning.
Defining characteristics: History of multiple failed weaning attempts. There was a slight increase in respiratory rate concerning baseline, decreased air entry during auscultation, and deterioration of arterial blood gas concerning baseline. Abnormal skin color, diaphoresis, increased heart rate.
Related factors: Inability to adapt to the reduction in mechanical ventilation levels, interrupting and prolonging the weaning period.
Diagnostic statement: Dysfunctional ventilatory response to weaning related to Inability to adapt to the reduction in mechanical ventilation levels that interrupts and prolongs the weaning period as evidenced by a history of multiple failed weaning attempts, increased respiratory and heart rate, deterioration of arterial blood gas analysis, abnormal skin color, diaphoresis.
Planning
Initial diagnosis.
Decrease in cardiac output
Results.
NOC (0400) Effectiveness of the heart pump.
Indicators:
Heart rate
Diastolic blood pressure
Systolic blood pressure
Pallor
Nursing interventions.
NIC (4040) Cardiac care.
Activities:
Perform a thorough assessment of peripheral circulation, checking peripheral pulses, edema, capillary refill, and the color and temperature of the extremities.
Monitor cardiovascular status.
Monitor fluid balance.
Administer captopril 0.25 mg PO q8h.
Administer milrinone 10 mg + dextrose 5% 50 cc, one cc per hour.
Administer furosemide 200 mg + dextrose 5% 50 cc 1.5cc per hour
Second diagnosis.
Collaboration problem: Acute renal failure
Results.
NOC (0504) Renal function.
Indicators:
Diuresis
Increase in serum creatinine
Fatigue

Nursing interventions.
NIC (2150) Peritoneal dialysis therapy.
Activities:
Assess catheter permeability by observing the difficulty of the inflow/outflow flow.
Monitor BP, HR, RR, temperature, and patient response during dialysis.
Dialysis exchanges (insertion, dwell time, and removal) should be performed per the center's protocol.
Measure and record abdominal circumference
Measure and record weight daily
Third diagnosis.
Dysfunctional ventilatory response to weaning
Results.
NOC (0412) Response to weaning from mechanical ventilation.
Indicators:
Respiratory rate
Heart rate
Difficulty breathing on one's own
Accessory respiratory sounds
Nursing interventions.
NIC (3310) Weaning from mechanical ventilation.
Activities:
Position the patient in such a way as to use the respiratory muscles and optimize diaphragmatic descent.
Aspirate the airway if necessary.
Alternate periods of weaning trial with periods of rest and sufficient sleep.
Observe for signs of respiratory muscle fatigue, such as a sudden rise in PCO2, rapid and shallow breathing, paradoxical abdominal wall movement, hypoxemia, and tissue hypoxia while weaning.
Direct the patient during difficult weaning trials.

Table 1. Execution of cardiac care intervention for diagnosis of decreased cardiac output.

Intervention: Acute cardiac care.			Intervention: Acute cardiac care.
Date	**Time**	**Activities**	
02/03/2020		An exhaustive assessment of the peripheral circulation was carried out, checking peripheral pulses, edema, capillary refill, color and temperature of the extremities.	
		The cardiovascular state was monitored	
		The water balance was monitored	
		Captopril 0.25 mg PO every 8 hours was administered	
		Milrinone 10 mg + dextrose 5% 50 cc was administered at 1 cc per hour	
		Furosemide 200 mg + dextrose 5% 50 cc was administered at 1.5 cc per hour	

Source: Prepared by the author.

Table 2. Implementation of the peritoneal dialysis therapy intervention for the problem of acute renal failure collaboration.

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Intervención: Terapia de diálisis peritoneal		
Date	**Time**	**Activities**
02/03/2020		The permeability of the catheter was assessed by observing the difficulty of the inflow/outflow flow Vital functions were monitored: BP, HR, RR and temperature, as well as the patient's response during dialysis Dialysis exchanges (insertion, dwell time and removal) were carried out according to the center's protocol. Abdominal girth was measured and recorded Weight was measured and recorded daily

Source: own elaboration.

Table 3. Execution of the weaning intervention from mechanical ventilation for the diagnosis Dysfunctional ventilatory response to weaning.

Intervención: Destete de la ventilación mecánica.		
Date	**Time**	**Activities**
02/03/2020		The patient was placed in a semi-Fowler's position, as far as possible, to use the respiratory muscles and optimize diaphragmatic descent. Weaning trial periods were alternated with periods of rest and sufficient sleep. In patients with fatigued respiratory muscles, do not delay the return to mechanical ventilation. Observe for signs of respiratory muscle fatigue such as a sudden rise in PCO2, rapid and shallow breathing and paradoxical movement of the abdominal wall; hypoxemia and tissue hypoxia while weaning The patient was guided during difficult weaning tests

Source: Author's own creation.

RESULTS

Evaluation

Effectiveness of the heart pump

Table 4. Baseline and final scores for the heart pump effectiveness indicators.

Indicators	Baseline score	Final score
Heart rate	2	3
Diastolic blood pressure	3	4
Systolic blood pressure	3	4
Paleness	2	3

Source: Author's own creation.

Table 4 shows that the mode of the indicators of the effectiveness of the heart pump selected for the diagnosis of a decrease in cardiac output before the nursing interventions was 3 (moderate deviation from the expected range); after the interventions, the mode was 4 (slight deviation from the expected range), corroborated by the improvement in heart rate, blood pressure, and skin color. The change score was +1.

Table 5. Baseline and final scores for indicators of renal function.

Indicators	Baseline score	Final score
Diuresis	1	1

Increase in serum creatinine	2	2
Fatigue	2	3

Source: Author's own creation.

Table 5 shows that the mode of the renal function outcome indicators selected for the problem of acute renal failure collaboration before nursing interventions was 2 (substantially compromised); after the interventions, the mode was 2 (substantially compromised), corroborating that there was no improvement in diuresis, creatinine values, and fatigue. The change score was 0.

Response to weaning from mechanical ventilation

Table 6. Baseline and final scores for the indicators of the outcome "Response to weaning from mechanical ventilation".

Indicators	Baseline score	Final score
Respiratory rate	2	3
Heart rate	2	3
Difficulty breathing unaided	2	2
Accessory respiratory sounds	2	3

Source: Author's own creation.

Table 6 shows that the mode of the renal function outcome indicators selected for the problem of acute renal failure collaboration before nursing interventions was 2 (substantial deviation from the expected range); after the interventions, the mode was 3 (moderate deviation from the expected range), corroborating that there was a slight improvement in HR, RR, and accessory respiratory sounds. However, there was no change in the patient's breathing difficulty or respiratory sounds. The change score was +1.

Data was collected from the medical records and the mother as secondary sources in the assessment phase. Physical examination was also used to collect information. The information was then organized in the Assessment Guide based on Marjory Gordon's Functional Health Patterns. The difficulty in this phase was due to the patient's connection to the mechanical ventilator and the patient's age at the time of the interview.

In the diagnosis phase, the significant data was analyzed according to NANDA, arriving at six nursing diagnoses, of which three were prioritized: decreased cardiac output, collaboration problem, acute renal failure, and dysfunctional ventilatory response to weaning. The difficulty in this phase was to determine the prioritized diagnosis between decreased cardiac output and dysfunctional ventilatory response to weaning.

The planning phase was carried out, considering the NOC and NIC taxonomies. The analysis was conducted to determine the nursing outcomes that best relate to the nursing diagnoses and the interventions consistent with the outcomes. A reanalysis and adjustments of the outcome indicators had to be made. The difficulty in this phase lay in determining the score of the outcome indicators at baseline and the final evaluation due to the subjectivity of this determination.

The planning was carried out in the implementation phase; there were no significant difficulties due to the expertise in carrying out the activities of each intervention.

Finally, the evaluation phase allowed for feedback from each stage during the care provided to the patient in the present study.

The evaluation of the nursing results is detailed in the results section.

CONCLUSIONS

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The Nursing Care Process was managed in its five stages, which allowed for humanized, individual, and quality care for the patient.

The management of the NANDA NOC-NIC taxonomies is of utmost importance in managing the same knowledge-based language and contributing to studies in the field of nursing.

Finally, the nursing care provided contributed to the patient's recovery.

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FINANCING

None.

CONFLICT OF INTEREST

None.