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Postoperative Myocardial Revascularization: Possible Diagnosis And Nursing Interventions

Pós-Operatório de Revascularização do Miocárdio: Possíveis Diagnósticos e Intervenções de Enfermagem

La Revascularización Miocárdica Postoperatoria: Posibles Diagnósticos e Intervenciones de Enfermeira

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ABSTRACT

Objective: The research's main focus was to describe both the diagnosis and nursing interventions most common in the postoperative period of myocardial revascularization. **Methods:** It is an integrative literature review that was performed an analysis of publications on the subject. In order to guide the literature search, it was used the Patient, Intervention, Comparison and Outcomes (PICO) strategy, and with the purpose of complement the review, 13 articles on the topic were selected. **Results:** The research data made possible to identify 25 nursing diagnosis, according to the North American Nursing Diagnosis Association (NANDA) Taxonomy II, among them are Risk for infection; Acute pain; Decreased cardiac output; Impaired gas exchange; Risk for unstable blood glucose level among others. **Conclusion:** The research proved to be crucial to developing studies regarding nursing diagnosis in the postoperative period of myocardial revascularization, directing the nursing patient-specific actions, and then facilitating their decision-making process.

Descriptors: Cardiac Surgery, Nursing Diagnosis, Nursing Interventions, Myocardial Revascularization.

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RESUMO

Objetivo: Descrever os diagnósticos e intervenções de enfermagem mais comuns no período de pós-operatório de revascularização do miocárdio. **Metodos:** Trata-se de uma revisão integrativa da literatura, com analise de publicação sobre a temática. Para norteamento a busca da literatura foi utilizado como estratégia PICO. Para complementar a pesquisa selecionou-se 13 artigos sobre o tema. **Resultados:** As informações possibilitaram identificar 25 diagnósticos de enfermagem, segundo a Taxonomia II NANDA, dentre eles destacam-se: Risco para infecção; Dor aguda; Debito cardíaco diminuído; troca de gases prejudicada; Risco de Glicemia instável dentre outros. **Conclusão:** O estudo revelou ser fundamental desenvolver estudos sobre diagnósticos de enfermagem no pós-operatório de Revascularização do miocárdio, direcionando a enfermagem em ações específicas de cada paciente, facilitando sua tomada de decisão.

Descriptores: Cirurgia Cardíaca, Diagnósticos de Enfermagem, Intervenções de Enfermagem, Revascularização Miocárdica.

RESUMEN

Objetivo: Describir los diagnósticos de enfermería y las intervenciones son más comunes en el postoperatorio de cirugía de revascularización miocárdica. **Metodos:** Se trata de un examen integrador de la literatura, con el análisis de la publicación sobre el tema. A norteamento la búsqueda en la literatura se usa como estrategia de pico. Para complementar la investigación hemos seleccionado 13 artículos sobre el tema. **Resultados:** La información nos permitió identificar 25 diagnósticos de enfermería, según la taxonomía de la NANDA II, entre ellos son: riesgo de infección; Dolor agudo; Insuficiencia cardiaca; intercambio gaseoso disminuidos visuales; Riesgo de glucemia inestable entre otros. **Conclusión:** El estudio demostró ser crucial para desarrollar estudios sobre diagnósticos de enfermería en el postoperatorio de cirugía de revascularización miocárdica, dirigiendo las acciones de enfermería específicos para cada paciente, facilitando su toma de decisiones.

Descriptores: Cirugía Cardiaca, Diagnósticos de Enfermería, Intervenciones de Enfermería, Revascularización Miocárdica.

INTRODUCTION

According to data from the World Health Organization (WHO), the main cause of death in the world, and consequently in Brazil, has as its factor heart diseases, which represent 33% of mortality in the country. These are causes related to diseases that affect the blood vessels.[1]

The different symptoms that can manifest in the onset of heart disease are characterized as tiredness, chest pain, tingling in the upper limbs and shortness of breath. Nevertheless, cardiovascular diseases can be asymptomatic, appearing as the first manifestation, sudden death or in the form of an acute myocardial infarction. In this sense, the prevention of these diseases still constitutes a life-saving mediation, even with all the advances currently brought by medicine for the treatment of heart disease.[1]

The prevalence with a constant increase of ischemic heart diseases motivated the appearance of a great number of studies aiming at the improvement of its treatment, diagnosis and prophylaxis. Despite the great success of angioplasty, myocardial revascularization surgery is still considered today, the treatment method indicated for many of these patients.[2]

Nevertheless, these surgical therapies are complex, regardless of the operative phase that is found which requires proper treatment in all of these phases. The Postoperative (PO) period of cardiac surgeries, is the time in which the recovery of the patient in post-anesthetic and in post-surgical stress is observed, and it is marked by the instability of the patient's clinical condition, being full of particularities, mainly because it is a period of critical care.[3]

Therefore, the nurse must provide direct care to critically ill patients, and great attention should be given to such patients, since they may present different hemodynamic instabilities in the disease development. Although, in order for nurses to perform an effective care practice, it is necessary to pay attention to identifying and meeting the specific needs of each patient and in the best possible way.[3]

Hence, for the direction of their conducts, nurses use scientific methods such as the Nursing Care Systematization (NCS), which include the history of nursing, nursing diagnoses, planning, implementation and evaluation of the assistance results. These needs may vary or have different priorities according to the PO period, in other words, whether immediate, mid-term or late, and the nurse must develop cognitive, technical, organizational and constructive interpersonal skills and competencies with the purpose of adequately serve them.[3]

One of the steps of NCS is the Nursing Diagnosis (ND) that provides a standardized communication among nurses to detect during the identification and annotation of problems that manifest in the patient, becoming a vehicle of specific language recognized globally.[4]

The nursing diagnoses for all patients, including those submitted to the myocardial revascularization procedure, are based on several theories of nursing, among them the Theory of Orem, Florence, Roy, etc. Among the main NDs, these may be present: decreased cardiac output, impaired spontaneous ventilation, risk of infection, impaired gas exchange, risk of ineffective tissue perfusion, decreased urine output among others.[5]

Bearing in mind the aforementioned, the present study aims to answer the following guiding question: What are the main nursing diagnoses and interventions for patients in the postoperative period of myocardial revascularization?

The research is justified by the importance of knowing the diagnoses and the nursing interventions before the patients who are in the postoperative myocardial revascularization period, so that the nurse has in mind and in hand, a tool to elaborate the systematization of the nursing assistance, which has as one of its stages, the identification and elaboration of ND.

The nursing diagnosis is a tool that will guide the care provided to the patient focused on their needs. This knowledge, when applied to patients submitted to

myocardial revascularization procedure, allows nurses to interpret and prescribe care that will collaborate in the therapy of these patients, thus favoring a standardization in communication among the nursing team.[5]

Therefore, the present study aimed to describe the most common nursing diagnoses in the postoperative period of myocardial revascularization, as well as the possible nursing interventions against the diagnoses found.

METHODS

It is an integrative literature review that consists of a broad analysis of published studies that allow discussions about methods and research results (Mendes, Silveira, Galvão). It is a tool that permits the analysis of primary and secondary articles with several types of design, focused on the proposed theme, and it is fundamental to define in a clear and specific way the subject to be studied with the goal of reaching conclusions of easy interpretation.[6]

This research covered 5 steps, 1st phase: Definition of the guiding question (What are the main nursing diagnoses and interventions for patients in the postoperative myocardial revascularization period?); 2nd phase: Data collection (definition of databases and search of articles); 3rd phase: Selection of data and by means of inclusion and exclusion criteria established; 4th and 5th phase: Data analysis through the reading of the articles and discussion of the results found.

Data collection was carried out by a search in the databases Base de Dados de Enfermagem (BDENF) [Nursing Database], *Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS)* [Latin American and Caribbean Literature in Health Sciences], Scientific Electronic Library Online (SciELO), *Biblioteca Virtual em Saúde (BVS)* [Virtual Health Library]. The inclusion process employed the articles available in full, online, in Portuguese, English, and Spanish, with publication from 2006 to 2017, addressing the proposed theme. The documents were selected from the terms contained in the Health Sciences Descriptors (DeCS): "Cardiac surgery", "nursing diagnoses", "myocardial revascularization", and "nursing interventions." Documents such as annals of scientific events, preliminary notes, and manual have been disregarded.

The collection was performed from January to March 2017, based on the guiding question: What are the main nursing diagnoses and interventions for patients in the postoperative myocardial revascularization period? The Evidence-Based Practice (EBP) is a methodology used to identify the evidence of a treatment and diagnosis, being effective to evaluate the quality of the studies and mechanisms of assistance implementation. The scientific evidence consists of a certain subject where it is certified as false or true, a previous research is necessary.[7]

The EBP consists of stages that aid in the data synthesis, to search for the studies to be analyzed: problem identification, relevant question formulation, evidence search, evaluation, applicability analysis, implementation and conclusion of the results.[7] Through this, articles were identified, of which 94 articles were excluded through the Patient, Intervention, Comparison and Outcomes (PICO) strategy, which is a tool used by evidence-based practice, with the objective of aiding in the bibliographic survey, seeking to solve problems of assistance, teaching and research practice,[7] according to **Table 1**.

Table 1: Search strategy and article selection by PICO. *Goiânia* city, *Goiás* State, Brazil,

Letter	Description	Analysis
P	Patient	Patient in the postoperative cardiac surgery (myocardial revascularization) period
I	Intervention	Nursing team
C	Comparison	Main nursing diagnoses and possible interventions in the postoperative myocardial revascularization period
O	Outcomes	The importance of knowledge of nursing diagnoses in patient care during the postoperative myocardial revascularization period and the implications for their care practice

Through this survey, 10 scientific papers were studied and an analytical reading of all contents was carried out, followed by the questioning, description and discussion of the results.

RESULTS AND DISCUSSION

Herein, there were chosen 13 articles addressing this topic.[8-20] The presentation of the results and discussion were done in a grouped, descriptive and analytical way, enabling the reader to evaluate the applicability and understanding of the integrative review, providing the nurses with the necessary tools to assist in their decision-making process.

Table 2: Distribution of results according to nursing domains, classes and diagnosis. *Goiânia* city, *Goiás* State, Brazil, 2017.

DOMAINS	CLASSES	MOST COMMON NURSING DIAGNOSES (FREQUENCY OVER 50%) DESCRIPTORS IN THE LITERATURE
Nutrition	Metabolism	Risk of unstable blood glucose level[8-11]
	Hydration	Risk of electrolyte imbalance[8,12,13]
		Risk for imbalanced fluid volume[9-11,14]
	Respiratory function	Impaired gas exchange[10,12]
	Gastrointestinal Function	Risk of constipation[8]
Activity/Rest	Activity/Exercise	Impaired physical mobility[8,15,16]
		Impaired bed mobility[13]
Coping/stress tolerance	Coping Answers	Anxiety[9,10,15]
Security and Protection	Cardiovascular/ Pulmonary Responses	Decreased cardiac output[9,12,17]
		Risk of ineffective renal perfusion[13]
		Risk for impaired cardiovascular function
		Ineffective breathing pattern[9,15,17,19]
		Ineffective peripheral tissue perfusion[17]
		Risk of decreased cardiac tissue perfusion[8]
		Impaired spontaneous ventilation[12,15]
	Self-care	Bathing self-care deficit[9,15]
		Dressing self-care deficit[15,16]
		Deficit in self-care intimate hygiene[9]
	Physical injury	Risk of aspiration[9,11]
		Ineffective airway clearance[10,15]
		Risk for impaired skin integrity[8,9,12,13,15,20]
		Impaired tissue integrity and Impaired skin integrity[9,13,15,16]
		Risk of bleeding[8]
	Thermoregulation	Risk for imbalanced body temperature[11]
Comfort	Physical comfort	Acute pain[8-10,15,16,19]

Table 3: Diagnosis and interventions/nursing activities. *Goiânia* city, *Goiás* State, Brazil, 2017.

Nursing diagnoses	Interventions/Nursing activities
Risk of unstable blood glucose level[8-11]	Check the results of capillary glycemia in the postoperative period; Evaluate signs of hyperglycemia and hypoglycemia; Perform capillary glycemia control during the patient's stay in anesthetic recovery, if recommended; Perform all pertinent records in the patient's chart, related to the identified diagnoses, the team's behavior, and the patient's answers.
Risk of electrolyte imbalance[8,12,13]	Monitor abnormal levels of serum electrolytes; Monitor the occurrence of neurological manifestations, through the Glasgow and Ramsay Scale; Obtain samples of calcium, magnesium and potassium levels for laboratory analysis, according to protocol; Identify possible causes of electrolyte imbalance; Recognize and report the presence of electrolyte imbalance; Administer supplementary electrolytes as prescribed; Monitor the renal sufficiency of patients receiving replacement of these electrolytes, through a rigorous water balance; Monitor the occurrence of pulmonary, cardiovascular and gastrointestinal manifestations and, the hemodynamic condition; Provide continuous cardiac monitoring.
Risk for imbalanced fluid volume[9-11,14]	Administer blood products if necessary and according to medical prescription; Check the patient's hydration conditions (mucosa, edema, pulse and heart rate); Monitor serum electrolyte levels; Check presence of bleeding; Perform water balance; Weigh daily and monitor trends; Monitor the hydration situation (wet mucous membranes, adequacy of heart rate and blood pressure), when appropriate; Monitor laboratory results relevant to fluid retention (increased urea, decreased hematocrit and increased levels of urinary osmolality); Monitor abnormal serum electrolyte levels; Check presence of bleeding; Perform water balance; Weigh daily and monitor trends; Monitor the hydration situation (wet mucous membranes, adequacy of heart rate and blood pressure), when appropriate; Monitor laboratory results relevant to fluid retention (increased urea, decreased hematocrit and increased levels of urinary osmolality); Monitor abnormal serum electrolyte levels when possible.
Impaired gas exchange[10,12]	Monitor the fan parameters routinely if patient with definitive airway; Check all fan connections regularly; Monitor factors that increase O_2 consumption (fever, tremor, seizures) that can overcome fan settings and cause O_2 desaturation; Maintain unobstructed airway, through tracheal aspiration according to the patient's peculiar need, using aseptic techniques; Monitor the respiratory secretions of the patient; Listen to lung sounds for crepitation or other adventitious noises; Keep bed head high if there is no contraindication; Promote adequate oral hygiene; Assess respiratory perfusion ventilation; Monitor level of consciousness, blood pressure, pulse, temperature and respiratory pattern; collect and analyze control tests (arterial blood gas analysis), and calculate PaO_2/FiO_2 ratio.
Risk of constipation[8]	Monitor the appearance of signs and symptoms of constipation; Record date of last bowel movement; Monitor bowel movements, including stool frequency, consistency, shape, volume and color, if appropriate; Monitor hydro-aerial noises; Register preexisting bowel problems and use of laxatives; Assess the profile of medications for gastrointestinal side effects; Administer enema or irrigation, according to medical prescription; Weigh the patient regularly.
Impaired physical mobility[8,15,16]	Change of position in bed/postural change; Incentive to exercises; rest bed care; care for pressure injury.
Anxiety[9,10,15]	Clarify patient's doubts regarding treatment; Establish a relationship of trust with the patient; Stimulating the patient about reporting their anxiety; Monitor the emotional state of the individual; Provide a calm and pleasant environment; Provide psychological support; Provide information on diagnosis, treatment, and prognosis; Provide well-being.
Impaired bed mobility[13,20]	Assist in walking and activities; Help the patient to stand and walk a specific distance; Monitor any signs of immobility complications on a daily basis; Orient the companion to realize bed activity; Perform body and scalp hygiene on the bed.
Decreased cardiac output[9,12,17,18]	Control liquids volume gained; Monitor changes in heart rate after physical exertion; Position the patient adequately in bed; Reduce physical effort; Watch for signs of systemic vascular resistance (signs of decompensated shock); Listen to heart sounds and breathing sounds; Evaluate peripheral pulses every two hours or if signs of decompensation occur; Observe presence of cold and sticky skin.
Risk for impaired cardiovascular function	Assist in insertion and removal of invasive monitoring lines; Monitor heart rate and rhythm; Monitor blood pressure (systolic, diastolic and the average), central venous pressure; Monitor the forms of hemodynamic waves in the presence of invasive blood pressure (IBP) for changes in cardiovascular function; Compare hemodynamic parameters with other clinical signs and symptoms.
Ineffective breathing pattern[9,15,17]	Monitor frequency, rhythm, depth and effort in breathing; Record thoracic movements observing the existence of symmetry, use of accessory musculature and retraction of supraclavicular and intercostal muscles; Monitor the occurrence of noisy breathing, such as squeaky wheezing and snoring; Monitor respiratory patterns: bradypnea, tachypnea, hyperventilation, Kussmaul breathing, Cheyne-Stokes respiration, apneustic pattern, Bilot breathing and ataxic patterns; Palpate in search of equal pulmonary expansion; Strike the thorax anteriorly and posteriorly, from the apexes to bases, bilaterally; Observe the location of the trachea; Monitor the occurrence of diaphragmatic muscle fatigue (paradoxical movement); Listen to breath sounds, observing the areas of diminished/absent ventilation and the presence of adventitious noises; Monitor mechanical ventilator data, recording increases in inspiratory pressures and reductions in tidal volume, as appropriate; Monitor the occurrence of increased restlessness, anxiety, and shortness of breath; Record changes in SaO_2, SvO_2, CO_2 terminal current and changes in arterial blood gas values, as appropriate; Monitor the occurrence of dyspnea and events that improve or worsen; Monitor hoarseness and voice change, hourly, in patients with facial burn; Monitor the occurrence of crepitation, as appropriate; Open airways, using the chin lift or mandibular maneuver technique, as appropriate;
Ineffective peripheral tissue perfusion[17,18]	Control of peripheral sensitivity (numbness, tingling, hyperesthesia, hypoesthesia); Examine the skin for changes in integrity; Monitor color, temperature and skin moisture; Control presence of peripheral cyanosis; Observe the presence and quality of the pulses; Monitor renal function (e.g. levels of urea, release of creatinine); Positioning the patient for an excellent perfusion; Monitor pulse oximetry as appropriate; Monitor trends in oxygen delivery to tissues (e.g. PaO2, SaO2, hemoglobin, DC), if possible; Monitor laboratory values (coagulation profile, arterial blood gas, lactate level, cultures and chemical profile); Administer vasopressors as appropriate.
Risk of ineffective renal perfusion[8,10,18]	Interpretation of laboratory data: Monitor serum levels of urea, creatinine and electrolytes; Check total cholesterol, fractions, and blood glucose levels. Fluid/Electrolyte Control: Monitor levels of serum electrolytes and those relevant to fluid retention; Observe signs and symptoms of electrolyte imbalance: cramps, arrhythmias, neurological changes, edema, etc.; Maintain accurate recording of elimination and ingestion; Monitor symptoms of kidney failure (edema, neurological changes, changes in blood pressure, etc.).
Risk of decreased cardiac tissue perfusion[8,18]	- Monitoring vital signs: Monitor blood pressure, pulse, respiratory pattern and observe trends; Verify the presence and quality of the pulses; Control presence of peripheral and central cyanosis; Accompany skin color and temperature. - Cardiac care: Evaluate chest pain (intensity, location, irradiation, duration and precipitating factors and relief); Document cardiac arrhythmias; Orient the patient to immediately report chest discomfort; Check for signs and symptoms of respiratory failure. - Bedside laboratory tests: Monitor laboratory data, where appropriate (cardiac enzymes, electrolyte levels). Interpretation of laboratory data: Monitor results of sequential tests in the search for trends and extreme changes (glycemia, total cholesterol and fraction).
Risk of bleeding[8,20]	Observe and record presence of blood; Orient the patient to maintain rest; Observe spots on the patient's body.
Impaired spontaneous ventilation[12,15]	Raise bed head to improve ventilation; Implement oxygen mask oxygen therapy; Observe signs of oxygen induced hypoventilation; Positioning the patient to facilitate the ventilation/infusion combination; Monitor respiratory patterns: bradypnea, tachypnea, hyperventilation, Kussmaul respirations, Cheyne-Stokes respirations, apneustic pattern, Blot breathing and ataxic patterns.
Risk of infection[8-11,13,15,17,20]	Evaluate the nutritional status; Evaluate catheter insertion sites for the presence of hyperthermia; Control liquids and electrolytes; Keep permeable airways; Monitor temperature and respiratory rate; Monitor signs and symptoms of wound infection; Supervise the skin; Guidance for early ambulation; Check the surgical incision site after each dressing; Use appropriate aseptic techniques after each bandage.
Dressing self-care deficit[15,16]	Provide clothing so that the patient has access to them (e.g. near the bed); Be available to help dressing up the patient if necessary; Maintain privacy while the patient dresses up; Reinforce attempts to dress themselves.
Deficit in self-care for intimate hygiene[9]	Assist in intimate hygiene; Maintain perineum care; Promote body mechanics; Improve the patient's body image; Improve patient self-esteem; Assist in the use of the toilet.
Bathing self-care deficit [9,16]	Assist in the bath; Maintain nail care, perineum, hair, eyes, ears and feet; Promote oral health; Promote body mechanics; Improve the patient's body image; Improve patient self-esteem; Assist in the use of the toilet; Assist the patient in dressing/tidy up; Stimulate the exercise of dressing.
Risk of aspiration[9,11]	Monitor the level of consciousness and cough reflex; Position the patient 90° decubitus degrees or as high as possible; maintaining the tracheal balloon of the orotracheal tube (TOT) or tracheostomy (TCT); Feed the patient in small quantities and check the positioning of the probe before feeding the patient, turning off or stopping the diet during aspiration.
Ineffective airway clearance[10,15]	Administer medications (e.g. bronchodilators and inhalers) that promote airway clearance and gas exchange; Clear airways through tracheal aspiration; Keep the airways humidified for better removal of secretions; Monitor respiratory pattern (respiratory rate, oxygen saturation, dyspnea, presence of adventitious noise).
Risk for impaired skin integrity[8,9,12-3,15]	- Keep pyramidal mattress; Implementing UP care protocol; Protect skin to prevent breakage; Perform change of decubitus; Protect bony prominences; Keep the perineum dry and clean; Implement protocol of care for UP; Assist in the change of decubitus; Moisturize the skin. - Offer moisturizer to the skin; Inspect the skin for hyperemic or ischemic spots; Sit the patient in a chair.
Impaired tissue integrity and Impaired skin integrity[9,13,15,16,20]	Do the dressing with topical, appropriate medication; Observe signs and symptoms of infection; Observe and maintain care with pressure areas; Moisturize the skin when necessary; Make daily cleaning of the surgical incision; Observe and record possible changes in the lower extremities; Orient or position the patient for a better circulatory flow; Observe signs and symptoms of venipuncture; Observe skin changes.
Acute pain[8-10,15-7]	Perform a complete assessment of pain, including location, characteristics, beginning/duration, frequency, quality, intensity and severity, in addition to precipitating factors; Observe the occurrence of nonverbal indicators of discomfort, especially in patients unable to communicate effectively; Use therapeutic communication strategies to recognize the pain experience and convey acceptance of the patient's response to pain; Investigate factors that alleviate/worsen pain; Control environmental factors capable of influencing the patient's response to discomfort; Reduce or eliminate factors that precipitate or increase the pain experience; Encourage the patient to monitor their

	own pain and intervene appropriately; Administer analgesics, when prescribed; Apply heat/cold when appropriate.
Risk for imbalanced body temperature[11]	Monitor temperature, respiratory pattern, blood pressure and pulse - Evaluate color, temperature and skin moisture - Monitor signs and symptoms of hypothermia (temperature drop, tremor) and hyperthermia (temperature increase, facial flushing, sweating) - Use blanket when available and indicated - Keep the air conditioner off.

It was noticed that several nursing diagnoses addressed in the literature can be directed to patients who are in the postoperative period of myocardial revascularization surgery. Among the main ones, there may be decreased cardiac output, risk of infection, acute pain, risk of reduced cardiac tissue perfusion, risk of bleeding, impaired spontaneous ventilation, impaired gas exchange, risk for imbalanced fluid volume, among others.

There are other NDs less mentioned in the literature, but no less important diagnostic form: Risk of ineffective peripheral tissue perfusion; Dysfunctional ventilatory weaning response; Risk of shock; Risk for ineffective cerebral tissue perfusion; Feeding self-care deficit[9,15,16]; Risk of contamination; Risk for imbalanced body temperature[13]; Impaired comfort[8]; Delayed surgical recovery[11-22] among others.

It is noteworthy that the ND of delayed surgical recovery can be directly related to those of acute pain and fatigue ND, since a study carried out in 2014, pointed out that pain and fatigue appear to be more a cause (related factor) of delayed surgical recovery than one defining feature.[22] Hence, this ND, as well as the others emphasized in this study, deserve attention and redoubled focus, since it can contribute directly to the quality of nursing care as well as to the length of hospital stay.

The analysis of the publications that compose the results of the present study showed that most of the NDs were directly related to the postoperative period of cardiac surgeries, thus enabling knowledge of ND postoperative myocardial revascularization, which appeared in several ways in different patients. These evidence allowed knowing the ND available in the period that carries out myocardial revascularization, as well as a possible interconnection with the interventions that will be offered to these patients.[23]

The professionals, who make up the multi-professional team, especially nursing, play a fundamental role in the recovery of the health and well-being of patients submitted to Myocardial Revascularization (MR) surgery. With the goal of achieving better results in the postoperative period, adequate nursing staff should be able to avoid or minimize possible complications in a potentially more severe population, aiming at reducing the length of stay in the Intensive Care Unit (ICU) and consequently, a considerable reduction in costs.[23]

In order for this to happen, it is essential to know the profile of these patients, as well as the most incidental complications in the postoperative period, with the aim of raising subsidies for the preparation and qualification of the nursing team against the demands of care.[23]

In a study with 22 patients undergoing cardiac surgery whose objective was to identify the nursing diagnoses according to NANDA taxonomy II for the planning of nursing care in patients in the postoperative period of coronary artery bypass graft surgery were based on the main ND: Risk of infection (22, 100%), Risk of constipation (22,100%), Dressing self-care deficit (22, 100%), Impaired skin integrity (22, 100%), Impaired physical mobility, 90.9%), Impaired tissue integrity (20, 90.9%).[15]

In another study that aimed to identify the nursing diagnoses in patients submitted to cardiac surgery, it pointed out 15 perceived diagnoses that were part of the assistance planning, such as: Impaired gas exchange, Ineffective airway clearance, Impaired verbal communication, Impaired bed mobility, Impaired skin integrity, Hypothermia, Hyperthermia, Ineffective renal perfusion, Decreased cardiac output, Acute pain, Insomnia, Anxiety, Risk of infection, Risk for imbalanced fluid volume, and Risk for unstable blood glucose level.[10]

In Cruz and Lopez's (2010)[9] study with 20 patients, the lead objective was to identify the main nursing diagnoses in the postoperative period of cardiac surgery in an intensive care unit of a public hospital in Bauru city. The research highlighted that 100% of the patients had the following NDs: Anxiety, Impaired verbal communication, (Feeding, Bathing, Hygiene and Intimate hygiene) self-care deficit, Acute Pain, Impaired tissue integrity, Impaired bed mobility, Risk of aspiration, Risk for glycemia, Risk for imbalanced fluid volume, followed by two NDs, fear that affected 15 patients (75%), decreased cardiac output, and ineffective respiratory pattern affecting 12 patients (60%).

It is emphasized that ineffective breathing pattern, as well as other respiratory diagnoses, are generally a priority, since they directly affect tissue oxygenation, necessitating fast and tenacious interventions.[24] Therefore, a careful evaluation of the respiratory function, as well as a good clinical judgment about the manifestations presented, is indispensable to elaborate a correct planning of the nursing actions.

Another study, which aimed to describe aspects of the different techniques of myocardial revascularization and the consequences for the nurse's performance in the care, showed that ND's presented in such situation were: Decreased cardiac output, Impaired gas exchange, Risk for imbalanced fluid volume, Acute pain, Risk of ineffective renal perfusion, Ineffective thermoregulation, Risk of infection, Risk of decreased cardiac tissue perfusion, Risk of bleeding, Risk for impaired skin integrity, and Risk of aspiration.[25] Thus, it is perceived that there are several ND described in the literature that resemble those described in this study. Additionally, through the use of nursing classification systems, it is possible to direct the treatment and, thus, to better meet the needs of the patients, contributing to the construction of nursing knowledge and enhancement.[13]

These NDs are subsidies to direct the systematized conduct of nursing, contributing directly to a better therapy of the patient that presents some complication coming from the MR postoperative. Also, NDs assist in the nurses' decision-making (nursing prescription), and guide the nursing

team in the assistance provided, it can be said that the ND favors a humanized and patient-oriented assistance, which interferes directly to the reduction of errors in care, and consequently in the reduction of mortality of patients who underwent MR surgery, and who may or have developed some complication from this procedure.

Therefore, the knowledge of these diagnoses allows nursing to provide care at a high level of quality, with safety, confidence and technical capacity, directly contributing to the reduction of the hospitalization time of these patients.

Implications in nursing care practice

The failures during the nursing care to patients in the postoperative period may be due to the lack of training, skill and attention of these professionals. These factors are indispensable in the daily life assistance practice.

The identification of nursing diagnoses in this period has the purpose of guiding and assisting the planning of nursing care, based on the needs of each patient, resulting in effective actions to solve the problems.[13]

The lack of systematic observation, deficient training, or even lack thereof, and the lack of definition of the role of each member of the nursing team are the main causes of failure in surgical patient care.[26] Consequently, the lack of knowledge on the part of the nurses makes it difficult to act on the clinical judgment of the patient's responses to the patient's health status. Nonetheless, the more familiarity nurses have with the ND, the greater their ability, agility and accuracy in diagnosing, which will result in greater visibility for the profession.[27]

Due to the modification of the clinical profile of patients undergoing myocardial revascularization surgery, and to the various complications that may be present in this surgical stage, it is necessary to qualify the nursing professionals, among them the nurse, to elaborate the care plan based on the main NDs for this type of patient, a fact that could significantly contribute to the reduction of morbimortality.

Considering this perspective, goals such as rehabilitating the health of revascularized patients and returning them to society can be achieved through essential actions such as training, health education, institution of care protocols, the definition of roles within the team. Always having as parameters to be followed, the systematization of nursing care, this form allows to express the autonomy of the nurse through the ND, during the receipt and treatment of patients in the postoperative myocardial revascularization period, at this and other stages, be elaborated and sequentially specified by a nurse, so as to guarantee the best possible care.

It is essential that the nurse seeks to improve themselves with nursing assistance methodologies in nursing, in order to base knowledge and enable integral, humanized and tenacious care. Hence, it is necessary to promote the awareness of these professionals about the benefits of using NCS through training, so that the patient undergoing myocardial revascularization can receive effective attention, contributing to the improvement of their prognosis.[27]

CONCLUSIONS

There is little evidence to address the specific diagnoses for the myocardial revascularization procedure. These NDs are an indispensable tool for the foundation of the activities that will be developed in front of the patient. In the patient submitted to myocardial revascularization procedure, it is not different, providing a correct orientation in what should be done to this patient, as well as in the appearance of complications arising from this type of procedure.

Among the main NDs in front of the revascularized patient are decreased cardiac output, risk of infection, ineffective breathing pattern, risk of decreased cardiac tissue perfusion, risk of ineffective renal perfusion, anxiety, risk for unstable blood glucose level, risk of electrolyte imbalance, risk for imbalanced fluid volume, impaired bed mobility, risk of decreased cardiac tissue perfusion, among others. Nonetheless, the ND "Risk for impaired cardiovascular function" and Delayed surgical recovery should receive special attention, since myocardial revascularization is a highly complex procedure that invasively manipulates the heart and can directly interfere with the patient's hemodynamics. Moreover, attention to this ND can contribute directly to the early identification of complications and consequently a rapid and effective intervention.

It was also observed in the present study that in the postoperative myocardial revascularization period, the nurse should intensify their vigilance, since this procedure can develop several complications, in different organs and systems of the human body, turning the NDs not only the cardiological area, but also the other adjacent areas that interrelate to that organ.

Given the aforesaid, we suggest new researches that expand the focus on ND in the postoperative myocardial revascularization period as well as the ND that are present in the complications developed in this surgical stage, specifying such diagnoses for such procedure, thus facilitating the decision-making of the nurse according to the type of cardiac surgery.

REFERENCES

1. Wainstein MV, Wainstein RV. Prevenção da doença isquêmica do coração: o que é mais importante?. Revista HCPA. 2012;32(3):387-88.
2. Luchesa CA, Greca FH, Souza LCG, Santos JLV, Aquim EE. Papel da eletroanalgesia na função respiratória de pacientes submetidos à operação de revascularização do miocárdio. Rev Bras Cir Cardiovasc. 2009;24(3):391-6.
3. Duarte SCM, Stipp MAC, Mesquita MGR, Silva MM. O cuidado de enfermagem no pós-operatório de cirurgia cardíaca: um estudo de caso. Esc Anna Nery. 2012;16(4):657-65.
4. Souza V, Zeitoun SS, Barros ALBL. Débito cardíaco diminuído: revisão sistemática das características definidoras. Acta Paul Enferm, . 2011;24(1):114-19.

5. North American Nursing Diagnosis Association. Diagnósticos de enfermagem da NANDA: definições e classificação 2015-2017. Porto Alegre: Artmed; 20015.
6. Ercole FF, Melo LS, Alcoforado CLGC. Revisão Integrativa versus Revisão Sistemática. Rev Min Enferm. 2014; 18(1):1-260.
7. Santos CMC, Pimenta CADM, Nobre MEC. The PICO strategy for the research question construction and evidence search. Rev Latino-am de Enfermagem. 2007; 15(3):508-11.
8. Ribeiro CP, Silveira CO, Benetti ERR, Gomes JS, Stumm EMF. Diagnósticos de enfermagem em pacientes no pós-operatório de cirurgia cardíaca. Rev Rene. 2015; 16(2):159-67.
9. Cruz APO, Lopes R. Diagnóstico de enfermagem no pós-operatório de cirurgias cardíacas. Salusvita. 2010; 29(3):293-312.
10. Pivoto FL, Lunardi Filho WD, Santos SSC, Almeida MA, Silveira RS. Diagnósticos de enfermagem em pacientes no período pós-operatório de cirurgias cardíacas. Acta Paul Enferm. 2010; 23(5):665-70.
11. Souza TM, Carvalho R, Paldino CM. Diagnósticos, prognósticos e intervenções de enfermagem na sala de recuperação pós-anestésica. Rev. SOBECC. 2012; 17(4):33-47
12. Waldrigues MC, Wagner BV, Mercês NNA, Perly T, Almeida EA, Caveião C. Complicações da hipotermia terapêutica: diagnósticos e intervenções de enfermagem. J. res.: fundam. care. Online [internet]. 2014; 6(4):1666-76. Acesso em: 13 fev 2017. Disponível em: http://www.seer.unirio.br/index.php/cuidadofundamental/article/download/3403/pdf_1215.
13. Carvalho IM, Ferreira DKS, Nelson ARC, Duarte FHS; Prado NCC, Silva RAR. Systematization of nursing care in mediate post-operative of cardiac surgery. Rev Fund Care Online. 2016; 8(4):5062-7. Acesso em: 13 mai 2017. Disponível em: http://www.seer.unirio.br/index.php/cuidadofundamental/article/view/3651/pdf.
14. Luvisotto MM, Carvalho R, Galdeano LE. Transplante renal: diagnósticos e intervenções de enfermagem em pacientes no pós-operatório imediato. Einstein. 2007; 5(2):117-22.
15. Rocha LA, Maia TF, Silva LF. Diagnósticos de enfermagem em pacientes submetidos à cirurgia cardíaca. Rev Bras Enferm. 2006; 59(3):321-6.
16. Bertoncello KCG, Cavalcanti CDK, Ilha P, Diagnósticos reais e proposta de intervenções de enfermagem para os pacientes vítimas de múltiplos traumas. Rev. Eletr. Enf. [Internet]. 2013; 15(4):905-14. Acesso em: 14 mai 2017. Disponível em: http://dx.doi.org/10.5216/ree.v15i4.19497.
17. Moreira RAN, Caetano LAC, Barros LM, Galvão MTG. Diagnósticos de enfermagem, fatores relacionados e de risco no pós-operatório de cirurgia bariátrica. Rev Esc Enferm USP. 2013; 47(1):168-75.
18. Moreira RAN, Barros LM, Rodrigues AB, Caetano JÁ. Diagnósticos, intervenções e resultados de enfermagem no pós-operatório de cirurgia bariátrica. Rev Rene. 2013; 14(5):960-70.
19. Galdeano LE, Rossi LA, Santos CB, Dantas RAS. Diagnósticos de enfermagem no perioperatório de cirurgia cardíaca. Rev Esc Anna Nery. 2006; 40(1):26-33.
20. Nascimento DM, Nóbrega MML, Carvalho MWA, Norat EM. Diagnósticos, resultados e intervenções de enfermagem para clientes hospitalizados submetidos à prostatectomia. Rev. Eletr. Enf. [Internet]. 2011; 13(2):165-73. Acesso em: 26 jun 2017. Disponível em: http://www.fen.ufg.br/revista/v13/n2/v13n2a02.htm.
21. Bulechek GM, Butcher HK, Dochterman JM, Wagner CM . Classificação das intervenções de enfermagem - NIC. 6ª ed. Rio de Janeiro: Elsevier; 2016. 944 p.
22. Santana RF, Delphino TM, Henriques NM, Souza PA, Soares TS, Pereira SK. Diagnóstico de enfermagem recuperação cirúrgica retardada. Rev Rene. 2014; 15(3):533-42.
23. Fernandes MVB, Aliti G, Souza EN. Perfil de pacientes submetidos à cirurgia de revascularização miocárdica: implicações para o cuidado de enfermagem. Rev. Eletr. Enf. [Internet]. 2009; 11(4):993-9. Acesso em: 14 mar 2017. Disponível em: https://www.fen.ufg.br/revista/v11/n4/pdf/v11n4a25.pdf.
24. Andrade LZC, Silva VM, Lopes MVO, Chaves DBR, Távora RCO. Ineffective airway clearance: prevalence and spectrum of its clinical indicators. Acta Paul Enferm. 2014; 27(4):319-25.
25. Benedito DSM, Marques IR. Revascularização miocárdica e implicações para a assistência de enfermagem. Rev Enferm UNISA. 2009; 10(1):83-9.
26. Chianca TCM. Falhas de enfermagem no pós-operatório imediato de pacientes cirúrgicos. Rev Latino-am Enfermagem. 2006; 14(6):879-86.
27. Aquino EM, Roehrs H, Méier MJ. Nursing diagnosis in patients undergoing a cardiac catheterization in a unit of cardiology. Rev enferm UFPE online. 2014; 8(11):3929-37. Acesso em: 05 mar 2017. Disponível em: http://www.revista.ufpe.br/revistaenfermagem/index.php/revista/article/viewArticle/6238.

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