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Original Article

NURSING CARE IN POSTOPERATIVE COMPLICATIONS OF MYOCARDIAL REVASCULARIZATION SURGERY

CUIDADOS DE ENFERMAGEM NAS COMPLICAÇÕES NO PÓS-OPERATÓRIO DE CIRURGIA DE REVASCULARIZAÇÃO DO MIOCÁRDIO

CUIDADOS DE ENFERMERÍA EN LAS COMPLICACIONES EN EL POST-OPERATORIO DE CIRUGÍA DE REVASCULARIZACIÓN DEL MIOCARDIO

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Objective: to describe the complications and the nursing care offered to patients in the postoperative period of myocardial revascularization surgery (MRS). Method: a retrospective descriptive study with quantitative approach was carried out through the analysis of 80 medical charts of individuals submitted to MRS between January and December 2014. Results: pulmonary (82.5%) and cardiac (30%) were the most frequent complications found in the postoperative period. It was observed that monitoring fluid balance and vital signs, followed by detection of altered blood pressure were the most frequently provided nursing care measures. Conclusions: monitoring of vital signs, recognition of changes in blood pressure, monitoring of fluid balance and of respiratory patterns for bradypnea, tachypnea, and hyperventilation were the most frequently offered nursing care measures to patients in the postoperative period of myocardial revascularization surgery (MRS).

Descriptors: Thoracic surgery. Postoperative complications. Nursing care. Nursing.

Objetivo: descrever as complicações e os cuidados de enfermagem ofertados aos pacientes no pós-operatório da cirurgia de revascularização do miocárdio (CRVM). Método: estudo descritivo retrospectivo, com abordagem quantitativa, realizado mediante análise de 80 prontuários de indivíduos submetidos à CRVM entre janeiro e dezembro de 2014. Resultados: dentre as complicações encontradas no pós-operatório, destacaram-se as complicações pulmonares (82,5%) e as cardíacas (30%). Notou-se que a monitoração do equilíbrio de líquido e dos sinais vitais, seguido pelo reconhecimento na alteração da pressão sanguínea foram os cuidados de enfermagem mais ofertados. Conclusões: a

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monitoração dos sinais vitais, o reconhecimento da alteração da pressão sanguínea, a monitoração do equilíbrio de líquidos e dos padrões respiratórios para bradipneia, taquipneia e hiperventilação foram os cuidados de enfermagem mais ofertados aos pacientes no período pós-operatório da cirurgia de revascularização do miocárdio (CRVM).

Descritores: Cirurgia torácica. Complicações pós-operatórias. Cuidados de enfermagem. Enfermagem.

Objetivo: describir las complicaciones y los cuidados de enfermería ofertados a los pacientes en el post-operatorio de la cirugía de revascularización del miocardio (CRVM). Método: estudio descriptivo retrospectivo, con enfoque cuantitativo, realizado mediante análisis de 80 prontuarios de individuos sometidos a la CRVM entre enero y diciembre de 2014. Resultados: dentro de las complicaciones encontradas en el post-operatorio, se destacaron las complicaciones pulmonares (82,5%) y las cardíacas (30%). Se notó que el monitoreo del equilibrio de líquido y de los signos vitales, seguido por el reconocimiento en la alteración de la presión sanguínea fueron los cuidados de enfermería más ofertados. Conclusiones: el monitoreo de los signos vitales, el reconocimiento de la alteración de la presión sanguínea, el monitoreo del equilibrio de líquidos y de los padrones respiratorios para bradipnea, taquipnea y hiperventilación fueron los cuidados de enfermería más ofertados a los pacientes en el período post-operatorio de la cirugía de revascularización del miocardio (CRVM).

Descriptores: Cirugía torácica. Complicaciones post-operatorias. Cuidados de enfermería. Enfermería.

Introduction

Non-communicable chronic diseases encompass a number of pathologies, such as cardiovascular diseases (CVDs), neoplasias, chronic respiratory diseases, and diabetes *mellitus*, which stand out for their high morbidity and mortality. In addition, they have multiple etiologies associated to functional deficiencies and disabilities and potentiated by socioeconomic, cultural, and environmental factors[1]. CVDs have the greatest epidemiological impact and account for about 30% of all deaths worldwide[2]. Therefore, heart diseases represent a major public health problem, and it is essential to use diagnostic, therapeutic, and preventive methods capable of interrupting their progression and preventing their onset[3].

Cardiac surgery is an alternative to prolong the life of patients and reduce morbimortality due to circulatory diseases. It is performed only when clinical treatment is not able to provide cure and/or improvement of the patient's quality of life[3]. Cardiac surgeries are classified into corrective, substitutive, and reconstructive. Among them, the most common are the reconstructive, especially myocardial revascularization[3]. Myocardial revascularization surgery (MRS) aims to correct myocardial ischemia as a consequence of coronary artery obstruction, seeking to relieve symptoms and improve the quality of life, increase life expectancy, as well as to allow the patient to return to work as early as possible[4]. However, patients may develop postoperative complications such as cardiac, pulmonary, cerebrovascular, infectious, and renal changes[5].

Postoperative MRS complications have been widely discussed in the literature and their incidence depends on individual factors such as age, lifestyle, associated comorbidities, and clinical situation at the time of surgery, as well as issues related to the surgical process, such as duration of surgery, use of extracorporeal circulation, anesthetic agents used, and intraoperative complications.

The early identification of the main postoperative complications allows the nurse to act in a safe and humanized manner and thus to establish a care strategy to prevent damage, improve the patient's prognosis, and reduce the time spent in the hospital environment[6]. Knowing the care provided to patients can indicate the path taken by the nursing team in the assistance to the user and if this needs for make adjustments.

Thus, the present study intends to describe the postoperative complications in patients undergoing MRS, hospitalized in a teaching

hospital of the countryside of MG, and identify the main care measures adopted to solve these complications. Recognizing the pattern of complications and the care provided may help the nursing team in the construction of a work tool aimed at early and effective interventions for this population.

The objective of this study is to describe the complications and the nursing care offered to patients in the postoperative period of myocardial revascularization surgery (MRS).

Methods

This is a retrospective descriptive study, carried out through the analysis of medical records. The research was performed in a large hospital in the countryside of Minas Gerais, Brazil. The researched Health Institution is a reference in urgency, emergency, and elective care, assisting patients of the Unified Health System (SUS), health plans, and private patients.

The medical records of all patients submitted to MRS were consulted between January and December 2014, totaling 80 medical charts. The data were collected from June to July 2015. The inclusion criteria were: patients who had undergone myocardial revascularization surgery. The exclusion criterion was age below 18 years.

A form prepared by the researchers was used to collect data, covering sociodemographic variables - sex, age, race, origin and marital status - and clinical variables - identifying if the patient had a history of systemic arterial hypertension, diabetes *mellitus*, dyslipidemia, chronic obstructive pulmonary disease, renal disease, previous acute myocardial infarction, cerebrovascular disease, smoking habit, and body mass index. The form also presented a list of complications and possible related nursing care measures identified in the national literature[3,5,7-11].

Data were analyzed through the descriptive statistics with the support of the SPSS 17.0 software. The results were presented in frequency distribution tables. The project was submitted to the Research Ethics Committee of the Federal University of São João Del Rei and the partner institution, and was approved under Opinion nº 1,011,644 in 4/3/2015. The principles of privacy and confidentiality, as established in Resolution nº 466/2012 regulating research on human beings, were respected.

Results

From 80 participants, 81.2% were male, 35.3% were by 51-59 years old, 41.5% were aged between 60-69 years, and 5% were aged between 81-84 years. Regarding ethnic group, 25.0% of the patients declared themselves white, and 2.5% black. The majority of the patients resided in the urban area. Regarding the marital situation, the majority were married (61.3%), followed by singles (25.0%), 6.2% were divorced, and 5.0% widowed.

Regarding the clinical history prior to surgery, 77.5% had a history of systemic arterial hypertension, 38.8% had diabetes *mellitus*, 38.8% had dyslipidemia, 10.0% had chronic obstructive pulmonary disease, and 3.8% of patients had renal disease, of which 1.3% had chronic renal failure and 2.5% had acute renal failure. Acute myocardial infarction had been previously experienced by 46.3% of the patients.

Regarding lifestyle, 65% of the patients were smokers and 18.8% had a history of alcoholism when they were hospitalized. Regarding body mass index, 1.3% of the patients were underweight, 21.3% had normal weight, 12.5% were overweight, and 2.5% had obesity level I.

Extracorporeal circulation (ECC) had been used in 96.3% of the patients. In 63.8%, the time of ECC had been between 40 and 100 minutes; in 26.7%, between 101 and 160 minutes; and only 1.3% had used ECC for more than 161 minutes.

Among the complications of the circulatory system found in the postoperative period, arrhythmias occurred in 30% of the patients. Among these, 45% had sinus tachycardia, 29.1%

bradycardia, 16.6% atrial fibrillation, and 4.16% atrial flutter.

Table 1 – Main complications in the postoperative period of MRS. Divinópolis, Minas Gerais, Brazil – 2015

Variables	n	%
Heart Complications		
Arrhythmias	24	30.0
Chest pain	19	23.8
Hemodynamic instability	10	12.5
Acute myocardial infarction	5	6.3
Cerebrovascular Complications		
Behavior change	18	22.5
Stroke	1	1.3
Pulmonary Complications		
Mechanical ventilation for more than 24 hours	17	21.3
Respiratory Insufficiency	12	15.0
Bronchospasm	4	5.0
Pneumothorax	3	3.8
Hypoxia	1	1.3
Kidney Complications		
Decreased urine output	14	17.5
Need for dialysis	3	3.8
Infectious Complications		
Pneumonia	11	14.2
Urinary	1	1.3
Mediastinitis	1	1.3

Source: Created by the authors.

Other postoperative cardiac complications arose and were described as pericardial friction (16.2%), hypothermia, hyperthermia, heart failure, and hypotension (2.5%), besides T wave inversion, suggestive of myocardial ischemia, found in 4.16% of the patients. Among the other pulmonary complications, 14 participants had pulmonary alterations that had not been described in the form, such as tachypnea (28.5%), pleural effusion (28.5%), atelectasis (14.2%), hypercapnia (14%), and acute lung edema (7.14%).

Table 2 – Main nursing interventions offered to patients submitted to MRS. Divinópolis, Minas Gerais, Brazil – 2015 (to be continued)

Variables	n	%
Heart Complications		
Monitoring of vital signs	51	63.7
Detection of changes in blood pressure	48	60.0
Monitoring of fluid balance	40	50.0
Cerebrovascular Complications		
Monitoring of vital signs	17	21.2
Detection of changes in blood pressure	16	20.0
Provision of medication as needed	15	18.7

Table 2 – Main nursing interventions offered to patients submitted to MRS. Divinópolis, Minas Gerais, Brazil – 2015 (conclusion)

Variables	n	%
Pulmonary Complications		
Monitoring of respiratory patterns for bradypnea, tachypnea, and hyperventilation	29	36.2
Monitoring frequency, rhythm, depth, and effort of breaths	24	30.0
Monitoring increased agitation, anxiety, and dyspnea	17	21.2
Kidney Complications		
Keeping a thorough record of ingestion and elimination	10	12.5
Monitoring of vital signs	10	12.5
Provision of liquids when needed	6	7.5
Infectious Complications		
Wear gloves as required by standard precautions	2	2.5
Maintenance of the aseptic environment in the exchange of equipment and bottles	1	1.2
Examination of the condition of any surgical incision/wound	1	1.2

Source: Created by the authors.

The less frequent care measures for cardiac complications were the observation of signs and symptoms of decreased cardiac output (12.5%), immediate report of any discomfort in the chest (6.3%), and observation of the abdomen for indicatives of reduced perfusion (1.3%).

In the case of cerebrovascular complications, the less frequent care measures were limited number of caregivers (1.3%), monitoring of prothrombin time and partial thromboplastin time (1.3%), as well as monitoring of intracranial pressure and neurological response to care activities (1.3%).

As for care for pulmonary complications, the least offered care measures were monitoring of the patient's ability to effectively cough (8.8%), observation of changes in SaO_2 and SvO_2 in the expired CO_2 and in the arterial blood gas values (8.8%) and monitoring of values of pulmonary function tests, particularly vital capacity, maximal inspiratory force, forced expiratory volume/ forced vital capacity (1.3%).

Changes in the urinary system were present in 21.3% of the patients, and the less frequent care measures for these patients were the daily assessment of the patient's weight (2.5%), monitoring of fluid loss (1.3%), and education on water restriction, when appropriate (1.3%). Regarding infectious complications, mediastinitis was recorded. Among patients with infectious complications, the less frequent care measures were the use of sterilized gloves (1.2%), cleaning of the patient's skin with a bactericidal agent (1.2%), and monitoring of systemic signs and symptoms as much as infection sites (1.2%).

Discussion

The literature indicates a higher prevalence of males, smokers, and elderlies among patients undergoing MRS[4,10]. It also highlights the relationship between the presence of comorbidities such as Hypertension, Diabetes *Mellitus*, Dyslipidemia, and the need for surgery. The data found in these researches corroborate the findings of the present study, considering that a large part of the patients submitted to MRS were men over 60 years of age, smokers, and who had previous diagnosis of the comorbidities listed above. Notably, these individual and clinical characteristics act as risk factors for postoperative complications[4-5,12-14].

Investigations have identified that most of the patients who need to be submitted to MRS had a BMI above 25 kg/m^2; they are, thus, overweight[12,15]. In the data collected in the present study, this association could not be performed because the BMI had not been recorded in all the charts evaluated.

One of the factors that can increase the morbimortality and cause complications in the postoperative period, especially in the elderly, is the time of extracorporeal circulation (ECC). Prolonged ECC, besides causing Systemic Inflammatory Response Syndrome (SIRS), predisposes to postoperative complications, mainly the respiratory ones[13-14]. The majority of the patients studied had undergone MRS with ECC, but the current study did not aim to test the association between ECC and postoperative complications. However, another investigation demonstrated an association between ECC and complications such as pain, oliguria, hyperglycemia, hypotension, arrhythmias, nausea, and fever[16]. It is important to emphasize the need for nurses to recognize these possible complications related to the use of ECC as early as possible and act in a timely manner to avoid worsening of the patient's clinical condition.

Other typical MRS complications that may arise in the postoperative period have been described in the literature and were also found in the present research, including as the presence of hemodynamic instability, pain, and angina[9].

According to the literature, the main nursing care measures for cardiac patients in the immediate postoperative period should be the maintenance of the cardiac output, reduction/absence of pain, adequate tissue perfusion, tissue integrity, hydroelectrolytic balance and glycemic control, maintenance of adequate ventilation and oxygenation, precautions and measures to reduce the risk of infections, communication, reduction of anxiety in patients and their relatives, taking into account the need of self-care, and provision of adequate nutritional support[3,8-10].

In the postoperative period of cardiac surgery, neurological complications are multifactorial and include pre-, intra- and postoperative risk factors such as age, gender and previous neurological diseases[7]. Among the possible neurological complications after a MRS, we can highlight Cerebral Vascular Accident (CVA) with aphasia, behavioral alterations, abstinence crisis, agitation, apathy, and mental confusion[7]. According to the literature, patients with neurological complications need to receive the following care in the postoperative period: verification of responsiveness, orientation to the patient in time and space, and use of the Glasgow Coma Scale when indicated[8].

Atelectasis, pneumonia, pleural effusion, restrictive ventilatory disorders, paralysis or phrenic nerve palsy, and hypoxemia stand out among the main pulmonary complications[17]. The patient's exposure, prolonged mechanical ventilation, and iatrogenic fluid overload make the lungs a frequent focus of complications[18]. Pulmonary complications recorded in medical records, such as mechanical ventilation time for more than 24 hours and respiratory failure, were the ones that most resembled the published studies.

In view of these complications, the hemodynamic status and ventilatory condition must be more closely monitored. Change of decubitus, for example, is a measure to prevent the accumulation of secretions and collapse of the alveoli. Thus, improvement of respiratory amplitude, monitoring of pulse oximetry, maintenance of normal respiratory rate, assessment of the cause of the alteration, and creation of measures to improve the respiratory pattern are necessary[8]. Regarding renal complications, acute renal failure (ARF) stood out, as did in another study[19]. In ARF, sudden deterioration of renal function occurs, with loss of kidney capacity to excrete nitrogenous compounds and maintain hydroelectrolytic balance[20].

In view of the possible renal complications, it is important that nurses monitor the fluid balance and carry out a thorough monitoring of the patient's renal function, always observing the slightest increases in the creatinine clearance rate, which has proven to be the most authentic indicator of reduced glomerular filtration rate, in order to moderate or reverse such aggravations. It is also the duty of the nurse to perform the evaluation of the hemodynamic status of the patient, such as vital signs, peripheral perfusion, urine output, and to administer intravenous

infusions to reverse systemic hypotension when prescribed by the physician[21].

Patients submitted to cardiac surgeries commonly present respiratory tract infections and other types of infections in the postoperative period as a consequence of the extremely invasive surgical procedure itself and postoperative conducts[22]. Surgical site infections (SSI) rank third among all healthcare-related infections and comprise 14% to 16% of the infections found in hospitalized patients, a result that differs from those found in the surgeries evaluated in the present study[23].

Infectious complications after clean cardiac surgeries occur in up to 3.5% of the patients. The main infections are mediastinitis, infection at the saphenous vein stripping site, endocarditis, sternal infection, thoracic wound infection, sepsis, pulmonary infections, vascular access site infections, urinary tract infections, and gastrointestinal tract infections[5].

Health professionals, especially nursing professionals, should be careful to prevent cross-infection during invasive procedures. Simple measures help prevent the transmission of pathogens such as hand washing, proper use of personal protective equipment, maintenance of aseptic techniques, correct maintenance of contaminated clothing and equipment, cleaning of the environment and of private accommodation of patients that could contaminate the environment, aseptic technique while performing procedures and observation of signs of infection in invasive devices[3,6].

The nursing team is the fundamental basis of care, because they deal with patients in daily basis. The performance of nurses before cardiac postoperative complications can be effective as long as these professionals have adequate material and human resources, and also knowledge and skills acquired through constant training[9].

For all the listed postoperative complications, the nursing care indicated in the literature is more comprehensive than those identified in the patients' charts, which does not mean that they have not been performed, but indicates a possible underreporting of the nursing service in the medical records. The absence of the systematization of perioperative nursing care (SPNC) in the care units also contributes to the invisibility of the whole assistance offered to the patients. It should be emphasized that the SPNC organizes the nursing work process and allows the individual evaluation of the patients, with the identification of real and risk nursing diagnoses that allow the prescription of nursing interventions according to the needs assessed, and therefore prevention of complications.

In spite of the limitations of the study, the results found helped to point out the main complications in the postoperative period of MRS and also to describe the nursing care measures most frequently offered (registered) to the patients, as well as the risk factors that may have contributed to the appearance of possible complications.

Conclusion

The study allows us to conclude that monitoring of vital signs, recognition of blood pressure changes, monitoring of fluid balance and respiratory patterns for bradypnea, tachypnea, and hyperventilation were the most frequently offered nursing care measures to patients in the MRS postoperative period.

It should be emphasized that studies related to the topic toned to be addressed and discussed in order to contribute to the quality of patient care. Furthermore, they can also collaborate in the prevention of future events, being these related to the patient's clinical history or not.

Therefore, nurses trained and aware of the reality in which they live have more opportunities to contribute to the improvement of the patient's prognosis in the postoperative period. By knowing these complications in the operative periods, it is possible to develop a clinical reasoning around the established situation. In this way, it is possible to implement individual care plans that contemplate the patients in an integral manner.

Collaborations:

1. conception, design, analysis and interpretation of data: Liliane de Lourdes Teixeira Silva, Adriana Ferreira Silva, Jessica Campos Daniel, Ana Flávia Leite Andrade and Emylle Thayssa Mendonça Santos;

2. writing of the article, relevant critical review of intellectual content: Liliane de Lourdes Teixeira Silva, Luciana Regina Ferreira da Mata, Adriana Ferreira Silva, Jessica Campos Daniel, Ana Flávia Leite Andrade and Emylle Thayssa Mendonça Santos;

3. final approval of the version to be published: Liliane de Lourdes Teixeira Silva.

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