Nursing actions in the management of pain related to the use of a patient-controlled analgesia pump during the postoperative period of cardiac surgery

Atuação da enfermagem no gerenciamento da dor relacionada ao uso da bomba de analgesia controlada pelo paciente durante o pós-operatório de cirurgia cardíaca

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ABSTRACT

BACKGROUND AND OBJECTIVES: Acute postoperative pain affects more than 80.0% of patients and approximately 75.0% of cases are described as moderate to severe. Effective pain relief after cardiac surgery has assumed an important role with the introduction of fast track protocols, requiring better monitoring and patient education for its effectiveness. The present study's objective was to verify if nurses have been playing an active role during pain management, so that this brings positive impacts to the patient in pain control.

METHODS: A cross-sectional, descriptive study with a quantitative approach, with data extracted and collected from the digital platform Research Electronic Data Capture in March 2020, referring to data entered in the period between October 2018 and October 2019, totaling 326 patients in the postoperative period of cardiac surgery who used the electronic patient-controlled analgesia pump (PCA) model CADD-Legacy PCA.

RESULTS: Predominantly male subjects (73.9%), with a mean age of 59.9±14.9 years. Among the characteristics of the PCA pump, intravenous infusion (98.8%) and bolus/PCA mode (98.5%) stood out. There was adequate monitoring of vital signs in compliance in 96.6% of cases, guidance by the nurse at the time of PCA pump installation in 85.9% and pain control after suspension of the PCA pump in 94.2%. With those who had pain controlled after the end of therapy, there was a predominance of pain control in 95% of patients (p=0.11).

CONCLUSION: The results show that well-established protocols, adequate monitoring, and the correct orientation of the patient regarding the use of the device, bring positive impacts after suspension of PCA.

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RESUMO

JUSTIFICATIVA E OBJETIVOS: A dor aguda pós-operatória acomete mais de 80% dos pacientes e, aproximadamente, em 75% dos casos, é descrita como moderada a intensa. O alívio efetivo da dor após cirurgia cardíaca assumiu um papel importante com a introdução de protocolos de via rápida, necessitando de melhor monitoramento e educação do paciente para sua efetividade. O objetivo deste estudo foi verificar se o enfermeiro vem desempenhando um papel ativo durante o gerenciamento da dor, de forma que isso traga impactos positivos ao paciente no controle álgico.

MÉTODOS: Trata-se de um estudo transversal, descritivo e de abordagem quantitativa, com dados coletados da plataforma digital *Research Electronic Data Capture* em março de 2020, referente aos dados inseridos no período entre outubro de 2018 e outubro de 2019, totalizando 326 pacientes em pós-operatório de cirurgia cardíaca que utilizaram bomba de infusão eletrônica modelo CADD-Legacy ACP.

RESULTADOS: A média de idade foi de 59,9±14,9 anos (n=326), com um público predominantemente do sexo masculino (73,9%). Dentre as características de bomba de analgesia controlada pelo paciente (ACP), destacaram-se via de infusão endovenosa (98,8%) e modo *bolus*/ACP (98,5%). Houve monitorização adequada de sinais vitais em conformidade em 96,6% dos casos, orientação feita pelo enfermeiro no momento da instalação da bomba de ACP em 85,9% e controle da dor após suspensão da bomba de ACP em 94,2%. Com aqueles que tiveram dor controlada após término da terapia, observou-se predominância do controle álgico em 95% dos pacientes (p=0,11).

CONCLUSÃO: Os resultados mostraram que protocolos bem estabelecidos, monitoramento adequado e orientação correta do paciente quanto ao uso do dispositivo trazem impactos positivos após suspensão da ACP.

Descritores: Analgesia controlada pelo paciente, Cirurgia torácica, Cuidados pós-operatórios.

INTRODUCTION

The definition revised by the International Association for the Study of Pain (IASP) defines pain as "an unpleasant sensory and

emotional experience associated with, or resembling that associated with, actual or potential tissue damage"[1]. Cardiac surgery, which causes significant trauma in the thoracic region due to sternotomy, is considered one of the most painful surgeries[2].

Considered a common phenomenon, it can cause suffering by exposing patients to unnecessary risks, and one of the predominant forms is acute pain, causing changes in various physiological mechanisms, injuries to the body and organic stress, affecting more than 80% of patients and, approximately, in 75% of cases, it is described as moderate to severe, according to the pain score[3].

The nurses, who are with the patient at bedside, frequently are responsible for pain control. Thus, the implementation of quality improvement programs for pain management is recommended to improve postoperative analgesia, enabling patient satisfaction and reducing the incidence of chronic pain[4].

Effective pain relief in the period after cardiac surgery has assumed an important role with the introduction of fast track protocols. The concept of patient-controlled analgesia (PCA) enables the patient to supplement analgesia according to his or her needs. PCA is commonly considered an intermittent intravenous administration of opioids under patient control (with or without a continuous infusion)[2,5].

The guidance plans designed by the nursing team should include information and clarifications about the causes and explanations of pain control procedures and instructions for the use of the pump during the postoperative period, favoring the education process[2,5].

Thus, the present study's objective was to verify if nurses have been playing an active role in pain management, bringing positive impacts to the patient' pain control.

METHODS

A cross-sectional, descriptive study with a quantitative approach. The study was conducted based on Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)[6]. Data collection was performed after approval by the Research Ethics Committee of *Instituição Hospital do Coração/Associação Beneficência Síria* (Heart Hospital Institution/Syrian Charity Association), with CAAE: 30711620.5.0000.0060.

Data was collected from the digital data recording and management platform Research Electronic Data Capture (RedCap) of a philanthropic hospital specialized in cardiology, located in the south-center of the city of São Paulo. The sample was extracted in March 2020, referring to data entered in the period between October 2018 and October 2019.

To compose the sample, the inclusion criteria comprised: individuals of both genders; aged over 18 years; who underwent cardiac surgery; who started using the electronic infusion pump model CADD-Legacy PCA; and who received pre- and/or postoperative monitoring. Patients who used the mechanical PCA and who underwent other surgical procedures not classified as cardiac were excluded.

The database was built containing information related to the following variables: gender, age, infusion route, prescribed modality, control of vital signs, adverse effects, administered boluses, requested boluses and nurse guidance.

The information related to the variables collected is filled in by the attending nurses every 6 hours, at bedside, and registered on the PCA pump's own form. Later, the RedCap platform is fed with data entered by the pain specialist nurse.

The benefit of evaluating the nurse's performance through this study is being able to discuss the patients' autonomy in managing their pain, since they are responsible for activating the PCA device when they have pain, and the nurses responsible for educating about the use of the equipment and monitoring the use and complaints reported by the patient.

The main objective of the analysis was to identify the nurse's performance in pain management in patients using PCA in the postoperative period of cardiac surgery. The specific objectives are: to gather the profiles of patients who use this therapy, identify the most prevalent characteristics of programming, verify the relationship between the nurse's guidance and pain control after suspension of therapy and the incidence of adverse effects during use of the PCA pump.

For analysis, data were extracted from the RedCap database and entered into a Microsoft Office Excel database. The variables were described in absolute and relative frequencies. Current age was presented in mean and standard deviation, as well as with the median.

Aspects such as: the attending nurse's guidance now of PCA installation and the analgesic control after the PCA suspension were evaluated, and this data was analyzed in Fisher's Exact test. Adverse effects were not considered for analysis since the data collected was insufficient.

RESULTS

From the total of 427 patients who used the PCA pump in the period intended for collection, 326 (76%) are cardiac surgery patients, from these 326 patients there was a predominance of 73.9% males, with mean age of 59.9±14.9 years (n=326).

Regarding the prevalent characteristics related to the use of PCA, the infusion routes should be mentioned, predominating among them the venous infusion route (98.8%) through central venous catheter due to the postoperative condition. As for the other routes, the use of spinal erector (0.3%) and epidural route (0.9%) were observed.

Regarding the prescribed modalities, the following were identified: continuous; continuous + bolus (continuous infusion associated with triggering as needed by the patient); and bolus/PCA (triggering only occurs as needed by the patient). From these modalities, there was a predominance of the bolus/PCA programming, representing 98.5% of cases. As for the others, the continuous mode was used by 0.3% of the sample, and the continuous + bolus mode by 1.2% of the configurations.

Among the nurse's attributions, the monitoring of vital signs performed by the nursing team was observed, which, according to the institutional protocol, is performed every 2 hours in the first 12 hours after the device is installed and, after this period, every 4 hours. The evaluation regarding the hemodynamic mo-

nitoring is classified as compliant, non-compliant or partially compliant. Therefore, 96.6% of the cases were compliant, 0.6% non-compliant and 2.5% partially compliant.

Regarding the installation and guidance of the nurse at the moment of the PCA installation in the postoperative period, it was observed that in 314 (96.3%) of the cases the device was installed by the nurse, and in 12 (3.7%) by the anesthesiologist. As for the guidance, 280 patients (85.9%) received the guidance from the attending nurse, and 34 (10.4%) patients reported not having received guidance at the time of installation.

After the PCA pump therapy was suspended, the presence of pain control was evaluated by checking the pain records made in the last 24 hours in the institutional control sheet. It was observed that 307 individuals (94.2%) had controlled pain after the removal of the device. When relating the guidance of the attending nurse at the time of the PCA installation (n=280) with those who had pain control after suspension of the pump, that is, a period of 24 hours after the removal of the PCA pump, a predominance of pain control in 95% of patients (p=0.11) was observed. Adverse effects had no relevance in the analysis, since the data collected was insufficient.

DISCUSSION

Pain is a frequent symptom with a high incidence in patients submitted to cardiac surgery. Since postoperative pain can influence the recovery of the patient, its control involves adapting the analgesic treatment and the needs of each individual.

The PCA pump with opioids through venous, epidural or subcutaneous route is an analgesic method used in the postoperative period for moderate to intense pain, characterized by self-administration, which respects the individuality of each patient because it offers several modalities as to its programming in order to meet the patient's needs[7].

The present study observed a high prevalence of the venous route by central venous catheter (98.8%), however, what is found in the literature refers to the epidural route, which is considered the most used, because the drug, when administered, has a stable concentration in the sites of action, avoiding "peaks and valleys" in concentration and effect, as in the case of morphine, which due to its low liposolubility, when given in bolus, can lead to respiratory depression[8].

Nevertheless, in the institution where the study was conducted, the standard was the venous route by a central venous catheter, since the pharmacological concentration is in a smaller volume due to its high dilution, thus avoiding the incidence of adverse effects.

During the use of PCA, the patient actively participates in determining the bolus of analgesic that will be administered, avoiding delays when medicating, and making it possible to schedule intervals between doses that avoid the probability of an overdose[6].

The most prescribed modality was the bolus/PCA method. The definition of the infusion modality is personalized to each patient according to the knowledge of their tolerance to pain and to the opioid, which goes against the literature, which no longer recommends continuous infusion. This modality is indicated only for carefully selected patients with good tolerance to opioids and/or who will remain in an intensive care unit, as well as the use of the continuous modality associated with the bolus, which is quite controversial in the literature[6].

As for the monitoring of vital signs, it was observed that most cases had adequate control. In a study, it was observed that the continuous pain assessment and the systematized data recording interfered positively in the pain experience[9]. The intention of offering autonomy to the patient in the use of PCA is to provide pain control instead of creating barriers between the patient and the team that assists him/her. Managing the patient's pain is to actively participate in the follow-up, evaluation, and reevaluation to make the necessary adjustments in the treatment, determining its efficacy and managing adverse effects until the suspension of treatment when necessary.

Monitoring adverse effects is one of the attributions of nurses when dealing with patients who use PCA. In this sample, the data collected was insufficient and the justification is due to the change of routine for monitoring and recordings in this period, i.e., the nurses were in the process of adapting to the new form and, also, to the fact that the patient was being admitted to an intensive care unit bed, and there may be underreporting of adverse effects.

As seen in the literature, the adverse effects expected during the use of PCA include itching, nausea, vomiting, urinary retention, decreased intestinal transit, and respiratory depression[10]. Often one of these symptoms end up being associated to low output and surgery, which justifies the incorrect recording of adverse effects.

Thus, the team must be able to recognize the adverse effects and possible complications from the use of PCA associated with opioids, knowing how to differentiate the effects caused by pharmacological use from those associated with a worsening of the condition. Therefore, it is important to work on the continuing education of the team and the patient[7].

Providing information about the surgical procedure and guidance on the proper handling of a device of such complexity is important to reduce doubts, increase positive expectations about the surgery, and thus promote elements that implement the feeling of autonomy. Postoperative pain control is an important aspect of care in the surgical setting, aiming to reduce and control postoperative complications and ensure faster recovery without suffering[11].

Studies that address the patient's experience in this pain management process and the identification of adverse effects reported by the patient may add to the care offered during nursing care. The present study has limitations, such as the use of secondary data analysis collected in a single institution, a factor that makes it difficult to generalize the findings. For this reason, it is suggested that other studies be carried out taking these limitations into consideration.

CONCLUSION

The results show that well-established protocols, adequate monitoring, and the correct guidance of the patient regarding the use of the device bring positive impacts after suspension of PCA.

AUTHORS' CONTRIBUTIONS

Lisa Catherine Miranda do Santos Pereira
Statistical Analysis, Funding Acquisition, Data Collection, Conceptualization, Resource Management, Research, Methodology, Writing - Preparation of the original, Writing – Review and Editing, Visualization
Siomara Tavares Fernandes Yamaguti
Project Management, Supervision, Validation
Tatiane Gloria da Mota
Conceptualization, Research, Methodology, Supervision

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