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RELATION BETWEEN STRESSORS AND HEMODYNAMIC INSTABILITY IN THE POSTOPERATIVE PERIOD AFTER CARDIAC SURGERY[1]

Carina Aparecida Marosti Dessotte[2], Rejane Kiyomi Furuya[3], Hélen Francine Rodrigues[4], Lidia Aparecida Rossi[5], Rosana Aparecida Spadoti Dantas[6]

[1] São Paulo Research Foundation (FAPESP – Regular Project modality, number 2013/16535-0).

[2] Ph.D. in Sciences. Professor, General and Specialized Nursing Department, *Escola de Enfermagem de Ribeirão Preto* (EERP), *Universidade de São Paulo* (USP). Ribeirão Preto, São Paulo, Brazil. E-mail: camarosti@usp.br

[3] Ph.D. in Nursing. Professor, *Instituto Federal do Paraná*. Londrina, Paraná, Brazil. E-mail: re.furuya@gmail.com

[4] Master's Student, Graduate Program in Nursing Fundamentals, EERP/USP. Ribeirão Preto, São Paulo, Brazil. E-mail: hfrodrigues.usp@gmail.com

[5] Ph.D. in Fundamental Nursing.Professor, General and Specialized Nursing Department, EERP/USP. Ribeirão Preto, São Paulo, Brazil. E-mail: rizzardo@eerp.usp.br

[6] Ph.D. in Nursing. Professor, General and Specialized Nursing Department, EERP/USP. Ribeirão Preto, São Paulo, Brazil. E-mail: rsdantas@eerp.usp.br

ABSTRACT

Objective: assess the relation between the perceived stressors at the Intensive Care Unit and hemodynamic instability in the postoperative period of patients submitted to the first cardiac surgery.

Method: observational analytic prospective cohort study, developed at a university hospital in the interior of São Paulo State. A consecutive and non-probabilistic sample was constituted, consisting of patients submitted to the first coronary artery bypass graft or heart valve disease correction. The Environmental Stressor Questionnaire (range 0-200, with higher scores indicating greater stress) and tissue perfusion markers were used to assess the research variables.

Results: 150 patients participated in the study. The average score for the assessment of stressors was 75.6 for patients with hemodynamic instability (n=91) and 72.8 for patients without hemodynamic instability, without a statistically significant difference (p=0.398; Student's t-test).

Conclusion: in the study sample, we found no relation between perceived stressors at the Intensive Care Unit and hemodynamic instability in the postoperative period of cardiac surgery.

DESCRIPTORS: Perioperative nursing. Physiological stress. Cardiovascular system. Thoracic surgery. Postoperative complications.

RELAÇÃO ENTRE ESTRESSORES E INSTABILIDADE HEMODINÂMICA NO PÓS-OPERATÓRIO DE CIRURGIA CARDÍACA

RESUMO

Objetivo: avaliar a relação entre os estressores percebidos na Unidade de Terapia Intensiva e a instabilidade hemodinâmica no pós-operatório de pacientes submetidos à primeira cirurgia cardíaca.

Método: estudo observacional analítico, de coorte prospectiva, desenvolvido em hospital universitário do interior paulista. Uma amostra consecutiva e não probabilística foi constituída por pacientes submetidos à primeira cirurgia cardíaca de revascularização do miocárdio ou correção de valvopatias. A Escala de Avaliação de Estressores em Unidade de Terapia Intensiva (com valores de 0-200; o maior valor indica maior estresse) e os marcadores de perfusão tecidual foram utilizados na avaliação das variáveis de interesse.

Resultados: participaram do estudo 150 pacientes. Os pacientes com instabilidade hemodinâmica (n=91) apresentaram média de 75,6 pontos na avaliação dos estressores e aqueles sem instabilidade hemodinâmica (n=59) apresentaram média de 72,8 pontos, não havendo diferença estatisticamente significante entre eles (p=0,398; teste t de Student).

Conclusão: na amostra estudada, não foi constatada relação entre estressores percebidos na Unidade de Terapia Intensiva e a instabilidade hemodinâmica no pós-operatório de cirurgias cardíacas.

DESCRITORES: Enfermagem perioperatória. Estresse fisiológico. Sistema cardiovascular. Cirurgia torácica. Complicações pós-operatórias.

RELACIÓN ENTRE ESTRESORES E INESTABILIDAD HEMODINÁMICA EN EL POST-OPERATORIO DE LA CIRUGÍA CARDÍACA

RESUMEN

Objetivo: evaluar la relación entre los estresores percibidos en la Unidad de Terapia Intensiva y la inestabilidad hemodinámica en el post-operatorio de pacientes sometidos a la primera cirugía cardíaca.

Método: estudio observacional analítico de cohorte prospectivo y desarrollado en un hospital universitario del interior paulista. Una muestra consecutiva y no probabilística fue constituida por pacientes sometidos a la primera cirugía cardíaca de revascularización del miocardio o corrección de valvulopatías. La Escala de Evaluación de los Estresores en la Unidad de Terapia Intensiva (con valores de 0-200; el mayor valor indica un mayor estrés) y los marcadores de perfusión tisular fueron utilizados en la evaluación de las variables de interés.

Resultados: participaron del estudio 150 pacientes. Los pacientes con inestabilidad hemodinámica (n=91) presentaron una media de 75,6 puntos en la evaluación de los estresores y aquellos pacientes sin inestabilidad hemodinámica (n=59) presentaron una media de 72,8 puntos, no habiendo ninguna diferencia estadísticamente significativa entre ellos (p=0,398; test t de Student).

Conclusión: en la muestra estudiada no fue constatada ninguna relación entre los estresores percibidos en la Unidad de Terapia Intensiva y la inestabilidad hemodinámica en el post-operatorio de las cirugías cardíacas.

DESCRIPTORES: Enfermería perioperatoria. Estrés fisiológico. Sistema cardiovascular. Cirugía torácica. Complicaciones post-operatorias.

INTRODUCTION

Although the advancement of minimally invasive procedures has expanded the possibilities of treating cardiovascular diseases, such as coronary artery disease and heart valve disease, surgery is still the treatment of choice for a large number of patients. Cardiac surgery is a complex procedure, which can have important organic repercussions in the postoperative period (PO), which justifies the need for patients to stay in Intensive Care Units (ICUs).[1] Among the organic repercussions for these individuals, hemodynamic instability is highlighted.[2]

There is no doubt about the need for all the devices the ICU provides to treat patients in the postoperative period of cardiac surgery. The ICU is considered a stressing site though, where patients may present physical and psychological discomfort due to environmental characteristics, including the large amount of equipment, professionals and procedures that often interrupt the circadian cycle.[3]

Stress is defined as an external or internal factor, which can be physical or psychological, and which affects the normal state of dynamic balance in an individual (homeostasis). In the face of stress, the body responds with certain intrinsic reactions (General Adaptation Syndrome), which can harm the patients' PO. These reactions depend on the intensity, quantity and quality of the stressors.[4]

Considering that the main treatment objective of ICU patients is to maintain hemodynamic stability, in order to guarantee the perfusion of the target organs,[5] and aware that the ICU is a stress-generating environment, we intend to answer the following question: are the perceived stressors at an ICU associated with the presence of hemodynamic instability in the PO of patients submitted to the first cardiac surgery?

This inquiry is based on the physiological response to stress, involving the endocrine and autonomic systems, causing, for example, increased adrenaline and noradrenaline secretion, which will result in increased frequency and strength of cardiac contraction, decrease of urinary output, increased contraction of peripheral vessels, among other effects that may result in the worsening of patients in the postoperative period of cardiac surgery and lead to hemodynamic instability.[6]

After a broad review of the literature, we found only one study that investigated the stressors perceived by patients undergoing cardiac surgeries during their ICU stay. Moreover, the authors of that study the authors only described the main stressors the patients perceived.[7] Therefore, we did not find studies that investigated the association between perceived stressors in an ICU and the presence of hemodynamic instability in the PO of patients submitted to the first cardiac surgery.

The results of this study may provide scientific evidence for the implementation of interventions in clinical practice, which the health team should follow and which the managers of those units should endorse, aiming to reduce hemodynamic instability and, consequently, improving the patients' postoperative recovery.

In view of the above, our objective was to evaluate the association between perceived stressors in an ICU and the presence of hemodynamic instability in the PO of patients submitted to the first cardiac surgery.

METHOD

An observational and analytic longitudinal study was developed at a university hospital in the interior of São Paulo. The data were collected in the Surgical and Medical Inpatient Units of that hospital between August 2013 and September 2015.

The data were collected at two moments, namely: Preoperative T0, the day before cardiac surgery, we collected data on sociodemographic and clinical characteristics through individual interviews with the participants and consultation of their charts; T1 postoperative after discharge from the ICU, we collected the data on the anesthetic-surgical procedure, as well as the patient's evolution (vital signs and tissue perfusion markers) throughout their stay in the ICU from the medical chart to investigate the hemodynamic instability. Through an interview, we also applied the scale that investigated the perceived stressors experienced in the ICU.

A consecutive non-probabilistic sample was constituted with subjects of both sexes, over 18 years of age who had an appointment to undergo the first coronary artery bypass graft (CABG) and/or surgery to correct heart valve diseases in 24 hours.

Patients were excluded who did not present cognitive conditions to answer the questionnaires - evaluated by the Mini Mental State Examination (MMSE),[8] in the version adapted to Portuguese[9] - and had clinical decompensation of the heart disease on the day before surgery (presence of dyspnea, chest pain and orotracheal intubation).

In order to characterize the participants, a data collection instrument was developed, including sociodemographic (date of birth, sex, education in full years, marital status, performance of paid activities and monthly family income) and clinical variables (date of hospitalization; interview date, main diagnosis, pre-operative comorbidities, current and past smoking, left ventricular ejection fraction (LVEF), surgery performed and use of psychotropic drugs during PO). The participants' age was calculated by subtracting the date of birth from the interview date.

To evaluate the LVEF, results greater than or equal to 50% were considered as preserved, while values inferior to 50% were considered as reduced LVEF.[10]

To evaluate the perceived stressors, we used the Environmental Stressor Questionnaire (ESQ)[11] in the version adapted to Portuguese.[12] The instrument consists of 50 items, evaluated on an ordinal five-point scale: (1) not stressful; (2) moderately stressful; (3) very stressful; (4) extremely stressful and (0) not applicable. The scale was applied after the discharge from the ICU, not exceeding 48 hours after discharge, following the authors' guidelines. The total score was obtained by adding up the scores of the 50 items, with a possible range from 0 to 200 in which, the higher the score, the greater the patient's perceived stress.[12] The mean score was calculated for each of the 50 items and ranked from the most to the least stressful.

As we did not find a single variable in the literature to classify the patient for hemodynamic instability, we used the tissue perfusion markers in this study, considering that the major goal of monitoring and maintaining hemodynamic stability is to guarantee the perfusion of target organs, that is: mean blood pressure >70 mmHg, satisfactory level of consciousness, adequate diuresis (>0.5 mL/kg/hr), serum lactate <2 mmol/L and central venous oxygen saturation >70%.[5,13] Thus, we assume that the patient presented hemodynamic instability when a concomitant change was found in three of the parameters described at any time during the ICU stay and regardless of the number of times the condition was observed. Thus, the patients were classified as either with hemodynamic instability or without hemodynamic instability. In the ICU, where the patients participating in this study remained, these variables are evaluated and recorded routinely every hour while the patient is intubated. After extubation, evaluation occurs every two hours until the patient is discharged from the unit.

Although the patient's level of consciousness was evaluated, we do not consider this a determinant of hemodynamic instability, as the patients in the PO period remain sedated for some time, making it difficult to correctly evaluate this parameter.

The use of psychotropic drugs in the PO was investigated due to the possibility of compromising the participants' assessment of their own perception about the stressors. This variable was collected from the medical prescription in the patient charts.

The data were first inserted in Office Excel® 2010 using double typing of the answers obtained and later validation. They were then transferred to IBM SPSS® Version 22.0 for Windows® (SPSS, Inc., Chicago, IL, USA) for data analysis.

We applied descriptive simple frequency analyses for nominal or categorical variables, and central tendency (mean and median) and dispersion (standard deviation) for continuous variables. Student's t test for independent samples (age, education and monthly income) and the chi-square test (genger) were used to compare the sociodemographic and

clinical characteristics of the patients, when separated by group (with and without hemodynamic instability), marital status and professional status). In order to investigate the relationship between the patients' perceived stressors and the hemodynamic instability in the PO of cardiac surgery, we used Student's t-test for independent samples. The level of significance was set at 0.05.

The study respected the ethical precepts of National Health Council Resolution 466, of December 12, 2012, and received approval from the Ethics Committee at the Ribeirão Preto College of Nursing under opinion 622,796, CAAE: 17269013.0.0000.5393.

RESULTS

In the data collection period, 297 patients underwent cardiac surgery. Of this total, 112 patients did not meet the inclusion criteria, 12 refused to participate in the study, 12 did not answer the Environmental Stressor Questionnaire and 11 died. Thus, the study sample consisted of 150 patients.

Of the 150 patients, 91 (60.7%) presented hemodynamic instability. The patients' sociodemographic characteristics have been displayed in Table 1.

Table 1 – Sociodemographic characteristics of patients according to hemodynamic instability. Ribeirão Preto, SP, Brazil, 2015 (n=150)

Variables	With hemodynamic instability (n=91)		No hemodynamic instability (n=59)		*p*
	% (n)	Mean (SD)*	% (n)	Mean (SD)*	
Genger					
Male	63.7 (58)		67.8 (40)		0.610*
Female	36.3 (33)		32.2 (19)		
Marital situation					
With partner	69.2 (63)		78.0 (46)		0.241*
No partner	30.8 (28)		22.0 (13)		
Employment situation					
Inactive	72.5 (66)		64.4 (38)		0.292*
Active	27.5 (25)		35.6 (21)		
Age (in years)		58.6 (12.0)		58.4 (12.6)	0.901†
Education (full years)		5.34 (4.2)		4.90 (3.7)	0.500†
Monthly family income (in *reais*)		2,471.00 (2,694.00)		2,139.00 (1,524.00)	0.370†

*=coefficient resulting from Chi-square test; †p-value resulting from Student's t-test for independent samples

We observed that most patients in both groups were male, had a partner and did not work before the hospitalization. Age, education and monthly family income were also similar between the groups, characterizing homogeneity.

In Table 2, the patients' preoperative clinical and surgery characteristics are displayed according to the presence of hemodynamic instability.

Table 2 – Patients' preoperative clinical characteristics according to hemodynamic instability. Ribeirão Preto, SP, Brazil, 2015 (n=150)

Variables	With hemodynamic instability (n=91) % (n)	Without hemodynamic instability (n=59) % (n)
Main diagnosis		
Coronary artery disease	50.5 (46)	47.5 (28)
Heart valve disease	40.7 (37)	45.8 (27)
Coronary artery + heart valve disease	8.8 (8)	6.8 (4)
Presence of comorbidities		
Systemic Arterial Hypertension	78.0 (71)	67.8 (40)
Overweight/obesity	68.1 (62)	52.5 (31)
Dyslipidemia	50.5 (46)	47.5 (28)

Diabetes mellitus	45.1 (41)	40.7 (24)
Atrial Fibrillation	12.1 (11)	5.1 (3)
Left Ventricular Ejection Fraction		
Preserved	67.0 (61)*	69.5 (41)†
Reduced	27.5 (25)	25.4 (15)
Smoking		
Past	41.7 (38)	39.0 (23)
Current	12.1 (11)	25.4 (15)
Surgery performed		
Coronary artery bypass graft	50.5 (46)	45.8 (27)
Valvulopathy correction	42.9 (39)	47.4 (28)
Coronary artery bypass graft + valvulopathy correction	6.6 (6)	6.8 (4)

*no results were found for five patients; †no results were found for three patients.

In the patient group with hemodynamic instability, 82.4% (n=75) received psychotropic drugs in the postoperative period. A similar percentage of patients who received psychotropic drugs in the PO period was found in the group without hemodynamic instability (84.7%; n=50).

In Table 3, we present the distribution of the mean scores for the items of the Environmental Stressor Questionnaire, according to the groups. When more than one item presented the same average, the items were ranked in the same position in decreasing order.

Table 3 – Distribution of means, standard deviation and rank of items in the Environmental Stressor Questionnaire and mean item scores according to the presence of hemodynamic instability. Ribeirão Preto, SP, Brazil, 2015 (n=150)

Scale items	With hemodynamic instability (n=91)		Without hemodynamic instability (n=59)	
	Mean (SD)*	Rank	Mean (SD)*	Rank
Being thirsty	2.7 (1.0)	1st	2.6 (1.0)	1st
Having tubes inside your nose and/or mouth	2.3 (1.2)	2nd	2.1 (1.1)	3rd
Being unable to sleep	2.2 (1.2)	3rd	2.2 (1.1)	2nd
Being strapped to tubes and drains	2.1 (1.1)	4th	2.2 (1.0)	2nd
Being unable to perform your role within the family	2.1 (1.2)	4th	2.1 (1.1)	3rd
Having to look up at the details in the ceiling	2.0 (1.0)	5th	2.1 (1.0)	3rd
Feeling pain	2.0 (1.3)	5th	2.1 (1.3)	3rd
Missing your spouse or partner	1.9 (1.2)	6th	2.2 (1.0)	2nd
Not having control over yourself	1.9 (1.1)	6th	1.7 (1.0)	5th
Being afraid of dying	1.9 (1.4)	6th	1.5 (1.0)	7th
Not knowing the length of the ICU stay	1.9 (1.0)	6th	1.7 (0.9)	5th
Being unable to move your hands or arms due to intravenous serum or medication	1.8 (1.0)	7th	1.9 (1.0)	4th
Having the lights constantly on	1.8 (1.1)	7th	1.9 (0.9)	4th
Not being able to communicate	1.8 (1.1)	7th	1.9 (1.0)	4th
Seeing your family and friends only for a few minutes every day	1.7 (1.0)	8th	1.6 (1.0)	6th
Having an uncomfortable bed and/or pillows	1.6 (1.0)	9th	1.5 (1.0)	7th
Not knowing when the procedures will be performed on you	1.6 (0.9)	9th	1.4 (0.8)	8th
Being pierced by needles	1.6 (1.0)	9th	1.5 (0.8)	7th
Not knowing what day today is	1.6 (1.0)	9th	1.2 (0.9)	10th
Not knowing what time it is	1.5 (1.1)	10th	1.4 (1.0)	8th
Not knowing exactly where you are	1.5 (1.0)	10th	1.1 (0.7)	11th
Feeling annoyed	1.5 (1.2)	10th	1.2 (0.7)	10tn
Not having privacy	1.5 (0.9)	10th	1.3 (0.7)	9th
Listening to the noise and alarms of the medical devices	1.4 (0.8)	11th	1.4 (0.7)	8th
Having to use oxygen	1.4 (0.8)	11th	1.4 (0.8)	8th

Scale items	With hemodynamic instability (n=91)		Without hemodynamic instability (n=59)	
	Mean (SD)*	Rank	Mean (SD)*	Rank
Listening to unknown sounds and noises	1.4 (0.9)	11th	1.4 (0.8)	8th
Having financial concerns	1.4 (1.1)	11th	1.4 (0.8)	8th
Being afraid of catching AIDS	1.4 (0.9)	11th	1.3 (0.9)	9th
Feeling pressured to agree to the treatment	1.1 (0.7)	11th	0.9 (0.6)	13th
Having strange devices around you	1.3 (0.7)	12th	1.4 (0.8)	8th
Listening to your heart monitor go off	1.3 (0.7)	12th	1.1 (0.6)	11th
Being awakened by the nursing staff	1.3 (0.7)	12th	1.2 (0.7)	10th
Hearing the nursing team speak with terms that you do not understand	1.3 (0.8)	12th	1.1 (0.6)	11th
Being in a very warm or very cold room	1.3 (0.9)	12th	1.4 (0.9)	8th
Feeling that the nursing staff is in a hurry	1.2 (0.7)	13th	1.2 (0.9)	10th
Not receiving explanations about your treatment	1.2 (0.9)	13th	0.9 (0.7)	13th
Having the nursing staff constantly doing tasks around your bed	1.2 (0.7)	13th	1.3 (0.7)	9th
Listening to other patients moaning	1.2 (1.0)	13th	1.2 (0.9)	10th
Having men and women in the same room	1.2 (0.7)	13th	1.2 (0.6)	10th
Seeing serum bags hanging over your head	1.2 (0.8)	13th	1.1 (0.4)	11th
Listening to people talking about your	1.2 (0.8)	13th	1.2 (0.8)	10th
Having your blood pressure checked several times a day	1.1 (0.6)	14th	1.1 (0.4)	11th
Listening to the telephone ringing	1.1 (0.6)	14th	1.2 (0.6)	10th
Feeling that the nursing staff pays more attention to the devices than to you	1.1 (0.8)	14th	1.0 (0.6)	12th
Observing treatments being administered to other patients	1.1 (0.7)	14th	1.2 (0.9)	10th
Smelling strange smells around you	1.1 (0.8)	14th	1.2 (0.9)	10th
Receiving care from doctors that you do not know	1.1 (0.4)	14th	1.0 (0.3)	12th
The nursing staff member does not introduce himself/herself by the name	1.0 (0.8)	15th	0.9 (0.8)	13th
Being examined frequently by the medical and the nursing staff	1.0 (0.2)	15th	1.1 (0.5)	11th
Nurses and doctors speaking too loudly	1.0 (0.6)	15th	1.0 (0.7)	12th
Mean score of scale items	1.5 (0.5)		1.4 (0.3)	

*(SD)=Standard deviation

The item both groups evaluated as the most stressful was "Being thirsty", followed by "Having tubes inside your nose and/or mouth" in the group of patients with hemodynamic instability, and the items "Being strapped to tubes and drains", "Being unable to perform your role in the family", and "Missing your spouse or partner" in the group of patients without instability.

On the other hand, the items the patients with hemodynamic instability assessed as the least stressful were "Nurses and doctors speaking too loudly", "Being examined frequently by the medical and the nursing staff" and "The nursing staff member does not introduce himself/herself by the name". For those patients who did not present hemodynamic instability, the items assessed as the least stressful were "The nursing staff member does not introduce himself/herself by the name", "Not receiving explanations about your treatment" and "Feeling pressured to agree to the treatment".

It is also observed that the mean item scores were similar between the groups. The mean item scores in the group of patients with hemodynamic instability was 1.5 (SD=0.5) and, in the group without hemodynamic instability, it was 1.4 (SD=0.3). Thus, for most patients in both groups, the perception of stressors was classified as "non-stressful" and "moderately stressful".

Regarding the total scale score, patients with hemodynamic instability had a mean value of 75.6 (SD=23.6), whereas patients without hemodynamic instability had a mean value of 72.8 (SD=17.4). However, the difference found was not statistically significant (p=0.398; Student's t-test).

DISCUSSION

We did not find a statistically significant relationship between the stressors perceived by the patients (total score on the Environmental Stressor

Questionnaire) and the presence of hemodynamic instability in the postoperative period after the first cardiac surgery. The averages of the items were 1.5 and 1.4, respectively, for patients with and without instability. On the response scale, these scores range between "not stressful" and "moderately stressful".

Although the relation between the stressors the patients perceived during ICU hospitalization and hemodynamic instability in the postoperative period of cardiac surgeries was not found in this study, the stressors and the physiological response they trigger in the patients' organism should be assessed routinely because, as the study shows, the patients experienced both physical and psychological stressors during their stay in the ICU. The response to stress, depending on its quantity and quality of exposure, when triggering the General Adaptation Syndrome, worsens the performance of the circulatory system, which is already deteriorated by the underlying heart diseases and by the anesthetic-surgical procedure itself.

Still in relation to the stressors the patients perceived, when evaluating the mean scores of each item in the scale, comparing the two groups (with and without instability), we verified that the item "Being thirsty" received scores between 2 and 3, that is, between moderately stressful and very stressful. In the group of patients considered hemodynamically stable, the second stressor was "Having tubes inside your nose and mouth" (mean=2.3) and the third "Being unable to sleep" (mean=2.2), an inverse result to that observed in the group with hemodynamic instability.

Although there are no studies in the literature on the relationship between hemodynamic instability and the perceived stressors in an ICU, studies were found that investigated the relationship between physical stressors, present in the preoperative and intraoperative periods,[1,14-15] and preoperative psychological stressors (symptoms of anxiety and depression) with complications in the PO.[16-18]

About these studies, there is scientific evidence that the length of preoperative hospitalization, chronic obstructive pulmonary disease, diabetes mellitus, smoking, advanced age (over 70 years), female, malnutrition or obesity, preoperative physiological condition of the cardiovascular system, type and length of the surgery, the use of and total time of ECC and anoxia, postoperative orotracheal intubation time and postoperative blood transfusion, are related to the appearance of complications in the postoperative period, but not specifically hemodynamic instability.[1,14-15]

Regarding the psychological stressors and their relation with PO complications, studies have shown that preoperative symptoms of anxiety and depression influenced and enhanced the occurrence of physiological complications in the PO,[16-18] besides increasing the length of hospitalization and postoperative mortality.[17]

The patients who participated in this study are similar, in sociodemographic and clinical terms, to the patients who participated in other studies, and reflect the new profile of patients referred for cardiac surgery: older patients with more preoperative comorbidities, which increases the possibility of complications in the PO period. This change in the profile of patients referred for cardiac surgery entails the need for further studies in this area.

In this study, most patients were male, married or living with a fixed partner and inactive union before the surgical procedure, in both groups. The prevalence of men undergoing cardiac surgery was also found in other studies,[1-2,15,19-23] as well as the higher percentage of patients with partners.[20-21]

The mean age found in the group of patients who presented hemodynamic instability was 58.6 years (SD=12.0). A similar age was found in the group without hemodynamic instability, 58.4 years (SD=12.6). These results are in accordance with the literature.[1-2,20,22]

The similarity between the groups with and without instability in terms of age is important, as aging increases the risk of PO complications. There was a higher percentage of male patients in both groups.

Hypertension already affected most patients in both groups, like in other studies.[2,19-21] In this study, most patients in both groups suffered from overweight/obesity and, in the group with hemodynamic instability, from dyslipidemia. These data differ from the literature, which presents a lower frequency of patients affected by these comorbidities in the preoperative period (less than 50% of participants).[2,20-21]

Regarding smoking, when adding up current and past smokers, the majority in both groups presents this comorbidity. These results are in line with the literature.[2,20-21] Diabetes mellitus affected 45.1% of patients with hemodynamic instability and 40.7% of patients without hemodynamic instability, in line with the literature.[2,21]

Therefore, the main limitation found in the study refers to the evaluation of the variable hemodynamic instability. It was decided to investigate

this complication because it is one of the most detrimental for the recovery of patients in the postoperative period after cardiac surgery. As no consensus was found in the literature on how to evaluate it, nor studies with the same purpose as this article, we assumed and used the markers of tissue perfusion, as hemodynamic instability is directly related to poor perfusion of the target organ. Target organ perfusion is routinely assessed in ICUs by means of tissue perfusion markers.

This study contributes to clinical practice by surveying the stressors this group of patients perceives. The results presented could support the planning of nursing care with the objective of reducing the patients' exposure to these stressors, minimizing the response to the General Adaptation Syndrome and favoring PO recovery. The nurse can address the main stressors the patients perceived (being thirsty, having tubes inside the nose and/or mouth, being strapped by tubes and drains) during the preoperative period. Being aware of the temporality of water restriction, of the orotracheal tube and chest drains may make the patients less stressed during the PO period.

Therefore, further investigation, looking for the relation between the list of stressors present in the ICU and postoperative complications, can be useful for the planning of nursing care, as much of the stressors present in these environments are subject to management and modifications, and the major goal of intensive care is to maintain hemodynamic stability.

Other studies should be performed to evaluate the stressors ICU patients perceive through different techniques, including qualitative studies on this subject. In addition, the need for consensus and tools to assess hemodynamic instability in ICU patients is highlighted.

CONCLUSION

In this research, we did not find a relationship between the stressors perceived in an ICU and hemodynamic instability during the PO of patients undergoing the first coronary artery bypass graft and/or heart valve disease correction. Therefore, further research is necessary to better understand the reduction of stressors in the ICU.

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Correspondence: Carina Aparecida Marosti Dessotte
Escola de Enfermagem de Ribeirão Preto da Universidade de São Paulo
Departamento de Enfermagem Geral e Especializada
Avenida dos Bandeirantes, 3900
14040-902 - Campus Universitário - Monte Alegre, Ribeirão Preto, SP, Brazil
E-mail: camarosti@usp.br

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