

# CARDIAC SURGERY: CLINICAL PROFILE OF PATIENTS AND 30-DAY FOLLOW-UP

*Cirurgia cardíaca: perfil clínico dos pacientes e acompanhamento em 30 dias*

*Cirugía cardíaca: perfil clínico del paciente y seguimiento en el período de 30 días*

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**ABSTRACT: Objective:** To characterize the clinical profile of patients who underwent cardiac surgery in the perioperative period and describe the follow-up after 30 days of hospital discharge. **Method:** Retrospective study, with a sample of 54 patients, both male and female, aged  $\geq 18$  years. The analyzed variables were: sociodemographic, clinical and those related to the perioperative period and 30-day follow-up. **Results:** The mean age of patients was  $65.5 \pm 15$  years; most were male (79.6%). The most prevalent risk factors were: hypertension (72.2%), dyslipidemia (48.1%) and ischemic heart disease (31.5%). Valve procedures had higher prevalence (50.0%). The most prevalent complication in the postoperative period was arrhythmia (18.5%). At post-discharge, statins (78.4%) were the most prevalent medication, followed by antiplatelet agents (50.9%) and anticoagulants (31.3%). After 30 days of hospital discharge, the percentage of readmission was 11.7%, being the main causes of readmission respiratory infection/pleural effusion and surgical site infection. **Conclusion:** Surgical patients were mostly elderly men who had comorbidities; arrhythmia was the main complication found after surgery. The incidence of readmission 30 days after discharge was related to pulmonary complications and infections.

**Keywords:** Nursing care. Perioperative nursing. Cardiac surgical procedures.

**RESUMO: Objetivo:** Caracterizar o perfil clínico dos pacientes submetidos à cirurgia cardíaca no perioperatório e descrever o acompanhamento após 30 dias da alta hospitalar. **Método:** Estudo retrospectivo, com amostra de 54 pacientes, de ambos os sexos, com idade  $\geq 18$  anos, submetidos à cirurgia cardíaca. As variáveis analisadas foram: sociodemográficas, clínicas e relacionadas ao perioperatório e seguimento em 30 dias. **Resultados:** A média de idade dos pacientes foi de  $65,5 \pm 15$  anos; a maioria do sexo masculino (79,6%). Fatores de risco mais prevalentes: hipertensão (72,2%), dislipidemia (48,1%) e cardiopatia isquêmica (31,5%). Os procedimentos valvares tiveram maior prevalência (50,0%). A complicação mais prevalente no pós-operatório foi arritmia (18,5%). No pós-alta, o uso das estatinas predominou (78,4%), seguido de antiagregante plaquetário (50,9%) e anticoagulante (31,3%). Após 30 dias da alta hospitalar, houve 11,7% de readmissões, sendo a infecção respiratória/derrame pleural e a infecção de sítio cirúrgico as principais causas de reinternação. **Conclusão:** Os pacientes cardíacos foram na maioria homens, idosos e que apresentavam comorbidades; arritmia foi a principal complicação após a cirurgia. A incidência de readmissão após 30 dias da alta foi relacionada a comprometimentos pulmonares e infecciosos.

**Palavras-chave:** Cuidados de enfermagem. Enfermagem perioperatória. Procedimentos cirúrgicos cardíacos.

**RESUMEN: Objetivo:** Caracterizar el perfil clínico de los pacientes sometidos a cirugía cardíaca en el período perioperatorio y describir el seguimiento a los 30 días del alta hospitalaria. **Método:** Estudio retrospectivo, con una muestra de 54 pacientes, de ambos sexos,  $\geq 18$  años, sometidos a cirugía cardíaca. Las variables analizadas fueron: sociodemográficas, clínicas y relacionadas con el período perioperatorio y seguimento en 30 días. **Resultados:** La edad

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Received on: 07/13/2020 – Approved on: 10/26/2020

<https://doi.org/10.5327/Z1414-4425202100010007>

media de los pacientes fue de  $65,5 \pm 15$  años; la mayoría eran hombres (79,6%). Factores de riesgo más prevalentes: hipertensión (72,2%), dislipidemia (48,1%) y cardiopatía isquémica (31,5%). Los procedimientos valvulares tuvieron una mayor prevalencia (50,0%). La complicación más prevalente en el postoperatorio fue la arritmia (18,5%). Al alta, predominó el uso de estatinas (78,4%), seguido de antiagregantes plaquetarios (50,9%) y anticoagulantes (31,3%). Treinta días después del alta hospitalaria hubo un 11,7% de reingresos, siendo la infección respiratoria / derrame pleural y la infección del sitio quirúrgico las principales causas de reingreso. **Conclusión:** Los pacientes cardíacos eran en su mayoría hombres, ancianos y con comorbilidades; la arritmia fue la principal complicación después de la cirugía. La incidencia de reingreso a los 30 días del alta se relacionó con alteraciones pulmonares e infecciosas. **Palabras Clave:** Atención de enfermería. Enfermería perioperatoria. Procedimientos quirúrgicos cardíacos.

## INTRODUCTION

Chronic diseases involve a set of pathologies, such as heart disease, which presents high rates of morbidity and mortality. The World Health Organization (WHO) points to heart disease as the main causes of death around the world. The most recent survey, with data from 2015, shows that 17.7 million deaths were caused by cardiac diseases<sup>1</sup>. In Brazil, in 2019, more than 289 thousand people died due to cardiac diseases and their complications. Such diseases present multiple etiologies, associated with functional incapacities, which, consequently, potentialize socioeconomic, cultural and environmental impacts.

Cardiovascular disease represent a major public health issue, requiring efficient methods aiming at potentializing resolutive actions regarding health care. The estimations point out to the possibility that, in the next 20 years, in Brazil, the number of elders will be higher than 30 million people, representing almost 13% of the population. Considering that life expectancy has been increasing, the consequence is that the elderly will require some type of cardiac intervention, thus leading to more longevity and improved quality of life<sup>2,3</sup>.

Studies show changes in the clinical profile of the patients. With new technologies and improvements in care processes, cardiac surgery has been indicated later on, which leads patients to have several associated pathologies. However, the higher number of comorbidities influences the clinical outcomes, with more postoperative complications<sup>4</sup>.

Surgical treatment aims at increasing survival rates, improving the quality of life of patients. Among cardiac surgeries, myocardial revascularization is the most prevalent one (64% in Brazil), followed by valve repair. Considering the limitations generated by the surgical procedure, it is necessary that patients maintain their functional independence, thus allowing their return to activities of daily living<sup>5-7</sup>.

Data from DATASUS in the past five years (between 2014 and 2019), in an analysis of the Brazilian population, showed there were 72,157 surgical cardiac procedures, being 43.57% in the Southeast Region of the country. In the past year (2019), there were 32,732 surgical cases, and mortality rates of 7.05%. Heart diseases account for several readmissions and long periods of hospital stay<sup>7</sup>.

Most patients who undergo cardiac surgery presents with high levels of anxiety and expectation regarding the procedure, which may compromise the evolution. Therefore, the nursing staff is responsible for giving information to patients, increasing their knowledge and reassuring them in the pre, peri and post-operative periods<sup>8</sup>. In that sense, care processes require continuous improvement, as well as the follow-up of these patients both in the perioperative period and after hospital discharge. The first 30 days after discharge are important for the readaptation of the patient to the activities of daily life, due to the complexity of the anesthetic-surgical procedure and hospital stay.

Perioperative nursing care plays a relevant role in this scenario, not only due to the direct care provided to the patients submitted to cardiac surgeries, but also for the guidance and orientation addressed to patients and their relatives during hospitalization and after hospital discharge.

## OBJECTIVE

To characterize the clinical profile of patients submitted to cardiac surgery in the perioperative period and describe the follow-up of these patients 30 days after hospital discharge.

## METHOD

This is a retrospective study carried out in a major general hospital, in the South of Brazil, city of Caxias do Sul, Rio

Grande do Sul state (RS). The institution has been a reference in cardiac surgery since 2004, and contains a thoracic pain unit, with six beds, and two intensive care units for adults, with 10 beds each, where patients who underwent cardiac surgery recover. The surgical demand is approximately six to eight surgeries a month. The analyzed period was from March to September 2019.

The study included patients of both sexes, aged  $\geq 18$  years, who underwent cardiac surgery procedures (myocardial revascularization, valve procedures, aneurysms and combined surgeries), both elective and emergency surgeries. Patients whose surgeries were related to congenital heart defects were excluded.

The sample was composed of 54 patients, in total, who met the inclusion criteria in the period. Data collection was based on a secondary database, updated by the nursing staff of the operating room (OR), which follows-up patients for up to one year after the anesthetic-surgical procedure. Patient follow-up includes one telephone call made by the nurse 1, 3, 6 and 12 months after the surgery. For this study, we only considered the 30-day follow-up period.

In the preoperative period, the sociodemographic and clinical variables were analyzed; in the perioperative period, the analyzed variables were time of extracorporeal circulation (ECC) and time of clamping; the variables in the postoperative period were time of extubation after admission to the intensive care unit (ICU), use of medicines, use of circulatory assist device, use of blood components, complications (cardiocirculatory, renal, respiratory complications and others related to the procedure), and death. In the 30-day follow-up period, hospital readmissions, cardiopulmonary outcomes and surgical site infection (SSI) were assessed.

The data are presented through absolute (n) and relative (%) numbers, mean and standard deviation, when normally distributed, or median with 25 and 75 percentile, when there is no normal distribution. Normality was verified by the Shapiro-Wilk test. The data were verified using the Statistical Package for Social Sciences (SPSS), version 25.

This study is characterized as a sub-analysis of a larger project, with the sample, and followed the recommendations of Resolution n. 466/2012, of the National Health Council. It was approved by the Research Ethics Committee of the institution that hosted the study, via Plataforma Brasil – Certificado de Apresentação para Apreciação Ética (CAAE) 33329114.3.0000.5523 / Report 3.935.050.

## RESULTS

We analyzed data of 54 patients, and the mean time of stay in the ICU was  $4.19 \pm 4.31$  days. The mean age of the sample was  $65.5 \pm 15$  years. The prevalent sex was male, with 43 (79.6%) patients. The procedure with the highest prevalence was valve surgery, with 27 (50.0%) patients, followed by myocardial revascularization surgery (MRS), with 17 (31.5%) patients. Most surgeries were elective – 50 (92.5%). The socio-demographic and clinical characterization of the sample is described in Table 1.

Regarding intraoperative variables, the mean time of ECC was  $109 \pm 39$  minutes, and clamping time was, in average,  $76 \pm 28$  minutes. The longest time of ECC was found in patients who underwent MRS ( $105 \pm 44$  min), followed by patients submitted to valve surgeries ( $100 \pm 33$  min). Regarding extubation, we observed that 37 (68.5%) patients were extubated in the six postoperative hours, and valve surgeries presented the highest number of extubation procedures – 21 (77.8%), as recommended.

Vasopressors were the most used medicine, mostly in patients who underwent valve surgery (21 / 77.8%), followed by vasodilating drugs (9 / 52.9%), in MRS surgeries.

**Table 1.** Sociodemographic and clinical characterization in the preoperative period of patients submitted to cardiac surgery (n=54).

Variables	Total n=54 n (%)	MRS n=17 n (%)	Valve n=27 n (%)	Others n=10 n (%)
Procedures	54 (100.0)	17 (31.5)	27 (50.0)	10 (18.5)
Male	43 (79.6)	15 (88.2)	18 (66.7)	10 (100.0)
Age*	$65.5 \pm 15$	$65 \pm 13$	$63 \pm 14$	$56 \pm 16$
SAH	39 (72.2)	14 (82.4)	21 (77.8)	4 (40.0)
Dyslipidemia	26 (48.1)	12 (70.6)	11 (40.7)	3 (30.0)
Ischemic cardiomiopathy	17 (31.5)	17 (100.0)	0 (0)	0 (0)
Smoking	15 (27.8)	6 (35.3)	5 (18.5)	4 (40.0)
DM	14 (25.9)	9 (52.9)	4 (14.8)	1 (10.0)
Alcoholism	4 (7.4)	2 (11.8)	0	2 (20.0)
CKD	1 (1.9)	0 (0)	1 (3.7)	0
DPOC	1 (1.9)	0 (0)	0 (0)	1 (10.0)
Fração de ejeção	$60 \pm 1$	$60 \pm 1$	$63 \pm 1$	$63 \pm 0$

\*mean and standard deviation; MRS: myocardial revascularization surgery; SAH: systemic arterial hypertension; DM: diabetes mellitus; CKD: chronic kidney disease; COPD: chronic obstructive pulmonary disease.

Concerning blood transfusion, we identified that 11 (20.4%) patients needed this therapy. Most patients were discharged from the ICU with satisfactory Swift score (Table 2).

Mortality rate in the immediate postoperative period (IPO) was three (5.5%) patients. Regarding postoperative complications after 48 hours, arrhythmia stood out (10/ 18,5%), followed by bleeding and vasoplegia (6 / 11.1%). Such data are shown in Table 3.

Concerning the complications presented by patients after 48 hours until hospital discharge, arrhythmia was prevalent and affected seven (13.7%) patients (Table 4).

Among the medications the patients of the sample took in the household, after hospital discharge, the following stand out: statins (40 / 78.4%), platelet antiaggregants (26 / 50%), angiotensin-converting enzyme (ACE) inhibitors (20 / 39.2%) and oral anticoagulants (16 / 31.3%).

Six (11.7%) patients were readmitted 30 days after hospital discharge due to complications. The main complications in this period were: respiratory infection/ pleural effusion (3 / 5.9%) and SSI (3 / 5.9%). Other data are shown in Table 5.

**Table 2.** Data referring to immediate postoperative care in the intensive care unit (ICU) (n=54).

Variables	Total n=54 n (%)	MRS n=17 n (%)	Valve n=27 n (%)	Others n=10 n (%)
Extubation in up to 6 hours	37 (68.5)	8 (47.1)	21 (77.8)	8 (80.0)
Vasopressor	47 (87.0)	16 (94.1)	21 (77.8)	10 (100.0)
Vasodilator	20 (37.0)	9 (52.9)	8 (29.6)	3 (30.0)
Inotropic agents	8 (14.8)	5 (29.4)	3 (11.1)	0 (0)
Precedex	10 (18.5)	5 (29.4)	3 (11.1)	2 (20.0)
Fentanyl	5 (9.3)	2 (11.8)	3 (11.1)	0 (0)
Midazolam	3 (5.6)	3 (17.6)	0 (0)	0 (0)
Intra aortic balloon	1 (1.9)	1 (5.9)	0 (0)	0 (0)
Renal replacement therapy	1 (1.9)	0 (0)	1 (3.7)	0 (0)
Blood transfusion	11 (20.4)	5 (29.4)	4 (14.8)	2 (20.0)
ICU discharge - Swift	--	--	--	--
Low	46 (85.2)	14 (82.4)	24 (88.9)	8 (80.0)
High (≥15)	8 (14.8)	3 (17.6)	3 (11.1)	2 (20.0)

MRS: myocardial revascularization surgery.

**Table 3.** Complications presented by postoperative patients (up to 48 hours) (n=54).

Variables	Total n=54 n (%)	MRS n=17 n (%)	Valve n=27 n (%)	Others n=10 n (%)
Arrhythmia	10 (18.5)	2 (11.8)	7 (25.9)	1 (10.0)
Bleeding	6 (11.1)	2 (11.8)	3 (11.1)	1 (10.0)
Vasoplegia	6 (11.1)	4 (23.5)	1 (3.7)	1 (10.0)
Kidney failure	3 (5.6)	1 (5.9)	2 (7.4)	0 (0)
Acute respiratory failure	3 (5.5)	1 (5.9)	1 (3.7)	1 (10.0)
Death	3 (5.5)	1 (5.8)	1 (3.7)	1 (10.0)

MRS: myocardial revascularization surgery.

**Table 4.** Complications presented by patients 48 hours after hospital discharge (n=51).

Variables	Total n=51 n (%)	MRS n=16 n (%)	Valve n=26 n (%)	Others n=10 n (%)
Arrhythmia	7 (13.7)	2 (12.5)	4 (15.4)	1 (11.1)
Kidney failure	3 (5.9)	1 (6.3)	1 (3.8)	1 (11.1)
Respiratory failure	1 (2.0)	1 (6.3)	0 (0)	0 (0)
Surgical wound infection	1 (2.0)	0 (0)	0 (0)	1 (11.1)
Acute pulmonary edema	2 (3.9)	2 (12.5)	0 (0)	0 (0)
Pneumonia	1 (1.9)	0 (0)	1 (3.8)	0 (0)

MRS: myocardial revascularization surgery.

**Table 5.** Readmissions and complications of the patients 30 days after hospital discharge (n=51).

Variables	Total n=51 n (%)	MRS n=16 n (%)	Valve n=26 n (%)	Others n=9 n (%)
Hospital readmission in 30 days	6 (11.7)	1 (6.3)	2 (7.7)	2 (22.2)
Pleural effusion and respiratory infection	3 (5.9)	1 (6.3)	2 (7.7)	0 (0)
Surgical wound infection	3 (5.9)	1 (6.3)	0 (0)	2 (22.2)

MRS: myocardial revascularization surgery.

## DISCUSSION

The study included data from 54 patients submitted to cardiac surgeries and the male gender was prevalent, with mean age of 65 years. The most prevalent comorbidity was systemic arterial hypertension (SAH), followed by dyslipidemia. Among the most prevalent cardiac surgeries, valve replacements and MRS stood out. Other studies, also performed with patients who underwent cardiac surgery, showed the prevalence of elderly men; however, the most common procedure was MRS, and the most prevalent comorbidities were SAH, diabetes mellitus (DM) and dyslipidemia<sup>9-11</sup>.

Regarding the perioperative period, it is observed that the duration of ECC and clamping is similar to the mean found in the literature. In a case-control study that compared patients that were not part of the protocol and those who were part of the Enhanced Recovery After Surgery (ERAS) protocol, the authors observed higher time of ECC and clamping, similarly to the information found in this study. The ERAS protocol aims at improving the outcomes and complications in the postoperative period by proposing specific preoperative care<sup>12</sup>. However, another study carried out in the Northwest of Rio Grande do Sul state showed that the duration of ECC was shorter, considering the profile of patients attributed to MRS. The long duration of ECC is associated with systemic inflammatory disease and may cause complications such as vasoplegia, renal disease, among others; besides, it may increase hospitalization time<sup>13</sup>.

As to the time of extubation, studies point out to a superior interval in comparison to that presented in this study. An analysis carried out in the Southeast of Brazil, which assessed 200 postoperative cardiac surgery patients, showed mean time of extubation superior than 12 hours<sup>10</sup>. Another study, which assessed 47 patients submitted to heart valve surgery, showed mean time of 14.5 hours. Early extubation, or before a 6-hour period, favors outcomes such as reduced hospitalization time, whereas extubation after a 6-hour period is associated with postoperative complications<sup>3,10,14</sup>.

Regarding the drugs used in the IPO, vasopressors stood out and were followed by vasodilators (nitroglycerin). In MRS, when the mammary artery is used as a bypass, the use of vasodilators is necessary to maintain bypass permeability. Vasopressors, on the other hand, are necessary in the IPO, given the hemodynamic instability. The most used vasopressor in the IPO is noradrenaline; the most used vasodilator is nitroglycerin, and both use the central venous access<sup>10</sup>.

Regarding the need for blood components in the IPO, half of the patients in this study needed a blood transfusion, mostly those submitted to MRS. Postoperative bleeding is the main reason why patients received blood components<sup>15</sup>. The transfusion of blood components is associated with transfusion reaction, postoperative infection, increased postoperative morbidity and mortality, risk of immunosuppression and longer duration of hospitalization<sup>15</sup>.

Atrial fibrillation (AF) is one of the most common complications in the IPO and can also be present in the late postoperative period. According to the II Brazilian Guidelines for Atrial Fibrillation, in the postoperative period AF can occur from 24 to 72 hours after surgery, especially in valve surgeries<sup>16</sup>.

In accordance with the data in this study, another analysis that approaches patients in the postoperative period identified that the most common complication in patients who undergo cardiac surgery was arrhythmia, especially AF, observed in 45% of them<sup>17</sup>. Besides arrhythmias, other complications can be found in the postoperative period, such as bleeding and vasoplegic syndrome; both stand out due to high mortality rates. A study that described clinical outcomes of patients in an institution in the Northwest of Rio Grande do Sul state indicated bleeding as the second most common complication in the postoperative period, with several possible causes: surgical techniques, coagulation disorders, excessive use of heparin and complications owed to the long duration of ECC. These complications can be related to preexisting conditions, considering that many patients present with multiple comorbidities. Therefore, it is important that patients be clinically compensated<sup>13</sup>.

One study that aimed at describing the complications in the IPO of cardiac surgeries, involving a mostly male population who underwent MRS, showed that patients presented with hydroelectrolytic disorders, followed by cardiac arrhythmia, as the main complications<sup>18</sup>. Another study aimed at describing complications in 2,648 patients who underwent cardiac surgery in an institution in the State of São Paulo, describing the following as main complications: acute kidney injury and lung pathologies coming from respiratory infection and pleural effusion, both related to the long duration of ECC<sup>19</sup>.

After hospital discharge, six (11.7%) patients were readmitted, all due to reasons related to the surgical procedure. The main causes were respiratory infection and SSI. In a descriptive study carried out in the Southeast of Brazil, the authors identified a lower readmission rate (5.9%) than the one found in this analysis, but SSI was also the main cause. Some of the factors that contribute with SSI are DM,

dyslipidemia, obesity, chronic obstructive pulmonary disease (COPD) and smoking<sup>6</sup>.

Mediastinitis was the focus of a study carried out in Universidade de São Paulo (USP), in which most patients presented with infection after hospital discharge (54.7%); and, of these, 85.1% needed to be hospitalized again for a mean period of 31.8 days<sup>20</sup>.

The complications from the intraoperative period and the IPO cause longer hospitalization time, and patients become vulnerable to readmission. Bleeding in the intraoperative period and prolonged mechanical ventilation, the difficulty to stabilize blood sugar, among others, are triggering factors for the unsuccessful hospital discharge.

Therefore, the control and prevention measures are essential and are directly related to the evolution of the patient in the postoperative period. Health care programs that provide preoperative care to patients with preexisting diseases aim at optimizing treatment, thus preventing clinical decompensation in the postoperative period, with repercussions after hospital discharge<sup>6,21</sup>. A study carried out with 20 patients submitted to reconstructive heart surgery showed that most of them was not advised about how to care for the surgical wound. That study shows a gap in terms of guidance, which is only provided at the time of hospital discharge<sup>22</sup>. Adequate rehabilitation, allied to household care, is essential to prevent rehospitalization. Control and care with comorbidities are essential. Therefore, the work of the multidisciplinary staff is essential to obtain success in the postoperative period<sup>6</sup>.

The mortality rate in this study was of three (5.5%) patients. Two of them presented with prolonged ECC time (214 min and 136 min), and this was a risk factor for mortality. Deaths occurred in the first 48 hours after the anesthetic-surgical procedure; in two cases, it was necessary to intervene again due to bleeding; and, in another situation, the patient presented with vasoplegic syndrome. The national literature

demonstrates mortality rates ranging from 8.7 to 14.2%<sup>23,24</sup>. When associated with infectious endocarditis, these rates increase, ranging from 15 to 30%<sup>25</sup>, reaching incidence of 10.5% in patients who developed mediastinitis<sup>20</sup>.

The clinical and sociodemographic variables demonstrate results that are compatible with other studies related to this matter. This study reaffirms the importance to get to know the profile of patients who undergo cardiac surgery, in order to contribute with orientations during hospitalization, thus subsidizing strategies to improve adherence to treatment and control of complications.

The limitation of this study is the fact that the sample is small, since this is a hospital with fewer surgical interventions per month.

## CONCLUSION

Most patients whose data were analyzed were male, with comorbidities, who underwent valve replacement and myocardial revascularization procedures. Mortality rate was 5.5%, and deaths occurred up to 48 hours after the anesthetic-surgical procedure. The complications shown in the postoperative period were mostly arrhythmias, bleeding and vasoplegia. The main cause for readmission, 30 days after discharge, was respiratory infection/pleural effusion, and surgical site infection.

The knowledge about the profile and evolution of patients who underwent cardiac surgery in the hospital that hosted the study subsidize strategies to implement improvements in care processes, as well as continued training for patient care team, promoting safe practices. Besides, orientations for discharge addressed to the cardiac rehabilitation of patients submitted to surgery must be increased and varied, including family members and empowering the patient and the perioperative nursing team.

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