Factors associated with reoperation due to bleeding and outcomes after cardiac surgery: a prospective cohort study

Fatores associados à reoperação por sangramento e desfechos após cirurgia cardíaca: estudo de coorte prospectivo

Factores asociados con la reintervención por sangrado y desenlaces después de cirugía cardiaca: un estudio de cohorte prospectivo

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ABSTRACT

Objective: Identify the incidence and factors associated with reoperation due to bleeding in the postoperative of a cardiac surgery, in addition to the clinical outcomes of patients. **Method:** Prospective cohort study, conducted in an Intensive Care Unit (ICU), with adult patients undergoing cardiac surgery. Patients diagnosed with coagulopathies were excluded. The patients were followed up from hospitalization to hospital discharge. **Results:** A total of 682 patients were included, and the incidence of reoperation was 3.4%. The factors associated with reoperation were history of renal failure (p = 0.005), previous use of anticoagulant (p = 0.036), higher intraoperative heart rate (p = 0.015), need for transfusion of blood component during intraoperative (p = 0.040), and higher SAPS 3 score (p < 0.001). The outcomes associated with reoperation were stroke and cardiac arrest. **Conclusão:** Reoperation was an event associated with greater severity, organic dysfunction, and worse clinical outcomes, but there was no difference in mortality between the groups.

DESCRIPTORS

Thoracic Surgery; Postoperative Hemorrhage; Reoperation; Second-Look Surgery; Outcome Assessment, Health Care.

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INTRODUCTION

Cardiovascular diseases are a worldwide public health problem and can cause significant changes to a patient's life. Cardiac surgery, a complex procedure, is one of the treatments for heart diseases that results in a critical postoperative condition, requiring intensive care to establish a good recovery. The immediate recognition of possible complications in the postoperative period of cardiac surgery is fundamental to avoid hemodynamic instability and death[1]. Despite the advances in cardiac surgery and perioperative care, postoperative complications remain frequent, leading to a substantial increase in mortality of patients undergoing these procedures[2]. Bleeding is the postoperative complication with the greatest cause of morbidity and mortality and is associated with the high need for surgical reoperation[3].

The incidence of reoperation due to bleeding after cardiac surgeries in adult patients is reported in the literature as being between 2% and 6%[3–10]. In this context, researchers have been dedicated to investigating risk factors for reoperation due to bleeding, which include advanced age; higher number of comorbidities; presence of congestive heart failure; liver failure; renal failure requiring hemodialysis; patients with symptomatic angina; patients with a lower ejection fraction; longer time of myocardial ischemia and cardiopulmonary circulation; aortic valve surgery; surgeries for placement of ventricular assistance devices; and iatrogenesis[6,9].

Reoperation, in turn, has a considerable effect on the evolution of the postoperative period. Patients submitted to reoperation due to bleeding have a higher incidence of acute kidney injury, stroke, sternal wound infection, pulmonary infections, longer mechanical ventilation time, greater need for circulatory support with intra-aortic balloon, high rates of transfusion of blood components, sepsis, atrial arrhythmias, longer length of stay in the Intensive Care Unit (ICU), increased treatment costs[11], and have a higher mortality rate.

Mortality after reoperations ranges from 1.2% to 22.4%[4,7,8,10,12]; however, an investigation that included 528,686 patients who underwent myocardial revascularization in more than 800 hospitals showed that this rate has been reduced over the years, either due to changes in the management of hemostasis during surgery and the appropriate use of blood components and procoagulants, or due to the acquired knowledge of risk factors that may favor the early implementation of interventions capable of impacting morbidity and mortality[5].

In Brazil, the incidence of reoperation after cardiac surgery was described between 3.7% and 5.6%[13–15]. Previous studies have focused on postoperative bleeding[13–14], with only one describing the risk factors for reoperation[15] and there was no description of outcomes of reoperated patients. With the advancement of surgical techniques and changes in the epidemiology of patients undergoing cardiac surgeries, changes in the incidence of reoperations may occur, as well as in risk factors and clinical outcomes. Thus, we sought to investigate the incidence and causes associated with reoperation due to bleeding in the postoperative period of cardiac surgery, in addition to the clinical outcomes of patients.

METHOD

DESIGN OF STUDY AND SCENARIO

This is a prospective cohort study, conducted in a Surgical Intensive Care Unit (ICU) of a teaching hospital specialized in cardiology and pulmonology of high complexity in the municipality of São Paulo, Brazil, from June 2016 to February 2019.

POPULATION, SAMPLE SIZE AND SELECTION CRITERIA

The participants were identified from the surgical program. Those aged over 18 years, who underwent cardiac surgery by median sternotomy (myocardial revascularization, valvuloplasty/valve replacement, aneurysm correction/aortic dissection, heart transplantation, and combined surgeries) were selected. Participants diagnosed with coagulopathy, such as Von Willebrand's disease, hemophilia, coagulation deficiency, and thrombocytopenia, were excluded. This is a convenience sample, with 682 consecutive cases being followed during the study period.

DATA COLLECTION

Reoperation was defined as the return of the patient to the operating room for hemostasis analysis due to significant bleeding in the immediate postoperative period, that is, in the first 24 hours of ICU admission. The decision to reoperate is made by the ICU medical team in conjunction with the cardiac surgeon. The participants were followed, from hospitalization to hospital discharge, by five researchers who received training to standardize data collection.

The variables included in this study were selected after analyzing studies[7,9,13,15] that investigated associative and predictive factors for bleeding and/or reoperation in the postoperative period of cardiac surgery. The variables were divided considering the pre-, intra-, and postoperative periods[7,9,13,15].

The preoperative variables were[7,9,13,15] age, sex, race, body mass index (BMI), left ventricular ejection fraction (LVEF), EuroSCORE (European System for Cardiac Operative Risk)[16], previous cardiac surgery, presence of heart failure according to the functional class of the New York Heart Association (NYHA), systemic arterial hypertension (SAH), diabetes mellitus (DM) type II, previous history of kidney injury, smoking and sepsis, previous use of anticoagulant and platelet aggregation inhibitors, basal creatinine, platelets, hemoglobin (Hb), hematocrit (Ht), and international normalized ratio (INR). Intraoperative data included: type of cardiac surgery, use and duration of extracorporeal circulation (CPB), duration of anoxia, number of sternal wires, use of heparin, initial and final activated coagulation time (ACT), minimum body temperature, higher mean arterial pressure (MAP), higher heart rate (HR), and amount of intraoperative bleeding and transfusion of blood components. The variables of the immediate postoperative period (first 24 hours) were the Simplified Acute Physiology Score (SAPS 3)[17] and the results of the following laboratory tests on ICU admission: platelets, INR, activated partial thromboplastin time (aPTT), Hb, Ht, arterial oxygen saturation, arterial pH, HCO_3 (Bicarbonate), venous oxygen saturation,

and creatinine. Finally, the outcome variables were stroke (cerebrovascular accident – CVA), myocardial infarction (MI), cardiac arrest (CA), and death.

The data collection instrument consisted of two parts: the first comprised data collected from physical and electronic medical records; the second part comprised the application of the EuroSCORE to assess the risk of cardiac surgery and the Simplified Acute Physiology Score (SAPS 3), which predicts the risk of mortality/morbidity at the time of ICU admission.

Data Analysis and Treatment

The collected data were stored in a database and the analysis was performed with the software R. Continuous variables were described by mean, standard deviation of the median, and inter-quartile range, and categorical variables by absolute and relative frequencies. The Kolmogorov-Smirnov test was performed to assess the normality of the distribution of continuous variables. Bivariate analysis of the continuous variables of the reoperated and non-reoperated groups was performed, comparing them with Student's t, Wilcoxon-Mann-Whitney, and Brunner-Munzel tests; for categorical variables, the following tests were performed: Fisher's exact and Pearson's chi-square with the 5% statistical significance level.

Ethical Aspects

The study participants received clarification regarding the research in the preoperative period, those who agreed to parti-cipate were included upon signing the informed consent form. The study was approved by the Research Ethics Committee involving Human Beings of theInstituto do Coração, Hospital das Clinicas HCFMUSP, Faculdade de Medicina, Universidade de Sao Paulo, Sao Paulo, SP, BR., under the number of the Certificate of Presentation for Ethical Appreciation (CAAE): 55701616.7.0000.0068.

RESULTS

The final sample consisted of 682 participants from the 686 eligible patients. The two patients who did not agree to parti-cipate in the study and two others who died in the intraoperative period were excluded. The incidence of reoperation due to blee-ding was 3.4% (n = 23). Of the 23 participants who returned to the operating room due to bleeding, 16 were on the account of chest drains and seven presented cardiac tamponade.

Sociodemographic and Clinical Characteristics of the Population Preoperatively

Table 1 compares the patients from the reoperated and non-reoperated groups, presenting similarities in their sociode-mographic characteristics. Patients requiring reoperation had a history of kidney injury (p = 0.005), higher basal creatinine (p = 0.045), and higher use of anticoagulants (p = 0.036).

Intraoperative Data

A total of 45 combined surgeries were performed, which include valve approaches and revascularization surgeries only in the group of non-reoperated patients. The amount of steel threads used to suture the sternum was compared between the reoperated (8.0–10.0) and non-reoperated (8.0–9.0) groups, no difference was found (p = 0.780). In the group of reoperated patients, the minimum bleeding volume during the surgery was of 120 ml and the maximum was of 2500 ml. Table 2 shows the intraoperative characteristics. The reoperated patients presented, during the intraoperative, a greater need for transfusion of blood components (p = 0.040) and higher HR (p = 0.015).

Immediate Postoperative and Clinical Outcomes

The postoperative variables of venous saturation of O_2 (p = 0.683) and arterial saturation of O_2 (p = 0.100) showed no statistical difference between groups. Bleeding in the reoperated group ranged from 300 to 1950 ml. Table 3 shows the variables of the immediate postoperative period, at the time of ICU admission, comparing the reoperated and non-reoperated groups. Patients who required reoperation were admitted to the ICU with a higher severity score (SAPS 3) (p < 0.001).

Only one participant in the reoperated group had a CVA (p = 0.034) and none had a diagnosis of acute myocardial infarction. CA was more frequent in the reoperated group (p < 0.001). Table 4 shows the variables of clinical outcome.

DISCUSSION

Reoperation due to bleeding in the postoperative period of cardiac surgery is an important event, with an incidence reported in the literature between 2% and 6%[4–10], being a serious complication that can lead to a worse prognosis for the patient. The incidence of reoperation found in this study (3.4%) was lower than that found in the cohort (5.9%), in which patients had a higher mean age (68.5 years), higher EuroSCORE (>6.66%), and lower number of combined surgeries (myocardial revascularization + valve approach) when compared to our study[4].

Studies conducted in North America and Europe present a profile of cardiac surgeries that differs from those found in Brazil[6,9,10,18]. The higher proportion of myocardial revascu-larization surgeries in the cohorts of these countries reveals a particularity of the Brazilian epidemiological profile. In Brazil, rheumatic etiology predominates as the main cause of valvulopathy, which explains the higher proportion of these surgeries in Brazilian hospitals and in the present cohort. Moreover, since Brazil is also a developing country with an aging population, the diagnosis of valve diseases of degenerative etiology has increased, often accompanied by age-related comorbidities. Thus, this sum increases the proportion of valve surgeries in this Brazilian cohort, which may make treatment more complex and prone to clinical outcomes that are not always satisfactory[10,13,15,18].

Regarding the clinical history of the patients included in the study, the basal creatinine values of reoperated patients were higher, with an average of 1.36 mg/dL, and 26% had a history of previous renal failure. In another investigation, those who required reoperation due to bleeding were more likely to be dependent on dialysis[18].

Although anticoagulant drugs are requested to be discon-tinued considering the half-life of elimination, we observed

Table 1 – Reoperated and non-reoperated patients according to demographic and clinical characteristics in the preoperative period of cardiac surgery – São Paulo, SP, Brazil, 2019.

Characteristic	Reoperated N = 23 (3.4%)	Non-reoperated N = 659 (96.6%)	Total 682 (100%)	*p*-value
Sex				0.100[P]
Male n(%)	18 (78.3)	404 (61.3)	422 (61.9)	
Female n(%)	5 (21.7)	255 (38.7)	260 (38.1)	
Age-years m(SD)	62.4 (±11.8)	58.7 (±12.5)	58,8 (±12,5)	0.158[t]
Race				0.351[F]
White n(%)	19 (82.6)	580 (88.0)	599 (87.8)	
Black n(%)	3 (13.0)	69 (10.5)	72 (10.6)	
Asian n(%)	1 (4.4)	10 (1.5)	11 (1.6)	
BMI (kg/cm²)	26.1 (±4.4)	26.5 (±5.2)	26.6 (±5.2)	0.828[t]
EuroSCORE med(IQ)	4.0 (4.0–7.0)	4.0 (3.0–6.0)	4.0 (3.0-6.0)	0.053[w]
FEVE med(IQ)	50.0 (35.0–62.0)	60.0 (50.0–64.0)	60.0 (50.0–64.0)	0.113[w]
Previous cardiac surgery n(%)	3.0 (13.0)	104.0 (15.8)	107.0 (15.7)	0.723[P]
Heart failure Functional classification (NYHA)				0.081[F]
No HF n(%)	13 (56.6)	454 (69)	467 (68.5)	
I n(%)	1 (4.3)	25 (3.8)	26 (3.8)	
II n(%)	1 (4.3)	80 (12.2)	81 (12.0)	
III n(%)	6 (26.1)	78 (11.8)	84 (12.3)	
IV n(%)	2 (8.7)	21 (3.2)	23 (3.4)	
SAH n (%)	14 (60.9)	456 (69.2)	470 (68.9)	0.397[P]
Type II diabetes n(%)	7 (30.4)	195 (29.6)	202 (29.6)	0.931[P]
Smoking habit				0.366[P]
Non-smoker n(%)	14 (60.9)	415 (63.0)	429 (62.9)	
Smoker n(%)	1 (4.3)	80 (12.1)	81 (11.9)	
Former smoker n(%)	8 (34.8)	164 (24.9)	172 (25.2)	
Platelet Aggregation Inhibitors	11 (47.8)	338 (51.3)	349 (51.2)	0.694[P]
History of kidney injury n(%)	6 (26.1)	58 (8.8)	64 (9.4)	0.005[P*]
Anticoagulant n(%)	11 (47.8)	183 (27.8)	194 (28.4)	0.036[P*]
Creatine basal (mg/dl) med(IQ)	1.17 (0.97–1.61)	1.05 (0.89–1.22)	1.05 (0.89–1.22)	0.045[w*]
History of sepsis n(%)	2 (8.7)	15 (2.3)	17 (2.5)	0.109[F]
Platelets (cells/mm³) m(SD)	198700 (±79200)	212100 (±64660)	211190 (±65807)	0.331[t]
Hemoglobin (g/dl) m(SD)	12.7 (±2.4)	13.0 (±1.9)	12.9 (±1.9)	0.895[w]
Hematocrit (%)	37.7 (±7.0)	38.6 (±5.5)	38.6 (±5.6)	0.607[w]
INR med(IQ)	1.1 (1.0–1.2)	1.1 (1.0–1.1)	1.1 (1.0–1.1)	0.324[w]

Key: m – mean; SD – standard deviation; med – median; IQ – 1st and 3rd interquartile intervals; BMI – body mass index; LVEF – left ventricule ejection fraction; NYHA – *New York Heart Association*; HF – Heart failure; SAH – systemic arterial hypertension; INR – international standard reason; EuroSCORE – *European System for Cardiac Operative Risk*; P – Pearson's Chi-Square; t – Student's t-test; w – Wilcoxon-Mann-Whitney test; F – Fisher's exact test.

a higher prevalence of previous use of these drugs in patients that required reoperation. This finding can be explained due to the variability of the effects of coumarins on different individuals[19]. Another hypothesis may be that the medical guidelines regarding the interruption interval of these drugs before surgery were ignored. This association of previous use of anticoagulants and the higher occurrence of reoperation should lead to an integration of the teams responsible for the preoperative – be it in outpatient clinics, infirmary, or emergency units – and the surgical and postoperative teams, to increase awareness and preparation for a possible reoperation.

In this study, the group of reoperated patients received more intraoperative blood components (48% vs. 28%). We cannot affirm the causality within this association since patients may have shown a greater propensity to bleed during the surgical procedure. It is known, however, that the need for transfusion of blood components in the intraoperative period, besides being a marker of blood loss, may predispose the patient to a higher

Table 2 – Reoperated and non-reoperated patients according to intraoperative variables of cardiac surgery – São Paulo, SP, Brazil, 2019.

Charcteristics	Reoperated N = 23 (3.4%)	Non-reoperated N = 659 (96.6%)	Total 682 (100%)	p-value
Type of cardiac surgery				0.172F
MR surgery n(%)	8 (34.8)	289 (43.8)	297 (43.5)	
Valve surgery n(%)	10 (43.5)	263 (39.9)	273 (40.0)	
Aortic surgery n(%)	3 (13.0)	39 (5.9)	42 (6.2)	
Heart transplant n(%)	2 (8.7)	21 (3.2)	23 (3.4)	
Combined surgery n(%)	0	45 (6.8)	45 (6.6)	
ECC n(%)	23 (100.0)	634 (96.0)	657 (96.3)	1,000F
ECC time (minutes) med(IQ)	80.0 (65.0–119.0)	100.0 (80.0–118.2)	100.0 (80.0–118.5)	0.123w
Anoxia duration (minutes) med(IQ)	60.0 (46.0–98.0)	77.0 (58.0–92.0)	76.5 (57.0–92.0)	0.443t
Heparin (IU) m(SD)	35,905.0 ± (20,493.6)	36,100.0 (±19,474.1)	36,100.0 (±19,474.1)	0.780t
Initial ACT (seconds) med(IQ)	125.0 (115.0–169.0)	118.0 (111.0–132.5)	118.0 (111.0–133.0)	0.063B
Final ACT (seconds) med(IQ)	119.0 (112.0–149.0)	120.0 (112.0–135.0)	120.0 (112.0–135.0)	0.399w
Minimum body temperature med(IQ)	34.2 (31.8–35.0)	33.4 (31.8–34.8)	33.5 (31.8–34.8)	0.241w
Higher MAP (mmHg) med(IQ)	90.0 (80.0–110.0)	90.0 (80.0–100.0)	90.0 (80.0–102.0)	0.511w
Higher HR (bpm) med(IQ)	110.0 (100.0–125.0)	100.0 (90.0–115.0)	100.0 (90.0–115.0)	0.015w*
Bleeding (ml) med(IQ)		340.0 (200.0–450.0)	350.0 (200.0–450.0)	0.108B
Transfusion of blood components n(%)	11.0 (47.8)	185.0 (28.1)	196.0 (28.7)	0.040F*

Key: m – average; SD – standard deviation; med – median; IQ – 1st and 3rd interquartile intervals; MR – myocardial revascularization; ECC – extracorporeal circulation; ACT – activated coagulation time; F – Fisher's exact test; w – Wilcoxon-Mann-Whitney test; t – Student's t-test; B – Brunner-Munzel test.

Table 3 – Reoperated and non-reoperated patients according to variables of the immediate postoperative period of cardiac surgery at the time of ICU admission – São Paulo, SP, Brazil, 2019.

Characteristic	Reoperated N = 23 (3.4%)	Non-reoperated N = 659 (96.6%)	Total 682 (100%)	p-value
SAPS 3 med(IQ)	37.0 (31.0–49.0)	30.0 (23.0–36.0)	30.0 (23.0–36.0)	<0.001w*
Platelets m(SD)	147,800.0 (±62,210.0)	149,400.0 (±51,800.0)	149,280.0 (±52,115.9)	0.768t
INR med(IQ)	1.2 (1.2–1.3)	1.2 (1.1–1.3)	1.2 (1.1–1.3)	0.204w
aPTT med(IQ)	31.1 (26.7–33.7)	29.0 (26.8–32.3)	29.0 (26.8–32.4)	0.239w
Hemoglobin m(SD)	11.2 (±2.6)	11.5 (±1.7)	11.5 (±1.7)	0.238w
Hematocrit m(SD)	34.0 (±7.7)	35.2 (±5.2)	35.2 (±5.3)	0.308w
Arterial pH med(IQ)	7.34 (7.28–7.39)	7.34 (7.30–7.38)	7.34 (7.30–7.38)	0.734w
Bicarbonate med(IQ)	23.0 (21.7–24.4)	22.6 (21.4–24.2)	22.7 (21.4–24.2)	0.678w

Key: m – average; SD – standard deviation; med – median; IQ – 1st and 3rd interquartile intervals; INR – International normalized ratio; aPTT – activated partial thromboplastin time; Hb – hemoglobin; Ht – hematocrit; SaO₂ – oxygen saturation; SvO₂ – venous oxygen saturation; SAPS 3 – Simplified Acute Physiology Score 3; DDAVP – Desmopressin; 24h diuresis expressed in mL; w – Wilcoxon-Mann-Whitney test; t – Student t-test.

Table 4 – Reoperated and non-reoperated patients according to clinical outcome in the ICU during the immediate postoperative period of cardiac surgery – São Paulo, SP, Brazil, 2019.

Charcteristics	Reoperated N = 23 (3.4%)	Non-reoperated N = 659 (96.6%)	Total 682 (100%)	p-value
CVA n(%)	1 (4.3%)	0	1 (0.1)	0.034F*
CA n(%)	4 (17.4)	7 (1.0)	11 (1.6)	<0.001F*
Death n(%)	2 (8.7)	12 (1.8)	14 (2.0)	0.098F

Key: CVA – Cerebrovascular Accident; CA – Cardiac arrest; F – Fisher's exact test.

risk of complications. The increased use of blood components may influence hemodynamic status in the postoperative period and is related to adverse events, such as hemolytic and nonhemolytic reactions; worse postoperative results, such as infection and renal failure; as well as respiratory, cardiac, and neurological complications[17]. Therefore, transfusion of blood components should be done thoughtfully since reoperated patients seem to need it even more. A practical implication of this association is the need for nurses from the operating room to communicate the increased need for blood components, preparing the postoperative team for this event while placing the patients as priority for surveillance regarding excessive bleeding in this period[20].

Considering that late bleeding rarely occurs, monitoring the thoracic drains and hemodynamic state of the patients in the first hours of ICU admission is essential to minimize negative outcomes, in addition to the early recognition of significant bleeding signaling the need to return to the operating room, since the delay in reoperation worsens the outcome[7].

The highest HR in the intraoperative period was higher in the group of reoperated patients. The study that evaluated the variables related to excessive bleeding in the postoperative period of cardiac surgery identified high heart rate as a predictor of this symptom[21]. The decrease in systolic volume due to blood loss, which characterizes patients undergoing reoperation, may be the explanation for the higher heart rate. In our study, however, this symptom still occurred in the intraoperative period, which can also be explained by the greater blood loss at this time.

As for the data obtained at the time of ICU admission, a significant difference was found in the SAPS 3 score. This higher score indicates that patients who required reoperation were in a more severe condition upon arriving at the ICU.

Regarding clinical outcomes, a more unfavorable evolution of reoperated patients is perceived, which evidences the deterioration that blood loss in the immediate postoperative period causes[22]. The occurrence of a CVA and cardiac arrest established a high morbidity rate for patients who need reoperation due to bleeding, and the CVA was a finding affirmed by other authors[5,12].

Thus, the monitoring of these patients should be reinforced based on parameters common to the postoperative period, such as HR and temperature, measurement of cardiac output, continuous, if possible, careful follow-up of bleeding, of the blood volume, and of the hydroelectrolytic and electrocardiographic balance.

This study presented some limitations, such as a sample size that did not allow a statistical analysis of variables with independent association. The human factor was not included in the investigation, despite knowing that the surgical technique, experience, and revision of hemostasis at the end of the procedure, vary among professionals, affecting the bleeding and reoperation[7]. The study was conducted in a single hospital unit; the characteristics of this cardiology center, however, are representative of Brazilian epidemiology, since this tertiary hospital, located in the most populous city in Brazil, serves public and private services.

The findings of this investigation contribute to the early identification of factors that, related to bleeding and reoperation, make the planning of the multidisciplinary team effective, with actions directed to and individualized for patients. The factors identified in this study are easy to obtain in tertiary hospitals and easy to interpret, making bedside monitoring a cost-benefit action. The nurse, as the one responsible for care, as well as being, in most cases, the professional who stays closer to the patient, can use these findings to improve their assistance and their results of their care.

CONCLUSION

The incidence of reoperation due to bleeding in the postoperative period of cardiac surgery was 3.4%. Associated factors included: history of renal failure; previous use of anticoagulant, higher basal creatinine value; higher heart rate and need for intraoperative blood transfusion; and higher SAPS 3 scores on admission to the Intensive Care Unit. The reoperated patients presented severe clinical outcomes significantly associated with the event, which included stroke and cardiac arrest, however, there was no difference in mortality between the groups.

RESUMO

Objetivo: Identificar a incidência e os fatores associados à reoperação devido sangramento no pós-operatório de cirurgia cardíaca, além dos desfechos clínicos dos pacientes. **Método:** Estudo de coorte prospectivo, realizado em Unidade de Terapia Intensiva (UTI), com pacientes adultos submetidos à cirurgia cardíaca. Foram excluídos pacientes com diagnóstico de coagulopatias. Os pacientes foram acompanhados desde a internação até a saída hospitalar. **Resultados:** Foram incluídos 682 pacientes e a incidência de reoperação foi 3,4 %. Os fatores associados à reoperação foram: histórico de insuficiência renal (p = 0,005), uso prévio de anticoagulante (p = 0,036), maior frequência cardíaca intraoperatória (p = 0,015), necessidade de transfusão de hemocomponentes no intraoperatório (p = 0,040) e maior pontuação no SAPS 3 (p < 0,001). Os desfechos associados a reoperação foram: acidente vascular encefálico e parada cardiorrespiratória. **Conclusão:** A reoperação foi um evento associado a maior gravidade, disfunção orgânica, e piores desfechos clínicos, porém não houve diferença de mortalidade entre os grupos.

DESCRITORES

Cirurgia Torácica; Hemorragia Pós-Operatória; Reoperação; Cirurgia de Second-Look; Avaliação de Resultados em Cuidados de Saúde.

RESUMEN

Objetivo: Identificar la incidencia y los factores asociados con la reintervención por sangrado en el postoperatorio de cirugía cardiaca, además de los resultados clínicos de los pacientes. **Método:** Estudio de cohorte prospectivo, realizado en una Unidad de Cuidados Intensivos, con pacientes adultos sometidos a cirugía cardiaca. Se excluyeron a los pacientes con diagnóstico de coagulopatías. Los pacientes tuvieron un seguimiento efectuado desde el ingreso hasta el alta hospitalaria. **Resultados:** Se incluyeron a 682 pacientes, y la incidencia de reintervención fue del 3,4%. Los factores asociados a la reintervención fueron antecedentes de insuficiencia renal (p = 0,005), uso previo de anticoagulante (p = 0,036), mayor frecuencia cardíaca intraoperatoria (p = 0,015), necesidad de transfusión de hemocomponentes en el intraoperatorio (p = 0,040) y mayor

puntaje en SAPS 3 (p < 0,001). Los desenlaces asociados con la reintervención fueron accidente cerebrovascular y paro cardiorrespiratorio. **Conclusión:** La reintervención fue un evento asociado con mayor gravedad, disfunción orgánica y peores desenlaces clínicos, pero no hubo diferencia en la mortalidad entre los grupos.

DESCRIPTORES

Cirugía Torácica; Hemorragia Posoperatoria; Reoperaciónspanish; Segunda Cirugía; Evaluación de Resultado en la Atención de Salud.

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