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Original Article

INFECÇÃO DO SÍTIO CIRÚRGICO EM PACIENTES SUBMETIDOS A CIRURGIAS CARDÍACAS: UMA ANÁLISE DO PERFIL EPIDEMIOLÓGICO

SURGICAL SITE INFECTION IN PATIENTS SUBMITTED TO CARDIAC SURGERIES: AN EPIDEMIOLOGICAL PROFILE ANALYSIS

INFECCIÓN DEL SITIO CIRÚRGICO EN PACIENTES SOMETIDOS A CIRUGÍAS CARDÍACAS: ANÁLISIS DEL PERFIL EPIDEMIOLÓGICO

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RESUMO

Objetivo: Objetivou-se descrever a ocorrência da infecção do sítio cirúrgico em pacientes submetidos à revascularização do miocárdio e/ou implante de valva cardíaca e seu perfil epidemiológico. **Método:** Tratou-se de estudo retrospectivo, realizado em hospital de grande porte. Os dados foram coletados nos prontuários dos pacientes de cirurgias entre 2011 e 2015. Realizou-se estatística descritiva e análise bivariada pelo Epi-info 6.4. **Resultados:** Foram revisados 280 prontuários de pacientes com idade média de 58 anos. As principais comorbidades encontradas nesses pacientes foram hipertensão arterial e dislipidemia, sendo comum ainda a febre reumática naqueles com implante de prótese valvar. Foram diagnosticadas 52 infecções do sítio cirúrgico, sendo 32 (61,5%) durante a internação e 20 (38,5%) por reinternação. As infecções incisionais superficiais foram prevalentes seguidas de órgão/cavidade. A idade, tempo de internação total e no pós-operatório e dias no Centro de Terapia Intensiva após a cirurgia foram associadas à ocorrência infecciosa em órgão/cavidade. O tempo médio de internação foi de 18,1 dias nos pacientes sem infecção e 25,4 naqueles com infecção. **Conclusão:** É imprescindível investir em medidas de prevenção de infecções que envolvem equipes assistenciais, profissionais de controle de infecção e núcleos de segurança na busca de melhores práticas assistenciais.

Descritores: Infecção; Infecção da ferida cirúrgica; Enfermagem; Vigilância em saúde pública; Vigilância epidemiológica.

ABSTRACT

Objective: The study aimed to describe the occurrence of surgical site infection in patients submitted to myocardial revascularization and/or cardiac valve implantation as well as its epidemiological profile. **Method**: This was a retrospective study performed at a large hospital. Data were collected from patients' records of surgeries performed from 2011 to 2015. Descriptive statistics and bivariate analysis were performed using Epi-info 6.4. **Results**: We reviewed 280 patient records with a mean age of 58 years old. The main comorbidities found in those patients were arterial hypertension and dyslipidemia and, in those patients with valve prosthesis, rheumatic fever was common. Fifty-two (52) surgical site infections were diagnosed, 32 (61.5%) happening during the hospitalization and 20 (38.5%) in re-hospitalization. The superficial incisional infections were prevalent followed by organ/cavity. Age, total and post-operative hospitalization time, and days at the Intensive Care Center Unit after surgery were associated to infectious occurrence in organ/cavity. The mean time of hospitalization was 18.1 days in patients without infection and 25.4 in those with infection. **Conclusion**: It is imperative to invest in infection prevention measures involving care teams, infection control professionals and safety centers in the search for better care practices.

Descriptors: Infection, Surgical wound infection, Nursing, Public health surveillance, Epidemiological surveillance

RESUMEN

Objetivo: Describir la ocurrencia de infección del sitio quirúrgico en pacientes sometidos a revascularización del miocardio, y/o implantación de valvas y su perfil epidemiológico. **Método:** Fue un estudio retrospectivo en un hospital grande. Los datos fueron recopilados de las historias clínicas de los pacientes, para las cirugías realizadas en los años 2011 a 2015. Las estadísticas descriptivas y análisis bivariados fueron realizados con Epi-Info 6.4. **Resultados:** Revisamos 280 prontuarios de los pacientes con edad media de 58 años. Las principales comorbilidades fueron la hipertensión y la dislipidemia, siendo común la fiebre reumática en las de implantación de prótesis valvular. Fueron diagnosticadas 52 infecciones de sitio quirúrgico, el 61,5% durante la hospitalización y 38,5% en rehospitalización. Las infecciones incisionales superficiales más frecuentes, seguidas por órganos/cavidad. La edad, tiempo de internación total y en el postoperatorio y días en el Centro de Terapia Intensiva, después de la cirugía fueron asociadas a la ocurrencia infecciosa en órgano/cavidad. La duración media de internación en pacientes sin infección fue de 18,1 días, y con infección fue 25,4 días. **Conclusión:** Es imprescindible investir en medidas de prevención con participación de los equipos de asistencia, profesionales de control de infección y núcleos de seguridad buscando mejores prácticas asistenciales.

Descriptores: Infección; Infección de la herida quirúrgica; Enfermería; Vigilancia en salud pública; Vigilancia epidemiológica.

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INTRODUCTION

Cardiac surgeries are among the most performed in the world. Every 1,000,000 inhabitants per year, occur around 2000 cardiac surgeries in the United States, 900 in Europe and 350 in Brazil[1]. The surgeries for Coronary Artery Bypass Grafting (CABG) and the implantation of cardiac valves are the two most common types and may be performed separately or concomitantly.

The CABG is one of the therapeutic modalities to treat Coronary Artery Disease, which generally develops in patients with predisposing factors such as smoking, family history, obesity, systemic arterial hypertension (SAH), diabetes mellitus, dyslipidemia, among others[2]. The implants of cardiac valves, in turn, occur to optimize the health status of patients withvalvular
heart disease that result from advanced age or complications resulting from rheumatic fever, which is responsible for the etiology in 70% of cases in Brazil, giving the country a particular epidemiological profile in relation to developed countries[3].

The most common valvular heart diseases in rheumatic disease are stenosis and mitral insufficiency, followed by the aortic valves that affect young patients, being, in senility, aortic stenosis by calcifications the most frequent and often associated with dyslipidemia, smoking and SAH[3].

Surgical site infections (SSI) represent the most common complication in patients undergoing surgical procedures, highlighting Healthcare-Associated Infections (HAI). In American hospitals, in 2011, 21.8% of hospitalized patients affected by HAI developed SSI, which represented the second main cause of these infections[4]. In Brazil, SSI occupy the third position among all HAI, with rates ranging between 14% and 16% among hospitalized patients[5].

Among cardiac surgeries, SSI are serious and of great economic impact as a result of the prolonged hospitalization time (15 through 45 days), the cost (six times higher, considering the patient without infection, ranging from $19,000.00 to $150,000,00) and, by raising the mortality rate (around 8% to 20%), even after the treatment[6-8].

The post-surgical infection outcome is favored by a multiplicity of interrelated factors that cover various aspects of pre-, trans- and post-operative care, in addition to involving multiple organizational and human factors, requiring the performance of a multiprofessional team trained and qualified in the prevention of such events. Studies show that the nurse has played a key role in the deployment and support of surveillance measures for risk factors and prevention of SSI, as the deployment of bundles and the surgical checklist, for example, tools that have contributed to the significant reduction of SSI in various institutions[9-10].

However, the defined risk factors may not behave in the same way as predictors of infection in patients undergoing cardiac surgery, in different populations. Under this perspective and given the importance of SSI in cardiac surgeries, the study of different populations should be conducted in order to establish whether the studies are consistent with those described in the literature or different epidemiological behavior may be identified in different populations.

Therefore, the present study aims to describe the occurrence of SSI in patients undergoing CABG and/or cardiac valve implantation and their epidemiological profile.

METHODS

This was a retrospective study conducted at a university public hospital of Minas Gerais, with 509 beds registered in the *Cadastro Nacional de Estabelecimentos de Saúde* (National Registry of Health Establishment), for exclusive service to patients of the Unified Health System (UHS).

The study selected records of patients undergoing CABG or heart valve implantation or both, concomitantly, in the period from 01 January 2011 to 31 December 2015. Records of patients that died in a period equal to or less than 24 hours after the procedure were excluded, as well as of those that did not undergo surgeries in the study institution, totaling 280 records analyzed.

Data collection occurred through the review of medical records, adopting an instrument that contemplated sociodemographic, hospitalization, surgical procedure data, in addition to the aspects related to the occurrence of SSI in these patients.

SSI were classified as superficial incisional, deep incisional and organ/cavity, as criteria for epidemiological notification of the National Healthcare Surveillance Network of the Centers for Disease Control (NHSN-CDC)[11] version 2015,

based on the affected structure, time of occurrence and presence of signs and symptoms.

The data were compiled in a database using EPi-info, version 6.04, and analyzed by descriptive statistics, measures of central tendency (mean and median) and dispersion (standard deviation). The Mann-Whitney test was used in the bivariate analysis, in the verification of the relationship between the proposed variables and the occurrence of SSI. Variables that presented $p<0.05$ were considered significant.

The study was approved by the Research Ethics Committee (REC), CAAE-53843316.4.0000.5149, respecting the regulations described in Resolution 466/2012 of the National Health Council (NHC). Since this study collected data from secondary sources, contained in medical records, there was no need for an Informed Consent Form (ICF) by the REC.

RESULTS AND DISCUSSION

There were 280 medical records of patients that underwent cardiac surgeries in the analyzed period: 152 (54.3%) underwent CABG, 105 (37.5%) underwent valvular prosthesis implantation and 23 (8.2%) both surgeries, concomitantly.

In the general sample and by type of surgery, male patients predominated, 156 (55.7%), married 165 (65.7%), differing from females 64 (61.0%), regarding those that underwent cardiac valve implantation. The highest number of surgeries occurred in 2015 - 71 (25.4%) and the lowest in 2014 - 37 (13.2%). Most patients, 252 (90%), came from their houses. In all years, the combined surgical procedures occurred less than the others, alone. The CABG were prevalent, except in 2015, when valvular prosthesis implantation predominated (Table 1).

Table 1 – Sociodemographic characteristics of the patients (n=280) by type of performed surgery, in the period from 2011 to 2015, Belo Horizonte, 2017.

Characteristics	Type of performed surgery							
	CABG		Valcular prosthesis implantation		CABG and Valcular prosthesis implantation		Total	
	N	%	N	%	N	%	N	%
Gender								
Female	52	34.2	64	61.0	8	34.8	124	44.3
Male	100	65.8	41	39.0	15	65.2	156	55.7
Marital status (n= 251)								
Unmarried	18	13.2	33	34.7	2	10.5	53	21.1
Married	97	70.8	53	55.8	15	79.0	165	65.7
Widow(er)	15	10.9	8	8.4	2	10.5	25	10.0
Divorced	7	5.1	1	1.1	0	0.0	8	3.2
Uninformed	15	-	10	-	4	-	29	-
Origin								
Community	135	88.8	95	90.5	22	95.7	252	90
Hospital	17	11.2	10	9.5	1	4.3	28	10
Surgery year								
2011	45	29.6	17	16.2	2	8.7	64	22.9
2012	32	21.1	16	15.2	5	21.7	53	18.9
2013	27	17.8	22	21.0	6	26.1	55	19.6
2014	18	11.8	18	17.1	1	4.3	37	13.2
2015	30	19.7	32	30.5	9	39.1	71	25.4

The mean age of patients was 58 years (SD=13.7). Distributed by surgical procedure, the mean age in CABG was 62.7 years (SD=10.1). In the implantation of prostheses, the mean age was 51.1 years (SD=15.6), and, in the concomitant surgeries, 63.6 years (SD = 11.4). The variation of the mean age of patients submitted to cardiac surgical procedures, from 51 to 63 years, is in agreement with the national and international literature[8,12-16].

The most frequent comorbidities among patients who underwent CABG were SAH in 37 (24.2%) and dyslipidemia in 28 (18.3%). In relation to the valvular prosthesis implantation, 20 (19.6%) had rheumatic fever and 18 (17.1%) hypertension.

Among the patients submitted to both surgeries, 5 (23.3%) patients had hypertension and 3 (14%) dyslipidemia. Potential comorbidities are generally present in the patients' age group of this study, which may trigger congenital cardiopathies susceptible to surgical treatment, such as the SAH, rheumatic fever and dyslipidemia. Although age is a risk factor for SSI, it cannot be modified.

The mean hospital stay prior to the surgical procedure was 12.8 days (SD=9.5). Per procedure, in the CABG, the average time of 13.6 days (SD=9.3), in implants of valves 11.9 days (SD=10), and after both concomitant surgeries 11 days (SD=7.7).

Of the total sample analyzed, 105 patients (37.5%) needed admission prior to surgery in the ICU, in an average of 4.7 days (SD=3.3). Patients undergoing CABG needed 4.8 days (SD=3.2), while patients undergoing implantation of cardiac prosthesis and both concomitant procedures needed 4.5 days (SD=4.1) and 3.5 days (SD=1.4), respectively.

The records showed that 260 (92.9%) surgeries were elective and 20 (7.1%) were performed as a matter of urgency. In 270 (96.8%) patients, the potential for contamination of surgeries was clean.

The evaluation of the perioperative period revealed that the extracorporeal circulation (ECC) occurred in 278 (99.3%). The average time of cardiopulmonary bypass (CPB) was approximately 82 minutes (SD=25.7) for CABG, 94.1 minutes (SD=32.3) in implants of cardiac valves and 116.4 minutes (SD=25.2) in patients submitted to two concomitant procedures. For the three procedures, the average time of ischemia during ECC was 66.2 minutes (SD=24.4), 75.9 minutes (SD=27.3) and 93.0 minutes (SD=18.3), respectively. The CABG performed alone or concomitantly with the cardiac valve implantation occurred in 177 (63.2%) patients.

The use of prophylactic antimicrobial occurred in 270 (96.4%) patients, while 10 (3.6%) started the therapeutic use of antibiotics before surgical procedure for the treatment of the infection. In these patients, the initial dose was administered up to one hour before incision in 218 (88.6%) medical records that contain this information and after the beginning of surgery in 28 (11.4%). The mean interval between the administration of the first dose of antibiotic and the beginning of the surgical incision was 45.1 minutes (SD = 20.2), estimated among the 246 patients, for whom this information was available. To be effective, the antimicrobial drugs need to be administered in up to one hour before the procedure, in order to ensure the ideal serum and tissue concentration at the time of incision, except in cases of use of vancomycin and fluoroquinolones, which should be administered 120 minutes before beginning the surgery, due to the prolonged time of infusion required for them[5,14]. In this sense, most (88.6%) antimicrobials were administered at the proper time.

The duration of prophylaxis in up to 24 hours occurred in 188 (73.2%) patients; duration from 24 to 48 hours in 65 (25.3%) and 4 (1.6%) in a period greater than 48 hours. The chosen antibiotic was cefazolin in 243 (90.0%) patients and oxacillin in 19 (7.0%). The estimated mean surgical time was 247.7 minutes (SD=47.2), but four records did not contain this information.

For patients submitted to cardiac surgeries in the analyzed period, 52 (18.6%) were diagnosed with SSI, a rate well above those described in the world literature that oscillate between 1.6% and 9.4%[7,8,13-15,17]. In those diagnosed with SSI, 32 cases (61.5%) occurred during hospitalization and 20 (38.5%) after hospital discharge. Of these, 12 (25.5%) needed admission for treatment of the SSI.

According to the affected structure, the superficial incisional infections occurred in 34 (65.4%) patients with SSI, followed by the organ/cavity infections in 12 (23.1%) and deep incisional in six (11.5%). Regarding component/cavity infections, the mediastinitis were the most prevalent, with nine (75%), followed by cases of endocarditis, with two (16.7%). Similarly to other studies, the superficial incisional SSI are the most diagnosed, having been found in 65% of the SSI notifications in the present study[15-16,18].

Nevertheless, the occurrence of several cases of organ/cavity infections, mediastinitis and endocarditis stood out, which are more serious and induce rehospitalization, leading to more severe consequences for patients. Among the performed procedures, the cases of infection were distributed as follows: 34 (65.4%) occurred among patients submitted to CABG; 12 (23.1%) patients after implantation of a prosthesis; and six (11.5%) after completion of both surgeries concomitantly (Table 2).

Table 2 – Surgical site infection distribution according to the affected structure and time of diagnosis in patients submitted to coronary artery bypass grafting, implantation of cardiac valves and both, in the period from 2011 to 2015. Belo Horizonte, 2017.

Characteristics of SSI	Type of surgery						Total	
	CBAG		Implantation of cardiac valves		CBAG and implantation of cardiac valves			
	N	%	N	%	N	%	N	%
Infection site								
Superficial incisional	25	75.8	6	46.2	03	50.0	34	65.4
Deep incisional	3	9.1	2	15.4	1	17.7	6	11.5
Organ/cavity	5	15.2	5	38.4	2	33.3	12	23.1
Time of daignosis								
During hospitalization	18	54.5	10	76.9	4	66.7	32	61.5
After discharge	15	45.5	3	23.1	2	33.3	20	38.5

The global average time elapsed between the surgery and the SSI diagnosis was 18.1 days (SD=10.2). The literature confirms the observed data, pointing to a variation of the manifestation between the 14th and 30th day of surgery[15]. The estimates per procedures were 17.6 days (SD=8.5) after CABG; 15.0 days (SD=5.4) after valve replacement surgeries and 26.7 days (SD=20.2) in patients submitted to both surgeries concomitantly.

The average number of days between surgery and the SSI diagnosis was 12.8 days (SD=6.0), 30 days for inpatients and 26.3 days (SD=10.1) in patients after discharge. Although most SSI, 32 (65%), had been diagnosed during hospitalization and 20 (38.5%) had been detected by data from patient readmission, this value is worrisome and may be also underestimated, since the post-discharge surveillance may not have been carried out and, in addition, some patients may have developed signs and symptoms of SSI and have not returned to the hospital for an adequate diagnosis and treatment. This fact reinforces the need for follow-up of patients for a period after discharge or even improve the internal system of notification of readmissions of patients with infectious complications, as recommended by the CDC(16).

The SSI rates are often influenced by the quality of surveillance, follow-up time of the patient (mainly in the post-discharge), data collection methods, organization of the data report to national programs and for the feedback. The values found have often been underestimated, especially when comparing institutional or national data of a surveillance program with data from well-designed studies[19-21].

Regarding the mean time of hospitalization of patients without SSI, this was of 18.1 days, while patients with SSI stayed a week longer (25.4 days). These findings are consistent with other studies that showed a mean hospitalization of patients without infectious manifestation from nine to 18 days[22] and, in the presence of SSI, beyond 45 days. This time of hospitalization may be up to three times higher compared to those without SSI, thus contributing to increased associated healthcare costs and for the wear of the patient and his/her families[6-7,23-24].

The mean hospitalization of patients after the SSi diagnosis was 34.4 days (SD=19.0). The average duration of hospital stay after the SSI diagnosis was 33.9 days (SD=18.8) in patients diagnosed during hospitalization. This study highlights a longer hospital stay after the SSI diagnosis of patients undergoing implantation of heart valve, with an average of 39.4 days, followed by CABG - 31.4 days, with a slight increase in relation to those submitted to both surgeries concomitantly - 30.8 days.

In those patients diagnosed after discharge and requiring readmission for treatment of SSI, the average length of stay was 33.9 days (SD=25.0), and this average was 25.4 in those undergoing CABG, 9.5 in patients undergoing valve replacement and 55, in patients undergoing both procedures.

Patients without SSI showed an average of 19 days of hospitalization (SD=22.3), while those with infection showed an average of 25 days (SD=19.2). The stay in the ICU in patients with SSI was six days (SD=13.5), while without SSI was four days (SD=13.9).

Of the total sample, 270 (96.4%) patients were discharged, nine (3.2%) died and one (0.4%) was transferred to another hospital. The readmission was necessary in 69 (25.5%) patients, and, of these, 12 (17.4%) were by SSI. Of the patients who died, five (55.6%) showed other types of HAI, one evolved with SSI and pneumonia and in only two (22.2%) there was no history of infection.

The development of SSI has been described as a multifactorial, involving risk factors related to the pathogen such as the microbial load involved, its pathogenicity and infectivity; to the patient regarding the extremes of age, preexisting diseases, period of preoperative hospitalization, nutritional status, uncontrolled blood glucose levels, smoking, obesity, immunosuppression, remnants infections and realization of perioperative transfusion of blood products; and the surgical procedure: hair removal, preparation of the surgical area, antisepsis of the surgeon's hands, antimicrobial prophylaxis, surgical technique, asepsis, prolonged time of surgery, problems in the normothermia and oxygenation of the patient[25].

In the analysis of the SSI determinants, demographic data and the preoperative, intraoperative and postoperative moments were analyzed in relation to patients with and without SSI.

In the present study, among the risk factors related to the patient, age was the only one that showed a correlation with the SSI outcome (p=0.011), among other sociodemographic variables analyzed (Table 3). This fact is in accordance with other studies that present extremes of age as a risk factor for the SSI[12,16].

Among the variables analyzed in the preoperative period, hospitalization period (p=0.902), time in the preoperative ICU (p=0.253) and the occurrence of the SSI were not statistically significant. The preoperative hospitalization period, although being a risk factor for SSI, was not associated with SSI in this study. However, the increased postoperative period was significantly associated with the SSI outcome. The increased hospitalization time in pre or post-operative period favors the acquisition of hospital microbiota by the patient, increasing the risk of colonization and the development of SSI[16].

During surgery, the variables: use of cardiopulmonary bypass (p=0.831), and surgical time (p=0.078) showed no statistical significance, as well as the use of prophylactic antibiotics (p=0.280), range of administration of the first dose before the incision (p=0.823), use of additional doses during the surgery (p=1.00) and duration of prophylaxis until 24 hours (p=0.763).

Another risk factor for SSI, related to the surgical procedure evaluated by the study, was the surgery duration. According to the literature, the greater the surgery duration, the higher the risk of SSI due to exposure and tissue manipulation. Prolonged procedures are those that last more than 75% of the time in other similar, i.e., the percentile 75 of each type of surgery[16]. However, this factor was not significantly associated with the SSI outcome.

Regarding risk factors related to the aforementioned surgical procedure, the antibiotic prophylaxis was administered in up to an hour before incision was related as a protective factor for the development of SSI. The administration of prophylactic antibiotics prior to surgery aims at reducing the microbial load in the surgical wound.

The procedures that require this practice are considered potentially contaminated surgeries and some clean surgeries, whose the consequences of an ISC can be severe, such as open cardiac surgeries (as in this study, in which 96.4% of the patients received prophylaxis properly), joint replacements, vascular prosthesis and craniotomies[14,16].

Table 3 – Characteristics related to the occurrence of SSI among patients submitted to coronary artery bypass grafting, implantation of cardiac valves or both surgeries (n=280), in the period from 2011 to 2015. Belo Horizonte, 2017.

Characteristics	Surgical Site Infection						P-value
	Absent			Present			
	Mean	SD	Median	Mean	SD	Median	
Age (years)	57.5	13.4	60.0	61.8	15.7	66.5	0.011[1]
Time of hospitalization (days)	11.5	6.1	9.5	13.1	10.1	11.0	0.902[1]
ICU hospitalization (pre-operatory)	5.4	3.6	4.5	4.5	3.2	3.0	0.253[1]
Time of ECC	88.2	28.2	88.0	92.6	36.6	89.5	0.831[1]
Interval of administration of the 1st dose of ATM before the incision	43.2	21.0	45.0	43.9	25.4	45.0	0.823[1]
Surgical time	244.9	56.2	240.0	260.1	59.8	255.0	0.078[1]
Hospitalization time after the surgery	15.5	18.3	11.0	25.2	17.4	20.0	<0.001[1]
Days in the ICU after the surgery	7.2	13.9	6.0	11.9	13.5	6.0	<0.001[1]
Total time of hospitalization	23. 6	22.3	19.0	32.5	19.4	25.0	<0.001[1]

1: Mann-Whitney

Prophylaxis should not exceed 24 hours, except in cardiothoracic surgeries, in which the prophylaxis up to 48 hours after the procedure have been accepted, despite not being a scientifically based practice[5]. In the present study, most antimicrobial prophylaxis was maintained for 24 hours (73.2% of the patients), and 25.3% from 24 to 48 hours, as recommended in the literature.

Other postoperative conditions that were statistically significant in relation to the SSI outcome, as shown in Table 3, were hospitalization time after surgery (p<0.001), days in the ICU after surgery (p<0.001) and total time of hospitalization (p<0.001). The hospitalization in cardiac surgery can extend up to four times the permanence of the patient, health expenditures by up to six times, impacting financially the institution, the social life of the patient and family[22.23]. The prolonged stay in the hospital environment can also encourage the outcome of infection by the greater probability of contamination in this environment[4, 5,17].

CONCLUSION

In this study, the variables age, total time of hospitalization, postoperative hospitalization time and days in the ICU after surgery were associated with the occurrence of SSI in CABG and valvular prosthesis implantation, and the last three variables can be modified, depending on each case.

The rates of infections were high in the three types of cardiac surgeries analyzed, and the most prevalent was superficial SSI, followed by organ/cavity SSI. The average time until the diagnosis of SSI was high, with a considerable number of infections detected by hospital readmissions. Therefore, it demonstrates the need to strengthen a network of post-discharge surveillance that is capable of diagnosing SSI of those patients that were discharged early or not.

According to the obtained results, it is evident the increased hospitalization time required for treating SSI, thus inferring the increased healthcare costs involved, as well as the wear of the patient and his/her family. In this sense, investing in measures to prevent these infections becomes indispensable, being necessary the involvement of health care teams, professionals of hospital infection control and patient safety, in order to seek the proposition of better healthcare practices aiming at patient safety and improving the quality of care.

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