Profile of surgical site infections in cancer patients undergoing conventional abdominal surgeries

Perfil das infecções de sítio cirúrgico em pacientes oncológicos submetidos a cirurgias abdominais convencionais

Perfil de las infecciones del sitio quirúrgico en pacientes con cáncer sometidos a cirugías abdominales convencionales

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ABSTRACT: Objective: To characterize the profile of Surgical Site Infection (SSI) cases in oncological surgical patients undergoing elective conventional abdominal surgeries. **Methods:** A retrospective cohort study analyzed elective conventional abdominal surgeries performed from 2020 to 2021. SSI cases were identified according to the criteria set by the Center for Epidemiological Surveillance of the state of São Paulo. **Results:** A total of 100 surgical procedures were analyzed, and 19 SSI cases were identified, with the majority being organ/site infections. The profile of patients affected by SSI consisted mainly of male individuals, with comorbidities (ASA 3), smokers, and those diagnosed with spleno-pancreatic or hepatic neoplasia. The risk factors associated with SSI included the duration of the procedure (p=0.015) and surgical re-intervention (p<0.001). The most frequently identified microorganism was *Enterococcus faecalis*, followed by Gram-negative bacteria. The most commonly used antibiotic for treatment was ceftriaxone. **Conclusion:** The patient profile was associated with the presence of comorbidities, spleno-pancreatic neoplasia diagnosis, longer anesthetic-surgical procedure duration, and surgical re-intervention. The majority of cases were classified as organ/site infections, associated with *Enterococcus faecalis* and treated with ceftriaxone.
Keywords: Surgical wound infection. Medical Oncology. General Surgery.

RESUMO: Objetivo: Caracterizar o perfil de casos de Infecção de Sítio Cirúrgico (ISC) em pacientes cirúrgicos oncológicos submetidos a cirurgias abdominais convencionais eletivas. **Métodos:** Coorte retrospectiva que analisou cirurgias abdominais convencionais eletivas no período de 2020 a 2021. A identificação dos casos de ISC ocorreu segundo os critérios do Centro de Vigilância Epidemiológica do Estado de São Paulo. **Resultados:** Foram analisados 100 procedimentos cirúrgicos, e identificados 19 casos de ISC, sendo a maioria infecção de órgão e espaço. O perfil dos pacientes acometidos por ISC foi de indivíduos do sexo masculino, com comorbidades (ASA 3), tabagistas e com neoplasia espleno-pancreática ou hepática. Os fatores de risco associados à ISC foram a duração do procedimento (p=0,015) e a reabordagem cirúrgica (p<0,001). O microrganismo mais frequentemente foi *Enterococcus faecalis*, seguido por Gram-negativos. O antibiótico mais usado no tratamento foi ceftriaxona. **Conclusão:** O perfil dos pacientes esteve atrelado à presença de comorbidades, diagnóstico de neoplasia espleno-pancreática, maior duração do procedimento anestésico-cirúrgico e reabordagem cirúrgica. A maior parte dos casos foi classificada como infecção de órgão e espaço, associadas ao *Enterococcus faecalis* e tratadas com ceftriaxona.
Palavras-chave: Infecção da ferida cirúrgica. Oncologia. Cirurgia.

RESUMEN: Objetivo: Caracterizar el perfil de los casos de infección de herida quirúrgica (IHQ) en pacientes oncológicos sometidos a cirugías abdominales convencionales electivas. **Métodos:** Estudio de cohorte retrospectivo que analizó las cirugías abdominales convencionales electivas realizadas entre 2020 y 2021. La identificación de los casos de IHQ se llevó a cabo de acuerdo con los criterios del Centro de Vigilancia Epidemiológica del Estado de

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São Paulo. **Resultados:** Se analizaron 100 procedimientos quirúrgicos y se identificaron 19 casos de IHQ, siendo la mayoría infecciones de órgano y espacio. El perfil de los pacientes afectados por IHQ correspondió a individuos masculinos, con comorbilidades (ASA 3), fumadores y con neoplasias esplenо-pancreáticas o hepáticas. Los factores de riesgo asociados a la IHQ fueron la duración del procedimiento (p=0,015) y la reintervención quirúrgica (p<0,001). El microorganismo más frecuente fue *Enterococcus faecalis*, seguido de bacterias Gram-negativas. El antibiótico más utilizado en el tratamiento fue la ceftriaxona. **Conclusión:** El perfil de los pacientes estuvo relacionado con la presencia de comorbilidades, diagnóstico de neoplasia espleno-pancreática, mayor duración del procedimiento anestésico-quirúrgico y reintervención quirúrgica. La mayoría de los casos se clasificaron como infecciones de órgano y espacio, asociadas a *Enterococcus faecalis* y tratadas con ceftriaxona.

Palabras clave: Infección de la herida quirúrgica. Oncología Médica. Cirugía General.

INTRODUCTION

Surgical Site Infection (SSI) refers to an infection involving tissue caused by an infectious agent, occurring within 30 days following a surgical procedure, or within 90 days in cases involving the implantation of foreign material[1]. SSI is classified based on the type and extent of the affected tissue and can be categorized as: superficial incisional infection, deep incisional infection, or organ or cavity infection[1].

The development of SSI may be associated with both extrinsic and intrinsic risk factors for the patient[2]. According to the Global Guidelines for the Prevention of SSI, developed by the World Health Organization (WHO)[3], intrinsic factors include age, gender, smoking, obesity, malnutrition, presence of pre-existing infections, comorbidities, immunosuppression, and diabetes. Extrinsic factors are related to the cleanliness of the operating room and surgical materials, the duration of the preoperative stay, the length of the surgery, as well as the proper preparation of the patient's skin before the procedure and the hand hygiene of the surgical team[2].

SSI can affect immunosuppressed patients and those with comorbidities, including individuals with neoplasms. Tumors develop through cellular mutations that evade detection by the immune system, followed by uncontrolled cell proliferation[4]. Several factors contribute to immune system failures that lead to the emergence of tumors, such as smoking, alcoholism, poor diet, genetic predisposition, radiation exposure, ethnic factors, and viral infections, among others[5]. Additionally, the most common cancer treatments can induce immunosuppression[6].

Although limited studies in the literature explore the association between SSI and oncological surgeries, evidence suggests that the prevalence of SSI is higher in cancer patients[7]. Research indicates that SSI is linked to poorer outcomes in patients with gynecological cancer, including prolonged hospital stays[8], increased readmission rates[9], and higher mortality[10].

Given the higher incidence of SSI in cancer patients compared to non-cancer patients, and the limited available evidence, it is crucial to identify the risk factors associated with the development of SSI in this population. Understanding these factors is essential for preventing complications and can help identify potential areas for nursing intervention during the perioperative period.

OBJECTIVE

The objective was to characterize the profile of Surgical Site Infection cases in oncological surgical patients undergoing elective conventional abdominal surgeries.

METHOD

Type and location of study

This is a retrospective cohort study conducted at a secondary teaching hospital located in São Paulo, the capital.

Sampling

Medical records of patients who underwent elective conventional abdominal surgeries and had a medical diagnosis of malignant neoplasia, regardless of whether they developed SSI, were selected based on the criteria defined by the Epidemiological Surveillance Center of the State of São Paulo (*Centro de Vigilância Epidemiológica* – CVE)[11], which are grounded in the standards established by the Centers for Disease Control and Prevention (CDC)[12].

Data collection procedures

The printed elective surgical schedule for the years 2020 to 2021 was reviewed to identify patients who underwent conventional abdominal surgeries. In the sample, cases classified as SSI were identified by the institution's Hospital Infection Control Service (*Serviço de Controle de Infecção Hospitalar* – SCIH), based on the criteria established by CVE[11].

A data collection instrument was used to gather information on age, gender, diagnosis, presence of comorbidities, type of anesthetic technique, drugs administered, duration of the procedure, use of blood components, and post-discharge surveillance data, which was conducted by the institution's SCIH for up to 30 days after the procedure.

Data analysis

The data were entered into a Microsoft Excel® spreadsheet, and analyses were conducted using R software, version 4.2.1, by a statistician, following the proposed objectives and methodology. Numerical variables were described using the mean, standard deviation, and common percentiles (*i.e.*, minimum, first quartile, median, third quartile, and maximum), while categorical variables were described using absolute and relative frequencies, with results presented in tables. Finally, numerical variables were analyzed using the Student's *t*-test, Wilcoxon-Mann-Whitney test, and Brunner-Munzel test, while χ^2 or Fisher's exact test was used for categorical variables.

Ethical aspects

The current research was part of the project titled "Impact of the Application of Towels Impregnated with Chlorhexidine on the Outcome of Surgical Site Infection in Conventional Abdominal Surgeries (*Impacto da aplicação de toalhas impregnadas com clorexidina no desfecho infecção de sítio cirúrgico em cirurgias abdominais convencionais*)," approved by the Research Ethics Committees of the School of Nursing of Universidade de São Paulo (USP) and the University Hospital of USP, under the number CAAE: 29473520.2.0000.5392. Additionally, the study adhered to the ethical and legal standards outlined in Resolution 466/2012 of the National Health Council, as it involved human participants.

RESULTS

A total of 100 medical records of patients diagnosed with four main groups of neoplasms (splenopancreatic or hepatic neoplasia, gastric, intestinal, and other types) from 2020 to 2021 were included in the analysis. Among these, 19 cases of SSI were identified, representing an incidence rate of 19.00% (Table 1).

The mean age of the individuals included in the study was 61.2 years; the mean Body Mass Index (BMI) was 26.41 kg/m², indicating overweight status; and the mean hemoglobin level was 12.49 g/dL. The mean preoperative hospitalization time was 2.35 days; the interval between the preoperative chlorhexidine bath and the start of surgery was 4.35 hours; and the average duration of the procedure was 2.9 hours, corresponding to size 2 surgeries (Table 2).

Table 3 shows the association between various variables and the SSI outcome. The mean age of patients who did not develop SSI was 60.8 years, while the mean age of those who developed SSI was 62.94 years (p=0.495). Males predominated among patients who developed SSI, whereas females were more prevalent among those without a diagnosis of SSI; however, this difference was not statistically significant (p=0.057).

Regarding preoperative hemoglobin levels, the data were similar: 12.56 g/dL for patients who did not develop SSI and 12.19 g/dL for those who did (p=0.526). For BMI, the mean value for patients without SSI was 26.66 kg/m², while it was 25.37 kg/m² for those who developed SSI (p=0.354). The highest incidence of SSI occurred among patients classified as ASA 3 (25.00%), followed by those classified as ASA 2 (17.74%) (p=0.599).

Regarding the medical-oncological diagnosis, 22.22% of patients who developed SSI had a diagnosis of splenopancreatic or hepatic neoplasia, followed by gastric neoplasia (21.74%), intestinal neoplasia (19.35%), and other neoplasms, which were not associated with any cases of infection. Among the patients with an oncological diagnosis and SSI, 35.29% had undergone some form of prior oncological surgery, and 40.00% had received chemotherapy before the surgery.

When analyzing the presence of comorbidities, it was found that 18.31% of patients diagnosed with SSI had a chronic disease, with Diabetes Mellitus (DM) being the most

Table 1. Incidence of Surgical Site Infection among sample patients, in 2020 and 2021. São Paulo; 2022.

Characteristic		2020		2021	
		Number	%	Number	%
SSI Diagnosis	No	53	86.89	28	71.79
	Yes	08	13.11	11	28.21

SSI: Surgical Site Infection.

Table 2. Measures of central tendency and variability and corresponding p-values. São Paulo; 2022.

	n	Missing data	Mean	SD	Minimum	Q1	Median	Q3	Maximum	95%CI Lo	95%CI Up
Age	100	0	61.2	12.22	33.96	53.97	63.10	69.6	88.91	58.78	63.63
BMI	94	6	26.41	5.29	13.97	23.27	26.10	29.96	42.38	25.33	27.5
Hemoglobin	100	0	12.49	2.3	6	11.15	12.7	14.1	16.5	12.04	12.95
Preoperative hospitalization duration	100	0	2.35	3.78	0	1	1	2	28	1.8	3.39
Interval between bath and surgery	85	15	4.35	1.98	1	2.75	3.83	6	9.75	3.96	4.79
Surgery Duration	100	0	2.9	1.5	0.58	1.81	2.75	3.52	7.67	2.62	3.21

SD: standard deviation; BMI: Body Mass Index.

prevalent, affecting 12.5% of cases. Additionally, 31.25% of patients were smokers, and 18.75% were former smokers.

Regarding the preoperative hospitalization time and the interval between the preoperative bath with 2% chlorhexidine degerming agent and the start of the surgery, it was found that, among those who developed SSI, the average hospitalization time was 2.79 hours, and the average time between the chlorhexidine bath and the start of surgery was 3.86 hours. In contrast, among those who did not develop SSI, the values were 2.25 hours and 4.47 hours, respectively. No statistically significant differences were observed between the groups (p=0.300 and p=0.412, respectively).

Analysis of data on trichotomy, drains, potential for surgical contamination (potentially contaminated and contaminated), intraoperative blood transfusion, and surgical reapproach revealed that, among patients diagnosed with SSI, 20.45% underwent trichotomy, 19.4% underwent contaminated surgery, 22.45% used some type of drain, and 19.32% did not receive intraoperative blood transfusion. A surgical reapproach was performed in 66.67% of the cases, with a significant difference observed in the group affected by SSI (p<0.001). Regarding the duration of the anesthetic-surgical procedure, a longer duration was associated with the SSI outcome (p=0.015). Among patients not affected by SSI, the mean surgery duration was 2.66 hours, while among those who developed infection, the mean duration was 3.89 hours.

Table 4 presents the type of SSI according to classification, whether a microorganism was identified, and the type of biological material used. It also includes data on the antibiotic therapy administered before and after microbial identification, as well as the microorganisms identified.

Nineteen cases of SSI were identified, with the majority categorized as organ and space infections (68.42%). The culture materials used included abscess, incision, blood, and others, with the latter being the most prevalent (41.67%). Microorganisms were identified in 84.62% of cases, predominantly gram-negative bacteria (52.63%), followed by gram-positive bacteria (42.11%) and fungi (5.26%). Among the identified microorganisms, the most common was *Enterococcus faecalis* (26.32%), followed by *Pseudomonas aeruginosa* and *Enterobacter cloacae* (15.79% each), *Escherichia coli* and *Streptococcus spp.* (10.53%), and *Staphylococcus aureus*, *Morganella morganii*, *Enterobacter aerogenes*, and *Candida glabrata* (5.26% each).

The antibiotics administered prior to the diagnosis of SSI included cefazolin, metronidazole, ceftriaxone, ampicillin, ceftazidime, cefoxitin, and meropenem, with ceftriaxone and metronidazole being the most commonly used (8%). After the diagnosis of SSI, the antibiotics used included ceftriaxone, piperacillin-tazobactam, ciprofloxacin, ampicillin, meropenem, vancomycin, metronidazole, fluconazole, clindamycin, micafungin, and polymyxin, with ceftriaxone being the most frequently used (9%).

DISCUSSION

In the present study, the SSI rate was 19.0%, which is similar to that found in another hospital, where the rate was 16.3%[13], analyzing all patients over 14 years of age who underwent abdominal surgeries, both conventional and laparoscopic, including emergency and elective surgeries[13]. According to a systematic review conducted by the WHO, the incidence of SSI is 11.2% per 100 surgeries, which is slightly lower than the rate found in this study[2].

The profile of patients with a higher rate of SSI in this study included male individuals with comorbidities, the most prevalent being DM, who were or had been smokers

Table 3. Numeric variables between groups with and without Surgical Site Infection and p-value for each variable. São Paulo, 2022.

Characteristic	Without SSI	With SSI	p-value
Age (years, mean±SD)	60.80 (12.19)	62.94 (12.56)	0.495*
Gender (n, %)			
Female	41 (89.13)	5 (10.87)	0.057†
Male	40 (74.07)	14 (25.93)	
BMI (Kg/m^2, mean±SD)	26.66 (5.22)	25.37 (5.60)	0.354*
Preoperative Hemoglobin (g/dL, mean±SD)	12.56 (2.3)	12.19 (2.32)	0.526*
ASA Classification (n, %)			
1	5 (100.00)	0 (0.00)	0.599‡
2	51 (82.26)	11 (17.74)	
3	24 (75.00)	8 (25.00)	
4	1 (100.00)	0 (0.00)	
Oncological diagnosis (n, %)			
Spleno-pancreatic or hepatic neoplasia	7 (77.78)	2 (22.22)	0.795‡
Gastric neoplasia	18 (78.26)	5 (21.74)	
Intestinal neoplasia	50 (80.65)	12 (19.35)	
Other neoplasia	6 (100.00)	0 (00.00)	
Previous chemotherapy (n, %)			
No	77 (82.80)	16 (17.20)	0.227‡
Yes	3 (60.00)	2 (40.00)	
Previous radiotherapy (n, %)			
Information not available	1	1	
No	80 (81.63)	18 (18.37)	
Previous oncological surgery (n, %)			
No	70 (84.34)	13 (15.66)	0.061†
Yes	11 (64.71)	6 (35.29)	
Chronic Diseases (n, %)			
No	23 (79.31)	13 (15.66)	0.784†
Yes	58 (81.69)	13 (18.31)	
DM (n, %)			
No	60 (78.95)	16 (21.05)	0.354†
Yes	21 (87.50)	3 (12.50)	
Smoking (n,%)			
No	39 (81.5)	9 (18.75)	0.341†
Former smoker	31 (86.11)	9 (18.75)	
Yes	11 (68.75)	5 (31.25)	
Preoperative hospitalization (days, mean±SD)	2.25 (3.03)	2.79 (6.12)	0.300§
Interval between preoperative bath and surgery (hours, mean±SD)	4.47 (2.09)	3.86 (1.33)	0.412//
Shaving (n,%)			
No	46 (82.14)	10 (17.86)	0.744†
Yes	35 (79.55)	9 (20.45)	

Continue...

Table 3. Continuation.

Characteristic	Without SSI	With SSI	p-value
Contamination potential (n,%)			
Potentially contaminated	27 (81.82)	6 (18.18)	0.884†
Contaminated	54 (80.60)	13 (19.40)	
Surgery duration (hours, mean±SD)	2.66 (1.28)	3.89 (1.97)	**0.015§**
Intraoperative blood transfusion			
No	71 (80.68)	17 (19.32)	0.827†
Yes	10 (83.33)	2 (16.67)	
Surgical reoperation			
No	76 (89.41)	9 (10.59)	**<0.001†**
Yes	5 (33.33)	10 (66.67)	
Drains			
No	43 (84.31)	8 (15.69)	0.391†
Yes	38 (77.55)	11 (22.45)	

Statistical Tests: *Student's *t*-test; †χ^2; ‡Fisher's Exact; §Wilcoxon-Mann-Whitney; //Brunner-Munzel. SSI: Surgical Site Infection; SD: standard deviation; BMI: Body Mass Index; SD: standard deviation; ASA: American Society of Anesthesiologists; DM: Diabetes Mellitus. Bold indicates statistically significant results.

and had a BMI indicating overweight. Most of these patients were classified as having anesthetic risk ASA 3. Furthermore, another study indicated that, according to the ASA classification, the risk of developing SSI increases by 52% for patients classified as ASA 2, 134% for those classified as ASA 3, and up to 89% for those classified as ASA 4 or 5[14]. This may help explain the higher rates of SSI observed in the present study, as there was a predominance of patients classified as ASA 3.

The group of patients with the highest SSI rate also included those diagnosed with splenopancreatic or hepatic neoplasia (22.22%), of whom 35.29% had undergone some form of previous oncological surgery and 40% had received chemotherapy prior to surgery. According to a report by the WHO, the SSI rate per 100 patients was higher among those who underwent oncological procedures, with a rate of 17.2%, which is higher than the rates observed in other types of surgeries, such as orthopedic surgeries (15.1%), general surgeries (14.1%), and pediatric surgeries (12.7%)[2].

Prior chemotherapy contributes to a decrease in the patient's immunity, as the treatment eliminates both cancer cells and healthy cells, thereby impacting immune function and making the individual more susceptible to infections[6]. Consequently, this aspect of the treatment also increases the susceptibility to developing SSI.

It was observed that, among patients diagnosed with SSI, approximately 20% underwent trichotomy, had contaminated surgeries, used some type of drain, and did not receive intraoperative blood transfusion. A study conducted in two hospitals in Sierra Leone, West Africa, showed that contaminated surgeries, intraoperative blood transfusions, and the use of drains were associated with the development of SSI. According to the same study, patients who underwent contaminated surgeries were six times more likely to develop SSI than those who underwent clean surgeries[15], further increasing the risk of this complication[14].

Regarding trichotomy, several national and international guidelines recommend its use only when failure to do so would interfere with the surgical procedure. Additionally, trichotomy should be performed using an electric trichotomizer and should be restricted to the smallest possible area[2,12]. However, in this study, data on the type of device used for trichotomy and the size of the area in which it was performed were not included in the medical records analyzed, although the use of an electric trichotomizer is recommended by the institution.

The only risk factors associated with the development of SSI in this study were surgical reoperation and the duration of the surgical procedure. Among the cases of SSI, the average duration of the anesthetic-surgical procedure was 3.89 hours, and 66.67% of the patients underwent surgical reoperation. These findings align with the WHO Guideline on safe surgery, which states that the longer the procedure, the greater the likelihood of developing SSI[2]. Additionally, another study demonstrated that patients who underwent surgeries lasting more than three hours were twice as likely to develop SSI[13].

Table 4. Classification of Surgical Site Infection, biological material collection, pre- and post-diagnosis antibiotic therapy, microorganisms, and classification among the 19 identified infection cases. São Paulo; 2022.

Characteristic	Number	%
Classification of SSI		
Superficial incisional	4	21.05
Deep incisional	2	10.53
Organ/site	13	68.42
Material for Culture		
Abscess	4	33.33
Incision	2	16.67
Blood	1	8.33
Other	5	41.67
Microorganism Identification		
Yes	11	84.62
No	8	15.39
Pre-Diagnosis ATB Therapy		
Cefazolin	11	84.62
Metronidazole	8	8
Ceftriaxone	8	8
Ceftazidime	1	1
Cefoxitin	1	1
Post-Diagnosis ATB Therapy		
Ceftriaxone	9	9
Piperacillin-tazobactam	4	4
Ciprofloxacin	2	2
Ampicillin	1	1
Meropenem	4	4
Vancomycin	6	6
Metronidazole	8	8
Fluconazole	1	1
Clindamycin	1	1
Micafungin	1	1
Polymyxin	1	1
Microorganism		
Candida glabrata	1	5.26
Enterobacter aerogenes	1	5.26
Enterobacter cloacae	3	15.79
Enterococcus faecalis	5	26.32
Escherichia coli	2	10.53
Morganella morganii	1	5.26
Pseudomonas aeruginosa	3	15.79
Staphylococcus aureus	1	5.26
Streptococcus spp	2	10.53
Microorganism Classification		
Fungus	1	5.26
Gram-negative	10	52.63
Gram-positive	8	42.11

SSI: Surgical Site Infection; ATB: Antibiotic.

A longer surgical time implies a reduction in the pharmacokinetic bioavailability of previously administered antimicrobials, increased exposure of the surgical wound and tissues to microorganisms from the patient's own microbiota, and a higher risk of potential breaches in aseptic technique[2,12]. Furthermore, in the event of SSI development, there is a greater likelihood of surgical re-approach[16], a complication that was associated with the occurrence of SSI in the present study.

Most cases of SSI were classified as organ and space infections, with *Enterococcus faecalis* being the most frequently identified microorganism, belonging to the Gram-positive class. Bacteria of the *Enterococcus* genus and Gram-negative bacteria are part of the natural microbiota of the gastrointestinal tract. Given that the type of surgery performed involves manipulation of the gastrointestinal tract, it is expected that the primary microorganisms causing SSI belong to these two groups. This also contributes to the fact that most cases of infection were classified as organ and space infections. This finding aligns with a study conducted with 50 patients who underwent abdominal surgeries and developed organ and space SSIs, where the most frequently observed microorganisms were Gram-negative, which showed no sensitivity to the antimicrobials administered preoperatively, suggesting they were likely part of the patients' natural microbiota[13].

The most commonly used pre-diagnostic antibiotics were ceftriaxone and metronidazole, while ceftriaxone was the most commonly used post-diagnostic antibiotic. It is evident that the choice of antibiotics should target the spectrum of microorganisms most commonly responsible for SSI. In this study, contaminated surgeries were the most frequently performed, given the common manipulation of the gastrointestinal tract. As such, the use of antibiotic prophylaxis is indicated, with a preference for low-cost antibiotics that possess bactericidal properties, a narrow spectrum of action, and good tissue penetration[2].

As limitations of the study, it is important to note that the diagnosis of SSI was made by the professionals of the institution's own SCIH. Additionally, since most cancer diagnoses were made at the hospital, either when the patient sought care or at the time of the surgical approach, few patients had undergone chemotherapy or radiotherapy prior to surgery.

Finally, when analyzing the role of Nursing in the prevention of SSI in cancer patients, several key interventions emerge: better control of blood glucose levels in patients with DM, preoperative bathing, management of environmental factors in the operating room to maintain aseptic technique during the procedure, implementation of post-discharge surveillance protocols to diagnose SSI early and actively seek out

potential infections, as well as educating family members and patients on prevention, recognizing signs and symptoms of SSI, and the necessary procedures should an infection occur[17,18]. Additionally, nurses can collaborate with the multidisciplinary team to develop measures to be implemented in the preoperative, intraoperative, and postoperative periods to prevent SSI, and also provide guidance on care during cancer treatment.

CONCLUSION

In the sample studied, 19% of cancer patients developed SSI. The profile of these patients included males with comorbidities, primarily DM and overweight, smokers, classified as ASA 3, and diagnosed with splenopancreatic or hepatic neoplasia. The risk factors associated with the development of SSI were the duration of the surgical procedure and surgical re-intervention. Most cases of SSI were classified as organ and space infections, with *Enterococcus faecalis*, a Gram-positive microorganism, being the most frequently identified. This microorganism is part of the gastrointestinal tract microbiota. The most commonly used antibiotics for pre-diagnosis treatment were ceftriaxone and metronidazole, while ceftriaxone was the most frequently prescribed antibiotic following the diagnosis of SSI.

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CONFLICT OF INTERESTS

The authors declare there is no conflict of interests.

AUTHORS' CONTRIBUTION

LCG: Formal analysis, Data curation, Writing – original draft, Writing – review & editing. ALGD: Formal analysis, Data curation, Writing – original draft, Writing – review & editing. FRSL: Formal analysis, Data curation, Writing – original draft, Writing – review & editing. JRG: Project administration, Formal analysis, Conceptualization, Investigation, Methodology, Funding acquisition, Writing – original draft, Writing – review & editing, Supervision, Validation, Visualization. VBP: Project administration, Formal analysis, Conceptualization, Investigation, Methodology, Funding acquisition, Writing – original draft, Writing – review & editing, Supervision, Validation, Visualization.

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