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EPIDEMIOLOGICAL PROFILE OF POSTOPERATIVE DIGESTIVE FISTULAS

PERFIL EPIDEMIOLÓGICO DE FÍSTULAS DIGESTIVAS PÓS-OPERATÓRIAS

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ABSTRACT

Background and objectives: Gastrointestinal fistulas are anomalous communications between the digestive system and other structures. This article presents the epidemiological profile of patients who developed postoperative abdominal fistulas and their outcomes. **Methods**: Cross-sectional study that evaluated surgical procedures done in a 25 week period that presented risks for fistulous formations. Were analyzed age, type of the surgery (elective or urgent), pre-existing risk factors, need for postsurgical intensive care unit, type of fistula, reoperations to the fistula treatment, and outcome (discharge or death). **Results**: There were 1785 abdominal surgical procedures, with a fistula incidence of 1.8%. Most of the patients who developed fistulas were over 60 years old (71.4%), and surgeries that resulted in fistulous complications were mainly urgent (75.0%), with the need for intensive care in 46.9%. The most frequent types of fistula were enteral (52.3%) and biliary (23.8%), and surgical treatment took place in 53.1% of cases. Late hospital discharge was predominant in these patients (40.6%), and the death rate was 3.1%. **Discussion**: These complications are common

after abdominal surgery and require clinical attention. There is a correlation between the formation of the fistulas and urgent surgery procedures, directly impacting the length of hospital stay. **Conclusion**: The risk factors of fistula development are advanced age and the presence of malignant disease. They are more prevalent in urgent surgeries and patients were more likely to need reoperation and have a delay on discharge.

Keywords: General surgery; Risk factors; Digestive system.

RESUMO

Justificativa e objetivos: As fístulas gastrointestinais são comunicações anômalas entre o sistema digestório e outras estruturas. Este artigo apresenta o perfil epidemiológico de pacientes que desenvolveram fístulas abdominais no pós-operatório e seus desfechos. Métodos: Estudo transversal que avaliou procedimentos cirúrgicos realizados no período de 25 semanas e que apresentavam risco para formações fistulosas. Foram analisados idade, tipo de cirurgia (eletiva ou urgente), fatores de risco pré-existentes, necessidade de unidade de terapia intensiva pós-cirúrgica, tipo de fístula, reoperações para tratamento da fístula e desfecho (alta ou óbito). Resultados: Foram realizados 1.785 procedimentos cirúrgicos abdominais, com incidência de fístula de 1,8%. A maioria dos pacientes que desenvolveram fístulas tinham mais de 60 anos (71,4%) e as cirurgias que resultaram em complicações fistulosas foram principalmente de urgência (75,0%), com necessidade de unidade de terapia intensiva em 46,9%. Os tipos de fístula mais frequentes foram enteral (52,3%) e biliar (23,8%), e o tratamento cirúrgico ocorreu em 53,1% dos casos. A alta hospitalar tardia foi predominante nesses pacientes (40,6%) e a taxa de óbito foi de 3,1%. Discussão: Essas complicações são comuns após cirurgias abdominais e requerem atenção clínica. Existe uma correlação entre a formação das fístulas e os procedimentos cirúrgicos de urgência, impactando diretamente no tempo de internação. Conclusão: Os fatores de risco para o desenvolvimento de fístulas são a idade avançada e a presença de doença maligna. Elas são mais prevalentes em cirurgias de urgência e os pacientes têm maior probabilidade de necessitar de reoperação e atrasar a alta.

Descritores: Cirurgia geral; Fatores de Risco; Sistema digestório.

INTRODUCTION

Digestive fistulas are anomalous communication between the digestive system and another structure of the organism, through which digestive fluid drains.[1] These passages can be internal, between the digestive tube and an abdominal viscera or cavity, or external, when the communication occurs with the skin surface.[1]

The incidence of acquired intestinal fistulas is related to several factors, being abdominal surgical procedures the most common cause.[2] In these cases, what usually happens is the dehiscence of a digestive anastomosis or communication with another structure due to a healing abnormality of the digestive tract.[2] The occurrence of anastomotic dehiscences is closely related to the formation of digestive fistulas and is linked to some risk factors - since one complication leads to another.[2] This situation may result in the accumulation of free digestive content, as in the case of a coleperitoneum, characterized by the presence of bile in the peritoneal cavity, or the formation of an organized collection, for example, a biloma.[2] Regarding fistulas with cutaneous drainage, the exteriorization of gastrointestinal or biliopancreatic content occurs, usually by the surgical wound. Other etiologies that can also lead to this condition include diverticular diseases, Crohn's disease, traumas, foreign bodies, infectious diseases, neoplasms, and radiation.[3-5]

Several factors can be considered complications and aggravating digestive fistulas, as well as predictors of their formation. Diseases or health aspects that influence negatively the wounds healing, such as malnutrition, old age, and the presence of active malignant disease, are considered to aggravate the risk of the formation of postoperative digestive fistulas.[5] In addition to being known to oscillate between the first and second most common surgical complications, digestive fistulas are also of high severity and highly willing to unfavorable outcomes.[6-8]

As for indicators of worse prognosis and, consequently, death, also the individual factors of each patient - age, previous general condition, and comorbidities - it can be said that in the majority of them the main ones have malnutrition, hydroelectrolytic disorders, and infections.[1,5] Among these, malnutrition is pointed out as a factor that deserves to be highlighted, not only because of its high prevalence in patients with intestinal fistulas but also because it is easy to diagnose and has a great impact on the direction of therapy.[1,9]

The severity of each patient's condition is related to factors such as etiology, type of drainage (internal or external), anatomical location, and flow rate of the fistula.[1,2] About the flow rate, it is possible to categorize them according to their drainage as low (less than 200 mL/day), moderate (200 to 500 mL/day), or high output (greater than 500 mL/day), with higher output fistulas leading to greater clinical repercussions.[5] Having this in view, it is mandatory to monitor possible anastomotic dehiscences and formation of digestive fistulas after all abdominal procedures to enable prompt identification and early treatment initiation, especially in major surgeries.[6]

After recognizing the formation of the fistula, some main care must be performed, among them is reinforcing the need for correct nutrition, cleaning the skin, correcting possible hydroelectrolytic disorders, and preventing sepsis.[5,6] Malnutrition is a major predictor of morbidity and mortality and has a high incidence in these patients due to a series of predisposing factors.[5,6] Hypokalemia is the main electrolyte disorder

and should be promptly corrected after identification.[5] Septic complications are the most common cause of death in patients with digestive fistulas and should be treated resolutely.[6]

The complexity of the treatment of digestive fistulas requires the involvement not only of the surgeon but of a multidisciplinary team.[6] Usually, hospitalization in an intensive care unit (ICU) is necessary so there is adequate monitoring of the possible complications already mentioned, responsible for the high death rates from this condition compared to other operative complications to evaluate.[5,6,9] Especially in high-output fistulas, there is a great insensitive loss of body fluids, and prolonged fasting is instituted to reduce the stimulus to the production of digestive secretions.[2] In these situations, parenteral nutrition becomes essential, and the complexity of the nutritional management of these patients requires constant surveillance of disorders linked to low food intake.[6,10]

Although most fistulas resolve spontaneously, it is important to carefully monitor the cases in which the patient needs surgical intervention, either for closing the fistula or for treating complications resulting from the general clinical picture, such as peritonitis and abdominal abscesses. Although the priority is conservative treatment, surgical interventions may be indispensable as auxiliary measures, especially in the fight against sepsis[6,10].

Being a situation with several variables and possible outcomes, it is important to know the factors that alter the prognosis of patients with abdominal digestive fistulas and how to manage them in the best possible way, according to the main needs observed within this population. This information reinforces the relevance of knowing the profile of patients, taking into account that the mortality rate of patients with digestive fistulas is much higher than that of patients undergoing surgeries in general, even after advances in the treatment of these complications[2,5,7,8].

METHODS

Ethical aspects

All information contained in the study was obtained solely and exclusively through electronic medical records, with no direct contact between researchers and patients. This research was approved by a local ethics committee under protocol number 46376621.2.0000.0093. In addition, the entire research followed the principles of the Helsinki declaration.

Type of study

This is an analytical cross-sectional and retrospective study, carried out in a philanthropic hospital, with the purpose of evaluating the incidence and epidemiological profile of postoperative digestive fistulas of surgeries performed within a pre-stipulated period of 25 months.

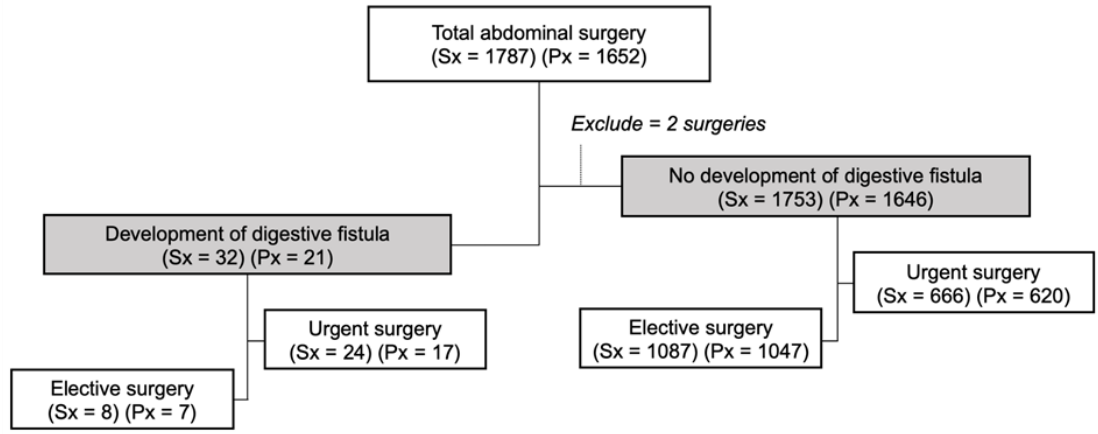
Sample selection

The sample was selected from electronic medical record data of patients operated by the service of the general surgery of the hospital during the period of 25 months.

This survey included all patients who underwent surgery that entered the abdominal cavity and/or digestive tract (susceptible to the formation of digestive fistulas), operated by the general surgery team within the selected period. Patients whose medical records did not adequately present all the information necessary to understand the surgery performed and the postoperative outcomes were excluded from the study, as well as those who died due to causes not related to the studied surgery.

Statistical analysis

This present study sought to evaluate two groups with different sets of variables. The first group consisted of the total number of patients and surgeries performed in the stipulated sample selection period, while the second group - a subset of the first - consisted only of patients who had postoperative digestive fistulas, the distribution of the study population can be better visualized in **Figure 1**



Sx = number of surgeries
Px = number of patients

Figure 1 – Flowchart showing different sample units depending on the analysis

It is important to note that since some patients have undergone more than one surgery over the period evaluated, the number of sample units varied according to the analysis due to the change in the observation unit. Thus, for analyses whose variables could be related to surgical procedures, it was decided to consider the number of surgeries as a sample and for those variables only related to the patient, the number of patients was chosen as a sample.

The variables evaluated in the first group were: age (counted in years); surgery (indicating the type of surgical procedure performed); the character of the surgery (divided into elective and emergency surgeries - classification criteria described below); outcome (divided into patients who required reoperation, patients who died, patients

who were discharged until the third postoperative day (PO) and patients who were discharged after the fourth postoperative day); postoperative complications; and, finally, the fistula variable (presence or absence of this complication).

The variables evaluated in the second group, which consisted only of patients who had digestive fistula, were: age (in years); presence or absence of malignant disease; type of malignant disease; presence or absence of inflammatory bowel disease (IBD); malnutrition (defined from the body mass index (BMI) below 18.5); spontaneous closure of the fistula (yes or no); type of fistula; the need for total parenteral nutrition (TPN); and, finally, the need for admission to the intensive care unit (ICU).

Regarding the type of surgery, those in which the procedure was pre-scheduled were classified as elective. Urgent surgeries were those in which there was no such schedule, including both those performed on patients referred by the mobile emergency care service (SAMU) and those performed on patients who directly sought hospital emergency care.

After defining the variables of interest and obtaining access to the information bank, the computation of the collected data was performed in a Microsoft Office Excel spreadsheet (2007, version 12.0), then the analyses were performed using the Jamovi Software (2020, version 1.2).

First, descriptive analyses were made to understand the distribution of characteristics throughout the samples, then inferential analyzes were made. The chisquare test was used to verify the association between categorical variables and both binomial and multinomial logistic regression were used to understand the dependence of the variables, in addition to providing measures of effect size. In all tests, the level of significance was set at 5% (0.05).

RESULTS

In total, the hospital surgical center received 2108 surgeries within the stipulated 25-month period. Of these, 1787 entered the peritoneum or a portion of the gastrointestinal tract and were liable to have a fistulous formation as a complication, being considered generically in this article as abdominal surgeries. For a better understanding of the distribution of surgical procedures, Figure 2 shows the absolute incidence of the most prevalent surgeries.

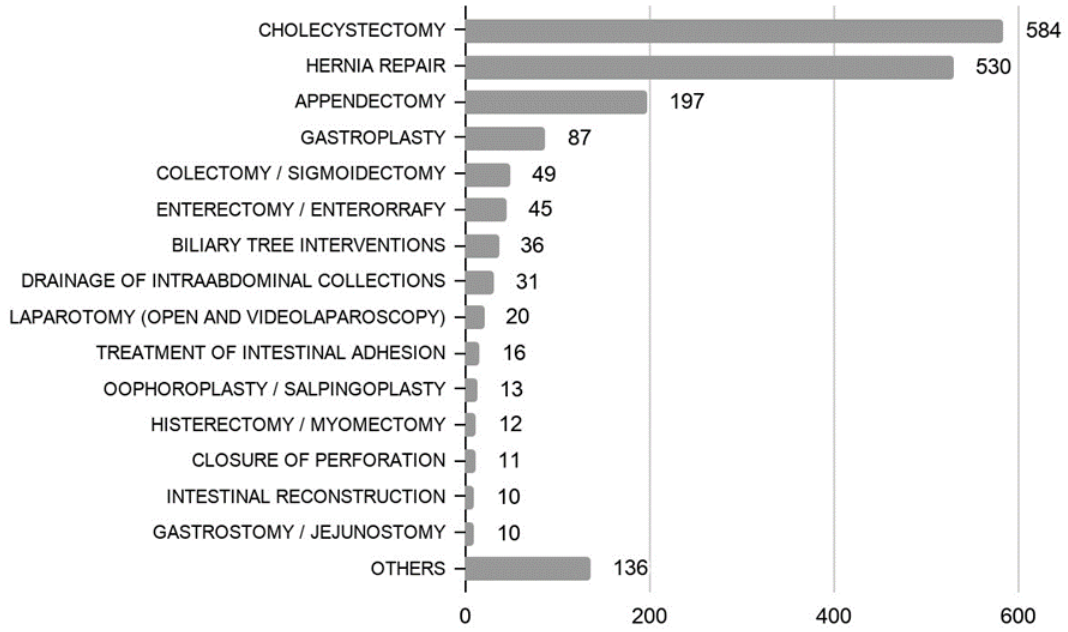


Figure 2 – Absolute incidence by type of surgery

Of the 1787 abdominal surgeries, this study included 1785, as two patients were transferred during the postoperative hospital stay and were not included in the analyzes. There was a predominance of elective surgeries (n = 1095 / 61.3%) and the most frequent surgeries were cholecystectomies (n = 584 / 32.6%), followed by hernia repair (n = 530 / 29.6%) and appendectomy (n = 197 / 11.0 %). As for the outcome of surgical admission, patients from 1538 (86.1%) surgeries were discharged from the hospital until the third PO day; 148 (8.3%) were discharged after the fourth PO day; 56 (3.1%) died in the same hospital and 43 (2.4%) were reoperated. The average age of patients undergoing surgical procedures was 52 years, ranging from 14 to 97 years.

Considering that post-surgical complications are those that occurred within 12 months after the date of the procedure, 1553 (87%) surgeries had no complications. The most prevalent surgical complications were surgical wound seroma (n = 38 / 2.1%), digestive fistulas (n = 32 / 1.8%) and surgical wound infection (n = 27 / 1.5%).

The presence of digestive fistulas was considered in all patients who had dehiscence of digestive anastomosis or accumulation of intra-abdominal digestive secretion (such as biloma or coleperitoneum) evidenced by both imaging tests and clinical examination. In this context, this study relied on data obtained from surgeries performed on 21 patients, in which 32 cases of digestive fistulas were verified, generating an incidence of 1.8%. **Figure 1** shows the difference between the number of surgical procedures and the number of patients in each category studied.

There was a clear change in the predominant character of the surgeries in each group: while only 38% of the surgeries that did not result in fistulas were emergency, 75% of those that resulted in fistulas were performed in an emergency. In the inferential analysis of the character of the surgery, it was noted what was expected only by

observing the descriptive data: there is an association between the patient developing the fistula and the nature of the surgery (p <0.01). Through a logistic regression model, it was corroborated that patients who underwent urgent surgery had about 4.9 times more chance of developing fistulas than patients who underwent elective surgery (Odds Ratio (OR) = 4.89 / Confidence Interval (CI) 95% = 2.18 - 10.96). The distribution of surgeries by character (elective or emergency) and their influence on the development or not of digestive fistulas were detailed in Table 1.

Table 1 – Character of the surgery and its effect on the presence or absence of digestive fistula.

Groups	Elective surgery N (%)	Urgent surgery N (%)	P value	OR (95% CI)
Without fistula	1087 (62.0%)	666 (38.0%)	<0.001	4.896 (2.18-10.96)
With fistula	8 (25.0%)	24 (75.0%)		

OR = Odds Ratio; 95% CI = Confidence Interval of 95%

Then comparing data from patients who underwent abdominal surgeries and developed digestive fistulas to those who did not have this complication, the average age was not only higher in the group with fistula, but also had a smaller standard deviation, suggesting less variation in the age of these patients. The effect of age on the patient's chance of developing post-operative digestive fistula was analyzed using regression to obtain an OR of 1.03 (95% CI = 1.01 - 1.06). This indicates that, on average, there is an increase of about 3% in each year of life in the chance of a patient developing a fistula. The age data are specified in Table 2.

Table 2 – Average age divided between presence or absence of fistula and what is the effect of age on whether the patient has a fistula or not.

Groups	N	Average age (min.-max.)	Standard deviation	P value	OR (95% CI)
Without fistula	1646	51.55 (14-97)	16.77	0.016	1.033 (1.010 - 1.061))
With fistula	21	60.71 (37-77)	12.34		

Min. = minimum age; Max. = maximum age; OR = Odds Ratio; 95% CI = 95% Confidence Interval

As for the length of hospital stay, there was also an evident divergence between the groups. While in about 88% of surgeries without fistulas, patients were discharged until the third day of PO, the same happened in only 1 (3.1%) in which case this complication was identified. Besides, the 1753 surgeries that did not trigger fistulas, in 135 (7.7%) the patient was discharged after the fourth PO day and in only 26 (1.5%) the reoperation was accurate. 55 (3.1%) deaths were identified in this group, but as their causes are not related to fistulas, further investigations were not carried out at this time. Among the 32 surgeries that resulted in postoperative fistula, patients from 13 (40.6%)

operations remained in the hospital at least until the fourth PO day, in 17 (53.1%) cases there was a need for reoperation and in 1 (3.1%) the patient died. These data on the outcome of the surgical admission are shown in Table 3.

Table 3 – Outcome of hospitalization divided by the presence or absence of digestive fistula.

Groups	Discharge up to 3rd PO N (%)	Discharge up to 4th PO N (%)N (%)	Reoperation	Death
Without fistula	1537 (87.7%)	135 (7.7%)	26 (1.5%)	55 (3.1%)
With fistula	1 (3.1%)	13 (40.6%)	17 (53.1%)	1 (3.1%)

PO = postoperative

When assessing the possible impact of the fistula variable on the outcome of hospitalization, detailed in Table 4, it was found that patients who presented fistula had a lower chance of being discharged until the third day of PO (OR = 0.007 / 95% CI = 8.78 e4 - 0.05) and a greater chance of needing reoperation (OR = 6.7 / 95% CI = 2.94 - 15.65). In the analysis of deaths, there was no difference in mortality between patients with and without fistula (OR = 0.18 / 95% CI = 0.02 - 1.47).

Table 4 – Comparisons of the impact of digestive fistula between possible hospital outcomes and discharge after the fourth postoperative day.

Outcome	P value	OR	95% CI
Discharge up to 3rd PO	< 0.001	0.007	8.78e-4 - 0.052
Reoperation	< 0.001	6.788	2.944 - 15.651
Death	0.112	0.188	0.024 - 1.478

PO = postoperative; OR = Odds Ratio; 95% CI = 95% Confidence Interval

The study of the presence of preoperative risk factors was also carried out among patients who developed postoperative fistula. Malignant disease, age over 60 years, IBD, and malnutrition were the factors evaluated. Of the 21 patients in this group, 15 (71.4%) were elderly over 60 years old (mean age 67), 4 (19.0%) had neoplasms, 1 (4.8%) had IBD and 2 (6.2 %) were malnourished.

After surgery and identification of the fistula, it was analyzed if the post-surgical management occurred in the ward or whether there was a need for admission to the ICU bed, also, whether a parenteral diet was used during the follow-up. The types of fistula recorded were enteral (n = 11 / 52.3%), biliary (n = 5 / 23.8%), colony (n = 3 / 14.3%), duodenal (n = 1 / 4.8%) and pancreatic (n = 1 / 4.8%). Monitoring took place in the ward in 53.1% (17) of the cases and the ICU in the other 46.9% (15), with TPN being necessary in 37.5% (12) of the post-surgical cases.

As for surgical outcomes, it was analyzed whether spontaneous closure occurred or whether a new surgical intervention was needed to treat the fistula or peritonitis resulting from this complication, as well as the rate of death related to the fistula. In this scenario, in 34.4% (11) of the cases, the recovery of the fistula occurred spontaneously, in 62.5% (20) of the cases it was necessary to reoperate for the treatment and the death rate was 3.1%, occurring in only 1 of the cases.

DISCUSSION

This study investigated all operations performed by the general surgery department of a philanthropic hospital within the 25-month interval. The surgeries that were capable of forming fistulas were more detailed analysis, similar to the trial by Wercka et al.[1] An advantage of the present investigation is that the period and the sample were longer than those already portrayed in the Brazilian literature.[1,11]

The fact that fistula formations are prevalent surgical complications, the second most important in the hospital where the study was carried out, draws our attention because it is a factor that is known to have a negative influence on the quality of life, morbidity and mortality of patients.[12] The total sample of surgeries was 1785, being 32 cases of digestive fistulas formation as a postoperative complication, corresponding to an incidence of 1.8%, slightly lower than that found in the literature.[1,11] Similar to the literature, the mean age of patients who developed digestive fistulas was 60.7 years, slightly higher than the age found by other epidemiological studies, corroborating the fact that there is a higher prevalence of this post-surgical complication in an elderly population.[1,6,8] There was also a higher occurrence of fistulas in patients with malignant diseases, similar to what was observed, no study by Averbeck et al.[11]

As for the character of the surgery, divided between elective and urgent, this study diverged from other Brazilians.[1,10] A higher incidence of elective surgeries was found when analyzing the total abdominal surgeries, and in contrast, the prevalence of urgent surgeries leading to complications fistulous. It is important to highlight at this moment that the profile of the studied hospital is right away of care for elective surgeries, fewer beds are available for patients without pre-scheduling, so this data was already expected by the researchers.

Concerning the type of fistulas, our findings were also in line with those in the bibliography. A higher incidence of biliary fistulas was expected,[1,7] and in this study, the two most prevalent types of fistulas were enteral and biliary. Despite the desire to enrich the specific epidemiology of fistulas with more detailed information, such as data on flow and path, these were not adequately found in most medical records, making this comparison impossible.

In relation to deaths, contrasting with data from the literature, we found no statistically significant difference in mortality between patients with and without

fistula.[5,6,8] In this context, this data would possibly be different if the investigation was carried out comparing the specific causes of death in each group and not just the overall incidence.

There were some limiting factors of the study, such as a deficiency in the registration and correct characterization of digestive fistulas by health professionals who monitor inpatients. Lack of descriptions of the rate, aspect, or other information about this complication, making it difficult to identify diseases related to this comorbidity.

In conclusion, postoperative digestive fistulas are complications of relevant prevalence within the scope of abdominal surgical procedures and deserve special attention because they are related to unfavorable outcomes.

CONCLUSION

Gastrointestinal fistulas are prevalent post-surgical complications. Advanced age and the presence of malignant disease are risk factors for the development of digestive fistulas. This complication was more prevalent in emergency surgeries in this study, and patients were more likely to need reoperation and have a delay on discharge. No difference in mortality was identified between patients who had or did not have digestive fistulas. The scarcity of details on the characterization of fistulas in electronic medical records suggests a need to increase the training of health professionals in this subject and more studies to deepen the understanding of the topic.

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