



Covid-19 Pandemic Increased the Number of Ostomies Performed in the Mid-west of Santa Catarina

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Abstract

Introduction Intestinal ostomy represents the externalization of the intestine to the abdominal wall.

Objective To analyze the clinical and epidemiological profile of patients who underwent intestinal ostomy construction from 2010 to 2023 at the Hospital Universitario Santa Terezinha (HUST) in Joaçaba, Santa Catarina.

Method This is a quantitative study with a cross-sectional approach through access to medical records of patients undergoing intestinal ostomy surgery from 2010 to 2023. Descriptive and association analyses were performed using JASP 0.18.1 software.

Results Three hundred and seventy-one (371) patients, predominantly male (58.8%), were included in this study. At the time of surgery, the average age was 60.4 years. The younger patient was 13 years old, while the older patient was 97 years old. Most of the hospitalizations were due to neoplasms, with emphasis on colorectal neoplasia (39.6%), with a predominance of ileostomies (54.4%). A significant increase of this type of surgery ($p=0.013$) was noted, coincidentally with the SARS-CoV-2 virus pandemic.

Conclusions Males and elderly people who underwent ileostomy due to colorectal neoplasia, were predominant, most of which were permanent. There was an increase in the number of ostomy cases during the SARS-CoV-2 pandemic in the region. Such conditions may be associated with gastrointestinal complications, with a high potential for enteral surgery under unfavorable conditions.

Keywords

- health profile
- surgical stomas
- colostomy
- ileostomy
- health planning

Introduction

Stoma, ostoma, and ostomy are synonymous terms originating from the Greek word “stoma” which means “mouth,” denoting a surgically made opening of a hollow organ with externalization at a location distinct from its physiological place, aiming to excrete waste products or divert food transit.¹ Intestinal ostomy refers to the externalization of a

segment of the intestine to eliminate feces, whose consistency will depend on the intestinal portion subjected to the surgical procedure.²

Various clinical conditions can motivate the performance of an intestinal ostomy, which can be temporary or permanent. Currently, one of the main reasons is the presence of neoplasms in the colon and/or rectum. However, other pathologies, such as inflammatory bowel

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disease (IBD) and diverticular disease, can also require this surgery.^{1,2}

Additionally, external situations such as injuries from stabbing, gunshot wounds, or blunt trauma can lead to the need for an ostomy. Similarly, an ostomy may be chosen when the surgeon considers the intestinal anastomosis unsafe, with a high risk of suture dehiscence and the possible evolution of sepsis, opting for the creation of a protective ostomy, which is usually temporary.³

In Brazil, epidemiological research show that there are ~400,000 individuals with intestinal stomas, and nearly 10,000 new cases per year. However, the construction of this externalization still represents physical and emotional changes for the patients,² impacting their lifestyle and potentially causing depressive symptoms, social isolation, marital relationship issues, and low self-esteem.⁴

Therefore, the present study aims to analyze the clinical and epidemiological profile of patients from the Mid-West of Santa Catarina who underwent intestinal ostomy construction between 2010 and 2023.

Method

This study has been done using a quantitative and cross-sectional approach. An analysis of medical records from 2010 to 2023 was performed between December 2023 and January 2024 for patients who underwent intestinal ostomy surgery at the Hospital Universitário Santa Terezinha (HUST) in Joaçaba, Santa Catarina, which is a reference in oncology services in the Mid-West area of Santa Catarina state, covering over 60 municipalities.

Data collection was done through a research form created by the authors and filled out with information from each patient's medical records. After filling out the form, the information was compiled into an Excel sheet and separated into different spreadsheets according to the year.

The inclusion criteria for the research were: patients who underwent intestinal ostomy construction surgery and were hospitalized at HUST between 2010 and 2023. Exclusion criteria were patients with repeated or incomplete data in the medical records, causing confusion about the date of surgery or the reason for the surgical procedure. From that point, the medical record number of each patient was obtained, along with demographic data (such as gender and date of birth), clinical information such as the underlying pathology that led to the surgical procedure, whether the patient underwent complementary treatment with chemotherapy or radiotherapy, the date of the surgical procedure and the respective age of the patient at the time, as well as the type of ostomy (ileostomy or colostomy, and whether it was a loop or end ostomy), the nature of its permanence (temporary or permanent), and finally, whether the patient had comorbidities described in pre-surgery consultations.

The data were computed in terms of absolute and relative frequencies. Associations described in the results were analyzed using Pearson's chi-square test for categorical variables. Comparisons of mean ages between genders or surgery years were done using the student's *t*-test (for gender) and

ANOVA (for surgery years). All analyses were performed using JASP 0.18.1 software, adopting a significance level of $p < 0.05$. The research project was approved by the UNOESC Research Ethics Committee under opinion number 6.335.039.

Results

The medical records of 371 patients with intestinal ostomy between the years 2010 and 2023 were analyzed. The overall average age of the patients at the time of surgery was 60.48 years \pm 14.54 years. The maximum age was 97 years, and the minimum was 13 years. Regarding gender, 153 (41.2%) patients were female and 218 (58.8%) were male. The most common type of ostomy was ileostomy ($n = 202$; 54.4%), followed by colostomy ($n = 169$; 45.6%). **Fig. 1** shows the frequencies of ostomies over the analyzed years. The highest number of such surgeries ($n = 66$; 17.79%) was in 2022.

A comparison was made between the pre-COVID-19 pandemic years (2010 to 2019) and the post-pandemic years (2020–2023) to assess whether the increase in ostomies performed during the pandemic period was statistically significant. **Fig. 2** presents the average ostomies per year, showing a significant increase during the SARS-CoV-2 virus pandemic ($p = 0.013$).

Of the total ostomies performed, 291 (78.4%) were due to some colorectal neoplasm as the underlying pathology. Consequently, 39.6% ($n = 147$) of the patients underwent chemotherapy and/or radiotherapy as complementary treatment.

The most prevalent comorbidities were hypertension ($n = 94$; 25.3%), current or former smoking ($n = 56$; 15.1%), diabetes mellitus ($n = 35$; 14.3%), dyslipidemia ($n = 17$; 4.6%), and obesity ($n = 3$; 0.8%). It is important to note that several patients have multiple comorbidities.

Table 1 shows the absolute frequencies among the observed variables and the relative frequency (%) in relation to the total observations. The data referring to totals differs from the sample total (371), due to the lack of information in the medical records.

No associations or significant differences were found between the presence of comorbidities and gender, type of

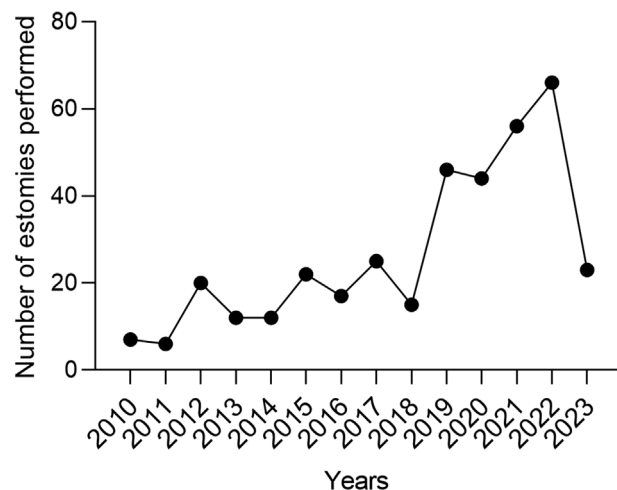


Fig. 1 Number of ostomies performed between 2010 and 2023 in Joaçaba, SC.

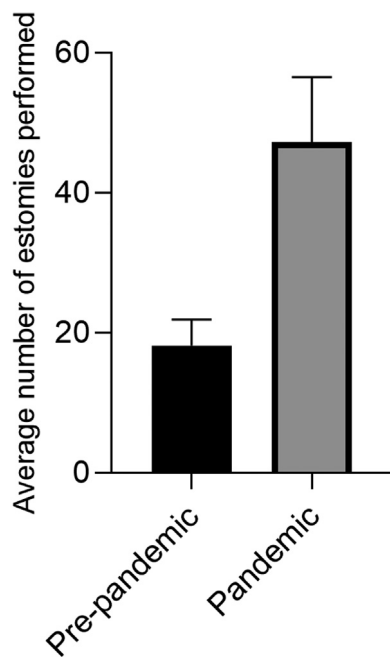


Fig. 2 Mean and standard error of the mean of intestinal ostomies performed from 2010 to 2019–Pre-pandemic and from 2020 to 2023–Pandemic. Mann-Whitney test ($p=0.013$).

ostomy, or year of surgery. No significant differences were found between the average ages and gender or year of surgery either.

Discussion

It is estimated that there are over 400,000 ostomized people in Brazil, according to the Ministry of Health.² This procedure significantly impacts patients' quality of life.⁴

This study shows that 58.8% of the ostomized patients were male, with an average age of 60.4 years at the time of surgery, regardless of gender or type of exteriorization. This information converges with the statistics of studies conducted in other regions of the country regarding gender^{3–5} and age.^{3,5,6}

Regarding the causes for ostomy indication, 78.4% of the patients had some colorectal neoplasm as the underlying

pathology, with 39.6% undergoing complementary treatment, such as chemotherapy and/or radiotherapy. This result aligns with previous studies, which indicate that colorectal neoplasm was responsible for more than 57% of the indications for constructing an intestinal ostomy.^{4,5} Among the reasons why colorectal cancer is the main cause for ostomy creation, the late diagnosis of intestinal neoplasms or other pathological conditions resulting in an acute abdomen is highlighted. In these cases, patients are often operated on without prior intestinal preparation, leading to the construction of protective stomas to prevent morbidity and mortality from suture dehiscence.⁷

Ileostomies were more prevalent, representing 54.5% of the patients, which significantly diverges from Brazilian studies that point to colostomy as the predominant form of exteriorization, with more than 75% of the patients analyzed.^{4–6} This divergence did not change during all the analyzed years, nor during the COVID-19 pandemic, with a similar absolute average.

Regarding the duration of stay, only 29.1% of the analyzed patients had a diagnosis of temporary ostomy with reversal, while the others had a definitive ostomy or no reversal until the year 2023. A similar result was found in other studies in the literature.^{4,5,8} This shows the existing controversy regarding the optimal timing for reversing the intestinal stoma.

No protocols that encourage the early reconstruction of intestinal transit were found, despite recent clinical studies showing that this is a viable and safe approach.^{8,9}

Early closure does not increase the number of postoperative complications; on the contrary, the presence of the ostomy itself contributes to worsening the patient's quality of life, increasing complications, and aggravating clinical conditions.¹⁰ Terés et al. demonstrated that selecting patients with eligible clinical criteria for an early ostomy reversal protocol resulted in a shorter ostomy duration, reduced care by specialized ostomy nurses, and reduced morbidity and mortality from dysfunctional stomas.⁹

However, the absence of randomized clinical trials validating the benefits of two major surgical interventions in a short period of time along, with the appropriate patient profile for the early reversal technique, is an evident gap. A

Table 1 Absolute frequencies among the observed variables and the relative frequency (%) in relation to the total observations

Variable		n	total	%
Gender	Female	153	371	41,2
	Male	218	371	58,8
Complementary Treatment	Chemotherapy	101	147	68,7
	Chemotherapy/Radiotherapy	37	147	25,2
	Radiotherapy	9	147	6,1
Ostomy type	Colostomy	169	371	45,6
	Ileostomy	202	371	54,4
Duration	Temporary	108	108	100
Type	Loop ostomy	40	47	85,1
	End ostomy	7	47	14,9

study conducted in the United States highlighted the need for these analyses to promote changes in surgical practice. This study revealed that early ileostomy closure (performed within two weeks) could offer various benefits but faces logistical challenges that need to be overcome to ensure the success of the technique. Moreover, both patients and surgeons showed interest in this approach, justifying clinical trials to explore and implement this practice.⁸

Regarding the type of stoma exteriorization created the lack of specification in surgical reports and respective evolutions in medical records represented a significant limitation in data collection. Only 47 medical records contained this information, of which 85.1% of the patients received loop exteriorization, being the most prevalent modality compared with the terminal form.

These results substantially differ from other national studies, where terminal exteriorization was more predominant.^{8,11} Therefore, due to the lack of information in 12.6% of the records, it was not possible to reach significant conclusions on this matter.

The study period to analyze the profile of ostomized patients was from 2010 to 2023, with a predominance of surgeries performed between 2019 and 2022, corresponding to 57.1% of the total. This significant increase coincides with the SARS-CoV-2 virus pandemic, which caused severe acute respiratory syndrome.¹² It is important to highlight that during this period, there was a prioritization of emergency and oncological surgeries over elective surgeries for benign clinical conditions.¹⁰ This may have contributed to an increase in ileostomies and colostomies during emergency procedures. On the other hand, studies also show that this period led to a delay in reconstructing the intestinal transit and performing elective surgeries after the neoplasm diagnosis, although without changing the tumor stage.^{10,13}

It is important to highlight that although SARS-CoV-2 infection is commonly associated with respiratory symptoms, there are also extrapulmonary manifestations of this condition. Gastrointestinal symptoms are frequently reported, including abdominal pain, diarrhea, nausea, and vomiting. Hospitalized patients with severe COVID-19 infection may develop critical gastrointestinal complications with a high fatality potential, such as Ogilvie's syndrome, mesenteric ischemia, intestinal bleeding, and paralytic ileus. Studies indicate a positive association between the severity of the SARS-CoV-2 infection and digestive system impairment.¹⁴

The pathophysiology of gastrointestinal tract damage is multifactorial, but the viral binding to enzymatic receptors present in the gastrointestinal tract leads to intense inflammation in the intestinal epithelial lining, with consequent cytokine release and tumor necrosis factor, favoring endothelial damage and micro ischemic events.¹⁵

Another association highlighted in the literature warns about the use of immunobiologicals such as tocilizumab, and high-dose steroids in the therapy of severely ill patients hospitalized due to the virus, as previous research reported cases of intestinal perforation associated with these immunosuppressive effects, in addition to attenuating the evident

signs of abdominal sepsis, leading to late and incorrect diagnoses of acute abdomen cases.¹⁴

Quaresma et al. conducted two reviews addressing the effects of biological therapy in patients with IBD and concluded that prolonged corticosteroid use, along with other confounding factors, and not biological agents, were identified as significant risk factors for postoperative complications in this population.^{16,17} During the COVID-19 pandemic, many patients saw their treatments interrupted due to concerns about the supposed risk of immunosuppression associated with biologicals. In contrast, corticosteroids were often employed to treat disease relapses, and when surgery was necessary, the vast majority of patients were under prolonged use of high-dose corticosteroids, increasing the risk of septic complications and suture dehiscence.^{16–19}

The incidence of acute gastrointestinal complications in cases of severe COVID-19 infection and the impact of using immunomodulatory drugs and/or steroidal anti-inflammatories can result in a surgical emergency. The association found may justify the increased number of emergency intestinal ostomies performed during the SARS-CoV-2 virus pandemic, as demonstrated in this research.

Another relevant factor, highlighted in a Chinese study, was the demonstration of the causal effects of COVID-19 on increased cancer risk. Using a Mendelian approach, the study observed that genetic predispositions for severe COVID-19 cases were causally associated with a higher risk of esophageal cancer, colorectal cancer, stomach cancer, and colon cancer, among others, including breast cancer. These data justify the higher incidence of ostomies performed in the present study. Additionally, recent observational studies indicated that new cancer cases diagnosed during the COVID-19 pandemic were at more advanced stages compared with the non-epidemic period.²⁰ This information suggests the presence of possible carcinogenic factors associated with the COVID-19 infection, which are not yet fully understood. This could lead to findings that not only indicate a stimulus for cancer development but also an intensification and acceleration of disease manifestations. However, to confirm these assumptions, longer and more comprehensive studies coordinated in a centralized context will be needed.

Despite the increase in ostomies performed between 2019 and 2022, a significant decrease was recorded in 2023. This reduction can be associated with the resumption of normal care volumes in colorectal cancer treatment settings, as well as more effective follow-up of cancer patients in general. However, for accurate monitoring and observation of the development of ostomy cases in Joaçaba during the post-pandemic period, continuous and specific studies are necessary. This allows for a more complete understanding of trends and the potential long-term impacts of the pandemic on surgical procedures related to colorectal cancer.

Among the possible limitations of this study, it is important to consider the incomplete filling out of surgical reports and medical records, which may have introduced

information bias and distorted the results and discussions presented. This bias may be associated with the fact that different medical professionals filled out the records and/or surgical reports, resulting in more detailed descriptions in some cases than in others, which may have interfered with the etiological analysis of intestinal ostomy creation, the mode of exteriorization, complementary treatment performance, and comorbidity identification in patients. Additionally, as a cross-sectional study, the evaluation of event causality is subject to hypotheses and associations and does not allow for definitive causal relationships to be inferred. These considerations are essential for an appropriate and contextual interpretation of the study results.

Despite that, this study provides a portrait of the clinical profile of patients with intestinal ostomy in a reference region for oncological surgeries in the Midwest of Santa Catarina. This highlights the importance of clinical and epidemiological research to better understand these patients.

Conclusion

This study allowed for the characterization of the clinical and epidemiological profile of ostomized patients in a public care service in the Midwest of Santa Catarina. It was identified that most patients were male, elderly, and had malignant colon and rectal neoplasms, resulting in the need for a permanent ileostomy without the need for prior or subsequent complementary treatment to the surgical procedure. A significant increase in this type of surgery was observed during the COVID-19 pandemic in this population. Although the reasons for this increase were raised, further studies are needed to analyze this phenomenon at a national and global level.

Conducting randomized clinical studies to establish specific protocols for early intestinal stoma closure can be an effective measure to reduce the high rates of definitive intestinal stoma, positively impacting the quality of life of ostomized patients. These results have epidemiological importance for future interventions in planning and improving the care provided to ostomized patients in regional health services and beyond. The implementation of standardized protocols and specific guidelines can significantly improve the care and well-being of these patients.

Authors' Contributions

Fabiana Baldissera Bom, Barbarah Zimlich de Souza and Abel Botelho Quaresma designed the study. Fabiana Baldissera Bom, Barbarah Zimlich de Souza collected data. All authors reviewed and Abel Botelho Quaresma approved the final version.

Conflict of Interest

None.

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