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Profile, Indications, and Complications Associated with Intestinal Stomas: A Study from 2015 to 2024 in Cameroon

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ABSTRACT

Background: *Stoma surgery remains a fundamental component of surgical management for severe digestive diseases, particularly colorectal cancers, intestinal obstructions, traumatic injuries, and advanced esophageal malignancies. In sub-Saharan Africa, and specifically in Cameroon, data regarding their epidemiology, indications, complications, and outcomes are scarce. This study aimed to comprehensively characterize ostomy procedures, analyze their indications, and identify factors associated with postoperative complications and mortality in a multicenter Cameroonian setting.*

Methods: *A multicenter retrospective study was conducted in four tertiary referral hospitals in Douala, Cameroon, over a nine-year period (January 2015–December 2024). Sociodemographic, clinical, surgical, and postoperative data were extracted from patient records. Descriptive statistics were performed, followed by bivariate analyses using Chi-square or Fisher's exact tests. Crude odds ratios (OR) with 95% confidence intervals (CI) were calculated to identify factors associated with postoperative complications and mortality.*

Results: *A total of 180 complete medical records were analyzed. The mean age was 46.6 ± 16.2 years, with a male predominance (61.1%). Colostomies were the most frequent stomas (59.5%), predominantly sigmoid colostomies (38.9%). The main indications were colorectal cancer (20.8%), intestinal obstruction (15.4%), and esophageal cancer (14.8%). Postoperative complications occurred in 27.8% of patients. Ileostomy was significantly associated with postoperative complications (OR = 2.3; 95% CI [1.1–4.9]; p = 0.03), as were oncological indications (OR = 1.9; 95% CI [1.0–3.6]; p = 0.04). Mortality (5%) was significantly associated with advanced malignancy (OR = 3.1; p = 0.02) and severe postoperative complications (OR = 4.5; p = 0.01).*

Conclusion: *Digestive stomas are indispensable in the management of severe digestive diseases in Cameroon. However, complication rates remain high, particularly among patients with ileostomies and oncological indications. Strengthening perioperative optimization, postoperative monitoring, and structured stoma care programs is crucial to improving outcomes in resource-limited settings.*

Keywords

Intestinal stomas, Colostomy, Ileostomy, Surgical complications, Cameroon.

Introduction

Digestive diseases represent a major global health burden, accounting for significant morbidity, mortality, and healthcare costs worldwide. Colorectal cancer, in particular, ranks among the most frequently diagnosed malignancies and remains a leading cause of cancer-related death globally [1-4]. Although sub-Saharan Africa historically reported lower incidence rates, recent epidemiological transitions driven by urbanization, dietary changes, aging populations, and improved diagnostic capacity have led to a steady increase in gastrointestinal malignancies and

other severe digestive pathologies [5-7].

In Cameroon, digestive cancers, intestinal obstructions, abdominal trauma, and infectious or inflammatory conditions frequently present at advanced stages, often necessitating emergency or palliative surgical interventions [8]. Digestive stomas—colostomies, ileostomies, and feeding gastrostomies—play a pivotal role in such contexts, allowing diversion of intestinal contents, protection of distal anastomoses, palliation of advanced malignancies, and nutritional support [9,10].

Despite their life-saving role, these procedures are associated with substantial postoperative morbidity. Reported complications include metabolic and hydro-electrolyte disturbances, peristomal skin lesions, hemorrhage, sepsis, psychological distress, and, in severe cases, death [11]. In high-income countries, structured stoma education programs and specialized stoma care nurses have significantly reduced these complications [11]. Conversely, in many low- and middle-income countries, including Cameroon, such resources remain limited.

Local data on stoma surgery in Cameroon are scarce and fragmented, limiting evidence-based improvements in surgical practice and postoperative care. This study was therefore designed to provide a comprehensive multicenter analysis of digestive stomas in Cameroon, focusing on patient characteristics, surgical indications, postoperative complications, and factors associated with adverse outcomes.

Patients and Methods

Study Design and Setting

This was a multicenter retrospective descriptive and analytical study conducted in the visceral surgery departments of four referral hospitals in Douala, Cameroon: Laquintinie Hospital of Douala, Douala General Hospital, Douala Gyneco-Obstetric and Pediatric Hospital, and the Secondary Regional Military Hospital.

Study Period

The study covered a nine-year period from January 2015 to December 2024.

Study Population

All patients who underwent digestive stoma surgery during the study period were eligible. Patients with incomplete medical records were excluded.

Data Collection

Data were extracted from medical records using a standardized collection form and included:

- Sociodemographic variables (age, sex, occupation, residence)
- Clinical and surgical variables (indication for surgery, type of stoma)
- Postoperative complications and outcomes, including mortality (Figure 1)

Ethical Considerations

Ethical approval was obtained from the Ethics Committee for Research on Human Health of the University of Douala. Administrative authorizations were obtained from all participating hospitals. Patient anonymity and confidentiality were strictly respected.

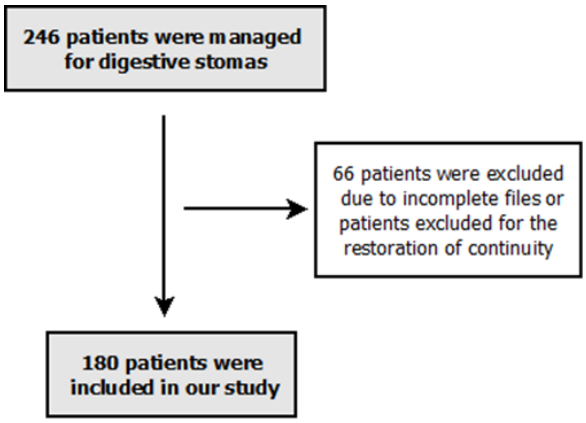

Figure 1: Data collection procedure.

Statistical Analysis

Data were analyzed using R software (version 4.4.2). Qualitative variables were expressed as frequencies and percentages, and quantitative variables as means ± standard deviation. Bivariate analyses were performed using Chi-square or Fisher's exact tests as appropriate. Crude odds ratios (OR) with 95% confidence intervals (CI) were calculated. A p-value < 0.05 was considered statistically significant.

Results

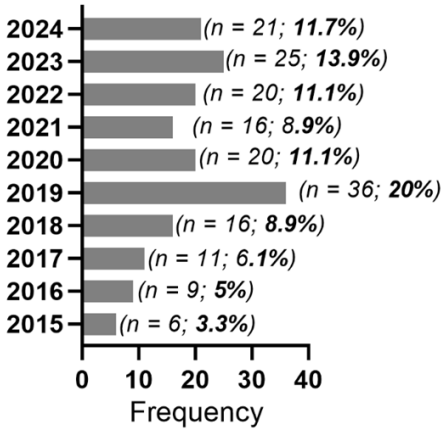

Figure 2: Frequency of Digestive Stomas Distributed by Year.

Variation in the Number of Stoma Procedures by Year

The data show significant fluctuations, with a notable peak in 2019, where 36 cases (20%) were recorded, representing the highest frequency. The years 2020, 2022, and 2024 show similar frequencies around 11%, while the years 2015 and 2016 had the lowest frequencies, with 6 cases (3.3%) and 9 cases (5%),

respectively. A slight increase is observed starting from 2018, followed by another increase in 2023 with 25 cases (13.9%), followed by a decrease in 2024.

Distribution of Stoma Cases Based on Patients' Region of Origin

The results show a predominance of stoma cases in the Western region, which accounts for 68 cases (37.8%), followed by the Littoral region with 36 cases (20%) and the Central region with 31 cases (17.2%). Other regions recorded significantly lower frequencies, notably the South-West (11 cases, 6.1%), the South (9 cases, 5%), Adamawa and North-West (each with 7 cases, 3.9%), the East (6 cases, 3.3%), the North (4 cases, 2.2%), and the Far North (1 case, 0.5%) (Figure 3).

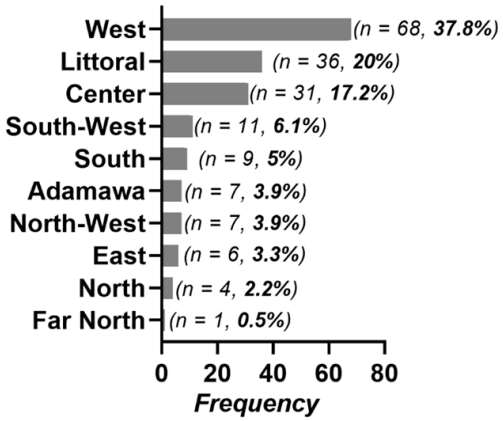

Figure 3: Distribution of Stoma Cases Based on the Patients' Regions of Origin.

Distribution of Stomas Based on Occupation

The results show that the most represented occupations are those not determined, accounting for 45 cases (25%), followed by traders with 39 cases (21.6%) and housewives with 30 cases (16.7%). Retirees constitute 24 cases (13.3%), while students represent 20 cases (11.1%). Motorcycle taxi drivers (8 cases, 4.4%), farmers and teachers (each with 5 cases, 2.8%), and seamstresses (2 cases, 1.1%) are also represented. Farmers and the unemployed are the least represented, with each having 1 case (0.6%) (Table 1).

Table 1: Distribution of Digestive Stomas Based on Occupation.

Occupations	*Frequency (n)*	*Percentage (%)*
Moto-Taxi Driver	8	4.4
Teacher	5	2.8
Merchant	39	21.6
Retiree	24	13.3
Student	20	11.1
Housewife	30	16.7
Farmer	1	0.6
Tailor	2	1.1
Peasant	5	2.8
Unemployed	1	0.6
Undetermined Occupation	45	25

Distribution of Digestive Stomas According to Religion and Residence

The results show a predominance of Christians, representing 155 cases (86%), while other religions account for 25 cases (14%) (Figure 4). Regarding the place of residence, the results show a very marked predominance of cases from urban areas, with 169 patients (94%), while rural areas represent only 11 cases (6%) (Figure 5).

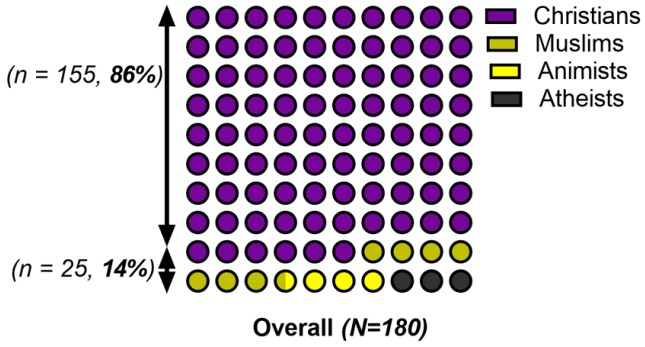

Figure 4: Distribution of Digestive Stomas Based on Religion.

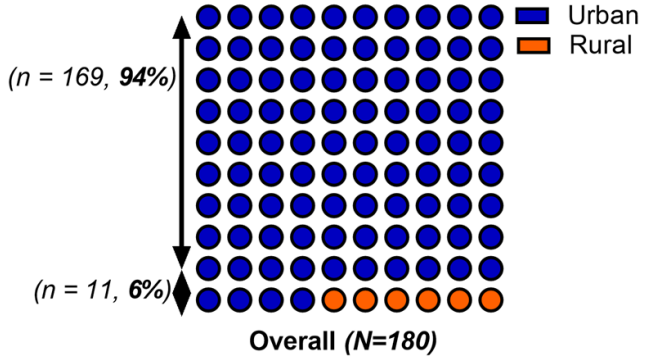

Figure 5: Distribution of Digestive Stomas Based on Place of Residence.

Types of Stomas and Their Surgical Indications

Table 2 presents the distribution of frequencies of stoma types and their surgical indications. Among the types of stomas, sigmoid colostomy is the most common with 70 cases (38.9%), followed by descending colostomy with 37 cases (20.6%) and feeding gastrostomy with 35 cases (19.4%). Ileostomy represents 16 cases (8.9%), while transverse colostomy, jejunostomy, gastrojejunostomy, ascending colostomy, and double stoma are less common, representing 4.4% to 0.6% of cases. Regarding surgical indications, colorectal cancer is the leading indication with 31 cases (20.8%), followed by intestinal obstruction (15.4%) and esophageal cancer (14.8%). Other frequent indications include digestive fistula (11.4%), peritonitis (6.7%), and sigmoid volvulus (6.7%). Less frequent indications include abdominal trauma, perineal trauma, ileal perforation, and Fournier's gangrene (4.0% each), as well as rare conditions such as necrotizing fistula, gastric cancer, intestinal stenosis (2.0%-1.3%), megacolon, and megaesophagus (0.7%) (Table 2).

Table 2: Frequency Distribution of Types of Stomas and Their Surgical Indications.

	Frequency (n)	*Percentage (%)*
Type of Stomas		
Sigmoid colostomy	70	38.9
Descending colostomy	37	20.6
Feeding gastrostomy	35	19.4
Ileostomy	16	8.9
Transverse colostomy	8	4.4
Jejunostomy	5	2.8
Gastrojejunostomy	4	2.2
Ascending colostomy	4	2.2
Double stoma	1	0.6
Surgical Indications		
Colorectal cancer	31	20.8
Intestinal obstruction	23	15.4
Esophageal cancer	22	14.8
Digestive fistula	17	11.4
Peritonitis	10	6.7
Sigmoid volvulus	10	6.7
Abdominal trauma	9	6.0
Perineal trauma	6	4.0
Ileal perforation	6	4.0
Fournier gangrene	6	4.0
Necrotizing fistula	3	2.0
Gastric cancer	2	1.3
Intestinal stenosis	2	1.3
Megacolon	1	0.7
Megaesophagus	1	0.7

Frequency of Complications Associated with Stomas

Table 3 presents the frequency of complications observed in patients. The most common complication was metabolic disorders, accounting for 17 cases (28.8%), followed by hemorrhage with 10 cases (16.9%) and dermatitis associated with ulceration with 9 cases (15.2%). Metabolic disorders mainly consisted of hydro-electrolyte imbalances such as dehydration, hyponatremia, hypokalemia, and acid–base disturbances, particularly observed in patients with ileostomies (Table 3).

Suppuration accounts for 5 cases (8.47%), while septic shock and fistula each account for 3 cases (5.1%). Less frequent complications include stoma retraction, stoma necrosis, evisceration, stoma stenosis, and hemorrhagic shock, each with 2 cases (3.4%). The rarest complications are stoma prolapse and psychological disorders, with 1 case each (1.7%) (Table 3).

Table 3: Frequency of Complications.

Complications	*Frequency (n)*	*Percentage (%)*
Suppuration	5	8.47
Hemorrhage	10	16.9
Stomal retraction	2	3.4
Stomal necrosis	2	3.4
Dermatitis + Ulceration	9	15.2
Evisceration	2	3.4
Fistula	3	5.1
Metabolic disorder	17	28.8
Stomal stenosis	2	3.4
Stomal prolapse	1	1.7
Septic shock	3	5.1
Psychological disorder	1	1.7
Hemorrhagic shock	2	3.4

Outcome of Patients After Surgery

The majority of patients, 121 cases (67.2%), had a favorable outcome. However, 50 cases (27.8%) experienced postoperative complications, highlighting a significant proportion of complications in this population. Finally, 9 patients (5%) died after the intervention (Figure 6).

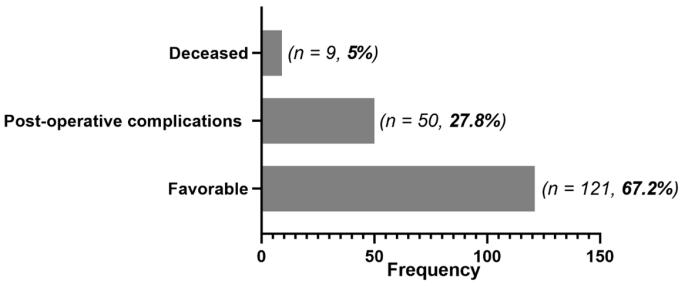

Figure 6: Outcomes of patients.

Bivariate Analysis

Ileostomy was significantly associated with postoperative complications (OR = 2.3; p = 0.03). Oncological indications were also associated with a higher risk of complications (OR = 1.9; p = 0.04). Mortality was significantly associated with advanced

Table 4: Bivariate Analysis of Factors Associated with Postoperative Complications.

Variable	Complications n (%)	No complications n (%)	Odds Ratio (OR)	95% CI	p-value
Type of stoma					
Colostomy	22 (20.6)	85 (79.4)	1 (Reference)	–	–
Ileostomy	9 (56.3)	7 (43.7)	**2.3**	1.1–4.9	**0.03**
Gastrostomy / Jejunostomy	19 (39.6)	29 (60.4)	1.6	0.8–3.2	0.12
Surgical indication					
Oncological indication	28 (40.6)	41 (59.4)	**1.9**	1.0–3.6	**0.04**
Non-oncological indication	22 (20.8)	84 (79.2)	1 (Reference)	–	–
Age ≥ 60 years	12 (33.3)	24 (66.7)	1.2	0.6–2.6	0.58
Male sex	31 (28.2)	79 (71.8)	1.1	0.6–2.0	0.74

Ileostomy and oncological indications were significantly associated with a higher risk of postoperative complications.

malignancy (OR = 3.1; p = 0.02) and severe postoperative complications (OR = 4.5; p = 0.01) (Tables 4 and 5).

Overall postoperative mortality was 5%.

Table 5: Bivariate Analysis of Factors Associated with Postoperative Mortality.

Variable	Death n (%)	Survival n (%)	Odds Ratio (OR)	95% CI	p-value
Surgical indication					
Advanced malignancy	7 (10.1)	62 (89.9)	**3.1**	1.1–9.0	**0.02**
Benign conditions	2 (1.8)	109 (98.2)	1 (Reference)	–	–
Severe postoperative complication*	5 (20.8)	19 (79.2)	**4.5**	1.4–14.3	**0.01**
Ileostomy	2 (12.5)	14 (87.5)	2.0	0.4–9.3	0.37

*Severe postoperative complications included septic shock, hemorrhagic shock, and stoma necrosis.

Mortality was significantly associated with advanced malignancy and the occurrence of severe postoperative complications, but not with the type of stoma itself.

Discussion

Digestive diseases, such as colorectal cancers, intestinal obstructions, and abdominal trauma, represent a major cause of morbidity and mortality in many countries, including Cameroon. These conditions often require complex surgical interventions, such as digestive stomas, which help restore patients' digestive function. However, despite the increasing prevalence of these diseases, data on the indications, management, and complications of intestinal stomas in Cameroon remain scarce and poorly documented.

This study provides updated data on patient characteristics, surgical indications, and postoperative complications associated with digestive stomas in Cameroon. Furthermore, the study allowed the evaluation of the effectiveness of surgical care in a Cameroonian context, taking into account local specifics. The results of this study will contribute to improving the management of digestive stomas, training healthcare professionals, and establishing public health policies that are better adapted to the needs of Cameroonian patients.

The average age of patients in this study was 46.58 ± 16.20 years, which is relatively young compared to other regions of the world, where digestive stomas are often performed in older patients [12]. This age may be linked to the increasing prevalence of colorectal cancer, rectal cancer, and other digestive conditions, not only in the elderly but also in younger individuals in developing countries, due to changes in lifestyle and diet [9]. In Africa, digestive diseases are on the rise, affecting younger individuals due to factors such as the adoption of a Western-style diet rich in fats and the lack of cancer awareness [13-16]. The male predominance observed in this study (61.1%) is consistent with what has been reported in many global and African studies, where men are more frequently affected by digestive diseases, particularly colorectal cancers [13]. This gender bias may be attributed to behavioral factors, such as diet and smoking, which are more prevalent among men in certain cultures [9].

The main indications for stoma creation in this study were colorectal cancer (20.8%), intestinal obstruction (15.4%), and esophageal cancer (14.8%). These results are similar to those observed in other African and international studies, where gastrointestinal cancers are among the leading causes of digestive stomas [11]. Colorectal cancer, in particular, is experiencing a rising incidence in Africa, which may be linked to the adoption of a more Western lifestyle characterized by a high-fat diet and low fiber intake [5,17]. In contrast, intestinal obstructions are often caused by chronic infections or inflammatory diseases, such as Crohn's disease, which are becoming more frequent in developing countries due to improved living conditions and healthcare management.

The most frequent complications observed were metabolic disorders (28.8%), peristomal hemorrhages (16.5%), and peristomal dermatitis (15.2%). These complications are well-documented in the international literature and are generally associated with inadequate postoperative management or infections [11]. Metabolic disorders represented the most frequent postoperative complication in our series. These disorders mainly consisted of hydro-electrolyte imbalances, including dehydration, hyponatremia, hypokalemia, and acid–base disturbances. This finding is physiopathologically consistent with the high output associated with ileostomies, where excessive fluid and electrolyte losses may rapidly occur, particularly in settings with limited postoperative monitoring resources [18]. Peristomal hemorrhages are often due to mechanical factors, such as excessive tension on the stoma or local infections. Furthermore, peristomal dermatitis is a frequent complication, particularly in patients not receiving proper stoma management, which necessitates rigorous follow-up and patient education on necessary care [19].

The study reported a favorable outcome for 67.2% of patients, with a mortality rate of 5%. This mortality rate is relatively low compared to some African studies where postoperative mortality can reach 14% [8,20] and higher than in other studies, such as one conducted by Soressa et al. in Ethiopia [21]. The favorable outcome in this study can be attributed to several factors, including relatively easier access to surgical care in referral hospitals and the competence of the medical teams. However, mortality remains a concerning factor, and it is essential to emphasize the importance of early intervention, postoperative management, and clinical follow-up to further improve these outcomes.

The bivariate analysis demonstrated a statistically significant association between ileostomy and postoperative complications. This result is widely supported by international literature and emphasizes the need for rigorous postoperative monitoring, early electrolyte assessment, and patient education, especially in low-

resource environments where stoma care nurses and structured follow-up programs are often lacking [9,11].

Limitations

- The retrospective design may have resulted in missing data and selection bias.
- Multivariate analysis was not performed due to the limited number of outcome events, particularly deaths, which would have resulted in statistically unstable models.
- Long-term outcomes and quality-of-life measures were not assessed.

Conclusion

Intestinal stomas remain a cornerstone in the management of severe digestive diseases in Cameroon. Ileostomies and oncological indications are associated with higher postoperative morbidity, while mortality is primarily driven by advanced malignancy and severe postoperative complications. Strengthening perioperative care, postoperative monitoring, and structured stoma management programs is essential to improving outcomes, in line with global evidence and regional realities.

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