

Primary Anastomosis versus Hartmann's Procedure in the Management of Sigmoid Volvulus in the General Surgery Department of Ignace Deen National Hospital, Conakry University Hospital

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Abstract

Introduction: Sigmoid volvulus is a common cause of acute intestinal obstruction in several African settings. When surgical treatment is required, the choice between sigmoid colectomy with primary colorectal anastomosis and Hartmann's procedure depends on the patient's general condition and intraoperative findings. The aim of this study was to compare the indications and short-term outcomes of these two procedures in patients operated on for sigmoid volvulus in a resource-limited setting. **Materials and Methods:** This was a prospective, non-randomized observational comparative study conducted over 18 months, from January 1, 2024, to June 30, 2025, in the General Surgery Department of Ignace Deen National Hospital-Conakry University Hospital. All consecutive patients admitted and operated on for sigmoid volvulus during the study period were included. The choice between primary anastomosis and Hartmann's procedure was made intraoperatively according to bowel viability, the presence of necrosis or inflammatory changes, tissue quality, and the patient's general condition. Sociodemographic, clinical, para-clinical, therapeutic, and postoperative variables were analyzed. **Results:** Among 1094 emergency surgical procedures performed during the study period, 112 patients with sigmoid volvulus underwent surgery. Primary anastomosis was performed in 80 patients (71.4%), whereas Hartmann's procedure was performed in 32 patients (28.6%). The mean age was 49.5 years (range, 7 - 80 years), and 72 patients (64.3%) were male. The mean time from symptom onset to consultation was 5.0 days. Fifty-four percent of patients were referred

from another healthcare facility. All patients underwent laboratory investigations and plain abdominal radiography. Abdominopelvic CT and MRI were not available in the emergency setting. The mean time from admission to surgery was 13.8 hours. Primary anastomosis was mainly selected when the bowel was viable and tissue quality was considered suitable, whereas Hartmann's procedure was mainly performed in the presence of necrosis, extensive inflammatory changes, or other unfavorable intraoperative findings. The mean hospital stay was 11.5 days after primary anastomosis and 16.9 days after Hartmann's procedure. Overall, 93 patients (83.0%) had an uncomplicated post-operative course, while 19 (17.0%) developed complications. Twelve patients died (10.7%): 8 (10.0%) in the primary-anastomosis group and 4 (12.5%) in the Hartmann group. Because the procedures were selected according to intraoperative severity, these crude outcome differences cannot be interpreted as evidence of superiority of either procedure. **Conclusion:** In this non-randomized cohort, primary anastomosis was the most frequently performed procedure and was mainly used in patients with viable bowel and favorable local conditions. Hartmann's procedure was reserved for patients with less favorable intraoperative findings. The results support an individualized approach based on bowel viability, tissue quality, contamination, and the patient's general condition rather than a universal preference for one technique.

Keywords

Sigmoid Volvulus, Sigmoid Colectomy, Primary Anastomosis, Hartmann's Procedure, Intestinal Obstruction, Emergency Surgery, Guinea

1. Introduction

Sigmoid volvulus is an important cause of acute large-bowel obstruction and remains a significant surgical problem in many African countries. It occurs when the sigmoid colon rotates around its mesenteric axis, potentially leading to venous obstruction, ischemia, necrosis, perforation, peritonitis, and septic shock if treatment is delayed [1].

The epidemiological profile of sigmoid volvulus varies according to geographical region. Several African series have reported a relatively young patient population and a marked male predominance, although the disease may occur at any age [2]. In Guinea, a previous study conducted at Ignace Deen National Hospital reported 72 cases of sigmoid volvulus between 2018 and 2022, with a mean age of 49.4 years and a marked male predominance [3].

The management of sigmoid volvulus depends on the clinical presentation and the viability of the involved bowel. In patients without clinical or radiological evidence of ischemia or perforation, urgent endoscopic detorsion is generally recommended as the initial treatment when the necessary expertise and equipment are available. Definitive sigmoid resection during the index admission is then recommended because of the high risk of recurrence after non-operative treatment

alone [4].

When ischemia, necrosis, perforation, peritonitis, or failed endoscopic decompression is present, urgent surgical resection is indicated [1]. Following sigmoid resection, the surgeon must decide whether intestinal continuity can safely be restored by primary colorectal anastomosis or whether an end colostomy with a rectal stump, as in Hartmann's procedure, is safer.

Primary anastomosis has the advantage of restoring intestinal continuity during the initial operation and avoiding a temporary stoma and subsequent reversal procedure. However, anastomosis may carry an increased risk of leakage when the patient is unstable or when the bowel is severely inflamed, edematous, ischemic, or contaminated. Hartmann's procedure may therefore be preferred in patients with severe physiological compromise or unfavorable intraoperative conditions [1].

The World Society of Emergency Surgery (WSES) recommends that the decision between primary colorectal anastomosis and end colostomy be individualized according to the patient's overall condition and the condition of the colon, particularly in the presence of ischemia or perforation [1]. Observational studies have similarly shown that Hartmann's procedure or stoma formation is more frequently used in patients with non-viable bowel, advanced age, poor general condition, or peritonitis, making direct comparisons of postoperative outcomes between the two procedures subject to substantial selection bias [5].

In resource-limited settings, the choice of surgical procedure may also be influenced by delayed presentation, referral patterns, limited access to advanced imaging and endoscopy, and the availability of postoperative intensive care and stoma management [6].

African studies have reported different approaches to emergency colectomy. In Dakar, Touré *et al.* reported a higher mortality after primary colectomy with anastomosis than after colectomy with temporary colostomy, although the retrospective nature of the study and differences in patient severity limit interpretation of these findings [7]. Other African studies have reported that primary resection and anastomosis can be performed in appropriately selected patients, particularly in the absence of bowel necrosis [8].

Recent evidence from a tertiary referral center also suggests that primary anastomosis can be safely performed in selected patients with sigmoid volvulus. Agirman *et al.*, in a 58-year experience, reported shorter hospitalization and lower morbidity and mortality among patients undergoing primary anastomosis, while emphasizing that stoma formation remained appropriate in patients with poor general condition, advanced age, or high-risk bowel [9]. Altundas *et al.* similarly reported favorable results for emergency primary anastomosis in 175 patients with sigmoid volvulus [10].

In Guinea, there are limited data comparing primary anastomosis and Hartmann's procedure in the emergency management of sigmoid volvulus. The aim of this study was therefore to describe and compare the indications and short-term

postoperative outcomes of primary anastomosis and Hartmann's procedure in patients operated on for sigmoid volvulus in the General Surgery Department of Ignace Deen National Hospital, Conakry University Hospital.

2. Materials and Methods

2.1. Study Design and Setting

This was a prospective, non-randomized observational comparative study conducted over 18 months, from January 1, 2024, to June 30, 2025, in the General Surgery Department of Ignace Deen National Hospital-Conakry University Hospital, Conakry, Guinea.

The study was conducted in a tertiary referral surgical department receiving patients from both the Conakry area and other regions of Guinea.

2.2. Study Population

All consecutive patients admitted to the General Surgery Department and operated on for sigmoid volvulus during the study period were eligible for inclusion.

2.3. Inclusion Criteria

Patients were included if they:

- 1) had a diagnosis of sigmoid volvulus established on the basis of clinical and/or radiological findings and confirmed at laparotomy;
- 2) underwent emergency sigmoid colectomy during the study period; and
- 3) underwent either primary colorectal anastomosis or Hartmann's procedure.

2.4. Exclusion Criteria

Patients treated without sigmoid resection, patients managed exclusively by non-operative endoscopic detorsion, and patients whose medical records did not contain sufficient information regarding the surgical procedure and postoperative outcome were excluded from the comparative analysis.

Patients with recurrent sigmoid volvulus were not excluded if they fulfilled the inclusion criteria. However, the number of recurrent cases was not systematically recorded in the study database and could therefore not be analyzed separately.

2.5. Diagnosis of Sigmoid Volvulus

The diagnosis was based on the clinical presentation of acute intestinal obstruction, including abdominal distension, abdominal pain, vomiting and/or cessation of stool and flatus, together with supportive abdominal radiography findings. The diagnosis was confirmed intraoperatively by identification of torsion of the sigmoid colon around its mesenteric axis.

In our setting, emergency abdominal CT was not routinely available during the study period. MRI was not available for emergency diagnosis.

2.6. Surgical Management and Choice of Procedure

All patients underwent emergency laparotomy.

The surgical procedure was selected intraoperatively and was not randomized. Primary anastomosis was considered when the sigmoid colon could be safely resected and the remaining bowel appeared viable, with satisfactory tissue quality, limited contamination, and a patient's general condition considered compatible with immediate restoration of intestinal continuity.

Hartmann's procedure was selected when unfavorable intraoperative conditions were present, including bowel necrosis, extensive inflammatory changes, marked bowel-wall edema, extensive contamination, or other circumstances in which primary anastomosis was considered unsafe.

Thus, the two treatment groups were inherently different with regard to disease severity and intraoperative conditions. The study was designed to describe real-world surgical decision-making rather than to establish the superiority of one procedure over the other.

2.7. Study Variables

The variables collected included:

- age and sex;
- referral status;
- time from symptom onset to consultation;
- preoperative investigations;
- time from admission to surgery;
- surgical team experience;
- intraoperative bowel viability;
- presence of necrosis and inflammatory changes;
- surgical procedure performed;
- duration of hospital stay;
- postoperative complications;
- Clavien-Dindo classification of complications;
- mortality; and
- postoperative stoma outcome.

2.8. Outcome Definitions

A favorable postoperative outcome was defined as survival to discharge without a documented postoperative complication requiring additional therapeutic intervention.

Postoperative complications were classified according to the Clavien-Dindo classification.

Mortality was defined as death occurring during the postoperative hospital stay.

For patients with a stoma, postoperative stoma outcome was assessed according to the documented clinical evolution. The reported mean time of 18.9 days should be interpreted as the interval recorded in the study database for recovery of satis-

factory stoma function; it should not be interpreted as the time to definitive stoma closure unless stoma closure was actually performed and documented.

2.9. Statistical Analysis

Data were entered and analyzed using SPSS version 21.0.

Continuous variables were expressed as means and ranges, and categorical variables as frequencies and percentages.

For comparisons between the primary-anastomosis and Hartmann groups, categorical variables were compared using the chi-square test or Fisher's exact test when appropriate. Continuous variables were compared using the Student's t-test or an appropriate non-parametric test according to the distribution of the data.

A two-sided p-value <0.05 was considered statistically significant.

Because treatment allocation was based on intraoperative findings rather than randomization, p-values were interpreted cautiously and no causal inference regarding the superiority of either procedure was made.

2.10. Ethical Considerations

The survey was conducted anonymously, and confidentiality was respected. Verbal informed consent was obtained from all patients or their legal representatives when appropriate.

The study was approved by the Head of the General Surgery Department and the Chair of General and Visceral Surgery. The name and reference number of the institutional ethics committee should be added here if formal ethics committee approval was obtained.

The authors received no financial support for the research or publication of this study.

3. Results

During the 18-month study period, 1094 emergency surgical procedures were performed in the department. Among these, 112 patients were operated on for sigmoid volvulus, corresponding to 10.2% of emergency surgical procedures.

Of the 112 patients, 80 (71.4%) underwent sigmoid colectomy with primary colorectal anastomosis, whereas 32 (28.6%) underwent Hartmann's procedure.

3.1. Sociodemographic Characteristics

The mean age of the patients was 49.5 years, with a range of 7 to 80 years.

There were 72 men (64.3%) and 40 women (35.7%), giving a male-to-female sex ratio of 1.8.

The age distribution is presented in **Table 1**.

3.2. Referral Status and Delay before Consultation

The mean interval between symptom onset and consultation was 5.0 days.

Table 1. Distribution of patients according to age group and surgical procedure.

Age group (years)	Primary anastomosis n	Hartmann's procedure n	Total n	Percentage (%)
0 - 14	2	0	2	1.8
15 - 29	8	3	11	9.8
30 - 44	13	5	18	16.1
45 - 59	24	8	32	28.6
60 - 74	28	14	42	37.5
≥75	5	2	7	6.2
Total	80	32	112	100

Note: Percentages were recalculated using the total study population of 112 patients.

The mean delay was 4.9 days among patients who underwent primary anastomosis and 5.1 days among those who underwent Hartmann's procedure.

More than half of the patients (54%) were referred from another healthcare facility. Among referred patients, 77% came from public healthcare facilities.

These findings indicate that delayed presentation and referral were common characteristics of the study population.

3.3. Preoperative Investigations

All patients underwent laboratory investigations and plain abdominal radiography.

No patient underwent emergency abdominopelvic computed tomography or magnetic resonance imaging because these examinations were not available in the emergency setting during the study period.

The diagnosis was therefore based mainly on clinical assessment, plain abdominal radiography, and intraoperative findings.

3.4. Time to Surgery

The mean interval between admission and surgery was 13.8 hours, with a range of 8 to 96 hours.

The mean interval was 14.2 hours in the primary-anastomosis group and 13.5 hours in the Hartmann group.

3.5. Surgical Team

Most procedures were performed by specialist surgeons. Specialists operated on 91 patients (81.3%), while residents performed 21 procedures (18.8%).

Anesthesia was administered by anesthesia and intensive-care nurses in 94 cases (83.9%) and by anesthetists in 18 cases (16.1%).

The distribution according to the experience of the surgical team is shown in **Table 2**.

Table 2. Distribution of procedures according to the experience of the surgical team.

Surgical team	Primary anastomosis n	Hartmann's procedure n	Total n	Percentage (%)
Specialist surgeons	64	27	91	81.3
Residents	16	5	21	18.8
Total surgical procedures	80	32	112	100
Anesthetists	12	6	18	16.1
Anesthesia nurses	68	26	94	83.9

Note: Anesthesia personnel are presented separately and therefore are not included in the 112 surgical procedures.

3.6. Intraoperative Criteria for Selection of the Surgical Procedure

The choice of surgical procedure was made intraoperatively.

Primary anastomosis was mainly selected when the bowel was viable and the tissue was considered suitable for anastomosis. The main reasons recorded included absence of intestinal necrosis, absence of major inflammatory changes, resection through healthy bowel, absence of significant bowel-wall edema, and good general condition.

Hartmann's procedure was mainly selected when the bowel was necrotic or markedly inflamed. Other unfavorable findings included extensive necrosis, severe bowel-wall edema, double volvulus, ileosigmoid knotting, and significant bowel distension.

The recorded reasons for selecting the surgical procedure are shown in **Table 3**. Because more than one indication could be recorded in an individual patient, the categories in this table are not mutually exclusive and their percentages should not be summed.

Table 3. Intraoperative reasons for selecting the surgical procedure.

Intraoperative finding/reason	Number	Percentage (%)
Reasons supporting primary anastomosis		
Absence of intestinal necrosis	34	30.3
Absence of inflammatory tissue	10	8.9
Resection in healthy bowel	5	4.5
Loose torsion/no significant wall edema	2	1.8
Viable loop/no necrosis	2	1.8
Healthy tissue	23	20.5
Good general condition allowing primary anastomosis	1	0.9

Continued

Reasons supporting Hartmann's procedure		
Tissue necrosis with inflammatory changes	10	8.9
Intestinal necrosis with uncontrolled diabetes	1	0.9
Marked inflammatory tissue	5	4.5
Tissue necrosis	12	10.7
Double colonic volvulus	1	0.9
Extensive necrosis	1	0.9
Tissue necrosis with ileosigmoid knot	1	0.9
Sigmoid necrosis with transverse-colon retro-distension	1	0.9
Bowel-wall edema	2	1.8

3.7. Hospital Stay

The overall mean hospital stay was 12.4 days.

The mean hospital stay was 11.5 days in the primary-anastomosis group and 16.9 days in the Hartmann group.

The longer hospital stay observed in the Hartmann group should be interpreted in the context of the more severe intraoperative conditions that led to selection of this procedure.

3.8. Postoperative Outcomes

Overall, 93 patients (83.0%) had a favorable postoperative outcome, whereas 19 patients (17.0%) developed postoperative complications.

In the primary-anastomosis group, 66 of 80 patients (82.5%) had a favorable outcome and 14 (17.5%) developed complications.

In the Hartmann group, 27 of 32 patients (84.4%) had a favorable outcome and 5 (15.6%) developed complications.

Overall, 12 patients (10.7%) died during the postoperative period. Mortality was 8/80 (10.0%) in the primary-anastomosis group and 4/32 (12.5%) in the Hartmann group.

The causes of death were septic shock in 7 patients (6.2%), multiple organ failure in 3 patients (2.7%), recurrent acute postoperative intestinal obstruction in 1 patient (0.9%), and stercoral fistula in 1 patient (0.9%) (**Table 4**).

The mean time to satisfactory stoma recovery among patients with a stoma was 18.9 days, with a range of 15 to 64 days. Among these patients, 96.4% had satisfactory evolution, while 3.6% developed a stercoral fistula managed conservatively with wound dressings.

Table 4. Postoperative outcomes according to surgical procedure.

Outcome	Primary anastomosis n (%)	Hartmann's procedure n (%)	Total n (%)
Favorable outcome	66 (82.5)	27 (84.4)	93 (83.0)
Postoperative complications	14 (17.5)	5 (15.6)	19 (17.0)
Clavien-Dindo grade II	1 (1.3)	0	1 (0.9)
Clavien-Dindo grade IIIb	5 (6.3)	1 (3.1)	6 (5.4)
Clavien-Dindo grade V (death)	8 (10.0)	4 (12.5)	12 (10.7)
Total	80 (100)	32 (100)	112 (100)

Note: Inferential p-values are not presented because treatment allocation was non-randomized and the original p-values were not adequately defined.

4. Discussion

This prospective study describes the real-world surgical management of sigmoid volvulus in a tertiary hospital in Guinea and compares two surgical strategies: sigmoid colectomy with primary colorectal anastomosis and Hartmann's procedure. Importantly, the study was observational and non-randomized. The choice of procedure was made intraoperatively according to the condition of the bowel and the patient's clinical status. Therefore, the results should be interpreted as a description of surgical decision-making and postoperative outcomes rather than as evidence that one technique is superior to the other.

The mean age of our patients was 49.5 years, with a male predominance of 64.3%. This relatively young age compared with many Western series is consistent with observations from several African settings, where sigmoid volvulus frequently affects younger patients. The male predominance has also been reported in large international and African series [11].

In Guinea, Condé *et al.* previously reported a mean age of 49.4 years and a male predominance of 80.6% among 72 patients treated for sigmoid volvulus at Ignace Deen National Hospital between 2018 and 2022 [3]. The similarity between their mean age and that observed in our study suggests a relatively stable demographic profile of sigmoid volvulus in this institution.

In our study, 54% of patients were referred from another healthcare facility, and the mean duration of symptoms before consultation was five days. Delayed presentation may increase the risk of bowel ischemia, necrosis, and perforation. In sigmoid volvulus, prolonged torsion progressively compromises venous and arterial blood flow, increasing the risk of bowel necrosis and systemic toxicity [12].

The management of sigmoid volvulus differs according to available resources. Current international recommendations support urgent endoscopic decompression in patients without clinical or radiological evidence of ischemia or perforation when endoscopy is available [1]. Following successful decompression, definitive sigmoid resection during the same admission is recommended because of the substantial risk of recurrence with non-operative treatment alone [13].

In our department, emergency endoscopic detorsion was not routinely available during the study period. All patients included in this study therefore underwent laparotomy and resection. This limitation of available resources represents an important contextual factor when comparing our findings with those from centers where endoscopic decompression is routinely performed.

Primary anastomosis was performed in 80 patients (71.4%), whereas Hartmann's procedure was performed in 32 (28.6%). This distribution reflects the surgeons' preference for restoring intestinal continuity when the local and systemic conditions were considered favorable.

Comparable African experiences have reported different proportions of primary anastomosis and stoma formation. In Maradi, Niger, Adakal *et al.* described the management of 30 patients with sigmoid volvulus, demonstrating the feasibility of ideal colectomy in selected patients [2]. In N'Djamena, Choua *et al.* reported different emergency surgical strategies according to the severity of sigmoid volvulus [14]. In Dakar, Touré *et al.* reported 13 ideal colectomies and 37 colectomies associated with temporary colostomy among 50 patients with colonic volvulus [7]. These differences illustrate the variability of surgical strategies according to bowel condition, available resources, and surgeon preference.

The most important determinant of procedure selection in our series was bowel viability and tissue quality. Primary anastomosis was mainly performed in the absence of necrosis and when the bowel could be resected through healthy tissue. Conversely, Hartmann's procedure was predominantly selected in the presence of necrosis and inflammatory changes.

This approach is consistent with current recommendations. The WSES consensus guidelines emphasize that, in patients requiring urgent colectomy, the choice between primary anastomosis and end colostomy should be individualized according to the patient's overall condition and the condition of the colon, including ischemia, perforation, and contamination [1].

African studies have also examined the role of ideal colectomy versus staged procedures. Togo *et al.* evaluated patients with sigmoid volvulus without necrosis and compared ideal colectomy with two-stage resection and anastomosis [8]. James Didier *et al.* similarly compared ideal colectomy with two-stage colectomy for left-sided colonic emergencies at the National Hospital of Niamey, where sigmoid volvulus represented the principal etiology of left colectomy [15]. These studies support the concept that restoration of intestinal continuity can be considered in appropriately selected patients.

Previous observational studies have similarly demonstrated that Hartmann's procedure is more frequently selected in patients with non-viable bowel or peritonitis. In a series of 106 emergency sigmoid resections, Kuzu *et al.* reported that gangrenous bowel was associated with increased mortality and emphasized the importance of patient selection [5].

In a large series of 827 patients, Oren *et al.* reported that primary resection and anastomosis could be performed with acceptable morbidity and mortality in ap-

appropriately selected patients, while emergency surgery for gangrene or peritonitis carried higher risk [6].

The 2023 WSES guidelines also emphasize that sigmoid resection is the definitive procedure for preventing recurrence and that the entire redundant sigmoid segment should generally be removed. The guidelines further indicate that the decision to perform primary colorectal anastomosis, a diverted anastomosis, or an end colostomy should be individualized [1].

Recent evidence reinforces the importance of individualized selection. Agirman *et al.*, in a 58-year experience involving urgent sigmoidectomy for sigmoid volvulus, found that primary anastomosis was associated with shorter hospitalization and lower morbidity and mortality, but also emphasized that stoma formation was generally preferred in patients with poor health status, advanced age, and risky bowel [9]. Altundas *et al.* evaluated 175 patients undergoing emergency primary anastomosis after sigmoidectomy and reported comparable mortality and morbidity between patients managed with and without intraoperative colonic lavage [10]. These contemporary data support the feasibility of primary anastomosis in appropriately selected patients but do not justify routine anastomosis in patients with unfavorable physiological or local conditions.

In our series, the mean hospital stay was shorter in the primary-anastomosis group than in the Hartmann group (11.5 versus 16.9 days). This difference is clinically plausible because patients undergoing Hartmann's procedure had more unfavorable intraoperative findings. However, because treatment allocation was not randomized and the groups differed in severity, this difference cannot be interpreted as a direct effect of the surgical technique.

The overall favorable postoperative outcome was 83.0%. It was 82.5% in the primary-anastomosis group and 84.4% in the Hartmann group. Postoperative complications occurred in 17.5% of patients undergoing primary anastomosis and 15.6% of those undergoing Hartmann's procedure.

These findings should be interpreted cautiously. The apparently similar complication rates do not demonstrate equivalence between the two techniques. Hartmann's procedure was preferentially used in patients with necrosis and inflammatory changes, whereas primary anastomosis was preferentially used in patients with viable bowel and more favorable local conditions. This selection bias makes direct comparison of crude postoperative outcomes inappropriate.

Mortality was 10.7% overall, including 10.0% in the primary-anastomosis group and 12.5% in the Hartmann group. Septic shock was the leading recorded cause of death. The mortality observed in our series is consistent with the recognized severity of emergency sigmoid volvulus, particularly in patients presenting late or with bowel necrosis and systemic complications [11].

The study by Touré *et al.* from Dakar reported an overall mortality of 12% among 50 patients with colonic volvulus [7]. Their study found a higher mortality in patients treated by ideal colectomy than in those undergoing colectomy with temporary colostomy. However, as with our study, the surgical procedure was not

randomly allocated. Consequently, differences in bowel viability and severity may explain at least part of the observed differences.

The principal limitation of our study is therefore the absence of randomization. The procedure was selected according to intraoperative findings, meaning that the Hartmann group was likely to contain patients with more advanced local disease. Consequently, postoperative outcomes cannot be used to conclude that primary anastomosis is safer or more effective than Hartmann's procedure.

A second limitation is that several important severity variables, particularly the distribution of comorbidities, physiological instability, sepsis, bowel contamination, and ASA status, were not systematically recorded separately for each treatment group in the original database. These variables are important confounders and should be included in future prospective studies.

A third limitation is the lack of emergency CT imaging and routine endoscopic decompression in our setting. These resource limitations may influence both diagnostic accuracy and treatment pathways and should be considered when comparing our results with studies from high-resource settings.

A fourth limitation is the short duration of follow-up. Long-term outcomes, including recurrence after primary anastomosis, quality of life, and definitive stoma closure after Hartmann's procedure, were not systematically assessed.

Despite these limitations, our study provides useful information regarding the practical management of sigmoid volvulus in a resource-limited surgical environment. It demonstrates that primary anastomosis can be performed frequently when the bowel is viable and the patient's condition is favorable, whereas Hartmann's procedure remains an important option when necrosis, severe inflammation, contamination, or other unfavorable conditions make anastomosis unsafe.

The management of sigmoid volvulus should therefore be individualized rather than based on a rigid preference for one procedure. The surgeon should consider bowel viability, tissue quality, degree of contamination, the extent of necrosis, the patient's physiological condition, comorbidities, and the resources available for postoperative care and subsequent stoma management.

5. Limitations

This study has several limitations.

First, it was conducted at a single tertiary hospital and may not be representative of all surgical centers in Guinea.

Second, the study was observational and non-randomized. The choice between primary anastomosis and Hartmann's procedure was determined by intraoperative findings and the surgeon's clinical judgment. Therefore, substantial selection bias is likely.

Third, baseline severity variables such as comorbidities, ASA score, physiological instability, sepsis, degree of contamination, and bowel viability were not systematically recorded separately for each treatment group. This limits the ability to adjust for confounding factors.

Fourth, advanced imaging and emergency endoscopic decompression were not available in our setting, which may have influenced the diagnostic and therapeutic pathway.

Finally, the study focused on short-term postoperative outcomes. Long-term outcomes, including recurrence after primary anastomosis and quality of life or definitive stoma closure after Hartmann's procedure, were not systematically assessed.

6. Conclusions

In this prospective, non-randomized cohort of patients operated on for sigmoid volvulus, sigmoid colectomy with primary colorectal anastomosis was the most frequently performed procedure. Primary anastomosis was mainly selected when the bowel was viable, tissue quality was satisfactory, and the patient's condition allowed restoration of intestinal continuity.

Hartmann's procedure was mainly performed in the presence of bowel necrosis, extensive inflammatory changes, edema, contamination, or other unfavorable intraoperative findings.

The overall postoperative outcome was favorable in 83.0% of patients, while postoperative mortality was 10.7%. Crude postoperative outcomes were similar between the two groups; however, these results cannot be interpreted as a direct comparison of efficacy because the procedures were selected according to intraoperative severity.

In our setting, the choice between primary anastomosis and Hartmann's procedure should therefore remain individualized. Bowel viability, tissue quality, contamination, the extent of necrosis, the patient's general condition, comorbidities, and the surgeon's assessment should guide the decision.

Improving early referral, access to emergency endoscopy and imaging, perioperative resuscitation, and postoperative intensive care may contribute to reducing morbidity and mortality associated with sigmoid volvulus.

Ethics Approval and Consent to Participate

The study was conducted anonymously, and confidentiality was respected. Verbal informed consent was obtained from all patients or their legal representatives when appropriate. The study was approved by the Head of the General Surgery Department and the Chair of General and Visceral Surgery. The institutional ethics committee name and approval/reference number should be added if formal ethics committee approval was obtained.

Consent for Publication

Not applicable.

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Author Contributions

All authors contributed to the conception and design of the study, data collection, analysis and interpretation of the results, and drafting and critical revision of the manuscript. All authors approved the final version of the manuscript.

Availability of Data

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request, subject to institutional and ethical restrictions.

Conflicts of Interest

The authors declare that they have no competing interests.

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