

A South African central hospital's experience with malignant colorectal obstruction

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Background: The spectrum and outcome of colorectal cancer (CRC) presenting with obstruction is not well studied in low- to middle-income countries (LMIC) and could have implications for health policy. This study aimed to address this deficit in an LMIC setting.

Methods: A retrospective analysis was conducted of patients with large bowel obstruction, during the period 2000–2019 from the prospective Inkosi Albert Luthuli Central Hospital (IALCH) CRC registry data. Data analysed included the site of CRC, tumour differentiation, management of patients with obstructive CRC, resection margins post resection, oncological management and reasons for failure to receive oncological therapy. Patient follow-up and recurrence were recorded.

Results: Malignant obstruction from CRC occurred in 510 patients (20% of the CRC registry). Median age at presentation was 57 years (IQR 48–67). One hundred and seventy-six (34.5%) and 135 (26.5%) had stage III and IV disease respectively. Moderately differentiated cancer was seen in 335 (65.6%). Management was resection (370; 72.5%), diverting colostomy (123; 24.1%) and stent insertion (55; 10.8%). Twenty-one patients (5.7%) had positive resection margins. Recurrence occurred in 34 patients (6.7%), all of whom had initially undergone resection, giving a recurrence rate of 9.8% in those receiving surgery. Median disease-free interval for patients developing recurrence was 21 months (IQR 12–32).

Conclusion: One in five patients with CRC presented with obstruction. These patients were younger than in high income-country (HIC) series. Over 70% underwent resection. Stomas were used twice as frequently as stents to relieve the obstruction, a finding that is the reverse of that in HICs.

Keywords: obstructive colorectal cancer, malignant bowel obstruction, obstruction, colon cancer

Introduction

Colorectal cancer (CRC) is the third most common type of cancer worldwide. It is estimated that around 1.4 million new cases occur each year.¹ In South Africa, CRC is the fourth most common cancer among both men and women, with a crude incidence of 7.17/100 000/year for men and 5.80/100 000/year for women, and ranks sixth in cancer-related mortality with metastatic disease occurring in 20–25% of patients.² The CRC burden is growing in sub-Saharan Africa and accounts for over 600 000 deaths annually.¹ The data collection systems for healthcare facilities in sub-Saharan Africa are weak, which suggests that the prevalence of diseases may be underestimated.¹ The disease burden is highest in countries with a high human development index.³ Up to 20% of patients with CRC present with obstruction which tends to be associated with an increased morbidity and mortality rate when compared to those who have elective surgery.³ The healthcare burden of emergency CRC presentations is substantial, as these patients spend 50% more days in hospital than those with non-emergency diagnoses, and overall treatment costs are higher in high-income countries (HIC) with universal health care available.⁴

Large bowel obstruction (LBO) can present acutely, with colic-like abdominal pain, abdominal bloating and

absence of bowel movement and flatus, while vomiting is less frequent than in small bowel obstruction, or sub-acutely, with gradual development of symptoms, changes in bowel habits and recurrent left lower quadrant abdominal pain.⁵ Absence of passage of flatus (90%) and or faeces (80.6%) and abdominal distension (65.3%) were the most common symptoms and physical signs.⁵ The World Society of Emergency Surgery (WSES) lists contrast computed tomography (CT) of the abdomen as the best imaging technique to evaluate large bowel obstruction and it achieves diagnostic confirmation better than abdominal ultrasound (US) which in turn outperforms plain abdominal radiographs. The role of colonoscopy in diagnosis of LBO is limited due to its low availability in the emergency setting.⁵ The management of obstructed CRC includes resection, defunctioning colostomy and the use of colonic self-expanding metal stents (SEMS) depending on various factors including presentation status, resectability, patient's physiological status and expertise available.³ In order to improve healthcare services for this important complication of CRC, accurate data of disease burden treatment and outcomes are available to policy makers. This study aimed to document the clinicopathological spectrum of obstructive CRC and to document response to treatment as rates of CRC in sub-Saharan Africa increase.

Methods

The study was carried out at Inkosi Albert Luthuli Central Hospital (IALCH), a tertiary referral hospital in Durban. This study was a retrospective descriptive analysis of prospectively collected data, over the period 2000–2019, from the colorectal unit CRC registry. Patients with obstructing CRCs who survived to be assessed and further treated at IALCH were analysed. IALCH drains the eastern seaboard of the KwaZulu-Natal (KZN) province of South Africa, which covers a population of over 11 million. Patients with colonic cancers initially managed surgically at Addington and Greys hospitals are referred to the multidisciplinary clinic at IALCH after resection, unless they presented with complicated disease that requires management in a central hospital. The multidisciplinary team (MDT) comprising colorectal surgeons, oncologists and radiologists discuss their management and formulate a treatment plan. Patients who present with acute large bowel obstruction as assessed on clinical grounds and plain abdominal radiographs underwent emergency laparotomy at the referring hospital. If the obstruction was adjudged partial, the patient is referred to the colorectal unit for further assessment and management.

The surgeons in our unit adopted and employed the principles of total mesocolon/mesorectal excision.⁶ The surgical procedure was performed via the open or laparoscopic approach. Data was entered onto a password-protected computer-based Microsoft Access Database. Variables included demographics, clinical findings, operative and pathological findings, treatment outcome and follow-up. Simple statistical analysis including median, mean and interquartile range for continuous variables was done using Microsoft Excel.

Results

Two thousand five hundred and four patients (2504) with CRC were accrued into the database between 2000 and 2019. The cohort with obstructing CRC numbered 510, of whom 287 (56.3%) were male, with a male-to-female ratio of 1.3:1. The median age at presentation was 57 years (IQR 48–67).

Table I shows staging and tumour differentiation in patients with obstructed CRC. Stage III and IV disease accounted for 61% and stage I only 4%. Moderately differentiated tumours were present in two-thirds of the patients with mucinous differentiation being observed in 18 (3.5%).

Figure 1 shows management pathways of the patients with CRC obstruction. Three hundred and sixty-seven patients (72%) underwent resection. The primary management of an obstruction was resection, followed by the insertion of a stent and the diversion of the colostomy. Out of the 370 patients who had resection, almost 70% were primarily resected, while 55 had a SEMS insertion. One hundred and thirty-six (26.6%) patients required permanent stoma from the total cohort of 510, of these, 89 (17.5%) were patients initially planned for primary resection. Eleven patients underwent trial for resection but were deemed irresectable.

The obstructing cancer site distribution is shown in Table II. The most common site was the rectosigmoid colon (59.4%).

Table III illustrates the margin status of the 370 patients who underwent resection. An R0 resection was achieved in 260 patients (70.3%). The positive margin rate was 29%.

Table I: Staging and differentiation in patients with obstructed colorectal cancer

Staging	n	%
Stage I	20	3.9
Stage II	116	22.8
Stage III	135	26.5
Stage IV	176	34.5
Not staged	63	12.4
Differentiation		
Moderate	335	65.6
Mucinous	18	3.5
Poor	25	4.9
Well	13	2.6
Undifferentiated	1	0.2
Not stated	118	23.1

Table II: Site distribution of obstructive colorectal cancer

Site	n = 510	%	Stoma	Resection	Stent
Caecum	53	10.4	6	50	1
Ascending colon	32	6.3	2	29	1
Hepatic flexure	16	3.1	0	14	0
Transverse colon	29	5.7	3	27	0
Splenic flexure	31	6.1	3	27	2
Descending colon	38	7.5	9	35	0
Sigmoid colon	205	40.2	40	130	15
Rectum	98	19.2	58	35	14
Multiple	8	1.6	1	6	1

18 patients listed as rectosigmoid; 3 patients' site not stated

Table III: Margin status in patients undergoing resection for obstructed colorectal cancer

Margin involvement	Margin site		
	Distal	Proximal	CRM
No microscopic involvement (R0)	351 (94.86%)	352 (95.1%)	261 (71.12%)
Microscopic involvement (R1)	3 (0.81%)	1 (0.27%)	21 (5.67%)
Macroscopic involvement (R2)	14 (3.78%)	14 (3.78%)	84 (22.7%)
Not stated	2 (0.27%)	3 (0.81%)	4 (0.81%)

CRM – circumferential resection margin

Twenty-one and three patients had R1 and R2 resections respectively.

Forty-three patients (8.4%) received neoadjuvant therapy of whom 16 underwent resection. One hundred and ninety-seven were offered adjuvant therapy; only 72 (19.5%) received adjuvant therapy. One hundred and fifty-six patients (30.6%) received palliative therapy and 114 (21.7%) received no chemotherapy or radiation.

Table IV shows reasons for failure to receive oncological therapy. Forty-five patients were lost to follow-up after discharge from the hospital. The remaining 465 (91.2%) patients were followed up for a median of 11 months (IQR 4–26). The longest period a patient was followed up was 106 months. Recurrence occurred in 34 (6.7%) patients.

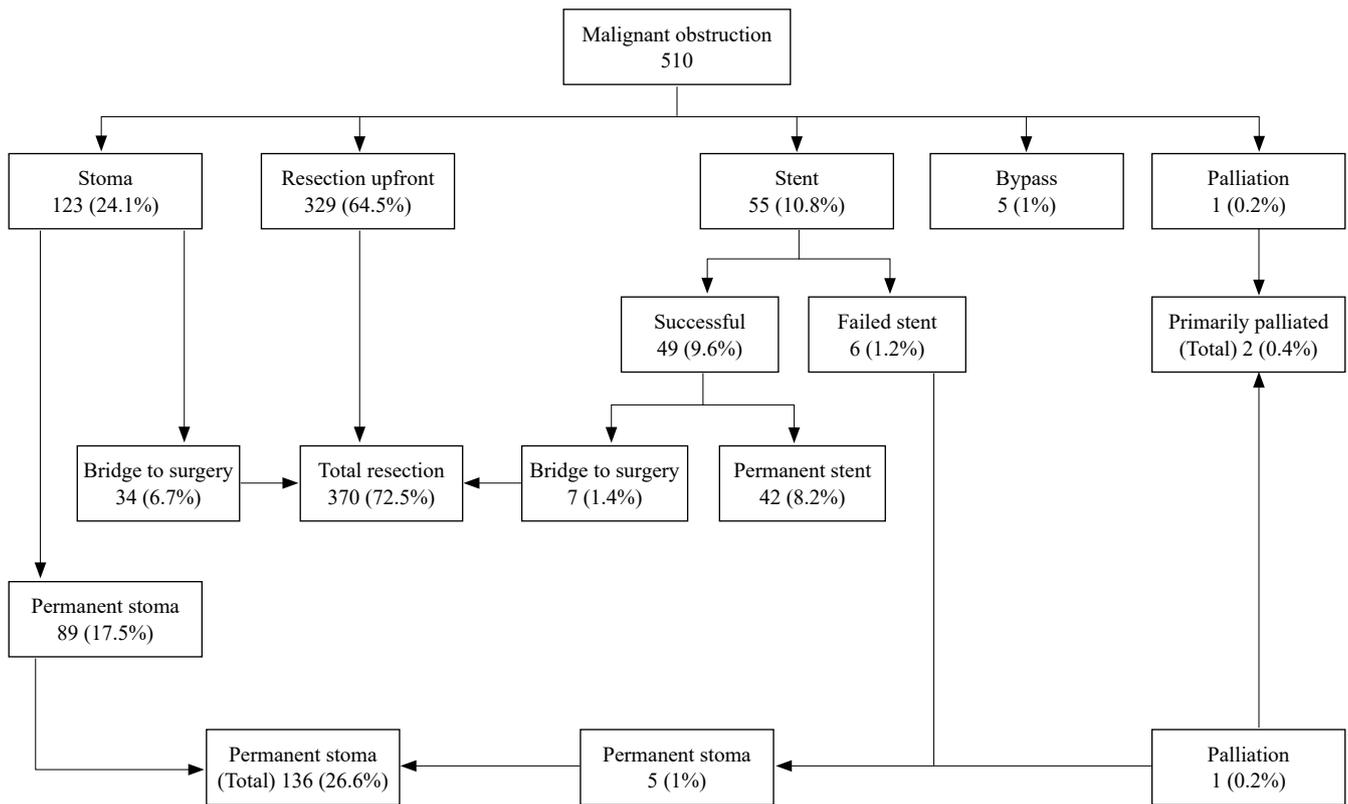


Figure 1: Management pathways for colorectal cancer obstruction

Table IV: Reasons why no oncological treatment was administered for patients with obstructed colorectal cancer

Reason for no oncology treatment	n = 125	%
Referred but did not arrive for treatment	11	8.8
Died before treatment	15	12
Delay before presenting after surgery	8	6.4
Defaulted after assessment	1	0.8
Early diagnosis	25	20
Poor general condition	13	10.4
Unknown	14	11.2
Declined	10	8
Planned for oncological treatment but did not return	13	10.4
Did not return	4	3.2
Late oncological referral	1	0.8
Other	10	8

All recurrences occurred in patients who underwent upfront resection (recurrence rate 9.8%) and none from those who received neoadjuvant therapy prior to definitive surgery. Median disease-free interval for patients developing recurrence was 21 months (IQR 12–32). There were 242 (47.5%) patients who are known to have died, of whom 22 (4.3%) died in hospital. The date of death was only recorded in 59 (11.6%).

Discussion

The study sought to establish the clinicopathological spectrum and management of obstructed CRC in KZN.

A number of observations have been made which are in keeping with observations in the international literature. CRC presents as an emergency in a wide range of patients, but the vast majority of reports present a figure of around 30%.⁷ LBO represents almost 80% of these emergency presentations.^{5,8,9} The proportion of patients with obstructed CRC from our database of CRC patients was 20.4%, which falls in the mid-range of the 10–30% reported in international reports.^{5,8,9} It is unclear in the setting of this cohort who generally have a poor socioeconomic status, how health-seeking behaviours or the pathway of care influences the rate of misdiagnosis and late complicated presentation with LBO.⁸ However, one of the limitations of this study was the lack of a standardised diagnosis of bowel obstruction at the referring hospital where the diagnosis was based on clinical features and abdominal radiographs. CT scan was not done routinely, hence our cohort represents a heterogeneous mix of partial and complete obstruction which may not be strictly comparable to other series.

Moolla and Madiba found that the mean age in South African black patients with obstructing CRC was 50 years, nearly a full two decades earlier than patients from HICs and a decade earlier than other racial groups in South Africa.¹⁰ This study has shown that the median age at presentation some eight years after Moolla and Madiba's study has risen to 57 years (IQR 48–67) which has demonstrated that obstructed CRC is now occurring at a similar age to those in HICs.

Tumour staging is seen as an important prognostic predictor of clinical outcome for patients with CRC.¹¹ The histological features such as degree of differentiation and the presence of mucinous and signet cells are thought to represent biologically aggressive forms of disease and are related to eventual poor long-term clinical outcomes in

patients presenting with obstructive CRC.¹¹ Ho et al. found that most cancers in their facility showed characteristics of moderate differentiation (58.1%) and 38% of cancers were reported to have lymphovascular invasion in patients presenting with complicated CRC (obstruction and perforation).¹² This study found that the majority of patients presented with moderately differentiated disease but had stage IV disease. Obstruction itself has been shown to be independently associated with perineural invasion (PNI) in colon cancer.¹³ Nozawa et al. found that obstruction and PNI increased the rate of recurrence, local distant metastases and negatively affected long-term survival after curative surgery in colon cancer.¹³

In this series, 70% were obstructed in the rectosigmoid region with over two-thirds having stage III and IV disease. These findings are comparable to those from a HIC country study that reported 70.5% had obstructing cancers at a site distal to the splenic flexure and 53.4% had T4 tumours.¹⁴

Over 70% of patients with obstruction were managed with resection in this study. This is in keeping with international trends typified by the report of Lee et al. that recommends that a single-stage procedure should be the objective for the treatment of patients with obstructing colorectal cancers, except hemodynamically unstable patients during surgery or when the condition of the bowel is not optimal for primary anastomosis.¹⁵ Two-thirds of patients underwent a resection upfront in the study cohort reported in this article, and a further 20% who were managed with a SEMS or colostomy went on to have resection.

Ten per cent of our patients had SEMS. This is in sharp contrast to a Japanese multicentre systematic review that showed 47% patients had SEMS, a rate four times higher than in our study. Diverting stoma was performed twice as often as SEMS in our study, whereas in their study, it was performed with equal frequency. Their study showed that the major complication rate was 16% in the SEMS group, which was half of those who had a stoma. In our study, technical success was achieved in 90%. The vast majority were palliative with only seven of the 49 successful SEMS enabling a bridge to surgery. Stenting has been reported to have an adverse effect on survival, though a current meta-analysis suggests that SEMS placement might not negatively influence oncological long-term outcomes, but will decrease the number of permanent stomas when compared to emergency surgery.¹⁶ Hence, current guidelines for stenting as a bridge to surgery recommend a shared decision-making process in patients with potentially curable left-sided obstructing colon cancer.¹⁷ They also recommend that the stent placement be performed by an experienced endoscopist under fluoroscopy.¹⁷

The aim of oncological surgery is to achieve negative circumferential and longitudinal resection margin, which is considered the hallmark of a successful oncologic resection with several studies demonstrating that CRC margin involvement is able to predict local recurrence and poor prognosis.¹⁸ Our study showed an overall free margin rate of 70.3% and positive margin rate of 28.9%. This does not compare favourably with a HIC report where 94% of patients underwent a R0 resection of the primary lesion.¹⁴ T4 tumour and R1 resection were noted to be independent prognostic factors for both recurrence and survival.

Improving oncological outcomes also requires neoadjuvant or adjuvant chemo- or chemoradiation therapy.

The poor follow-up in this series makes it difficult to assess efficacy, though the 16 patients who received neoadjuvant therapy had no recurrence of disease post resection.

The yearly incidence of recurrent disease after curative resection is about 9.9% at 1 year, 26.2% at 3 years, and 31.5% at 5 years.¹⁹ The study results depicted lower than 6.7% incidence of recurrence with respect to overall patients who underwent curative surgery.

The limitations of this study include the poor follow-up of patients who did not return for surveillance including colonoscopy during the study period, which precludes an accurate analysis of long-term oncological outcomes.

Conclusion

LBO diagnosed clinically and by plain radiographs is a common clinical presentation of CRC in this South African cohort. The R0 resection rate is below that found in HICs. Better delineation of partial from complete obstruction may reduce the need for urgent surgery and a more planned oncological approach in those with partial obstruction. In those with complete obstruction, improved timely access to colorectal SEMS could reduce the need for diverting stomas with their attendant morbidity. Barriers to long-term routine follow-up with postoperative surveillance need to be identified and addressed to optimise oncological outcomes.

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Conflict of interest

The authors declare no conflict of interest.

Ethical approval

Permission to conduct the study was granted from the Biomedical Research Ethics Committee of the University of KwaZulu-Natal (BREC no: BREC/00001235/2020).

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