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ORIGINAL ARTICLE

Challenge in diagnosis and treatment of colonic carcinoma emergencies

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KEYWORDS

Colonic carcinoma;
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Abstract *Introduction:* Despite advances in perioperative care and operative techniques, urgent colorectal operations are still associated with higher mortality and morbidity than elective surgery. *Aim:* This study was to identify the challenge in diagnosis and treatment of emergencies caused by colon carcinoma; and to assess its outcome.

Material and methods: This included 59 consecutive patients treated with emergency surgical intervention for colonic carcinoma; and other 59 patients of elective colonic surgery.

Results: Morbidity rates were 27.1% versus 10.2% after emergency and elective surgery. Rates of 1-, 2- and 3-year survival were 64.4%, 57.6% and 47.5% respectively after emergency surgery; and 71.2%, 62.7% and 50.8% respectively after elective surgery.

Conclusions: Challenge included presentation of undiagnosed patients with difficult or impossible colon preparation, colonoscopy, tissue biopsy or tumor staging; in addition to associated diseases and/or old age. Mortality and morbidity rates after emergency surgery were higher than elective surgery. Selection of the surgical procedure was guided by the tumor staging, co-morbidities and intraoperative assessment. Emergency resection, when possible, could approximate survival of elective resection. Total colectomy could obtain good outcome and survival when compared to other emergency procedures.

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1. Introduction

Despite advances in perioperative care and operative techniques, urgent colorectal operations are still associated with higher mortality and morbidity than elective surgery.¹ About 10% of all operations for colon carcinoma are performed in emergency situations because of severe preoperative complications. Urgent surgery in colon carcinoma is usually performed for advanced tumors of elderly patients. The diagnosis and treatment can be a challenge for the treating surgeon.²

Severe complications of colonic carcinoma may be the first presentation of colon carcinoma. In addition, the treatment of

acutely obstructed carcinoma of the left colon and sigmoid colon still represent a matter of controversy.³ The aim of this study was to identify the challenge in the diagnosis and treatment of emergencies caused by colon carcinoma; and to assess the outcome of these emergencies.

2. Methods

This study included 118 patients treated by surgery for colon carcinoma. This included 59 consecutive patients with emergency presentation of colonic malignancy; in addition to another 59 patients treated by elective colonic surgery. This study was approved by the Ethics Committee in Faculty of Medicine; Alexandria University.

The patients of emergency presentation were subjected to: detailed medical history, complete clinical examination, routine laboratory investigations and abdominal imaging by CT. Plain abdominal X-ray in standing position was done for patients with suspected intestinal obstruction.

Emergency surgical intervention was performed for 59 patients. Evaluation of the patients was done both preoperatively and intraoperatively. For each patient, a preoperative consent was signed for colectomy and intestinal stoma to be able to deal with different conditions. The emergency surgical procedures were determined by the location of the tumor, resectability, associated medical diseases and risk of the procedure. Resection with primary anastomosis was performed for resectable tumors with unloaded colon in patients without associated high risk of leakage. Hartmann's procedure was performed for resectable tumors with associated risk of leakage. Total colectomy was done for resectable tumors with

heavily loaded colon. Right hemicolectomy was done for resectable tumors in the right side. Intestinal stoma was performed for unresectable tumors. Intraoperative colonic lavage was done before primary anastomosis.

The early postoperative period of emergency was assessed for any complications. Follow up was done every 3 months during the first year then every 6 months after the first year. The follow up included clinical assessment, tumor markers, abdominal ultrasonography and abdominal CT.

Similar assessment was done for 59 patients treated by elective surgery for colonic carcinoma.

2.1. Statistics

The median and percentage values were calculated for many data. The student *t* test was used to compare parameters of the two groups. Fisher exact test was used to compare complications of both groups. The value of *p* was significant if ≤ 0.05 . The Kaplan Meier survival curves were used to illustrate postoperative survival.

3. Results

Fifty nine patients with emergency presentation of colonic malignancy were included in this study. They were 38 (64.4%) males and 21 (35.6%) females. Their mean age was 59.27 ± 8.07 years. The emergency clinical presentation included intestinal obstruction in 54 (91.5%) patients, acute abdomen due to colonic perforation in 2 (3.4%) patients and accidental discovery during appendectomy and cholecystectomy in 2 (3.4%) patients and bleeding per rectum in one (1.7%) patient.

Table 1 Preoperative demographic, operative and postoperative data.

	Emergency group (<i>n</i> = 59)	Elective group (<i>n</i> = 59)	Test of significance & Odd's ratio (OR)
Age (mean \pm SD)	59.27 \pm 8.07	60.58 \pm 8.19	<i>t</i> = 0.871
Gender			$\chi^2 = 0.884$
Male	38 (64.4%)	33 (55.9%)	<i>p</i> = 0.347
Female	21 (35.6%)	26 (44.1%)	
Intraoperative unresectable tumor			$\chi^2 = 2.167$
Yes	13 (22%)	7 (11.9%)	<i>p</i> = 0.141
No	46 (78%)	52 (88.1%)	OR = 2.1
Surgical procedures			$\chi^2 = 94.00$
Hartmann's operation	19 (32.2%)	0	<i>p</i> = < 0.001
Right hemicolectomy	4 (6.8%)	4 (6.8%)	
Anterior resection	13 (22%)	49 (83.1%)	
Total colectomy	11 (18.6%)	0	
Palliative stoma	12 (20.3%)	6 (10.2%)	
Postoperative complications			$\chi^2 = 4.692$
Yes	15 (25.4%)	6 (10.2%)	<i>p</i> = 0.030
No	44 (74.6%)	53 (89.8%)	OR = 3.01
Mortality			$\chi^2 = 1.229$
Yes	35 (59.3%)	29 (49.2%)	<i>p</i> = 0.268
No	24 (40.7%)	30 (50.8%)	OR = 1.51
Time of mortality			$\chi^2 = 0.740$
< 1 year	23 (65.7%)	16 (55.2%)	<i>p</i> = 0.673
Within 2nd year	5 (14.3%)	6 (20.7%)	
Within 3rd year	7 (20%)	7 (24.1%)	

Associated co-morbidities were detected in 15 (25.4%) patients and included uncontrolled diabetes, liver cirrhosis, ischemic heart disease and hypertension.

The laboratory workup showed anemia in 24 (40.6%) patients, impaired liver functions in 10 (16.9%) patients, elevated CEA in 43 (72.9%) patients and uncontrolled diabetes mellitus in 5 (8.4%) patients.

Plain abdominal X-ray in standing position revealed dilated intestinal loops with multiple air-fluid levels in 54 patients. Abdominal CT visualized the obstructed dilated intestinal loops in 54 obstructed patients; and visualized the tumors in 49 (83%) patients. These tumors were in the recto-sigmoid region in 45 (76.3%) patients, left side of colon in 10 (16.9%) patients, right side of colon in 4 (6.8%) patients.

Emergency operations were done for 54 patients with obstruction, 2 with peritonitis due to tumor perforation one with severe bleeding and 2 accidentally discovered. Resectability was possible in 46 (78%) patients. The resectable tumors were mobile, without distant spread, ascites, para-aortic lymph nodes nor peritoneal seeding. Median operative time was 200 min and median intraoperative blood loss was 500 ml. More data for emergency and elective patients are shown in (Table 1).

The data of 59 patients of emergency colonic operations were compared to another 59 elective operations for colon carcinoma. There was no significant difference in age and gender between emergency and elective groups. The intraoperative manifestations of advanced unresectable tumors were more in emergency group (Table 1) and included fixed tumors, liver metastases, peritoneal seeding, ascites and para-aortic lymph nodes. The surgical procedures for both emergency and elective patients and their outcome are shown in (Table 1).

Challenge and difficulties in emergency operations included unprepared colon, neither enough time nor feasibility of full investigations, associated diseases (co-morbidities), tumor perforation with peritonitis and accidental discovery during another operation.

Postoperative complications of emergency patients occurred in 16 (27.1%) patients; while complications of elective surgery were found in 6 patients (10.2%). These data are shown in (Table 2). The difference is significant with FE $p = 0.032$. Survival 1-, 2- and 3-year survival rates of operated emergency patients were 64.4%, 57.6% and 47.5% respectively (Fig. 1). Emergency resection of resectable tumors could achieve outcome and survival approximating the elective resection. The patients treated by total colectomy had 54.5% 3-year survival; this was the best survival among other surgical procedures. The majority of mortality after emergency surgery (62.7%) during follow up was associated with advanced tumor stage, old age >60 years and the presence of associated diseases. The 1-,

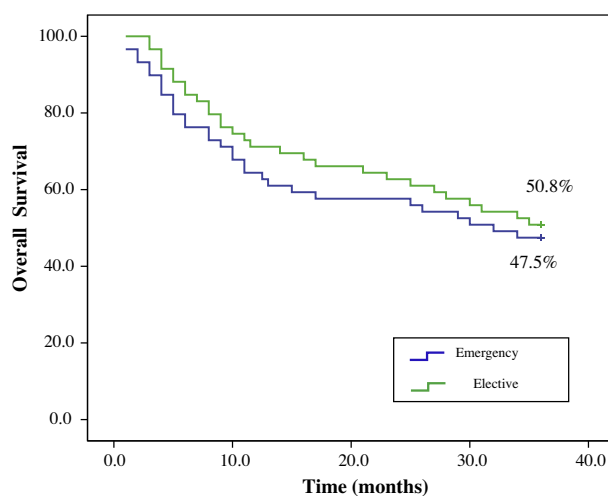


Figure 1 Kaplan Meier survival curves for emergency and elective groups.

2- and 3-year survival rates of operated elective patients were 71.2%, 62.7% and 50.8% respectively. Although the mortality in emergency group is more than elective group, the difference is not significant. This can be explained by our trend of tumor resection in emergency surgery when resectable.

4. Discussion

The emergency presentation of complicated colonic cancer is a challenge in diagnosis and treatment. Emergency surgical management of colon cancer remains controversial and is still associated with increased risk of morbidity and mortality.⁴⁻⁷ Currently, the mechanisms that worsen the prognosis of complicated colon cancer are still not well known. Complicated colon cancer presents in more advanced stages and have a worse overall long-term prognosis than uncomplicated tumor. Tumor stage is the most important prognostic factor for cancer of colon. In addition, the outcome is affected significantly by the associated medical diseases. Acute bleeding from tumors of the gastrointestinal tract is not the absolute sign of the patient being inoperable. In the majority of patients' emergency presentation, resection is feasible. Advanced age is not a contraindication to radical surgery in case of colorectal emergency in the elderly.⁸⁻¹²

In this study, all patients with colonic carcinoma presenting as an emergency condition were neither diagnosed nor investigated before presentation. Intestinal obstruction, bleeding or perforation were the first signs of presentation of colonic

Table 2 Postoperative complications of emergency and elective patients.

	Number of emergency patients (n = 59)	%	Number of elective patients (n = 59)	%	FE p
Wound infection	5	8.5	3	5.1	0.717
Intestinal leakage	3	5.1	2	3.4	1.000
Incisional hernia	3	5.1	1	1.7	0.619
Adhesive intestinal obstruction	2	3.4	—	—	—
Bleeding	2	3.4	—	—	—
Abdominal wall sinus	1	1.7	—	—	—

FE = Fisher exact test.

carcinoma. The obstructing tumors were not visualized by abdominal CT in 10 (16.9%) patients. Ultrasonography could not give good data in the presence of dilated intestinal loops. Usually there was no available tissue biopsy. Colonoscopy was impossible for emergency obstruction and unprepared colon. Also severe bleeding in unprepared colon hindered colonoscopy and made the colon full of blood clots. Also, the presence of other medical diseases affected the fitness of many patients. Preoperative accurate staging was usually difficult.

The treatment of the obstruction due to left colon carcinoma beyond left flexure is not standardized. Current surgical options are intraoperative lavage and resection of the colonic segment involved with primary anastomosis, subtotal colectomy with primary anastomosis, colostomy followed by resection, and resection of the colonic segment involved with end colostomy (Hartmann's procedure) requiring a second operation to reconstruct the colon. In addition, the endoscopic colonic stent can effectively decompress the obstructed colon, allow colon preparation and elective resection.¹²

The patients can be classified according to colorectal tumors emergency score (CTES), based on 4 risk factors: colonic perforation, serum albumin, concurrent cardiovascular disease and chronic renal insufficiency. Each patient is ranked low (CTES <4), moderate (CTES 4–12) or high (CTES > 12). The choice of surgical treatment can be guided by this classification. When the condition of the patient permits, it is preferable to perform primary anastomosis.¹³

Restorative colectomy with primary anastomosis should only be regarded when the risk is favorable. In high risk patients, Hartmann's procedure is widely used especially for patients presenting with left colon cancer-associated obstruction or perforation. The procedure can be performed after complete tumor resection or as a palliative procedure.^{5,14–16}

Urgent subtotal or total colectomy with primary anastomosis is a safe and efficient procedure in the management of acutely obstructed neoplasm of the left colon. It allows treating in one stage the cancer and the obstruction, bearing minimal mortality, acceptable morbidity and satisfactory postoperative functional results.³ Subtotal colectomy is still very useful in cases of synchronous tumors or proximal bowel damage. Simple colostomy has no role other than for palliation or use in very ill patients who would not survive any other procedure. The surgeon's experience often affects the surgical decision.¹⁶

Colorectal surgeons are more likely to perform single stage operations with primary anastomosis than non-colorectal surgeons.¹⁷ For appropriately selected patients, laparoscopic emergent colectomy appears safe with experienced surgeons.¹⁸ Also, emergency laparoscopically-assisted right hemicolectomy for obstructing right-sided carcinoma is feasible and safe with favorable short term clinical outcomes.¹⁹

The most important complication in emergency colonic surgery is anastomotic leakage. This leakage is commonly due to the impossibility of a correct preparation of the colon in emergency.²⁰

Manual decompression of colon alone is as good as colonic irrigation in the management of the left-sided colon. However, on-table antegrade colonic irrigation should be reserved for the loaded colon that may interfere with stapling, when resection margins are limited as in low anterior resection, and when the surgeon is less experienced.²¹

In this study, complications occurred in 16 (27.1%) patients of emergency group and included intestinal leakage, bleeding,

wound infection, abdominal wall sinus, incisional hernia, intestinal obstruction and recurrence. This rate of complications was significantly higher after emergency surgery than the rate after elective surgery (18.2% versus 10.2%).

Merkel et al.² found that the rates of surgical and non-surgical postoperative complications were higher in urgent surgery than in elective surgery (28.8% versus 19.8%) and also postoperative mortality was significantly higher (10.1% versus 4.0). The rates of locoregional recurrences and distant metastases were significantly higher after emergency surgery. Urgent surgery was found to be an independent prognostic factor for distant metastasis (relative risk 1.80) and cancer-related survival (relative risk 1.6).

Advanced tumor staging is a basis for poor long-term survival in emergency colorectal cancer.^{22,23} Radical operations can be fulfilled in emergency operations. Resection with free resection margins has a good effect on survival which may be similar to survival after elective surgery.^{8,10}

Charbonnet et al.²³ found that 70% of patients who underwent emergency surgery for obstructive/perforated left-sided colonic carcinoma had a curative resection with 5-year survival rate of 40%. Delayed resection seems to be a safer procedure and provided a better oncologic outcome compared with primary resection in obstructive left-sided colorectal cancer under emergency situations.²⁴

In a study by Tarcoveanu et al.²⁵ the factors with a significant negative influence on survival included age over 70 years, emergency surgery related to cancer complications and advanced stage. Sato et al.²⁶ found that the prognosis was significantly better in patients who received adjuvant chemotherapy, male patients, age > 50 years and fewer than 13 dissected lymph nodes.

In this study, there was challenge in treatment; the type of surgical procedure depended on the final intraoperative decision. Complications occurred in patients with obstruction, unprepared colon, old age > 60 years and/or associated diseases. The majority of mortality after emergency surgery (62.7%) during follow up was associated with advanced tumor stage, old age > 60 years and the presence of associated diseases.

In addition, the unresectable advanced tumors were the real challenge in surgical treatment. One-, two- and three-year survivals after emergency surgery were less than survivals in elective patients. The difference was not significant and this can be explained by the policy of excision of all resectable tumors in emergency conditions followed by either primary anastomosis, Hartmann's procedure or total colectomy.

5. Conclusion

There is much challenge in the diagnosis and treatment of emergency conditions of colon carcinoma. The challenge included emergency presentation of undiagnosed uninvestigated patients with difficult or impossible colon preparation, colonoscopy, tissue biopsy or tumor staging. In addition to associated diseases or old age in many patients. Mortality and morbidity rates after emergency surgery were higher than those rates after elective surgery of colon carcinoma. The selection of the surgical procedure was guided by the tumor staging, tumor location and associated diseases (co-morbidities). Total colectomy could obtain good outcome and survival when compared with other emergency procedures. Advanced unresectable tumors are the

real challenge in treatment. The policy of excision of resectable tumors in emergency surgery can improve survival to approximate elective surgery.

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