

## Original Research Article

# Evaluation of one-stage management of left side cancer colon

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### ABSTRACT

**Background:** Colorectal cancer in Egypt remains a heavy burden as about 40% of cases occur in individuals under 40 years of age. The one-stage resection and anastomosis surgery on the left colon due to carcinomas was lately proposed to be safely done. Aim of the work was to evaluate the immediate results of the one-stage resection and anastomosis surgery procedure for left colonic cancer patients and analyzing the relationship between occurrence of complications and clinico-pathological circumstances.

**Methods:** This is a prospective clinical study included 20 patients with mean age 59.4 years (70% males and 30% females) having left side cancer colon. All patients underwent history taking, clinical examination and one-stage resection and anastomosis surgery.

**Results:** High percentage of leakage was noticed in females >50 years, in diabetics, adenocarcinoma and ischemic heart disease. The leakage rate increased in those who stayed more in the hospital and decreased with the intraoperative preparation. High death rate was noticed in females >50 years and in diabetic patients with ischemic heart disease, adenocarcinoma, and obstructed colon. The pre and intraoperative preparation decreased the risk of death. High percentage of wound infection was noticed in males <50 years and in diabetic patients with adenocarcinoma and obstructed colon. The risk of wound infection was increased in patients who received intraoperative preparation and who stayed a week or less in the hospital.

**Conclusions:** The incidence of postoperative complications was sound within values generally reported in other studies. Nonetheless, more effort is required to determine risk factors for such postoperative complications to improve the long-term as well as short-term survival in colorectal cancer patients.

**Keywords:** Cancer, Colon, Surgery

### INTRODUCTION

Colorectal cancer is currently considered the third most commonly diagnosed cancer in males and the second in females, with an estimated 1.4 million cases and 693,900 deaths occurring in 2012 worldwide.<sup>1</sup> In Egypt, colorectal cancer remains a heavy burden as about 40% of cases occur in individuals <40 years of age.<sup>2</sup>

The right- and left-sided colon cancers are two distinct categories that arise proximally and distally to the splenic flexure showing genetic, environmental, and

embryological factors difference and exhibiting different prognostic values to targeted therapy.<sup>3-6</sup>

The one-stage resection and anastomosis surgery on obstructive lesions of the left colon due to carcinomas of the colon was lately proposed to be safely done as those of the right colon with an extremely lower mortality rate that might be due to metastasis following surgery or due to anastomotic leakage.<sup>7,8</sup>

Compared to colostomy, the resection with primary anastomosis is considered as the gold standard and the experience of the surgeon is considered the critical issue

for its success. The procedure could be safe and effective in cases of left colonic anastomosis taking into consideration, the early presentation, younger age and minimal fecal contamination.<sup>9</sup>

The changed survival rates and the occurrence of early complications (leakage and/or metastasis) of the resection with primary anastomosis of colon cancer prominently raise the importance for more research to define the factors affecting the success and/or occurrence of complications.

In this study, resection with primary anastomosis surgery procedure was carried out for patients with left colonic cancer, aiming to evaluate the immediate results of this procedure and the relationship between the occurrence of complications and the clinico-pathological conditions of the patients.

## METHODS

This prospective clinical study included 20 patients with left side cancer colon selected from the University Hospital (May 2017 to May 2018) after informed consents and approved by the ethics committee. All patients underwent treatment with one-stage resection and anastomosis surgery. All patients were admitted to the hospital at least one day before the surgery.

### Inclusion criteria

- Age 18-75 years
- Confirmed left side cancer colon (either obstructive or not) by endoscopy and biopsy.

### Exclusion criteria

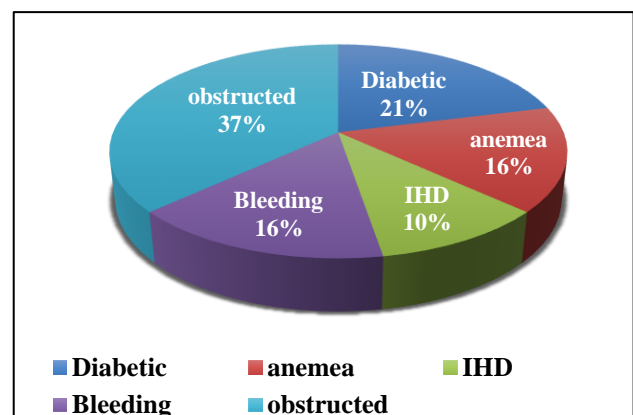
- Patients with history of other malignant diseases and the association of complications that cannot tolerate surgery,
- Severe heart and lung diseases,
- Uncontrolled hypertension, pulmonary infection, moderate/severe COPD,
- Uncontrolled diabetes, renal insufficiency and severe hepatitis.

All patients were subjected to history taking with special emphasizes to the age, sex, smoking habit and accompanying comorbidity. Physical examination that included the vital signs and local abdominal organomegaly, ventral hernias or scars of previous surgeries was performed. In addition, pre-operative laboratory investigations including CBC, bleeding profile, liver and renal function tests were done to exclude severe comorbidities. Pelvi-abdominal ultrasound and computed tomography (CT) scanning of the abdomen and pelvis with intravenous and rectal contrast were done to demonstrate the degree of local spread, attachment to nearby structures, peritoneal deposits and the presence of hepatic metastasis. Lower GI

endoscopy and tissue biopsy were done also to confirm the diagnosis of left sided colon cancer. Preoperative prophylaxis included; preoperative fluid resuscitation to optimize hydration status, preoperative antibiotic prophylaxis against both aerobic and anaerobic bacteria, placement of nasogastric tube, indwelling urinary catheter and venous thromboembolism prophylaxis in high-risk patients. On-table colonic lavage was carried in some cases with an average of 2 L normal saline at 37°C with gentle manipulation of the colon till the effluent was clear. All patients were operated upon under general anesthesia and the risk of aspiration of gastric contents was reduced by emptying the stomach before induction. Anterior resection of a portion of the colon was performed with care was taken to avoid spillage of enteric contents during bowel division. Then reconstruction was performed in an end-to-end fashion. Two bowel ends with right-angle clamps in situ were brought close by applying lateral seromuscular traction 3-0 vicryl sutures. The anastomosis was performed in a double-layer with 3-0 vicryl. Postoperative care included parenteral antibiotics (to avoid peritonitis), early postoperative mobilization (to reduce development of deep vein thrombosis), thromboprophylaxis (compression stockings and Clexane 20 mg once daily) and waiting for restoration of bowel sounds or flatus before commencing oral fluids.

## RESULTS

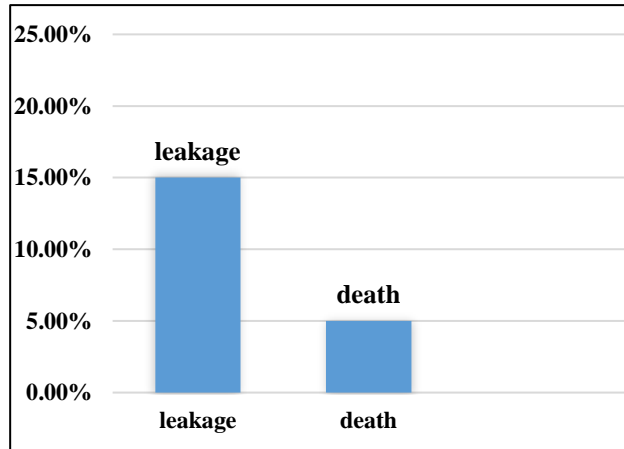
The mean age of the patients was 59.4±8.3years with 70% (14 patients) were males and 30% (6 patients) were females. Eight patients (40%) were smokers and 12 (60%) were non-smokers. The mean duration of hospital stay was 8.1±2.2 days (range 6-12 days). Comorbidities were; 8 (40%) patients were diabetic, 6 (30%) were anemic, 4 (20%) had ischemic heart disease (IHD), 14 (70%) had obstructed colon, and 3 (16%) of cases had bleeding (Figure 1).



**Figure 1: Comorbidities in all the cases.**

Preoperative investigations: Fourteen cases (70%) had undergone CT P/a, whereas 6 cases (30%) had undergone colonoscopy. Eighteen cases (90%) had adenocarcinoma, while 2 cases only had mucinous adenocarcinoma. Colon

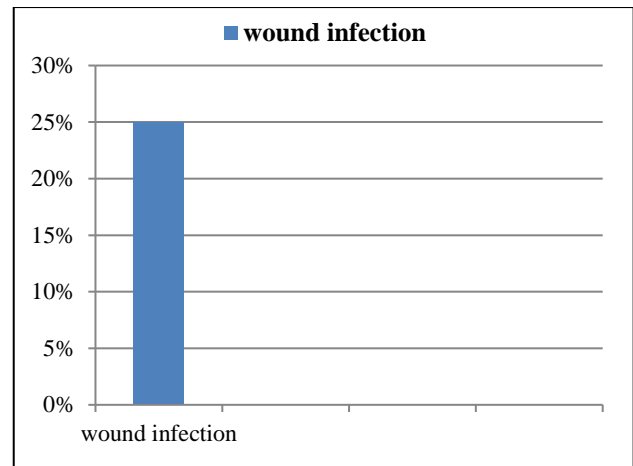
preparation: Eight patients (40%) had undergone intraoperative preparations, 6 (30%) patients had prepared preoperatively, and 6 (30%) had no preparation.



**Figure 2: Leakage and death among patients.**

#### Postoperative complications

There was one case of death (5%), 3 (15%) had anastomotic leakage and 5 (25%) had wound infection (Figures 2 and 3).



**Figure 3: Wound infection among patients.**

#### Relation of postoperative complications and clinical data

High percentage of leakage was noticed in females >50years and in diabetic patients with adenocarcinoma and IHD. Also, leakage rate was significantly higher in patients who stayed in the hospital more than 2 weeks than those who stayed one week or less (p value 0.02).

**Table 1: Relation between leakage and clinical data (n,%).**

|                      |                         | Total number | Leakage |        | P value |
|----------------------|-------------------------|--------------|---------|--------|---------|
|                      |                         |              | n       | %      |         |
| Age                  | <50 years               | 4            | 0       | 0%     | 0.406   |
|                      | >50 years               | 16           | 3       | 18.75% |         |
| Smoking              | Smokers                 | 8            | 1       | 12.50% | 0.089   |
|                      | Non-smokers             | 12           | 2       | 16.67% |         |
| Sex                  | Males                   | 14           | 1       | 7.14%  | 0.232   |
|                      | Females                 | 6            | 2       | 33.33% |         |
| Diabetes             | Diabetic                | 8            | 2       | 25%    | 0.089   |
|                      | Non-diabetic            | 12           | 1       | 8.33%  |         |
| Anemia               | Anemic                  | 6            | 1       | 16.67% | 0.232   |
|                      | Non-anemic              | 14           | 2       | 14.29% |         |
| IHD                  | Yes                     | 4            | 1       | 25%    | 0.369   |
|                      | No                      | 16           | 2       | 12.50% |         |
| Obstructed colon     | Yes                     | 14           | 2       | 14.29% | 0.232   |
|                      | No                      | 6            | 1       | 16.67% |         |
| Hospital stay (days) | Week or less            | 10           | 1       | 10%    | 0.02    |
|                      | more than a week        | 10           | 2       | 20%    |         |
| Colon preparation    | Intraoperative          | 8            | 1       | 12.50% | 0.002   |
|                      | Preoperative            | 6            | 1       | 16.67% |         |
|                      | No preparation          | 6            | 1       | 16.67% |         |
| Pathology            | Adenocarcinoma          | 18           | 3       | 16.67% | 0.499   |
|                      | Mucinous adenocarcinoma | 2            | 0       | 0%     |         |
| Investigation        | CT P/a                  | 14           | 2       | 14.29% | 0.232   |
|                      | Colonoscopy             | 6            | 1       | 16.67% |         |

**Table 2: Relation between deaths and clinical data (n,%).**

|                      |                         | Total number | Deaths |        | P value |
|----------------------|-------------------------|--------------|--------|--------|---------|
|                      |                         |              | n      | %      |         |
| Age                  | <50 years               | 4            | 0      | 0%     | 0.277   |
|                      | >50 years               | 16           | 1      | 6.25%  |         |
| Smoking              | Smokers                 | 8            | 0      | 0%     | 0.221   |
|                      | Non-smokers             | 12           | 1      | 8.33%  |         |
| Sex                  | Males                   | 14           | 0      | 0%     | 0.161   |
|                      | Females                 | 6            | 1      | 16.67% |         |
| Diabetes             | Diabetic                | 8            | 1      | 12.50% | 0.056   |
|                      | Non-diabetic            | 12           | 0      | 0%     |         |
| Anemia               | Anemic                  | 6            | 0      | 0%     | 0.161   |
|                      | Non-anemic              | 14           | 1      | 7.14%  |         |
| IHD                  | Yes                     | 4            | 1      | 25%    | 0.277   |
|                      | No                      | 16           | 0      | 0%     |         |
| Obstructed colon     | Yes                     | 14           | 1      | 7.14%  | 0.161   |
|                      | No                      | 6            | 0      | 0%     |         |
| Hospital stay (days) | Week or less            | 10           | 1      | 10%    | 0.012   |
|                      | more than a week        | 10           | 0      | 0%     |         |
| Colon preparation    | Intraoperative          | 8            | 0      | 0%     | 0.003   |
|                      | Preoperative            | 6            | 0      | 0%     |         |
|                      | No preparation          | 6            | 1      | 16.67% |         |
| Pathology            | Adenocarcinoma          | 18           | 1      | 5.56%  | 0.38    |
|                      | Mucinous adenocarcinoma | 2            | 0      | 0%     |         |
| Investigation        | CT P/a                  | 14           | 1      | 7.14%  | 0.161   |
|                      | Colonoscopy             | 6            | 0      | 0%     |         |

**Table 3: Relation between wound infection and clinical data (n,%).**

|                      |                         | Total number | Wound infection |        | P value |
|----------------------|-------------------------|--------------|-----------------|--------|---------|
|                      |                         |              | n               | %      |         |
| Age                  | <50 years               | 4            | 3               | 75.00% | 0.339   |
|                      | >50 years               | 16           | 2               | 12.50% |         |
| Smoking              | Smokers                 | 8            | 2               | 25.00% | 0.068   |
|                      | Non-smokers             | 12           | 3               | 25.00% |         |
| Sex                  | Males                   | 14           | 4               | 28.57% | 0.221   |
|                      | Females                 | 6            | 1               | 16.67% |         |
| Diabetes             | Diabetic                | 8            | 3               | 37.50% | 0.068   |
|                      | Non-diabetic            | 12           | 2               | 16.67% |         |
| Anemia               | Anemic                  | 6            | 1               | 16.67% | 0.221   |
|                      | Non-anemic              | 14           | 4               | 28.57% |         |
| IHD                  | Yes                     | 4            | 0               | 0.00%  | 0.368   |
|                      | No                      | 16           | 5               | 31.25% |         |
| Obstructed colon     | Yes                     | 14           | 4               | 28.57% | 0.221   |
|                      | No                      | 6            | 1               | 16.67% |         |
| Hospital stay (days) | Week or less            | 10           | 5               | 50.00% | 0.095   |
|                      | more than a week        | 10           | 0               | 0.00%  |         |
| Colon preparation    | Intraoperative          | 8            | 3               | 37.50% | 0.006   |
|                      | Preoperative            | 6            | 1               | 16.67% |         |
|                      | No preparation          | 6            | 1               | 16.67% |         |
|                      |                         |              |                 |        |         |
| Pathology            | Adenocarcinoma          | 18           | 5               | 27.78% | 0.0465  |
|                      | Mucinous adenocarcinoma | 2            | 0               | 0.00%  |         |
| Investigation        | CT P/a                  | 14           | 4               | 28.57% | 0.221   |
|                      | Colonoscopy             | 6            | 1               | 16.67% |         |

Patients whose colons prepared intraoperatively had significantly lower risk of leakage than those with preoperative preparations and those with no preparations (p value 0.002) (Table 1). High death rate was noticed in females >50 years and in diabetic patients with IHD, adenocarcinoma and obstructed colon. Also, death rate was significantly higher in patients who stayed in the hospital one week or less than those who stayed more than one week (p value 0.012). The patients whose colons prepared pre- and intraoperatively had significantly lower risk of death than those whose colons were not prepared (0.003) (Table 2). High percentage of wound infection was noticed in males <50 years and in diabetic patients with adenocarcinoma and obstructed colon. The risk increased significantly in patients who received intraoperative colon preparation than those received no preparations or preoperative preparations (p value 0.006). The risk also increased in patients who stayed week or less in the hospital (Table 3).

## DISCUSSION

In the current study resection with primary anastomosis surgery procedure was used for treating patients with left colonic cancer with different circumstances.

The mean duration of hospital stay was 8.1 days (range 6.0 to 12.0 days, median 7.5 days). Min et al, reported that the mean hospital stay was 12 days (range 10-15 days).<sup>10</sup> Andreano et al, showed that all patients with a regular postoperative course have had no more than 10 days of hospitalization except for those who suffered postoperative ileus which solved after no more 15 days.<sup>11</sup>

In this study, 90% of cases had adenocarcinoma and 10% had mucinous adenocarcinoma. Yang et al, showed that 7.3% of 21791 left colon cancer patients had mucinous adenocarcinoma and 92.7% had adenocarcinoma.<sup>12</sup> Moreover, we reported that 50% of cases died, and 15.0% had anastomotic leakage. This was nearly similar to the results of Awotar et al, reporting 2.90% death rate and 5.56% of patients having anastomotic leak.<sup>13</sup> However, Hong et al, that 2.6% of patients had anastomotic leakage with no mortalities during the first 30 postoperative days after using the intraoperative colonic irrigation.<sup>14</sup>

The present study showed that 25% had wound infection. Awotar et al, reported that 27.78% of patients had surgical wound infection whereas Hong et al, study reported that 18.4% of patients had surgical site infection.<sup>13,14</sup> However, Min et al, reported that no patient had either wound complications or sepsis.<sup>10</sup>

Regarding leakage, no case of the four <50 years experienced leakage, while 18.75% of cases >50 years reported leakage. Davila et al, reported older age as a risk factor for anastomotic leakage.<sup>18</sup> Also, 12.5% of smokers and 16.67% of non-smokers showed anastomotic leakage. This agreed with Zaharie et al, reported smoking as a

variable that is significantly associated with anastomotic leakage.<sup>15</sup>

Anastomotic leakage occurred more in females. This was against the results of Rudinskaite et al, who studied 269 patients that underwent primary resection and anastomosis of colorectal cancer finding that anastomotic leakage in males were more than females (11.27% versus 3.15%).<sup>16</sup> However, Telem et al, reported that males showed higher percentages of anastomotic leakage than females.<sup>17</sup>

Twenty-five percent of diabetics and 8.33% of non-diabetics, 16.67% of anemics and 14.29% of non-anemics, 25% of IHD patients and 12.5% of non-IHD patients had leakage. Telem et al.<sup>17</sup> reported that 34.5% of diabetics, 35.5% of coronary artery disease patients had anastomotic leakage. Also, Zaharie et al.<sup>15</sup> reported that anemia remained significant in logistic regression model of anastomotic leakage.

Furthermore, 14.29% of obstructed colon cases and 16.67% of non-obstructed colon cases reported leakage. The percentage was nearly the half in Hong et al.<sup>14</sup> study with 14.29% of obstructed colon patients showed postoperative leakage.

In addition, 10% of cases stayed for one week or less in the hospital and 20% of cases stayed more than one week reported leakage, 12.50% of cases prepared intraoperatively, 16.67% of cases prepared preoperatively, 16.67% of non-prepared cases had leakage. A 16.67% of adenocarcinoma cases and no cases with mucinous adenocarcinoma cases, and 14.29% of cases underwent CT P/a and 16.67% of cases underwent colonoscopy had leakage.

Authors reported that no case of the four <50 years died, while 6.25% of cases >50 years died. Davila et al, reported that 30-days postoperative mortality was significantly increased with old age.<sup>18</sup> Also, no one of smokers and 8.33% of non-smokers, no one of males and 16.67% of females died. Moreover, 12.5% of diabetic and none of non-diabetic showed mortality going with Mik et al, reporting diabetes as a risk factor for 30-days postoperative mortality.<sup>19</sup>

A 7.14 percentage of cases stayed for a week or less in hospital and none of cases stayed more than one week reported death. None of cases prepared intraoperatively, none of cases prepared preoperatively, 16.67% of non-prepared cases had died. Finally, 5.56% of adenocarcinoma cases and none of cases with mucinous adenocarcinoma, and 14.29% of cases underwent CT P/a and none of cases underwent colonoscopy showed mortality.

Seventy-five percentages of cases <50 years and 12.5% of cases >50 years reported wound infection. Twenty-five



percentage of smokers and 25.0% of non-smokers, 28.57% of males and 16.67% of females showed wound infection. Ishikawa et al, showed that 14.4% of patients <65years and 29.9% of >65years, 13.5% of smokers, and 11.5% of females and 17.5% of males had surgical site infection.<sup>20</sup>

Authors found that 37.5% of diabetics and 16.67% of non-diabetics, while Ishikawa et al, showed that 16.7% of diabetic patients had surgical site infection.<sup>20</sup>

And authors f found that 16.67% of anemics and 28.57% of non-anemics, none of IHD patients and 31.25% of non-IHD patients, 28.57% of obstructed colon cases and 16.67% of non-obstructed colon cases had infected wounds. Ishikawa et al, reported that 14.3% of cardiovascular disease patients had surgical site infection.<sup>20</sup> Hong et al, reported 12% of their obstructed cases had wounds infected.<sup>14</sup>

Fifty percent of cases stayed for a week or less in hospital and 37.5% of cases stayed more than one week reported wound infection. A 37.5% of cases prepared intraoperatively, 16.67% of cases prepared preoperatively and 16.67% of non-prepared cases showed infected wounds. Ishikawa et al, reported that 14.0% of patients undergone preoperative preparation and 17.3% of those with no preparation showed incisional infection.<sup>20</sup> They raised the importance of intraoperative preparation to reduce the development of incisional infection.

A 27.78% of adenocarcinoma cases and none of mucinous adenocarcinoma, and 28.57% of cases underwent CT P/a and 16.67% cases underwent colonoscopy had infected wounds.

From these accumulated data, it could be concluded that the incidence of postoperative complications in patients undergoing primary resection and anastomosis surgery for left colorectal cancer in present study was within values generally reported in other studies. Nonetheless, additional efforts are required to assess the risk factors for these postoperative complications to reduce their development and to improve long-term as well as short-term survival in colorectal cancer patients.

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