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## ORIGINAL ARTICLE

# OBSTRUCTING LEFT COLONIC CARCINOMA: THE SURGICAL CHALLENGE

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### Abstract

**Aim:** To approach the best surgical procedure to manage obstructing carcinoma of the left colon.

**Methods:** A total of 75 patients with obstructing left colonic carcinoma were equally randomized into three groups, 25 patients each. Group I underwent Hartmann's procedure, group II underwent primary resection anastomosis with covering ileostomy, while group III underwent primary resection anastomosis after on-table colonic lavage. The results of the three procedures were recorded and compared regarding the operative time, operative blood loss, the post-operative morbidity and mortality, intestinal leakage, psychological drawbacks, the hospital stay and the delay in starting the course of chemotherapy.

**Results:** There was no significant difference in the incidence of postoperative morbidity and mortality among the three groups but there is highly significant decrease in the incidence of nutritional deficiencies & psychological troubles and in the total hospital stay and time delay before receiving the chemotherapy in group III in comparison to group I & II. There was similar risk of anastomotic leakage in the three groups

**Conclusion:** Primary resection anastomosis after on-table colonic lavage appears to be the most ideal procedure as it provides a single stage final solution of the problem without increased risk of leakage or other complications and with the least psychological impact on the patient.

**Keywords:** Intestinal obstruction, colonic carcinoma, on-table lavage.

## INTRODUCTION

10-30 percent of patients with colorectal carcinoma present with acute obstructive symptoms.(1)

Large bowel obstruction results in massive colonic distension, bacterial translocation, electrolytes and fluid imbalance and an increased risk of colonic necrosis and perforation. Urgent surgical decompression is needed. Large bowel obstruction is more common with left–sided lesions than with lesions of the right colon.(2)

Malignant large bowel obstruction is most commonly caused by colonic adenocarcinoma, less frequently,

malignant tumors of the pelvis including bladder cancer, ovarian cancer, metastatic pelvic tumours, lymphoma and sarcoma[3]

Patients with malignant large bowel obstruction suffer greater operative morbidity and mortality than those who present for elective resection of non-obstructing colonic tumors; in addition, obstructing tumors correlate with increased local recurrence rate.[4]

There is a considerable debate surrounding the choice of the most appropriate operative procedure for malignant large bowel obstruction. Initially, staged procedures were advocated to decrease morbidity and mortality but it becomes apparent that single-stage procedures provide similar or better outcome.[5]

Historically, large bowel obstruction was felt best treated with a three-stage procedure. This technique consists of colostomy to relieve obstruction followed by resection with anastomosis leaving the colostomy in place to protect the healing anastomosis, and finally, colostomies take-down. Hartmann's procedure includes tumor resection and end–colostomy at the initial operation. Intestinal continuity is restored in a later procedure.[6]

More recently covering ileostomy has been introduced and preferred by many surgeons over colostomy as it is more defunctioning and much easier to close. Primary resection anastomosis of the colon with covering ileostomy is increasingly becoming the standard line of treatment of obstructing carcinoma of the distal colon in many centers.[7]

Many recent studies have concluded that single stage procedures provide similar or better outcomes and they created new interest in utilizing single-stage procedures.[1,5,8,9]

Two single-stage procedures have come to the forefront: subtotal coloectomy and segmental resection with on-table lavage. Subtotal colectomy has been advocated to decrease anastomotic complications, rates by creating anastomosis between ileum and colon or rectum instead of suturing dilated colon to normal caliber colon or rectum. Subtotal colostomy allows for removal of synchronous lesions in a single operation and eliminate the need for continued surveillance by eradicating the source of metachronous lesions but it is associated with greater frequency of bowel movements and fecal incontinence than occurs after segmental resection.[10]

Segmental resection with on-table lavage involves prograde or retrograde colonic irrigation with saline either before or after the tumor has been resected. After the tumor and draining lymph node basin are resected with appropriate margins, a primary anastomosis is performed. No faecal diversion is used. The disadvantages of this procedure are the longer operative time and the potential problems of anastomosing dilated obstructed colon to normal caliber large bowel.[5,10,11]

Also, more recently endoscopic insertion of self-expanding metallic stents to overcome the obstruction as a bridge to elective surgery has been introduced and tried by many centers but the results were not encouraging,[12] and many trials were stopped prematurely either due to the high technical failure rate reaching 53%[13] or due to high rate of complications such as perforation (6.9%)[12] and absolute risk of 30-days morbidity. Also silent perforations could have oncological significance, potentially resulting in tumour cell seeding and dissemination with an adverse effect on the 5-year overall and disease free survival rates.[14]

## MATERIAL AND METHODS

We chose the most popular three surgical procedures performed for patients with malignant large bowel obstruction: Hartmann's procedure, primary resection anastomosis with covering ileostomy and primary resection anastomosis after on–table lavage and we designed three equal groups (group I, II & III) each group is managed with only one of these three procedures and compared the results of the three groups regarding, the operative time, operative blood loss, postoperative morbidity and mortality, psychological troubles, anastomotic leak, total hospital stay and time delay before the chemotherapy.

This study was conducted on 75 patients with large bowel obstruction due to colonic carcinoma admitted to the emergency unit of our department of Surgery Zagazig University hospitals in the period from April 2010 to January 2013.

**Inclusion criteria:**

1. Adults of both sexes above 18 years and below 80 years of age.

2. Patients admitted with a diagnosis of large bowel obstruction suspected to be due to malignant tumors.

**Exclusion criteria:**

1. Patients under 18 years or above 80 years of age.

2. Patients whose intestinal obstruction was found to be caused by other than carcinoma of the colon

3. Patients who were missed during the follow up period.

4. Patients who were unstable during operation and a decision of only proximal colostomy was taken.

5. Patients who were managed with any procedure other than the three ones designed in this study.

6. Patients who refused to perform the second stage to close the stoma either revision of Hartarmann's procedure in group I or closure of ileostomy in group II.

All patients in the study were informed about the technique of surgery and consented for the surgeons' decision. The patients were serially numbered and orderly joined to one of the three groups group I, II and III in that order without exception or preference of the surgical team so that the 75 patients were randomly divided into three equal groups, 25 patients each. If one patient had been excluded at any moment during the study, then the next patient entering the study will join the group of the missed one instead of him to ensure equal number of the groups.

**Group I** patients were managed with Hartmann's procedure (excision of the tumor + terminal colostomy + closure of the distal stump) and patients who survive the procedure were prepared to revise the operation 3 months later.

**Group II** patients were managed with resection of the tumor and primary anastomosis and covering simple loop ileotomy and patients who survive the procedure were planned to close the ileostomy 3 months later.

**Group III** patients were managed with resection of the tumor and primary anastomosis after on–table colonic lavage.

All patients after admission were resuscitated with intravenous fluids, correction of blood electrolytes and acid–base imbalance. Nasogastric tubes and urinary catheters were inserted and prophylactic broad spectrum antibiotics were injected. Full preoperative laboratory investigations were ordered and checked. Thorough medical examination is performed to evaluate fitness for the operation also blood samples were obtained for cross-matching.

Technique of on-table lavage in group III: After dealing with the mesentery of the diseased colon, it is transected distal to the tumor with safety margins. The distal stump is closed temporary with an intestinal clamp and the proximal end is exteriorized outside the body and hold by an assistant that control passage of the drainage fluid into a large container beside the operating table. On-table lavage is performed using at least 3 liters of warm normal saline (6 bottles) and the colon is antegradely washed through a Nelaton catheter introduced through the opened base of appendix, and the fluid is drained distally through a stab wound in the left colon just above the obstructing carcinoma. The antegrade lavage is continued till the drained fluid becomes more or less clear with no gross faecal matter. In the last bottle, metronidazole was added to the saline to verify sterilization of colon after the lavage is completed, the catheter is withdrawn and the stump of the appendix is double ligated with Vicryle 2/0 simple sutures and the appendix is removed and distal colon harboring the tumor is resected with end to end anastomosis of the proximal colon to the distal stump and intestinal clamps are released. In two patients who had had their appendices previously removed, we introduce the irrigating catheter through a stab in the taenia coli of the caecum which was closed with two layers of interrupted vicryle sutures at the end of the lavage.

Postoperatively, all patients were cared in the intensive care unit (ICU) and put on intravenous fluids. Sips of water are allowed from the first day. Oral feeding was permitted on return of bowel habits in group I and II (no or bypassed anastomosis) but in group III oral feeding was delayed to the 3rd post-operative day. Total parental nutrition was supplied to malnourished patients and those with high output ileostomy. Patients were discharged from the ICU when they are haemodynamically stable and free of serious complications.

All patients were examined regularly by the psychiatrist using Hamilton scale for depression[16] the commonest used and most accepted scale to measure depression. It is a multiple item questionnaire used to provide an indication of depression, and as a guide to evaluate recovery with its 17 items. Each item on the questionnaire is scored on a 3 or 5 points scale. Scores of 0-7 are considered to be normal, Scores of 8-13 refer to mild depression, scores of 14-18 refers to moderate depression, scores of 19-22 refer to severe depression and 23 or more is considered very severe depression. Also participants were subjected to a semi-structured psychiatric interview, using a specially designed interview derived from the Psychiatric Department sheet of Zagazig University

All the postoperative data were recorded and patients were discharged from hospital when they were clinically stable and on full oral nutrition.

All patients were followed up for a period of 6 months postoperatively. Group I and II patients were re-admitted after 3 months interval from the primary operation to undergo closure of the stomas. All patients started the chemotherapy regimen when they are surgically free and fully recovered from surgery at least 3 weeks after last surgery.

Four patients were excluded during performing the study; the first was found to have a stricture on top of

complicated colonic diverticulosis. He was excluded after his histopathological examination of the specimen. Two patients were missed in the follow up period and one patient refused to revise his Hartmann's colostomy; all were excluded from the study and replaced with newer ones

In group I (Hartmann's group) two patients developed ischemia of stomal loop that needed reversion after 3days and other two patients developed para-stomal hernias that were managed during the second operation of revision of Hartmann's procedure.

**Statistical analysis:** The significance of the differences among the three groups was estimated using F test for quantitative data and student's t test for qualitative data and significance was estimated at P value < 0.05.

## RESULTS

This study included 75 patients (42 males and 33 females) with final diagnosis of obstructing left colonic carcinoma. Their ages vary from 35 to 78 years with average age 55 ± 12 years.

There were no statistically significant difference among the three groups regarding age, male to female ratio, site of obstruction and presence of concurrent medical disease endangering the prognosis such as diabetes mellitus, significant hypertension, old myocardial infarction or old cerebral stroke (Table 1). There was statistically highly significant increase in the mean operative time (OT) in group III (200 ± 90 min) compared with group II (180 ± 85 min) and group I (120 ± 60 min) however there is highly significant less mean operative blood loss (OBL) in group III (450 ml) compared with the other two groups (600 ml) in each of them (Table 2)

There was one anastomotic leak in each group. In group I, leakage occurred after revision of Hartmann's colostomy which was mild and responded well to conservative measures and stopped spontaneously within 2 weeks. Surprisingly, leak occurred in group II with protective ileostomy. Leakage was suspected post-operatively and confirmed by barium enema one month later. However, the fistula closed spontaneously within three months when closure of ileostomy was performed.

Also in group III there was recorded one case of anastomotic leak which was mild and closed spontaneously within one month.

There were no significant differences in the postoperative morbidity regarding wound infection, chest infection, pulmonary embolism among the three groups however there was statistically highly significant increased incidence of nutritional problems e.g. marked weight loss, (more than 10% of body weight), dehydration and hypo-vitaminosis in group II (9 patients 36%) in comparison to the other two groups also burst abdomen occurred only in group II. There were two cases of pulmonary embolism recorded; one in group I which was fatal and the other in group III which improved in response to conservative measures (Table 3).

All recorded major depressive disorders and psychological troubles including depressed mood, nervousness and irritability, isolation and bouts of weeping occurred much more frequently in group I & II in comparison to group III as shown in (Table 4).

The total hospital stay was high significantly shorter in patients of group III (9 ± 2.5 days) in comparison to the other two groups I & II (23.5 ± 10.25 and 21.25 ± 11 day respectively). Also there was highly significant increased delay before starting the chemotherapy in group I and II (125 ± 40 and 109.5 ± 30 days respectively) compared to group III (25.5 ± 10 days) (Table 6).

The total hospital stay = the sum of the inpatient stay for primary surgery plus that for stoma closure whenever performed i.e. in groups I & II.

There is only one peri-operative mortality in each group. In group I, death occurred in the 3rd postoperative day after reversion of Hartmann's procedure mostly due to pulmonary embolism. In group II, death occurred in 18th postoperative day due to uncontrolled high output ileostomy with associated sepsis and burst abdomen. In group III, the death occurred in the 2nd postoperative day due to myocardial ischemia over-imposed on old myocardial infarction and pervious old cerebral stroke.

**Table 1. Shows the age & sex distribution, site of obstruction and presence of concurrent medical diseases among the three groups.**

| | Group I (n=25) | Group II (n=25) | Group III (n=25) | P. value |
|---|---|---|---|---|
| **Age (in years)** | 38 : 74 (58±12) | 41 : 71 (53±10) | 35 : 78 (55±14) | 0. 26 |
| **Male : female** | 13 : 12 | 14 : 11 | 15 : 10 | 0.85 |
| **Site of obstruction** | | | | |
| *sigmoid colon | 10 (40%) | 12 (48%) | 12 (48%) | 0.20 |
| *descending colon | 8 (32%) | 7 (28%) | 6 (24%) | 0.29 |
| *splenic flexure | 7 (28%) | 6 (24%) | 7 (28%) | 0.93 |
| **Concurrent medical disease.** | | | | |
| • HT | 6 (24%) | 7 (28%) | 5 (20%0 | 0.35 |
| • DM. | 4 (16%) | 3 (12%) | 7 (28%) | 0.50 |
| • Old MI. | 1 (4%) | 0 (0%) | 1 (4%) | 0.61 |
| • Old CS. | 0 (0%) | 1 (4%) | 1 (4%) | 0.61 |
| • Total | 11 (44%) | 11 (44%) | 14 (56%) | 0.61 |

(HT) = significant hypertension. (DM) = diabetes mellitus.
(MI) = old myocardial infarction. (CS) = old cerebral stroke.

**Table 2. Shows the differences among the three regarding the operative time and operative blood loss.**

| | Group I (n=25) | Group II (n=25) | Group III (n=25) | P value |
|---|---|---|---|---|
| Operative time (in min.) | 120± 60 | 180 ± 85 | 200 ± 90 | 0.001 |
| Operative blood loss (in ml.) | 500 -700 (600) | 500 - 700 (600) | 400 - 500 (450) | 0.001 |

**Table 3. Shows the incidence of post-operative morbidity and mortality in the three groups.**

| | Group I n = 25 | Group II n = 25 | Group III n = 25 | P value |
|---|---|---|---|---|
| **Postoperative morbidity** | | | | |
| *wound infection | 2 (8%) | 3 (12%) | 3 (12%) | 0.86 |
| *chest infections | 1 (4%) | 3 (12%) | 3 (!2%) | 0.53 |
| *malnutrition | 2 (8%) | 9 (36%) | 0 (0%) | 0.000 |
| *burst abdomen | 0 (0%) | 1 (4%) | 0 (0%) | 0.36 |
| *pulmonary embolism | 1 (4%) | 0 (0%) | 1 (4%) | 0.59 |
| **Operative mortality** | 1 (4%) | 1 (4%) | 1 (4%) | 1.00 |

**Table 4. Shows the incidence of psychological troubles among the three groups.**

| Psychological troubles | Group I n = 25 | Group II n = 25 | Group III n = 25 | P value |
|---|---|---|---|---|
| Depressed mood | 12 (48%) | 15 (60%) | 5 (20%) | 0.01 |
| Nervousness & irritability | 7 (28%) | 15 (60%) | 3(12%) | 0.001 |
| Isolation | 12 (48%) | 8 (32%) | 0 (0%) | 0.004 |
| Bouts of weeping | 4 (16%) | 9 (36%) | 1 (4%) | 0.01 |
| Total no of patients who had Psychological troubles. | 19 (76%) | 22 (88%) | 6 (20%) | 0.000 |

**Table 5. Shows the results of Hamilton scale for depression among the three groups.**

| Hamilton scale | Group I n = 25 | Group II n = 25 | Group III n = 25 | P. value |
|---|---|---|---|---|
| Score | 17.6 ± 0.51 (Moderate) | 29.7 ± 9.06 (very severe) | 11.8 ± 2.6 (Mild) | 0.000 |

**Table 6. Shows the difference in the total hospital stay and the time delay before chemotherapy among the three groups.**

| | Group I (n= 25) | Group II (n= 25) | Group III (n= 25) | P. value |
|---|---|---|---|---|
| Total hospital stay ( in days ) | 23.5 ± 10.25 | 21.25 ± 11 | 9 ± 2.5 | 0.000 |
| Delay before starting chemotherapy ( in days ) | 125 ± 40 | 109.5 ± 30 | 35.5 ± 10 | 0.000 |

## DISCUSSION

In the present study, no selection of the procedure on the ground of the patient condition or the degree of colonic distension or the surgeon preference. The procedure was decided according to the serial number of patient in the study which determines the group to which he will join The three groups were well matched regarding the patients and disease characteristics.

The longer mean operative time in group III in comparison to the other two groups is explained by the extra-time needed for the on-table lavage of the colon and this agrees with results recorded by many studies[5,8,9,15] however we recorded less operative blood loss in group III than the other two groups and this is explained by the additional blood loss that occurs during performance of the stomas in group I and II.

There is a significant high incidence of nutritional problems in patients with ileostomy and reported the only case of burst abdomen. This should be considered during taking the decision of covering ileostomy in already malnourished or low body weight patients.

The higher incidence of the psychological troubles in group I & II in comparison to group III is mostly due to the stoma of which the patient is shameful and his sense that he still needs others' care and that he has not recovered yet and still there is another surgical setting, this is beside the serious nutritional deficiencies that undoubtedly affect the patient's emotions and mood.

There was no difference in the incidence of anastomotic leakage among the three groups (one case in each group). This may point to a fact that none of the three methods has superiority over the other in its protection against leakage and there is no absolute prophylaxis against leak, but it is worth to mention that leakage was not life threatening in the three groups.

There was no difference in the 30 days operative mortality among the three groups (one in each group).

In conclusion Hartmann's procedure remains the easiest and the safest primary surgery as it doesn't carry the risk of leakage in the first stage but the second stage is usually difficult and still carries the risk of leakage. In addition, it has a prolonged convalescence, repeated hospital admission and delay in starting chemotherapy. This is beside the psychological drawbacks and complications of the stoma.

Primary resection anastomosis with covering ileostomy appears to carry the high risk of stomal & nutritional problems without remarkable protective value against leakage. Also, it usually leads to longer hospital stay and much delay before starting chemotherapy this is beside its serious depression and psychological troubles.

Primary resection anastomosis after on-table colonic lavage appears to be the most ideal procedure as it provides a single stage final solution of the problem without increased risk of leakage or other complications. In addition it has the shortest hospital stay and the least psychological impact on patients and provides the chance for early chemotherapy and devoid of stomal complications.

## REFERENCES


1. Deans GT, krukowski ZH, Irwin ST. malignant obstruction of the left colon, Br J surg. 1999;81:1270-6.

2. Tekkis PP, Kinsman R, Thompson MR et al. Association of coloproctology of great Britain and Ireland study of large bowel obstruction caused by colorectal cancer. Ann surg. 2004;240:76-81.

3. Dean K, Madoff R, Coldberg S, Rothenberger D, Surgical management of left colon obstruction: The university of Minnesota experience. J Am coll surg. 1998;187:573:6.

4. Gandrup P, Lund L, Balslev I, Surgical treatment of acute malignant large bowel obstruction. Euro J Surg. 1992;158:427-30.

5. Sjodhl R, Franzen T, Nystrom P. resection for acute obstructing colorectal carcinoma Br J surg. 1992;79:685-8.

6. Edwards DP, Lappington–Clarke A, Sexton R. et al. stoma-related complications are more frequent after transverse colostomy than loop ileostomy: a prospective randomized clinical trial. Br J surg. 2001;88:360-63.

7. Mackenzie S, Thombson S, Backer L. management options in malignant obstruction of left colon. Surg Gynecol Obst. 1992;174:337-45.

8. Leitmann J, Sulivan J, Brams D, De cosse J. multivariate analysis of morbidity and mortality from the initial surgical management of obstructing carcinoma of colon. Surg Gynecol Obst. 1992;179:513-18.

9. The SCOTIA study group: subtotal colostomy versus on-table irrigation and anastomosis. Single stage treatment for malignant left-sided colonic obstruction: Prospective randomized clinical comparing subtotal colectomy with segmental resection following intra-operative irrigation Br J Surg. 1995;82:1622-7.

10. Van Gekdere D, Fa–Si–Oen P, Noach I, et.al. Complications after colorectal Surgery without mechanical bowel prep. J Am Surg. 2002;199:40-7.

11. Tan CJ, Dasari BVM and Gardiner K. Systematic review and meta-analysis of randomized clinical trials of self-expanding metallic stents as a bridge to surgery versus emergency surgery for left sided large bowel obstruction Br J Surg. 2012;99:469-76.

12. Pirlet IA, Slim K, Kwiatkowski F, Michot F, Millat BL. Emergency preoperative stenting versus surgery for acute left sided malignant colonic obstruction: a multicentre randomized controlled trial. Surg Endosc. 2011;25:1814-21.

13. Kim JS, Hur H, Min BS, Sohn SK, Cho CH, Kim NK. Oncological outcomes of self-expanding metallic stent insertion as a bridge to surgery in the management of left sided colon cancer obstruction: a comparison with non-obstructing elective surgery. World J Surg. 2009;33:1281-6.

14. TG Allen– Marsh. Should primary anastomosis and on-table colon lavage be standard treatment for left colon emergencies? Ann R coll Engl. 1993;75:195-1.

15. Hamilton M. Development of a rating scale for primary depressive illness. Br j Soc Clin Psychol. 1967;6:278-96.