

## Original Research Article

# Early experience of laparoscopic assisted right hemicolectomy: a single-center analysis

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### ABSTRACT

**Background:** Laparoscopic colon surgery has been currently accepted as an alternative to open surgery for colon cancer. the laparoscopic approach, also, has been shown to offer clear evidence of benefit when compared to open surgery.

**Methods:** From July 2013 to July 2016, patients admitted via the outpatient clinics of Menofia University Hospital for elective right hemicolectomy of proved malignancy of the cecum, ascending colon, and hepatic flexure of colon were evaluated for eligibility in this study.

**Results:** The study consisted of 22 patients; of them 13 were males (59.1%) and 9 were females (40.9%) patients, with a mean age of  $43 \pm 9$  years (range 25-70 years). mean operative time was  $125 \pm 14$  minutes (range 100-145 minutes). only four (4) intramuscular opioid injections were given as post-operative analgesia. clear fluids were started 48 hours after surgery and soft diet allowed after 72 hours. the mean length of hospital stay was 5.7 days. Only one male patient was converted to conventional surgery due to advanced tumor. two patients developed surgical site infection in the post-operative period that was mild and managed conservatively. there were no cases with intestinal leakage and mortality rate in 30 days postoperative follow up was zero.

**Conclusions:** Laparoscopic assisted right hemicolectomy is safe and feasible technique with a good learning curve.

**Keywords:** Laparoscopic assisted, Right hemicolectomy

### INTRODUCTION

Laparoscopic colon surgery has been currently accepted as an alternative to open surgery for colon cancer.<sup>1</sup> The laparoscopic approach, also, has been shown to offer clear evidence of benefit when compared to open surgery. These benefits include reduced length of hospital stay, earlier return of bowel function as well as reduced blood loss and pain without compromising quality of oncological resection and nodal yield.<sup>2</sup>

Laparoscopic right colectomy (LRC) requires advanced skills and a specific training is recommended in order to

perform this operation safely and effectively. Differences in training protocols exist among surgical teams and the need for a consensus on the key steps of LRC has been stressed by many authors.<sup>3</sup>

The perceived difficulties in performing LRC are further enhanced by the introduction of the concept of complete mesocolic excision (CME) in the surgical treatment of colon cancer. Several techniques have been proposed for LRC with CME and good oncologic results are reported in experienced hands.<sup>4</sup> Furthermore, complete mesocolic excision (CME) has been demonstrated to provide

superior nodal yield and offers prospects of better oncological outcomes than non-CME surgery.<sup>5</sup>

## METHODS

From July 2013 to July 2016, patients admitted via the outpatient clinics of Menofia University Hospital for elective right hemicolectomy of proved malignancy of the cecum, ascending colon, and hepatic flexure of colon were evaluated for eligibility in this study.

Patients requiring emergency surgery, those with signs of total obstruction, and those with metastatic colorectal cancer were excluded from this study. All patients' demographic data and surgical details were recorded and analysed retrospectively.

The patients were admitted one or two days prior to scheduled surgery. Detailed history and clinical examination of each patient was done, followed by routine laboratory investigations. Biopsy and staging investigations were undertaken after clinical assessment. Anesthesia evaluation was done in all patients. No formal gut preparation was done. An informed consent was taken. All patients underwent laparoscopic assisted right hemicolectomy in Trendelenburg position with left tilt under general anesthesia. Medial to lateral approach was used for dissection of the colon.

### Data collection

Clinical data like age, sex, operation time, total blood loss during surgery, liquid diet start time, time of first flatus, postoperative hospital stay, and complications within 30 days after surgery were collected. To evaluate the oncologic quality of the resection, tumor size, distal and proximal resection margin, and number of lymph nodes harvested were collected and compared consequently.

### Operative techniques

The patient was put in a left-tilt Trendelenburg position, and pneumoperitoneum with a pressure of 14cm H<sub>2</sub>O was initiated. A total of 4 trocars were used: two 12 mm trocars (umbilicus and left upper abdomen) and two 5mm trocars (right lumbar and left iliac).

The small bowel was displaced to the left and the omentum was turned up to the upper quadrant. The transverse colon and the ileocecal junction were towed cranially and laterally respectively. These retractions tented up the root of the mesentery and the right mesocolon, displaying the ileocolic and superior mesenteric vessels clearly, even in very obese patients.

A medial-to-lateral approach was useful to facilitate the exposure of the mesentery with the assistance of the peritoneal fixation of the right colon laterally. The "mesenteric window" was opened just at the inferior edge of the ileocolic vascular pedicle, which stood out clearly.

The origins of the ileocolic vessels were identified and then ligated at their origin point from the superior mesenteric vessels.

Then, dissection was done bluntly to separate the mesocolon from retroperitoneal structures. Dissection was made from above the retroperitoneum and the Gerota's fascia to the hepatocolic ligament. Then, the white line of Toldt was dissected to totally mobilize the ascending colon.

Besides, the right colic artery, and the middle colic artery were identified and ligated in cases of ascending and hepatic flexure tumours. After mobilization and division of the ileocolic pedicle from the duodenum, the dissection of the ventral side of the superior mesenteric vein leads to a complete dissection of the root of the middle colic artery and vein.

Careful dissection onto the duodenum and the caudal portion of the pancreas must be exercised in the exposure of the middle colic vessels. Dissection around Henle's trunk (the trunk of mesenteric veins) may lead to the exposure of an accessory right colic vein. Accessory right colic vein and right branches of middle colic vessels are clipped and divided.

The omentum along the transverse colon was divided and the lesser sac was entered. The hepatocolic ligament was transacted and the transverse colon was mobilized.

Once the entire right colon is freed, it is withdrawn through an enlargement of port site at the right lumbar region. The resection of ileum and transverse colon, and the anastomosis are accomplished extracorporeally by functional end to side anastomotic method using hand-sewn method. The anastomotic site is returned to the peritoneal cavity. Wounds and peritoneal cavity are copiously irrigated. All wounds are closed, and operation is completed.

## RESULTS

The study consisted of 22 patients; of them 13 were males (59.1%) and 9 were females (40.9%) patients, with a mean age of 43±9 years (range 25-70 years). Mean operative time was 125±14 minutes (range 100-145 minutes). Only four (4) intramuscular opioid injections were given as post-operative analgesia. Clear fluids were started 48 hours after surgery and soft diet allowed after 72 hours. The mean length of hospital stay was 5.7 days. Only one male patient was converted to conventional surgery due to advanced tumor. Two patients developed surgical site infection in the post-operative period that was mild and managed conservatively. There were no cases with intestinal leakage and mortality rate in 30 days postoperative follow up was zero.

As regarding histopathological reports; all cases were of adenocarcinoma type and no locally advanced tumours

(T4), surgical margins were free in all cases and the mean total number of lymph nodes harvested was 16.1.

The distribution of patients according to demographic characteristics, operative time, and duration of hospital stay are given in (Table 1).

**Table 1: Demographic characteristics, operative findings and postoperative complications.**

Characteristics	Total no. (22 cases)
Mean age (years)	43±9
Sex (male/female)	13/9
Body mass index	33±5
Tumor size (cm)	6.7±2
Site of lesion	
Caecum	14/63.6%
Ascending colon	5/22.7%
Hepatic flexure	3/13.7%
Depth of invasion	
T1	0/0%
T2	6/27.3%
T3	16/72.7%
T4	0/0%
Mean LN harvested	16.1
Mean operative time (min)	125±14
Mean hospital stay (days)	5.7
Wound infection	2/1.1%
Anastmotic leakage	0/0%

## DISCUSSION

In recent years, most reports indicated that patients who received laparoscopic colectomy had earlier bowel movement, shorter hospital stay, and better post-operative life quality with comparable postoperative complication rate.<sup>6,7</sup> In addition, recent RCTs and meta-analysis show, with level 1 evidence, that LCS achieves good oncological results compared to conventional surgery, definitely erasing early critical aspects over port-site metastases and doubtful oncologic adequacy of resections.<sup>8</sup>

This study presents twenty-two cases of laparoscopic assisted right hemicolectomy, representing the early experience.

Medial-to-lateral approach is actually considered of choice to perform laparoscopic surgery of right colon. Despite this technique can appear less familiar to some Surgeons, due to turning over of the classical lateral-to-medial approach of open procedures, it provides a technical feasibility through the early identification of the plane between the mesocolon and retroperitoneum, which, with the help of CO2 insufflation, minimizes the risk of injury to the ureter or the gonadal vessels. This approach also allows reaching an oncologic safety due to a real “no touch isolation technique”.<sup>9</sup>

Current standards of oncologic radicality include proximal ligation of the primary arterial supply, adequate proximal and distal margins, appropriate lymph nodes dissection and a real “no-touch isolation” technique that avoids manipulation and perforation of the tumor. In addition, a protected specimen retrieval is recommended.<sup>10</sup>

The operative duration learning curve reveals initial durations of about 145 minutes, which is more than double the durations reported for conventional right hemicolectomy performed by experienced surgeons. However, the duration decreased to about 100 minutes by the end of the study. The mean operative time in this study was quite comparable to other studies with reported mean operative time of ranges widely between 107 and 208 minutes.<sup>11</sup>

The present study has shown that patients had a significantly short post-operative hospital stay, decreased analgesic requirements and quicker bowel recovery than the experience in open surgery. Literatures had shown the use of post-operative parenteral or epidural analgesia for 48 hours.<sup>7</sup> In the patients, post-operative analgesics injections were required for 48 hours as well.

West et al, reported a mean hospital stay of 8.5±1.2 days.<sup>12</sup> The total duration of hospital stay was observed to be shorter in present study as compared to them. Post-operative hospital stay in present study was 5.7 days, which is comparable to 5 days and 6 days stay quoted in local and international studies by Maher et al and Senogore respectively.<sup>13,14</sup>

Author started clear fluids after 48 hours of surgery in the patients and allowed soft diet after 72 hours. In present study, no patient required insertion of nasogastric tube. However, some literatures showed 6% rate of re-insertion of nasogastric tube as Hohenberger et al.<sup>15</sup> Similarly, the time to first bowel movement in the present study was 48 hours which is comparable with that, published in other literatures as Zheng et al. about 3.5±1.3 days.<sup>16</sup>

The present study documented only two cases of surgical site infection as the only morbidities, these results matched to the trial done by Fabozzi et al.<sup>17</sup> who reported no post-operative complication in his subjects. The main limitation of the present study is the inclusion of small number of cases since most of these malignancies presented in advanced stage where laparoscopic surgery was not feasible.

The average nodal yield of 16.1 is slightly less consistent with previously published reports of 30 lymph nodes with right hemicolectomy and CME and is close to average yields of fewer than 18 lymph nodes with conventional surgery. The presence of at least 12 lymph nodes in the surgical specimen is widely accepted as the standard of treatment in colorectal cancer. In this study, there were two cases (with ten and 11 lymph nodes) with an

inadequate number of harvested lymph nodes. However, the overall percentage of cases for which adequate lymph nodes were harvested (20 of 22 cases or 90.9%) in this relatively small study is less than that reported in the national comprehensive cancer network (92%) and more than that reported in surveillance epidemiology and end result (58%) databases.<sup>18</sup>

## CONCLUSION

Laparoscopic assisted right hemicolectomy is safe and feasible technique with a good learning curve.

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