

Laparoscopic Low and Ultra - Low Anterior Resections: A Retrospective Analysis of 50 Sphincter Saving Procedures

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Laparoscopic Anterior resection for rectal cancer is a well-established procedure supported by several well-conducted large-scale randomised controlled trials and a lot of studies were published regarding this concern.

Aim of work: To evaluate the role of the laparoscopic techniques in the resection of low rectal cancers

Patients and methods: From July 2013 to September 2016 in Ain Shams University Hospitals, review of retrospectively collected data of 50 laparoscopic resections for low rectal cancer was done (low and ultra-low resection). Operation time, intra-operative blood loss, surgical complications, duration of hospital stay, retrieved lymph nodes, tumour, node, metastasis (TNM) stage and their follow up in outpatient department (OPD) were analysed.

Results: Forty four patients completed laparoscopic resections without conversion to open surgeries, 3 patients had minor leak from the staple line, 4 patients had anal stenosis and free distal margin was obtained in 95.5%.

Conclusion: Laparoscopic anterior resection for low rectal cancer is feasible and can be performed safely with acceptable rates of overall postoperative morbidity and low rates of specific complications.

Key words: Laparoscopic low anterior resection, proctectomy, rectal cancer.

Introduction

Traditionally, colorectal cancer resection has been performed through open surgery. However, following a lot of successful laparoscopic procedures, such as cholecystectomy, appendectomy and repair of inguinal or incisional hernias, this surgical technique has gradually been introduced firstly in the treatment of colon cancer and then in the treatment of rectal cancer.¹

Laparoscopic resection of the colon was first described by Jacobs and colleagues in 1991. Then the laparoscopic surgery has gained worldwide clinical acceptance in the treatment of patients with colorectal cancer as there are many benefits of the laparoscopic procedures such as decreasing surgical trauma, fewer post-operative complications, and rapid post-operative recovery in comparison with the ordinary open procedures.²

There was uncertain data from previous publications supporting the use of laparoscopic procedures for the treatment of low rectal cancers. That is why long-term oncological outcomes, remains unclear whether laparoscopic resection is feasible for the treatment of such low rectal cancers.³ However, the oncological safety of laparoscopic surgery for rectal cancer remained controversial due to the lack of definitive long-term results. Thus, the expected short-term benefits can only be of interest when oncological results are at least equal.⁴

However, during the last decade, data from multicentre studies and a meta-analysis have shown that rectal tumours may be laparoscopically removed without increasing the rate of morbidity or worsening oncological results.⁵

Despite the more recent studies which did not reproduce these results, many concerns still persist about the use of laparoscopic surgery in colon and rectal cancer treatment, notably with respect to the technique's complexity, the associated learning curve and the longer operative time.⁶

Aim of work

The aim of this study was to evaluate the role of the double stapled laparoscopic techniques in the resection of low rectal cancers in addition to its technical feasibility, complications and oncological outcomes.

Patients and methods

Our study was a retrospective study conducted at Ain Shams University Hospitals (El Demerdash and Ain Shams Specialized Hospitals). Reviewing the reports of 50 patients who were offered double stapled laparoscopic resections for low rectal cancers from July 2013 to September 2016 was done. Procedures performed were low/ultralow anterior resections.

The study was approved by the Ain Shams University Surgical Institutional Review Board.

The data obtained included:

- The preoperative history sheets including symptoms e.g.; change in the bowel habits (constipation or diarrhea), tenesmus, distension, bleeding, loss of weight and fatigue. A detailed family history of other family members who may have colorectal cancers or other extra colonic malignancies was also taken.
- Full general and local examination sheets (including digital rectal examination to access the mass, its distance from the anal verge).
- Full colonoscopy with subsequent biopsy reports, in addition to the reports of any biopsy taken via examination under general anaesthesia (if happened).
- Triphasic abdominal computed tomography (CT) films and reports for assessment of the extra colonic spread e.g.; liver metastasis. Chest computed tomography (CT) reports to assess pulmonary Mets.
- Full laboratory investigations in form of complete blood count, liver and renal functions, bleeding profile, viral markers, electrolytes, serum albumin and tumor markers "serum carcinoembryonic antigen (CEA) and CA19.9".
- Pelvic magnetic resonance imaging (MRI) was done to all patients for proper and detailed assessment of the tumour regarding the invasion of rectal wall layers and the nodal status as well as transmesorectal spread.
- History of the preoperative neoadjuvant radiochemotherapy (if it was indicated).
- Operative details were collected especially intra-operative blood loss, operation time, quality of the specimen and mesorectum, conversion to open surgery, the number of days until bowel function resumed, duration of hospital stay and surgical complications.
- Whole specimen histopathological reports were reviewed with concern to type and degree of differentiation of the tumour, safety margins of the specimen including the proximal, distal margins and circumferential margins, the status of the donuts in case of stapled anastomosis, T status and N status.
- Reports of the postoperative OPD follow-up visits till the end of the 3rd postoperative month.

Results

Out of the total 50 patients, 37 (74%) were males, and 13 (26%) were females. The age range was (19-74) years.

Forty two (84%) patients presented mainly with altered bowel habits. 39 patients (78%) presented with bleeding per rectum, 40 patients (80%) with tenesmus and significant loss of weight in 14 patients (28%). Preoperative anemia was encountered in 16 (32%) patients who presented with Hgb% less than 10.5gm% but more than 9gm%, while Hgb% less than 9gm% in seven patients (14%) those who received pre-operative blood transfusion (2-3 units of PRBCs). Hypoalbuminemia (less than 3.5 g/dl) was found in 4 patients (8%), two of them were known (HCV+) patients.

Preoperative abdominal CT-scan revealed liver metastases in 7 cases (14%) and cirrhotic liver pattern was noted in one case with minimal ascites. Regarding chest CT scan all of them were free regarding pulmonary Mets, effusion.

Regarding the preoperative MRI rectal protocol, it showed T1 stage in five patients (10%), T2 stage in 35 patients (70%), T3 in 8 patients (16%), while the nodal affection was positive in 41 cases (82%).

In our study, 43 patients received neoadjuvant chemoradiotherapy (two cycles of 5-Fluorouracil (5-FU) 450 mg/m² in continuous infusion and leucovorin 20 mg/m² for 5 days in the first and fifth weeks and radiotherapy 4,500 Gy in 25 fractions). The post chemo-radiotherapy MRI (n: 43) were done to assess the degree of tumour regression and nodal status and laparoscopic proctectomies were performed around the 6th to the 8th weeks post-completion of neoadjuvant therapy.

Low AR was performed in 44 cases (88%) and ultra-low AR in 6 cases (12%). Protective ileostomy was done in 49 patients (98%) except one who refused to have an ileostomy that he was counselled about its importance. The potential laparoscopic technique for all patients was medial to lateral approach with double stapled anastomosis. The retrieval of the specimen in patients who had completed laparoscopic procedures without conversion to open surgery (n: 44) were from small Pfannenstiel incisions.

Conversion to open surgery was done to six patients (12%), one case due to left ureteric injury, 2 cases for inadequate pelvic dissection, colonic perforation (splenic flexure) in one case, and the remaining case conversion was due to failed stapling technique.

For the 44 patients who completed successful

laparoscopic surgeries.

- The operative time was ranging from 175 minutes to 290 minutes and the blood loss was 80-320 ml. The postoperative hospital stay range was 7-13 days, and the number of days to toleration clear fluids oral intake was 1.5-2.5 day.
- The postoperative surgical morbidity rate was 22.7%, which included 3 anastomotic leakages (6.8%), and the diagnosis was confirmed by pelviabdominal CT with oral and IV contrast or gastrograffin enema study. Conservative management was done in the form of intravenous antibiotics according to C&S and U/S guided drainage in 1 case with pelvic collection. In the other 2 patients they were asymptomatic and discovered on doing routine gastrograffin enema prior to ileostomy closure, so ileostomy closures were postponed for 2 months and leaks disappeared in the next gastrograffin enema study (n: 2).
- Anal stenosis was present in 4 cases (9%). Dilatation was enough, which was done in repeated sessions of EUA and manual dilatation.
- One case had anastomotic recto-vaginal fistula (2.3%), in addition two cases had erectile dysfunction (4.5%).
- Postoperative mortalities were two cases (4.5%), one patient died of pulmonary embolism and the second mortality was due to liver cell failure (patient was child B preoperatively).
- Free distal margins > 1cm were obtained in 42 patients (95.5%), distal margin less than 1 cm in one case (2.3%), the circumferential margin involved in 2 cases (4.5%) and distal margin was infiltrated in 1 case (2.3%). The nodal status was positive in 37 cases (84.1%) and the mean number of lymph nodes retrieved was 7-22 with mean 10.8.

One case (from patients who were converted to open method [n: 6]) with midline incisions was complicated with wound infection with partial anterior sheath dehiscence without evisceration of the bowel loops. He was treated conservatively in form of broad spectrum antibiotics, abdominal binders and daily dressing.

Regarding the histopathological examination of the specimens, from our 50 cases, 48 specimens were adenocarcinoma (with variable degrees of differentiation). The remaining two cases were

tubulovillous adenomas with high grade dysplasia.

Table 1: Postoperative surgical complications for the 44 patients completed laparoscopic surgeries

Complications	N: 44	%
Leakage	3	6.8
Anal stricture	4	9
Anastomotic RV fistula	1	2.3
Wound dehiscence	0	0
Voiding problems	0	0
Sexual dysfunction	2	4.5
Total morbidity	10	22.7
Mortalities	2	4.5

RV fistula: rectovaginal fistula

Discussion

Laparoscopy has a lot of surgical advantages in the treatment of colorectal diseases and with the publication of several multi-institutional prospective randomized trials, it became clear that laparoscopic colectomy is equivalent to open colectomy in terms of oncologic safety for all stages of colon cancer. Margins of resection, number of lymph nodes harvested, cancer related survival rates, and rates of complications and mortality are the same whether the operation is performed open or laparoscopic. However, with tumours in the low rectum, the laparoscopic approach is a technical challenge, especially if sphincter preservation is required.⁷⁻⁹

Laparoscopic resection for rectal cancer may be associated with relatively high morbidity and conversion rates. In our study, the morbidity rate was 22.7% with two cases of mortality (4.5%). This is equivalent to rates reported in multiple studies (27.0-35%).¹⁰ Zhu et al, in a study performed upon 132 patients reported 20.5% as their overall incidence of surgical complications.¹¹ Toda & Kuroyanagi in their review concerned with the same article reported 6.1% to 69% post-surgical complications.¹² Moreover, in a large randomized controlled trial which included 484 cases of laparoscopic colorectal surgery the rate of intraoperative complications was 14% while the postoperative anastomotic leak rate was 10%.¹³ Also, the anastomotic leakage rate of 6.8% in our study is lower than the rates reported in other studies 9.1% and 9.8%, respectively.^{11,14}

The incidence of leak in our patients could be attributed to the lower location of the tumors in our patients. Lipska et al,¹⁵ performed a risk factor analysis for 98 cases of laparoscopic LAR and concluded that tumor located within 6 cm from the anal verge is a significant risk factor for surgical complications.

Unfortunately the mortality rate in our study is higher than reported rates which are around 1%.¹⁶

In our opinion it is related to the poor general condition of patients included in our study rather than the laparoscopic technique itself, moreover this low percentage (1%) was not specific for rectal resections only. Favouring our results is what was reported regarding the mortality rate after laparoscopic resection of low rectal tumors which is 4%.¹²

The 12% conversion rate in our study compares favourably with the results in many different studies with the mean conversion rate for collated series being in the region of 14.5-17.5%.^{4,17,18}

The rate of protective ileostomy was 98% which was routinely done for all patients except one due to patient's refusal. The role of diverting loop ileostomy in our opinion was not to prevent the leakage but to minimize the leakage manifestations and to permit an enough time for healing without a need for intervention.

In our study, the mean hospital stay was 10±3 (7-13 days) which is comparable to the values previously reported which is 8-11 days¹² and the mean operation time was 180-290 minutes, which is comparable to previously reported operation times ranging from 55-210 minutes and 138-250 minutes, respectively.^{11,14}

The mean amount of blood loss of 200±120 cc (range 80-320 cc) in the present study is comparable to the amount previously reported 20-320 cc and 170±130 cc, respectively.^{12,14} The range of days to gas out was (1-3 days) and the range of days to intake of a liquid diet is (1.5-2.5 days) in our study both are comparable to the values previously reported which is 2.65±1.35 to gas out and 2.35±1.25 to intake of liquid diet.¹⁴

Examination of the oncologic adequacy of laparoscopic rectal resection in our study showed two cases with involved circumferential margins, one case with distal margin less than 1 cm and one case with infiltrated distal margin and completion APR were done in a second surgical session for the last two patients. In a study conducted by Lam et al,¹⁹ from 97 patients who underwent laparoscopic low and ultralow ARs, they had 3 patients with infiltrated margins (distal margin). Vennix et al, after reviewing 29 references they stated that the surgical margins and number of lymph nodes retrieved are the same between open and laparoscopic LARs.⁴

The mean number of retrieved lymph nodes was 7-22 comparable to the values previously published

which is 12.25±8.15.²⁰

Conclusion

In conclusion, laparoscopic resection for low rectal cancers is a feasible technique and with proper training it can be performed safely with acceptable rates of overall morbidity. The limitations of this study include the relatively small sample size and the relatively short follow-up time, particularly for maintenance of oncologic issues. Planned randomised controlled trials addressing this issue with a larger sample size and long-term follow-up should be performed.

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