The Gulf Journal of Oncology

Indexed By PubMed and Medline Database

Issue 45, May 2024
ISSN No. 2078-2101





Tafaul-Al-Ahsa Cancer Foundation Wins EXCELLENCE AWARD for Cancer Awareness Initiatives at Gulf Cancer Awareness Week 2024





The Gulf Oncology Society meeting resulted in fruitful outcomes, with young doctors showing keen enthusiasm for assuming leadership roles and implementing impactful initiatives.

The Official Journal of the Gulf Federation For Cancer Control

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Original Article

Laparoscopic Versus Open Surgery for Colorectal Cancers: Clinical and Pathological Outcomes from a Single Institution in Bahrain

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Abstract

Introduction: Colorectal carcinoma is commonly diagnosed and accounts for an important cause of cancer–related mortality worldwide. Despite that literature has shown the superiority of laparoscopic surgery, with improved short–term clinical benefits and equivalent oncological outcomes compared with open surgery for colorectal cancer, most cases are operated by open approach. The purpose of this study was to compare the clinical and pathological outcomes between laparoscopic and open colorectal cancer surgery at our institution.

Methodology: 126 patients who had operations for colorectal cancers were identified. Patients' clinical data, surgery type and details, postoperative early clinical outcomes and histology reports were retrieved from the database and retrospectively reviewed. Statistical analysis was used to assess the differences between laparoscopy and open approach in terms of clinical and oncological outcomes.

Results: Significant advantages were associated with minimally invasive colorectal surgery, with shorter postoperative hospital stay, less incidence of medical complications and improved survival. There were no statistically significant differences between both groups in pathological parameters, namely, number of retrieved lymph nodes and margins.

Discussion: In the hands of skilled trained surgeons, laparoscopic surgery for colorectal cancer is oncologically safe as it showed adequate dissection and appropriate number of resected lymph nodes, and is associated with reduction in postoperative morbidity and mortality. Conversion to open surgery is a risk associated with minimally invasive surgery. However, it is reported that conversion and postoperative complications are decreasing with increased surgical experience.

Conclusion: In accordance with the current worldwide practice, our study indicates that minimally invasive surgery for colorectal cancer has the benefits of laparoscopy in terms of short–term clinical outcomes but show similar pathological outcomes in comparison to open approach. With increased surgical expertise, laparoscopic surgery is becoming the standard approach to treat colorectal cancer in our centre.

Keywords: colorectal oncology, clinical and pathological outcomes, open colorectal surgery, laparoscopic colorectal surgery.

Introduction

Colorectal cancer accounts for the third most prevalent cancer and is the second leading cause of cancer associated mortality worldwide[(1)]. Since it was first described in 1991, many reports of laparoscopic surgery for the treatment of colorectal cancer have been described[(2)]. Despite that published papers have concluded the superiority of laparoscopic surgery over open surgery, older studies suggest that laparoscopic surgery for colorectal cancer has not gained universal acceptance in clinical practice[(3)]. One of the reasons for this is that laparoscopic colorectal surgery requires advanced laparoscopic skills with a steep learning curve[(4)]. Concerning the oncological safety of laparoscopic surgery for colorectal cancer, multiple randomized controlled trials have shown that it is feasible with similar

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outcomes compared with open approach[5–9]. Laparoscopic colorectal surgery has the advantages of reduced pain after surgery, less bleeding intraoperatively, shorter hospital stay and improved return of bowel function[10]. Even though laparoscopy has equivalent oncological outcomes and better short–term postoperative benefits, conventional open surgery remains the most common approach to treat these patients[4]. In our centre, laparoscopic colon surgery was started in 2008 for selected cases. Later in 2013, with the increased expertise of our surgeons after returning from fellowships in minimally invasive surgery. Laparoscopic surgery for colorectal cancer became performed more frequently, and more established. The purpose of this study was to assess the oncologic safety and utility of laparoscopy by comparing the short–term oncological and clinical outcomes with open technique in colorectal cancer patients over a 5–year time frame at our institution.

Patients and Methods

We reviewed our database of 126 patients with colorectal cancer who had surgery at Salmaniya Medical Complex in Bahrain, from January 2016 to January 2021, retrospectively. Patient's demographic data, type of surgery, postoperative early outcomes and pathological outcomes were analysed. All patients were pathologically diagnosed with colon or rectal cancer. Final staging of cancers was done histologically along with CT scans of the chest, abdomen, and pelvis to rule out metastasis. Patients with synchronous tumors and those with metastases were excluded.

Operative technique

Patients who underwent elective surgery had thromboprophylaxis with enoxaparin, surgical prophylaxis with intravenous ceftriaxone and metronidazole and polyethylene glycol for mechanical bowel preparation. Laparoscopic dissection was done through medial approach and using Harmonic or Ligasure, depending on surgeon preference. In right–sided colectomies, the anastomosis was performed intracorporeally with an endovascular gastrointestinal anastomosis stapler. In left hemicolectomies, the distal segment was resected laparoscopically and a Pfannesteil incision was utilized to deliver the proximal segment and place the anvil, then the anastomosis was done. A wound protector was used to retrieve the specimen in all patients. In all low anterior resection cases, a protective ileostomy was done. Patients in both laparoscopic and open groups underwent standard oncologic resection. A drain was kept at the anastomosis and removed prior to discharge. Patients were discharged home after tolerating soft diet and return of bowel function.

Statistical analysis

Patients' clinical and pathological variables, short–term clinical events, including morbidity and mortality, length of stay and pathological outcomes, namely the number of harvested lymph nodes and margins, were compared. The Student's t–test was used to assess continuous variables. The chi–squared test was used to analyse categorical variables. A P value of <0.05 was considered statistically significant. We used SPSS 10.0 software (SPSS, Chicago, IL, USA) to analyse the data.

Results

We identified 46 patients who underwent laparoscopic surgery and 80 patients who underwent conventional open surgery for colorectal cancer during the same period. Patient clinicopathological characteristics are described in (Table 1).

There were no differences in baseline characteristics between both groups in terms of age, gender, tumor site and operations. In 6 patients who underwent open surgery and 8 patients who underwent laparoscopic surgery, a diverting ileostomy was done.

There were 4 cases where laparoscopic surgery was converted to open surgery. Length of stay was significantly longer for patients who underwent open surgery than those who underwent laparoscopic surgery (Table 2).

There was a significant difference in the rate of postoperative complications between the two groups, where the proportion of these complications were higher with open surgery.

Comparison of pathological outcomes are shown in (Table 3).

The mean number of retrieved lymph nodes was similar in laparoscopic and open surgery, 22.8 versus 27.3, respectively. The proportion of R1 resection margins was relatively higher with open surgery. However, none of these pathological outcomes showed statistical significance between the two groups.

Discussion

This study compared short–term clinical and pathological outcomes between laparoscopic and open colorectal cancer surgery in 126 patients. Laparoscopy had shorter hospital stay and lower incidence of postoperative morbidity and mortality versus open surgery, but comparable pathological outcomes. In recent decades, laparoscopic surgery for colorectal cancer has increased after showing that it is oncologically safe, as evidenced by multiple randomised controlled trials[5–9]. Despite this and

	Laparoscopic Surgery	Open Surgery
Age		
Mean ±SD	55.2 ± 11.8	58.5 ± 13.4
Gender		
Male	25	38
Female	21	42
Tumor site		
Caecum	8	11
Ascending colon	6	8
Hepatic flexure	2	2
Transverse colon	0	7
Splenic flexure	0	2
Descending colon	1	8
Sigmoid colon	21	33
Rectum	8	9
Operation		
Right hemicolectomy	14	13
Extended right hemicolectomy	2	5
Left hemicolectomy	7	14
Extended left hemicolectomy	0	5
Sigmoid resection	7	23
Anterior resection	6	4
Low anterior resection	8	6
Abdominoperineal resection	0	2
Total colectomy	2	8
Stoma		
Ileostomy	8	6
Colostomy	0	19
Neoadjuvant therapy		
Yes	6	8
No	40	72

TABLE 1: Patient and tumor characteristics.

	Laparoscopic Surgery	Open Surgery	P value
Length of stay			
Mean ±SD	6.28 ± 4.02	13.9 ± 16.3	0.002
Complications			
Wound infection	1	14	0.001
Anastomotic leak	1	5	
Postoperative ileus	0	7	
Pneumonia	0	6	
Myocardial infarction	0	2	
Mortality	0	13	0.002

TABLE 2: Comparison of short–term clinical outcomes.

	Laparoscopic Surgery	Open Surgery	P value
Lymph nodes			
Mean ±SD	22.8 ± 8.62	27.3 ± 20.5	0.155
Adequate lymphadenectomy			
Yes	44	72	0.324
No	2	8	
Tumor extent			
T1	6	4	0.384
T2	10	9	
T3	24	37	
T4	6	30	
Nodal status			
N0	30	38	0.289
N1	8	22	
N2	8	20	
Margins			
R0	44	69	0.130
R1	2	11	

TABLE 3: Comparison of oncological outcomes

the benefits of minimally invasive surgery, most cases in our institution are managed by open approach. The reason for this may be that laparoscopic surgery requires advanced skills in order to perform oncological resection and anastomosis[4]. Also, laparoscopy is associated with prolonged operative time. However, it is reported that the operative time is significantly decreased with experience[9]. Intraoperative blood loss is minimal in laparoscopic surgery compared with open surgery, perhaps because of high definition, magnified view, and fine dissection in laparoscopic surgery[3]. As with any laparoscopic surgery, conversion to open approach can be a risk encountered during minimally invasive colorectal procedures, with a reported 10–15% conversion rate reported in literature[11]. Reasons for conversion to open surgery include obesity, high American Society of Anesthesiologists scores, T3–

T4 tumors, technical difficulties, adhesions, injury to intra–abdominal viscera and inability to perform the anastomosis[4]. There were 4 cases (8.69%) of conversion to open surgery in our study. 3 cases were attributed to very large tumors, with difficulties in resection and anastomosis, and one case was due to significant bleeding, which could not be controlled laparoscopically. Surgical experience and careful patient selection can lower rates of conversion to open surgery, although conversion is not considered a complication and must be resorted to whenever required[12,13]. Laparoscopic colorectal surgery has been shown to result in a significant reduction of postoperative morbidity and mortality[14]. Leak rates for colorectal surgery range from 2.4–6.8%[15]. The rate of anastomotic leak was only 4.76%, in one patient after laparoscopic surgery and 5 patients after open surgery. It is reported that postoperative complications are decreasing with increased surgical experience, including anastomotic leak, wound infection, conversion to open surgery and even mortality[4]. Initial reports of port–site metastasis warned that laparoscopic surgery for colorectal cancer should only occur within the context of clinical trials, with later studies showing no difference in port–site recurrences between laparoscopic and open surgery[16,17]. The incidence of port–site metastasis ranges from 0–21.4% and it is suggested to employ surgical techniques, such as avoiding contact between laparoscopic instruments and the tumor and the use of wound protectors for extraction of the specimen, to reduce the incidence of wound recurrence[12]. Several papers have shown superior short–term clinical outcomes in favour of laparoscopic colorectal surgery[3,10]. We established the advantages of laparoscopic surgery for colorectal cancer with respect to shorter hospital stay, fewer postoperative complications and reduced mortality. After the initial description in 1991, significant concerns emerged regarding laparoscopic surgery for colorectal cancers when this approach may lead to worse cancer outcomes compared to conventional open approaches[2]. Multiple studies have shown the oncological safety of laparoscopic surgery versus open surgery in colorectal cancer[6,8]. The principles of oncological resection include free resection margins and the number of lymph nodes dissected, with a minimum of 12 lymph nodes that should be harvested. In our study, a mean of 22 and 27 lymph nodes were resected from patients after laparoscopic and open surgery, respectively. There was an appropriate number of resected lymph nodes in both groups, which shows adequate dissection of the mesocolon and mesorectum in our patients. With increased surgical expertise, a greater number of harvested lymph nodes will be expected[18]. During periods of learning curve, it is better to perform laparoscopic surgery on small tumors before operating on larger tumors and advanced procedures, such as those for rectal cancers, after having further experience[6,7]. Limitations of our study include its retrospective design, relatively small sample size and inclusion of emergency operations for colorectal resections. Despite that, the benefits of laparoscopic surgery can only be obtained when performed by skilled surgeons trained in laparoscopy so as to avoid unnecessary morbidity and even mortality.

Conclusion

The results of our study support that laparoscopic approach for colorectal cancer is clinically and oncologically feasible compared to conventional open surgery. Despite more cases of open surgery for colorectal cancer being done at our centre, we hope that this might be overcome with increased experience in the future. Laparoscopic colorectal surgery should be the standard approach for surgical treatment of colorectal carcinoma. It is crucial that experiences from various units on laparoscopic approach for colorectal cancer surgery be reported in literature. As the experience of our unit improves, there is a trend towards performing more laparoscopic colorectal resections safely without compromising clinical and oncological outcomes. With the technological advancements, robotic surgery has gained widespread acceptance in colorectal and pelvic surgery. At our centre, we have no experience with robotic surgery, however it is an area of future practice and research.

Acknowledgement

None.

Funding and Conflict of Interest

None.

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