ORIGINAL ARTICLE

Laparoscopic Colectomy for Carcinoma of the Colon in Octogenarians

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Abstract

Background The incidence of colorectal cancer increases with age; most patients present with resectable disease. Since there is a high morbidity rate in the elderly, the laparoscopic approach, with its lower complication rate, appears to be the ideal choice for treatment of this patient group. In this retrospective study, we aimed to compare the short-term results of laparoscopic (LC) with open (OC) colectomies for carcinoma in patients 80 years of age or older.

Methods The study comprised 93 patients aged 80 years and over who underwent OC or LC between 2005 and 2008. Demographics and clinical data were compared.

Results The LC group included 47, and the OC included 46 patients. No differences were found between the two groups with regard to mean age, comorbidities, and the extent of the resection. The operative time was shorter in the OC (121 vs. 157 min, $P=0.001$). Hospital stay was shorter in the LC (7.6 vs. 8.8 days, $P=0.06$). There were more postoperative complications in the OC (35.6%) than in the LC (30.4%), however the difference was not statistically significant ($P=0.6$).

Conclusions LC in the elderly is safe, with a shorter hospital stay, and carries a short-term benefit for selected patients and could be offered to all elderly patients.

Introduction

The number of elderly patients in western countries is increasing, along with high incidence of surgically resectable colorectal cancer. In fact approximately 50% of colorectal cancer patients are older than 70 years of age, and in this age group, colorectal cancer is the second most common cause of cancer death.[1,2] Associated comorbidities are mainly responsible for the high postoperative morbidity and mortality rates in elderly patients, especially those aged 80 years or older. Many randomized controlled trials showed that laparoscopic surgery for colon cancer is feasible and safe and has many short-term advantages.[3,4]

The benefits of laparoscopic surgery in comparison with open surgery are decreased morbidity, decreased pain, faster recovery, shorter hospital stay, and possibly reduced immunosuppression.[5] Therefore the laparoscopic approach appears to be the better choice for elderly patients. The aim of this retrospective study was to evaluate the early outcome first 30 postoperative days of patients 80 years old or more who underwent laparoscopic colectomy for cancer, compared with open surgery.

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Patients and Methods

The study included patients 80 years old or more who underwent open or laparoscopic colonic resection for colon carcinoma between 2005 and 2008 in the surgery department B, Hasharon Hospital. The full medical records were obtained and collectively reviewed.

The study excluded patients who were operated on for nonneoplastic colonic lesions, patients with rectal tumors (tumors below 12 cm from the anal verge), and patients with incomplete data. Patients with contraindication to laparoscopy (patients who required emergency operations for perforated or obstructed colonic cancer, and patients who presented with tumor invasion to the abdominal wall or adjacent organs) were also excluded.

All laparoscopic procedures were performed by the same laparoscopic surgeon. The selection of surgical procedure was based on the availability of the laparoscopic surgeon rather than randomization. The preoperative preparation for the patients included mechanical bowel preparation (poly-ethelene glycol) the day before the operation and prophy-lactic antibiotics (cefamizine 1 g and metronidazole 500 mg) on the induction of general anesthesia.

Data on patients' demographics and comorbidities were collected. Data of the surgical procedure that were collected included the method of procedure (laparoscopic or open), the type of resection performed, the duration of operation, the rate of conversion from laparoscopic to open procedure, tumor location, and the number of lymph nodes collected in the specimen. Postoperative pain management for all patients included parenteral narcotics (morphine or tramadol) and dypirone or paracetamol administrated orally.

Oral intake of liquid diet of all patients was recorded starting on the morning after surgery for 24 h and subsequently advanced to soft diet. No specific "fast-track" recovery program was applied. Bowel function postopera-tively was evaluated with respect to first flatus and bowel movement. Patients were discharged when oral diet was well accepted and no complications were detected. Postop-erative complications were defined as general complica-tions (cardiopulmonary, urinary tract infection) or those related to the surgery (wound infection, ileus, intra-abdominal collection or hemorrhage, and anastomotic leak). Operative mortality is defined as postoperative death that occurred within 30 days after surgery. The patients were analyzed as two separate groups according to the proce-dure: the open colectomy (OC) group and the laparoscopic colectomy (LC) group. The local ethics committee of Rabin Medical Center approved the study protocol and the data collection.

Statistical Analysis

Data were analyzed using the Statistical Package for Social Science software (SPSS Inc. Chicago, IL, USA). The Pearson χ^2 test, Fisher's exact test, and Student t test for equality of means were used when appropriate. Signifi-cance was evaluated at the 0.05 level.

Table 1 Demographic characteristics

Variable	OC	LC	P value
Number of patients	46	47	–
Age (year)	82.9±2.9	83.6±3.6	NS
Gender, M/F	24/22	25/22	NS
BMI (kg/m^2)	25.3±3.8	24.2±3.2	0.204
Comorbidities			
Ischemic heart disease	20 (43%)	17 (36%)	NS
Other malignancy	6 (13%)	5 (11%)	NS
Diabetes mellitus	21 (46%)	19 (40%)	NS
Chronic lung disease	3 (6.5%)	10 (21%)	0.070
ASA score			
I	3(6.5%)	2 (4.3%)	NS
II	15 (33%)	20 (42%)	NS
III	16 (37%)	19 (40%)	NS
IV	11 (24%)	6 (13%)	NS
Previous colectomy	3 (6.5%)	1 (2.1%)	NS

BMI body mass index, *ASA* American Society of Anesthesiology, *NS* not significant

Results

A total number of 93 patients aged 80 years or more were included in this study. There were 46 patients in the OC group and 47 in the LC group. The mean age was 82.9±2.9 in the LC group and 83.6±3.6 I n the OC group. The two groups were well matched for demographic data, and there were no significant differences in their BMI, comorbidities

Table 2 Operative variables

Variable	OC	LC	P value
Type of operation			
Right colectomy	26 (56%)	21 (45%)	NS
Left colectomy	5 (10%)	8 (17%)	NS
Sigmoidectomy	14 (30%)	18 (38%)	NS
Subtotal colectomy	1 (2.2%)	0	NS
Conversion	–	3 (6.3%)	–
Concomitant operations			
Cholecystectomy	2 (4.3%)	3 (6.3%)	NS
TEM	0	2 (4.3%)	NS
Mean operative time (min)	121±33	157±41	0.001
Tumor stage (AJCC)			
I	12 (26%)	17 (37%)	NS
II A	20 (43%)	12 (26%)	NS
III A	2 (4.3%)	2 (4.3%)	NS
III B	12 (26%)	16 (34%)	NS
Number of lymph nodes	11.6±3.8	10.9±4.2	0.237

TEM transanal endoscopic microsurgery, *AJCC* American Joint Committee on Cancer staging (seventh edition), *NS* not significant

Table 3 Number of cases per year

Year	OC	LC
2005	13	13
2006	11	10
2007	11	8
2008	11	16
Total	46	47

including ischemic heart diseases, other malignancy, diabetes, and chronic lung disease. Despite a slightly different distribution of the ASA classes between the two groups, it was statistically nonsignificant (Table 1). No difference was found with respect to tumor location and the preoperative tumor staging.

Table 2 shows the types of surgical resection carried out and the pathological tumor staging. There were no significant differences in the extent of resection and tumor staging between the OC and LC patients.

The number of lymph nodes examined was 11±3.8 in the OC group and 10.9±4.2 in the LC group (P=0.237). In both groups a negative proximal and distal surgical margin of the specimen was obtained. In two (4.3%) patients in the OC group and five (10.6%) patients in the LC group, concomitant operation was performed. Three patients in the laparoscopic group (6.3%) required conversion to open surgery because of adhesions in two of the patients and bleeding in the third. These patients remained in the laparoscopic group.

The mean operative time was significantly longer in the LC group (157±41 min) than the OC group (121±33 min, P<0.001). However, the operative times in the LC group decreased in the last 2 years. Table 3 shows the number of open and laparoscopic colon resection per year performed for octogenarians in the study period.

Patients in the LC group experienced an earlier first flatus (3.2±1.4 days) compared to the OC group (3.6±1.5 days);

however, the difference was not statistically significant (P= 0.361). Postoperative hospital stay for the LC group (7.6± 3.1 days) was shorter than for the OC group (8.8±3.6 days); however, the difference did not reach a statistical significance (P=0.062). No significant difference was found between the two groups regarding the number of patients admitted to the intensive care unit during their hospital stay (Table 4).

Regarding the postoperative complications, there were more complications (general and surgical) in the OC group (35.6%) than in the LC group (30.4%). The difference, however, failed to reach statistical significance (P=0.659). Three patients in the OC group died in the postoperative period in contrast to one death in the LC group; however, this difference was not statistically significant (P=0.361).

Anastomotic leak was diagnosed in two patients in the OC group; they were reoperated. Both underwent laparotomy, drainage, and protective ileostomy. These two patients had multiorgan failure and died. A third patient died in the OC group because of respiratory failure.

Two patients in the LC group were reoperated. One, who had an anastomotic leak, underwent laparotomy, drainage, and protective ileostomy, and died after the intervention. The other had laparotomy and adhesiolysis 10 days postoperatively for small intestinal obstruction.

Of interest was a group of nine patients older than 90 years of age. This subgroup included five patients in the LC group and four in the OC group. Their operative times were similar to their respective groups. No major complications and no death were observed, and the median length of hospital stay was similar to that of their respective groups.

Discussion

In many reports, old age itself is not an independent prognostic factor for colorectal surgery, and the stage-to-stage cancer-specific survival rates are similar to those of

Table 4 Postoperative data

Variable	OC	LC	P value
Mean hospital stay (day)	8.8±3.6	7.6±3.1	0.062
Intensive care unit admissions	12 (26%)	7 (15%)	NS
Complications	16 (35.6%)	14 (30.4%)	0.659
General			
Urinary infection	5 (10.9%)	3 (6.4%)	NS
Pneumonia	4 (8.7%)	3 (6.4%)	NS
Surgical			
Wound infection	2 (4.3%)	0	0.242
Ileus	7 (15.2%)	4 (9%)	NS
Anastomotic leak	2 (4.3%)	1 (2.1%)	NS
Reoperation	2 (4.3%)	2 (4.3%)	NS
Mortality	3 (6.5%)	1 (2.1%)	0.361

NS not significant

younger patients. Therefore, curative intent should be applied in patients with colorectal cancer irrespective of age.[6,7] Over the last decade, the number of surgeries for colorectal cancer in the elderly have increased mainly due to improvements in surgical and anesthesia techniques.[8]

Laparoscopic colectomy is widely accepted for colectomy, and recent data support issues of safety and less operative stress, which can potentially lead to a reduction in postoperative morbidities and faster recovery. Thus short-term benefits should be more evident in elderly patients than in the general population.[3,9]

Many randomized controlled trials demonstrate that laparoscopic surgery for colon cancer has short-term benefits including reduction in perioperative mortality, a lower rate of wound complications, and shorter length of hospital stay,[10] but other studies[11] found only minimal short-term quality of life benefits with LC for colon cancer compared to OC.[11] However, few reports provided information related to the complications and outcome of laparoscopic colectomy in the elderly.[3]

The patients included in our study were those who were operated with the intention to cure and were aged 80 years or older. The age of 80 years was used because it is beyond the normal life expectancy. In fact the life expectancy in Israel is nearly 80 years (83 years for women and 79 years for men).

The differences in the operative times between the two groups are similar to that of other reports.[3] The decrease of the operative time observed in the last 2 years in LC patients and the relatively low conversion rate (6.3%) may reflect more experience gained over time.[12]

The mean length of stay was shorter in the laparoscopic group, which concords with other reports[13,14] that may reflect the earlier recovery of bowel function and less postoperative pain and lower analgesic consumption. For elderly patients, a long hospital stay may be associated with certain complications such as hospital-acquired infection and loss of active daily life. Therefore, for such patients, a short hospital stay and rapid recovery are important issues.

The incidence of postoperative complications has been reported in large LC series to range from 6% to 36%,[4,12] and the postoperative complications were seen to be higher in the OC group.[4,13,15] Other reports provide similar morbidity rates in the two groups.[16] However the differences in morbidity between our two groups were small but we believe clinically relevant and may justify offering LC to all elderly patients with colon cancer.

There were more patients with pulmonary complications in the open colectomy group than the laparoscopic group despite the fact that there were more patients with underlying pulmonary disease in the laparoscopic group. A possible explanation for these results could be that elderly patients may better tolerate the hemodynamic and ventilator changes observed in laparoscopic surgery. In addition, less postoperative pain and lower analgesic consumption, in addition to the shorter hospital stay in the LC group, could have contributed to amelioration of the postoperative respiratory function.

The present study was not a randomized controlled study, and there was an apparent bias. Although the patients in our two groups were similar in terms of tumor staging, the type of resection performed, and the comorbidities, the retrospective nature of the study and the absence of specific selection protocol for laparoscopy were the main limitations and could have skewed the results.

The adequacy of oncologic resection remains a major issue in laparoscopic colectomy procedure. Adhering to standard cancer resection as in open surgery is mandatory. Negative surgical margins and adequate number of harvested lymph nodes in the specimen represent important measurements of the radicalness of colonic resection. A clean surgical margin was obtained in all our patients, and the number of lymph nodes examined was quite similar in both our groups, in accordance with other reports that had shown that the number of lymph nodes harvested was comparable between OC and LC.[17]

Nine patients were nonagenarians, four patients in the OC and five in the LC. They were similar to their respective groups in terms of tumor staging, the type of resection, and the postoperative outcome. This result may draw attention yet again to the principle that whenever possible, curative intent should be applied in patients with colon cancer irrespective of age.[8] Therefore, it might be more appropriate to speak of biological age, which gives a better estimation of the patient's condition than chronological age.

Our results concur with existing data demonstrating that laparoscopic colorectal procedures can be carried out with good results in older patients and may have some advantages over the open approach. Since colon cancer surgery is performed so commonly and since laparoscopic colectomy is increasingly employed for many cancer cases, even a small improvement in outcome can lead to important positive consequences, and these benefits may be more pronounced in the elderly. Laparoscopic colectomy in the elderly is a surgical advancement that appears to be less physiologically stressful than conventional open colectomy, and it should be considered the preferred approach in elderly patients.

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