





Laparoscopic resections for stage IV colorectal cancer - safety and effectiveness of the method as a guarantee for an uncomplicated postoperative period and optimal pharmacotherapeutic results

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Abstract

Introduction: Primary tumor resection can prevent future tumor-related complications in patients with stage IV colorectal cancer. This may influence the quality of life and prevent colostomies associated with the emergency surgery. Laparoscopic approach plays an important role in attempts to reduce perioperative complications in this specific group of patients.

Purpose: The aim is to assess early perioperative results in a group of 17 patients with stage IV colorectal cancer—multiple incurable liver metastases and/or pulmonary/peritoneal metastases of the disease. On the other hand, postoperative complications may delay administration of chemotherapy and influence survival.

Materials and methods: We analyze retrospectively the perioperative results in a group of 17 patients with laparoscopic palliative colorectal resections for stage IV colorectal cancer. Assessment includes perioperative complications, median hospital stay, perioperative blood loss, need for blood transfusion, operative time, and type of surgical procedure.

Results: We performed totally laparoscopic 10 sigmoid resections, five left colectomies, and two right colectomies. Fourteen simultaneous liver biopsies were performed during laparoscopy. No perioperative deaths were registered. Perioperative mortality rate is 0%. Perioperative morbidity rate is 0%. No perioperative complications. The median perioperative stay is 5.3 days. Median blood loss is 47.9 mL. Overall, three units of blood were transfused. The median transfusion rate is 0.17 units per patient. The median operative time is 130.2 minutes.

Conclusion: The laparoscopic approach is associated with very good perioperative results in patients with stage IV colorectal cancer and palliative resection of the primary tumor. Early hospital discharge and minimal operative trauma may not influence early administration of chemotherapy.

Keywords

colorectal cancer, laparoscopic resection, palliative, stage IV

Introduction

Colorectal cancer remains one of the leading cancer-related deaths globally (Brenner et al. 2014). Nowadays the percentage of patients diagnosed with stage IV disease remains high and is about 20%, due to late diagnosis and insufficient prophylaxis of the disease. Approximately 80% of them are presented with incurable distant metastases (Costi et al. 2014). Palliative treatment is very important and is used to increase survival and maintain quality of life (Strickler and Hurwitz 2014). Moreover, there are recent developments concerning biological and targeting agents based on genetic alterations with the potential capability to increase survival (Baek et al. 2019). Early integration of palliative treatment is now a standard approach for patients with advanced cancer (Greer et al. 2013) and currently is multimodal (Osayande et al. 2019). Symptomatic primary tumors should be resected using oncological principals if circumstances allow it (Chang et al. 2012), despite some symptoms becoming less prominent during chemotherapy (Feo et al. 2017). According to some reports, the laparoscopic approach in palliative resection for symptomatic primary tumors in patients with stage IV is useful and appropriate. On one hand, minimally invasive surgery is associated with faster recovery, a shorter hospital stay, and a lower complication rate compared to open surgery. On the other hand, the period for initiation of systematic chemotherapy is shorter (Akagi et al. 2013).

Resection of the asymptomatic primary tumor is still under debate.

Some studies recommended systematic chemotherapy alone for asymptomatic primary tumors for incurable stage IV colorectal cancer (Scoggis et al. 1999; Michel et al. 2004). Moreover, some asymptomatic patients may become symptomatic during chemotherapy and may need emergency surgery. Open surgery is associated with high levels of perioperative mortality and morbidity rate (Liu et al. 1997). Instead of this, palliative resection is associated with a higher median survival rate (Beham A et al. 2006). Following development of the laparoscopic surgery since introduced for colorectal resections in 1991, a lot of evidence is assumed for better perioperative results and oncological non-inferiority compared to open surgery (Fleshman et al. 2007; Colon Cancer Laparoscopic or Open Resection Study Group et al. 2009; Green et al. 2013; Zhuang et al. 2015; Zhang et al. 2017; Wei et al. 2020). These benefits may be very important for patients with stage IV colorectal cancer and incurable metastases.

Materials and methods

This is a retrospective study based on a subgroup of 17 patients with stage IV colorectal cancer with incurable metastases. Sixteen patients had multiple liver metastases. Four patients had pulmonary metastases and two peritoneal ones. This study is a part of a retrospective comparative analysis between laparoscopic and open colorectal resections based on 285 cases for the period of 11 years with a ratio of 1.8:1 for laparoscopic cases.

All patients met the inclusion criteria: mild-to-moderate symptoms or lack of symptoms related to the primary tumor. From the study are excluded patients with acute bowel obstruction, perforation, peritonitis, abscess, fistula, and acute bleeding.

Patient demographics are listed in Table 1.

Patients with middle and low rectal cancers are also excluded from the study because of the higher risk of perioperative complications. These patients during the operation may need the creation of an ileostomy or colostomy, which may worsen quality of life after surgery.

The median age in the study group is 64.7 years with equal sex distribution. Left side and high rectum tumors are the most prevalent in the group. Eleven patients had significant comorbidity according to ASA grades III and IV. Fourteen patients had lymph node involvement on histopathological specimens.

All patients were operated on with standard multiport laparoscopy.

In all cases, laparoscopic operation is performed using oncological standards—primary resection with regional lymphadenectomy.

Perioperative data were analyzed: gender and age distribution, perioperative comorbidity assessment according to the American Society of Anesthesiologists, symptoms, preoperative hemoglobin level, type of operation, operative time, perioperative blood loss, blood transfusion per unit, local T status of the primary tumor, perioperative complications.

Results

As standard preoperative assessment, a lower endoscopy with biopsy and contrast CT scan were performed. Preoperative management includes mechanical bowel preparation with a combination of IV antibiotics, carbohydrate, and protein load. Consultation with a cardiologist is mandatory. Consultations with other specialists are performed according to ASA III or more.

Patients are included in our ERAS program with early verticalization, alimentionation, and pain management.

All patients in the study group were operated on with conventional multiport laparoscopy.

Pneumoperitoneum is created by Veress needle in the supraumbilical or left subcostal area (Palmer's point). Intra-peritoneal CO₂ pressure is 12–14 mm Hg.

As standard, the medial dissection approach is used for left and right colectomies with regional D2 lymphadenectomy. For transverse colon and left colic flexure cancers, a lateral approach is used with first-step gastro-colic ligament transection and mobilization of left colic flexure.

Liver biopsies were performed in 15 patients during the laparoscopic colorectal resection. Usually, in the presence of multiple liver metastases, the procedure can be easily performed without additional port insertion. Macroscopically, during the laparoscopy, tumor adherence to the parietal peritoneum is found (cT4a) in four patients with local excision of the adherent site. Peritoneal metastases during the laparoscopy were found in 2 patients. An excisional biopsy for confirmation of peritoneal spread was performed.

Patient demographic data are summarized in Table 1.

On Table 1 are shown age, sex distribution, median BMI index, type of operative procedure, perioperative risk assessment according to ASA grade, distant metastases, local tumor stage, and nodal stage.

Our postoperative recovery protocols include no naso-

Table 1. Patient demographic data.

Parameter	Result	Range
Age (yrs, mean and range)	64.7	(39–81)
Sex (male/female)	9/8	
BMI index (mean and range)	25.68	(18.07–38.64)
Procedure		
Right colectomy	2	
Left colectomy	5	
Sigmoid and High rectal resection	9	
Low anterior rectal resection	1	
ASA		
ASA I	2	
ASA II	4	
ASA III	9	
ASA IV	2	
Incurable metastases		
Liver	16	
Lung	4	
Peritoneum	2	
Macroscopic local tumor status cT		
cT3	13	
cT4	4	
Nodal stage pN		
Positive	14	
Negative	3	

gastric tubes, immediate verticalization, feeding, and multimodal analgesia without opioid analgesics.

Perioperative outcomes are listed in Table 2.

Table 2. Perioperative outcomes.

Parameter	Result	Range
Operative time (mean, range)	130.2 min	(70–255 min)
Estimated blood loss (mean, range)	47.9 ml.	(10–200 mL)
Transfusions (mean, units)	0.17 units per patient	(3 units)
ICU stay (days)	0	
Conversion	0	
Time to flatulence	2.41 days	(1–3 days)
Time to defecation	2.94 days	(2–4 days)
Hospital stay (mean, range)	5.35 days	(5–7 days)
Mortality	0	
Morbidity	0	
Anastomotic leakage	0	
Abscess	0	
Wound infection	0	
Ileus	0	
Other	0	
Leucocyte count on day 1 postoperative (mean, range)	11.1	(7.2–16.2)

Perioperative results are shown on Table 2, which include median operative time, median blood loss, median number of blood transfusions, median ICU stay, conversion rate, median time to flatulence and defecation, median hospital stay, mortality rate, complications, and median leucocyte count on the first postoperative day.

No complications related to the access, operative table position, or pneumoperitoneum were observed. All the laparoscopic resections are completed laparoscopically. No conversions were reported in this study group. No complications were reported according to the liver biopsy—bleeding or bile leak. Restoration of the GI function is confirmed by the appearance of first flatulence and defecation on median 2.41 and 2.94 postoperative days, respectively. All laparoscopic colorectal resections are completed with primary anastomosis. No anastomotic leak, intraabdominal abscess, or postoperative ileus were reported. Only three patients required chemo transfusions due to anemia related to the primary tumor. The median hospital stay is 5.35 days. Thirteen patients (76.4%) were discharged on perioperative day 5.

Discussion

Despite advances in screening programs, around 20% of patients with colorectal cancer are presented with metastases at the time of diagnosis (Brenner et al. 2014). In developed countries, 5-year overall survival remains low between 18.8% and 13% (Watanabe et al. 2015; Siegel et al. 2016). This specific group of patients has a very poor prognosis. The aim for most patients is to improve quality of life and extend survival. Systematic chemotherapy is shown to improve overall survival (Nordic Gastrointestinal Tumor Adjuvant Therapy Group 1992; Scheithauer et al. 1993). Nowadays, multidrug regimens are used to improve results and quality of life in patients with incurable colorectal cancer metastases, including biological and targeting

agents (Baek et al. 2019; Ding et al. 2021). It is clear that symptomatic primary tumors should be resected according to oncological principals when circumstances allow it (Chang et al. 2012) because of the risk of complications. The question about palliative resection of the primary asymptomatic tumor and when it should be performed in the multimodal treatment is still actual. Several reports in the literature show improvement of the long-term survival after palliative colorectal resections (Lam-Boer et al. 2016; Ha et al. 2018). In a recent published study, Leone N et al. report significant improvement of overall survival with 14 months between patients with primary tumor resection compared to patients on chemotherapy alone (Leone et al. 2023). More promising data come from Rijken A et al. Authors report in a recent study significant improvement in overall survival in patients with resection of primary tumor associated with peritoneal colorectal metastases compared with patients on chemotherapy alone (Rijken et al. 2023). Resection of the primary tumor can influence and improve the results of poly-chemotherapy in patients with unresectable colorectal metastases in patients receiving aggressive postoperative chemotherapy (Colloca et al. 2022). Perioperative complications are shown to be associated with decreased overall survival after primary tumor resection in patients with incurable stage IV colorectal cancer (Fujita et al. 2021). Emergency surgery for complicated colorectal cancer is associated with greater perioperative morbidity and mortality rates compared with elective surgery. Smothers et al. report morbidity and mortality rates of 64% and 35%, respectively, in a series of emergency operations for complicated colorectal cancer compared to significantly lower rates for elective procedures (Smothers et al. 2003). Moreover, there is a group of patients with asymptomatic primary tumors, which may become symptomatic during systematic therapy and may need emergency surgery.

Laparoscopic surgery is associated with better perioperative results compared to open surgery for stage I-III colorectal cancer (Braga et al. 2002; Guillou et al. 2005; Colloca et al. 2022). In the postoperative period, time to flatus, defecation, oral food intake, verticalization, and hospital stay are significantly shorter after laparoscopic approach, and this data are available for colorectal resections for stage IV colorectal surgery (Guillou et al. 2005; Colloca et al. 2022). In our study group, despite the advanced stage of disease, results show 0% perioperative morbidity and mortality rate. There are no conversions, and the conversion rate is 0%. In large studies, the complication rate is approximately 21% (Braga et al. 2002; Fleshman et al. 2007) for laparoscopic colorectal resections, and the conversion rate is up to 29% (Braga et al. 2002; Guillou et al. 2005;

Colloca et al. 2022). Even with the small number of patients in our retrospective study, the results are very promising. Early hospital discharge and minimal tissue trauma associated with the laparoscopic approach suppose early administration of poly-chemotherapy in these patients.

Conclusion

Laparoscopic resection of the primary tumor in cases of incurable stage IV colorectal cancer is safe and effective. Fast recovery, short hospital stay, low levels of perioperative complications, and conversions are making palliative laparoscopic colorectal resections standard of care.

Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statements

Clinical trials: EK-13-24/07.11.2024.

The authors declared that no experiments on humans or human tissues were performed for the present study.

Informed consent from the humans, donors or donors' representatives: Department of General, Visceral and Emergency Surgery, University Multi-Profile Hospital for Active Treatment and Emergency Medicine "N. I. Pirogov".

The authors declared that no experiments on animals were performed for the present study.

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Author contributions

All authors have contributed to the research, literature review and manuscript writing.

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Data availability

All of the data that support the findings of this study are available in the main text.

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