

World Journal of *Gastrointestinal Surgery*

World J Gastrointest Surg 2024 June 27; 16(6): 1485-1955



EDITORIAL

- 1485** Has the open surgical approach in colorectal cancer really become uncommon?
Cariati M, Brisinda G, Chiarello MM
- 1493** Intestinal Behçet's disease: A review of clinical diagnosis and treatment
Liu Y, Gao F, Yang DQ, Jiao Y
- 1501** Non-operative management of rectal cancer: Highlighting the controversies
Emile SH, Wignakumar A
- 1507** Current considerations for the surgical management of gallbladder adenomas
Pavlidis ET, Galanis IN, Pavlidis TE
- 1513** Immunotherapy in gastric cancer with liver metastasis: Challenges and opportunities
Bardakçi M, Ergun Y
- 1517** From the mathematical model to the patient: The scientific and human aspects of artificial intelligence in gastrointestinal surgery
Arredondo Montero J

MINIREVIEWS

- 1521** Laparoscopic right radical hemicolectomy: Central vascular ligation and complete mesocolon excision *vs* D3 lymphadenectomy - How I do it?
Yadav K

ORIGINAL ARTICLE**Case Control Study**

- 1527** Perioperative outcomes of transvaginal specimen extraction laparoscopic total gastrectomy and conventional laparoscopic-assisted total gastrectomy
Zhang ZC, Wang WS, Chen JH, Ma YH, Luo QF, Li YB, Yang Y, Ma D

Retrospective Cohort Study

- 1537** Optimal extent of lymphadenectomy improves prognosis and guides adjuvant chemotherapy in esophageal cancer: A propensity score-matched analysis
Tang JM, Huang SJ, Chen QB, Wu HS, Qiao GB
- 1548** Efficacy of laparoscopic low anterior resection for colorectal cancer patients with 3D-vascular reconstruction for left coronary artery preservation
Wang Y, Liu ZS, Wang ZB, Liu S, Sun FB

- 1558** Robotic-assisted low anterior resection for rectal cancer shows similar clinical efficacy to laparoscopic surgery: A propensity score matched study
Long SX, Wang XN, Tian SB, Bi YF, Gao SS, Wang Y, Guo XB
- 1571** Machine learning prediction model for gray-level co-occurrence matrix features of synchronous liver metastasis in colorectal cancer
Yang KF, Li SJ, Xu J, Zheng YB
- 1582** Risk factors associated with intraoperative persistent hypotension in pancreaticoduodenectomy
Wang XJ, Xuan XC, Sun ZC, Shen S, Yu F, Li NN, Chu XC, Yin H, Hu YL
- Retrospective Study**
- 1592** Endoscopic ultrasound-guided biliary drainage *vs* percutaneous transhepatic bile duct drainage in the management of malignant obstructive jaundice
Zhu QQ, Chen BF, Yang Y, Zuo XY, Liu WH, Wang TT, Zhang Y
- 1601** Clinical efficacy of Gamma Knife® combined with transarterial chemoembolization and immunotherapy in the treatment of primary liver cancer
Wang GF, Shu CX, Cai XD, Wang HB, Xu JH, Jia YQ
- 1609** Identifying the risk factors for pancreatic fistula after laparoscopic pancreaticoduodenectomy in patients with pancreatic cancer
Xu H, Meng QC, Hua J, Wang W
- 1618** Correlation between postoperative chemotherapy regimen and survival in patients with resectable gastric adenocarcinoma accompanied with vascular cancer thrombus
Yang ZF, Dong ZX, Dai CJ, Fu LZ, Yu HM, Wang YS
- 1629** Gastroesophageal signet ring cell carcinoma morbidity and mortality: A retrospective review
Grinlinton M, Furkert C, Maurice A, Angelo N, Booth M
- 1637** Analysis of lymph node metastasis and survival prognosis in early gastric cancer patients: A retrospective study
Liu DY, Hu JJ, Zhou YQ, Tan AR
- 1647** Clinical study of neutrophil-to-lymphocyte ratio and platelet-to-lymphocyte ratio in hypertriglyceridemia-induced acute pancreatitis and acute biliary pancreatitis with persistent organ failure
Xu MS, Xu JL, Gao X, Mo SJ, Xing JY, Liu JH, Tian YZ, Fu XF
- 1660** Tumor recurrence and survival prognosis in patients with advanced gastric cancer after radical resection with radiotherapy and chemotherapy
Nie SF, Wang CY, Li L, Yang C, Zhu ZM, Fei JD
- 1670** Prediction and analysis of albumin-bilirubin score combined with liver function index and carcinoembryonic antigen on liver metastasis of colorectal cancer
Wang ZM, Pan SP, Zhang JJ, Zhou J

- 1681** Comparative analysis of the short and medium-term efficacy of the Da Vinci robot *versus* laparoscopic total mesangectomy for rectal cancer
Gao WG, Shi W, Gong XC, Li ZW, Tuoheti Y
- 1691** How to apply *ex-vivo* split liver transplantation safely and feasibly: A three-step approach
Zhao D, Xie QH, Fang TS, Zhang KJ, Tang JX, Yan X, Jin X, Xie LJ, Xie WG
- 1700** Clinical efficacy of laparoscopic cholecystectomy combined with endoscopic papillary balloon dilation in treatment of gallbladder stones with common bile duct stones: A retrospective study
Liu HD, Zhang Q, Xu WS, Jin S
- 1709** Evaluation of oxaliplatin and tiglo combination therapy in locally advanced gastric cancer
Wang T, Zhang LY
- 1717** Lung ultrasound score evaluation of the effect of pressure-controlled ventilation volume-guaranteed on patients undergoing laparoscopic-assisted radical gastrectomy
Tan J, Bao CM, Chen XY
- 1726** Effect of endoscopic sphincterotomy and endoscopic papillary balloon dilation endoscopic retrograde cholangiopancreatographies on the sphincter of Oddi
Fu K, Yang YY, Chen H, Zhang GX, Wang Y, Yin Z
- 1734** Influence of reduced-port laparoscopic surgery on perioperative indicators, postoperative recovery, and serum inflammation in patients with colorectal carcinoma
Wu HB, Liu DF, Liu YL, Wang XF, Cao YP
- Clinical Trials Study**
- 1742** Clinical effect of spleen aminopeptide on improving liver function damage and immune function in children with infant hepatitis syndrome
Fang XQ, Gan T, Wang LM
- Observational Study**
- 1749** Observation of therapeutic effect of lamp irradiation combined with purple gromwell oil gauze on alleviating intestinal colic in patients
Cen BZ, Chen YS, Li LP, Wu JW, Xie YF
- Randomized Controlled Trial**
- 1756** Radiofrequency ablation combined with transcatheter arterial chemoembolization for recurrent liver cancer
Guo JY, Zhao LL, Cai HJ, Zeng H, Mei WD
- Randomized Clinical Trial**
- 1765** Effect of high-protein peptide-based formula compared with isocaloric isonitrogenous polymeric formula in critically ill surgical patient
Sumritpradit P, Shantavasinkul PC, Ungpinitpong W, Noorit P, Gajasen C

Clinical and Translational Research

- 1775 Metabolic disorders and hepatitis: Insights from a Mendelian randomization study
Liang LB, Liu XP, Mao TR, Su QL
- 1791 Analysis of cancer-specific survival in patients with metastatic colorectal cancer: A evidence-based medicine study
Zhou YJ, Tan ZE, Zhuang WD, Xu XH
- 1803 FDX1 as a novel biomarker and treatment target for stomach adenocarcinoma
Xie XZ, Zuo L, Huang W, Fan QM, Weng YY, Yao WD, Jiang JL, Jin JQ

Basic Study

- 1825 Peritoneal fluid indocyanine green test for diagnosis of gut leakage in anastomotic leakage rats and colorectal surgery patients
Huang Y, Li TY, Weng JF, Liu H, Xu YJ, Zhang S, Gu WL

SYSTEMATIC REVIEWS

- 1835 Global geoeidemiology of gastrointestinal surgery rates in Crohn's disease
Weissman S, Aziz M, Bangolo A, Nagesh VK, Aung H, Mathew M, Garcia L, Chandar SA, Karamthoti P, Bawa H, Alshimari A, Kejela Y, Mehdi N, Joseph CA, Kodali A, Kumar R, Goyal P, Satheesha S, Nivedita F, Tesoro N, Sethi T, Singh G, Belal A, Intisar A, Khalid H, Cornwell S, Suresh SB, Ahmed K, Marole KK, Anand OP, Reshi RB, Mehta TI, Elias S, Feuerstein JD

META-ANALYSIS

- 1845 Compare clinical efficacy and safety of neoadjuvant therapy and neoadjuvant chemoradiotherapy for locally advanced rectal cancer: Meta-analysis
Wang Y, Yang Y, Liu QQ, Wang SZ
- 1857 Sarcopenia adversely impacts clinical outcomes in patients undergoing pancreaticoduodenectomy: A systematic review and meta-analysis
Zhang QH, Ma JD, Lu YM, Zhang RN, Zhao ZH, Li YT, Chen QP
- 1871 Comparison efficacy and safety of total laparoscopic gastrectomy and laparoscopically assisted total gastrectomy in treatment of gastric cancer
Li L, Liu DY, Leng J, Tao XM, Wu HQ, Zhu YP
- 1883 Application value of indocyanine green fluorescence imaging in guiding sentinel lymph node biopsy diagnosis of gastric cancer: Meta-analysis
Zhang QJ, Cao ZC, Zhu Q, Sun Y, Li RD, Tong JL, Zheng Q

SCIENTOMETRICS

- 1894 Visualizing the landscape of appendiceal tumor research after 2010: A bibliometric study
Ji JN, Yin ZB

CASE REPORT

- 1910** No-touch isolation technique in emergency pancreaticoduodenectomy for neoplastic hemorrhage: Two case reports and review of literature
Cho A, Katagiri S, Ota M, Onizawa S, Higuchi R, Sugishita T, Niwa Y, Ishita T, Mouri T, Kato A, Iwata M
- 1918** Malignant myopericytoma originating from the colon: A case report
Zhang HL, Zhang M, Guo JQ, Wu FN, Zhu JD, Tu CY, Lv XL, Zhang K
- 1926** Novel magnetic compression technique for the treatment of postoperative anastomotic stenosis in rectal cancer: A case report
Zhang MM, Sha HC, Xue HR, Qin YF, Song XG, Li Y, Li Y, Deng ZW, Gao YL, Dong FF, Lyu Y, Yan XP
- 1933** Magnetic compression anastomosis to restore biliary tract continuity after obstruction following major abdominal trauma: A case report
Zhang MM, Tao J, Sha HC, Li Y, Song XG, Muensterer OJ, Dong FF, Zhang L, Lyu Y, Yan XP
- 1939** Colo-colonic intussusception as a rare complication of colonoscopy with polypectomy: Two case reports
Xiang SH, Xu GQ
- 1948** Resection of polyps involving the appendiceal orifice by combined endo-laparoscopic surgery: Two case reports
Zhang YY, Lu JY, Wang Q, Yang AM

LETTER TO THE EDITOR

- 1953** Evaluating bacterial contamination and surgical site infection risks in intracorporeal anastomosis: Role of bowel preparation
Lee J

ABOUT COVER

Peer Reviewer of *World Journal of Gastrointestinal Surgery*, Deven Juneja, DNB, FNB, EDIC, FCCP, Director, Department of Critical Care Medicine, Max Super Speciality Hospital, New Delhi 110017, India.
devenjuneja@gmail.com

AIMS AND SCOPE

The primary aim of *World Journal of Gastrointestinal Surgery* (WJGS, *World J Gastrointest Surg*) is to provide scholars and readers from various fields of gastrointestinal surgery with a platform to publish high-quality basic and clinical research articles and communicate their research findings online.

WJGS mainly publishes articles reporting research results and findings obtained in the field of gastrointestinal surgery and covering a wide range of topics including biliary tract surgical procedures, biliopancreatic diversion, colectomy, esophagectomy, esophagostomy, pancreas transplantation, and pancreatectomy, *etc.*

INDEXING/ABSTRACTING

The WJGS is now abstracted and indexed in Science Citation Index Expanded (SCIE, also known as SciSearch®), Current Contents/Clinical Medicine, Journal Citation Reports/Science Edition, PubMed, PubMed Central, Reference Citation Analysis, China Science and Technology Journal Database, and Superstar Journals Database. The 2024 Edition of Journal Citation Reports® cites the 2023 journal impact factor (JIF) for WJGS as 1.8; JIF without journal self cites: 1.7; 5-year JIF: 1.9; JIF Rank: 123/290 in surgery; JIF Quartile: Q2; and 5-year JIF Quartile: Q3.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: Zi-Hang Xu, Production Department Director: Xiang Li, Cover Editor: Jia-Ru Fan.

NAME OF JOURNAL

World Journal of Gastrointestinal Surgery

ISSN

ISSN 1948-9366 (online)

LAUNCH DATE

November 30, 2009

FREQUENCY

Monthly

EDITORS-IN-CHIEF

Peter Schemmer

EDITORIAL BOARD MEMBERS

<https://www.wjgnet.com/1948-9366/editorialboard.htm>

PUBLICATION DATE

June 27, 2024

COPYRIGHT

© 2024 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS

<https://www.wjgnet.com/bpg/gerinfo/204>

GUIDELINES FOR ETHICS DOCUMENTS

<https://www.wjgnet.com/bpg/gerinfo/287>

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

<https://www.wjgnet.com/bpg/gerinfo/240>

PUBLICATION ETHICS

<https://www.wjgnet.com/bpg/gerinfo/288>

PUBLICATION MISCONDUCT

<https://www.wjgnet.com/bpg/gerinfo/208>

ARTICLE PROCESSING CHARGE

<https://www.wjgnet.com/bpg/gerinfo/242>

STEPS FOR SUBMITTING MANUSCRIPTS

<https://www.wjgnet.com/bpg/gerinfo/239>

ONLINE SUBMISSION

<https://www.f6publishing.com>



Has the open surgical approach in colorectal cancer really become uncommon?

Maria Cariati, Giuseppe Brisinda, Maria Michela Chiarello

Specialty type: Surgery

Provenance and peer review:

Invited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's classification

Scientific Quality: Grade C

Novelty: Grade B

Creativity or Innovation: Grade B

Scientific Significance: Grade B

P-Reviewer: Trabelsi M, United States

Received: December 18, 2023

Revised: April 29, 2024

Accepted: May 15, 2024

Published online: June 27, 2024

Processing time: 194 Days and 22.7 Hours



Maria Cariati, Department of Surgery, Azienda Sanitaria Provinciale di Crotone, Crotone 88900, Italy

Giuseppe Brisinda, Abdominal and Endocrine Metabolic Medical and Surgical Sciences, Fondazione Policlinico Universitario A Gemelli IRCCS, Rome 00168, Italy

Maria Michela Chiarello, Department of Surgery, Azienda Sanitaria Provinciale di Cosenza, Cosenza 87100, Italy

Corresponding author: Giuseppe Brisinda, MD, Professor, Surgeon, Abdominal and Endocrine Metabolic Medical and Surgical Sciences, Fondazione Policlinico Universitario A Gemelli IRCCS, 8 Largo Agostino Gemelli, Rome 00168, Italy. gbrisin@tin.it

Abstract

Colorectal cancer is the third most common cancer in the world. Surgery is mandatory to treat patients with colorectal cancer. Can colorectal cancer be treated in laparoscopy? Scientific literature has validated the oncological quality of laparoscopic approach for the treatment of patients with colorectal cancer. Randomized non-inferiority trials with good remote control have answered positively to this long-debated question. Early as 1994, first publications demonstrated technical feasibility and compliance with oncological imperatives and, as far as short-term outcomes are concerned, there is no difference in terms of mortality and post-operative morbidity between open and minimally invasive surgical approaches, but only longer operating times at the beginning of the experience. Subsequently, from 2007 onwards, long-term results were published that demonstrated the absence of a significant difference regarding overall survival, disease-free survival, quality of life, local and distant recurrence rates between open and minimally invasive surgery. In this editorial, we aim to summarize the clinical and technical aspects which, even today, make the use of open surgery relevant and necessary in the treatment of patients with colorectal cancer.

Key Words: Colorectal cancer; Laparoscopy; Laparoscopic colorectal resection; Bowel obstruction; Bowel perforation; Advanced colorectal cancer

©The Author(s) 2024. Published by Baishideng Publishing Group Inc. All rights reserved.

Core Tip: In terms of oncological outcomes and quality of resection, laparoscopic approach allows to do just as well as open surgery, in particular the number of the lymph nodes removed is identical, regardless of the access. However, the laparoscopic approach is not recommended when the neoplasm presents with urgency, in the occlusive or perforated phase, as well as it is not recommended for locally advanced tumors. When the tumor involved the serosal layer or invades an adjacent organ, open “*en-bloc*” excision is recommended.

Citation: Cariati M, Brisinda G, Chiarello MM. Has the open surgical approach in colorectal cancer really become uncommon? *World J Gastrointest Surg* 2024; 16(6): 1485-1492

URL: <https://www.wjgnet.com/1948-9366/full/v16/i6/1485.htm>

DOI: <https://dx.doi.org/10.4240/wjgs.v16.i6.1485>

INTRODUCTION

Colorectal cancer is the third most common cancer in the world. In 2019, new cases of colorectal cancer in the world were 1931590, corresponding to 10% of new cancer diagnoses, and is responsible for approximately 750000 cancer-related deaths annually[1]; in Italy there are estimated around 51000 cases/year, representing overall the 15% of new cancer diagnoses[2]. Surgery is mandatory to treat patients with colorectal cancer. In the case of primary non-metastatic disease, surgery guarantees a better long-term prognosis, both in terms of overall survival, disease-free survival and patient quality of life[3-5].

Curative resection aims to radically remove the segment of intestine in which the tumor is located. The resection must include at least 5 cm of healthy colon upstream and downstream of the lesion[6,7]. Furthermore, lymphadenectomy is fundamental for a systematic lymph node dissection and for removing all potentially metastatic lymph nodes[8-11]. International guidelines have established that a number equal or greater than 12 lymph nodes must be removed to guarantee an adequate lymphadenectomy and, at the same time, the possibility of staging the neoplastic disease more accurately[9,10,12]. It is therefore established as an oncologically appropriate resection influences the prognosis of patients with colorectal cancer.

In recent decades, the traditional surgical approach *via* laparotomy and direct access to the patient's abdominal cavity has been joined by new minimally invasive surgical techniques. Laparoscopic surgery has now been validated through large randomized controlled studies conducted throughout the world. In this editorial, we aim to summarize the clinical and technical aspects which, even today, make the use of laparotomy relevant and necessary in the treatment of patients with colorectal cancer.

LAPAROSCOPIC TREATMENT

Laparoscopic surgery in colorectal cancer represents a correct alternative to open surgery, if performed by surgeons with adequate training in this specific procedure[13]. Even in laparoscopic surgery the proximal and distal resection margins are appropriate and proximal vessel ligation is performed safely. Curative resections are therefore obtained, with *en-bloc* removals and tumor-free radial margins (R0)[14].

The United Kingdom Medical Research Council (MRC) trial of conventional *vs* laparoscopic assisted surgery in colorectal cancer, published in 2005, which included patients with both colon and rectal cancer was the first randomized controlled trial to investigate the role of laparoscopy in colorectal cancer[15]. After this trial there were four subsequent randomized controlled trials comparing laparoscopy to open surgery in colorectal cancer. All these studies - the Comparison of Open *vs* Laparoscopic Surgery for Mid and Low Rectal Cancer After Neoadjuvant Chemoradiotherapy[16], the Colorectal Cancer Laparoscopic or Open (COLOR II)[17], the American College of Surgeons Oncology Group Z6051[18], and the Australasian Laparoscopic Cancer of the Rectum Randomized Clinical Trial (ALaCart)[19] - were designed to assess the non-inferiority of laparoscopic surgery compared to open surgery. In all these studies, patients with T4 tumors were excluded from inclusion. The COLOR II study also excluded T3 tumors within 2 mm of the endopelvic fascia. The laparoscopic approach was associated with longer operative times, lower estimated blood loss, and faster recovery of bowel function in all of these studies. These randomized trials evaluating the oncologic outcomes of laparoscopic colectomy showed no significant differences in proximal and distal margins, number of lymph nodes retrieved, and perpendicular length of the primary vascular pedicle compared with open surgery[14,15,17,20-22]. Furthermore, long-term survival and recurrence were no different for patients treated with open and laparoscopic surgery in these studies[15,21,23,24].

Recently, the short-term results of a multicenter prospective randomized trial conducted in China comparing laparoscopic and open resection have been published[20]. The Laparoscopy-Assisted Surgery for Carcinoma of the Low Rectum study was conducted on a population of over 1000 patients. Specifically, 685 patients in the laparoscopic surgery group and 350 patients in the open surgery group were included. No significant differences in morbidity rate were observed between the two groups. Higher rates of sphincter preservation and shorter length of stay were observed in patients undergoing laparoscopic surgery.

Extraperitoneal rectal carcinoma presents peculiar aspects. While the approach to carcinoma of high rectum does not differ from that of the recto-sigmoid junction and the sigmoid carcinoma, surgery of the mid-lower rectum presents technical difficulties that are best managed in high-volume specialist centers. The cornerstones of this surgery concern the total excision of the mesorectum (Figure 1), the preservation of the sympathetic and parasympathetic innervation (nerve-sparing technique), the distal and circumferential section margin free from neoplasia and, in locally advanced forms (T3-T4 and/or regional lymph node metastases) the use of neoadjuvant therapies. In these patients, laparoscopic total mesorectal excision can be performed safely and adequately as demonstrated in prospective studies and retrospective series [25-29]. Mid and long-term oncological outcomes appear similar between open and laparoscopic approaches[30]. We can therefore conclude that oncologic results of the laparoscopic surgery for rectal cancer are generally comparable to open surgery. Currently, the results reported by numerous studies in the literature highlight that laparoscopic surgery is the therapeutic option of choice for the surgical treatment of rectal cancer.

THE ROLE OF OPEN SURGERY

In colorectal cancer patients, laparoscopic surgery has some controversial aspects. A learning curve appears fundamental in the laparoscopic field. Both the surgeon and the operating room auxiliary staff are required to acquire advanced laparoscopic skills in well-defined time intervals[31,32]. Laparoscopic surgery is very demanding, and can be performed with low morbidity and mortality rates only by a surgeon with above-average experience with this type of surgery and a large caseload of laparoscopic colorectal procedures. The learning curve for such procedures is appreciably longer than for other laparoscopic operations. With increasing experience, technically more demanding operations, including radical oncologic rectal laparoscopic procedures, can be performed with appreciably reduced operating times and conversion rates, but with no increase in morbidity or mortality. At least 20 laparoscopic procedures for colon cancer are required for the individual surgeon to be included in multicenter clinical trials. Studies more carefully examining the learning curve for laparoscopic colectomy have suggested that full surgical autonomy and competence is acquired with at least 50 colorectal resection procedures in a defined time interval[31-33]. Advanced laparoscopic training during residency or fellowship and training on simulators may shorten the learning curve toward proficiency. Mentoring, proctoring, and working with an experienced assistant have each been shown effective in the adoption of techniques new to a surgeon's skill set[34-37].

Furthermore, aspects of laparoscopic surgery have raised some initial concerns in the scientific community. The risk of a potential violation of oncological principles, the possible spread of neoplastic cells linked to carbon dioxide insufflation and the possibility of tumor recurrence in the access sites of the trocars have represented some of the controversial aspects [38,39]. However, it seems right to emphasize that these fears and these controversial aspects were found to be completely unjustified, both by evaluating some aspects of basic scientific research and by analyzing the results of large randomized and controlled studies.

T4 tumors show an incidence of up to 15% in patients with colon cancer. Among patients with rectal cancer, 5% to 12% of patients have tumors adherent to adjacent organs[40-42]. In these patients, is recommended *en-bloc* resection to manage locally advanced colorectal cancer[43,44]. Thus is T4 colorectal cancer still an absolute contraindication to laparoscopic surgery? The answer is that T4 colon cancer is not an absolute contraindication. Obviously, the possibility of treating T4 colorectal cancer laparoscopically depends on local circumstances (*e.g.*, organs involved in the enlarged demolition and factors related to the surgeon (*e.g.*, skill and experience of the individual surgeon in performing a laparoscopic *en-bloc* resection). Intraoperative observation of a T4 lesion often requires conversion to open surgery, especially if the goal of the therapeutic approach is curative resection. This eventuality is necessary because *en-bloc* demolition in the presence of a T4 lesion is not always effective in laparoscopic surgery. However, *en-bloc* resection may not be possible using either technique or, therefore, the surgeon must decide whether conversion is likely to allow curative resection. To date, there have been no randomized trials comparing laparoscopic and open approaches to T4 colonic or rectal cancers.

In the UK MRC-CLASSIC trial, 34% of the patients randomized to the laparoscopic group underwent conversion to an open procedure. In this group of patients, a higher post-operative morbidity rate ($P = 0.002$) and a worsened overall survival have been observed[45,46]. Furthermore, in patients undergoing laparoscopic low anterior resection or abdominoperineal resection (Figure 2), there was a higher rate of positive circumferential margins, although this did not impact local recurrence or survival[47]. Overall, male sexual and erectile function was worse in the laparoscopic group[46].

In rectal cancer, when using the minimally invasive approach, particularly for tumors in low rectum, a further challenge is represented by the anatomical conformation of the pelvis. Elements that can hinder the execution of an oncological adequate resection for rectal cancer laparoscopically are the size and location of the tumor. Additional clinical-anatomical factors such as narrow pelvis, obesity, large uterus and preoperative radiation effects are of particular importance. The inability to conduct demolition in accordance with oncological principles should lead to conversion to open surgery. Similar considerations must guide the choice of the type of colorectal anastomosis or the creation of a temporary or permanent stoma.

Complications of large bowel diseases account for 47% of gastrointestinal emergencies. Colorectal cancer presents as emergency in a wide range of patients (from 7% to 40% of the total). Large bowel obstruction represents almost 80% of the emergencies related to colorectal cancer, while perforation accounts for the remaining 20%. The most common location of bowel obstruction is the sigmoid colon, with 75% of the tumors located distal to the splenic flexure. Perforation occurs at the tumor site in almost 70% of cases and proximal to the tumor site in around 30% of cases[48]. The management of colon and rectal obstruction and perforation is challenging in terms of clinical severity, diagnostic and therapeutic options, and management of septic (Figure 3) and oncological issues. As a general rule, the principles of



Figure 1 Surgical specimen of anterior resection of the rectum with complete removal of the mesorectum (personal observations).

oncological resection should be followed. It should be emphasized that in these conditions it is important to consider the role of medical comorbidities, sarcopenia and local or systemic septic status. Even in these patients, the main objective is to optimize the postoperative course, avoiding and preventing complications, especially anastomotic leakage, to allow the completion of oncological staging and the start of integrated chemotherapy and/or radiotherapy treatments[48].

In case of colonic obstruction due to tumor of the right colon or proximal transverse colon, right hemicolectomy, classic or extended, with subsequent primary ileocolic anastomosis represents the most appropriate treatment. The general condition of the patient strongly affects the choice to perform an anastomosis. The patient's condition, including hemodynamic stability, the extent of abdominal distention, the resectability of the carcinoma and the surgeon's ability to perform a curative resection represent the elements that must be taken into consideration when choosing a possible laparoscopic approach in the presence of an occlusive colorectal carcinoma[49]. Although there have been some retrospective studies demonstrating feasibility of laparoscopic resection with benefits in short-term outcomes, a prospective randomized controlled trial has not yet been published[50-52].

In case of obstructing cancer of the left colon, a variety of options have been advocated[53]. Resection and primary anastomosis, with or without protective stoma, resection according to Hartmann, intraabdominal subtotal colectomy with ileostomy or ileorectal anastomosis are the most frequently used procedures. More recently, endoscopically placed colonic stents are used in selected patients. These endoscopic procedures, allowing the decompression of the colon and favoring the clinical stabilization of the patient, allow urgent surgery to be postponed and elective colectomies with primary anastomosis to be performed in a re-balanced patient. In this way, such an approach allows the decrease in colostomy creation rates in patients with occluding cancer of the left colon.

The use of laparoscopy in the emergency treatment of colorectal cancer cannot be recommended and should be reserved to selected favorable cases and in specialized centers[54]. Emergency presentation has been considered an absolute contraindication to laparoscopy, due to the profile of the patient at high septic risk and the level of technical operative difficulties due to the dilated and vulnerable intestine. However, with the spread of colorectal laparoscopy and the increase in experience, favorable results have been published[55], but no randomized trials.

Risk factors for conversion for different populations have been widely reported in the literature. A recent meta-analysis documented an average conversion rate of 17.9%. An evaluation of the factors that negatively influence the completion of the laparoscopic surgical procedure has shown that the factors that are most responsible for the conversion to open surgery are male sex, a tumor localized in the extraperitoneal rectum, the T3/T4 stage and the presence of metastases to locoregional lymph nodes[56]. With increasing laparoscopic hospital volume, conversion decreases below 10% with only

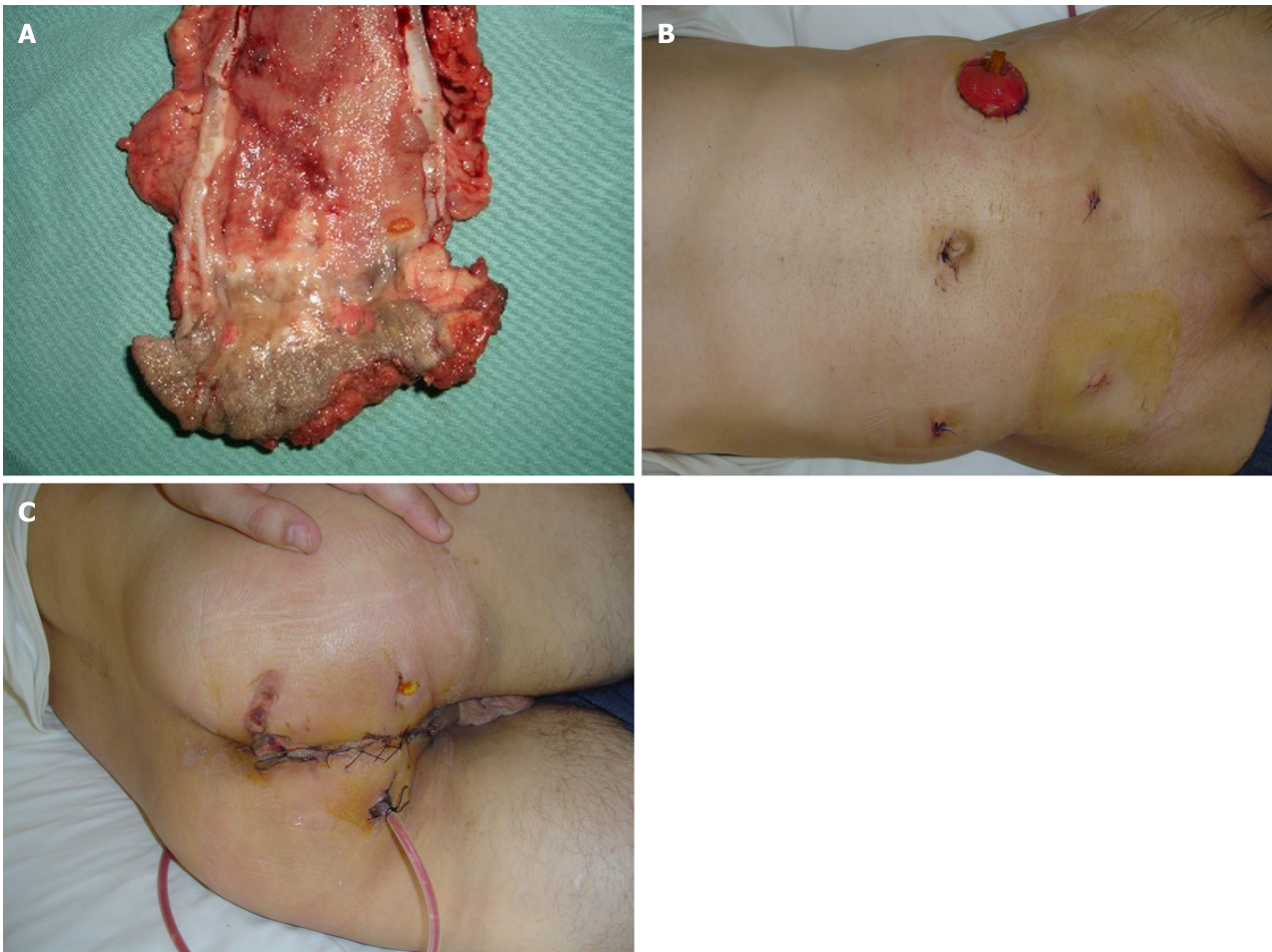


Figure 2 Clinical case of adenocarcinoma of the low rectum treated with laparoscopic abdominoperineal resection sec. Miles after neoadjuvant treatment. A: Surgical specimen of abdominoperineal resection; B: Photo of the abdomen; C: Perineal wound (personal observations).



Figure 3 Intraoperative photo of diffuse fecal peritonitis due to perforation of the cecum in a patient with neoplastic stenosis of the sigmoid colon (personal observations).

minimal impact of conversion on short-term postoperative outcome. To perform an early conversion can be an appropriate decision, for which reason this type of conversion should not be considered a failure[57-59].

CONCLUSION

Laparoscopy is a safe and effective surgical technique for the treatment of colorectal cancer. Laparoscopy remains an acceptable minimally invasive option in well trained hands. Surgeon represents a significant prognostic factor: His operative volume and that of the team with which he works is linked to surgical mortality, peri-operative complications and prognosis. Locally advanced disease and emergency presentation are relative contraindications to the laparoscopic

approach. Highly predictive factors of conversion are the lower and left site of the tumor, obesity as well as previous major abdominal surgery.

Laparoscopic surgery for low rectal cancer, when performed by experienced surgeons, could produce pathological outcomes comparable to those of open surgery. In large surgical series and multicenter studies, no differences are observed regarding complete excision of the mesorectum and the appropriateness of the resection margins. In the population of patients undergoing laparoscopic demolition, a higher rate of sphincter preservation and a favorable post-operative recovery are documented. While no differences in short-term oncological outcomes have been observed, long-term oncological outcomes in homogeneous patient populations are currently being evaluated.

FOOTNOTES

Author contributions: Cariati M and Chiarello MM designed the research; Cariati M performed the research; Brisinda G and Chiarello MM analyzed the data; and all the authors wrote, read and approved the final manuscript.

Conflict-of-interest statement: All the authors report no relevant conflicts of interest for this article.

Open-Access: This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <https://creativecommons.org/licenses/by-nc/4.0/>

Country of origin: Italy

ORCID number: Maria Cariati 0000-0002-3278-2567; Giuseppe Brisinda 0000-0001-8820-9471; Maria Michela Chiarello 0000-0003-3455-0062.

S-Editor: Wang JJ

L-Editor: A

P-Editor: Xu ZH

REFERENCES

- 1 **Morgan E**, Arnold M, Gini A, Lorenzoni V, Cabaas CJ, Laversanne M, Vignat J, Ferlay J, Murphy N, Bray F. Global burden of colorectal cancer in 2020 and 2040: incidence and mortality estimates from GLOBOCAN. *Gut* 2023; **72**: 338-344 [PMID: 36604116 DOI: 10.1136/gutjnl-2022-327736]
- 2 **AIOM**. I numeri del cancro in Italia 2023. Roma: Intermedia Editore, 2023
- 3 **Angenete E**. The importance of surgery in colorectal cancer treatment. *Lancet Oncol* 2019; **20**: 6-7 [PMID: 30545751 DOI: 10.1016/S1470-2045(18)30679-X]
- 4 **Sartori CA**, D'Annibale A, Cutini G, Senargiotto C, D'Antonio D, Dal Pozzo A, Fiorino M, Gagliardi G, Franzato B, Romano G. Laparoscopic surgery for colorectal cancer: clinical practice guidelines of the Italian Society of Colo-Rectal Surgery. *Tech Coloproctol* 2007; **11**: 97-104 [PMID: 17510740 DOI: 10.1007/s10151-007-0345-y]
- 5 **Green CJ**, Maxwell R, Verne J, Martin RM, Blazeby JM. The influence of NICE guidance on the uptake of laparoscopic surgery for colorectal cancer. *J Public Health (Oxf)* 2009; **31**: 541-545 [PMID: 19321518 DOI: 10.1093/pubmed/fdp027]
- 6 **Levine RA**, Chawla B, Bergeron S, Wasvary H. Multidisciplinary management of colorectal cancer enhances access to multimodal therapy and compliance with National Comprehensive Cancer Network (NCCN) guidelines. *Int J Colorectal Dis* 2012; **27**: 1531-1538 [PMID: 22645076 DOI: 10.1007/s00384-012-1501-z]
- 7 **You YN**, Hardiman KM, Bafford A, Poylin V, Francone TD, Davis K, Paquette IM, Steele SR, Feingold DL; On Behalf of the Clinical Practice Guidelines Committee of the American Society of Colon and Rectal Surgeons. The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for the Management of Rectal Cancer. *Dis Colon Rectum* 2020; **63**: 1191-1222 [PMID: 33216491 DOI: 10.1097/DCR.0000000000001762]
- 8 **Wood TF**, Saha S, Morton DL, Tsioulis GJ, Rangel D, Hutchinson W Jr, Foshag LJ, Bilchik AJ. Validation of lymphatic mapping in colorectal cancer: in vivo, ex vivo, and laparoscopic techniques. *Ann Surg Oncol* 2001; **8**: 150-157 [PMID: 11258780 DOI: 10.1007/s10434-001-0150-1]
- 9 **Bilchik AJ**, Trocha SD. Lymphatic mapping and sentinel node analysis to optimize laparoscopic resection and staging of colorectal cancer: an update. *Cancer Control* 2003; **10**: 219-223 [PMID: 12794620 DOI: 10.1177/107327480301000305]
- 10 **Wu Z**, Zhang S, Aung LH, Ouyang J, Wei L. Lymph node harvested in laparoscopic versus open colorectal cancer approaches: a meta-analysis. *Surg Laparosc Endosc Percutan Tech* 2012; **22**: 5-11 [PMID: 22318051 DOI: 10.1097/SLE.0b013e3182432b49]
- 11 **Yeung TM**, Wang LM, Colling R, Kraus R, Cahill R, Hompes R, Mortensen NJ. Intraoperative identification and analysis of lymph nodes at laparoscopic colorectal cancer surgery using fluorescence imaging combined with rapid OSNA pathological assessment. *Surg Endosc* 2018; **32**: 1073-1076 [PMID: 28643063 DOI: 10.1007/s00464-017-5644-4]
- 12 **Lykke J**, Jess P, Roikjer O; Danish Colorectal Cancer Group. A high lymph node yield in colon cancer is associated with age, tumour stage, tumour sub-site and priority of surgery. Results from a prospective national cohort study. *Int J Colorectal Dis* 2016; **31**: 1299-1305 [PMID: 27220610 DOI: 10.1007/s00384-016-2599-1]
- 13 **Liang Y**, Li G, Chen P, Yu J. Laparoscopic versus open colorectal resection for cancer: a meta-analysis of results of randomized controlled trials on recurrence. *Eur J Surg Oncol* 2008; **34**: 1217-1224 [PMID: 18155389 DOI: 10.1016/j.ejso.2007.11.004]
- 14 **Bonjer HJ**, Hop WC, Nelson H, Sargent DJ, Lacy AM, Castells A, Guillou PJ, Thorpe H, Brown J, Delgado S, Kuhrij E, Haglind E, Pahlman

- L; Transatlantic Laparoscopically Assisted vs Open Colectomy Trials Study Group. Laparoscopically assisted vs open colectomy for colon cancer: a meta-analysis. *Arch Surg* 2007; **142**: 298-303 [PMID: [17372057](#) DOI: [10.1001/archsurg.142.3.298](#)]
- 15 **Guillou PJ**, Quirke P, Thorpe H, Walker J, Jayne DG, Smith AM, Heath RM, Brown JM; MRC CLASICC trial group. Short-term endpoints of conventional versus laparoscopic-assisted surgery in patients with colorectal cancer (MRC CLASICC trial): multicentre, randomised controlled trial. *Lancet* 2005; **365**: 1718-1726 [PMID: [15894098](#) DOI: [10.1016/S0140-6736\(05\)66545-2](#)]
 - 16 **Kang SB**, Park JW, Jeong SY, Nam BH, Choi HS, Kim DW, Lim SB, Lee TG, Kim DY, Kim JS, Chang HJ, Lee HS, Kim SY, Jung KH, Hong YS, Kim JH, Sohn DK, Kim DH, Oh JH. Open versus laparoscopic surgery for mid or low rectal cancer after neoadjuvant chemoradiotherapy (COREAN trial): short-term outcomes of an open-label randomised controlled trial. *Lancet Oncol* 2010; **11**: 637-645 [PMID: [20610322](#) DOI: [10.1016/S1470-2045\(10\)70131-5](#)]
 - 17 **van der Pas MH**, Haglind E, Cuesta MA, Furst A, Lacy AM, Hop WC, Bonjer HJ; COLOrectal cancer Laparoscopic or Open Resection II (COLOR II) Study Group. Laparoscopic versus open surgery for rectal cancer (COLOR II): short-term outcomes of a randomised, phase 3 trial. *Lancet Oncol* 2013; **14**: 210-218 [PMID: [23395398](#) DOI: [10.1016/S1470-2045\(13\)70016-0](#)]
 - 18 **Fleshman J**, Branda M, Sargent DJ, Boller AM, George V, Abbas M, Peters WR Jr, Maun D, Chang G, Herline A, Fichera A, Mutch M, Wexner S, Whiteford M, Marks J, Birnbaum E, Margolin D, Larson D, Marcello P, Posner M, Read T, Monson J, Wren SM, Pisters PW, Nelson H. Effect of Laparoscopic-Assisted Resection vs Open Resection of Stage II or III Rectal Cancer on Pathologic Outcomes: The ACOSOG Z6051 Randomized Clinical Trial. *JAMA* 2015; **314**: 1346-1355 [PMID: [26441179](#) DOI: [10.1001/jama.2015.10529](#)]
 - 19 **Stevenson AR**, Solomon MJ, Lumley JW, Hewett P, Clouston AD, Gebiski VJ, Davies L, Wilson K, Hague W, Simes J; ALaCaRT Investigators. Effect of Laparoscopic-Assisted Resection vs Open Resection on Pathological Outcomes in Rectal Cancer: The ALaCaRT Randomized Clinical Trial. *JAMA* 2015; **314**: 1356-1363 [PMID: [26441180](#) DOI: [10.1001/jama.2015.12009](#)]
 - 20 **Jiang WZ**, Xu JM, Xing JD, Qiu HZ, Wang ZQ, Kang L, Deng HJ, Chen WP, Zhang QT, Du XH, Yang CK, Guo YC, Zhong M, Ye K, You J, Xu DB, Li XX, Xiong ZG, Tao KX, Ding KF, Zang WD, Feng Y, Pan ZZ, Wu AW, Huang F, Huang Y, Wei Y, Su XQ, Chi P; LASRE trial investigators. Short-term Outcomes of Laparoscopy-Assisted vs Open Surgery for Patients With Low Rectal Cancer: The LASRE Randomized Clinical Trial. *JAMA Oncol* 2022; **8**: 1607-1615 [PMID: [36107416](#) DOI: [10.1001/jamaoncol.2022.4079](#)]
 - 21 **Bonjer HJ**, Deijen CL, Abis GA, Cuesta MA, van der Pas MH, de Lange-de Klerk ES, Lacy AM, Bemelman WA, Andersson J, Angenete E, Rosenberg J, Fuerst A, Haglind E; COLOR II Study Group. A randomized trial of laparoscopic versus open surgery for rectal cancer. *N Engl J Med* 2015; **372**: 1324-1332 [PMID: [25830422](#) DOI: [10.1056/NEJMoa1414882](#)]
 - 22 **Lacy AM**, García-Valdecasas JC, Delgado S, Castells A, Taurá P, Piqué JM, Visa J. Laparoscopy-assisted colectomy versus open colectomy for treatment of non-metastatic colon cancer: a randomised trial. *Lancet* 2002; **359**: 2224-2229 [PMID: [12103285](#) DOI: [10.1016/S0140-6736\(02\)09290-5](#)]
 - 23 **Hewett PJ**, Allardyce RA, Bagshaw PF, Frampton CM, Frizelle FA, Rieger NA, Smith JS, Solomon MJ, Stephens JH, Stevenson AR. Short-term outcomes of the Australasian randomized clinical study comparing laparoscopic and conventional open surgical treatments for colon cancer: the ALCCaS trial. *Ann Surg* 2008; **248**: 728-738 [PMID: [18948799](#) DOI: [10.1097/SLA.0b013e31818b7595](#)]
 - 24 **Veldkamp R**, Kuhry E, Hop WC, Jeekel J, Kazemier G, Bonjer HJ, Haglind E, Pahlman L, Cuesta MA, Msika S, Morino M, Lacy AM; Colon cancer Laparoscopic or Open Resection Study Group (COLOR). Laparoscopic surgery versus open surgery for colon cancer: short-term outcomes of a randomised trial. *Lancet Oncol* 2005; **6**: 477-484 [PMID: [15992696](#) DOI: [10.1016/S1470-2045\(05\)70221-7](#)]
 - 25 **Tjandra JJ**, Chan MK, Yeh CH. Laparoscopic- vs. hand-assisted ultralow anterior resection: a prospective study. *Dis Colon Rectum* 2008; **51**: 26-31 [PMID: [18085339](#) DOI: [10.1007/s10350-007-9107-1](#)]
 - 26 **Morino M**, Parini U, Giraudo G, Salval M, Brachet Contul R, Garrone C. Laparoscopic total mesorectal excision: a consecutive series of 100 patients. *Ann Surg* 2003; **237**: 335-342 [PMID: [12616116](#) DOI: [10.1097/01.SLA.0000055270.48242.D2](#)]
 - 27 **Cheung HY**, Chung CC, Wong JC, Yau KK, Li MK. Laparoscopic rectal cancer surgery with and without neoadjuvant chemo-irradiation: a comparative study. *Surg Endosc* 2009; **23**: 147-152 [PMID: [18802735](#) DOI: [10.1007/s00464-008-0081-z](#)]
 - 28 **Hasegawa H**, Ishii Y, Nishibori H, Endo T, Watanabe M, Kitajima M. Short- and midterm outcomes of laparoscopic surgery compared for 131 patients with rectal and rectosigmoid cancer. *Surg Endosc* 2007; **21**: 920-924 [PMID: [17285382](#) DOI: [10.1007/s00464-006-9132-5](#)]
 - 29 **Miyajima N**, Fukunaga M, Hasegawa H, Tanaka J, Okuda J, Watanabe M; Japan Society of Laparoscopic Colorectal Surgery. Results of a multicenter study of 1,057 cases of rectal cancer treated by laparoscopic surgery. *Surg Endosc* 2009; **23**: 113-118 [PMID: [18802736](#) DOI: [10.1007/s00464-008-0078-7](#)]
 - 30 **Franks PJ**, Bosanquet N, Thorpe H, Brown JM, Copeland J, Smith AM, Quirke P, Guillou PJ; CLASICC trial participants. Short-term costs of conventional vs laparoscopic assisted surgery in patients with colorectal cancer (MRC CLASICC trial). *Br J Cancer* 2006; **95**: 6-12 [PMID: [16755298](#) DOI: [10.1038/sj.bjc.6603203](#)]
 - 31 **Marusch F**, Gastingier I, Schneider C, Scheidbach H, Konradt J, Bruch HP, Köhler L, Bärlechner E, Köckerling F; Laparoscopic Colorectal Surgery Study Group (LCSSG). Experience as a factor influencing the indications for laparoscopic colorectal surgery and the results. *Surg Endosc* 2001; **15**: 116-120 [PMID: [11285950](#) DOI: [10.1007/s004640000340](#)]
 - 32 **Schlachta CM**, Mamazza J, Grégoire R, Burpee SE, Pace KT, Poulin EC. Predicting conversion in laparoscopic colorectal surgery. Fellowship training may be an advantage. *Surg Endosc* 2003; **17**: 1288-1291 [PMID: [12739116](#) DOI: [10.1007/s00464-002-8920-9](#)]
 - 33 **Schlachta CM**, Mamazza J, Seshadri PA, Cadeddu M, Gregoire R, Poulin EC. Defining a learning curve for laparoscopic colorectal resections. *Dis Colon Rectum* 2001; **44**: 217-222 [PMID: [11227938](#) DOI: [10.1007/BF02234296](#)]
 - 34 **Künzli BM**, Friess H, Shrikhande SV. Is laparoscopic colorectal cancer surgery equal to open surgery? An evidence based perspective. *World J Gastrointest Surg* 2010; **2**: 101-108 [PMID: [21160858](#) DOI: [10.4240/wjgs.v2.i4.101](#)]
 - 35 **Arteaga González I**, Díaz Luis H, Martín Malagón A, López-Tomassetti Fernández EM, Arranz Duran J, Carrillo Pallares A. A comparative clinical study of short-term results of laparoscopic surgery for rectal cancer during the learning curve. *Int J Colorectal Dis* 2006; **21**: 590-595 [PMID: [16292517](#) DOI: [10.1007/s00384-005-0057-6](#)]
 - 36 **Akiyoshi T**, Kuroyanagi H, Ueno M, Oya M, Fujimoto Y, Konishi T, Yamaguchi T. Learning curve for standardized laparoscopic surgery for colorectal cancer under supervision: a single-center experience. *Surg Endosc* 2011; **25**: 1409-1414 [PMID: [20953880](#) DOI: [10.1007/s00464-010-1404-4](#)]
 - 37 **Chen G**, Liu Z, Han P, Li JW, Cui BB. The learning curve for the laparoscopic approach for colorectal cancer: a single institution's experience. *J Laparoendosc Adv Surg Tech A* 2013; **23**: 17-21 [PMID: [23317439](#) DOI: [10.1089/lap.2011.0540](#)]
 - 38 **Berends FJ**, Kazemier G, Bonjer HJ, Lange JF. Subcutaneous metastases after laparoscopic colectomy. *Lancet* 1994; **344**: 58 [PMID: [7912321](#) DOI: [10.1016/S0140-6736\(94\)91079-0](#)]
 - 39 **Martel G**, Crawford A, Barkun JS, Boushey RP, Ramsay CR, Fergusson DA. Expert opinion on laparoscopic surgery for colorectal cancer

- parallels evidence from a cumulative meta-analysis of randomized controlled trials. *PLoS One* 2012; **7**: e35292 [PMID: [22532846](#) DOI: [10.1371/journal.pone.0035292](#)]
- 40 **Ng DC**, Co CS, Cheung HY, Chung CC, Li MK. The outcome of laparoscopic colorectal resection in T4 cancer. *Colorectal Dis* 2011; **13**: e349-e352 [PMID: [21689365](#) DOI: [10.1111/j.1463-1318.2011.02698.x](#)]
- 41 **Bretagnol F**, Dedieu A, Zappa M, Guedj N, Ferron M, Panis Y. T4 colorectal cancer: is laparoscopic resection contraindicated? *Colorectal Dis* 2011; **13**: 138-143 [PMID: [20653697](#) DOI: [10.1111/j.1463-1318.2010.02380.x](#)]
- 42 **Kim IY**, Kim BR, Kim HS, Kim YW. Differences in clinical features between laparoscopy and open resection for primary tumor in patients with stage IV colorectal cancer. *Onco Targets Ther* 2015; **8**: 3441-3448 [PMID: [26640384](#) DOI: [10.2147/OTT.S93420](#)]
- 43 **Sugarbaker PH**. Revised guidelines for second-look surgery in patients with colon and rectal cancer. *Clin Transl Oncol* 2010; **12**: 621-628 [PMID: [20851803](#) DOI: [10.1007/s12094-010-0567-8](#)]
- 44 **Turaga K**, Levine E, Barone R, Sticca R, Petrelli N, Lambert L, Nash G, Morse M, Adbel-Misih R, Alexander HR, Attiye F, Bartlett D, Bastidas A, Blazer T, Chu Q, Chung K, Dominguez-Parra L, Espat NJ, Foster J, Fournier K, Garcia R, Goodman M, Hanna N, Harrison L, Hoefer R, Holtzman M, Kane J, Labow D, Li B, Lowy A, Mansfield P, Ong E, Pameijer C, Pingpank J, Quinones M, Royal R, Salti G, Sardi A, Shen P, Skitzki J, Spellman J, Stewart J, Esquivel J. Consensus guidelines from The American Society of Peritoneal Surface Malignancies on standardizing the delivery of hyperthermic intraperitoneal chemotherapy (HIPEC) in colorectal cancer patients in the United States. *Ann Surg Oncol* 2014; **21**: 1501-1505 [PMID: [23793364](#) DOI: [10.1245/s10434-013-3061-z](#)]
- 45 **Jayne DG**, Guillo PJ, Thorpe H, Quirke P, Copeland J, Smith AM, Heath RM, Brown JM; UK MRC CLASICC Trial Group. Randomized trial of laparoscopic-assisted resection of colorectal carcinoma: 3-year results of the UK MRC CLASICC Trial Group. *J Clin Oncol* 2007; **25**: 3061-3068 [PMID: [17634484](#) DOI: [10.1200/JCO.2006.09.7758](#)]
- 46 **Jayne DG**, Thorpe HC, Copeland J, Quirke P, Brown JM, Guillo PJ. Five-year follow-up of the Medical Research Council CLASICC trial of laparoscopically assisted versus open surgery for colorectal cancer. *Br J Surg* 2010; **97**: 1638-1645 [PMID: [20629110](#) DOI: [10.1002/bjs.7160](#)]
- 47 **Sawyer MA**, Sawyer EM. Controversies in laparoscopic surgery for colorectal cancer. *Curr Surg* 2004; **61**: 334-341 [PMID: [15276336](#) DOI: [10.1016/j.cursur.2004.01.013](#)]
- 48 **Pisano M**, Zorcolo L, Merli C, Cimbanassi S, Poiasina E, Ceresoli M, Agresta F, Allievi N, Bellanova G, Cocolini F, Coy C, Fugazzola P, Martinez CA, Montori G, Paolillo C, Penachim TJ, Pereira B, Reis T, Restivo A, Rezende-Neto J, Sartelli M, Valentino M, Abu-Zidan FM, Ashkenazi I, Bala M, Chiara O, De' Angelis N, Deidda S, De Simone B, Di Saverio S, Finotti E, Kenji I, Moore E, Wexner S, Biffl W, Coimbra R, Guttadauro A, Leppäniemi A, Maier R, Magnone S, Mefire AC, Peitzmann A, Sakakushev B, Sugrue M, Viale P, Weber D, Kashuk J, Fraga GP, Kluger I, Catena F, Ansaloni L. 2017 WSES guidelines on colon and rectal cancer emergencies: obstruction and perforation. *World J Emerg Surg* 2018; **13**: 36 [PMID: [30123315](#) DOI: [10.1186/s13017-018-0192-3](#)]
- 49 **Fleshman J**, Marcello P, Stamos MJ, Wexner SD; American Society of Colon and Rectal Surgeons (ASCRS); Society of American Gastrointestinal and Endoscopic Surgeons (SAGES). Focus Group on Laparoscopic Colectomy Education as endorsed by The American Society of Colon and Rectal Surgeons (ASCRS) and The Society of American Gastrointestinal and Endoscopic Surgeons (SAGES). *Dis Colon Rectum* 2006; **49**: 945-949 [PMID: [16649114](#) DOI: [10.1007/s10350-006-0559-5](#)]
- 50 **Kleespies A**, Füessl KE, Seeliger H, Eichhorn ME, Müller MH, Rentsch M, Thasler WE, Angele MK, Kreis ME, Jauch KW. Determinants of morbidity and survival after elective non-curative resection of stage IV colon and rectal cancer. *Int J Colorectal Dis* 2009; **24**: 1097-1109 [PMID: [19495779](#) DOI: [10.1007/s00384-009-0734-y](#)]
- 51 **Tebala GD**. Colorectal surgery in a rural setting. *Updates Surg* 2015; **67**: 407-419 [PMID: [26545384](#) DOI: [10.1007/s13304-015-0331-2](#)]
- 52 **Smyth R**, Darbyshire A, Mercer S, Khan J, Richardson J. Trends in emergency colorectal surgery: a 7-year retrospective single-centre cohort study. *Surg Endosc* 2023; **37**: 3911-3920 [PMID: [36729232](#) DOI: [10.1007/s00464-023-09876-0](#)]
- 53 **Vallance AE**, Keller DS, Hill J, Braun M, Kuryba A, van der Meulen J, Walker K, Chand M. Role of Emergency Laparoscopic Colectomy for Colorectal Cancer: A Population-based Study in England. *Ann Surg* 2019; **270**: 172-179 [PMID: [29621034](#) DOI: [10.1097/SLA.0000000000002752](#)]
- 54 **Marcello PW**, Milsom JW, Wong SK, Brady K, Goormastic M, Fazio VW. Laparoscopic total colectomy for acute colitis: a case-control study. *Dis Colon Rectum* 2001; **44**: 1441-1445 [PMID: [11598472](#) DOI: [10.1007/BF02234595](#)]
- 55 **Gash K**, Chambers W, Ghosh A, Dixon AR. The role of laparoscopic surgery for the management of acute large bowel obstruction. *Colorectal Dis* 2011; **13**: 263-266 [PMID: [19906058](#) DOI: [10.1111/j.1463-1318.2009.02123.x](#)]
- 56 **Clancy C**, O'Leary DP, Burke JP, Redmond HP, Coffey JC, Kerin MJ, Myers E. A meta-analysis to determine the oncological implications of conversion in laparoscopic colorectal cancer surgery. *Colorectal Dis* 2015; **17**: 482-490 [PMID: [25524157](#) DOI: [10.1111/codi.12875](#)]
- 57 **Casillas S**, Delaney CP, Senagore AJ, Brady K, Fazio VW. Does conversion of a laparoscopic colectomy adversely affect patient outcome? *Dis Colon Rectum* 2004; **47**: 1680-1685 [PMID: [15540299](#) DOI: [10.1007/s10350-004-0692-4](#)]
- 58 **White I**, Greenberg R, Itah R, Inbar R, Schneebaum S, Avital S. Impact of conversion on short and long-term outcome in laparoscopic resection of curable colorectal cancer. *JSLs* 2011; **15**: 182-187 [PMID: [21902972](#) DOI: [10.4293/108680811X13071180406439](#)]
- 59 **de Neree Tot Babberich MPM**, van Groningen JT, Dekker E, Wiggers T, Wouters MWJM, Bemelman WA, Tanis PJ; Dutch Surgical Colorectal Audit. Laparoscopic conversion in colorectal cancer surgery; is there any improvement over time at a population level? *Surg Endosc* 2018; **32**: 3234-3246 [PMID: [29344789](#) DOI: [10.1007/s00464-018-6042-2](#)]



Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

Telephone: +1-925-3991568

E-mail: office@baishideng.com

Help Desk: <https://www.f6publishing.com/helpdesk>

<https://www.wjgnet.com>

