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ORIGINAL ARTICLE

# Laparoscopic versus open colectomy for obstructing right colon cancer: A systematic review and meta-analysis

R. Cirocchi<sup>a,\*</sup>, F. Cesare Campanile<sup>b</sup>, S. Di Saverio<sup>c</sup>,  
G. Popivanov<sup>d</sup>, L. Carlini<sup>e</sup>, D. Pironi<sup>f</sup>, R. Tabola<sup>g</sup>,  
N. Vettoretto<sup>h</sup>

<sup>a</sup> Department of general and oncologic surgery, university of Perugia, 1, via Tristano di Joannuccio, 05100 Terni, Italy

<sup>b</sup> General surgery unit, Andosilla hospital, Civita Castellana, VT, Italy

<sup>c</sup> Emergency surgery and trauma surgery unit, Maggiore hospital trauma center, Bologna, Italy

<sup>d</sup> Military medical academy, Sofia, Bulgaria

<sup>e</sup> Department of legal medicine, university of Perugia, Terni, Italy

<sup>f</sup> Department of surgical sciences, Sapienza university of Rome, Rome, Italy

<sup>g</sup> Department of gastrointestinal and general surgery, medical university of Wrocław, Wrocław, Poland

<sup>h</sup> Laparoscopic surgery unit, department of surgery, M Mellini hospital, Chiari, Italy

## KEYWORDS

Right colectomy;  
Colon cancer;  
Intestinal obstruction;  
Emergency surgery;  
Systematic review;  
Meta-analysis;  
Laparoscopy;  
Laparoscopic colectomy;  
Colorectal surgery

## Summary

**Background:** Hemicolectomy is the treatment of choice for intestinal obstruction from right colon cancer. This review compares the laparoscopic vs open access in hemicolectomy for patients with right colon cancer.

**Methods:** A systematic review and meta-analysis of clinical studies published after January 2017 was performed according to the Prisma guidelines. The study has been recorded on the Prospero register (CRD42016044108).

**Results:** Five studies were included for review. Only one anastomotic leak was reported in conventional open anastomosis group (1.9%) and none of the studies included in the meta-analysis reported re-operations during the first 30 postoperative days. The 30-day postoperative mortality did not differ between the two groups. The length of incision, blood loss, early mobilization after surgery, the 30-day postoperative overall complication rate and hospital length of stay were significantly shorter in the laparoscopic group. The difference in the duration of procedure was statistically significant in favor of the open group. The number of dissected lymph nodes, the overall survival at 5 years and time to flatus were described only in one study, without any significant difference. Finally, none of the trials reported any information concerning differences in the costs between the two techniques.

\* Corresponding author.

E-mail address: [cirocchiroberto@yahoo.it](mailto:cirocchiroberto@yahoo.it) (R. Cirocchi).

**Conclusions:** The better outcomes described in this study achieved with laparoscopy, must be interpreted with caution because of the small number of patients involved, the selection and publication bias and the low level of evidence of the analysed trials. Indeed, the advantages of a minimally invasive approach, which have been demonstrated by the present meta-analysis, should encourage the use of laparoscopy also in emergency setting.

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## Introduction

Colorectal cancer is the third most commonly diagnosed cancer in both men and women and is the leading cause of cancer-related deaths in the United States [1]. Most colorectal cancer receives elective surgery and only few of them are treated in an emergency setting for a perforation or obstruction (15%) [2,3].

Most patients with symptoms of intestinal obstruction are affected by left colon or rectal cancer. Only few patients have an intestinal obstruction from right colon cancer, more common in the elderly [4,5]. The surgical strategy for patients with bowel obstruction from right colon cancer differs according to the cancer location, staging, ASA score, comorbidities and the skills of the emergency surgeon [6–9].

The need for emergency surgery is more frequent in the elderly (especially in patients aged more than 75 years), and these patients are generally frail due to a significant incidence of comorbidities, thus they are affected by higher rates of postoperative morbidity and mortality [10,11]. The prognosis of patients treated in emergency setting is expectedly worse than those treated in elective setting [12–15].

The benefits of laparoscopic surgery for colon cancer elective treatment have been addressed by several randomized controlled trials (decreased total morbidity, local morbidity, shorter length of stay and improved quality of life); however, its role in an emergency setting needs to be clarified [16,17].

The guidelines of the Society of American Gastrointestinal and Endoscopic Surgeons for laparoscopic resection of curable colon and rectal cancer recommend: “the decision to proceed laparoscopically should take into account the patient’s condition, including hemodynamic stability, extent of abdominal distension, the resectability of the carcinoma, and the surgeon’s ability to perform a curative resection in this setting” [18].

Indeed, some surgeons have shown the safety and feasibility of laparoscopic right hemicolectomy, performed in acute setting in small series [19], but they could not demonstrate any statistically significant benefit [20–24].

To examine whether laparoscopic surgery may be beneficial also in emergency conditions, we reviewed the available comparative trials (randomized and non-randomized) of laparoscopic versus open right colectomy for obstructing colon cancer.

This systematic review aims at comparing their outcomes in terms of overall anastomotic leak rate, postoperative mortality, reoperation and covering stoma rates.

## Methods

A systematic review was performed examining the available data on controlled randomized and non-randomized comparative trials about the laparoscopic treatment of

intestinal obstruction by right colon cancer in accordance with the Preferred reporting items for systematic reviews and meta-analyses (PRISMA) standards [25]. A systematic literature search was conducted using the PubMed search engine up until January 16st 2017 (<https://www.ncbi.nlm.nih.gov/pubmed>) including the terms: “laparoscopy” and “colon cancer” combined with “intestinal obstruction”, “intestinal occlusion” or “emergency surgery”. No language, publication date, or publication status restrictions were imposed. All titles and abstracts of the considered studies were analyzed to select the comparative reports of randomized (RCTs) and non-randomized controlled trials (non-RCTs) about the laparoscopic vs open treatment for intestinal obstruction from right colon cancer. When multiple articles were published from a single study group and overlapping study periods were reported, only the most recent article was considered so as to avoid duplication of data. The Pubmed function “related articles” was used to enlarge each search, and the reference list of all potentially eligible studies was analyzed. To minimize retrieval bias, a manual search method including the Science citation index expanded, Scopus and Google scholar databases was performed. After this initial process, the full-text papers were independently screened by 2 authors for eligibility. The final decision on eligibility was reached by consensus between the 2 screening authors. All non-comparative trials and those studies in which data not related only to right colectomy cases were excluded from the analysis. Only studies which reported at least one of the outcomes of interest using laparoscopy for treatment of intestinal obstruction from right colon cancer were considered. Data were extracted by 2 authors based on an intention-to-treat principle. Any disagreement was resolved through discussion with a reassessment of the data and/or by involving a third author. For each study, the following data (when available) were extracted and summarized: author’s surname and year of publication; country of the hospital in which the procedures were performed; study design; number of patients, age, sex, BMI, TNM stage, skill of the surgeons, inclusion criteria, exclusion criteria, follow-up. The primary outcomes of interest in this systematic review were the overall anastomotic leak rate, the 30-day postoperative mortality, the 30-day postoperative reoperation rate and covering stoma rate. The severity of an anastomotic leakage was graded as grade A (anastomotic leakage results in no change in patient management), grade B (leakage requires active therapeutic intervention but is manageable without re-laparotomy) and grade C (anastomotic leakage requires re-laparotomy). The following data were considered as secondary outcomes: the 30-day postoperative overall complication, length of the incision, duration of operation, blood loss, number of dissected lymph nodes, time to flatus, time out from bed after surgery, hospital stay, overall survival at 5 years and costs. Methodological quality assessment for comparative studies was carried out using the modified grading system

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