



Review

Laparoscopic versus open surgery for colon cancer: A meta-analysis of 5-year follow-up outcomes



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ABSTRACT

Background: Colon cancer is one of the most common malignant tumors of digestive tract with a rather high incidence rate. Currently, surgery is the only radical therapy for colon cancer, while Laparoscopic colectomy (LAC) has become another focus since studies reported LAC could improve the short-time outcomes and quick recovery of patients compared with open colectomy (OC). However, it's still unclear whether LAC can better improve patients' long-time survival than OC.

Objective: We aimed to perform a meta-analysis to answer whether the 5-year recurrence and survival rate after LAC are comparable to those reported after OC in patient with colon cancer.

Methods: We searched Cochrane Library, PubMed, Embase, CBM, VIP, and CNKI for relevant studies. The time searched was from the establishment time of the databases to September 15, 2011. At the same time, we searched Google, Medical Martix and Baidu for more studies as well as a hand-search. We limited the language to English and Chinese. Two reviewers independently screened articles to identify randomized controlled trials (RCTs) according to the inclusion and exclusion criteria and assessed the methodological quality of included trials, and then extracted data. Meta-analysis was performed using RevMan5.0.

Results: Five RCTs involving 2695 patients reported long-term outcomes based on 5-year data and were included in the analysis. No significant differences between LAC and OC were found in the overall mortality (RR = 0.94; 95% CI (0.82, 1.09); $P = 0.23$, $I^2 = 21\%$), total recurrence rate (RR = 0.94; 95% CI (0.81, 1.10); $P = 0.24$, $I^2 = 27\%$), 5-year tumor free survival rate (RR = 1.00, 95% CI (0.94, 1.06); $P = 0.96$, $I^2 = 0\%$), and overall 5-year survival (RR = 1.02; 95% CI (0.97, 1.07); $P = 0.55$, $I^2 = 0\%$).

Conclusions: This meta-analysis suggests that LAC was as effective and safe as OC for colon cancer.

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Introduction

Colon cancer is one of the most common malignant tumors of digestive tract. Its incidence rate in western developed countries has been the 3rd place among all malignant tumors [1]. Its incidence rate in China is increasing gradually and has become the 3rd–5th common malignant tumor [2].

Currently, surgery is the only radical therapy for colon cancer, and Laparoscopic colectomy (LAC) has been the focus of the surgeon around the world since Jacobs M's first report of it [3]. For there are many studies which reported LAC could improve the short-time outcomes and quick recovery of patients compared with the traditional open colectomy (OC) [4–9]. Meanwhile the long-time outcomes of LAC were reported in some studies, but it's still unclear about whether LAC can better improve patients' long-time survival. Therefore, we aimed to undertake this analysis to systematically review the RCTs comparing LAC and OC in patients with colon cancer and to provide high quality evidence for clinical practice.

Methods

Search strategy

We identified eligible trials by an electronic search of Cochrane library, PubMed, Embase, CBM, CNKI, VIP and Wangfang using the English terms *laparoscopy, surgery, colon, colectomy, restorative proctocolectomy, colon cancer* and *colonic neoplasms*; Chinese terms *腹腔镜, 开腹, 结肠癌* and *随机*. The time searched was from the establishment time of the databases to September 15, 2011. At the same time, we searched Google, Medical Martix and Baidu for the relevant studies as well as a hand-search. We limited the language to English and Chinese.

Eligibility criteria

Study design

To be eligible, studies had to be randomized controlled trials with more than 100 patients, and with a follow-up no shorter than 5 years. Both the blinded and un-blinded trials were included.

Population studied

Patients with the main clinical manifestations of abdominal pain, abdominal distension, mucus stool and incomplete evacuation and were diagnosed with colon cancer (including carcinoma of

ileocecum, transverse colon, descending colon and sigmoid) confirmed by fiber colonoscope. Patients who undertook palliative resection, who had a history of radiation/chemotherapy or abdominal surgery, who were found with distant metastasis during the operation and who required emergency operation were excluded. We also excluded patients younger than 18 years old.

Study selection

Two reviewers working independently, in duplicate, scanned all titles and abstracts to exclude literature which surely didn't meet the eligibility criteria and then obtained the full text reports of candidate trials. The same reviewers independently assessed eligibility from the full text of these papers and identified the trials included. If there was any disagreement, another author would help to reach consensus.

Data collection

The same two investigators conducted data extraction using a standardized pre-piloted form. The reviewers collected information about the author, the population studied, number of the patients, methodological evaluation, interventions and outcomes. One of the investigators did the data collection and entry, the other was in charge of the checking. Disagreements were solved through discussion.

Quality assessment

The quality of trials was assessed with the methods recommended by the Cochrane Collaboration for assessing risk of bias [10]. The criteria used for quality assessment were sequence generation of allocation, allocation concealment, blinding, use of intent-to-treat analysis, and the proportion of patients failed to be followed up. Two investigators independently assessed the studies according to the same criteria. Disagreements were resolved by consensus.

Statistical analysis

The meta-analysis was done in line with recommendations from the Cochrane Collaboration using RevMan5.0 when possible. Otherwise, we conducted descriptive analysis. Heterogeneity was assessed with χ^2 test ($\alpha = 0.1$) and I^2 statistics. When there was no statistics heterogeneity among studies ($P > 0.10$, $I^2 < 50\%$), we used

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