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Review

Stenting as a bridge to resection versus emergency surgery for left-sided colorectal cancer with malignant obstruction: A systematic review and meta-analysis

Xin Wang, Jianjun He, Xuan Chen, Qingqiang Yang*

Department of the General Surgery, The Affiliated Hospital of Southwest Medical University, Luzhou, Sichuan 646000, China

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ABSTRACT

Purpose: This study aims to discuss the safety and feasibility of a combined treatment consisting of stent insertion and elective surgery for left-sided colorectal cancer with malignant obstruction.

Methods: Randomized clinical trials (RCTs) that discussed the safety and feasibility of stenting as a bridge to surgery in malignant colorectal cancer were identified in a search of medical databases, including PubMed, Embase, Cochrane Library, and SCIENCE. Each paper's quality was assessed using the Jadad scale. A meta-analysis was conducted using RevMan 5.3, and statistical heterogeneity between RCTs was defined as $I^2 > 50\%$.

Results: Nine RCTs included 594 patients were selected and analyzed. Of the included patients, 281 underwent stent insertion followed by elective surgery (SG group), and 313 underwent emergency surgery (EG group). The meta-analysis revealed that the patients in the SG group had a higher one-stage anastomosis rate. Patients in the SG had lower mortality rates and minor complications. There was no significant difference in anastomotic leakage between the two groups. The funnel plot showed that there was no publication bias in these outcomes.

Conclusion: Stenting as a bridge to surgery was safe and feasible in left-sided colorectal cancer with malignant obstruction. Compared with the patients in the EG group, the SG patients had an improved primary anastomosis rate and experienced no increase in the risk of other complications.

1. Introduction

Colorectal cancer (CRC) is a common malignancy of gastrointestinal system that has a high incidence rate. Approximately 8–29% of patients with CRC exhibit symptoms of a malignant obstruction at the time of diagnosis, and approximately 75% of colon obstructions occur in the left side of the colon [1]. Emergency surgery is the conventional treatment in these patients. Because of the obstruction, sufficient preoperative bowel preparation and acid-base and water-electrolyte balance correction could not be conducted.Hence, emergency surgery is the conventional treatment in these patients, who have consequently high morbidity (45–50%) and mortality (15–20%) rates [2]. Additionally, surgical treatment for left-sided CRC with malignant obstruction is controversial [3,4].

Colonic stenting as a bridge to elective surgery is receiving an increasing amount of attention for CRC patients with malignant obstruction. A few studies have reported that stenting as a bridge to elective surgery achieved good results in CRCs with malignant obstructions. The use of stenting substantially improved the one-stage anastomosis rate and did not increase the rates of other complications, including anastomotic leakage [5–7]. However, other studies have found no significant difference in primary anastomosis and stoma between patients who undergo colonic stenting as a bridge to elective surgery and those treated with emergency surgery [8]. Therefore, an objective evaluation of the safety and feasibility of colonic stenting as a bridge to elective surgery for left-sided CRC with acute obstruction is necessary. Here, we performed a meta-analysis of recently published relevant randomized clinical trials (RCTs).

2. Data and methods

2.1. Literature inclusion

2.1.1. Inclusion criteria

(1) Randomized clinical trials, (2) Patients with malignant obstruction caused by left-sided colorectal cancer, (3) Studies that included two groups (stenting group VS emergency group), (4) All cases included were resectable (5) There are a number of indicators in the study including①One-stage anastomosis②Anastomotic leakage③mortality④minor complications.

* Corresponding author.
E-mail addresses: 849557053@qq.com (X. Wang), 1499716846@qq.com (J. He), cx610@163.com (X. Chen), yangqingqiang121@163.com (Q. Yang).

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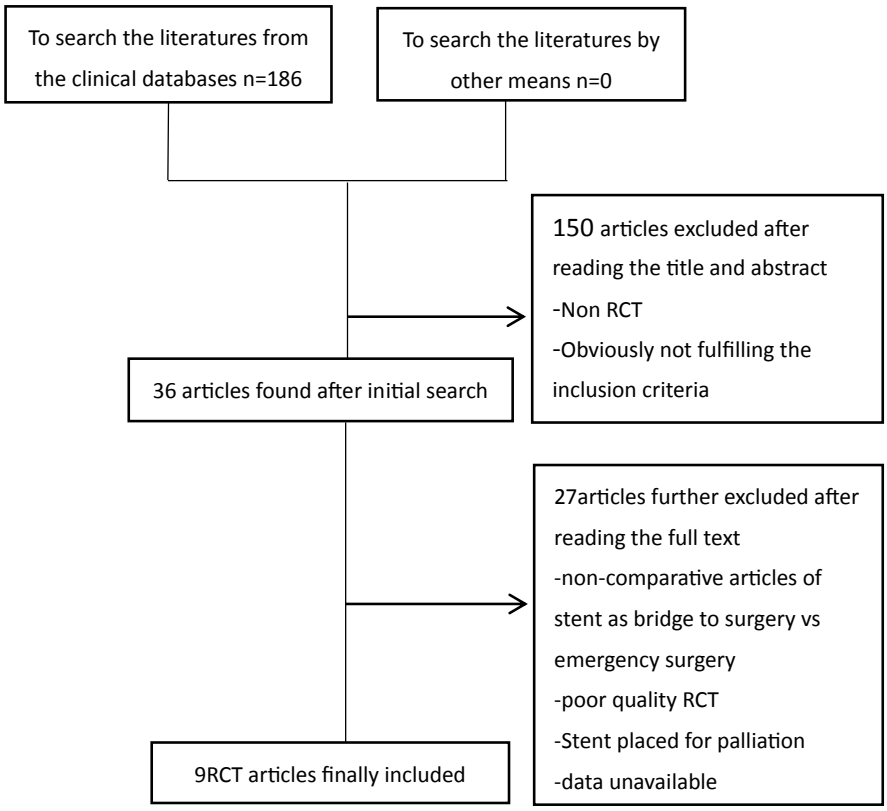

Fig. 1. Literature retrieval process.

2.1.2. Exclusion criteria

(1) The acute obstruction was not caused by left-sided colorectal cancer, (2) Incomplete data (3)Poor quality of the study(4) Studies that will not allow a meta-analysis to be carried out.

2.2. Literature search and data collection

We searched many databases, including PubMed, Embase, Cochrane Library, and SCIENCE. All studies were searched from the construction of the databases to January 2017. All studies were English references.The following terms were used to perform the search: colorectal cancer, malignant obstruction, colonic stent, and emergency surgery. All studies were screened by two independent authors who used previously defined inclusion and exclusion criteria. Controversial studies were resolved by discussion among all of the authors (Fig. 1).

2.3. Quality evaluation

The quality of studies was evaluated on the Jadad scale,and we chose high-quality studies for our meta-analysis. Jadad scale [9]was a simple and practical evaluation method which was used to assess the quality of the randomized controlled trials included in meta analysis and systematic reviews.The evaluation standards consist of random sequence generation, randomized concealment, blinding, loss to follow-up and sign out. For the first three evaluation standards, the following scale was used: appropriate (2 points), unclear (1 point), and inappropriate (0 point), and for follow-up and sign out, Yes (1 point) and No (2 points) were used. Finally, total scores from 1 to 3 points were rated as low-quality studies, and total scores from 4 to 7 points were rated as high-quality studies.

2.4. Data analysis

Data analysis was performed by RevMan 5.3 (Cochrane Collaboration). Heterogeneity was evaluated using the x^2 test and I^2 test. If there was no heterogeneity ($p > 0.1$, $I^2 < 50\%$) among the studies, we used a fixed-effects model. However, when $p < 0.1$ and $I^2 > 50\%$, we determined that the studies exhibited heterogeneity, and a random-effects model was selected for the analysis. The identified heterogeneity was then further analyzed. Odds ratios (OR) was used to describe quantities for numerical data, and the weighted mean difference (WMD) was used to describe measurement data. We calculated 95% confidence interval (CI) of all quantities, and $p < 0.05$ was considered to indicate significance.

3. Result

3.1. Search results

186 articles were found after the literature search.150 papers were excluded after initial search by reading the title and abstract.9RCTs were found after secondary screening by reading the full text of these 36 rest papers.Finally,9RCTs include 594 patients were included in our meta-analysis (Table 1).

3.2. Results of meta-analysis

3.2.1. One-stage anastomosis

A total of nine RCTs [3,10–17] reported one-stage anastomosis in two groups. The heterogeneity test of these 9 RCTs indicated $p = 0.16$ and $I^2 = 33\%$, the heterogeneity was small. Therefore, the fixed-effect model was adapted. The OR was 2.56 (95% CI: 1.79–3.66 $p < 0.0001$) (Fig. 2). The analysis revealed that stenting as a bridge to elective surgery increased the primary anastomosis rate to a large extent.

3.2.2. Anastomotic leakage

Eight RCTs [3,10–16] reported anastomotic leakage (Fig. 3). The heterogeneity test of these 8 RCTs indicated $p = 0.36$ and $I^2 = 9\%$; therefore, it was adapted to use the fixed-effect model. Test for overall effect revealed that the OR was 1.12 (95% CI: 0.55–2.30, $p = 0.75$).