



Review

Laparoscopic gastrectomy for remnant gastric cancer: Risk factors associated with conversion and a systematic analysis of literature



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HIGHLIGHTS

- LG is a feasible, effective and safe procedure for curative treatment of RGC.
- LG is hypothesized to be superior to OG for curative treatment of RGC.
- It is the first report to summarize the feasibility, efficacy and safety of LG.

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ABSTRACT

Background: In traditional opinion, history of abdominal surgery was the relative contraindication for Laparoscopic gastrectomy (LG) with high rate of conversion to Open gastrectomy (OG). Use of LG for treatment of remnant gastric cancer (RGC) has been documented in some case studies and controlled clinical trials. However, whether LG is superior, equal or inferior to OG in these patients is not clear.

Methods: English language articles published between January 2005 and January 2016 were searched in MEDLINE, Embase and the Cochrane Database of Systematic Reviews. Main outcome measures were: conversion of LG to OG, operative time, intraoperative blood loss, tumor size, positive proximal resection margin, lymph node dissection, disease stage, post-operative resumption of oral intake, postoperative hospital stay, complications, mortality and follow-up findings. Published clinical data which was in the situation of conversion to OG was collected, and the factors associated with conversion to open surgery were examined.

Results: Five non-randomized controlled trials and seven LG case studies were included in the systematic review. Meta-analysis of the data could not be performed due to high variation and heterogeneity in study design, study population, LG technique, and outcome measures among the included studies. Systematic analysis of the included studies showed that LG was associated with significantly shorter mean operative time, early resumption of oral intake, and shorter hospital stay, as compared to that with OG. No significant difference in complications was observed between the two groups.

Conclusion: LG in the hands of experienced surgeons is relative feasibility and safety for RGC. Previous surgical anastomosis, previous open surgery and surgical experience were associated with conversion to OG. However, these findings should be validated with robust prospective comparative studies.

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1. Introduction

Remnant gastric cancer (RGC) refers gastric cancer develops in the stump or in the remnant stomach following a gastrectomy irrespective of the histology of the primary lesion (benign or

malignant). RGC and gastric stump cancer are recognized as the same clinical entity. RGC is usually detected at an advanced stage and is associated with a low rate of curative resection and a generally poor prognosis. Open gastrectomy (OG) remains the main treatment modality, while laparoscopic gastrectomy (LG), a minimally invasive surgical technique that is widely accepted for treating gastric cancer (including for advanced cases) [1–3] is less frequently employed for treatment of RGC, owing to the technical complexity and concerns over radicality of resection in patients who have a history of upper abdominal surgery. Yamada and

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colleagues [4] in 2005 first reported successful LG in a 69-year-old patient with RGC; the operative time was approximately 5 h and minimal operative blood loss (~30 mL). This report prompted an increased interest in the use of LG for treating RGC.

A few case series and non-randomized controlled trials (non-RCTs) have compared the potential benefits of LG over OG for the treatment of RGC. These studies indicate the feasibility as well as a non-inferior oncological safety of LG, apart from the inherent benefits of minimal invasive surgery associated with LG. The primary objective of this systematic review was to compare the efficacy and safety of LG in comparison to that associated with OG, for the treatment of RGC. Factors associated with conversion to open surgery were also examined and the trend in publications related to the subject is briefly reviewed.

2. Materials and methods

2.1. Literature search

Studies published in English language between January 2005 and January 2016, were searched in MEDLINE, Embase and the Cochrane Database of Systematic Reviews. The key words used were “stomach” OR “gastric” AND “stump cancer” or “stump recurrent cancer” OR “remnant recurrent cancer” AND “laparoscopic” OR “laparoscopy”. All publication titles, abstracts, or related citations were manually reviewed by one of the authors.

2.2. Inclusion and exclusion criteria

Inclusion criteria were: (1) studies and case series that compared patient characteristics and perioperative outcomes of LG with that of OG for the treatment of RGC; (2) LG performed using either hand-assisted or total laparoscopic techniques; (3) studies that reported at least one of the outcome measures of interest; and (4) the study with a larger sample size or higher quality was included for analysis when more than one study was published by the same authors and/or institutions, unless these studies were mutually exclusive or involved different patient populations.

Exclusion criteria were: (1) studies that did not report the outcome measures of interest, unless these outcome measures could be determined from the published data; (2) studies that exclusively involved robotic surgery, unless the data were separately presented, and (3) studies that enrolled pediatric patients.

Studies that compared patients with matched demographic and clinical characteristics were included for further analysis.

The experimental protocol was developed in accordance with the ethical guidelines of the Helsinki Declaration and was approved by the Human Ethics Committee of Southern Medical University, Guangzhou, China.

2.3. Quality assessment of included studies

The Centre for Evidence-Based Medicine (CEBM) Levels of Evidence, 2011 version [5] was used to assess the quality of the selected studies. In addition, the Newcastle–Ottawa Quality Assessment Scale (Table 1) [6] was used to assess the quality of observational non-RCTs and controlled studies independently by two reviewers. Eight items in the Newcastle–Ottawa Scale were used to assess patient population and selection, study comparability, follow-up, and outcomes of interest. Each study was graded as either low quality (0–5) or high quality (6–9). A cohort study with a score above 5 was included in the meta-analysis. In case of any discrepancy, a third independent reviewer was consulted in order to reach consensus.

Table 1
Critical appraisal of included studies.

	Representative exposed cohort	Non-exposed selected from same population	Ascertainment of exposure reliable	Outcome of interest not present from start	Baseline comparability	Reliable outcome assessment	Standardized measurement of outcomes	Adequate short-term follow-up	Adequate long-term follow-up	Adequately dealt with loss to follow-up	No selective outcome reporting	Risk of bias	Level of evidence
Luo GD, 2015, China	1	1	0	1	1	1	0	0	0	0	1	High	4
Sang-Yong Son, 2015, Korea	1	1	1	1	1	1	0	0	1	0	0	Low	4
Kim, H S 2014, Korea	1	1	1	1	1	1	1	0	0	0	0	High	4
Nagai et al., 2013, Japan	1	1	1	1	1	1	1	1	0	0	0	Low	4
Park et al., 2008, Korea	1	1	1	1	1	0	0	1	0	0	0	High	4
Pan, Y 2014, China	0	0	N/A	1	1	N/A	N/A	1	0	1	1	High	4
Tsunoda, S 2014, Japan	0	0	N/A	1	0	1	0	0	N/A	1	1	High	4
Qian et al., 2010, China	0	N/A	N/A	1	N/A	N/A	N/A	1	0	1	1	High	4
Shinohara et al., 2012, Japan	0	N/A	N/A	1	N/A	N/A	N/A	1	0	0	0	High	4
Liu et al., 2013, China	0	N/A	N/A	1	N/A	N/A	N/A	1	0	1	1	High	4
Li et al., 2011, China	0	N/A	N/A	1	N/A	N/A	N/A	0	0	1	0	High	4
Corcione et al., 2008, Italy	0	N/A	N/A	1	N/A	N/A	N/A	1	0	0	0	High	4

N/A: not applicable.

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