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Comparison of short-term clinical outcomes between complete laparoscopic and laparoscopic-assisted total gastrectomy For Gastric Upper Cancer: A Meta-analysis

ZHAO Hai-yuan*, ZHANG Yi-sheng, LI Shang

Department of Gastrointestinal Surgery, Hospital of Wannan Medical College, Wuhu 241000, China

RESEARCH

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Corresponding Author:
ZHAO Hai-yuan
Department of Gastrointestinal Surgery,
Hospital of Wannan Medical College,
Wuhu 241000, China.
dukzhao@163.com

ABSTRACT

Background

Laparoscopic-assisted total gastrectomy (LATG) is the most commonly used method for laparoscopic treatment of gastric upper gastric cancer. However, because of the difficulties of total laparoscopic reconstruction, especially in vivo esophageal jejunum anastomosis is not easy to complete, resulting in a large number of complete laparoscopic total gastrectomy (TLTG), but it is worth to explore the complete laparoscopy and the clinical value of total gastrectomy.

Aims

This study from the perspective of evidence-based medicine TLTG treatment of gastric cancer in the safety and feasibility of the recent and effective.

Methods

A comparative study of the efficacy of TLTG and LATG in the treatment of upper gastric cancer was published in 2017. Meta-analysis was performed using RenMan 5.3 software.

Results

A total of 912 patients with gastric cancer were enrolled in this study. Among them, 425 LATG patients and 487 TLTG patients were all Asian populations. The results of meta-analysis showed that there was no significant difference in TLTG between operation time, proximal margin, lymph node dissection, postoperative complications and the most important complication of the anastomotic fistula compared with LATG (MD=-65.91, 95% CI:-114.18~-1.7.65, *P*<0.05), but the length of incision was shorter (*P*<0.05), but the length of incision was shorter (MD =-4.91, 95 (MD=-1.07, 95% CI:-1.88~-0.26, *P*<0.05), the time of premature feeding was earlier (MD=-1.07, 95% CI:-1.88~-0.26, *P*<0.05) (MD=-1.55, 95% CI:-2.70~-0.40, *P*<0.05). The postoperative hospital stay was shorter (MD=-1.55, 95% CI:-2.70~-0.40, *P*<0.05).

Conclusion

TLTG is safe and feasible in the treatment of upper gastric cancer in Asian population, and has the advantages of quick recovery after incision.

Key Words

Gastric cancer, total laparoscopic total gastrectomy, laparoscopic total gastrectomy, meta-analysis

Background

Gastric cancer is the fourth most common cancer in the world, since 2008 because of cancer causes death in gastric cancer in the second[1]. Surgery is widely used as the most effective treatment for gastric cancer. Since the first report in 1994, the number of patients undergoing laparoscopic gastrectomy (LG) has been increasing rapidly. In the early distal gastric cancer surgery, some randomized controlled trials showed laparoscopic gastrectomy without inferior open gastrectomy, and large retrospective study also received the acceptance and recognition of oncology.[2] In addition, laparoscopic surgery has the potential to restore fast, less complications, reduce bleeding and reduce the possibility of blood transfusion, laparoscopic small incision to reduce pain, reduce the risk of intestinal obstruction and the risk of the wound. Laparoscopic total gastrectomy (LATG) and total laparoscopic gastrectomy (TLTG) are two common methods of LG gastric cancer. Often, LATG's in

vitro coincidence is performed through a 5–7cm small incision in the upper abdomen. However, in obese patients with laparoscopic assisted total gastric anastomosis, prolonged incision as a necessary condition for the safety of anastomosis. In addition, in the case of shorter esophageal stumps, and in a limited space to do anastomosis more difficult, TLTG is another way of endoscopic anastomosis, that is, in vivo resection and anastomosis. It has advantages over LATG, including smaller wounds, less invasive.[3-6] Although the amount of laparoscopic radical gastrectomy (TLDG) is increasing due to the progress of laparoscopic surgical instruments and the accumulation of surgical experience, the technique of total laparoscopic total gastrectomy (TLTG) is difficult, especially in the esophagus Anastomosis of the jejunum does not allow full opening. This article further demonstrates the feasibility and safety of TLTG through Meta.

Method

(LATG) was used as the search term in PubMed, Embase, MEDLINE, Cochrane and other databases. The results were as follows: (1) The expression of laparo-scopic-assisted total gastrectomy (LATG) (CNKI), Chinese Journal of Biomedical Periodicals (CMCC), Chinese Journal of Gastroenterology, Chinese Academy of Sciences, Beijing 100029, China. OBJECTIVE: To investigate the effect of total laparoscopic total gastrectomy on laparoscopic total gastrectomy, And the Vibro database in the laparoscopic and total laparoscopic radical gastrectomy clinical efficacy of the literature; seized years from the reservoir to June 2017, the language is limited to Chinese and English, while the selected study of the reference literature to expand the search The

Inclusion and exclusion criteria

Included in the standard: (1) type of study: included in the comparison of laparoscopic assisted and laparoscopic radical gastrectomy clinical study of the efficacy of the study. (2) subjects: radical gastrectomy radical resection of gastric cancer patients. (3) Intervention: laparoscopic assisted laparoscopic laparoscopic assisted radical resection of gastric cancer, total laparoscopic group of patients underwent radical gastrectomy (4) outcome index: the literature at least one of the following indicators: Operation time, proximal margin, intraoperative blood loss, intraoperative lymph node dissection, incision length, postoperative first exhaust time, eating time, postoperative hospital stay and postoperative complications, postoperative anastomotic fistula.

Exclusion criteria

(1) The study of benign stomach disease, recurrent gastric cancer; (2) for the radical laparoscopic radical gastrectomy; (3) did not report the clinical efficacy of two surgical methods; Published or lack of original data.

Data Extraction and Document Quality Assessment

Document data was independently extracted by two researchers, and it was difficult to determine whether or not to incorporate the study into the study, either by discussion or by the third researcher. The extraction data mainly include: literature nomination, author, publication time, research methods, sample size, case characteristics, surgical related indicators and postoperative recovery. The quality of the literature was evaluated by the Newcastle-Ottawa Scale (NOS) scale. The quality score was higher than 6 points, which indicated that the quality of the literature was high and included in the meta-analysis.

Statistical analysis

Meta-analysis was performed using RevMan 5.2 statistical software to calculate the odds ratio (odds ratio, OR), 95% confidence interval (95% confidence interval, 95% CI), mean difference (MD) I2 Analysis of heterogeneity, I2 <50% that homogeneity is good, using a fixed effect model for analysis; I2 ≥50% that is included in the study between the statistical homogeneity, the use of random effects model analysis. Draw a funnel chart to analyse publication bias. Selected literature was arranged according to the published year. P<0.05 for the difference was statistically significant.

Results

Into the literature

A total of seven articles in line with the standard into the study, the literature search process shown in Figure 1, in which the English literature 4, Three articles, the cumulative sample size of 912 cases, including total laparoscopic resection of 487 cases, laparoscopic total gastrectomy group 425 cases. The basic data and quality score of the literature are shown in Table 1.

Operation and postoperative situation

Operation time

Seven articles were compared with the operation time, There was heterogeneity among the study groups (P=0.00, I2=91%), using random effects model analysis, meta-analysis showed no statistically significant difference between the two groups (MD=11.06, 95% CI:-9.59~31.70, P=0.29), Figure 2.

Intraoperative blood loss

Five articles were compared with the operation time, there was heterogeneity among the study groups (P=0.00, I2=96%), using a random effects model analysis, meta-analysis showed statistically significant difference between the two groups (MD=-65.91, 95% CI:-114.18~-1.7.65, P=0.007) Figure 3.

Approximate edge distance

Two articles were compared with the operation time, there was heterogeneity among the study groups (P=0.36, I2=0%), using the fixed effect model analysis, meta-analysis showed no statistically significant difference between the two groups (MD=0.18, 95% CI:-0.14~0.49, P=0.27) Figure 4.

Number of lymph node dissection

Six articles were compared with the operation time, there was heterogeneity among the study groups (P=0.45, I2=0%), using the fixed effect model analysis, meta-analysis showed no statistically significant difference between the two groups (MD=0.56, 95% CI:-0.78~1.90, P=0.41) Figure 5.

Postoperative first exhaust time

Six articles were compared with the operation time, There was heterogeneity among the study groups (P=0.00, I2=97%), using a random effects model analysis, meta-analysis showed statistically significant difference between the two groups (MD=-1.07, 95% CI:-1.88-0.26, P=0.009) Figure 6.

Time for the first time after eating

Five articles were compared with the operation time, There was heterogeneity among the study groups (P=0.00, I2=85%), using a random effects model analysis, Meta-analysis showed statistically significant difference between the two groups (MD=-0.76, 95% CI:-1.35-0.18, P=0.01) Figure 7.

Postoperative hospital stay

6 articles were compared with the operation time, there was heterogeneity among the study groups (P=0.00, I2=88%), using a random effects model analysis, Meta-analysis showed statistically significant difference between the two groups (MD=-1.55, 95% CI:-2.70-0.40, P=0.008) Figure 8.

Cut length

Two articles were compared with the operation time, There was heterogeneity among the study groups (P=0.97, I2=0%), using the fixed effect model analysis, Meta-analysis showed statistically significant difference between the two groups (MD=-4.91, 95% CI:-5.40~-4.42, P=0.00001) Figure 9.

Postoperative overall complications

Seven articles were compared with the operation time, there was heterogeneity among the study groups (P=0.91, I2=0%), using the fixed effect model analysis, meta-analysis showed no statistically significant difference between the two groups (MD=0.65, 95% CI:-5.40~1.04, P=0.07) Figure 10.

Anastomotic fistula

Six articles were compared with the operation time, there was heterogeneity among the study groups (P=0.80, I2=0%), using the fixed effect model analysis, meta-analysis showed no statistically significant difference in operation time between the two groups (MD=0.98, 95% CI:0.33-2.91, P=0.97) Figure 11.

Release bias analysis

In this study, postoperative overall complications were used as indicators to show bias analysis. It was found that the scatter points were all distributed in the inverted funnel and the symmetry was good, indicating that the publication bias had little effect on the meta-analysis (Figure 12).

Discussion

Although laparoscopic surgery is often used in the treatment of gastric cancer, laparoscopic assisted gastric cancer surgery is the most commonly used method, because the total laparoscopic total gastrectomy (TLTG) of the digestive tract reconstruction methods include endoscopic anastomosis, abdomen Small incision assisted in two ways.[14] But the two kinds of anastomosis methods are in the whole laparoscopy, the technical difficulty is higher, but with the development of technology, all-round mirror anastomosis was diversified trend, according to the laparoscopic anastomosis equipment used to classify (OrVilTM), anti-puncture, manual handbag sacking, etc. The other is a straight-cut closure method, which mainly includes a straight-cut closure side of the closure device, which is divided into a circular stapler method, Anastomosis, triangular anastomosis, T-anastomosis, etc.[15,16] But these emerging anastomosis methods have not yet matured, and the safety of surgery is the focus of the surgeon who performs TLTG. So the high risk of complications and the possibility of mortality concerns the enthusiasm of the body oesophageal jejunum anastomosis. With the progress of laparoscopic surgery and the accumulation of surgical experience, can now be completed under the laparoscopic oesophageal jejunum anastomosis. In this study, the advantages and feasibility of total laparoscopic oesophageal jejunum anastomosis were mainly studied through large data.

Because the reconstructed part of the TLTG may be difficult, some researchers believe that longer operative times can adversely affect the outcome of the patient. The results of the meta-analysis showed that there was no statistically significant difference in the operative time between the two groups. According to our TLTG experience, two points were helpful: first, the technique of oesophageal jejunal anastomosis was used to simplify the anastomosis. Second, TLTG can eliminate the opening and closing of small open surgery, resulting in shorter operative time. Of course, each doctor learning curve also has an impact on the operating time. So, 7 groups of data heterogeneity. TLTG incision is smaller than the upper abdominal incision required by LATG. Therefore, TLTG has a better cosmetic effect. However, it is not entirely clear whether TLTG is really more traumatic and less invasive than LATG. The data showed

that TLTG group had less blood loss than LATG group, the difference was statistically significant. This also further demonstrates that TLTG has a more minimally invasive effect and may also result in an increase in blood loss during the skin incision and anastomosis in the LATG group, and that the whole laparoscope has an operative amplification effect that makes the blood vessels more clear and reduces blood vessels And the use of small incision and ultrasound knife can also reduce the amount of bleeding[17,18] In addition, when the LATG, the oesophageal stump must be pulled out from the abdominal cavity. Stretching the oesophageal stump may cause splenic tear and bleeding. However, this result requires further rigorous explanation, since the amount of blood loss varies widely between studies, and the heterogeneity of the method of estimating the amount of blood loss is different. The results of this study showed that the first time of postoperative anal exhaust time, postoperative oral feeding time and postoperative hospital stay were shorter in LATG group than in LATG group, which indicated that TLTG had small gastrointestinal irritation and gastrointestinal function Quick recovery Kang et al.[19] study that laparoscopic operation more detailed, can reduce surgical trauma, so patients with faster recovery of intestinal function. In addition, Okholm et al.[20] that laparoscopic surgery on patients with immune damage to the body, reducing the inflammatory response, which also helps the recovery of gastrointestinal function.

Postoperative pathological findings is an important reference for determining the success of laparoscopic surgery for malignant tumours. In the case of short follow-up time, the main indicators of the quality of tumour radical resection of the number of lymph nodes and surgical margins. This study shows that no matter whether the use of LATG or TLTG, can be technically similar tumour resection, proximal margin and lymph node dissection of the number of differences was not statistically significant. The heterogeneity of which is largely dependent on the surgeon's technical and pathological analysis variability.

Surgical safety is the focus of the surgeon who performs TLTG. In this study, the overall complication of the two groups was not statistically significant. At the same time anastomotic leakage is the most common complications of digestive tract reconstruction, we also analysed the anastomotic fistula this important complication, the data show that the two groups of anastomotic fistula also no difference, no statistically significant. Likewise, there is a noticeable heterogeneity in the study because skilled surgeons are safer and faster than unskilled surgeons.

There are several restrictions on our research. First, all the results are from East Asia, with an average BMI below the average Western BMI. However, our results also apply to Western patients because in vitro reconstruction is easier than reconstruction of obese patients with lower abdominal incision. Second, there is a difference in the duration of each surgical procedure. LATG has been in operation since March 2006, and TLTG has been in operation since November 2007. Various surgical factors associated with the surgery itself, such as surgical instruments, sutures and drugs, may affect the outcome. In addition, there may be differences in surgical skills and perioperative care between individual surgical groups. Thirdly, most of the studies analysed focused only on gastrectomy. However, the included studies have gastric proximal gastrectomy because the size of the remaining studies is too small for deterministic conclusions, and the more the number of patients in the meta-analysis, the more likely the test is to be treated. So we did not rule out the study. Although such a low number does not mean significant deviations, but still leads to clinical heterogeneity.

Conclusion

Current studies have shown that TLTG is a viable option for patients with gastric cancer and is comparable to the LATG method. However, more methods are needed for high quality comparative studies to adequately assess the state of TLTG.

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PEER REVIEW

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

FUNDING

None

Table 1: Basic information and quality score of the literature

Author	Year / Country	Sample Size (n)		Quality Score
		TLTG	LATG	
Jung[7]	Korea/2013	40	47	8
Kim[8]	Korea/2013	90	23	9
Binghua Xu[9]	China/2013	69	70	8
Ito[10]	Japan/2014	117	46	6
Chenglong Cui[11]	China/2015	16	47	7
Ke Chen[12]	China/2016	108	145	9
Long Hua[13]	China/2017	47	47	8

Figure 1: Literature search process

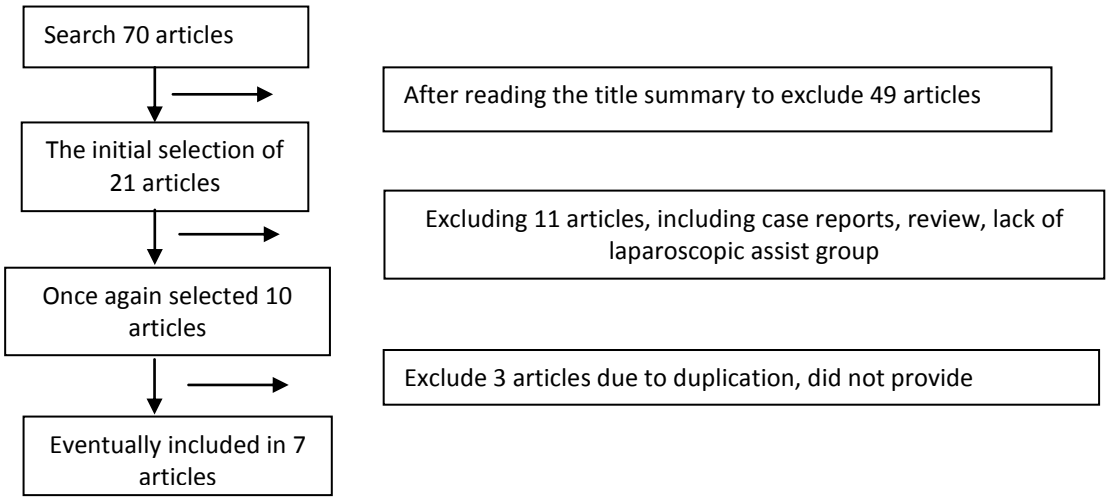
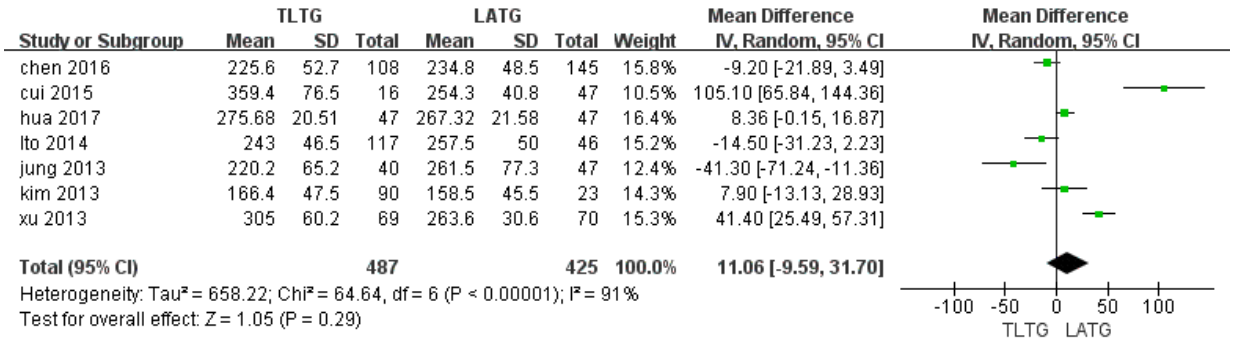


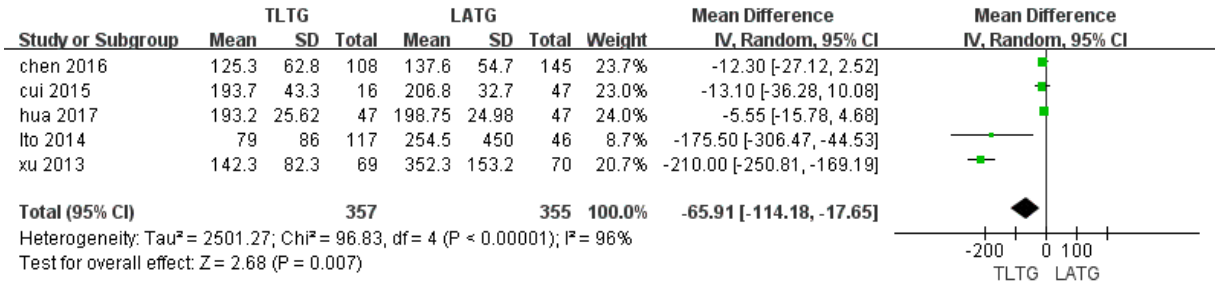
Figure 2: The results of meta - analysis of the operation time of laparoscopy and laparoscopic assisted group



Study or Subgroup	TLTG Mean	TLTG SD	TLTG Total	LATG Mean	LATG SD	LATG Total	Weight	Mean Difference IV, Random, 95% CI
chen 2016	225.6	52.7	108	234.8	48.5	145	15.8%	-9.20 [-21.89, 3.49]
cui 2015	359.4	76.5	16	254.3	40.8	47	10.5%	105.10 [65.84, 144.36]
hua 2017	275.68	20.51	47	267.32	21.58	47	16.4%	8.36 [-0.15, 16.87]
Ito 2014	243	46.5	117	257.5	50	46	15.2%	-14.50 [-31.23, 2.23]
jung 2013	220.2	65.2	40	261.5	77.3	47	12.4%	-41.30 [-71.24, -11.36]
kim 2013	166.4	47.5	90	158.5	45.5	23	14.3%	7.90 [-13.13, 28.93]
xu 2013	305	60.2	69	263.6	30.6	70	15.3%	41.40 [25.49, 57.31]
Total (95% CI)			**487**			**425**	**100.0%**	**11.06 [-9.59, 31.70]**

Heterogeneity: Tau² = 658.22; Chi² = 64.64, df = 6 (P < 0.00001); I² = 91%
Test for overall effect: Z = 1.05 (P = 0.29)

Figure 3: The results of meta - analysis of intraoperative blood loss in laparoscopic group and laparoscopic assistant group



Study or Subgroup	TLTG Mean	TLTG SD	TLTG Total	LATG Mean	LATG SD	LATG Total	Weight	Mean Difference IV, Random, 95% CI
chen 2016	125.3	62.8	108	137.6	54.7	145	23.7%	-12.30 [-27.12, 2.52]
cui 2015	193.7	43.3	16	206.8	32.7	47	23.0%	-13.10 [-36.28, 10.08]
hua 2017	193.2	25.62	47	198.75	24.98	47	24.0%	-5.55 [-15.78, 4.68]
Ito 2014	79	86	117	254.5	450	46	8.7%	-175.50 [-306.47, -44.53]
xu 2013	142.3	82.3	69	352.3	153.2	70	20.7%	-210.00 [-250.81, -169.19]
Total (95% CI)			**357**			**355**	**100.0%**	**-65.91 [-114.18, -17.65]**

Heterogeneity: Tau² = 2501.27; Chi² = 96.83, df = 4 (P < 0.00001); I² = 96%
Test for overall effect: Z = 2.68 (P = 0.007)

Figure 4: The results of meta - analysis of the distance between the laparoscopic group and the laparoscopic - assisted group

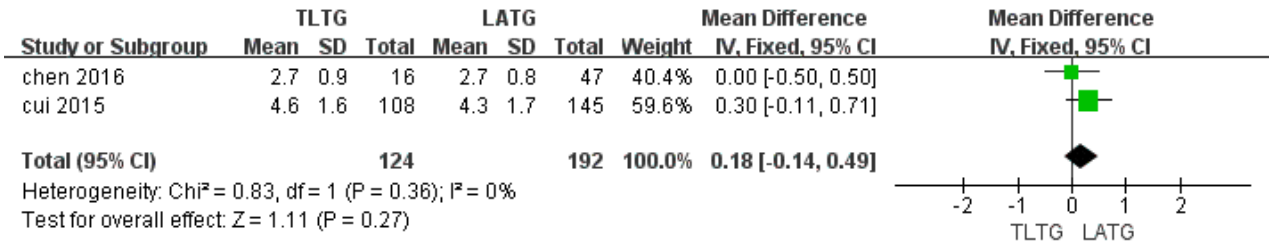


Figure 5: Total laparoscopic group and laparoscopic assisted lymph node dissection of meta-analysis results

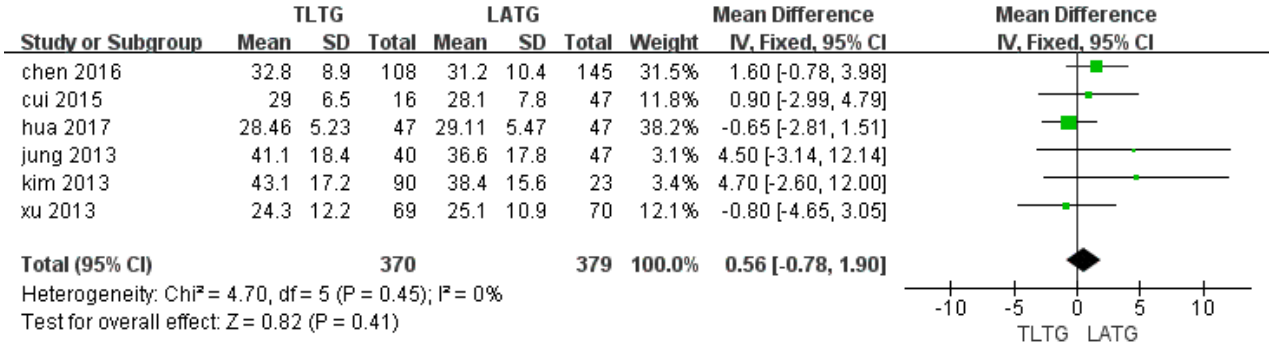


Figure 6: The results of meta - analysis of the first exhaust time in the laparoscopic group and the laparoscopic group

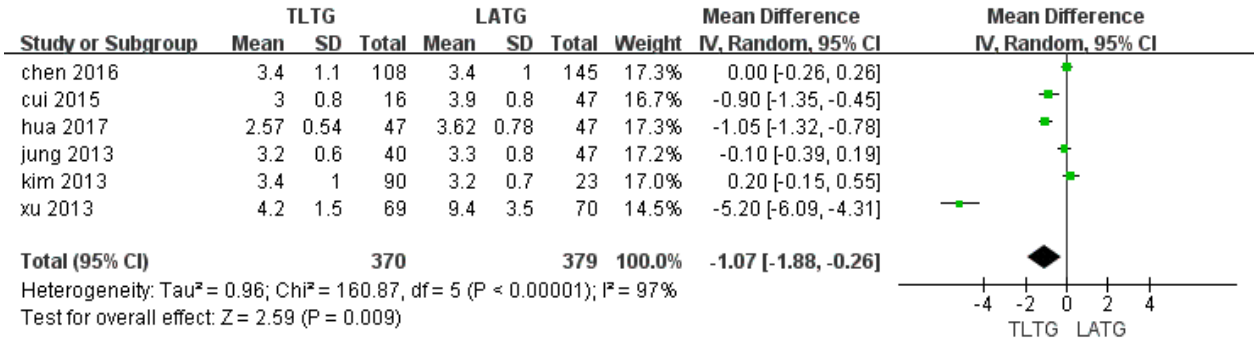


Figure 7: The results of meta - analysis of the first feeding time in the laparoscopic group and the laparoscopic group

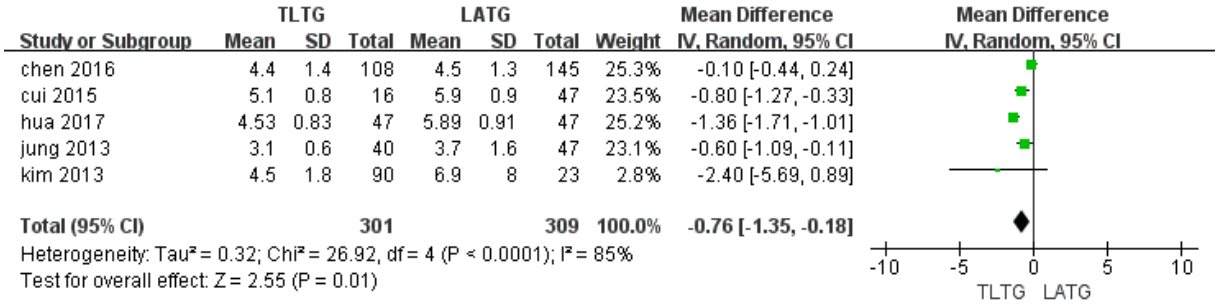


Figure 8: The results of meta - analysis of postoperative hospital stay in laparoscopic and laparoscopic assistive groups

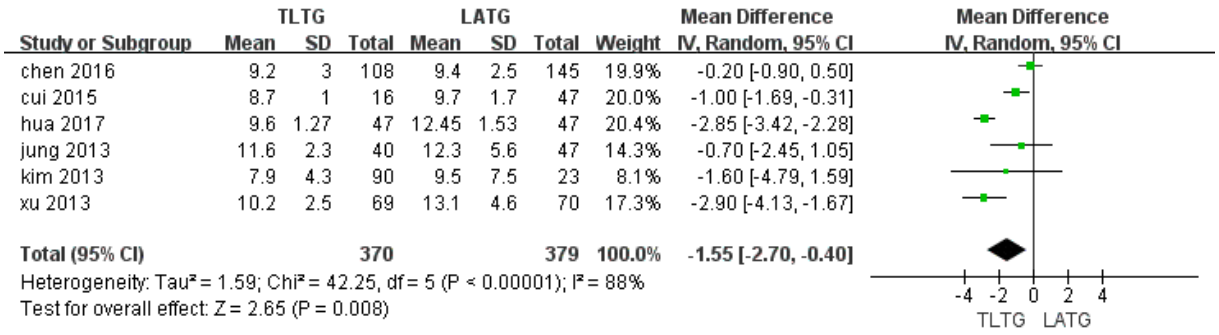


Figure 9: The results of meta - analysis of total laparoscopic and laparoscopic - assisted incision length

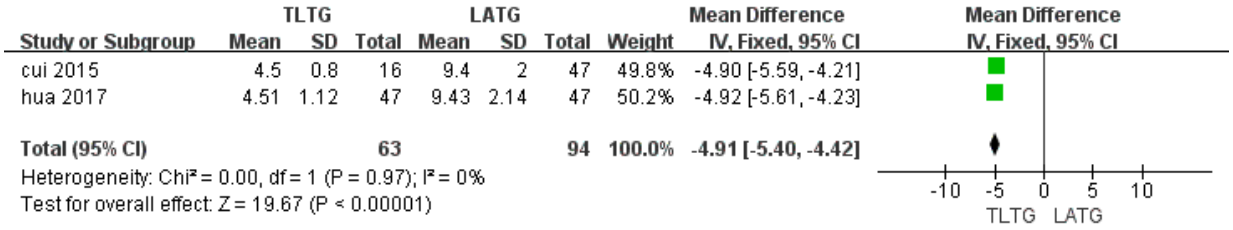


Figure 10: The results of meta - analysis of total postoperative complications in laparoscopic group and laparoscopic group

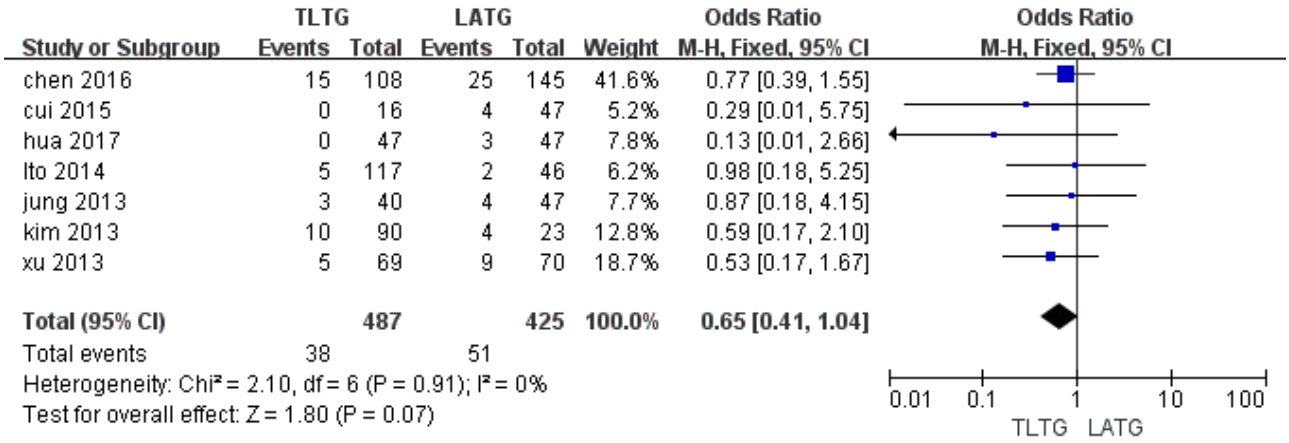


Figure 11: The results of meta - analysis of total laparoscopic and laparoscopic anastomotic fistula

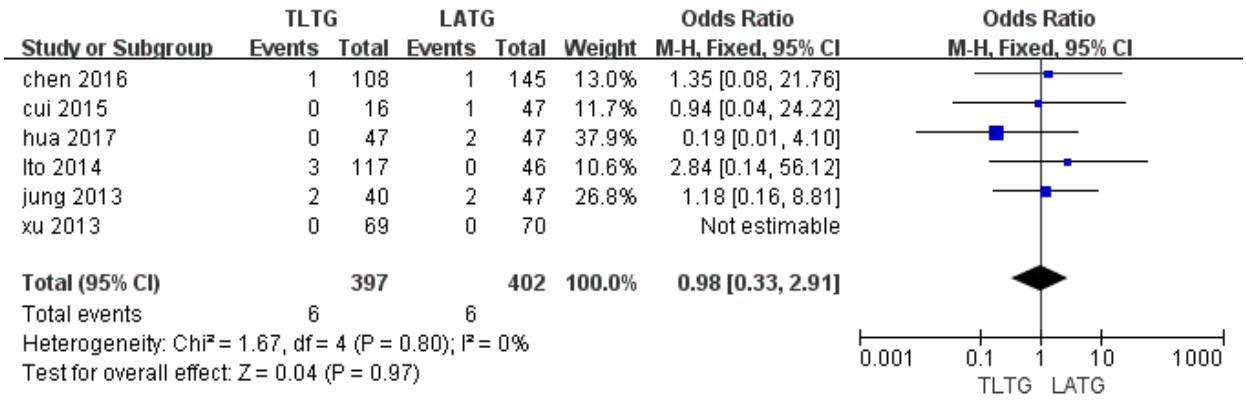
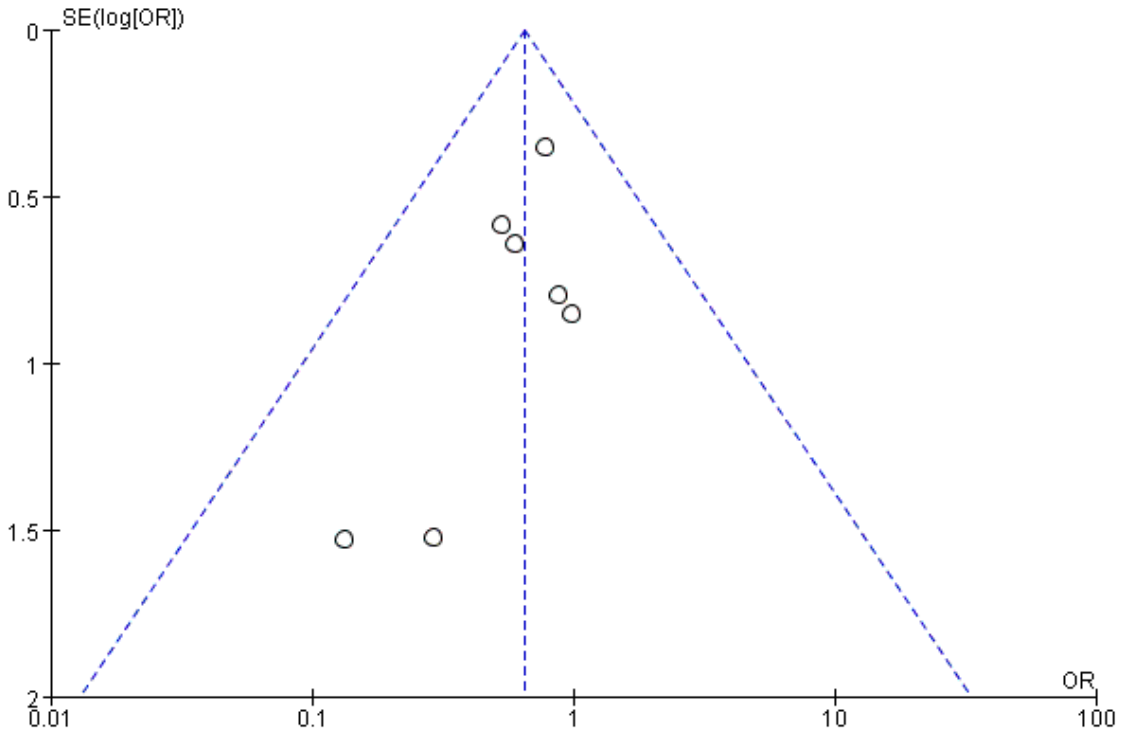


Figure 12: Biopsy of postoperative overall complications



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