

World Journal of *Clinical Cases*

World J Clin Cases 2018 December 6; 6(15): 869-1072



REVIEW

- 869 Biomarkers in colorectal cancer: Current clinical utility and future perspectives
Vacante M, Borzi AM, Basile F, Biondi A
- 882 Inflammation and de-differentiation in pancreatic carcinogenesis
Seimiya T, Otsuka M, Iwata T, Tanaka E, Suzuki T, Sekiba K, Yamagami M, Ishibashi R, Koike K

MINIREVIEWS

- 892 Management of gastroesophageal reflux disease: Patient and physician communication challenges and shared decision making
Klenzak S, Danelisen I, Brannan GD, Holland MA, van Tilburg MA
- 901 Non-small bowel lesion detection at small bowel capsule endoscopy: A comprehensive literature review
Koffas A, Laskaratos FM, Epstein O

ORIGINAL ARTICLE

Case Control Study

- 908 Genetic associations of inflammatory bowel disease in a South Asian population
Niriella MA, Liyanage IK, Kodisinghe SK, De Silva AP, Rajapakshe N, Nanayakkara SD, Luke D, Silva T, Nawarathne M, Peiris RK, Kalubovila UP, Kumarasena SR, Dissanayake VH, Jayasekara RW, de Silva HJ
- 916 Clinical relevance of atrial septal aneurysm and patent foramen ovale with migraine
He L, Cheng GS, Du YJ, Zhang YS

Retrospective Study

- 922 Current trends of liver cirrhosis in Mexico: Similitudes and differences with other world regions
Méndez-Sánchez N, Zamarripa-Dorsey F, Panduro A, Purón-González E, Coronado-Alejandro EU, Cortez-Hernández CA, Higuera de la Tijera F, Pérez-Hernández JL, Cerda-Reyes E, Rodríguez-Hernández H, Cruz-Ramón VC, Ramírez-Pérez OL, Aguilar-Olivos NE, Rodríguez-Martínez OF, Cabrera-Palma S, Cabrera-Álvarez G
- 931 Retrograde intrarenal surgery vs miniaturized percutaneous nephrolithotomy to treat lower pole renal stones 1.5-2.5 cm in diameter
Li MM, Yang HM, Liu XM, Qi HG, Weng GB

Clinical Trials Study

- 936 Comparative study on operative trauma between microwave ablation and surgical treatment for papillary thyroid microcarcinoma

Xu B, Zhou NM, Cao WT, Gu SY

Observational Study

- 944 Association between functional abdominal pain disorders and asthma in adolescents: A cross-sectional study

Kumari MV, Devanarayana NM, Amarasiri L, Rajindrajith S

Prospective Study

- 952 Evaluating mucosal healing using colon capsule endoscopy predicts outcome in patients with ulcerative colitis in clinical remission

Takano R, Osawa S, Uotani T, Tani S, Ishida N, Tamura S, Yamade M, Iwaizumi M, Hamaya Y, Furuta T, Miyajima H, Sugimoto K

META-ANALYSIS

- 961 Probiotic Medilac-S® for the induction of clinical remission in a Chinese population with ulcerative colitis: A systematic review and meta-analysis

Sohail G, Xu X, Christman MC, Tompkins TA

- 985 Impact of body mass index on short-term outcomes of laparoscopic gastrectomy in Asian patients: A meta-analysis

Chen HK, Zhu GW, Huang YJ, Zheng W, Yang SG, Ye JX

- 995 Scoring systems for prediction of mortality in decompensated liver cirrhosis: A meta-analysis of test accuracy

Wu SL, Zheng YX, Tian ZW, Chen MS, Tan HZ

CASE REPORT

- 1007 Gangrenous cholecystitis: A silent but potential fatal disease in patients with diabetic neuropathy. A case report

Mehrzad M, Jehle CC, Roussel LO, Mehrzad R

- 1012 Successful endovascular treatment of endoscopically unmanageable hemorrhage from a duodenal ulcer fed by a renal artery: A case report

Anami S, Minamiguchi H, Shibata N, Koyama T, Sato H, Ikoma A, Nakai M, Yamagami T, Sonomura T

- 1018** Didactic surgical experience of thyroid metastasis from renal cell carcinoma: A case report
Yamauchi M, Kai K, Shibamiya N, Shimazu R, Monji M, Suzuki K, Kakinoki H, Tobu S, Kuratomi Y
- 1024** Gastric cancer with severe immune thrombocytopenia: A case report
Zhao ZW, Kang WM, Ma ZQ, Ye X, Yu JC
- 1029** Injury to the axillary artery and brachial plexus caused by a closed floating shoulder injury: A case report
Chen YC, Lian Z, Lin YN, Wang XJ, Yao GF
- 1036** Pancreatic panniculitis and solid pseudopapillary tumor of the pancreas: A case report
Zhang MY, Tian BL
- 1042** Intermittent abdominal pain accompanied by defecation difficulties caused by Chilaiditi syndrome: A case report
Luo XG, Wang J, Wang WL, Yu CZ
- 1047** Endoscopic titanium clip closure of gastric fistula after splenectomy: A case report
Yu J, Zhou CJ, Wang P, Wei SJ, He JS, Tang J
- 1053** Successful steroid treatment for acute fibrinous and organizing pneumonia: A case report
Ning YJ, Ding PS, Ke ZY, Zhang YB, Liu RY
- 1059** Sub-Tenon's urokinase injection-assisted vitrectomy in early treatment of suprachoroidal hemorrhage: Four cases report
Chai F, Ai H, Deng J, Zhao XQ
- 1067** Plexiform fibromyxoma of the small bowel: A case report
Zhang WG, Xu LB, Xiang YN, Duan CH

ABOUT COVER

Editorial Board Member of *World Journal of Clinical Cases*, Steven M Schwarz, MD, Professor, Department of Pediatrics, Children's Hospital at Downstate, SUNY-Downstate Medical Center, Brooklyn, NY 11203, United States

AIM AND SCOPE

World Journal of Clinical Cases (*World J Clin Cases*, *WJCC*, online ISSN 2307-8960, DOI: 10.12998) is a peer-reviewed open access academic journal that aims to guide clinical practice and improve diagnostic and therapeutic skills of clinicians.

The primary task of *WJCC* is to rapidly publish high-quality Autobiography, Case Report, Clinical Case Conference (Clinicopathological Conference), Clinical Management, Diagnostic Advances, Editorial, Field of Vision, Frontier, Medical Ethics, Original Articles, Clinical Practice, Meta-Analysis, Minireviews, Review, Therapeutics Advances, and Topic Highlight, in the fields of allergy, anesthesiology, cardiac medicine, clinical genetics, clinical neurology, critical care, dentistry, dermatology, emergency medicine, endocrinology, family medicine, gastroenterology and hepatology, geriatrics and gerontology, hematology, immunology, infectious diseases, internal medicine, obstetrics and gynecology, oncology, ophthalmology, orthopedics, otolaryngology, pathology, pediatrics, peripheral vascular disease, psychiatry, radiology, rehabilitation, respiratory medicine, rheumatology, surgery, toxicology, transplantation, and urology and nephrology.

INDEXING/ABSTRACTING

World Journal of Clinical Cases (*WJCC*) is now indexed in PubMed, PubMed Central, Science Citation Index Expanded (also known as SciSearch®), and Journal Citation Reports/Science Edition. The 2018 Edition of Journal Citation Reports cites the 2017 impact factor for *WJCC* as 1.931 (5-year impact factor: N/A), ranking *WJCC* as 60 among 154 journals in Medicine, General and Internal (quartile in category Q2).

EDITORS FOR THIS ISSUE

Responsible Assistant Editor: *Xiang Li*
Responsible Electronic Editor: *Wen-Wen Tan*
Proofing Editor-in-Chief: *Lian-Sheng Ma*

Responsible Science Editor: *Ying Dou*
Proofing Editorial Office Director: *Jin-Lei Wang*

NAME OF JOURNAL
World Journal of Clinical Cases

ISSN
 ISSN 2307-8960 (online)

LAUNCH DATE
 April 16, 2013

FREQUENCY
 Semimonthly

EDITORS-IN-CHIEF
Sandro Vento, MD, Department of Internal Medicine, University of Botswana, Private Bag 00713, Gaborone, Botswana

EDITORIAL BOARD MEMBERS
 All editorial board members resources online at <http://www.wjgnet.com/2307-8960/editorialboard.htm>

EDITORIAL OFFICE
 Jin-Lei Wang, Director

World Journal of Clinical Cases
 Baishideng Publishing Group Inc
 7901 Stoneridge Drive, Suite 501, Pleasanton, CA 94588, USA
 Telephone: +1-925-2238242
 Fax: +1-925-2238243
 E-mail: editorialoffice@wjgnet.com
 Help Desk: <http://www.f6publishing.com/helpdesk>
<http://www.wjgnet.com>

PUBLISHER
 Baishideng Publishing Group Inc
 7901 Stoneridge Drive, Suite 501, Pleasanton, CA 94588, USA
 Telephone: +1-925-2238242
 Fax: +1-925-2238243
 E-mail: bpgoffice@wjgnet.com
 Help Desk: <http://www.f6publishing.com/helpdesk>
<http://www.wjgnet.com>

PUBLICATION DATE
 December 6, 2018

COPYRIGHT
 © 2018 Baishideng Publishing Group Inc. Articles published by this Open Access journal are distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits use, distribution, and reproduction in any medium, provided the original work is properly cited, the use is non commercial and is otherwise in compliance with the license.

SPECIAL STATEMENT
 All articles published in journals owned by the Baishideng Publishing Group (BPG) represent the views and opinions of their authors, and not the views, opinions or policies of the BPG, except where otherwise explicitly indicated.

INSTRUCTIONS TO AUTHORS
<http://www.wjgnet.com/bpg/gerinfo/204>

ONLINE SUBMISSION
<http://www.f6publishing.com>

Impact of body mass index on short-term outcomes of laparoscopic gastrectomy in Asian patients: A meta-analysis

Heng-Kai Chen, Guang-Wei Zhu, Yong-Jian Huang, Wei Zheng, Shu-Gang Yang, Jian-Xin Ye

Heng-Kai Chen, Guang-Wei Zhu, Yong-Jian Huang, Wei Zheng, Shu-Gang Yang, Jian-Xin Ye, Department of Gastrointestinal Surgery 2 Section, the First Hospital Affiliated to Fujian Medical University, Fuzhou 350005, Fujian Province, China

Heng-Kai Chen, Guang-Wei Zhu, Yong-Jian Huang, Wei Zheng, Shu-Gang Yang, Jian-Xin Ye, Key Laboratory of Ministry of Education for Gastrointestinal Cancer, Fujian Medical University, Fuzhou 350000, Fujian Province, China

ORCID number: Heng-Kai Chen (0000-0001-6894-9819); Guang-Wei Zhu (0000-0003-3011-9101); Yong-Jian Huang (0000-0001-9554-6425); Wei Zheng (0000-0002-0972-0309); Shu-Gang Yang (0000-0001-6964-8989); Jian-Xin Ye (0000-0002-6118-8583).

Author contributions: Chen HK, Zhu GW, Huang YJ, Zheng W, and Yang SG designed this work, collected and interpreted the data, and drafted the manuscript; Ye JX designed this work, critically revised the manuscript, and performed overall supervision; all authors contributed to the final approval and accountability for the manuscript.

Supported by the Project of Science and Technology Research Program of Fujian Province, No. 2016B044; the Fujian Provincial Natural Science Foundation, No. 2017J01279; the Nursery Garden Scientific Research Fund of Fujian Medical University, No. 2015MP024; Startup Fund for Scientific Research, Fujian Medical University, the Fujian Provincial Health Department Youth Foundation Project, No. 2017-1-51; and the National Clinical Key Specialty Construction Project (General Surgery) of China.

Conflict-of-interest statement: The authors deny any conflict of interest.

PRISMA 2009 Checklist statement: The authors have read the PRISMA 2009 Checklist, and the manuscript was prepared and revised according to the PRISMA 2009 Checklist.

Open-Access: This article is an open-access article which was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative

Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

Manuscript source: Unsolicited manuscript

Corresponding author to: Jian-Xin Ye, MD, Professor, Department of Gastrointestinal Surgery 2 Section, the First Hospital Affiliated to Fujian Medical University, No. 20, Chazhong Road, Fuzhou 350005, Fujian Province, China. yejianxinfuyi@126.com
Telephone: +86-591-87982080

Received: September 12, 2018

Peer-review started: September 12, 2018

First decision: October 15, 2018

Revised: October 24, 2018

Accepted: November 1, 2018

Article in press: November 1, 2018

Published online: December 6, 2018

Abstract

AIM

To perform a meta-analysis to investigate the correlation between body mass index (BMI) and the short-term outcomes of laparoscopic gastrectomy (LG) for gastric cancer (GC) in Asian patients.

METHODS

The PubMed, Cochrane, EMBASE, and Web of Science databases were searched for studies that focused on the impact of obesity on the short-term outcomes of LG for GC in Asian patients who were classified into a high BMI (BMI \geq 25 kg/m²) or low BMI group (BMI < 25 kg/m²). The results are expressed using the pooled odds ratio (OR) for binary variables and standard mean difference (SMD) for continuous variables with 95%

confidence interval (CI), and were calculated according to the fixed-effects model while heterogeneity was not apparent or a random-effects model while heterogeneity was apparent.

RESULTS

Nine studies, with a total sample size of 6077, were included in this meta-analysis. Compared with the low BMI group, the high BMI group had longer operative time (SMD = 0.26, 95%CI: 0.21 to 0.32, $P < 0.001$), greater blood loss (SMD = 0.19, 95%CI: 0.12 to 0.25, $P < 0.001$), and fewer retrieved lymph nodes (SMD = -0.13, 95%CI: 0.18 to 0.07, $P < 0.001$). There was no significant difference between the high and low BMI groups in postoperative complications (OR = 1.12, 95%CI: 0.95 to 1.33, $P = 0.169$), the duration of postoperative hospital stay (SMD = 0.681, 95%CI: -0.05 to 0.07, $P = 0.681$), postoperative mortality (OR = 1.95, 95%CI: 0.78 to 4.89, $P = 0.153$), or time to resuming food intake (SMD = 0.00, 95%CI: -0.06 to 0.06, $P = 0.973$).

CONCLUSION

Our meta-analysis provides strong evidence that despite being associated with longer operative time, greater blood loss, and fewer retrieved lymph nodes, BMI has no significant impact on the short-term outcomes of LG for GC in Asian patients, including postoperative complications, the duration of postoperative hospital stay, postoperative mortality, and time to resuming food intake. BMI may be a poor risk factor for short-term outcomes of LG. Other indices should be taken into account.

Key words: Obesity; Body mass index; Laparoscopic gastrectomy; Gastric cancer; Meta-analysis

© The Author(s) 2018. Published by Baishideng Publishing Group Inc. All rights reserved.

Core tip: The impact of body mass index (BMI) on the short-term outcomes of laparoscopic gastrectomy (LG) for gastric cancer in Asian patients have been controversial due to inconsistent results of previous studies. Our meta-analysis demonstrates that despite being associated with longer operative time, greater blood loss, and fewer retrieved lymph nodes, a high BMI could not be significantly associated with short-term outcomes of LG in Asian patients. BMI may be a poor risk factor for short-term outcomes of LG. Other indices should be taken into account.

Chen HK, Zhu GW, Huang YJ, Zheng W, Yang SG, Ye JX. Impact of body mass index on short-term outcomes of laparoscopic gastrectomy in Asian patients: A meta-analysis. *World J Clin Cases* 2018; 6(15): 985-994 Available from: URL: <http://www.wjgnet.com/2307-8960/full/v6/i15/985.htm> DOI: <http://dx.doi.org/10.12998/wjcc.v6.i15.985>

INTRODUCTION

Gastric cancer (GC), the second most prevalent cause of cancer-related deaths worldwide, has been a source of increasing concern^[1]. Since 1994, when laparoscopic technique was first used for GC^[2-6], laparoscopic gastrectomy (LG) has become increasingly popular for treating early GC (EGC) due to decreased intraoperative blood loss, less pain, and shorter hospital duration^[7-10]. The prevalence of obesity is increasing steadily in Asian countries. Obesity may increase the risk of health disorders, such as hypertension, cardiovascular disease, and type 2 diabetes mellitus^[11,12], and is regarded as a risk factor for worse surgical outcomes of complicated surgical procedures^[13]. Furthermore, patients with obesity have a higher risk of operative difficulties, as well as wound infection^[14-16]. Recently, the impact of obesity on short-term outcomes of LG in patients has been controversial due to inconsistent results of several studies. Obesity leads to a longer duration of postoperative hospital stay and time to resuming food intake in studies performed by Chen *et al.*^[17] and Yang *et al.*^[18], while Jung *et al.*^[19] reported that obesity was not a risk factor for these impacts. The studies performed by Chen *et al.*^[20], Shimada *et al.*^[21], and Yamada *et al.*^[22] suggested that the association between obesity and LG was significant, while Shin *et al.*^[23] and Oki *et al.*^[24] reported the opposite conclusion.

To date, although several studies used the body mass index (BMI) to assess the impact of obesity on the short-term outcomes of LG, the results have been controversial and limited. Hence, we conducted this meta-analysis to summarize all of the available evidence.

MATERIALS AND METHODS

Search strategy

The PubMed, Cochrane, EMBASE, and Web of Science databases were searched up to July 30, 2018 using the search terms (obesity) OR (metabolically benign) OR (obesity, morbid) OR (pediatric) OR (overweight) AND (body mass index) OR (index, body mass) OR (Quetelet index) OR (index, Quetelet) OR (Quetelet's index) OR (Quetelets index) AND (stomach neoplasms) OR (neoplasm, stomach) OR (stomach neoplasm) OR (gastric neoplasms) OR (gastric neoplasm) OR (neoplasm, gastric) OR (neoplasms, gastric) OR (cancer of stomach) OR (stomach cancers) OR (gastric cancer) OR (cancer, gastric) OR (cancers, gastric) OR (gastric cancers) OR (stomach cancer) OR (cancer, stomach) OR (cancers, stomach) OR (cancer of the stomach) OR (gastric cancer, familial diffuse) AND (laparoscopy) OR (laparoscopies) OR (celioscopy) OR (celioscopies) OR (peritoneoscopy) OR (peritoneoscopies) OR (surgical procedures, laparoscopic) OR (laparoscopic surgical procedure) OR (procedure, laparoscopic surgical) OR (procedures, laparoscopic surgical) OR (surgery, laparoscopic) OR (laparoscopic

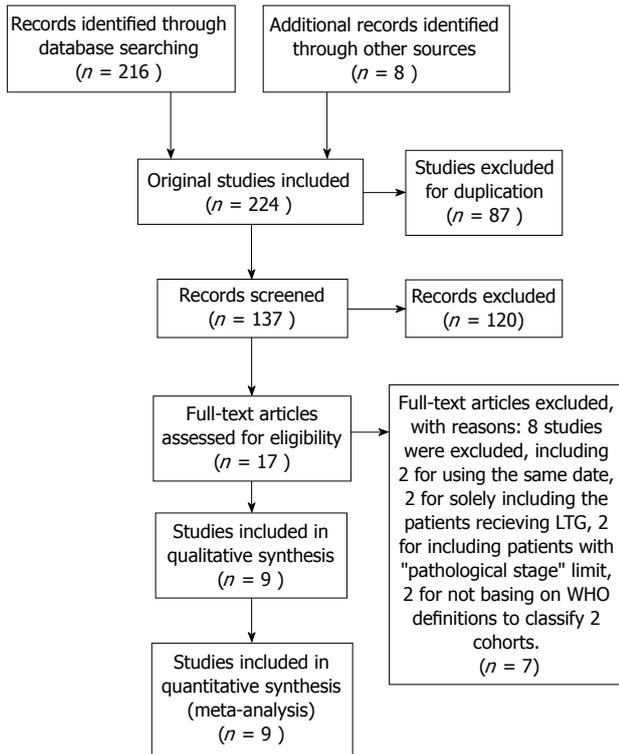


Figure 1 Flowchart of study selection in the meta-analysis. LTG: Laparoscopic total gastrectomy.

surgical procedures) OR (laparoscopic surgery) OR (laparoscopic surgeries) OR (surgeries, laparoscopic) OR (surgical procedure, laparoscopic) AND within the "Title/Abstract" and "Asian" limits. No restrictions were applied for language, country, or publication date. Moreover, lists of all relevant review articles were manually screened to identify further studies.

Selection criteria

Studies were included if they met the following predefined criteria: (1) all patients underwent LG; (2) all patients were diagnosed by esophagogastroduodenoscopy, postoperative pathological diagnosis, endoscopic ultrasound, or computed tomography (CT); (3) all studies were included without "age" or "pathological stage" limit; and (4) the risk estimates were adjusted for other confounding factors. Meeting abstracts, systematic reviews, case reports, studies without usable or extractable data, and those solely focusing on laparoscopic total gastrectomy (LTG) were all excluded. Publications with smaller data sets were excluded while the data were presented in more than one publication.

Outcome measures analyzed

Operative time, blood loss, and the number of retrieved lymph nodes were defined as indices of difficulties in LG. Postoperative complications, the duration of postoperative hospital stay, postoperative mortality, and time to resuming food intake were estimated as indices to assess the impact of BMI on the short-term outcomes

of LG. The cutoff points to divide patients into a high BMI and a normal BMI group were based on World Health Organization definitions (overweight, BMI ≥ 25 kg/m²; healthy-weight, BMI < 25 kg/m²)^[25,26]. Postoperative complications were defined as those requiring surgical or conservative treatment according to the Clavein-Dindo classification system. All of the postoperative complications observed in the included studies conform to this definition.

Data extraction and quality assessment

Data were extracted from the included studies by two independent investigators, and disagreements were resolved through consensus or consultation with a third investigator. Study characteristics such as the authors' names, year of publication, number of participants, operative time, blood loss, number of retrieved lymph nodes, postoperative complications, duration of postoperative hospital stay, postoperative mortality, and time to resuming food intake were recorded. The Newcastle-Ottawa Scale was used to assess the quality of the included studies.

Statistical analysis

The pooled odds ratio (OR) for binary variables and standard mean difference (SMD) for continuous variables with 95% confidence interval (CI) were calculated using a fixed-effects model while heterogeneity was not apparent or a random-effects model while heterogeneity was apparent. *P* for *I*² statistic was used to evaluate the heterogeneity in this meta-analysis, with *P* < 0.05 suggesting substantial heterogeneity among the included studies. The *Galbraith plot* test was performed to assess the potential source of heterogeneity. A sensitivity analysis was performed (when the number of included studies ≥ 9) to evaluate the stability of the results by excluding each study from the meta-analysis one by one. Publication bias was evaluated using funnel plots and the Egger's test (when the number of included studies ≥ 9). Duval's trim and fill method was used to solve publication bias. Statistical analyses were performed using STATA 12.1 (StataCorp, Texas, United States). A *P*-value < 0.05 indicated statistical significance.

RESULTS

Of the 224 studies identified using the predefined search strategy, 207 were excluded after screening titles and abstracts because they did not meet the predefined criteria; they were duplicate; or their full-text could not be accessed and insufficient data to make calculations from the abstracts. After performing full-text evaluations, eight studies were excluded, including two for using the same date, two for solely including the patients receiving LTG, two for including patients with "pathological stage" limit, and two for not being based on WHO definitions to classify the two cohorts. Thus, nine studies^[17-24,27] with a sample size of 6077 were included in the meta-analysis

Table 1 Characteristics of nine studies included in the meta-analysis

Study	Country	Study type	Inclusion period	Sample size	Type of gastrectomy	BMI cutoff point	Adjustment	Quality
Chen <i>et al</i> ^[20]	China	RC	2007-2010	531	LG	25	1, 3, 5	9
Chen <i>et al</i> ^[17]	China	RC	2004-2016	1691	LAG TLG	25	1, 2, 4, 5, 6, 7	8
Jung <i>et al</i> ^[19]	South Korea	RC	2006-2012	1512	LDG	25	1, 2, 3, 4, 6, 7	8
Lee <i>et al</i> ^[27]	South Korea	RC	-2005	1485	LAG	25	1, 2, 3, 4, 5, 7	9
Oki <i>et al</i> ^[24]	Japan	RC	2005-2009	138	TLDG	25	1, 2, 4, 5, 6, 7	8
Shimada <i>et al</i> ^[21]	Japan	RC	2007-2014	173	LADG	25	1, 2, 3, 4, 5, 6, 7	8
Shin <i>et al</i> ^[23]	South Korea	RC	2003-2005	192	LG	25	1, 2, 5, 6, 7	8
Yamada <i>et al</i> ^[22]	Japan	RC	1999-2005	141	LADG	25	1, 5, 6, 7	9
Yang <i>et al</i> ^[18]	China	RC	2009-2012	214	LAG	25	1, 2, 3, 5, 6, 7	8

1: Postoperative complications; 2: Postoperative hospital stay; 3: Mortality; 4: Time to resuming food intake; 5: Operative time; 6: Blood loss; 7: Retrieved lymph nodes. BMI: Body mass index; RC: Retrospective cohort; LG: Laparoscopic gastrectomy; TLG: Totally laparoscopic gastrectomy.

Table 2 Summary statistics of pooled odds ratio on various postoperative complications comparing high body mass index and normal body mass index groups receiving laparoscopic gastrectomy

Complication variable	No. of studies	No. of pooled patients	Pooled OR	95%CI	Test of heterogeneity		Test of overall effect	
					<i>P</i> value	<i>P</i> value		
Overall complications	9	6077	1.12	0.95-1.33	0.734	0.169		
Anastomotic leakage	6	3939	1.31	0.62-2.79	0.642	0.476		
Anastomotic stricture	4	3587	0.85	0.27-2.66	0.489	0.775		
Anastomotic bleeding	5	3798	0.63	0.27-1.45	0.942	0.277		
Abdominal abscess	5	3801	1.56	0.91-2.67	0.615	0.103		
Pancreatic leakage	6	3937	0.52	0.20-1.35	0.581	0.179		
Ileus	4	3584	1.96	0.79-4.83	0.382	0.144		
Wound	6	3939	1.77	0.92-3.42	0.289	0.087		

OR: Odds ratio; CI: Confidence interval.

(Figure 1). The outcomes of the quality assessment are shown in Table 1. All of the included studies obtained at least eight points, meaning that they were defined as high-quality.

Meta-analysis

Correlation between BMI and short-term outcomes of LG: There was no significant difference between the two cohorts in overall postoperative complications (OR = 1.12, 95%CI: 0.95 to 1.33, $P = 0.169$; Figure 2A), various postoperative complications (Table 2), the duration of postoperative hospital stay (SMD = 0.681, 95%CI: -0.05 to 0.07, $P = 0.681$; Figure 2B), postoperative mortality (OR = 1.95, 95%CI: 0.78 to 4.89, $P = 0.153$; Figure 2C), or time to resuming food intake (SMD = 0.00, 95%CI: -0.06 to 0.06, $P = 0.973$; Figure 2D). Heterogeneity was not apparent in any of these outcome results according to the fixed-effects model. Sensitivity analysis demonstrated that no study could affect the pooled OR for postoperative complications (Figure 3A). Visual assessments of the funnel plots (Figure 4A) and the Egger's test (Figure 5A) showed no evidence of publication bias for postoperative complications ($P = 0.849$).

Correlation between BMI and difficulties in LG:

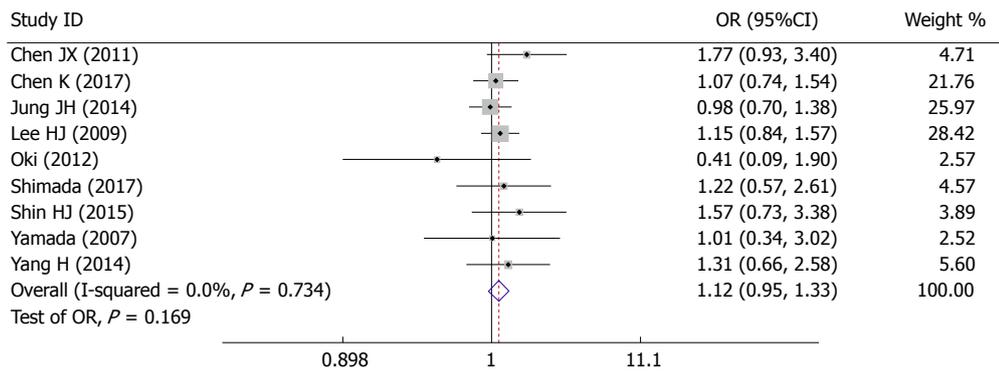
The high BMI group had longer operative time (SMD = 0.26, 95%CI: 0.21 to 0.32, $P < 0.001$; Figure 2E), greater blood loss (SMD = 0.19, 95%CI: 0.12 to 0.25,

$P < 0.001$; Figure 2F), and fewer retrieved lymph nodes (SMD = -0.13, 95%CI: 0.18 to 0.07, $P < 0.001$; Figure 6). Heterogeneity was not apparent in any of these outcome results according to the fixed-effects model. Sensitivity analysis demonstrated that no study could affect the pooled SMD for the operative time (Figure 3B). Visual assessment of the funnel plots (Figure 4B) and the Egger's test (Figure 5B) showed no evidence of publication bias for the operative time ($P = 0.887$).

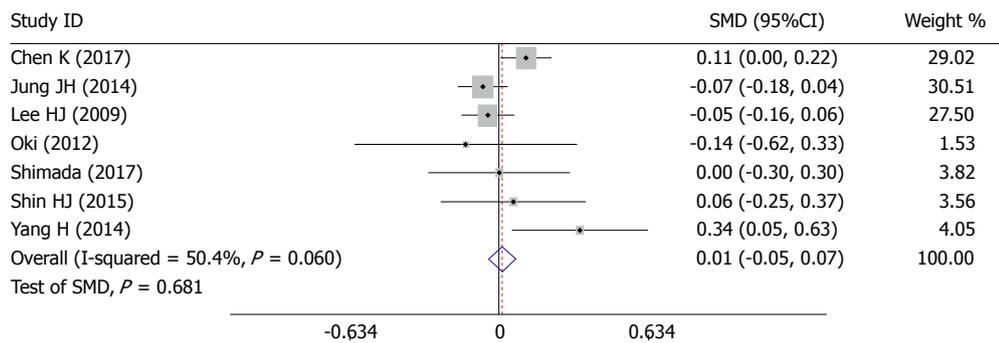
DISCUSSION

Obesity is traditionally considered a challenge for many surgeons who perform abdominal operations^[28-30]. Until now, the impact of obesity on the short-term outcomes of LG for GC has been controversial^[29,31]. This meta-analysis, including nine retrospective cohorts, aimed to investigate the correlation between obesity and the short-term outcomes of LG. Patients included were divided into a high BMI (≥ 25 kg/m²) and a normal BMI (< 25 kg/m²) group based on the World Health Organization definition of obesity. Splenic hilar lymph node dissection is necessary for LTG, but it is difficult to expose the deep location of the splenic hilum and complicated vessels. LTG has been regarded as a risk factor for short-term outcomes of LG for GC^[17]; therefore, studies solely focusing on LTG were excluded. Additionally, owing to the insufficient representativeness of the sample in the study with "pathological stage" limit, we excluded two studies

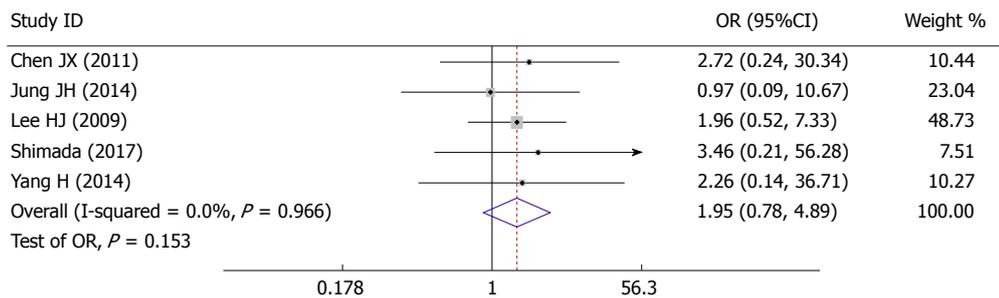
A



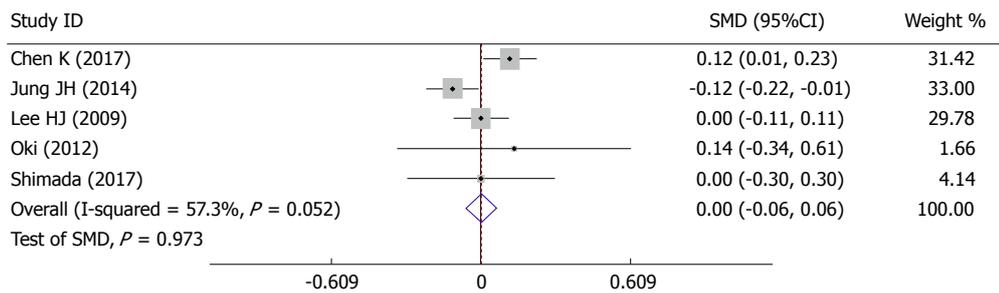
B



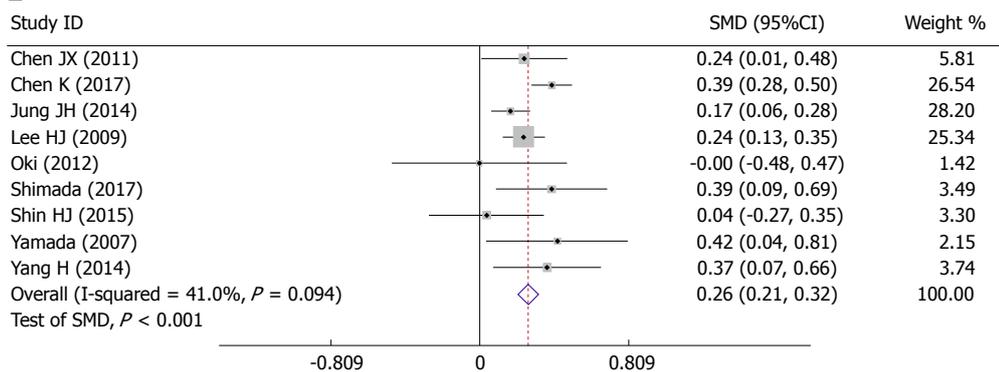
C



D



E



F

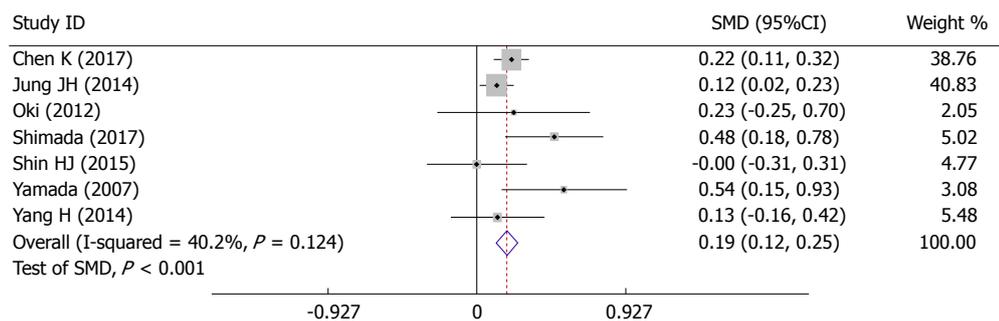
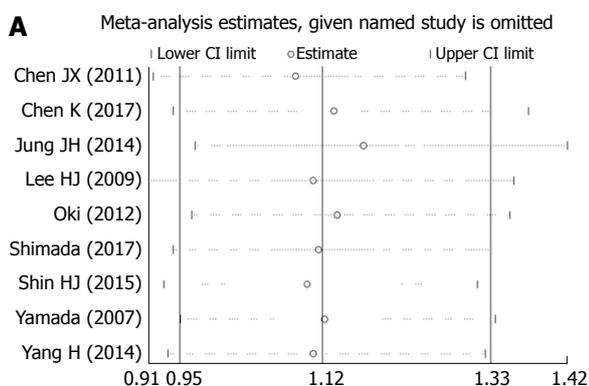


Figure 2 Correlation between body mass index and short-term outcomes/difficulties in laparoscopic gastrectomy. A: Correlation between body mass index (BMI) and postoperative complications in laparoscopic gastrectomy; B: Correlation between BMI and the duration of the postoperative hospital stay; C: Correlation between BMI and postoperative mortality; D: Correlation between BMI and the time to resuming food intake; E: Correlation between BMI and the operative time; F: Correlation between BMI and blood loss. SMD: Standard mean difference.

A



B

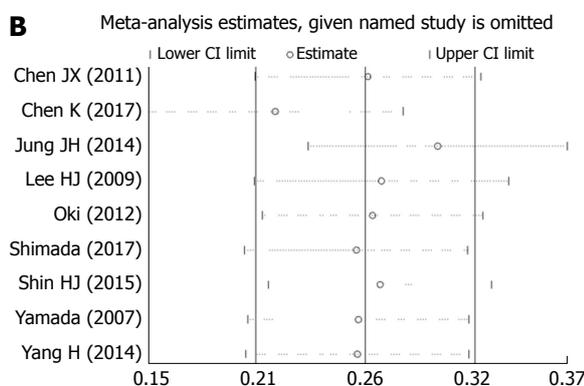
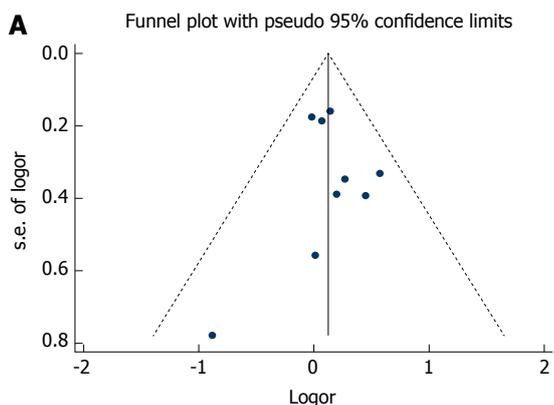


Figure 3 Sensitive analysis of association of postoperative complications and operative time with body mass index. A: Sensitive analysis of correlation between body mass index (BMI) and postoperative complications in laparoscopic gastrectomy; B: Sensitive analysis of correlation between BMI and the operative time.

A



B

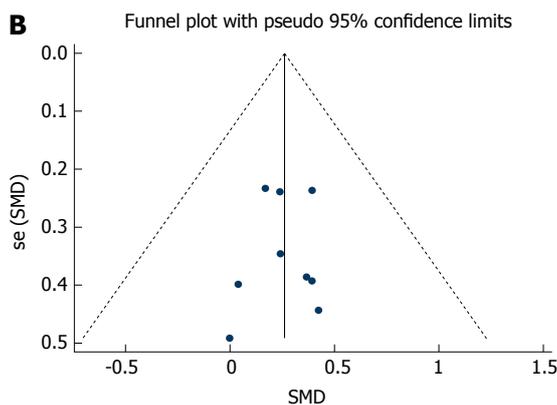


Figure 4 Funnel plot analysis of association of postoperative complications and operative time with body mass index. A: Funnel plot analysis of correlation between body mass index (BMI) and postoperative complications in laparoscopic gastrectomy; B: Funnel plot analysis of correlation between BMI and the operative time. SMD: Standard mean difference.

with this limit (one for solely including patients with early stage GC and the other for solely including patients with advanced GC).

Operative time, blood loss, and the number of retrieved lymph nodes were defined as indices of difficulties in LG. Our study has clearly demonstrated that the correlation between BMI and operative difficulties was

significant. Patients undergoing LG with a high BMI have longer operative time (SMD = 0.26, 95%CI: 0.21 to 0.32, $P < 0.001$), greater blood loss (SMD = 0.19, 95%CI: 0.12 to 0.25, $P < 0.001$), and fewer retrieved lymph nodes (SMD = -0.13, 95%CI: 0.18 to 0.07, $P < 0.001$). Likely due to hindered exposure to the stomach and pancreas, LG performed in patients with obesity is more technically

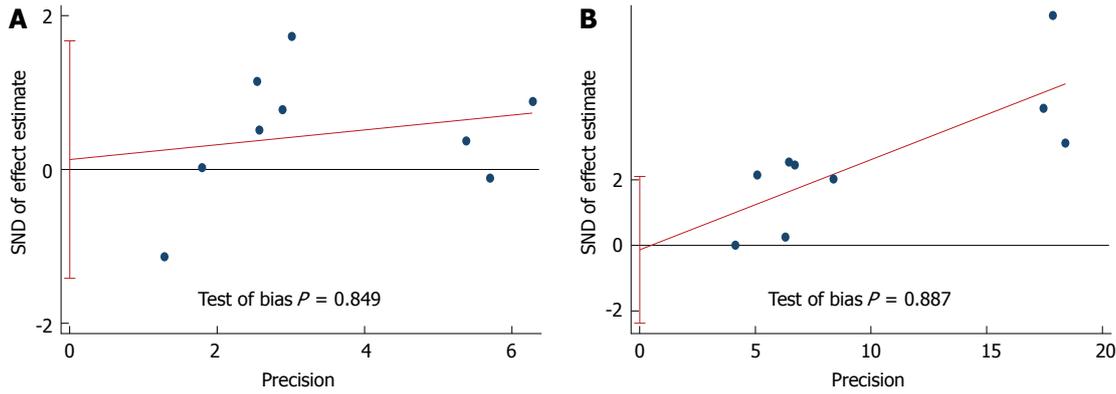


Figure 5 Egger's test of association of postoperative complications and operative time with body mass index. A: Egger's test of correlation between body mass index (BMI) and postoperative complications in laparoscopic gastrectomy; B: Egger's test of correlation between BMI and the operative time.

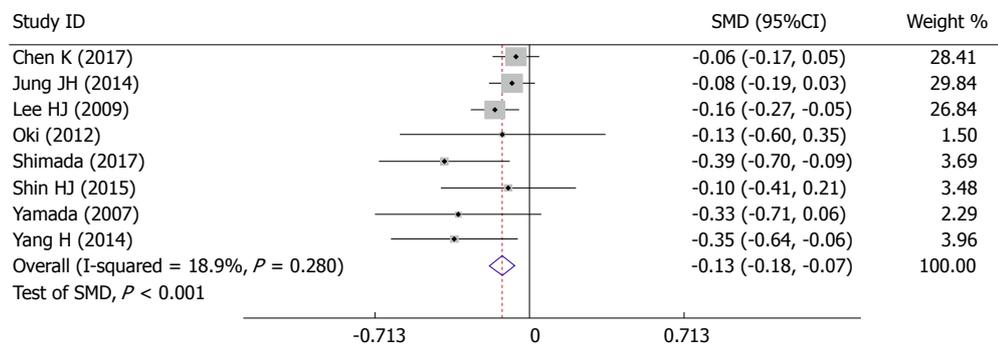


Figure 6 Correlation between body mass index and the number of retrieved lymph node. SMD: Standard mean difference.

demanding. The thickened mesentery, omentum, and ligamentum are very common in obese patients under certain circumstances and may lead to difficulties in the operative procedure, especially in ligation, dissection, or anatomy of the vessels and lymph nodes. Fatty stomach and omentum can also result in severe challenges owing to the stomach pulled by the surgeon. Blood bleed during the operation, caused by excessive incassate and fat mesenteries, is hard to stop in this narrow area surrounded by adipose tissue. It can be inferred that sensation recovery from anesthesia would be delayed in virtue of distribution of anesthetic agents affected by increased technical difficulties during exposure of an adequate operative field. Each of these potential factors contributes to longer surgical time and increased blood loss^[19]. As to the lower number of retrieved lymph nodes, it may be conferred that dissection of lymph nodes for patients with obesity could be limited by excess adipose tissue and structures. Obtaining lymph nodes from a mass of fat tissue could be more difficult than normal tissue and may be regarded as the other contributing factor to fewer retrieved lymph nodes; however, in all studies, the number of retrieved lymph nodes in the obese group was greater than the standard (> 15) recommended by the National Comprehensive Cancer Network (NCCN) guidelines, which suggests that LG can also ensure the curative effect in obese patients with GC.

Postoperative complications, the duration of

postoperative hospital stay, postoperative mortality, and time to resuming food intake were estimated as the impact of BMI on the short-term outcomes of LG. Our meta-analysis provided strong evidence that the correlation between BMI and postoperative short-term outcomes was not significant. In addition, anastomotic leakage, anastomotic stricture, anastomotic bleeding, abdominal abscess, pancreatic leakage, ileus, and wound infection would also be included in subgroup analysis. The results showed that BMI is not significantly associated with either overall postoperative complications or a particular one. The most critical factor contributing to this condition would be anastomosis. The excessive torsion of remnant stomach and duodenum could be avoided during the procedure of anastomosis performed by an experienced surgeon, especially in totally laparoscopic gastrectomy (TLG) which is becoming prevalent in Asian areas^[25]. In addition, the lower number of retrieved lymph nodes resulting from increased surgical difficulties also indicated that surgeons would be more careful and cautious during the operative procedure, and the injury of tissues and structures would be avoided to some extent. High-quality pre- and postoperative management could also help surgeons improve the patients' overall conditions and identify minor problems through observed indices on time, such as the amount of intro-abdominal bile drainage and the wound healing condition. Milder procedures and smaller wounds as well as careful pre-

and postoperative management result in lower rates of postoperative complications^[21]. Furthermore, to an extent, the results suggest that the assessment of obesity based solely on BMI may be insufficient. The distribution and amount of abdominal fat in an individual patient may not be accurately reflected by BMI, since it is a simple calculation based on weight and height^[23]. For instance, patients with a large amount of subcutaneous fat may have normal amounts of visceral and intra-abdominal fat that would not alter the difficulties and short-term outcomes of LG. Recent studies confer that visceral fat area is a more accurate predictor of intro- and postoperative outcomes than high BMI in obese patients due to its feasibility to evaluate the distribution of intra-abdominal fat^[32-34].

Limitations

Although we have searched recent publications using a rigorous search strategy, there are still some limitations to this meta-analysis. First, although all of the included studies obtained at least eight points, almost all of them were retrospective cohort studies. Although the randomized clinical trials (RCTs) are the gold standard for study design, it is hardly feasible to allocate patients with different BMIs randomly. Second, nine studies were included with a total sample size of 6077, which is relatively small. A larger sample size is needed to support the evidence. Third, as patients in Western countries have a higher BMI compared to Asian patients, our results should be considered carefully when being applied to other races, and more relevant studies should be performed worldwide.

In conclusion, our meta-analysis clearly supports that although high BMI in Asian patients with GC could increase the difficulties in LG with regard to operative time, blood loss, and the number of retrieved lymph nodes, there was no significant association between BMI and postoperative short-term outcomes, including postoperative complications, the duration of the postoperative hospital stay, postoperative mortality, and time to resuming food intake in Asian patients. It strongly demonstrates that a high BMI may not be a risk factor for short-term outcomes of patients undergoing LG if performed by an experienced surgeon with careful pre- and post-operative management, in contrast with the perspectives reported by previous studies. It may not be enough to estimate difficulties and postoperative outcomes in patients with GC undergoing LG using BMI as the only index to assess obesity. Other indices, for instance, VSA, should be taken into account.

patients with obesity have a higher risk of operative difficulties, as well as wound infection.

Research motivation

Recently, the impact of obesity on the short-term LG in patients has been controversial due to several studies. For instance, some studies reported that the association between obesity and LG was significant, while others reported the opposite conclusion.

Research objectives

To date, although several studies evaluating the body mass index (BMI) as an index to assess obesity and short-term outcomes of LG, the results have been controversial and limited. Hence, we conducted this meta-analysis to summarize all of the available evidence.

Research methods

The PubMed, Cochrane, EMBASE, and Web of Science databases were searched for studies that focused on the impact of obesity on the short-term outcomes of LG for GC in Asian patients who were classified into a high BMI (BMI ≥ 25 kg/m²) or low BMI group (BMI < 25 kg/m²). The results are expressed using the pooled odds ratio (OR) for binary variables and standard mean difference (SMD) for continuous variables with 95% confidence interval (CI), and were calculated according to the fixed-effects model while heterogeneity was not apparent or a random-effects model while heterogeneity was apparent.

Research results

Nine studies, with a total sample size of 6077, were included in this meta-analysis. Compared with the low BMI group, the high BMI group had longer operative time (SMD = 0.26, 95%CI: 0.21 to 0.32, $P < 0.001$), greater blood loss (SMD = 0.19, 95%CI: 0.12 to 0.25, $P < 0.001$), and fewer retrieved lymph nodes (SMD = -0.13, 95%CI: 0.18 to 0.07, $P < 0.001$). There was no significant difference between the high and low BMI groups in postoperative complications (OR = 1.12, 95%CI: 0.95 to 1.33, $P = 0.169$), the duration of postoperative hospital stay (SMD = 0.681, 95%CI: -0.05 to 0.07, $P = 0.681$), postoperative mortality (OR = 1.95, 95%CI: 0.78 to 4.89, $P = 0.153$), or time to resuming food intake (SMD = 0.00, 95%CI: -0.06 to 0.06, $P = 0.973$).

Research conclusions

Our meta-analysis provides strong evidence that despite the longer operative time, greater blood loss, and fewer retrieved lymph nodes, the association between BMI and the short-term outcomes of laparoscopic gastrectomy for GC, including postoperative complications, the duration of postoperative hospital stay, postoperative mortality, and time to resuming food intake was not significant. BMI could be a poor risk factor for short-term outcomes of LG. Other indices should be taken into account.

ACKNOWLEDGMENTS

We are grateful to Professor Xu, Jin-Fu Zhuang, Jing-Zhou Wang, Yi-Ling Lin, Chun-Lin Lin, Hai-Tao Yang, Tian Zou, and Ying Wang for their useful advice, guidance, and encouragement. In addition, Heng-Kai Chen especially wishes to thank his families and Dan Lin, his wife, for giving him complete spiritual support over the past years.

REFERENCES

- 1 Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. *CA Cancer J Clin* 2011; **61**: 69-90 [PMID: 21296855 DOI: 10.3322/caac.20107]
- 2 Adachi Y, Shiraishi N, Shiroimizu A, Bandoh T, Aramaki M, Kitano S. Laparoscopy-assisted Billroth I gastrectomy compared with conventional open gastrectomy. *Arch Surg* 2000; **135**:

ARTICLE HIGHLIGHTS

Research background

Gastric cancer (GC) is the second most prevalent cause of cancer-related deaths worldwide. Since 1994, laparoscopic gastrectomy (LG) has become increasingly popular for treating early GC in patients. The prevalence of obesity is increasing steadily in Asian countries. Obesity is regarded as a risk factor for worse surgical outcomes of complicated surgical procedures. Furthermore,

- 806-810 [PMID: 10896374 DOI: 10.1001/archsurg.135.7.806]
- 3 **Lin JX**, Huang CM, Zheng CH, Li P, Xie JW, Wang JB, Jun L, Chen QY, Lin M, Tu R. Evaluation of laparoscopic total gastrectomy for advanced gastric cancer: results of a comparison with laparoscopic distal gastrectomy. *Surg Endosc* 2016; **30**: 1988-1998 [PMID: 26208499 DOI: 10.1007/s00464-015-4429-x]
 - 4 **Lee HJ**, Yang HK, Ahn YO. Gastric cancer in Korea. *Gastric Cancer* 2002; **5**: 177-182 [PMID: 12378346 DOI: 10.1007/s101200200031]
 - 5 **Kim YW**, Bae JM, Lee JH, Ryu KW, Choi IJ, Kim CG, Lee JS, Rho JY. The role of hand-assisted laparoscopic distal gastrectomy for distal gastric cancer. *Surg Endosc* 2005; **19**: 29-33 [PMID: 15531976 DOI: 10.1007/s00464-004-8119-3]
 - 6 **Lee JH**, Ryu KW, Doh YW, Bae JS, Kim YW, Bae JM. Liver lift: A simple suture technique for liver retraction during laparoscopic gastric surgery. *J Surg Oncol* 2007; **95**: 83-85 [PMID: 17013820 DOI: 10.1002/jso.20611]
 - 7 **Hayashi H**, Ochiai T, Shimada H, Gunji Y. Prospective randomized study of open versus laparoscopy-assisted distal gastrectomy with extraperigastric lymph node dissection for early gastric cancer. *Surg Endosc* 2005; **19**: 1172-1176 [PMID: 16132323 DOI: 10.1007/s00464-004-8207-4]
 - 8 **Kim MC**, Kim KH, Kim HH, Jung GJ. Comparison of laparoscopy-assisted by conventional open distal gastrectomy and extraperigastric lymph node dissection in early gastric cancer. *J Surg Oncol* 2005; **91**: 90-94 [PMID: 15999352 DOI: 10.1002/jso.20271]
 - 9 **Mochiki E**, Nakabayashi T, Kamimura H, Haga N, Asao T, Kuwano H. Gastrointestinal recovery and outcome after laparoscopy-assisted versus conventional open distal gastrectomy for early gastric cancer. *World J Surg* 2002; **26**: 1145-1149 [PMID: 12209244 DOI: 10.1007/s00268-002-6286-8]
 - 10 **Noshiro H**, Nagai E, Shimizu S, Uchiyama A, Tanaka M. Laparoscopically assisted distal gastrectomy with standard radical lymph node dissection for gastric cancer. *Surg Endosc* 2005; **19**: 1592-1596 [PMID: 16247578 DOI: 10.1007/s00464-005-0175-9]
 - 11 **Pereira MA**. Diet beverages and the risk of obesity, diabetes, and cardiovascular disease: a review of the evidence. *Nutr Rev* 2013; **71**: 433-440 [PMID: 23815142 DOI: 10.1111/nure.12038]
 - 12 **National Task Force on the Prevention and Treatment of Obesity**. Overweight, obesity, and health risk. *Arch Intern Med* 2000; **160**: 898-904 [PMID: 10761953 DOI: 10.1001/archinte.160.7.898]
 - 13 **Lee JH**, Paik YH, Lee JS, Ryu KW, Kim CG, Park SR, Kim YW, Kook MC, Nam BH, Bae JM. Abdominal shape of gastric cancer patients influences short-term surgical outcomes. *Ann Surg Oncol* 2007; **14**: 1288-1294 [PMID: 17225982 DOI: 10.1245/s10434-006-9235-1]
 - 14 **Aronne LJ**, Brown WV, Isoldi KK. Cardiovascular disease in obesity: A review of related risk factors and risk-reduction strategies. *J Clin Lipidol* 2007; **1**: 575-582 [PMID: 21291699 DOI: 10.1016/j.jacl.2007.10.005]
 - 15 **Mozaffarian D**. Dietary and Policy Priorities for Cardiovascular Disease, Diabetes, and Obesity: A Comprehensive Review. *Circulation* 2016; **133**: 187-225 [PMID: 26746178 DOI: 10.1161/CIRCULATIONAHA.115.018585]
 - 16 **Nepogodiev D**, Chapman SJ, Glasbey J, Kelly M, Khatri C, Drake TM, Kong CY, Mitchell H, Harrison EM, Fitzgerald JE, Bhangu A; STARSurg Collaborative. Determining Surgical Complications in the Overweight (DISCOVER): a multicentre observational cohort study to evaluate the role of obesity as a risk factor for postoperative complications in general surgery. *BMJ Open* 2015; **5**: e008811 [PMID: 26195471 DOI: 10.1136/bmjopen-2015-008811]
 - 17 **Chen K**, Pan Y, Zhai ST, Cai JQ, Chen QL, Chen DW, Zhu YP, Zhang Y, Zhang YP, Maher H, Wang XF. Laparoscopic gastrectomy in obese gastric cancer patients: a comparative study with non-obese patients and evaluation of difference in laparoscopic methods. *BMC Gastroenterol* 2017; **17**: 78 [PMID: 28629379 DOI: 10.1186/s12876-017-0638-1]
 - 18 **Yang H**, Xing J, Cui M, Zhang C, Yao Z, Zhang N, Su X. [Efficacy evaluation of laparoscopy-assisted radical gastrectomy in obese patients with gastric cancer]. *Zhonghua Wei Chang Wai Ke Za Zhi* 2014; **17**: 776-780 [PMID: 25164893]
 - 19 **Jung JH**, Ryu SY, Jung MR, Park YK, Jeong O. Laparoscopic distal gastrectomy for gastric cancer in morbidly obese patients in South Korea. *J Gastric Cancer* 2014; **14**: 187-195 [PMID: 25328764 DOI: 10.5230/jgc.2014.14.3.187]
 - 20 **Chen JX**, Huang CM, Zheng CH, Li P, Xie JW, Wang JB, Lin JX. [Impact of obesity on laparoscopic-assisted radical gastrectomy for gastric cancer]. *Zhonghua Wei Chang Wai Ke Za Zhi* 2011; **14**: 781-784 [PMID: 22030777]
 - 21 **Shimada S**, Sawada N, Ishiyama Y, Nakahara K, Maeda C, Mukai S, Hidaka E, Ishida F, Kudo SE. Impact of obesity on short- and long-term outcomes of laparoscopy assisted distal gastrectomy for gastric cancer. *Surg Endosc* 2018; **32**: 358-366 [PMID: 28656334 DOI: 10.1007/s00464-017-5684-9]
 - 22 **Yamada H**, Kojima K, Inokuchi M, Kawano T, Sugihara K. Effect of obesity on technical feasibility and postoperative outcomes of laparoscopy-assisted distal gastrectomy--comparison with open distal gastrectomy. *J Gastrointest Surg* 2008; **12**: 997-1004 [PMID: 17955310 DOI: 10.1007/s11605-007-0374-x]
 - 23 **Shin HJ**, Son SY, Cui LH, Byun C, Hur H, Lee JH, Kim YC, Han SU, Cho YK. Is There any Role of Visceral Fat Area for Predicting Difficulty of Laparoscopic Gastrectomy for Gastric Cancer? *J Gastric Cancer* 2015; **15**: 151-158 [PMID: 26468412 DOI: 10.5230/jgc.2015.15.3.151]
 - 24 **Okai E**, Sakaguchi Y, Ohgaki K, Saeki H, Chinen Y, Minami K, Sakamoto Y, Toh Y, Kusumoto T, Okamura T, Maehara Y. The impact of obesity on the use of a totally laparoscopic distal gastrectomy in patients with gastric cancer. *J Gastric Cancer* 2012; **12**: 108-112 [PMID: 22792523 DOI: 10.5230/jgc.2012.12.2.108]
 - 25 Physical status: the use and interpretation of anthropometry. Report of a WHO Expert Committee. *World Health Organ Tech Rep Ser* 1995; **854**: 1-452 [PMID: 8594834]
 - 26 **Seidell JC**, Flegal KM. Assessing obesity: classification and epidemiology. *Br Med Bull* 1997; **53**: 238-252 [PMID: 9246834 DOI: 10.1093/oxfordjournals.bmb.a011611]
 - 27 **Lee HJ**, Kim HH, Kim MC, Ryu SY, Kim W, Song KY, Cho GS, Han SU, Hyung WJ, Ryu SW; Korean Laparoscopic Gastrointestinal Surgery Study Group. The impact of a high body mass index on laparoscopy assisted gastrectomy for gastric cancer. *Surg Endosc* 2009; **23**: 2473-2479 [PMID: 19343439 DOI: 10.1007/s00464-009-0419-1]
 - 28 **Dhar DK**, Kubota H, Tachibana M, Kotoh T, Tabara H, Masunaga R, Kohno H, Nagasue N. Body mass index determines the success of lymph node dissection and predicts the outcome of gastric carcinoma patients. *Oncology* 2000; **59**: 18-23 [PMID: 10895061 DOI: 10.1159/000012131]
 - 29 **Inagawa S**, Adachi S, Oda T, Kawamoto T, Koike N, Fukao K. Effect of fat volume on postoperative complications and survival rate after D2 dissection for gastric cancer. *Gastric Cancer* 2000; **3**: 141-144 [PMID: 11984727 DOI: 10.1007/PL00011708]
 - 30 **Tsujinaka T**, Sasako M, Yamamoto S, Sano T, Kurokawa Y, Nashimoto A, Kurita A, Katai H, Shimizu T, Furukawa H, Inoue S, Hiratsuka M, Kinoshita T, Arai K, Yamamura Y; Gastric Cancer Surgery Study Group of Japan Clinical Oncology Group. Influence of overweight on surgical complications for gastric cancer: results from a randomized control trial comparing D2 and extended para-aortic D3 lymphadenectomy (JCOG9501). *Ann Surg Oncol* 2007; **14**: 355-361 [PMID: 17146738 DOI: 10.1245/s10434-006-9209-3]
 - 31 **Bickenbach KA**, Denton B, Gonen M, Brennan MF, Coit DG, Strong VE. Impact of obesity on perioperative complications and long-term survival of patients with gastric cancer. *Ann Surg Oncol* 2013; **20**: 780-787 [PMID: 22976377 DOI: 10.1245/s10434-012-2653-3]
 - 32 **Kunisaki C**, Makino H, Takagawa R, Sato K, Kawamata M, Kanazawa A, Yamamoto N, Nagano Y, Fujii S, Ono HA, Akiyama H, Shimada H. Predictive factors for surgical complications of laparoscopy-assisted distal gastrectomy for gastric cancer. *Surg Endosc* 2009; **23**: 2085-2093 [PMID: 19116746 DOI: 10.1007/s00464-008-0247-8]

- 33 **Hiki N**, Fukunaga T, Yamaguchi T, Ogura T, Miyata S, Tokunaga M, Ohyama S, Sano T. Increased fat content and body shape have little effect on the accuracy of lymph node retrieval and blood loss in laparoscopic distal gastrectomy for gastric cancer. *J Gastrointest Surg* 2009; **13**: 626-633 [PMID: 19089516 DOI: 10.1007/s11605-008-0768-4]
- 34 **Ueda J**, Ichimiya H, Okido M, Kato M. The impact of visceral fat accumulation on laparoscopy-assisted distal gastrectomy for early gastric cancer. *J Laparoendosc Adv Surg Tech A* 2009; **19**: 157-162 [PMID: 19215214 DOI: 10.1089/lap.2008.0113]

P- Reviewer: Kocazeybek B, Musella M **S- Editor:** Ji FF
L- Editor: Wang TQ **E- Editor:** Bian YN





Published by **Baishideng Publishing Group Inc**
7901 Stoneridge Drive, Suite 501, Pleasanton, CA 94588, USA
Telephone: +1-925-223-8242
Fax: +1-925-223-8243
E-mail: bpgoffice@wjgnet.com
Help Desk: <http://www.f6publishing.com/helpdesk>
<http://www.wjgnet.com>

