

World Journal of *Gastrointestinal Surgery*

World J Gastrointest Surg 2024 July 27; 16(7): 1956-2364



Contents

Monthly Volume 16 Number 7 July 27, 2024

EDITORIAL

- 1956 Unveiling the potential of electrocautery-enhanced lumen-apposing metal stents in endoscopic ultrasound-guided biliary drainage
Chisthi MM
- 1960 Minimally invasive pelvic exenteration for primary or recurrent locally advanced rectal cancer: A glimpse into the future
Kehagias D, Lampropoulos C, Kehagias I
- 1965 Endoscopic submucosal dissection for early gastric cancer: A major challenge for the west
Schlottmann F
- 1969 Impact of immunotherapy on liver metastasis
Fu Z, Wang MW, Liu YH, Jiao Y
- 1973 Occurrence and prevention of incisional hernia following laparoscopic colorectal surgery
Wu XW, Yang DQ, Wang MW, Jiao Y
- 1981 Role of endoscopic-ultrasound-guided biliary drainage with electrocautery-enhanced lumen-apposing metal stent for palliation of malignant biliary obstruction
Deliwala SS, Qayed E

REVIEW

- 1986 Pancreatic pseudocyst: The past, the present, and the future
Koo JG, Liao MYQ, Kryvoruchko IA, Habeeb TA, Chia C, Shelat VG

ORIGINAL ARTICLE

Case Control Study

- 2003 Diagnostic significance of serum levels of serum amyloid A, procalcitonin, and high-mobility group box 1 in identifying necrotising enterocolitis in newborns
Guo LM, Jiang ZH, Liu HZ, Zhang L

Retrospective Cohort Study

- 2012 Clinical efficacy and safety of double-channel anastomosis and tubular gastroesophageal anastomosis in gastrectomy
Liu BY, Wu S, Xu Y
- 2023 Application of radioactive iodine-125 microparticles in hepatocellular carcinoma with portal vein embolus
Meng P, Ma JP, Huang XF, Zhang KL

Retrospective Study

- 2031** Reproducibility study of intravoxel incoherent motion and apparent diffusion coefficient parameters in normal pancreas
Liu X, Wang YF, Qi XH, Zhang ZL, Pan JY, Fan XL, Du Y, Zhai YM, Wang Q
- 2040** Weight regain after intragastric balloon for pre-surgical weight loss
Abbitt D, Choy K, Kovar A, Jones TS, Wikel KJ, Jones EL
- 2047** Retrospective analysis based on a clinical grading system for patients with hepatic hemangioma: A single center experience
Zhou CM, Cao J, Chen SK, Tuxun T, Apaer S, Wu J, Zhao JM, Wen H
- 2054** Spleen volume is associated with overt hepatic encephalopathy after transjugular intrahepatic portosystemic shunt in patients with portal hypertension
Zhao CJ, Ren C, Yuan Z, Bai GH, Li JY, Gao L, Li JH, Duan ZQ, Feng DP, Zhang H
- 2065** Evaluation of the clinical effects of atropine in combination with remifentanyl in children undergoing surgery for acute appendicitis
Li YJ, Chen YY, Lin XL, Zhang WZ
- 2073** The combined detection of carcinoembryonic antigen, carcinogenic antigen 125, and carcinogenic antigen 19-9 in colorectal cancer patients
Gong LZ, Wang QW, Zhu JW
- 2080** Clinical efficacy of laparoscopic cholecystectomy plus cholangioscopy for the treatment of cholecystolithiasis combined with choledocholithiasis
Liu CH, Chen ZW, Yu Z, Liu HY, Pan JS, Qiu SS
- 2088** Association between operative position and postoperative nausea and vomiting in patients undergoing laparoscopic sleeve gastrectomy
Li ZP, Song YC, Li YL, Guo D, Chen D, Li Y
- 2096** Preoperative albumin-bilirubin score predicts short-term outcomes and long-term prognosis in colorectal cancer patients undergoing radical surgery
Diao YH, Shu XP, Tan C, Wang LJ, Cheng Y
- 2106** Association of preoperative antiviral treatment with incidences of post-hepatectomy liver failure in hepatitis B virus-related hepatocellular carcinoma
Wang X, Lin ZY, Zhou Y, Zhong Q, Li ZR, Lin XX, Hu MG, He KL
- 2119** Effect of rapid rehabilitation nursing on improving clinical outcomes in postoperative patients with colorectal cancer
Song JY, Cao J, Mao J, Wang JL
- 2127** Interaction between the albumin-bilirubin score and nutritional risk index in the prediction of post-hepatectomy liver failure
Qin FF, Deng FL, Huang CT, Lin SL, Huang H, Nong JJ, Wei MJ

- 2135** Effectiveness of magnetic resonance imaging and spiral computed tomography in the staging and treatment prognosis of colorectal cancer
Bai LN, Zhang LX
- 2145** Correlation between abdominal computed tomography signs and postoperative prognosis for patients with colorectal cancer
Yang SM, Liu JM, Wen RP, Qian YD, He JB, Sun JS
- 2157** Study on the occurrence and influencing factors of gastrointestinal symptoms in hemodialysis patients with uremia
Yuan D, Wang XQ, Shao F, Zhou JJ, Li ZX
- 2167** "Hepatic hilum area priority, liver posterior first": An optimized strategy in laparoscopic resection for type III-IV hilar cholangiocarcinoma
Hu XS, Wang Y, Pan HT, Zhu C, Chen SL, Zhou S, Liu HC, Pang Q, Jin H
- 2175** Impact of nutritional support on immunity, nutrition, inflammation, and outcomes in elderly gastric cancer patients after surgery
Chen XW, Guo XC, Cheng F
- 2183** Therapeutic effects of Buzhong Yiqi decoction in patients with spleen and stomach qi deficiency after routine surgery and chemotherapy for colorectal cancer
Hu Q, Chen XP, Tang ZJ, Zhu XY, Liu C
- 2194** Influencing factors and risk prediction model for emergence agitation after general anesthesia for primary liver cancer
Song SS, Lin L, Li L, Han XD
- 2202** Potential applications of single-incision laparoscopic totally preperitoneal hernioplasty
Wang XJ, Fei T, Xiang XH, Wang Q, Zhou EC
- 2211** Clinical significance of preoperative nutritional status in elderly gastric cancer patients undergoing radical gastrectomy: A single-center retrospective study
Zhao XN, Lu J, He HY, Ge SJ
- 2221** Establishment and validation of a predictive model for peripherally inserted central catheter-related thrombosis in patients with liver cancer
Chen XF, Wu HJ, Li T, Liu JB, Zhou WJ, Guo Q
- Observational Study**
- 2232** Effect of information-motivation-behavioral skills model based perioperative nursing on pain in patients with gallstones
Ma L, Yu Y, Zhao BJ, Yu YN, Li Y
- 2242** Postoperative body weight change and its influencing factors in patients with gastric cancer
Li Y, Huang LH, Zhu HD, He P, Li BB, Wen LJ
- 2255** Cost burden following esophagectomy: A single centre observational study
Buchholz V, Lee DK, Liu DS, Aly A, Barnett SA, Hazard R, Le P, Kioussis B, Muralidharan V, Weinberg L

Randomized Controlled Trial

- 2270 Effectiveness of colonoscopy, immune fecal occult blood testing, and risk-graded screening strategies in colorectal cancer screening
Xu M, Yang JY, Meng T

Clinical and Translational Research

- 2281 Construction of prognostic markers for gastric cancer and comprehensive analysis of pyroptosis-related long non-coding RNAs
Wang Y, Li D, Xun J, Wu Y, Wang HL

Basic Study

- 2296 Yangyin Huowei mixture alleviates chronic atrophic gastritis by inhibiting the IL-10/JAK1/STAT3 pathway
Xie SS, Zhi Y, Shao CM, Zeng BF
- 2308 Impacts of different pancreatic resection ranges on endocrine function in *Suncus murinus*
Li RJ, Yang T, Zeng YH, Natsuyama Y, Ren K, Li J, Nagakawa Y, Yi SQ

SYSTEMATIC REVIEWS

- 2319 Impact of frailty on postoperative outcomes after hepatectomy: A systematic review and meta-analysis
Lv YJ, Xu GX, Lan JR

CASE REPORT

- 2329 Multidisciplinary management of ulcerative colitis complicated by immune checkpoint inhibitor-associated colitis with life-threatening gastrointestinal hemorrhage: A case report
Hong N, Wang B, Zhou HC, Wu ZX, Fang HY, Song GQ, Yu Y
- 2337 Sequential bowel necrosis and large gastric ulcer in a patient with a ruptured femoral artery: A case report
Wang P, Wang TG, Yu AY
- 2343 Colon signet-ring cell carcinoma with chylous ascites caused by immunosuppressants following liver transplantation: A case report
Li Y, Tai Y, Wu H
- 2351 Misdiagnosis of hemangioma of left triangular ligament of the liver as gastric submucosal stromal tumor: Two case reports
Wang JJ, Zhang FM, Chen W, Zhu HT, Gui NL, Li AQ, Chen HT

LETTER TO THE EDITOR

- 2358 Revolutionizing palliative care: Electrocautery-enhanced lumen-apposing metal stents in endoscopic-ultrasound-guided biliary drainage for malignant obstructions
Onteddu NKR, Mareddy NSR, Vulasala SSR, Onteddu J, Virarkar M

- 2362** Preservation of superior rectal artery in laparoscopic colectomy: The best choice for slow transit constipation?

Liu YL, Liu WC

ABOUT COVER

Peer Reviewer of *World Journal of Gastrointestinal Surgery*, Hideki Aoki, MD, PhD, Chief Doctor, Surgeon, Department of Surgery, Iwakuni Clinical Center, Iwakuni 740-8510, Japan. aoki.hideki.hy@mail.hosp.go.jp

AIMS AND SCOPE

The primary aim of *World Journal of Gastrointestinal Surgery* (WJGS, *World J Gastrointest Surg*) is to provide scholars and readers from various fields of gastrointestinal surgery with a platform to publish high-quality basic and clinical research articles and communicate their research findings online.

WJGS mainly publishes articles reporting research results and findings obtained in the field of gastrointestinal surgery and covering a wide range of topics including biliary tract surgical procedures, biliopancreatic diversion, colectomy, esophagectomy, esophagostomy, pancreas transplantation, and pancreatectomy, *etc.*

INDEXING/ABSTRACTING

The WJGS is now abstracted and indexed in Science Citation Index Expanded (SCIE, also known as SciSearch®), Current Contents/Clinical Medicine, Journal Citation Reports/Science Edition, PubMed, PubMed Central, Reference Citation Analysis, China Science and Technology Journal Database, and Superstar Journals Database. The 2024 Edition of Journal Citation Reports® cites the 2023 journal impact factor (JIF) for WJGS as 1.8; JIF without journal self cites: 1.7; 5-year JIF: 1.9; JIF Rank: 123/290 in surgery; JIF Quartile: Q2; and 5-year JIF Quartile: Q3.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: Zi-Hang Xu, Production Department Director: Xiang Li, Cover Editor: Jia-Ru Fan.

NAME OF JOURNAL

World Journal of Gastrointestinal Surgery

ISSN

ISSN 1948-9366 (online)

LAUNCH DATE

November 30, 2009

FREQUENCY

Monthly

EDITORS-IN-CHIEF

Peter Schemmer

EDITORIAL BOARD MEMBERS

<https://www.wjgnet.com/1948-9366/editorialboard.htm>

PUBLICATION DATE

July 27, 2024

COPYRIGHT

© 2024 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS

<https://www.wjgnet.com/bpg/gerinfo/204>

GUIDELINES FOR ETHICS DOCUMENTS

<https://www.wjgnet.com/bpg/gerinfo/287>

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

<https://www.wjgnet.com/bpg/gerinfo/240>

PUBLICATION ETHICS

<https://www.wjgnet.com/bpg/gerinfo/288>

PUBLICATION MISCONDUCT

<https://www.wjgnet.com/bpg/gerinfo/208>

ARTICLE PROCESSING CHARGE

<https://www.wjgnet.com/bpg/gerinfo/242>

STEPS FOR SUBMITTING MANUSCRIPTS

<https://www.wjgnet.com/bpg/gerinfo/239>

ONLINE SUBMISSION

<https://www.f6publishing.com>



Retrospective Study

Association between operative position and postoperative nausea and vomiting in patients undergoing laparoscopic sleeve gastrectomy

Zhao-Peng Li, Yan-Cheng Song, Ya-Li Li, Dong Guo, Dong Chen, Yu Li

Specialty type: Gastroenterology and hepatology

Provenance and peer review: Unsolicited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's classification

Scientific Quality: Grade C, Grade C

Novelty: Grade B, Grade C

Creativity or Innovation: Grade B, Grade C

Scientific Significance: Grade B, Grade C

P-Reviewer: Arslan M

Received: March 2, 2024

Revised: May 18, 2024

Accepted: June 18, 2024

Published online: July 27, 2024

Processing time: 141 Days and 19.7 Hours



Zhao-Peng Li, Yan-Cheng Song, Dong Guo, Dong Chen, Yu Li, Department of Gastrointestinal Surgery, The Affiliated Hospital of Qingdao University, Qingdao 266033, Shandong Province, China

Ya-Li Li, Department of Operation Room, The Affiliated Hospital of Qingdao University, Qingdao 266033, Shandong Province, China

Corresponding author: Yu Li, Doctor, Surgeon, Department of Gastrointestinal Surgery, The Affiliated Hospital of Qingdao University, No. 16 Jiangsu Road, Qingdao 266033, Shandong Province, China. liyu11920@hotmail.com

Abstract

BACKGROUND

Bariatric surgery is one of the most effective ways to treat morbid obesity, and postoperative nausea and vomiting (PONV) is one of the common complications after bariatric surgery. At present, the mechanism of the high incidence of PONV after weight-loss surgery has not been clearly explained, and this study aims to investigate the effect of surgical position on PONV in patients undergoing bariatric surgery.

AIM

To explore the effect of the operative position during bariatric surgery on PONV.

METHODS

Data from obese patients, who underwent laparoscopic sleeve gastrectomy (LSG) in the authors' hospital between June 2020 and February 2022 were divided into 2 groups and retrospectively analyzed. Multivariable logistic regression analysis and the *t*-test were used to study the influence of operative position on PONV.

RESULTS

There were 15 cases of PONV in the supine split-leg group (incidence rate, 50%) and 11 in the supine group (incidence rate, 36.7%) ($P = 0.297$). The mean operative duration in the supine split-leg group was 168.23 ± 46.24 minutes and 140.60 ± 32.256 minutes in the supine group ($P < 0.05$). Multivariate analysis revealed that operative position was not an independent risk factor for PONV (odds ratio = 1.192, 95% confidence interval: 0.376-3.778, $P = 0.766$).

CONCLUSION

Operative position during LSG may affect PONV; however, the difference in the incidence of PONV was not statistically significant. Operative position should be carefully considered for obese patients before surgery.

Key Words: Postoperative nausea and vomiting; Bariatric surgery; Laparoscopic sleeve gastrectomy; Operative positions; Obesity

©The Author(s) 2024. Published by Baishideng Publishing Group Inc. All rights reserved.

Core Tip: Laparoscopic sleeve gastrectomy is associated with a high incidence of postoperative nausea and vomiting (PONV). The incidence of PONV was higher in those who underwent the procedure in the supine split-leg position vs those who were supine; however, the difference was not statistically significant. Operative position may affect operative duration, although it is not a risk factor for PONV.

Citation: Li ZP, Song YC, Li YL, Guo D, Chen D, Li Y. Association between operative position and postoperative nausea and vomiting in patients undergoing laparoscopic sleeve gastrectomy. *World J Gastrointest Surg* 2024; 16(7): 2088-2095

URL: <https://www.wjgnet.com/1948-9366/full/v16/i7/2088.htm>

DOI: <https://dx.doi.org/10.4240/wjgs.v16.i7.2088>

INTRODUCTION

The global prevalence of obesity and obesity-related illnesses is escalating. Up to 2.1 billion individuals worldwide are categorized as overweight or obese[1]. Numerous studies have established a definitive link between obesity and several diseases, including cardiovascular disease, cancer, non-alcoholic fatty liver disease, and coronavirus disease 2019[2-5]. Bariatric surgery has proven to be one of the most effective interventions for metabolic regulation and weight reduction among obese patients[6]. Among the most frequently performed procedures is laparoscopic sleeve gastrectomy (LSG). Bariatric surgery has been shown to be one of the most effective intervention for metabolic control and weight loss in patients with obesity[7,8].

Postoperative nausea and vomiting (PONV) is a prevalent complication after surgery, particularly in bariatric procedures. According to studies, the incidence of PONV can reach up to 59.6% in bariatric surgery patients[9]. PONV can lead to several potential secondary complications, such as aspiration, incision rupture, higher medical costs, and an increased risk of postoperative bleeding[10]. Notably, dehydration caused by vomiting is a common reason for readmission following bariatric surgery[11]. Risk factors for PONV include being female, young age, the use of volatile anesthetics, preoperative reflux symptoms, non-smoking status, the administration of postoperative opioids, and prolonged anesthesia duration[12]. However, specific risk factors in bariatric surgery patients have not been identified. Operative positions refer to the positions of the patient during the operation. Proper operative positions are convenient to the exposure of the surgical field and the operative procedure. There are few studies on operative positions in terms of bariatric surgery. This study aimed to investigate the influence of operative positions for PONV in patients undergoing bariatric surgery.

MATERIALS AND METHODS

Patients and design

This study was approved by the Ethics Committee of the Affiliated Hospital of Qingdao University (Qingdao, China; Ethics Approval Number: QYFY WZLL27397). The inclusion criteria were as follows: LSG; no postoperative complications; routine use of prophylactic antiemetics during surgery; a consistent anesthesia plan during surgery; return to the ward after surgery; and hospitalization without other indications[13]. Individuals at high risk for anesthesia, those with serious complications, intensive care unit admission, other surgeries, non-laparoscopic surgery, and different anesthetic protocols were excluded.

Seventy-two patients were initially eligible for this study; however, after screening according to the inclusion and exclusion criteria, 60 were ultimately included. Patients were divided into two groups according to surgical position and period: Supine split-leg, between June 2020 and July 2021 ($n = 30$); and supine, between August 2021 and February 2022 ($n = 30$). Reasons for exclusion were as follows: Serious complications of obesity ($n = 3$); history of treatment in the intensive care unit ($n = 6$); undergone other surgeries ($n = 2$); and different anesthetic protocol ($n = 1$) (Figure 1).

Patients who underwent surgery positioned supine were placed in the middle of the bed, with hands on both sides of the body and legs fixed to the operating bed to ensure the head was high and feet were low during the procedure (Figure 2A). Patients who underwent surgery in the supine split-leg position had their legs on the footrest after laying flat on the operating bed, separating the legs, keeping the included angle between the legs at $< 90^\circ$ and properly fixed

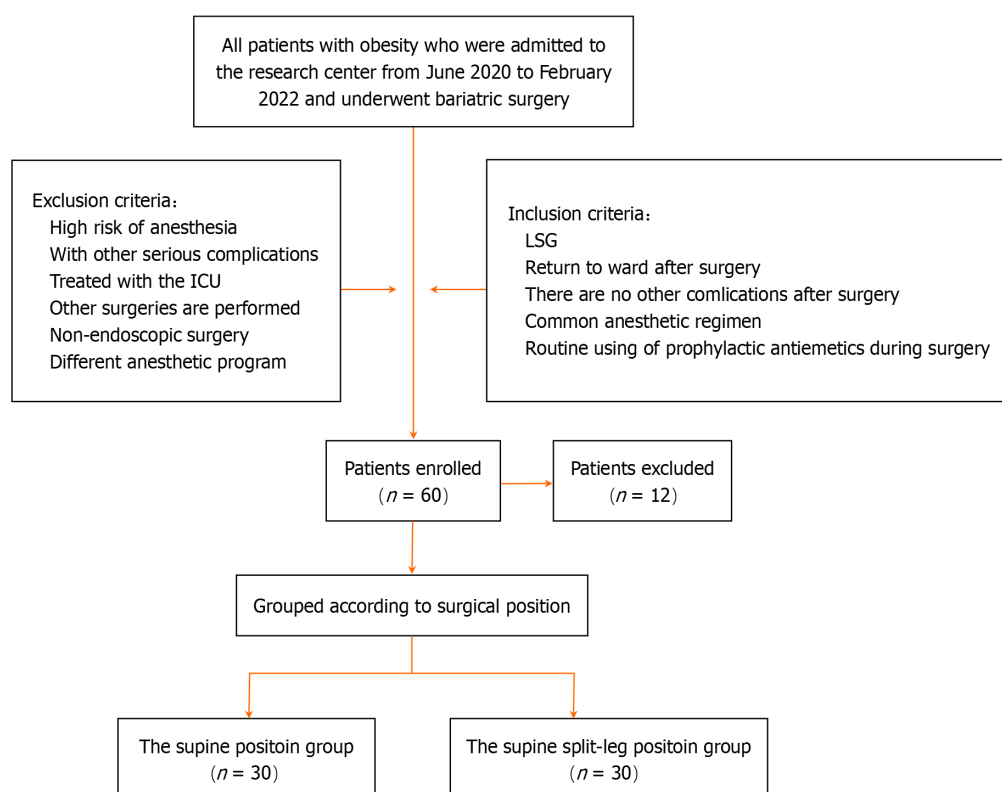


Figure 1 Flow diagram of this study. ICU: Intensive care unit; LSG: Laparoscopic sleeve gastrectomy.

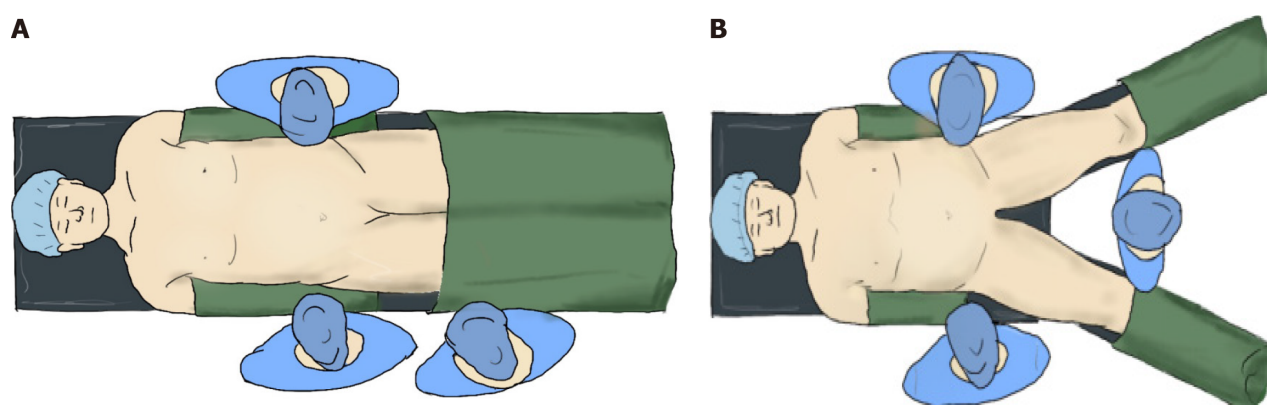


Figure 2 The supine position group and supine split-leg position group. A: The supine position group; B: The supine split-leg position group.

(Figure 2B). During the procedure, the patients were adjusted to the reverse Trendelenburg position (the angle was maintained at 30°); operative positions were not altered and efforts were made to ensure stability of both operative positions. Possible differences between the 2 operative positions were considered to be consistent. None of the patients received postoperative nasal tubes. All patient information was obtained in accordance with the ethical standards of the National Research Committee and the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all patients included in the study.

Perioperative management

Anesthetic management followed a standardized clinical protocol. All patients were treated by the same anesthesia team, and sufentanil, propofol, etomidate, and sevoflurane for inhalation were used to induce and maintain anesthesia. According to recent studies and guidelines, antiemetics are routinely used during the operation[14-16]. The specific scheme was intravenous ondansetron hydrochloride (8 mg)/intravenous dolasetron mesylate (12.5 mg).

Postoperatively, the patients were transferred to the general ward and their vital signs were closely monitored. Proton pump inhibitors and antibiotics were routinely used in the ward. The patients were evaluated for nausea and vomiting using a numerical rating scale (NRS). To promote early recovery, patients were encouraged to get out of bed early on the day after the operation.

Antiemetics were used in patients experiencing ≥ 2 episodes of vomiting or retching, and any nausea lasting > 30 minutes when the patient requested treatment. Based on numerical rating scale results, symptoms after surgery were treated with antiemetics, including metoclopramide (10 mg) intramuscular injection and ondansetron hydrochloride (8 mg) intravenous injection. The nursing team would monitor patient vital signs. If the patients experienced serious complications, such as arrhythmia and heart failure, the study was discontinued. Finally, the occurrence of PONV was evaluated based on the use of antiemetics and follow-up after surgery.

Data collection and analysis

This retrospective study included data from patients with obesity who were admitted to and underwent bariatric surgery at the Affiliated Hospital of Qingdao University between June 2020 and February 2022. Medical records were collected and reviewed, mainly recording the following data: Demographic and clinical data, including age, sex, body mass index (BMI), and time of use of antiemetics after surgery, as well as some details during the operation, including anesthesia plan, operation preparation time, operative duration, anesthesia recovery time after surgery, and use of antiemetics.

Normally distributed variables are expressed as mean \pm SD, while those that were non-normally distributed are expressed as median (interquartile range). Continuous variables were analyzed using the *t*-test or Wilcoxon rank-sum test, and classified variables were compared using the χ^2 test. Differences with $P < 0.05$ were considered to be statistically significant. Multivariate logistic regression analysis was used to study the factors influencing postoperative complications, and risk was expressed as odds ratio (OR) with corresponding 95% confidence interval (CI). Data analysis was performed using SPSS version 26 (IBM Corporation, Armonk, NY, United States).

RESULTS

Baseline data

Data from 60 patients with obesity who underwent LSG between June 2020 and February 2022 were reviewed. Demographic information of all patients is summarized in [Table 1](#).

Procedure-related data

Relevant data regarding the operative process in the 2 groups (*i.e.*, supine split-leg *vs* supine) are summarized in [Table 2](#). In the supine split-leg group, the mean preoperative preparation time was 35.00 ± 22.25 minutes, operative duration was 168.23 ± 46.24 minutes, anesthesia recovery time was 50.0 ± 30.00 minutes, and duration of hospitalization was 4 ± 1 days. In the supine group, the mean preoperative preparation time was 35.00 ± 21.25 minutes, operative duration was 140.60 ± 32.256 minutes, anesthesia recovery time was 42.5 ± 16.00 minutes, and length of hospitalization was 4 days. There were significant differences in operative duration between the 2 groups ($P < 0.05$).

Incidence of PONV and administration of rescue medication

Data from 60 patients who underwent bariatric surgery were collected for this study, of whom 26 experienced PONV: 15 in the supine split-leg group and 11 in the supine group. In the supine group, 11 patients were administered antiemetics 1-2 times and 4 were treated > 3 times. Six patients required treatment within 0-6 hours, 2 were treated for 6-12 hours, and 7 were treated for > 12 hours. In the split-leg group, 9 patients were administered antiemetics 1-2 times and 2 were treated > 3 times. Five patients were treated within 0-6 hours, 2 for 6-12 hours, and 4 for > 12 hours. The differences were not statistically significant ($P > 0.05$). Patient vomiting status and the use of antiemetics are summarized in [Table 3](#).

Risk factors for PONV

Previous studies have reported that smoking, BMI, sex, and other conditions are associated with the occurrence of PONV [17]. Subsequently, risk factors for PONV were analyzed using multivariate analysis. Regarding the factors associated with the occurrence of PONV, there were no statistically significant differences ($P > 0.05$) between smoking status, BMI, and sex. Results revealed that operative position was not an independent risk factor for PONV (OR = 1.192, 95%CI: 0.376-3.778, $P = 0.766$) ([Table 4](#)).

DISCUSSION

The current research indicates that the incidence of PONV in bariatric surgery is notably higher than in other routine surgeries, as evidenced by studies [18-21]. However, the mechanism behind this high incidence of PONV has not been fully explained. In clinical practice, the incidence of PONV varies depending on the operative positions. This study aims to elucidate the high incidence of PONV from a different perspective.

Operative positions refer to the positioning of the patient during surgery. Ensuring the correct operative positions is crucial for the well-being of patients [22]. Numerous operative positions can be employed during laparoscopic surgery and play a significant role, particularly in the realm of intraoperative anesthesia [23]. Many postoperative complications, including spinal cord injury, are associated with operative positions [24]. Despite being a common postoperative complication, there are limited studies exploring the effects of operative positions on PONV. This research focuses on the correlation between PONV and operative positions, and it has gathered a portion of surgical data for analysis.

Table 1 Demographical characteristics data of the patients

Variable	The supine position group	The supine split-leg position group	P value
Age (year)	32.27 ± 7.00	30.40 ± 6.04	0.273
BMI (kg/m ²)	39.88 ± 5.48	39.90 ± 4.83	0.986
Gender (female), <i>n</i> (%)	24 (80)	28 (93)	0.490
Smoking	12	2	0.002 ^a
Systolic pressure (mmHg)	141.1 ± 16.90	131.77 ± 17.11	0.038 ^a
Diastolic pressure (mmHg)	93.77 ± 13.18	88.93 ± 12.20	0.146
Blood uric acid (μmol/L)	402.00 (376.00, 485.25)	409.50 (343.25, 464.00)	0.124
Fasting blood-glucose (mmol/L)	5.44 (4.80, 6.96)	5.04 (4.59, 5.62)	0.311
ALT (U/L)	42.50 (18.25, 82.25)	27.00 (17.00, 44.75)	0.149
AST (U/L)	27.00 (18.50, 47.50)	21.00 (17.00, 30.25)	0.120

^a*P* < 0.05.

Normal distribution was expressed as the mean ± SD, non-normal distribution is expressed as median (interquartile spacing). The percentage (95% confidence interval) was for categorical variables. BMI: Body mass index; ALT: Alanine aminotransferase; AST: Aspartate aminotransferase.

Table 2 Clinical data of the patients

Variable	The supine position group	The supine split-leg position group	P value
Preparation time before surgery (minute)	35.00 (28.75, 50.00)	35.00 (28.75, 50.00)	0.834
Operation time (minute)	140.60 ± 32.26	168.23 ± 46.24	0.009 ^a
Anesthesia recovery time (minute)	42.5 (39.00, 55.00)	50.00 (40.00, 70.00)	0.05
Hospitalization time (day)	4 (1)	4 (0)	0.181

^a*P* < 0.05.

Normal distribution was expressed as the mean ± SD, non-normal distribution is expressed as median (interquartile spacing). The percentage (95% confidence interval) was for categorical variables.

Table 3 Application of vomiting and antiemetics

Variable	The supine position group	The supine split-leg position group	P value
Vomiting	11 (36.7%)	15 (50.0%)	0.297
Number of antiemetics applications (frequency)			
0	19	15	0.599
1-2	9	11	
> 3	2	4	
Time of application of vomiting medicine			
-	19	15	0.736
0-6 hours	5	6	
6-12 hours	2	2	
> 12 hours	4	7	

Operative positions refer to the patient's position during surgery. The correct operative position is crucial for patients. Various operative positions can be used for laparoscopic surgery and play a significant role in the surgical procedure, especially in the realm of intraoperative anesthesia. Many postoperative complications are tied to operative positions, including spinal cord injury. Several studies have shown that the incidence of PONV after bariatric surgery is high[19, 21]. Researchers found that the occurrence of PONV reaches up to 90% in LSG[18], which differs from our findings.

Table 4 Odds ratio and 95% confidence intervals of risk factors for postoperative nausea and vomiting after bariatric surgery

Influencing factor	P value	OR	95% confidence interval	
			Superior limit	Lower limit
Position	0.766	1.192	0.376	3.778
Gender	0.585	0.603	0.098	3.712
BMI	0.515	1.038	0.927	1.163
Smoking	0.161	2.97	0.649	13.592

BMI: Body mass index; OR: Odds ratio.

In our results, over 43.3% of patients developed PONV. Among them, 36.7% of patients experienced PONV in the supine position group, while 50.0% of patients did so in the supine split-leg position group. Regarding the administration of antiemetics, some researchers found that nearly all patients diagnosed with PONV received their first rescue medication within 6 hours after surgery. However, in another study, about 46.0% of patients received their first rescue antiemetic within 6 hours post-surgery[9]. In our study, only 18.3% of patients had their first rescue medication within 6 hours, with 16% in the supine position group and 20% in the supine split-leg position group.

A possible explanation for this difference is that prophylactic antiemetics were administered at the end of surgery. Routine intraoperative use of prophylactic antiemetics may reduce the likelihood of PONV in patients within 6 hours after surgery[14,15,25]. For patients who still experience PONV, we attribute it to their larger weight base, and the number of anesthetics used during surgery is also higher than in ordinary individuals. A study pointed out that PONV and the administration of antiemetics lead to a prolonged hospital stay for patients[26]. However, our results confirmed that there was no significant difference in hospital stay between the two groups, which may be related to the small number of cases we studied.

In our research, we observed no significant difference in preoperative preparation time between the two groups, likely attributed to our mature team collaboration. However, there was a notable difference in operation time, where the operation time in our study was significantly longer than reported in relevant literature[27]. The potential explanations for this are as follows: Firstly, during surgical procedures, we routinely suture and reinforce the cutting margin, which subsequently prolongs the operation time. Secondly, it is worth noting that the operation time in our study refers to the duration from the commencement of anesthesia to its conclusion, rather than solely the time required for surgical manipulation. Thirdly, this discrepancy may be related to the learning curve of our surgical team. Furthermore, the operation time in the supine split-leg position group was significantly longer compared to the supine position group. This is likely due to the enhanced convenience for surgeons and assistants during the operation in the supine position, as well as the improved accessibility for the instrument nurse to observe the operating table.

In multivariable logistic regression analyses, smoking, BMI, and gender have been confirmed as not being risk factors for PONV, consistent with previous studies[9], yet differing from the findings of Apfel *et al*[28]. We posit this may be due to the lack of statistical difference in gender and BMI among patients undergoing various surgical procedures before surgery, as well as the small sample size in this single-center retrospective study. Research has revealed a possible association between opioid usage and PONV issues[23]. The recovery time from anesthesia is primarily linked to the patient's intraoperative medication dosage and individual body metabolism[12,13]. Operation time can be influenced by surgical positions; longer operations tend to require higher anesthesia doses. In our results, the supine split-leg position group had an average operation time of 168.23 ± 46.24 minutes, whereas the supine position group's operation time was 140.60 ± 32.256 minutes. The supine split-leg position group required significantly more time compared to the supine position group. Consequently, anesthesia doses were higher in the supine split-leg position group due to the varying operation times. We anticipated differences in PONV incidence, yet surprisingly, the probability of PONV was not significantly different between the two groups. Surgical position was also not a risk factor for PONV, contrary to the results of Hozumi *et al*[27]. Our study found that 26 patients undergoing LSG experienced PONV, with an incidence of 50% in the supine split-leg position group and 36.7% in the supine position group ($P = 0.297$). This discrepancy may stem from several reasons. Primarily, PONV is a subjective research indicator, and tolerance varies among individuals. Secondary, this study only performed the analysis for the incidence of PONV and the extent of PONV was not considered. Thirdly, the quality of assessment for PONV in our study might be poor compared with well-planned prospective study.

In summary, our study revealed the impact of operative positions on the occurrence of PONV. We speculate that this could be attributed to the influence of operative positions on the intraoperative anesthesia dosage. Therefore, careful selection of operative positions during preoperative management is crucial. Our research does have certain limitations. Firstly, we were unable to collect intraoperative data regarding the amount of anesthesia administered. Secondly, our utilization of antiemetics relies heavily on patients' subjective factors. Due to individual differences in tolerance, it is challenging to ensure consistency in symptom relief when administering antiemetics to each patient. Lastly, owing to the learning curve, there are disparities in surgeons' proficiency. As a result, further prospective studies are necessary to validate the effect of operative positions on PONV.

CONCLUSION

LSG procedures exhibited a high rate of PONV. Specifically, the incidence of PONV was greater in the supine split-leg position group (50%) compared to the supine position group (36.7%), though this difference was not statistically significant ($P = 0.297$). Our findings indicate that operative positions can indeed influence the duration of surgery, although they do not constitute a risk factor for PONV. Therefore, we recommend careful selection of operative positions for these patients.

FOOTNOTES

Author contributions: Chen D and Li Y conceived the review; Li ZP conducted the literature search and drafted the manuscript; YL Li, Guo D, and Chen D collected the related article; Song YC and Li Y revised the manuscript; and all authors have read and approved the article.

Institutional review board statement: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was approved by the Ethics Committee of the Affiliated Hospital of Qingdao University (Ethical Approval Number: QYFY WZLL27397).

Informed consent statement: Informed consent was obtained from all individual participants included in the study.

Conflict-of-interest statement: All the authors report no relevant conflicts of interest for this article.

Data sharing statement: The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Open-Access: This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (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: <https://creativecommons.org/licenses/by-nc/4.0/>

Country of origin: China

ORCID number: Yu Li [0000-0002-0815-3023](https://orcid.org/0000-0002-0815-3023).

S-Editor: Wang JJ

L-Editor: A

P-Editor: Zhang L

REFERENCES

- 1 Ng M, Fleming T, Robinson M, Thomson B, Graetz N, Margono C, Mullany EC, Biryukov S, Abbafati C, Abera SF, Abraham JP, Abu-Rmeileh NM, Achoki T, AlBuhairan FS, Alemu ZA, Alfonso R, Ali MK, Ali R, Guzman NA, Ammar W, Anwari P, Banerjee A, Barquera S, Basu S, Bennett DA, Bhutta Z, Blore J, Cabral N, Nonato IC, Chang JC, Chowdhury R, Courville KJ, Criqui MH, Cundiff DK, Dabhadkar KC, Dandona L, Davis A, Dayama A, Dharmaratne SD, Ding EL, Durrani AM, Esteghamati A, Farzadfar F, Fay DF, Feigin VL, Flaxman A, Forouzanfar MH, Goto A, Green MA, Gupta R, Hafezi-Nejad N, Hankey GJ, Harewood HC, Havmoeller R, Hay S, Hernandez L, Husseini A, Idrisov BT, Ikeda N, Islami F, Jahangir E, Jassal SK, Jee SH, Jeffreys M, Jonas JB, Kabagambe EK, Khalifa SE, Kengne AP, Khader YS, Khang YH, Kim D, Kimokoti RW, Kinge JM, Kokubo Y, Kosen S, Kwan G, Lai T, Leinsalu M, Li Y, Liang X, Liu S, Logroscino G, Lotufo PA, Lu Y, Ma J, Mainoo NK, Mensah GA, Merriman TR, Mokdad AH, Moschandreas J, Naghavi M, Naheed A, Nand D, Narayan KM, Nelson EL, Neuhouser ML, Nisar MI, Ohkubo T, Oti SO, Pedroza A, Prabhakaran D, Roy N, Sampson U, Seo H, Sepanlou SG, Shibuya K, Shiri R, Shiu I, Singh GM, Singh JA, Skirbekk V, Stapelberg NJ, Sturua L, Sykes BL, Tobias M, Tran BX, Trasande L, Toyoshima H, van de Vijver S, Vasankari TJ, Veerman JL, Velasquez-Melendez G, Vlassov VV, Vollset SE, Vos T, Wang C, Wang X, Weiderpass E, Werdecker A, Wright JL, Yang YC, Yatsuya H, Yoon J, Yoon SJ, Zhao Y, Zhou M, Zhu S, Lopez AD, Murray CJ, Gakidou E. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2014; **384**: 766-781 [PMID: [24880830](https://pubmed.ncbi.nlm.nih.gov/24880830/) DOI: [10.1016/S0140-6736\(14\)60460-8](https://doi.org/10.1016/S0140-6736(14)60460-8)]
- 2 Poirier P, Giles TD, Bray GA, Hong Y, Stern JS, Pi-Sunyer FX, Eckel RH. Obesity and cardiovascular disease: pathophysiology, evaluation, and effect of weight loss. *Arterioscler Thromb Vasc Biol* 2006; **26**: 968-976 [PMID: [16627822](https://pubmed.ncbi.nlm.nih.gov/16627822/) DOI: [10.1161/01.ATV.0000216787.85457.f3](https://doi.org/10.1161/01.ATV.0000216787.85457.f3)]
- 3 Simonnet A, Chetboun M, Poissy J, Raverdy V, Noulette J, Duhamel A, Labreuche J, Mathieu D, Pattou F, Jourdain M; LICORN and the Lille COVID-19 and Obesity study group. High Prevalence of Obesity in Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) Requiring Invasive Mechanical Ventilation. *Obesity (Silver Spring)* 2020; **28**: 1195-1199 [PMID: [32271993](https://pubmed.ncbi.nlm.nih.gov/32271993/) DOI: [10.1002/oby.22831](https://doi.org/10.1002/oby.22831)]
- 4 Song Y, Zhang J, Wang H, Guo D, Yuan C, Liu B, Zhong H, Li D, Li Y. A novel immune-related genes signature after bariatric surgery is histologically associated with non-alcoholic fatty liver disease. *Adipocyte* 2021; **10**: 424-434 [PMID: [34506234](https://pubmed.ncbi.nlm.nih.gov/34506234/) DOI: [10.1080/21623945.2021.1970341](https://doi.org/10.1080/21623945.2021.1970341)]
- 5 De Pergola G, Silvestris F. Obesity as a major risk factor for cancer. *J Obes* 2013; **2013**: 291546 [PMID: [24073332](https://pubmed.ncbi.nlm.nih.gov/24073332/) DOI: [10.1155/2013/291546](https://doi.org/10.1155/2013/291546)]

- 6 **Suh S**, Helm M, Kindel TL, Goldblatt MI, Gould JC, Higgins RM. The impact of nausea on post-operative outcomes in bariatric surgery patients. *Surg Endosc* 2020; **34**: 3085-3091 [PMID: [31388805](#) DOI: [10.1007/s00464-019-07058-5](#)]
- 7 **Angrisani L**, Santonicola A, Iovino P, Ramos A, Shikora S, Kow L. Bariatric Surgery Survey 2018: Similarities and Disparities Among the 5 IFSO Chapters. *Obes Surg* 2021; **31**: 1937-1948 [PMID: [33432483](#) DOI: [10.1007/s11695-020-05207-7](#)]
- 8 **Welbourn R**, Hollyman M, Kinsman R, Dixon J, Liem R, Ottosson J, Ramos A, Våge V, Al-Sabah S, Brown W, Cohen R, Walton P, Himpens J. Bariatric Surgery Worldwide: Baseline Demographic Description and One-Year Outcomes from the Fourth IFSO Global Registry Report 2018. *Obes Surg* 2019; **29**: 782-795 [PMID: [30421326](#) DOI: [10.1007/s11695-018-3593-1](#)]
- 9 **Zhu J**, Wu L, Chen G, Zhao X, Chen W, Dong Z, Chen X, Hu S, Xie X, Wang C, Wang H, Yang W; Chinese Obesity and Metabolic Surgery Collaborative. Preoperative reflux or regurgitation symptoms are independent predictors of postoperative nausea and vomiting (PONV) in patients undergoing bariatric surgery: a propensity score matching analysis. *Obes Surg* 2022; **32**: 819-828 [PMID: [35088249](#) DOI: [10.1007/s11695-021-05859-z](#)]
- 10 **Hooper VD**. PONV/PDNU: Why Is It Still the "Big Little Problem?". *J Perianesth Nurs* 2015; **30**: 375-376 [PMID: [26408510](#) DOI: [10.1016/j.jopan.2015.09.001](#)]
- 11 **Celio A**, Bayouth L, Burruss MB, Spaniolas K. Prospective Assessment of Postoperative Nausea Early After Bariatric Surgery. *Obes Surg* 2019; **29**: 858-861 [PMID: [30565100](#) DOI: [10.1007/s11695-018-3605-1](#)]
- 12 **Gan TJ**, Belani KG, Bergese S, Chung F, Diemunsch P, Habib AS, Jin Z, Kovac AL, Meyer TA, Urman RD, Apfel CC, Ayad S, Beagley L, Candiotti K, Englesakis M, Hedrick TL, Kranke P, Lee S, Lipman D, Minkowitz HS, Morton J, Philip BK. Fourth Consensus Guidelines for the Management of Postoperative Nausea and Vomiting. *Anesth Analg* 2020; **131**: 411-448 [PMID: [32467512](#) DOI: [10.1213/ANE.0000000000004833](#)]
- 13 **Gan TJ**, Diemunsch P, Habib AS, Kovac A, Kranke P, Meyer TA, Watcha M, Chung F, Angus S, Apfel CC, Bergese SD, Candiotti KA, Chan MT, Davis PJ, Hooper VD, Lagoo-Deenadayalan S, Myles P, Nezat G, Philip BK, Tramèr MR; Society for Ambulatory Anesthesia. Consensus guidelines for the management of postoperative nausea and vomiting. *Anesth Analg* 2014; **118**: 85-113 [PMID: [24356162](#) DOI: [10.1213/ANE.0000000000000002](#)]
- 14 **Naem Z**, Chen IL, Pryor AD, Docimo S, Gan TJ, Spaniolas K. Antiemetic Prophylaxis and Anesthetic Approaches to Reduce Postoperative Nausea and Vomiting in Bariatric Surgery Patients: a Systematic Review. *Obes Surg* 2020; **30**: 3188-3200 [PMID: [32415635](#) DOI: [10.1007/s11695-020-04683-1](#)]
- 15 **Moussa AA**, Oregan PJ. Prevention of postoperative nausea and vomiting in patients undergoing laparoscopic bariatric surgery--granisetron alone vs granisetron combined with dexamethasone/droperidol. *Middle East J Anaesthesiol* 2007; **19**: 357-367 [PMID: [17684876](#)]
- 16 **Samieirad S**, Sharifian-Attar A, Eshghpour M, Mianbandi V, Shadkam E, Hosseini-Abrishami M, Hashemipour MS. Comparison of Ondansetron versus Clonidine efficacy for prevention of postoperative pain, nausea and vomiting after orthognathic surgeries: A triple blind randomized controlled trial. *Med Oral Patol Oral Cir Bucal* 2018; **23**: e767-e776 [PMID: [30341261](#) DOI: [10.4317/medoral.22493](#)]
- 17 **Stoops S**, Kovac A. New insights into the pathophysiology and risk factors for PONV. *Best Pract Res Clin Anaesthesiol* 2020; **34**: 667-679 [PMID: [33288117](#) DOI: [10.1016/j.bpa.2020.06.001](#)]
- 18 **Fathy M**, Abdel-Razik MA, Elshobaky A, Emile SH, El-Rahmawy G, Farid A, Elbanna HG. Impact of Pyloric Injection of Magnesium Sulfate-Lidocaine Mixture on Postoperative Nausea and Vomiting After Laparoscopic Sleeve Gastrectomy: a Randomized-Controlled Trial. *Obes Surg* 2019; **29**: 1614-1623 [PMID: [30734195](#) DOI: [10.1007/s11695-019-03762-2](#)]
- 19 **Groene P**, Eisenlohr J, Zeuzem C, Dudok S, Karcz K, Hofmann-Kiefer K. Postoperative nausea and vomiting in bariatric surgery in comparison to non-bariatric gastric surgery. *Wideochir Inne Tech Maloinwazyjne* 2019; **14**: 90-95 [PMID: [30766634](#) DOI: [10.5114/wiitm.2018.77629](#)]
- 20 **Halliday TA**, Sundqvist J, Hultin M, Walldén J. Post-operative nausea and vomiting in bariatric surgery patients: an observational study. *Acta Anaesthesiol Scand* 2017; **61**: 471-479 [PMID: [28374473](#) DOI: [10.1111/aas.12884](#)]
- 21 **Zheng XZ**, Cheng B, Luo J, Xiong QJ, Min S, Wei K. The characteristics and risk factors of the postoperative nausea and vomiting in female patients undergoing laparoscopic sleeve gastrectomy and laparoscopic gynecological surgeries: a propensity score matching analysis. *Eur Rev Med Pharmacol Sci* 2021; **25**: 182-189 [PMID: [33506906](#) DOI: [10.26355/eurrev_202101_24383](#)]
- 22 **Burlingame BL**. Guideline Implementation: Positioning the Patient. *AORN J* 2017; **106**: 227-237 [PMID: [28865633](#) DOI: [10.1016/j.aorn.2017.07.010](#)]
- 23 **Oti C**, Mahendran M, Sabir N. Anaesthesia for laparoscopic surgery. *Br J Hosp Med (Lond)* 2016; **77**: 24-28 [PMID: [26903452](#) DOI: [10.12968/hmed.2016.77.1.24](#)]
- 24 **Hewson DW**, Bedford NM, Hardman JG. Spinal cord injury arising in anaesthesia practice. *Anaesthesia* 2018; **73** Suppl 1: 43-50 [PMID: [29313911](#) DOI: [10.1111/anae.14139](#)]
- 25 **Bamgbade OA**, Oluwale O, Khaw RR. Perioperative Antiemetic Therapy for Fast-Track Laparoscopic Bariatric Surgery. *Obes Surg* 2018; **28**: 1296-1301 [PMID: [29116559](#) DOI: [10.1007/s11695-017-3009-7](#)]
- 26 **Schumann R**, Ziemann-Gimmel P, Sultana A, Eldawlatly AA, Kothari SN, Shah S, Wadhwa A. Postoperative nausea and vomiting in bariatric surgery: a position statement endorsed by the ASMBS and the ISPCOP. *Surg Obes Relat Dis* 2021; **17**: 1829-1833 [PMID: [34462224](#) DOI: [10.1016/j.soard.2021.08.005](#)]
- 27 **Hozumi J**, Egi M, Sugita S, Sato T. Dose of intraoperative remifentanyl administration is independently associated with increase in the risk of postoperative nausea and vomiting in elective mastectomy under general anesthesia. *J Clin Anesth* 2016; **34**: 227-231 [PMID: [27687380](#) DOI: [10.1016/j.jclinane.2016.04.018](#)]
- 28 **Apfel CC**, Philip BK, Cakmakaya OS, Shilling A, Shi YY, Leslie JB, Allard M, Turan A, Windle P, Odom-Forren J, Hooper VD, Radke OC, Ruiz J, Kovac A. Who is at risk for postdischarge nausea and vomiting after ambulatory surgery? *Anesthesiology* 2012; **117**: 475-486 [PMID: [22846680](#) DOI: [10.1097/ALN.0b013e318267ef31](#)]



Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

Telephone: +1-925-3991568

E-mail: office@baishideng.com

Help Desk: <https://www.f6publishing.com/helpdesk>

<https://www.wjgnet.com>

