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Original article

Perioperative outcome of laparoscopic sleeve gastrectomy for high-risk patients

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Abstract

Background: Morbidly obese patients with excessive concomitant disease carry a significantly increased perioperative risk. Although they may benefit most from a bariatric intervention, they are often denied surgery. Laparoscopic sleeve gastrectomy (LSG), as it is less complication-prone than other bariatric procedures, suits the needs of those patients.

Objective: To review the short-term outcome of LSG for high-risk patients

Setting: University hospital, Switzerland.

Methods: A total of 110 patients with high perioperative risk undergoing LSG between January 2008 and December 2014 were prospectively recorded. Patients were defined as "high-risk" if they met 2 of the following criteria: American Society of Anesthesiologists physical status score (ASA) $>$III, Obesity Surgery Mortality Risk Score (OS-MRS) $\geq$4, Revised Cardiac Risk Index (RCRI) class IV, Obstructive Sleep Apnea-Severity Index (OSA-SI) $\geq$5, renal insufficiency chronic kidney disease $\geq$3, liver cirrhosis, or history of life-threatening perioperative events.

Results: Of the patients, 59 (54%) were male. Median age was 49 years (range: 18–69), and median BMI was 51.7 kg/m^2 (38.7–89.2). Median operating time was 65 minutes (27–260). Eighty-six patients (78%) were classified as ASA IV, 65 (59%) as RCRI class IV, 51 (46%) as OS-MRS $\geq$4 and 63 (57%) as OSA-SI $\geq$5. Eighty-nine (81%) had type 2 diabetes, 70 (64%) were under antiplatelet and or anticoagulant therapy. Four patients (4%) were converted to open. Length of stay was 5 days (1–70). Major complications occurred in 12 patients (11%), including 1 mortality (1%).

Conclusion: "High-risk"-patients identified using a combination of established obesity- and co-morbidity-related risk scores profit from LSG as part of a uniform treatment pathway. Given the severity of co-morbidities, LSG can be performed safely. (Surg Obes Relat Dis 2016;X:XXX–XXX.) © 2016 American Society for Metabolic and Bariatric Surgery. All rights reserved. (Surg Obes Relat Dis 2016;▮:00–00.) © 2016 Published by Elsevier Inc. on behalf of American Society for Metabolic and Bariatric Surgery.

Keywords: High risk; Bariatric surgery; Sleeve gastrectomy; Co-morbidity; Adult; Outcome; Cardiac; Liver cirrhosis; Renal insufficiency; Obstructive sleep apnea syndrome; Mortality; Perioperative

Morbid obesity is not only associated with several obesity-related health risks, such as type 2 diabetes (T2D), arterial hypertension and obstructive sleep apnea (OSA), it also aggravates cardiac, liver, and kidney disease [1–3].

Bariatric surgery leads to a significant reduction of weight and associated co-morbidity in the short- and long-term and

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is currently the mainstay in a sustainable treatment of morbid obesity [4]. However, treatment of bariatric patients with a high burden of co-morbidities—obesity-related or not—remains a challenge. Although these patients could profit most from a bariatric procedure, they carry the highest perioperative risk and are therefore often refrained from surgery [5,6].

Outlining this population at highest perioperative risk proves difficult, as the definition of risk varies due to center- and surgeon-specific experiences without uniform treatment strategies [7]. A commonly used risk score in bariatric surgery is the Obesity Surgery Mortality Risk Score (OS-MRS) [8]. It assigns age ≥45 years, body mass index (BMI) ≥50 kg/m^2, male gender, hypertension, and risk factors for pulmonary embolism 1 point and stratifies patients with ≥4 points into the highest risk group with a 12-fold greater mortality than the lowest risk group [9,10]. American Society of Anesthesiologists (ASA) physical status classification system can predict perioperative mortality; in elective surgery, rates up to 3.2% in ASA grade III and 7.3% in ASA grade IV patients are reported [11]. Furthermore, co-morbidity-specific risk scores such as the OSA scoring system (OSA-SI) and revised cardiac risk index (RCRI) can be used [12,13]. In the former—proposed by the ASA task force on perioperative management of patients with OSA—severity of OSA, invasiveness of surgery, and need for postoperative opioids form a score to define a patient group at significantly increased perioperative OSA-related risk. In the latter, patients are included in a group at highest risk for cardiac complications—class IV—if 3 of 6 conditions (high-risk type of surgery, history of ischemic heart disease, congestive heart failure or cerebrovascular disease, preoperative treatment with insulin, and preoperative elevated serum creatinine) are met. The risk of major cardiac events in class IV is as high as 11% [13]. In a cohort study comparing patients undergoing noncardiac surgery, patients with OSA had significantly more complications, a longer length of stay, and intensive care unit-transfers [14]. Chronic kidney disease (CKD) is associated with adverse perioperative outcomes; patients with higher CKD stages (≥3) are at significantly higher morbidity and mortality risks than lower stages after general surgical and abdominal procedures [15]. Liver cirrhosis has a substantial effect on perioperative outcome [16]. Morbidity and mortality rates after bariatric surgery are elevated even in specialized centers; in a review of small series of bariatric surgery in cirrhotic patients the early mortality rate was 1.6%, the complication rate was 21.3%, and the rate of liver decompensation was 6.6%. All surgery-related mortality occurred in malabsorptive procedures such as Roux-en-Y gastric bypass (RYGB) [17].

Laparoscopic sleeve gastrectomy (LSG) has become one of the most commonly performed bariatric operations worldwide [18]. Shorter operative time, absence of anastomoses, maintained anatomy, and decreased technical difficulty are brought in as arguments in favor of this procedure. It therefore suits the needs of high-risk patients, as it is less complication-prone than RYGB [19–21].

In our practice, patients considered as high risk (Table 1) were treated according to a special pathway including intensified preoperative improvement of co-morbidities, enhanced perioperative surveillance, and LSG as a bariatric procedure with minimal surgical trauma.

The aim of this study was to analyze the short-term outcome of those high-risk patients undergoing LSG.

Table 1
Inclusion criteria

Presence of **at least 2** of the following conditions and/or criteria:
• ASA physical status IV
• Revised Cardiac Risk Index Class IV
○ *Presence of ≥2 parameters: history of ischemic heart disease, congestive heart failure, cerebrovascular disease, type 2 diabetes requiring preoperative insulin, chronic kidney disease (creatinine >2 mg/dL)*
• OS-MRS group C
○ *Presence of ≥4 parameters: BMI ≥50 kg/m^2, male gender, arterial hypertension, known risk factors for pulmonary embolism, age ≥45 years*
• OSA scoring system ≥5
○ *Severe OSA (AHI >40) or moderate OSA (AHI 21–40) with Pa_{CO2} >50 mm Hg*
• Renal insufficiency CKD ≥3
○ *Glomerular filtration rate ≤45 mL/min*
• Liver cirrhosis
• History of life-threatening, adverse perioperative event

ASA = American Society of Anesthesiologists; AHI = apnea-hypopnea index; CKD = chronic kidney disease; OSA = obstructive sleep apnea; OS-MRS = obesity surgery mortality risk score.

Patients and methods

Data collection

Data of "high-risk" patients undergoing primary LSG in a university hospital between January 2008 and December 2014 were recorded in a prospective computer database according to a standardized protocol. Patients were selected, treated, and followed up according to the guidelines of the Swiss Study Group for Morbid Obesity. This study was approved by the University of Bern Institutional Review Board.

Definitions

Patients were classified as "high-risk" if they met 2 of following criteria: definition as ASA grade ≥IV by 2 independent anesthesiologists, classification into class IV of RCRI or group C (≥4 points) of OS-MRS [8,13], ≥5 points in OSA-SI [12], history of adverse life-threatening perioperative events, renal insufficiency (CKD stage ≥3) [22], or liver cirrhosis (verified by liver biopsy).