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Original article

Evaluation of the obesity surgery mortality risk score for the prediction of postoperative complications after primary and revisional laparoscopic Roux-en-Y gastric bypass

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Abstract

Background: The Obesity Surgery Mortality Risk Score (OS-MRS) is a validated instrument for mortality risk prediction in patients undergoing laparoscopic Roux-en-Y gastric bypass (LRYGB) procedures classifying patients into low risk (class A), intermediate risk (class B), and high risk (class C).
Objectives: The primary aim of this study was to evaluate the accuracy of the OS-MRS in predicting postoperative complications after LRYGB. Secondarily, the postoperative complication rate between primary and revisional LRYGB was systematically analyzed.
Setting: The Obesity Center Amsterdam, located in a large teaching hospital, in Amsterdam, The Netherlands.
Methods: The OS-MRS was applied to a consecutive database of patients who underwent LRYGB from November 2007 onwards. Postoperative complications were scored according to the Clavien-Dindo classification. Revisional LRYGB was separately analyzed.
Results: LRYGB was performed in 1667 patients either as a primary (81.5%) or revisional (18.5%) procedure. The majority (n = 1371, 82.2%) were female, mean age 44.6 (standard deviation 14.4) years and mean body mass index 44.2 (6.5) kg/m^2. Nine hundred and four (54.2%) were OS-MRS class A, 642 class B (38.5%), and 121 (7.3%) class C. Complications occurred in 143 (10.5%) and 44 (14.2%) patients after primary and revisional surgery, respectively. In both primary and revisional LRYGB, there was no association between complications and the OS-MRS classification. Subanalysis comparing primary with revisional LRYGB found a significant association between revisional surgery and the development of severe complications (Clavien-Dindo ≥ 3) ($P = .003$) and mortality ($P = .017$).
Conclusion: The OS-MRS was not an accurate predictor for postoperative complications in patients who underwent primary or revisional LRYGB. As in other studies, revisional surgery is an independent risk factor for the development of severe complications. (Surg Obes Relat Dis 2016;▮:00–00.)

Keywords: Laparoscopic Roux-en-Y gastric bypass; Obesity Surgery Mortality Risk Score; Complication; Prediction; Clavien-Dindo

Obesity is a major health problem worldwide with 1.9 billion adults being overweight, of which >600 million were obese in 2014 [1]. The only long-term effective treatment for morbid obesity with good long-term results

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is bariatric surgery, which aims to reduce morbidity and mortality caused by morbid obesity and thereby increase quality of life [2]. Although primary bariatric surgery is considered to be relatively well tolerated with significant but decreasing mortality rates (between .04% and 2.0%) in recent decades, postoperative morbidity is still substantial (ranging from 10% short term to 30% long term with an average of 11%) [3–6]. A reliable instrument that predicts postoperative risks could both improve patient education concerning the risks of surgery and provide preventive measures attempting to reduce the postoperative complication risk.

The Obesity Surgery Mortality Risk Score (OS-MRS) was developed a decade ago by de Maria et al. to predict postoperative mortality caused by primary gastric bypass [7,8]. This score predicts mortality based on 5 parameters: body mass index (BMI) $\geq$50, age $\geq$45 years, male gender, hypertension, and risk of pulmonary embolism. The OS-MRS was the first scoring system validated in multiple, independent centers for mortality after laparoscopic Roux-en-Y gastric bypass (LRYGB) and should provide an accurate, risk-adjusted prediction of the mortality due to this procedure [9,10]. Although the OS-MRS was not validated to predict postoperative complications, some authors do use this system for the comparison of patients with complications, as do some (inter)national databases [11,12]. To increase insight into postoperative complications and their consequences, the Clavien-Dindo classification can be used to score the complications in severity [13].

In previous decades, restrictive procedures such as the (laparoscopic) adjustable gastric band became very popular due to the relatively low operative complexity and the assumptive reversibility of the procedure. Although the short-term results were promising, this procedure has several limitations in the long-term, such as band slippage, band erosion, pouch dilation, or esophageal dilation that are reported in 15% to 58% of patients [14–18]. In addition to this complication rate, the long-term weight loss was disappointing [19]. Due to the aforementioned limitations, an increasing number of patients opt for revisional surgery, often into LRYGB or laparoscopic sleeve gastrectomy (LSG). Overall, around 6.3% of bariatric surgical procedures consist of revisional surgery, with the majority undergoing revision into LRYGB [20].

Although revisional surgery in a single-step procedure turns out to be feasible, revisional LRYGB has a higher complication rate than primary LRYGB [21,22].

The aim of the present study is twofold: first, to evaluate the accuracy of the OS-MRS in predicting postoperative complications and second to systematically compare primary LRYGB with its revisional counterpart in a large cohort to evaluate the risks of revisional surgery.

Methods

An electronic database containing all consecutive patients undergoing bariatric surgery at the Obesity Centre Amsterdam, located in a large teaching hospital, the Sint Lucas Andreas Hospital, from November 2007 onward was retrospectively reviewed. All patients met the criteria as described by the International Federation for the Surgery of Obesity and Metabolic diseases [23]. Patients who underwent primary or revisional LRYGB from November 2007 to April 2015 with a minimal follow-up of 1 month were included.

Preoperative screening

All patients were preoperatively screened by a multidisciplinary team, focusing on physical, psychological, and dietary functioning. Furthermore, all patients underwent a poly(somno)graphy to detect obstructive sleep apnea and esophagogastroduodenoscopy to inspect the future remnant stomach, providing the opportunity to treat malignancies or premalignancies before surgery or a feces test to detect and if necessary eradicate *Helicobacter pylori* infection. Patients were preoperatively counseled to quit smoking.

Surgical procedure

LRYGB was performed by 3 experienced bariatric surgeons or under their direct supervision. In case of a revisional operation, the procedure started with removal of the band followed by direct revision. Pneumoperitoneum was obtained. Five trocars (three 12 mm and two 5 mm) were used. The proximal jejunum was identified and the future position of the gastrojejunostomy (GJ) was moved up to assess if a tension-free anastomosis was technically feasible. The pouch was created in the lesser curvature using 1 horizontal and 2 to 3 vertical firings of a 45-mm endoscopic stapler (Johnson & Johnson, Somerville, NY), leading to a pouch size of approximately 30 mL. The Roux limb was tension-free positioned in an antecolic, antegastric fashion. The GJ was stapled with a linear endoscopic stapler. The anterior aspect of the GJ was closed using uninterrupted VICRYL 2.0 (Ethicon, Somerville, NY) or a V-loc (Covidien, Dublin, Ireland). Subsequently, 120–150 cm was measured after which the side to side jejunojejunostomy was made with the linear stapler (the anterior side was closed with absorbable suture material, as previously described) and the connecting loop was transected. In case of a revisional procedure, the portacath was removed before the skin was closed.

Postoperative care

All patients were admitted in the hospital for at least 24 hours postsurgery and returned to the hospital or the 24-hour emergency room if any problems occurred. Both presentations were scored as a complication. Patients with severe sleep apnea (an apnea hypopnea index $>$30), were monitored at the intensive care unit the night after surgery. Nonsteroidal anti-inflammatory drugs (NSAIDs) were replaced by paracetamol or tramadol if necessary to avoid