The American Journal of Surgery (2014) 208, 163-168

The American Journal of Surgery®

Clinical Science

Perioperative outcome of esophageal fundoplication for gastroesophageal reflux disease in obese and morbidly obese patients

Dana A. Telem, M.D.*, Maria Altieri, M.D., Gerald Gracia, M.D., Aurora D. Pryor, M.D.

Division of Laparoscopic, Bariatric and Advanced GI Surgery, Stony Brook University Medical Center, 100 Nichols Road, Stony Brook, NY 11794, USA

KEYWORDS:
Morbid obesity;
Gastroesophageal reflux;
Fundoplication;
Outcomes;
Complications

Abstract

BACKGROUND: To determine the perioperative safety of esophageal fundoplication for gastroesophageal reflux disease (GERD) in patients with body mass index (BMI) $\geq$35 kg/m^2.

METHODS: A retrospective review of 4,231 patients who underwent fundoplication for GERD from 2005 to 2009 was performed. Patients were identified via National Surgical Quality Improvement Program and grouped by BMI $<$ 35 versus BMI $\geq$ 35 kg/m^2. Univariate analysis compared 30-day outcomes.

RESULTS: Of the 4,231 patients, 3,496 (83%) had BMI $<$ 35 kg/m^2 and 735 (17%) had BMI $\geq$ 35 kg/m^2. Mean BMI for each cohort was 27.9 versus 39.1, respectively. Patients with BMI $\geq$ 35 kg/m^2 had significantly longer operative times (129.7 vs 118 minutes, $P < .0001$) and increased American Society of Anesthesiologists scores (2.43 vs 2.3, $P = .001$). The overall complication rate was 1.96%. No difference was demonstrated by BMI in complication rate or hospital length of stay. Increased American Society of Anesthesiologists score, diabetes, black race, longer operative time, and intraoperative transfusion significantly increased postoperative complication rates.

CONCLUSIONS: No increased risk is conferred to morbidly obese patients who undergo fundoplication for GERD management. This study identified independent patient risk factors for postoperative complication following esophageal fundoplication.

Gastroesophageal reflux disease (GERD) is caused by incompetence of antireflux barriers at the gastroesophageal junction that results in acid or alkaline substances refluxing into the esophagus.[1,2] In the past decade, the prevalence of GERD has steadily increased. Parallel to the increase in reflux disease is the increased prevalence of obesity in the United States. Upwards of 35% of the US population are considered obese, with over 20% of the population characterized as

Dr Pryor has ownership interests in Barosense and Transenterix as well as research support from Novadaq and the fellowship council, which are not relevant to this manuscript and thus has no conflict of interest to disclose. Drs Telem, Altieri, and Gracia have no conflict of interests or financial ties to disclose.

This manuscript has been seen and approved by all authors and the material is previously unpublished.

Accepted for poster presentation at the 2013 American College of Surgeons Clinical Congress, October 6 to 10, 2013, Washington, District of Columbia.

* Corresponding author. Tel.: +1-631-444-7989; fax: +1-631-444-6176.

E-mail address: dana.telem@stonybrookmedicine.edu

Manuscript received December 4, 2013; revised manuscript December 25, 2013

0002-9610/$ - see front matter © 2014 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.amjsurg.2014.02.010

Table 1 Preoperative, intraoperative, and postoperative variables recorded

Preoperative	Intraoperative	Postoperative
Demographics	ASA class	Occurrences within 30 days
Age	Intraoperative blood transfusion	Hospital length of stay
Sex	Operative time	Return to OR within 30 days
Ethnicity	Intraoperative occurrence	Postoperative death within 30 days
Height	Cardiac arrest	
Weight	Myocardial infarction	
Preoperative risk assessment	Other (list)	
Comorbidities		
Endocrine disorder		
Pulmonary		
Gastrointestinal/hepatic		
Cardiac		
Vascular		
Renal		
Central nervous system		
Nutritional/immune/other		
Tobacco/alcohol use		

ASA = American Society of Anesthesiologists; OR = operating room.

having class II obesity and higher. Obesity is a well-established risk factor for the development of GERD.[1–3] The pathophysiologic changes attributed to increased reflux in obese patients include disorders of esophageal and gastric motility, increased abdominal pressure, and diminished lower esophageal sphincter pressure.[4]

Initial treatment of GERD focuses on lifestyle modification and medical therapy directed at neutralizing acid. For patients with GERD refractory to medical management or who do not desire lifelong medical therapy, surgical intervention is considered.[5–9] In nonobese patients, fundoplication remains the gold standard of antireflux procedure. For obese patients who qualify, many surgeons recommend roux-en-y gastric bypass (RYGB) in lieu of fundoplication; however, many patients are hesitant to proceed with this option. For morbidly obese patients desiring fundoplication as an antireflux operation, the intraoperative and perioperative safety of this procedure remains uncertain.[10,11] The purpose of this study is to determine the perioperative safety of esophageal fundoplication in the morbidly obese patient.

Methods

Following approval by the institutional review board-approved Surgical Quality Data Use Group, a retrospective review of 4,231 patients who underwent esophageal fundoplication for reflux disease from 2005 to 2009 was performed. Patients were identified via the National Surgical Quality Improvement Program database using current procedural terminology code 43280 for laparoscopic Nissen fundoplication and international classification of diseases code 530.81 for esophageal reflux. Minors, emergent cases, patients with body mass index (BMI) <18 kg/m^2, and patients undergoing concomitant procedures were excluded from the study.

Preoperative, intraoperative, and postoperative variables were recorded. Table 1 demonstrates the variables assessed. Patients were divided into 2 cohorts based on BMI and outcomes were compared. BMI $\geq$ 35 kg/m^2 was chosen as the cutoff as it is the criteria for when a gastric bypass would be considered in lieu of fundoplication in patients with GERD. Outcome assessment compared 30-day postoperative complications including wound infection, pneumonia, unplanned reintubation, pulmonary embolus, ventilator requirement >48 hours, urinary tract infection, acute renal failure, cerebral vascular accident, cardiac arrest, myocardial infarction, bleeding >4 units in the 1st 72 hours, deep venous thrombosis requiring therapy, systemic sepsis, unanticipated return to operating room, and postoperative death within 30 days.

A power analysis was performed. Using $\alpha = .05$, based on sample size, the power of this study is .83 to detect a minimum effect size of 1.5%. The anticipated complication rate in patients with BMI $<$ 35 kg/m^2 was anticipated to be 1.5% versus 3% in BMI $\geq$ 35 kg/m^2. This minimum effect size was selected based on prior literature demonstrating an overall low rate of complications following esophageal fundoplication.[2–6] Statistical analysis was performed by unpaired Student t test with 2-tail distribution for quantitative variables and chi-square test for categorical values using SPSS version 16 (SPSS Inc, Chicago, IL) statistical software. P values of less than .05 were considered to confer significance.

Results

Of the 4,231 patients, 3,496 (83%) had BMI $<$ 35 kg/m^2 and 735 (17%) had BMI $\geq$ 35 kg/m^2. Mean BMI for each cohort was 27.9 kg/m^2 (range 18 to 34.9) versus 39.1 kg/m^2 (range 35 to 56.1), respectively. Comparison of preoperative patient factors demonstrated a significantly increased