

A SURVEY OF PERIOPERATIVE COMPLICATIONS AND SHORT TERM OUTCOME AFTER LAPAROSCOPIC SLEEVE GASTRECTOMY

Thesis

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LIST OF ABBREVIATIONS

AHI	Apnea/hypopnea index
BMI	Body mass index
BPD	Biliary pancreatic diversion
CAD	Coronary artery disease
CPAP	Continuous positive airway pressure
CXR	Chest x-ray
DVT	Deep venous thrombosis
ECG	Electrocardiogram
FDA	Food and Drug Administration
GBP	Gastric bypass
GERD	Gastroesophageal reflux disease
HDL	High density lipoproteins
IBW	Ideal body weight
ICU	Intensive care unit
IDS	Intubation difficulty scale
IQR	Interquartile range
LDL	Low density lipoproteins
LGB	Laparoscopic gastric band
LSG	Laparoscopic sleeve gastrectomy
MAP	Mean arterial pressure
MOP	Morbidly obese patients
NIABP	Non-invasive arterial blood pressure
NASH	Nonalcoholic steatohepatitis
OSA	Obstructive sleep apnea
OSAHS	Obstructive sleep apnea/hypopnea syndrome
OSMR	Obesity surgery mortality risk
PCA	Patient controlled analgesia
PCI	Percutaneous coronary intervention
PE	Pulmonary embolism
PEEP	Positive end-expiratory pressure
PFTs	Pulmonary function tests
RBCs	Red blood cells
SD	Standard deviation
TBW	Total-body weight
VBG	Vertical banded gastroplasty

Abstract

Introduction:

LSG is a popular bariatric operation that has an increasing reputation nowadays. Many studies reported postoperative surgical and metabolic outcomes after LSG. Although this kind of operations is done in patients of high prevalence of medical problems and anesthetic difficulty, no studies to the best of our knowledge reported outcomes of this operation of anesthetic interest.

Methods :

Data were collected prospectively in a seven month period from 150 patients who were included in the study. All airway, respiratory, cardiovascular and other anesthesia related complications were reported as well as surgical outcomes. Possible risk factors for developing perioperative complications were also reported.

Results :

No major anesthesia related complications were reported in our cohort of patients. Three cases(2%) of surgical anastomotic leakage were reported with no mortalities. Four cases(2.6%) of difficult intubation were also reported. Risk factors for incidence of airway complications were gender, weight , BMI , smoking , abnormal chest auscultation , abnormal CXR , mallampati score , obesity surgery mortality risk and STOP-BANG score. Risk factors for incidence of respiratory complications were age, gender, weight, smoking ,dyspnea, abnormal chest auscultation , abnormal CXR, abnormal PFTs, mallampati score , neck circumference, obesity surgery mortality risk and STOP-BANG score .Risk factors

for incidence of cardiovascular complications were abnormal CXR and STOP-BANG score .

Conclusion:

We reported that LSG is done in our hospital with a low incidence of surgical complications and nearly no major anesthetic complication and no mortalities. We consider the operation to be a safe procedure with a good outcome.

Keywords

CXR-BMI-ICU-OSMR- VBG

INTRODUCTION

Morbid obesity possess a medical burden with many comorbidities . Morbid obesity is defined as body mass index (BMI) (calculated as weight in Kilograms divided by the square of height in meters) $\geq 40 \text{ kg/m}^2$, or $\geq 35 \text{ kg/m}^2$ in presence of comorbidities. Morbid obesity is a common health problem with decreased life expectancy especially in patients with BMIs above 40 kg/m^2 .⁽¹⁾

Surgery should be considered as a treatment option for patients with a BMI of 40 kg/m^2 or greater who instituted but failed an adequate exercise and diet program (with or without adjunctive drug therapy) and who present with obesity-related comorbid conditions such as hypertension, impaired glucose tolerance, diabetes mellitus, hyperlipidemia and obstructive sleep apnea where the stomach is reduced to about 15% of its original size.⁽²⁾

Minimal surgical complications were reported after LSG such as staple line leak, strictures, gastrointestinal bleeding, port-site hemorrhage, acute cholecystitis, prosthetic heart valve complications and inability to tolerate oral intake resulting in dehydration. Reoperation rates after LSG was 2% with minimal perioperative deaths.⁽³⁾⁽⁴⁾

Although outcome and complications of bariatric surgery were reported in the last few years in many centers however most studies for the outcome of LSG were mainly concerned of the surgical outcome and complications.⁽⁵⁾

The aim of our study is to report the incidence of perioperative complications focusing on those of anesthetic interest and to identify the risk factors associated with perioperative adverse events.

Chapter 1 :Obesity

Globally obesity was considered a rarity until the middle of the 20th century.^[6] Today, a significant proportion of the adult population suffers from obesity.^[7] Obesity and its associated health concerns now represent major causes of morbidity and mortality and have an enormous impact on health care spending. It is second only to smoking as a preventable cause of death.^[8]

Obesity can be defined as a “disease” because it is a physiologic dysfunction of the human being with environmental, genetic, and endocrinologic causes.^[8]

Obesity most frequently develops when food calorie intake exceeds energy expenditure over a long period. Factors influencing obesity involve energy intake or expenditure (or both) and are influenced by genetic, behavioral, cultural, and socioeconomic factors. The body mass index (BMI) has become the most widely applied classification tool used to assess individual weight status. BMI is defined as the patient's weight, measured in kilograms, divided by the square of the patient's height, measured in meters, which yields a measurement bearing the unit kg/m^2 . Using this system, patients are classified according to BMI, and the associated risk of health problems developing is shown in (Table 1) . As BMI increases beyond normal weight, the risk of serious health problems developing rises greatly (Table 2). Malnourishment and malnutrition are commonly offered as explanations for the fact that underweight patients are also at increased risk for contracting illnesses.^[9]

Table 1 : Levels of Risk Associated with Increasing Body Mass Index⁽¹⁰⁾

Classification	BMI (kg/m ²)	Risk of Health Problems Developing
Underweight	<18.5	Increased
Normal weight	18.5-24.9	Least
Overweight	25.0-29.9	Increased
Obese		
Class 1	30.0-34.9	High
Class 2	35.0-39.9	Very high
Class 3	40.0-49.9	Extremely high
Superobese	≥50	Exceedingly high

Table 2 : Waist Circumference and Risk⁽¹⁰⁾

Waist Circumference	Body Mass Index (kg/m ²)		
	Normal Weight	Overweight	Obese Class 1
<102 cm (♂)	Least risk	Increased risk	High risk
<88 cm (♀)			
≥102 cm (♂)	Increased risk	High risk	Very high risk
≥88 cm (♀)			

Specific diseases are commonly associated with obesity and obesity is often accompanied by multiple comorbid states as shown in table (3). As a result of these concomitant conditions, obesity is also associated with early death.^[4] Of the health risks listed in table (3) , metabolic syndrome and OSA merit additional attention because they pose special concerns for the anesthetic care of the obese population.^{[11] [12] [13]}

Table 3 : Health Risks Associated with Increasing Body Mass Index⁽¹⁰⁾

Metabolic syndrome	30% of middle-aged people in developed countries have features of metabolic syndrome
Type 2 diabetes	90% of type 2 diabetics have a BMI > 23 kg/m ²
Hypertension	5× the risk with obesity
	66% of hypertension is linked to excess weight
	85% of hypertension is associated with a BMI >25 kg/m ²
Coronary artery disease and stroke	3.6× the risk for coronary artery disease for each unit change in BMI
	Dyslipidemia progressively develops as BMI increases from 21 kg/m ² with a rise in small-particle low-density lipoprotein
	70% of obese women with hypertension have left ventricular hypertrophy

	Obesity is a contributing factor to cardiac failure in >10% of patients
	Overweight/obesity plus hypertension is associated with an increased risk for ischemic stroke
Respiratory effects	Neck circumference >43 cm in men and >40.5 cm in women is associated with obstructive sleep apnea, daytime somnolence, and development of pulmonary hypertension
Cancer	10% of all cancer deaths among nonsmokers are related to obesity (30% of endometrial cancers)
Reproductive function	6% of primary infertility in women is attributable to obesity
	Impotency and infertility are frequently associated with obesity in men
Osteoarthritis	Frequent association in the elderly with increasing body weight—the risk of disability attributable to osteoarthritis is equal to that for heart disease and greater than that for any other medical disorder of the elderly
Liver and gallbladder disease	Overweight and obesity are associated with nonalcoholic fatty liver disease and NASH; 40% of NASH patients are obese and 20% have dyslipidemia
	3× the risk for gallbladder disease in women with a BMI >32 kg/m ² ; 7× the risk if the BMI >45 kg/m ²

BMI, body mass index; NASH, nonalcoholic steatohepatitis.

Complications of obesity of anesthetic importance:

1- Obstructive Sleep Apnea/Hypopnea Syndrome

OSA and obstructive sleep hypopnea are related conditions characterized by recurrent episodes of upper airway obstruction occurring during sleep . OSA is defined as complete cessation of airflow during breathing lasting 10 seconds or longer despite maintenance of neuromuscular ventilatory effort and occurring five or more times per hour of sleep, accompanied by a decrease of at least 4% in SaO_2 . Obstructive sleep hypopnea is defined as partial reduction of airflow of greater than 50% lasting at least 10 seconds, occurring 15 or more times per hour of sleep, and accompanied by a decrease of at least 4% in SaO_2 . The diagnosis can be made only in patients who undergo polysomnography. The results of polysomnography are reported as the apnea/hypopnea index (AHI), which is derived from the total number of episodes of apnea and hypopnea divided by the total sleep time. Most sleep centers commonly use an AHI of between 5 and 10 events per hour as a normal limit.^[14]

The severity of obstructive sleep apnea/hypopnea syndrome (OSAHS) is defined arbitrarily, but a recent recommendation for classification of the disease is as follows^[14]:

Mild disease—AHI of 5 to 15 events per hour

Moderate disease—AHI of 15 to 30 events per hour

Severe disease—AHI of greater than 30 events per hour