## Laparoscopic Metabolic Surgeries

Essay

Submitted for Partial Fulfillment of Master Degree in General Surgery.

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### List of Abbreviations

**AGB** : Adjustable gastric band

**ACCP** : American college of chest physicians

**BS** : Bariatric surgery

**BPD**: Biliopancreatic diversion

**BPD/DS**: Biliopancreatic diversion with duodenal

switch

BIB : BioEntericsintragastric balloon

**BP** : Blood pressure

**BMI** : Body mass index

**CVD** : Cardiovascular Diseases

**CT** : Computed tomography

**CHD** : Congestive heart failure

**CHAOS**: Coronary heart disease, hypertention,

atherosclerosis, obesity and stroke

**DGRY**: Derivation gastrojejunal Roux-en-Y

**DM** : Diabetes mellitus

**DJBS**: Duodenojejunal bypass sleeve

**EWL** : Excess weight loss

**GI** : Gastro intestinal

**GE** : Gastroesophageal

GIB : Gastrointestinal bleedingGRY : Gastrojejunal Roux-en-Y

GJ : Gastro-jejunostomy

**GSHS**: Global School-based Student Health Survey

**GLP-1** : Glucagon like peptide - 1

**GIP** : Glucose-dependent insulinotropic peptide

#### 🕏 List of Abbreviations 🗷

**HDL**: High density lipoprotein

**HDL-C**: High density lipoprotein cholesterol

**HTN**: Hypertension

**IT** : Ileal transposition

**IHD** : Ischemic heart diseases

**LAGB**: Laparoscopic adjustable gastric band

**LMGB**: Laparoscopic mini gastric bypass

**LRYGB**: Laparoscopic Roux-en-Y gastric bypass

**LSG**: Laparoscopic sleeve gastrectomy

**LDL** : Low density lipoprotein

**METS** : Metabolic syndrome

**MGB** : Mini gastric bypass

**MO** : Morbid obesity

**NCEP**: National cholesterol educational program

**NHLBI**: National Heart, Lung and Blood Institute

**NIH** : National institute of health

**NICE**: National Institute of Health and Clinical

Excellence

**NEFA**: Non estritified free fatty acids

**OSA** Obstructive sleep apnea

**PTH** : Parathyroid hormone

**PYY** : Peptide YY

**PA** : Physical activity

PAI : Plasminogen activator inhibitor

**POD** : Post-operative day

**RRYGB**: Robotic Roux-en-Y gastric bypass

**RYGB** : Roux-en-Y gastric bypass

#### E List of Abbreviations &

**SADI-S**: Single anastomosis duodenoileal bypass with

sleeve gastrectomy

**SAS** : Sleep apnea syndrome

**SG** : Sleeve gasterctomy

**IDF** : The international diabetes foundation

**SASI** : The single anastomosis sleeve ileal bypass

**TAF1**: Thrombin activatable fibrinolysis inhibitor

**TG** : Triglycerides

**US** : United States

**UGI**: Upper gastrointestinal

**VTE**: Venous thromboembolism

**VBG** : Vertical banded gastroplasty

**VLDL** : Very low density lipoprotein

**Vit** : Vitamin

**WHO**: World Health Organization

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#### **Abstract**

It has been estimated that 190 million people worldwide have diabetes mellitus (DM) and it is likely that this will increase to 324 million by 2025. This epidemic is taking place both in developed and developing countries and the combination of DM, obesity, and metabolic syndrome is now recognized as one of the major threats to human health in the 21<sup>st</sup> century.

Roux-en-Y gastric bypass (RYGB) is the most commonly performed bariatric operation, ameliorates virtually all obesity-related comorbid conditions, the most impressive being a dramatic resolution of type 2 DM (T2DM). After RYGB, 84% of patients with T2DM experience complete resolution, and virtually all have improved glycemic control. Increasing evidence indicates that the impact of RYGB on T2DM cannot be explained by the effects of weight loss and reduced energy intake alone.

Potential mechanisms underlying that direct antidiabetic impact of RYGB include increased lower intestinal hormones as glucagon-like peptide-1 (GLP-1), altered physiology from excluding ingested nutrients from the upper intestine, and other changes yet to be fully characterized. Research aimed at determining the relative importance of these effects and identifying additional mechanisms promises not only to improve surgical design but also to identify novel targets for antidiabetic medications.

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**Key words:** diabetes mellitus, metabolic syndrome, Roux-en-Y gastric bypass, glucagon-like peptide-1, Obesity, Bariatric surgery.

#### Introduction

It has been estimated that 190 million people worldwide have diabetes mellitus (DM) and it is likely that this will increase to 324 million by 2025. This epidemic is taking place both in developed and developing countries and the combination of DM, obesity, and metabolic syndrome is now recognized as one of the major threats to human health in the 21<sup>st</sup> century (*Geloneze*, 2008).

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characterized. Research aimed at determining the relative importance of these effects and identifying additional mechanisms promises not only to improve surgical design but also to identify novel targets for antidiabetic medications (*Thaler and Cummings*, 2009).

The effect of purely restrictive procedures in improving glucose control is directly proportional to the degree of weight loss (*Mingrone*, 2008).

Two hypotheses have been proposed to explain the early effects of bariatric surgery on T2DM, the hindgut hypothesis and the foregut hypothesis (*Mingrone and Castagneto-Gissey*, 2009).

Rubino and Marescaux have developed an experimental animal model with duodenal exclusion. A surgery with only two anastomoses was performed on rats of the Goto-Kakizaki species, the most widely used animal model of nonobese T2DM. A duodeno-jejunal bypass and a simple enteroenteric anastomosis was performed, preserving the gastric volume (*Pitompo*, 2008).

The continual advances in our knowledge of the pathogenesis and hormonal disorders of morbid obesity lead to the development of new technical options. In Europe, multinational studies are being assembled to look

at a procedure called ileal transposition (IT). First described by Koopmans and Sclafani in 1981. This procedure has actually been proposed as being potentially useful in treating glucose intolerance related to obesity because of the potential for increasing GLP-1 secretion (*Strader et al.*, 2004).

### Aim of the work

The aim of this work is to discuss the metabolic syndrome and its pathophysiology, with special focus on the role of minimally invasive laparoscopic procedures in the management of this syndrome.