Effects of bariatric surgery on non insulin Dependent Diabetes Mellitus

Essay
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By

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Contents

Introduction

Obesity is a major health problem worldwide. An estimated 66% of American adults are overweight, defined as a BMI of more than 25 kg/m2. Half of these are obese (BMI>30 kg/m2), and nearly 5% have clinically severe obesity (term preferred to morbid obesity, with BMI>40 kg/m2***)(Ogden CL, et al.2006*****).**

Multiple chronic diseases are associated with obesity, including type 2 diabetes mellitus, hypertension, dyslipidemia, metabolic syndrome, coronary heart disease, ischemic stroke, nonalcoholic steatohepatitis (NASH) ,polycystic ovarian syndrome, respiratory disease (sleep apnea and obesity-hypoventilation syndrome), gallbladder disease, musculoskeletal disease,and certain cancers .***(KatherineJ et al., 2009)***

Type 2 diabetes mellitus (DM) has now reached epidemic proportions affecting 246 million people worldwide, and it is expected to affect 380 million by 2025**.** Diabetes now touches nearly 24 million lives in the United

States, with an increase of more than 3 million predicted to occur in approximately 2 years. According to new 2007 prevalence data, another 57 million people are estimated to have prediabetes ***(Samuel coffin et al., 2009)***

Bariatric procedures were initially classified as restrictive, malabsorptive, or combined, reflecting the purported mechanism of weight loss ***(Rubino F, et al. 2006***)

Restrictive procedures, such as laparoscopic adjustable gastric banding (LAGB) and vertical banded gastroplasty (VBG), greatly reduce the volume of the stomach to decrease food intake and induce early satiety. Malabsorptive procedures, such as biliopancreatic diversion (BPD), shorten the small intestine to decrease nutrient absorption. Combined procedures, such as the Roux-en-Y gastric bypass (RYGB), incorporate both restrictive and malabsorptive elements**.(*Murphy MA, et al. 2006*)**

There is now considerable evidence that operations previously performed as weight-loss procedures are able

to induce long-term diabetes remission in most cases (***Sjostorm L, et al. 2004***)

In ameta-analysis of 22 094 type 2 diabetic patients undergoing gastrointestinal bypass surgery for morbid obesity, showed a greater than 80% complete resolution of diabetes. Gastrointestinal bypass procedures such as Roux-en-Y gastric bypass (RYGB) and biliopancreatic diversion (BPD) demonstrate 83.7 and 98.9% complete resolution of diabetes compared with restrictive procedures such as laparoscopic adjustable gastric band, which achieves 47.9% resolution.(***Buchwald H, et al. 2004***)

Glycemic control in diabetic patients improves markedly within days of bariatric surgery, which suggests that the procedures alter the hormones that control insulin secretion (***Rubino F,et al. 2006***).

The majority of obese patients who undergo selected types of bariatric surgery experience resolution of type 2 diabetes and enjoy normal blood glucose and

glycosylated hemoglobin levels,with discontinuation of all diabetes-related medications.(***Buchwa d H, et al.2004***)

There have been many hypotheses concerning the mechanism of surgical resolution of diabetes. Weight loss, decreased caloric intake, malabsorption, the early delivery of nutrients to the distal small intestines and the exclusion of the proximal intestine have all been proposed as possible explanations(***Gumbs AA, et al.2005***)

Aim of work

This work aims to evaluat the effect of bariatric surgery on non insulin dependent diabetes mellitus (type 2 diabetes mellitus)

Anatomy of the stomach

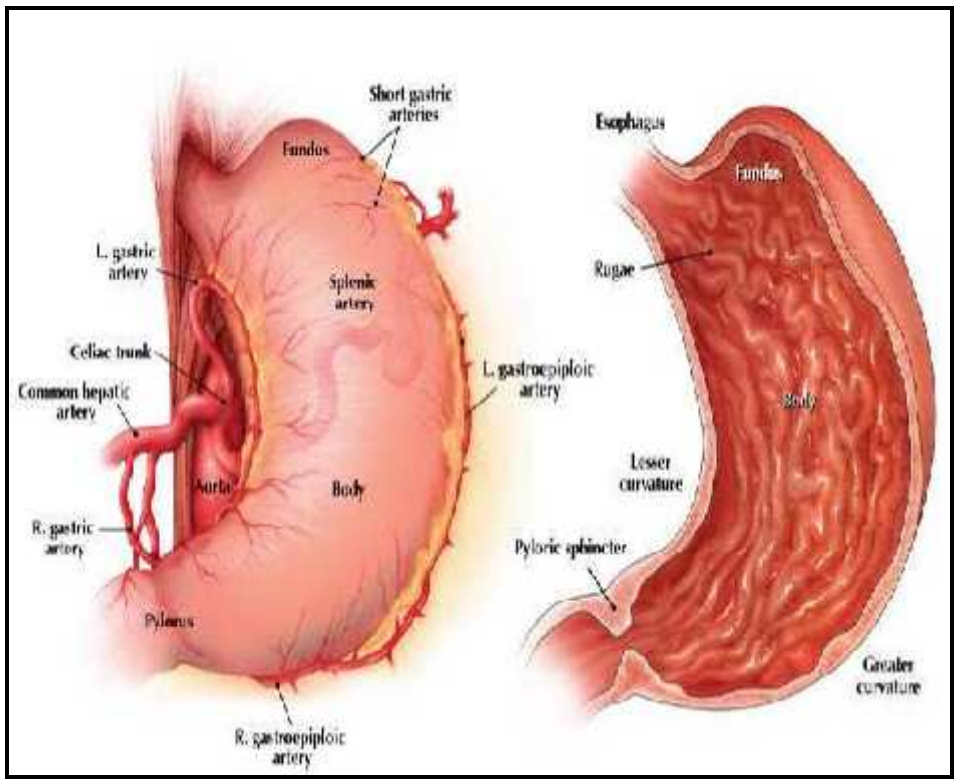

Fig. (1): Anatomy of stomach

The stomach is roughly J-shaped structure occupies the epigastrium and left hypochondrium regions. ***(Snell, 2004)***

***** Both shape and size of the stomach vary greatly as follows:***

It tends to be high and transverse in the "short" obese persons, and "elongated" in thin persons, even in the

same person, the shape depends on three factors; fullness, body position and phase of respiration ***(Snell, 2004).***

** The **stomach is divided into four parts;**

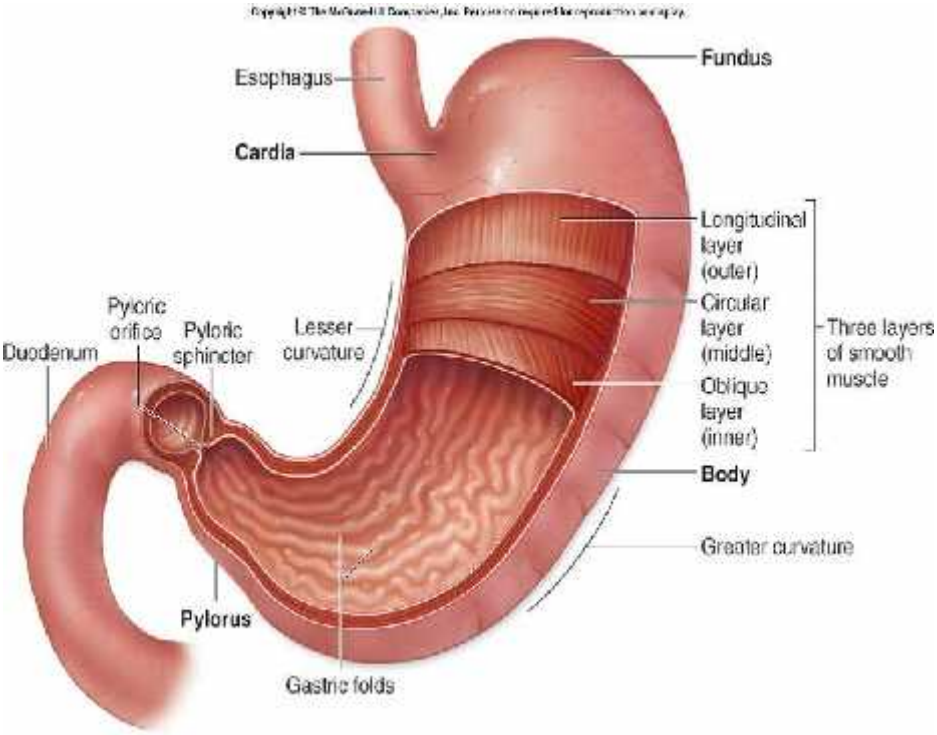

Fig. (2): Parts of stomach:

The cardiac orifice** is rather fixed and lies in the upper part of the epigastrium in contact with the left lobe of the liver ***(Keith moor and Arthur Dalley, 1999).

****Pyloric part** itself is divided in to antrum (Proximal dilated part), canal (distal narrow tail) and sphincter (which surrounds the pyloric orifice). ***fundus** is

the dome-shaped part of the stomach, which projects to the left and above a horizontal line from the cardiac orifice to the greater curvature ***(Neil Borley, 2005)***.

****The lesser curvature:*** it forms the right border of the stomach; it extends from the right side of the cardiac orifice to the upper border of the pylorus. The lowest part of the lesser curvature is represented by a notch called incisura angularis. The right and left gastric vessels run along lesser curvature. ***(Neil Borley, 2005)***.

****Greater curvature;*** It forms the convex left and lower border of the stomach, at the left and upper part of the greater curvature the fundus of the stomach is connected to the spleen by the gastrosplenic ligament, while from the rest of the greater curvature the greater omentum descends to reach the transverse colon ***(Neil Borley, 2005)***.

***Body of the stomach** is a region between the fundus and incisura angularis on the lower part of lesser curvature to the greater curvature.

****Surfaces and peritoneal coverings:***

The stomach has two surfaces; anterior and posterior, which are covered by peritoneum except a small triangular area in the posterior surface near the cardiac,

and where the stomach is directly related to the left crus of the diaphragm which is called **"bare area of the stomach"** ***(Snell, 2004)***.

The stomach is related to the greater sac of peritoneum in front and to the lesser sac behind ***(Snell, 2004).***

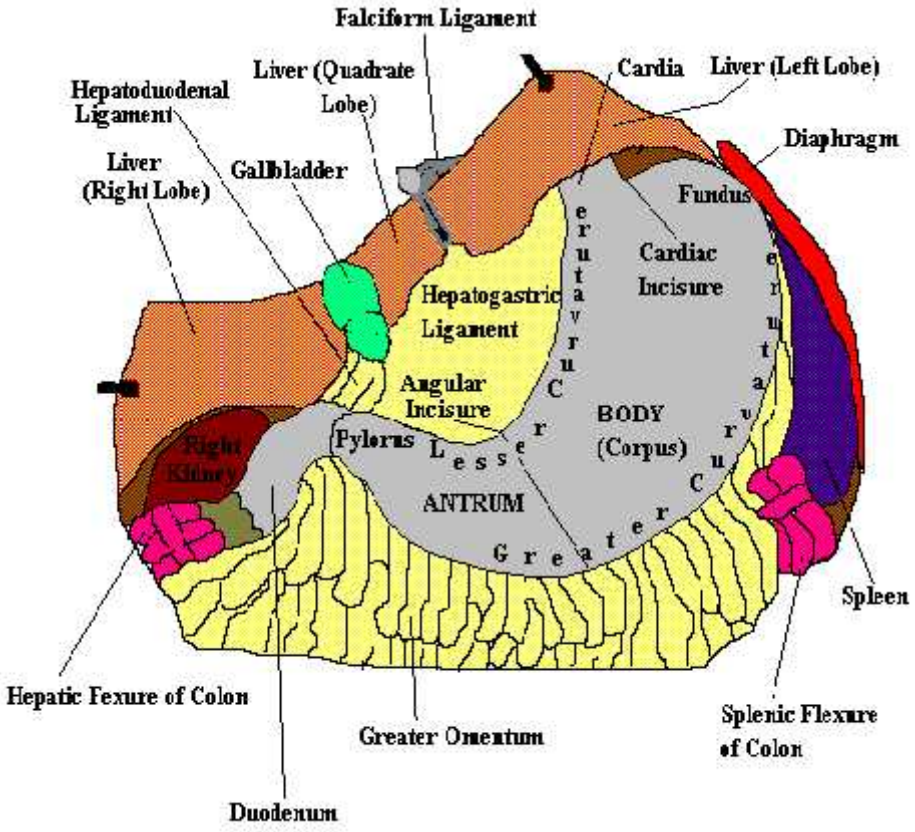

Fig. (3): Surfaces and peritoneal coverings:

Relations of the stomach:

**** Antero-superior surface is subdivided to:***

Fundus,** related to heart and pericardium. Left lobe of the liver is at direct contact with the anterior surface over a narrow area adjoining the lesser curvature ***(Neil Borley, 2005).

****The lower and right part** of the anterior surface lies at direct contact with the anterior abdominal wall in the region of the upper part of the left rectus muscle and linea Alba ***(Neil Borley, 2005)***.

*****The upper and left part** of the anterior surface lies under cover of the left costal margin and is in contact with left half of the diaphragm, which separates this part of the stomach from the left pleura and base of the left lung.

*****Relations of the Postero-inferior surface:***

Which forms a large part of the anterior wall of the lesser sac of the peritoneum. The cavity of the lesser sac separates the posterior surface of the stomach from many

structures, which together form what is usually known as the stomach bed. There are 8 structures arranged in this order from below upwards; transverse colon, transverse mesocolon, body of pancreas, Splenic artery, upper part of the left kidney, left suprarenal gland, Spleen and left crus of diaphragrn ***(Neil Borley, 2005).***

Blood Supply of the stomach*:*

****Arterial blood -supply***

The stomach is richly supplied with arteries either from the celiac trunk itself, or from its branches. Five arteries supply the stomach; **left and right gastric artery**, **right and left gastroepiploic arteries and short gastric arteries** ***(Neil Borley, 2005)***.

*****Venous drainage:***

Veins, which correspond to the arteries, drain into the portal circulation. **Right and left gastric veins** drain into the portal vein itself. **The left gastroepiploic and short gastric veins** join the splenic vein**. The right gastroepiploic** vein drains into the superior mesenteric vein ***(Neil Borley, 2005)***.