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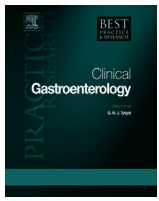

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Laparoscopy for primary and secondary bariatric procedures

Matthias Lannoo, MD, PhD student [a,*], Bruno Dillemans, MD [b,1]

[a] Department of Abdominal Surgery, University Hospitals, Leuven, Belgium
[b] Department of Abdominal Surgery, AZ Sint Jan, Bruges, Belgium

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A B S T R A C T

Recently obesity has been defined as a disease and has turned bariatric surgery into a part of a chronic illness management. Obesity induces several comorbidities leading to cardiovascular disease and mortality. The effects of bariatric surgery on these comorbidities used to be classified as weight-loss induced. However bariatric surgery has recently been termed metabolic surgery because of the suspected direct, weight loss independent effect of bariatric procedures on the physiopathological mechanisms causing excess fat storage and insulin resistance. This review describes the standard procedures commonly performed and their specific outcomes on metabolic diseases in order to work towards more patient tailored treatment of obesity and to reduce side effects. Furthermore this review focuses on gaps in understanding the pathogenesis of obesity and its treatment with bariatric surgery. Surgery failures as well as new techniques are discussed and evaluated.

Introduction

At its 2013 Annual Meeting the American Medical Association (AMA) has finally conceded that ‘obesity has to be classified as a disease’. It is a genetic disease whose phenotype is completely dependent on the presence of an easy accessible, abundant quantity of food. In some cases a second hit

* Corresponding author. Tel.: +32 16 34 42 65.
E-mail addresses: Matthias.lannoo@uzleuven.be (M. Lannoo), bruno.Dillemans@azsintjan.be (B. Dillemans).
[1] Tel.: +32 50 45 25 60.

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trigger in the form of a live event is necessary [1]. This trigger can already occur in foetal life with child obesity as a consequence [2]. Apart from a number of monogenetic syndromes, knowledge of the causal genetic defects is very limited due to the large number of genes simultaneously involved together with an even larger partition of epigenetic phenomena [3].

The most obvious characteristics of the phenotype are the overall presence of large fat deposits as a result of a hyperplasia and hypertrophy of fat cells storing a large quantity of free fatty acids. In many patients this condition results in the development of the 'metabolic syndrome' with hypertension, type 2 diabetes dyslipidemia, gastro-oesophageal reflux disease, steatohepatitis and, finally, end-stage cardiovascular disease and early death.

These fat deposits are specialized in self-preservation through neuronal and hormonal mechanisms altering food intake, food processing and usage of the energy delivered. Food intake is controlled by two complementary regulation systems, the homeostatic system adapting energy delivery to energy needs and the hedonic system controlling rewarding mechanisms related to food consumption. The homeostatic system modulates insulin sensitivity, beta cell function basal metabolism, heat production, food thermogenesis. Fasting can modulate the hedonic system [4].

These new insights in the pathogenesis of obesity as well as the development of the laparoscopic approach has been changing bariatric surgery in several ways:

- Nearly complete shift from open to laparoscopic approach.
- Increase in the more physiological procedures at the cost of the more mechanic restrictive procedures.
- The choice of type of procedure is less a matter of the patient or dependent on the surgeon's expertise but more for the multidisciplinary team, based on the comorbidities and psychosocial state of the individual patient.
- Surgery is no longer a stand alone procedure but a therapeutic module in a multidisciplinary chronic illness management model for the treatment of obesity.

Laparoscopy has rendered open bariatric surgery obsolete

As no other sub discipline in abdominal surgery, bariatric surgery worldwide has implemented laparoscopy on a vast scale. Currently bariatric surgery is by laparoscopy in more than 90% usage of cases. This is because of the added value for both the patient and the surgeon [5].

For the patient laparoscopy reduced operative time, postoperative pain and duration of immobility. These are all determining factors for pulmonary complications such as atelectasis, pneumonia and lung embolism. For the surgeon laparoscopy offers better exposure which facilitates the creation of an optimal gastric pouch, the placement of a band or sleeve resection. This is especially important in patients with extreme obesity [6]. Buchwald et al reported lower mortality in the laparoscopic approach, reduced incidence of wound complications and incisional hernias and conclude laparoscopy is the preferred approach [7].

Technique of most common procedures

Laparoscopic gastric banding

Currently given the lower rates of band erosion with the pars flaccida technique, in which the band is placed around the mesentery of the smaller curvature of the stomach, is uniquely implemented. A point just lateral of the angle of Hiss is identified and the peritoneum is opened and this will be the endpoint of the retrogastric dissection. This dissection starts through the pars flaccida component over the lowermost aspect of the right crus of the diaphragm where the peritoneum is opened. The dissection continues anterior of both crus to arrive on the greater curvature aspect of the stomach at the site of prior dissection at the angle of Hiss. The band, after is brought intra-abdominal through a 12 mm trocar, is grasped and drawn behind the stomach with the grasper at the end of the tubing and closed. The tubing is brought outside and the port-a-cath is fixed on the fascia in the left upper quadrant of the abdomen [8].