Sleeve Gastrectomy After Failed Laparoscopic Gastric Band

A Thesis

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By

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TABLE OF ABBREVIATIONS

Abbreviation	Meaning
BMI	Body mass index
BPD	Biliopancreatic diversion
BPD-DS	Bilio-pancreatic diversion with duodenal switch
CT	Computerized tomography
DM	Diabetes mellitus
EWL	Excess weight loss
GB	Gastric banding
GERD	Gastroesophageal reflux disease
GLP	Glucagon like peptide
HDL	High density lipoprotein
LAGB	Laparoscopic adjustable gastric banding
LESP	Lower esophageal sphincter pressure
LSG	Laparoscopic sleeve gastrectomy
MDT	Multidisciplinary team
MGB	Minigastric bypass
POD	Post-operative day
Qol	Quality of life
RCT	Randomized controlled trial
RYGB	Roux-en-Y gastric bypass
SAGB	Swedish adjustable gastric banding
TGs	Triglycerides
VBG	Vertical banded gastroplasty

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INTRODUCTION

Bariatric surgery remains the most effective treatment leading to substantial long-term weight loss, improvement or resolution of co-morbidities, and even reduced mortality rates ***(Schauer et al., 2017)***.

Laparoscopic adjustable gastric banding (LAGB) is the least invasive bariatric procedure involving the engagement of an inflatable band device around the proximal stomach to modulate the amount of food intake ***(Willcox et al., 2016)***.

At first, LAGB gained popularity due to perception of reversibility, significant and rapid weight loss, resolution of co-morbidities and low operative morbidity rates. However, prolonged follow-up revealed unsatisfactory weight loss in approximately 30–50% of cases. Additionally, complications such as band slippage, erosion, and pouch or oesophageal dilatation necessitated revision in up to 20% of patients. Although safe, re-banding demonstrated poor results in terms of further weight loss following surgery ***(Lazzati et al., 2017)***.

Hence, the demand for other bariatric surgeries as a revision to failed LAGB is continuously increasing. Although revisional surgery poses a greater surgical challenge and is associated with increased complication rates compared to primary bariatric surgery, a number of bariatric procedures were shown to be safe and effective following failed LAGB. These include laparoscopic Roux-en-Y gastric bypass (RYGB), biliopancreatic diversion (BPD), duodenal switch (DS), and laparoscopic sleeve gastrectomy (LSG) ***(Fielding, 2018)***.

Laparoscopic sleeve gastrectomy consists of resecting the greater curvature of the stomach, forming a vertical sleeve of the residual stomach portion. Laparoscopic sleeve gastrectomy (LSG) was initially devised as the first step of the duodenal switch procedure but is increasingly offered as a primary

independent bariatric operation and also as a revision procedure for failed LAGB ***(Janik et al., 2019)***.

Although a number of studies have described this procedure as a revision option for patients who have failed LABG, the majority of these studies have performed this procedure only on selected elective patients and often as staged procedures with band removal followed by sleeve gastrectomy at a later date ***(Bernante et al., 2006)***.

Increasingly gaining popularity as a standalone operation, this procedure provides similar outcomes to gastric bypass with regard to weight loss and comorbidity improvement/resolution yet is less technically challenging. Recently, a number of studies examined the benefits of LSG as a revisional surgery following failed LAGB in comparison to RYGB. Nevertheless, the surgery of choice following removal of gastric banding is yet undetermined ***(Janik et al., 2019)***.

In this study, we report a series of patients in whom LAGB was converted to LSG as revisional bariatric operation.

AIM OF WORK

We aim at re-assessing the safety and outcome of conversion of failed LAGB to LSG as regard:

A- Operative time & intra-operative complications.

B- Post-operative complications (leakage & bleeding).

C- Assessment of weight loss after one month & 6 months and one year.

Adjustable Gastric Banding

Introduction

Gastric banding is one of the so-called restrictive procedures in bariatric surgery. The aim is to limit the size of the stomach to a small pouch, which is created by tightening the gastric band. At first the idea of restricting the size of the stomach was carried out by performing gastroplasty. This procedure however was irreversible and the laparoscopic procedure faced major technical difficulties. Also, the band was not adjustable, which is why this procedure is hardly performed anymore and has been replaced by adjustable gastric banding ***(Clark et al., 2018)***.

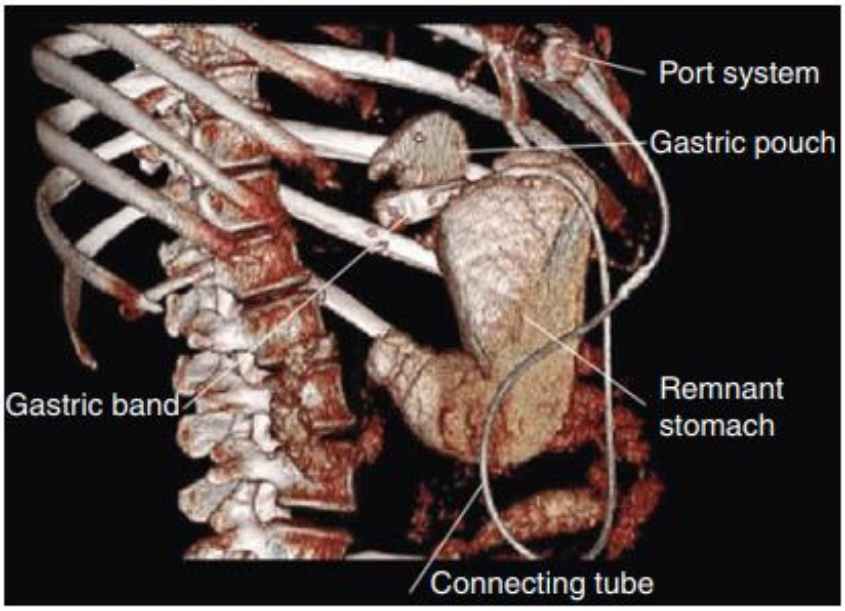

Figure (1): CT-reconstruction of a gastric band ***(Korenkov et al., 2012)***.

Today inflatable adjustable bands are usually chosen. A silicone ring with a soft inflatable balloon inside is connected to an access port just under the skin via a small tube. The band is then adjusted by injecting saline through the port. The most popular bands are the Lap-Band (Allergan) and the SAGB (Ethicon) ***(Korenkov et al., 2012)***.

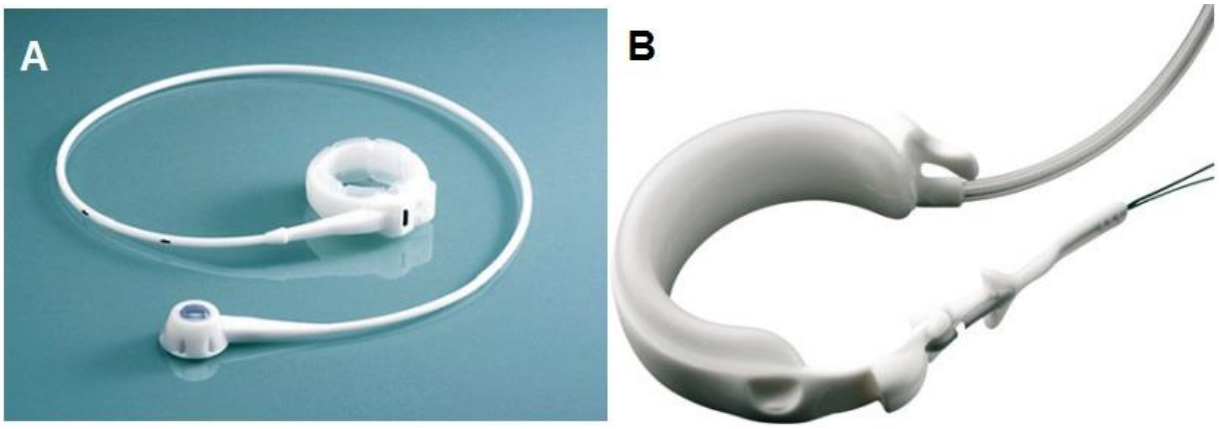

Figure (2): (A) Lap-band (courtesy of Allergan). (B) SAGB (courtesy of Ethicon) ***(Korenkov et al., 2012)***.

Frequent problems occur concerning the port (port rotation, leakage, difficult injections, pain around the port, exposure to radiation etc.) which is why better ports are developed today or alternatively remote adjustable gastric bands, which are tested in clinical trials at the time ***(Ren-Fielding and Allen, 2015)***.

Figure (3): Remote adjustable Gastric band (courtesy of Allergan). (1) A control unit sends energy and information telemetrically to the easyband through magnetic induction. (2) Antenna: magnetic induction is sent to the antenna, which is connected to the easyband. (3) A microchip saves the adjustments of the easyband ***(Korenkov et al., 2012)***.

The first to place an adjustable gastric band was Belachew (1983). His technique is referred to as the perigastric pathway. A higher rate of intraoperative complications (i.e., stomach perforation) and band related complications (i.e., slippage or band migration) was observed, however. The method was therefore abandoned in favor of the pars-flaccida approach. There are only a few occasions when the perigastric pathway may be preferable ***(Clark et al., 2018)***.

Role of gastric banding in other bariatric surgeries

Even though the laparascopic placement of an adjustable gastric band is considered to be one of the simpler bariatric procedures, there still are several technical difficulties and pitfalls. The addition of an adjustable gastric band to Roux-en-Y gastric bypass and sleeve gastrectomy has been reported to be a useful revision strategy in a small series of patients with inadequate weight loss after proximal gastric bypass ***(O'Brien and Dixon, 2007)***.

Surgical technique

This operation has undergone several phases in its evolution. Certain principles are currently fairly standard. The upper gastric pouch (the "virtual pouch") is made very small, approximately 15 mL in volume, and is placed primarily anteriorly. A minimal posterior dissection is carried out above the peritoneal reflection of the bursa omentalis, at a level where the esophagogastric junction and the immediately adjacent stomach are fixed to the crura of the diaphragm ***(Cobourn and Dixon, 2016)***.

The dissection on the lesser curvature includes the neurovascular bundle of the lesser omentum—the pars flaccida approach. This approach has superceded the technically more difficult perigastric approach and is associated with a lower rate of gastric prolapse. A combined technique also has been described, consisting of an initial pars flaccida dissection, which is then converted to a perigastric placement of the band ***(Ponce et al., 2005)***.

Suture fixation of the anterior wall of the stomach, with gastrogastric sutures, completes band placement. This maneuver has recently become controversial. The balloon is deflated within the band at the time of operation. This precaution prevents tightness of the stoma and perioperative edema and reduces the risk of immediate postoperative emesis. The system is assembled, and the port for inflation and deflation of the band is secured onto the rectus fascia of the anterior abdominal wall ***(Clark et al., 2018)***.

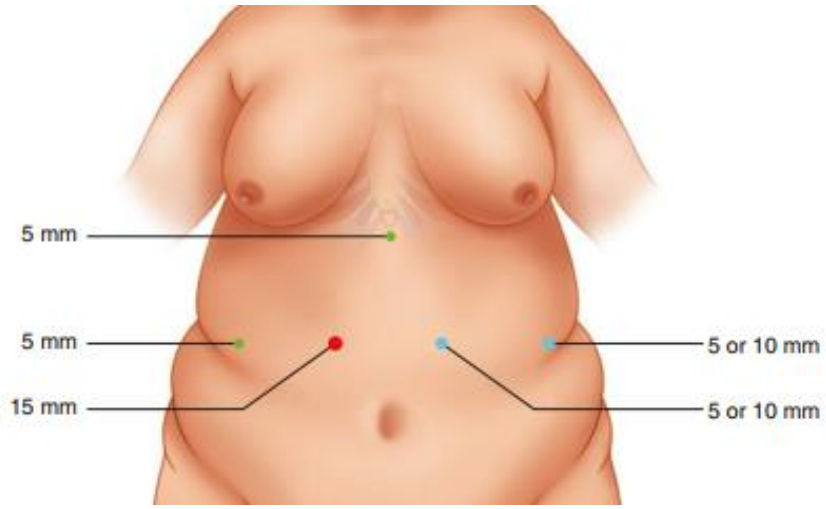

Figure (4): Port positioning ***(Clark et al., 2018)***.

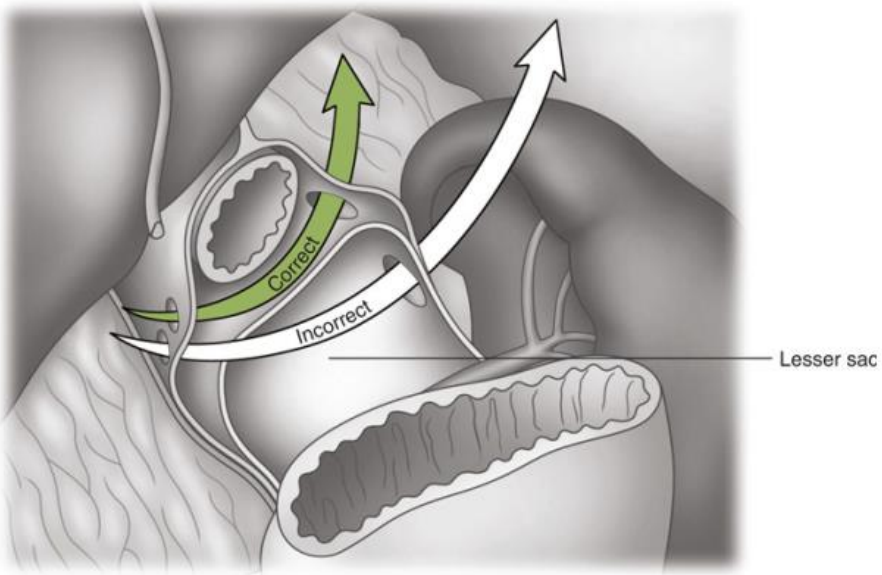

Figure (5): Lesser sac anatomy with "correct" posterior tunnel creation during band placement ***(Ponce, 2015)***.

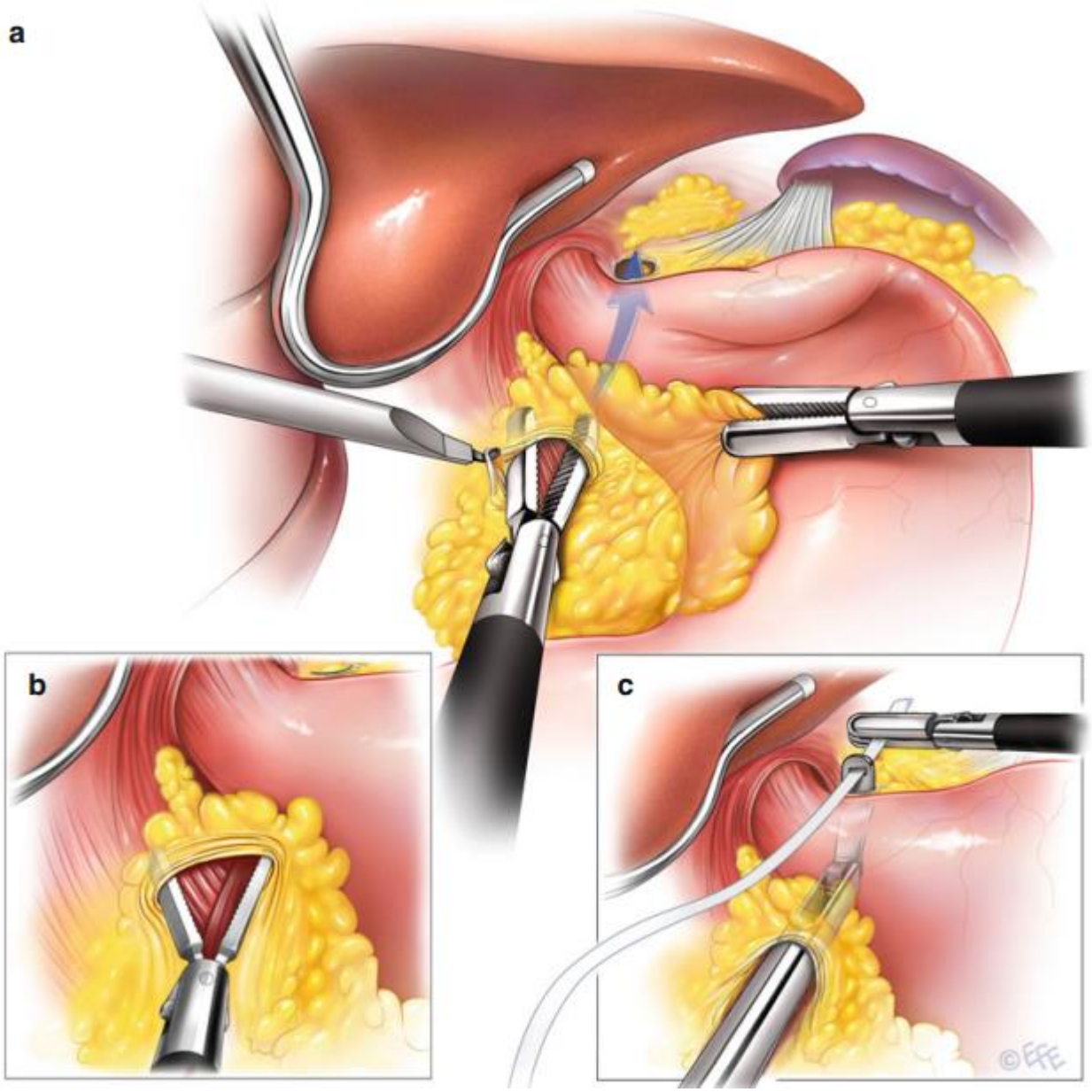

Figure (6): Creation of tunnel posterior to upper stomach, through pars flaccida. (**a**) Dissection of plane through pars flaccida above lesser sac. (**b**) Opening of pars flaccida membrane. (**c**) Gastric band is grasped and pulled through tunnel ***(Cobourn and Dixon, 2016)***.