

Global Bariatric Surgery

The Art of Weight Loss Across
the Borders

Rami Lutfi
Mariano Palermo
Guy-Bernard Cadière
Editors

 Springer

EXTRAS ONLINE

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To Suhayla, Samira, Edward, Maria, and George, for making me who I am

To Aida, for being the strong base for everything that matters

To Lea, Talia, Doreah, and Isabella, for carrying the torch forward

And to every person struggling with severe obesity, for making my job worthy

— Rami Lutfi

The Editors would like to dedicate this book to the memory of Dr. Eduardo Jacob who passed before seeing his work and contribution.

Dr. Jacob was a great surgeon and teacher. It is on shoulders like his that the mission of advancing surgical science and technology is carried on.

On behalf of our patients and readers, we thank you Edu for your contribution in this book and in the world of surgery.

— The Editors

Foreword

For “Global Bariatric Surgery: The Art of Weight Loss Across the Borders”

As I write these lines, prevalence of obesity in the world is even higher, complex, and uncontrollable, as if a virus had infected the planet, like a communicable process displayed on color maps from the CDC (Centers for Disease Control and Prevention). The life expectancy of many countries, with a few demonstrating a decline, is now threatening and is probably associated, like tobacco, with an upsurge in cancer incidence. Yet, prevention would be the least expensive urgent proposition to counteract this wave, but the aftereffects of such community health changes would be reflected 25 years later, and for those who are affected now, only surgery urgently has the answers, and it is offered to 0.5–1% of patients in Western countries, even lower in others!

It has been 25 years since the first laparoscopic bariatric surgery by Guy-Bernard Cadière, and it is very “a propos” that my friends and editors Rami Lutfi, Mariano Palermo, and Guy-Bernard Cadière have congregated a marvelous book and masterpiece on this subject. In “Global Bariatric Surgery: The Art of Weight Loss Across the Borders,” international experts’ experience have been assembled and gathered to write the most up-to-date information on bariatric and metabolic surgery with all its known facets. This surgical topic has provided growth to the fastest surgical societies in severe countries and worldwide and has pushed the boundaries on hormonal research in the causation of type-2 diabetes and GI incretins. The comprehensive varying opinions on the management of sleeve gastrectomy, weight regain, gastric bypass, and complex revisions are unique to this time. Not only are differing surgical perspectives presented, but physicians, endoscopists, and researchers also describe alternative methods of management, in complications, future treatments, and understanding of the disease.

Aspiring to be wide-ranging, the content includes developments as well as basic standardized techniques, likely occurring complications, described to help practitioners avoid dangerous pitfalls. The editors have, for example, included such topics as the relationship between obesity and cancer, the use of surgery in adolescents, preparation and follow-up care, as well as the use of interventional radiology. The latest scientific evidence concerning endoscopy, radiology, robotics, and pharmaceuticals is presented in detail.

Thus, this reference work methodically covers the technique and results of laparoscopic bariatric and metabolic surgery, with an international participation, as obesity and type-2 diabetes are affecting various parts of the world differently, and one with great interest, watches the various approaches taken, and compares them. In letters written by Seneca (64 AC), it is said that reading in the sustenance of a good mind, and will-fortified opinions, and this detailed, authoritative work should do the same to the novice and advanced Bariatric surgeon.

Montreal, Quebec, Canada
April 2018

Michel Gagner

Acknowledgments

I would like to dedicate this book to my wife Gabriela, my two children Agustina and Lucas, my parents Mario and Loly, and also my dear grandmother Lucila, for supporting me to go on progressing in my personal life and also in the field of laparoscopic and bariatric surgery.

Also I am very thankful to all my professors especially those that inspired me to be a better surgeon day by day in the clinical field, teaching, and research and for teaching me the lovely art of surgery.

Mariano Palermo

“When I was a young surgeon, the number one surgical principle was ‘big surgeon, big incision.’ Now the minimal invasive surgery has become the gold standard. However, this surgery is difficult and needs a good knowledge of anatomy and operative strategy. I hope this book allows the surgeon to have a better understanding of the principles of laparoscopic surgery. Thank you to Dr. Mariano Palermo and Dr. Rami Lutfi for working so hard on this book.”

Best regards
Guy-Bernard Cadière

Contents

Part I History and Present

- 1 History of Bariatric Surgery** 3
Mariano Palermo, Tripurari Mishra, and Rami Lutfi
- 2 Bariatric Surgery: Current State of Affairs** 17
Katherine S. Blevins, Dan E. Azagury,
and John Magaña Morton
- 3 Accreditation, Quality, and Centers of Excellence** 21
Wayne J. English, Teresa R. Fraker,
and Amy Robinson-Gerace

Part II Global Bariatric Surgery

- 4 Global Certifications for Surgeons and Centers** 35
Joseph Mark Drosdeck and Samer G. Mattar
- 5 Bariatric and Metabolic Surgery in Latin America** 43
Camilo Boza, Ricardo Funke, Ricardo Flores,
and Fernando Muñoz
- 6 Bariatric and Metabolic Surgery in the Middle East** 49
Talat Sh. Al Shaban, Ramzi S. Alami,
and Abdelrahman Ali Nimeri
- 7 Asian Experience** 59
Muffazal Lakdawala and Aparna Govil Bhasker

Part III Standard Bariatric Operations

- 8 Gastric Banding** 69
Jaclyn Clark, Christine Ren Fielding, and George Fielding
- 9 Sleeve Gastrectomy** 79
Blake R. Movitz, Arsalan Salamat, and Rami Lutfi
- 10 Gastric Bypass** 97
Omar Ezequiel Bellorin-Marin and Alfons Pomp

- 11 Duodenal Switch** 113
Sébastien Blaye-Felice, Stéfane Lebel, Simon Marceau,
François Julien, and Laurent Biertho

Part IV Controversial and Nontraditional Bariatric Operations

- 12 Gastric Plication** 127
Samuel Ordoñez Ortega, Eduardo Valdivieso Rueda,
Juan Pablo Pantoja, and Mauricio Sierra
- 13 Single Anastomosis Gastric Bypass** 133
Federico Davrieux, Luciano Antozzi, Mariano Palermo,
and Natan Zundel
- 14 Single Anastomosis Duodenal Switch (SADI-S)** 139
Adriana Ruano, Cristina Sánchez-del-Pueblo, Andrés
Sánchez-Pernaute, and Antonio Torres
- 15 Vagal Nerve Control of Appetite, Energy, Regulation,
and Body Weight** 145
Sachin Kukreja, Mark Knudson, Katherine Tweden,
Kelly Aspinwall, and Scott A. Shikora

Part V Revisional Bariatric Surgery

- 16 Revision After Gastric Banding** 161
Andres Giovannetti and Rami Lutfi
- 17 Revision After Sleeve Gastrectomy** 171
Daniel Cottam, Hinali Zaveri, Amit Surve,
and Austin Cottam
- 18 Resleeve Gastrectomy** 185
Patrick Noel and Marius Nedelcu

Part VI Complications and Adverse Outcomes

- 19 Complications of Gastric Bands** 197
Bradley F. Schwack, Christine Ren Fielding, and Jaime Ponce
- 20 Acute and Subacute Leaks** 205
Ricardo Funke, Camilo Boza, and Fernando Muñoz
- 21 Chronic Leak and Fistulas** 211
Luciano Antozzi, Priscilla Antozzi,
and Mario Norberto Antozzi
- 22 Intolerance to Oral Intake, Refractory Nausea,
and Vomiting** 219
Aaron Lee and Samuel Szomstein
- 23 Postoperative Strictures** 229
Mandi Joshi, Emanuele Lo Menzo, Samuel Szomstein,
and Raul J. Rosenthal

24 Postoperative Gastroesophageal Reflux Disease	239
Alexandra H. Leon Guerrero and Marina S. Kurian	
Part VII Endoscopy	
25 Building Bariatric Endoscopy Practice for the Surgeon	253
Josemberg Campos, Maíra Danielle Gomes de Souza, Manoel Galvao Neto, Milton Ignacio Carvalho Tube, and Luiz Gustavo de Quadros	
26 Endoscopic Bariatric Therapies	261
Anthony Choi and Reem Sharaiha	
27 Endoscopic Management of Complications	269
Manoel Galvao Neto, Lyz Bezerra Silva, Luiz Gustavo de Quadros, and Josemberg Campos	
Part VIII Special Surgical Situation and Consideration	
28 Robotic Surgery	281
John Cole Cowling, Aarthy Kannappan, Erik B. Wilson, Keith C. Kim, and Shinil K. Shah	
29 Bariatric Surgery in Adolescence	293
Marc Michalsky	
30 Large Ventral Hernias	305
Luciano G. Tastaldi, David M. Krpata, and Michael J. Rosen	
31 Post-Bariatric Body Contouring	323
Ramsen Azizi	
32 The Super Super-Obese	335
Kelvin D. Higa and Alan C. Wittgrove	
33 Optimizing the Staple Line	341
Edgardo Serra and Carlos Eduardo Jacob	
Part IX Medical Management and Special Disorders	
34 Preoperative Preparation and Workup	351
Paul R. Kemmeter and Eric J. Krebill	
35 Medical Management of Obesity	379
Marianela Aguirre Ackermann	
36 Metabolic Surgery, Reality or Myth: Scientific Side of Obesity Pathophysiology and Management	403
Emma Rose McGlone and Ahmed R. Ahmed	
37 Is Type 2 Diabetes a Surgical Disease?	415
Kai Tai Derek Yeung and Ahmed R. Ahmed	
38 Biliary Disease and Bariatric Surgery	425
Mariano Palermo, Pablo Acquafresca, Flávio Coelho Ferreira, Cinthia Barbosa de Andrade, and Josemberg Campos	

39 Gastroesophageal Reflux Disease 437
Isaac C. Payne, Andrew C. Berry, and William O. Richards

40 Obesity and Cancer 451
Samer A. Naffouje and George I. Salti

41 Bariatric Surgery and Cancer 465
Yaniv Fenig and Ronald Matteotti

42 Bariatric Surgery and Transplantation 471
Giuseppe D’Amico, Kiara Tulla, and Ivo Tzvetanov

Part X Research and Innovation

43 Interventional Radiology, Is There a Role for the Surgeon?... 481
Mariano Palermo, Pablo Acquafresca, and Mariano Gimenez

44 Accommodating Research in Busy Bariatric Practice 491
Aaron Lee Wiegmann and Alfonso Torquati

45 Proper Approach to New Bariatric Procedures 503
Kara J. Kallies and Shanu N. Kothari

Index 509

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Part I

History and Present



History of Bariatric Surgery

1

Mariano Palermo, Tripurari Mishra, and Rami Lutfi

From a symbol of beauty and wealth to a burden of negative stigma, the perception of overweight and obesity has transformed over the years up to our current times, when it is recognized as a chronic disease.

But despite all evidence, obesity continues to be considered by many, even in health care, a choice rather than a disease.

Its complex nature, the lack of understanding, and the significant role of behavioral factors justified, for many, discrimination and negative opinion about obesity and its treatment modalities.

While many believe it to be a product of civilization, obesity dates back as early as our genesis. It was, however, the exception due to its rarity, as opposed to the growing epidemic we see at our recent times where at least one in three Americans is overweight.

Due to its rarity, obesity was once perceived as a sign of beauty, well-being, or wealth. Venus of Hohle Fels, found in Germany, is an obese female

figurine [1] that dates back to 35,000 BC (Fig. 1.1), and according to the *New York Times*, Hatshepsut's mummy is that of an obese, diabetic 50-year-old woman [2].

The prevalence of obesity remained constantly low until last century when science and technology allowed us to have machines and tools to help alleviate most physical work and shifting most jobs from a physical to intellectual ones.

That technology came also into our homes where we stopped getting up to change the TV channel and our kids mastered sports digitally without going in the field and running. As a result, obesity has rapidly uptrended even in our kids, who, in the USA, are expected to be the first generation that would not outlive their parents.

With the alarming growth of the complex problem came the need for better understanding and search for potential solutions. The concept of body mass index was created, and soon this was tied to morbidity and earlier mortality. Because of the alarming data, an official call was made in 2001 by the US Surgeon General for action to prevent and treat obesity [3]. Surgeons were always at the front line of that battle starting in the midst of last century, designing different operations to make weight loss meaningful and long lasting.

Between restricting food intake for earlier satiety and redirecting ingested food to decrease absorption, the operations have shifted back and forth with many combining both mechanisms. Interestingly, the concept for bariatric surgery (in restriction and malabsorption) was initially

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Fig. 1.1 Venus of Hohle Fels, found in Germany, is an obese female figurine that dates back to 35,000 BC. Conard [1]. doi:<https://doi.org/10.1038/nature07995>



developed from the unintended consequence of weight loss after gastrointestinal surgery for ulcer and cancer. Removing large parts of stomachs or intestine caused severe postoperative weight loss, which some surgeons recognized to be advantageous in the morbidly obese patients.

It all started in the 1950s, when Linnear performed the earliest purely malabsorptive procedure for weight loss by creating a jejunoileal bypass and functionally removing varying lengths of small bowel. This procedure evolved into two variants based on the choice of the enteroenterostomy, while the common channel remained always the same length at 35 cm.

The classic jejunoileal bypass was described by Payne and Dewind in 1969 [5] with end-to-side jejunoileostomy (Fig. 1.2). This was designed as a less malabsorptive operation than their original 1963 jejuno-transverse colostomy bypass (Fig. 1.3). In that operation, they bypassed a much longer segment of intestine hoping for better weight loss. They reported on ten patients [6] but soon realized the severe electrolyte abnormalities and dehydration from uncontrolled diarrhea necessitating revision to their classic jejunoileal bypass.

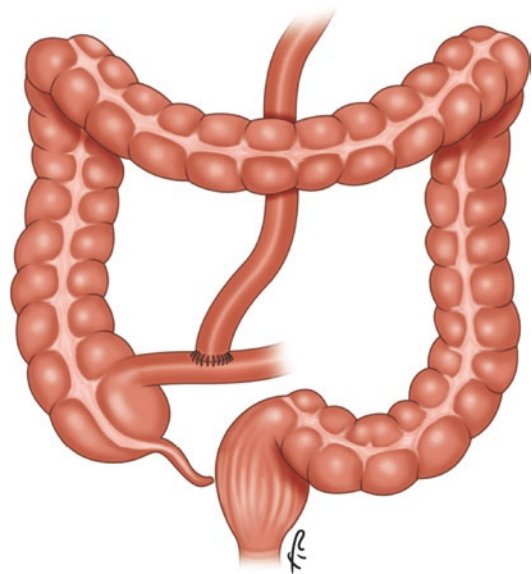


Fig. 1.2 Classic JIB by Payne and Dewind (end-to-side anastomosis)

In 1973 JIB was modified by Scott and Dean [7] to an end-to-end anastomosis reconstruction with drainage ileosigmoidostomy (Fig. 1.4).

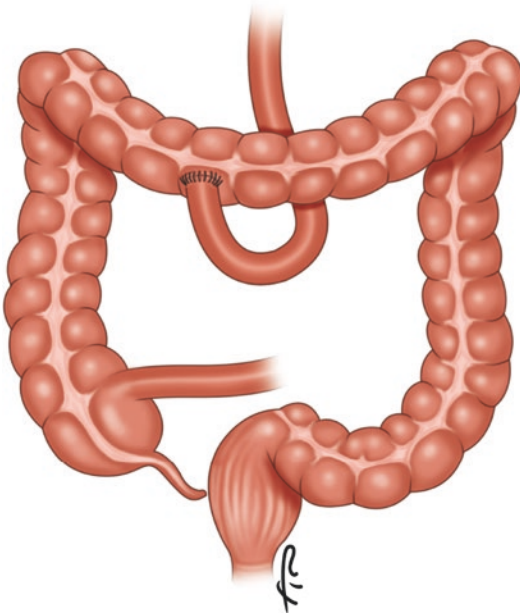


Fig. 1.3 Jejunocolostomy bypass by Payne and DeWind

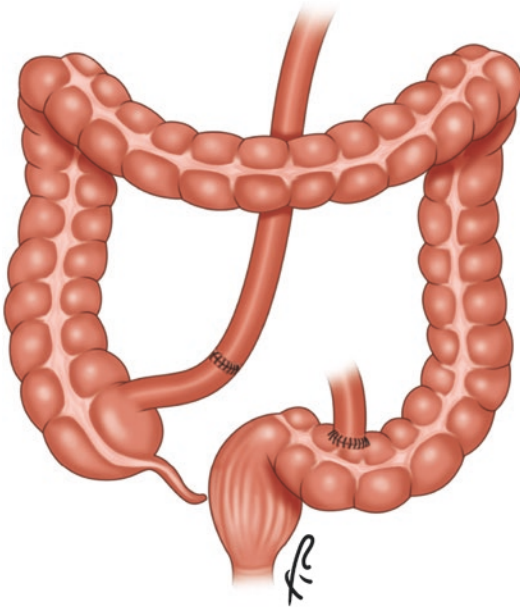


Fig. 1.4 Modified JIB by Scott and Dean with end-to-end anastomosis

Soon after adopting these malabsorptive operations, it became apparent that there is a high price for the significant postoperative

weight loss. Many, previously rare, short- and long-term complications were starting to be well described as these operations became more common. Most technical ones were related to the long defunctionalized limb of intestine (in end-to-side technique), where the lack of flow led to bacterial overgrowth which, in many instances, was toxic and life threatening. In addition, liquid contents refluxed in antiperistaltic direction and got gradually absorbed causing in many patients weight regain and long-term failures [8]. Aggressive, significant malabsorption, while thought to be critical for durable significant weight loss, proved to be often morbid and potentially lethal, leading surgeons to eventually abandon these operations.

Bypassing the segment for bile acid resorption reduced the absorption of fat and fat soluble vitamins (A, D, E, and K) leading to deficiencies that were not described before that era. Uncommon condition became common such as osteoporosis-associated pathological fractures due to vitamin D deficiency and night blindness due to vitamin A deficiency. Furthermore, gallstones were very common due to the loss of bile salts. Lastly, the increased exposure of colonic mucosa to these bile salts caused voluminous secretions of water and electrolytes causing severe cramping and diarrhea resulting in wide array of adverse outcome ranging from poor quality of life to life-threatening dehydration.

Alongside the work on malabsorption, the concept of restriction and portion control carried much enthusiasm as complications from the malabsorptive operations were increasingly reported. Horizontal gastropasty was the first restrictive procedure to be described (Fig. 1.4), in which around 30 cc of fundus is partitioned from the remaining stomach below using a single row of staples. Continuity is reestablished by creating a narrow outlet removing three or less staples and reconnecting the two compartments (Fig. 1.5). Food passes slowly causing prolonged premature stretching of the fundus and therefore early prolonged satiety [9].

Avoiding small bowel bypass with its negative consequences of severe malabsorption, along with the technical simplicity and safety of this operation, made restriction a very appealing

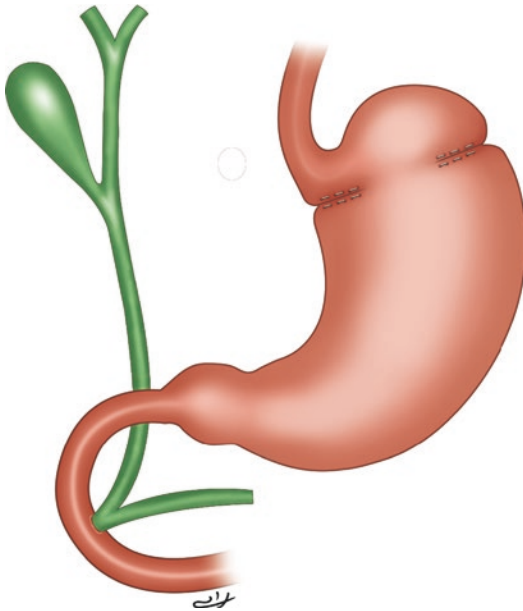


Fig. 1.5 Horizontal gastroplasty

concept. Unfortunately, like any novel weight loss procedure, the hopes were short lived, and weight regain occurred as early as 6–9 months postoperatively. The staple line dehisced and the normal volume of the stomach was restored allowing consumption of normal larger meals causing weight regain [4].

Despite the many technical modifications in stapling, and changing the size of the fundus to cause durability, it was realized that the horizontal design of the staple line cannot hold against the forward peristalsis of the gastric wall. This understanding led Dr. Mason from the University of Iowa to separate the two gastric components, applying the principle of partial gastrectomy to weight loss while leaving the distal stomach in situ. Continuity was restored with gastrojejunostomy, bypassing the duodenum and part of the jejunum. This was the first concept of combined restriction and malabsorption and the birth of modern bariatric surgery as we know it today.

Dr. Mason's operation, described in 1967, was called gastric bypass and remains the cornerstone of bariatric surgery up to this time [10]. It consisted of a completely divided 30 ml gastric pouch using surgical stapler and reconstruction using loop gastrojejunostomy with 0.8–1 cm

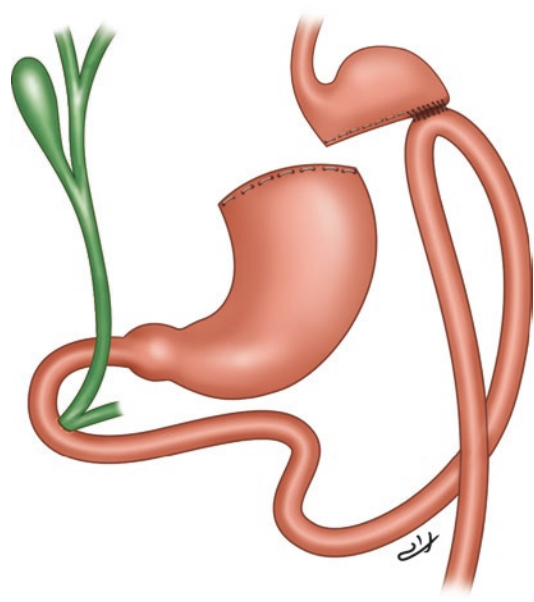


Fig. 1.6 Gastric bypass as described by Dr. Mason

anastomosis (Fig. 1.6) bypassing the duodenum and the first few inches of the small intestine.

There was significant excitement about this “combination” surgery, but it was far from being ready for widespread use. Many problems occurred with the surgery that required modifications and caused significant variation in outcome. Surgeons soon realized the need to standardize this operation in order to optimize results.

The pouch size was agreed upon to be less than 50 cc and the outlet need to be less than 1 cm in diameter. The most significant modification was switching reconstruction from loop configuration to Roux-en-Y, in order to prevent the bile from refluxing through the afferent jejunal limb into the gastric pouch.

It is worth noting that the anatomical configuration of the gastric bypass as an operation was described almost a century prior to that intended for weight loss. In 1892, Dr. Cesar Roux, from Switzerland, designed the “roux” configuration to bypass gastric obstruction. However, he later abandoned the procedure in 1910 due to high rates of marginal ulcer and nutritional deficiency.

As for weight loss, Dr. Griffin, in 1977, is credited for changing the “loop” to the “Y” configuration in order to prevent reflux (Fig. 1.7).