Laparoscopic Sleeve Gastrectomy

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Editors

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Foreword

Over the last century, we witnessed the obesity disease's rapid progression across all continents to become the pandemic that it now is in 2020. In parallel to this trend, bariatric surgeons have been trying to develop an ideal surgical approach that combines safety with durable weight loss and remission of associated comorbid illnesses. Bariatric surgery evolved from being initially hypoabsorptive (ileocolic bypass, biliopancreatic diversion, and jejunoileal bypass) to purely restrictive (vertical banded gastroplasty and gastric banding), and finally evolved further to combined hypoabsorptive and restrictive (gastric bypass).

Sleeve gastrectomy, first performed by Hess et al. as a restrictive component of the open biliopancreatic diversion and duodenal switch, has become an innovative and integral part of the bariatric surgery armamentarium. With the advent of laparoscopy, Gagner et al. introduced the concept of a step approach in super morbidly obese subjects and performed a laparoscopic sleeve gastrectomy (LSG), followed by a second step biliopancreatic diversion with duodenal switch (BPD-DS).

Not surprisingly, the initial excellent outcomes of LSG inclusive of patient-reported significant weight loss and remission of comorbidities at 6-month follow-up resulted in subjects foregoing the second stage BPD-DS.

The mechanism of action of LSG is still the subject of intense research and encompasses multiple mechanisms. LSG combines a restrictive element by significantly decreasing the gastric capacity to approximately 200 cc volume, and an anorectic component as it removes 80% of the ghrelin-producing cell mass. In addition, because the food transit is displaced toward the lesser curvature of the stomach or "Magenstrasse," a significant number of patients develop rapid emptying that results in stimulation of GLP1 hormones and dumping syndrome. Further characteristics are related to changes in the microbiome that seem to have an impact in the binding capacity of biliary acid with intestinal receptors.

Over the last decade, the indication of LSG as a final step continued to evolve until it has now become the most common stand-alone bariatric procedure performed worldwide. Its technical simplicity, in conjunction with excellent weight loss, remission of comorbid illnesses, and the best safety record ever in bariatric surgery, are the most important attributes responsible for this phenomenon.

As with any surgical approach, LSG is not exempt from short- and long-term complications and failures. In the short-term, and despite its technical simplicity, staple line disruptions can result in serious morbidity requiring a multidisciplinary treatment algorithm that might include a proximal gastrectomy and Roux-y reconstruction. Weight regain and the development of gastroesophageal reflux disease are the two most important long-term complications that result in disease recurrence and need for reoperative interventions.

This excellent monograph, put together by Dr. Salman Al-Sabah and co-authors, is a wonderful guide that will help surgeons navigate the different aspects of performing this procedure while managing the obesity disease. It thoroughly reviews all facets of a care path, including procedure indications, contraindications, technique, and reoperative strategies. It also provides the reader with a review of the most current nutritional and lifestyle interventions available to help our patients maintain their weight loss and have long-term success.

I congratulate Dr. Al-Sabah and the elite faculty he chose to author these chapters for this outstanding book and wish him and all readers continued health and success.

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Preface

"المعدة بيت الداء"

"The Stomach is the home of disease"—Al-Harith ibn Kaladah (ancient Arab physician)

The prevalence of obesity is on a continuous rise worldwide, with an estimate of at least 1.9 billion adults (39%) considered as overweight and 600 million (13%) classified as obese in the year 2014. With it, this has brought a concomitant increase in the number of bariatric surgeries performed, with laparoscopic sleeve gastrectomy (LSG) becoming the most performed bariatric procedure as of 2014. This raise in the popularity of the LSG procedure has been attributed to its relative surgical simplicity, low complication rate, significant improvement in comorbidities, and evident weight loss.

"Laparoscopic Sleeve Gastrectomy is an easy, yet not a simple procedure." —Dr. Raul Rosenthal

Skill and expertise is required in the postoperative management of complications. Therefore, we decided to put this book together, to focus on all aspects related to the LSG, from how to choose the patient to long-term outcomes and options when the surgery fails.

Since the development of the LSG, many advances have been made in the field of bariatric surgery. The history of this procedure is more of an evolution of prior procedures than a discrete timeline of the development of a single procedure. The sleeve has its roots in the earliest gastroplasty procedures and as an observation from prior anti-reflux procedures in 1988. Since then, it has matured into its own technique and pioneered and refined over multiple meetings and summits by Dr. Michel Gagner. Bariatric surgeons have subsequently discussed its place in the field, comparing it to existing procedures and questioning its validity in the long-term. However, they are all in consensus that this procedure is an option for those seeking bariatric surgery.

I draw my inspiration from the highly readable and accessible works of my colleagues that have presented and published on this topic in world-renowned journals. It builds on the existing studies and literature that are in published journals regarding LSG, with its foundation concentrated around the Arab region, which has the highest levels of obesity prevalence worldwide.

It has been well established and accepted that the LSG is an effective bariatric procedure for those eligible for it. However, proper guidelines for choosing the proper bariatric procedure according to each individual patient has yet to be set. This book aims to lay out all aspects of the LSG, explaining and proposing guidelines for surgeons, the thought process and rationale behind choosing patients for this procedure, performing the procedure according to specific patient characteristics, the perioperative period, follow-up and postoperative requirements including exercise, nutrition, and supplementation, dealing with postoperative complications and morbidities, assessing success and knowing when the procedure has failed, discussing possible revision options for each patient according to their cause of failure. Additionally, this book discusses perspectives beyond the clinical, ranging from medicolegal aspects and medical tourism to recommended diet and exercise programs post-sleeve. The aim of this book is to consolidate all available information on LSG, putting it all in one place for bariatric surgeons and healthcare providers to refer to when needed.

Many papers and studies have been conducted covering multiple aspects of the LSG, looking at its effect on obesity, as well as comorbidities associated with obesity, short- and long-term outcomes, management of complications, the nutritional effect on the body, and so on. Surgeons have discussed it at length in conferences all around the world, speaking about its role in topics such as pediatric and adolescent obesity, debating future directions for its improvement and development.

The book is of interest to practicing surgeons working in the general and/or bariatric surgery field, as well as residents and trainees specializing in general surgery or have an interest in bariatric surgery. It involves a collaboration between multiple departments that deal with patients undergoing this procedure, providing insight from all those involved, and therefore, would also be beneficial to nutritionists working with bariatric patients, and researchers interested in metabolic medical issues and obesity. It also provides a highly accessible introduction to innovations in this topic, with a wide range of examples and areas covered being of interest to them, and concludes with the future directions in this field, thus making it “The Complete Book of Laparoscopic Sleeve Gastrectomy.”

Safat, Kuwait — Salman Al-Sabah
Cleveland, USA — Ali Aminian
Napoli, Italy — Luigi Angrisani
New York, USA — Eliana Al Haddad
Adelaide, Australia — Lilian Kow

Acknowledgments by Salman Al-Sabah

If your actions inspire others to dream more, learn more, do more and become more, you are a leader—John Quincy Adams

I dedicate this book to my family for their constant support and also to all the mentors, colleagues, students over the past 20 years that have given the opportunity to learn and teach, الحمدلله. I believe as innovation increases, healthcare continues to evolve. It is important for surgeons to lead the way in the management of obesity and related chronic diseases. Mentorship and leadership are vital in our current environment and with more challenges come opportunities to innovate and lead. With the Arab region having a predominantly higher burden of obesity, I hope this book will be a success story from this region and inspire both surgeons and academics of this region to be great future leaders in surgery.

I would also like to acknowledge the contributions of my fellow editors and all the contributors of this book.

Acknowledgments by Dr. Eliana Al Haddad

I would firstly like to thank my colleague and friend, Dr. Salman Al-Sabah, who has been a guide and mentor to me throughout my medical journey. To my family and friends, who have unconditionally supported me every step of the way, I can never express the degree of my gratitude toward you all.

With enough hard work and dedication, we were able to put together this tremendous piece of literature, which will hopefully aid patients and surgeons alike in their weight loss journey.

‘‘The purpose of life is not to be happy. It is to be useful, to be honorable, to be compassionate, to have it make some difference that you have lived and lived well.’’—Ralph Waldo Emerson

Acknowledgments by Lilian Kow

It is a big task when one sets out to write a “complete book” on a procedure. This is because like all bariatric surgery, it is not just about the surgery that determines the success of the procedure. For a successful outcome, one must understand the chronic multifactorial disease of obesity, the health burden to the individual and health stakeholders, and how to manage the patient in the long-term.

This book sets out to cover all aspects of the laparoscopic sleeve gastrectomy. It is appropriate to write this book just over 20 years since the first laparoscopic sleeve gastrectomy was performed by Professor Michel Gagner as a first stage laparoscopic BPD. Like most “good ideas”, it was by serendipity that the sleeve gastrectomy was found to be as good as a stand-alone operation and because of its simplicity was adopted by bariatric surgeons all around the world overtaking both gastric banding and gastric bypass as the most commonly performed bariatric operation.

Despite its simplicity, it was not without risks and complications. Over the last 2 decades, this procedure has been extensively studied in clinical trials and RCTs, its mechanism on gut physiology systematically studied and refined. The production of this Complete Book of Laparoscopic Sleeve Gastrectomy is hence timely and appropriate as the book of resource systematically laid out from 2 decades of experiences for all bariatric surgeons.

June 2020

Lilian Kow
President IFSO

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Editors and Contributors

About the Editors

Dr. Salman Al-Sabah is the Chairman of Surgery at Jaber Al-Ahmad Al-Sabah Hospital, Kuwait, and an associate professor at Kuwait University. He graduated from Kuwait Medical School and completed his residency in General Surgery and Master of Management and Health Leadership and Fellowship in Minimal Invasive and Bariatric Surgery at McGill University, Canada. He has contributed to several publications as well as presenting as a speaker and moderator in international conferences for the field of Minimally Invasive and Bariatric Surgery. His principal clinical foci are Metabolic/Bariatric Surgery, Minimally Invasive Surgery, Advanced Endoscopy, Health Policy, and research. Additionally, Dr. Al-Sabah is on the editorial board and reviewer of international peer-review journals. He is the founder and President of the Gulf Obesity Surgery Society, the Kuwait Association of Surgeons and Governor for Kuwait at the American College of Surgeons. Dr. Al-Sabah's research has been the foundation in the establishment of international guidelines in the fields of gastroenterology and metabolic and bariatric surgery. He is also the recipient of the prestigious 2018, Scientific Production Prize from the Kuwait Foundation for the Advancement of Sciences (KFAS) for his contributions in the field of Medical Health and Allied Sciences. Dr. Al-Sabah was instrumental in establishing the Kuwait National Bariatric Registry.

Ali Aminian, M.D. is Director of Bariatric and Metabolic Institute at the Cleveland Clinic. He is an Associate Professor of Surgery at the Cleveland Clinic Lerner College of Medicine. His clinical interests include gastrointestinal surgery, advanced laparoscopic surgery, and specifically surgery for severe obesity, diabetes, and metabolic disease. As an academic su^200), he has published high impact journals including New England Journal of Medicine, JAMA, Diabetes Care, and Annals of Surgery. His studies have been widely covered by the media such as New York Times, Wall Street Journal, TIME, Reuters, Forbes, and among the others.

Prof. Luigi Angrisani born in Naples. He received master's degree with honors in Medicine and Surgery at the University "Federico II" of Naples and postgraduate

degree and medical practice in London, Pittsburgh, Lyon, Bombay, New York, Los Angeles, Birmingham, and Cambridge. He is Director of the Unit for General and Laparoscopic Surgery at San Giovanni Bosco Hospital in Naples; Professor of General Surgery at the Federico II University of Naples, Italy; and Past President of the Italian Society for Obesity and Metabolic Diseases (SICOB). He involved in editorial activity with several publications in the bariatric field worldwide. He is an Associate Editor of the scientific journal *Obesity Surgery* (Springer). He is Past President of IFSO, International Federation for the Surgery of Obesity and Metabolic Disorders; Chairman IFSO Board of Trustees; and President of IFSO World Congress Rome 2022.

Dr. Eliana Al Haddad obtained her bachelor's degree in biology from the American University of Beirut. She then graduated from Lebanese American University Gilbert and Rose-Mary Chagoury School of Medicine in 2016. After which, she completed a three-year postdoctoral research fellowship in congenital cardiac surgery at Columbia University Medical Center in New York. She has contributed to several international publications in the fields of bariatric and general surgery, as well as pediatric cardiothoracic surgery. She is currently working as a postdoctoral research fellow in the field of bariatric and general surgery with Dr. Salman Al- Sabah. Her principal foci are research in the fields previously mentioned. Additionally, Dr. Al Haddad is on the editorial board and a Reviewer of international peer-reviewed journals.

Lilian Kow is a Senior Consultant Surgeon at Flinders Medical Centre and Clinical Associate Professor at Flinders University of South Australia. She has been involved in training surgeons in bariatric surgery nationally and internationally. Lilian Kow was born in Malaysia. Her family migrated to Adelaide, Australia, where she completed her high school and qualified to study medicine at the Flinders University of South Australia. She went on to complete a Ph.D. in Neuroscience in the School of Medicine at the Flinders University of South Australia. Her thesis entitled "A systemic study of the regulation of intestinal motility in an organ culture system" was awarded by Flinders University of South Australia in 1996. After completing her advanced surgical training in general surgery, she became a Fellow of the Royal Australasian College of Surgeons FRACS in 1996. Lilian is a Co-Founder/Director of the Adelaide Bariatric Centre, which was established in 1995, as the first obesity surgical clinic in Adelaide. Over the years, Lilian has visited many bariatric clinics around the world and is of the firm belief that bariatric surgery works better with an effective support program. Lilian has been at the forefront along with her colleagues at the Adelaide Bariatric Centre in developing a very effective multidisciplinary program for supporting their patients in their weight loss journey. The program in Adelaide was one of the initial ones adopted in Australia and internationally and the first to be used in South Australia. Lilian and her colleagues have been firmly committed to providing this very important multidisciplinary support for our patients:

a program which clearly makes the Adelaide Bariatric Centre the leading centre for the management of weight loss in South Australia and one of the leading centres in Australia. She is the President of IFSO and the Past President of the IFSO-APC and the Obesity Surgical Society of Australia and New Zealand OSSANZ (ANZMOSS). She also runs the Education Portfolio as the executive member for Australian Chinese Medical Association (SA).

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Introduction

Learning About the Laparoscopic Sleeve Gastrectomy (ISG) The Birth and Evolution of Laparoscopic Sleeve Gastrectomy

Michel Gagner

Is sleeve gastrectomy the result of an omphaloskepsis? Omphaloskepsis or navel contemplation of one's self is known to be an aid to meditation. The word originates from the Greek omphalos, signifying "navel" and skepsis, meaning "viewing". In Hinduism, the navel is the site of a powerful chakra, focal point of mediation, the site of the universe, but it is also the exit of the sleeve gastrectomy specimen, transcending a powerful individual change.

The sleeve gastrectomy follows the duodenal switch evolution, but its originators did not create the concept of a stand alone or staged procedure called "sleeve gastrectomy". Doug Hess and Picard Marceau altered the open biliopancreatic diversion, modified it, and called it duodenal switch, generally called "DS", in 1988–90, with the needs for a major gastrectomy to diminish the acid load on the duodenal ileal anastomosis, causing dramatically less anastomotic ulcers [1, 2]. In Marceau's description, the BPD distal gastrectomy is replaced with a "65% parietal cell gastrectomy" along the greater curvature; note that this was not called "sleeve gastrectomy" at the time, leaving a stomach of at least 200 mL [3].

I initiated, as a principal investigator, a small animal swine pilot project in May 1999 at Mount Sinai School of Medicine where I had been an attending and professor of surgery, with the help of Dr. Gregg Jossart who was a clinical fellow in laparoscopic/bariatric surgery at Mount Sinai School of Medicine in New York under my directorship, has since served as the Director of Minimally Invasive Surgery at California Pacific Medical Center in San Francisco since 1999, assisted by Dr. John de Csepel, who was my research fellow and resident at the time from the same organization, who is now the Chief Medical Officer & Vice President of Medical Affairs for Medtronic's Minimally Invasive Therapy Group's for a

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diverse portfolio ($9 billion in annual revenues) in New York City, and Dr. Stephen Burpee, resident at the time who is now an attending bariatric surgeon in private practice in Tucson Arizona, Laparoscopic Duodenal Switch Feasibility study in 6 pigs was realised in the institution research centre, which was ultimately published later in 2001 [4].

This laboratory effort was to comprehend the complexities and technical impediments of performing such surgeries in real patients. After I initiated the first laparoscopic Roux-en-Y gastric bypass program at Mount Sinai in 1998, strong from my experience with the same surgery since 1995 at the Cleveland Clinic in Ohio, and preceding animal experiment on laparoscopic Roux-en-Y gastric bypass with our clinical fellow Dr. Mario Potvin at the Centre de Recherche de l'Hotel-Dieu de Montreal in 1993 [5], who is now an attending surgeon in the Marshfield Clinic Health System in Wisconsin, I embarked on July 2, 1999, 21 years ago, to perform the first Laparoscopic DS at Mount Sinai Hospital in New York. Dr. Christine Ren, our newest fellow of 1 day, following Dr. Jossart's fellowship year, a finishing general surgery resident from the NYU program, assisted me, NYU had no or minimal laparoscopic bariatric surgery experience at the time.

- This entailed a laparoscopic sleeve gastrectomy, using a bougie in place of 60Fr and multiple serial firings of laparoscopic linear staplers, followed with duodeno-ileostomy using a transabdominal circular stapler, end to side, antecolic, and a side-to-side ileo-ileostomy using a linear stapler and hand-sewn closure of the enterostomy. Initially, mesenteric defects were not closed, but later than a year afterwards, a 2.6% mesenteric internal hernia incidence was observed, mostly Petersen's, and routine closure of both mesenteric defects was initiated in 2000. It is amazing today, looking back at this era, that I had introduced this on patients with BMI >60 kg/m^2, as it was my conviction at the time, even today, that hypoabsorptive procedures should be completed in this class of super to super super obesity [7]. After her 1999–2000 fellowship with us, Dr. Christine Ren subsequently became Professor in the Department of Surgery at NYU Grossman School of Medicine and Division Chief of Bariatric Surgery.

We therefore initiated quite a series of patients such by December 1999, an abstract was submitted to the 2000 annual meeting of ASBS, not called ASMBS at the time, American Society of Bariatric Surgery, usually held in June, and accepted for an official podium presentation [8]. Dr. Gregg Jossart returned for an operating room visit to Mount Sinai NY in the fall of 1999, just before the annual meeting of the American College of Surgeons held in San Francisco, accompanied by Dr. Robert Rabkin, his new partner at the time in San Francisco, interested in learning and observing a live case of laparoscopic DS procedure, which they initiated afterwards with a hand assisted technique, not with complete laparoscopy. Dr. Jossart and Rabkin have displayed their preliminary experience at SAGES 2001, with 79 cases done, 27 lap assisted and 52 hand assisted which started in October 1999 until July 2000 [9]. At the Annual meeting of ASBS in June 2000, a short

video presentation was produced from Dr. Jossart, Dr. R. Rabkin, and Dr. Donald Booth from Biloxi, and with an abstract revealing that they had started the complete laparoscopic technique in January of the same year [10].

By serendipity and providence, I could not perform a complete laparoscopic DS early in our experience, due to ventilator pressure problems, and tight pneumoperitoneum in spite of utmost muscular relaxation, and I decided to abandon after completion of the sleeve gastrectomy, which to this day, was constantly done first. My observation of weight loss, disappearance of co-morbidities, led me to believe that this group of high-risk patients, those with BMI>60 kg/m^2, it would be preferable to realize the long and tedious operation in 2 steps instead, with a 6 months interval as a minimum. As, a later review of our data had substantiated the higher mortality and morbidity rate of full laparoscopic DS in BMI>60 kg/m^2, much higher than a 2 stage procedure [11]. This led me to do the first presentation on laparoscopic sleeve gastrectomy "alone" at Dr. Phillip Schauer's meeting in Feb 20–25 2001, MISS Minimally Invasive Symposium in Snowbird, Utah, on sleeve gastrectomy as a 2 stages procedure. The reception was tepid, unenthusiastic, and because nobody was really doing laparoscopic duodenal switch at the time, as a large part of this crowd had been invited and paid by laparoscopic adjustable gastric band companies, it had generated no awareness from the audience, except for one individual in attendance. I suppose, it was either Dr. Peter Crookes or Dr. Gary Anthone who were working at USC Los Angeles at the time, who came forward during the coffee break, and confided to me that they had done a handful of patients with an open technique, as a salvage, but that they were not published and thought there was no interest in the subject at the time. They subsequently published this experience in 2004 and 2006, but I pondered if they would have published it, if it were not from my experience laparoscopically, and subsequent hype of the subject [12, 13].

Consequently, with Dr. Christine Chu, another clinical fellow, who is now working for Kaiser Permanente Northern California Bariatric Surgery Center, an abstract was sent for presentation at the annual meeting of SAGES in the spring of 2002. The abstract was published in Surgical Endoscopy, and this constitute the first official publication on the subject, entitled" Two-stage laparoscopic BPD/DS. An Alternative Approach to Super-Super Morbid Obesity", many co-authors represented my faculty partners and bariatric fellows at the time 2001–2002, at Mount Sinai hospital and School of Medicine in NY, NY [14]. From July 1999 until July 2001, 102 laparoscopic duodenal switches had been achieved, of which 7 were by two stages completed, and did not include also the sleeve alone that had not been converted for numerous motives, including patients who declined a second stage. On March 15th 2002, at the New York Hilton Hotel, the presentation of the first series, at an official societal meeting, on laparoscopic sleeve gastrectomy, took place.

I was part of the World Congress program in 2002, as it was combined for IFSES, the International Federation of Societies of Endoscopic Surgery, and this was a few months after the tragically September 11, 2001 events, which still attracted a large crowd in New York City, in spite of the fear of traveling and

flying, they were even discussions to delay or cancelled the meeting. Fortunately, we had put an outstanding postgraduate laparoscopic bariatric course at Mount Sinai School of Medicine, with countless live surgeries, which encompassed laparoscopic Roux-en-y gastric bypasses, duodenal switch and sleeve gastrectomy as a stand-alone procedure. There was also an animal lab and a cadaver laboratory, where those techniques were tutored. Many participants remembered and reminisced, still exchange with me about this event as one of the turning point in their profession. During the same congress, Dr. Shoji Fukuyama, MD, Christine Chu, MD, Won Woo Kim, MD, and myself also presented a video of the two-stage procedure at the video session V02 on March 15th, 2002 [15]. Dr. Kim returned to Seoul Korea were he was an early adopter of sleeve gastrectomy in Asia, starting in 2003. Further, Dr. David Voellinger presented a poster, another clinical fellow that year, who did just before is residency at the University of Alabama in Birmingham, is now an attending bariatric surgeon and the Medical Director for the Novant Health Bariatric Center and Vice Chief of Staff at Presbyterian Medical Center in Charlotte, NC, entitled "Laparoscopic Sleeve Gastrectomy is a safe and effective Primary Procedure for Biliopancreatic Diversion With Duodenal Switch", because it had been turned down for a podium oral presentation, it was a poster abstract [16]. It included a series of 24 patients; initial mean weight was 414 lbs., with mean BMI of 65 (range 58–76 kgm^2). Mean operative time was 114 min with an average length of stay of 3 days (range 2–7) with a median of 3 days. Follow-up at 3 weeks, 3 months, and 6 months after sleeve resulted in an excess total body weight loss of 11, 23, and 32% and mean BMI of 60, 56 and 49 kgm^2. No major morbidity and no mortality ensued in this population. The conclusion was: Laparoscopic sleeve gastrectomy is feasible and can be performed with minimal morbidity as the primary stage of LBPDDS in the superobese. It also results in substantial short-term weight loss and should allow for a safer operation during second stages [16].

Dr. Bruce V. MacFadyen Jr. from the University of Texas-Houston Medical School, who was the main co-editor of Surgical Endoscopy at the time with Sir Alfred Cuschieri, turned down the manuscript submitted, for lack of long-term follow-up!! This infuriated me, as Surgical Endoscopy had an earlier tradition of publishing pioneering concepts a decade before. And this is why our second series has been published 1 year after, in 2003, in a distinct journal, more open minded to bariatric subjects, in Obesity Surgery, by our clinical fellow at the time Dr. Joseph Patrick Regan, and Barry Inabnet pushing for its publication on "Early experience with two-stage laparoscopic roux-en-Y gastric bypass as an alternative in the super-super obese patient" which is much quoted in the bariatric surgical literature [17]. As much commercial medical insurances were denying duodenal switches, although accepted by CMS, patients ended up, after their approval, with a second stage Roux-en-Y gastric bypass, which I considered an inferior operation for super-obeses. As I said, this was not my first cohort of patients, in this short paper in obesity Surgery, there were only 7 patients who had an initial sleeve followed several months later, with a mean of 11 months, a lap Roux-en-y gastric bypass, were the upper sleeve was transected, from a BMI of 63 to 50 kg/m^2

after a sleeve, and then to 44 kg/m^2, 2.5 months later. The very first sleeve gastrectomy series was published as a book chapter, with considerable delays, in 2005, which many referenced today, as the first series of laparoscopic sleeve gastrectomy [18] of note, Dr. Regan is now attending staff at Columbia St. Mary's Hospital Columbia, in Milwaukee, WI, as well as medical director and assistant Clinical Professor of Surgery of the Medical College of Wisconsin and member of the Milwaukee Institute of Minimally Invasive Surgery.

As I said earlier, Dr. Gregg Jossart who is now Director, Minimally Invasive Surgery, California Pacific Medical Center, San Francisco, California and Dr. Gary J. Anthone who as since left private bariatric surgery practice to be the chief medical officer and director of public health of Nebraska, have composed a short piece on the history of sleeve gastrectomy in the Bariatric Times in 2010 [19]. In 1997, Dr. Gary Anthone was performing an open duodenal switch on a 13-year-old girl with a history of common bile duct stones [12]. Intraoperatively, the common bile duct stones could not be completely cleared, and elected to just do an open sleeve gastrectomy in order to leave access for a postoperative endoscopic retrograde cholangiopancreatography (ERCP). From 1997 to 2001, he performed 21 open sleeve gastrectomies in high-risk patients with super-morbid obesity [12]. The lesser curve stomach left was approximately 100 mL in volume (presently the pouch volume is approximately 60 cm^3 or less) and the patients reached 40–50% excess weight loss (EWL). By October 2005, he had narrated on 118 open sleeve gastrectomies with similar outcomes [13].

Professor Michael J. McMahon, previously from the General Infirmary at Leeds, robust from the experience of Professor Johnston with Margenstrasse &Mill gastroplasty, had executed from January 2000 until December 2001, laparoscopic sleeve gastrectomy in 20 patients. Of note, Prof Michael J. McMahon had visited me at Mount Sinai School of Medicine during this time interval, where the laparoscopic sleeve gastrectomy had been performed 7 months earlier in duodenal switch patients. The technique described in their manuscript of 8-years results, is identical to the technique used at Mount Sinai, except for a smaller bougie of 32 Fr, the one that was currently used for M&M in Leeds. At 8 years, 55% of patients had more than 50% EWL [20].

In San Francisco, Dr. Gregg Jossart, our former fellow, was an early adopter of sleeve gastrectomy in the West coast, he had started to offer the stand-alone procedure with a 32 French calibre pouch (30–60 cm^3) to lower BMI patients, in November 2002 [21]. I had several conversations with him encouraging them to start the laparoscopic two stage procedure in San Francisco. The results of 216 patients compared successfully the other stapling procedures and certainly against adjustable gastric banding, with 75–85% EWL at two years of follow up [21].

Adjustable gastric banding has been almost abandoned, and performed less than 1% of the time in North America. Dr. Jacques Himpens from Brussels Belgium, an early adopter of the technique, has been convinced after video transmission of surgeries performed from Mount Sinai NY to Brussels and Europe, and had published some 6 years results in the Annals of Surgery, a landmark paper, where sleeves where performed between November 2001 and October 2002, in