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## Editorial

### Revisional Bariatric Surgery: Are We Opening a Pandora's Box?☆



### *Cirugía bariátrica de revisión: ¿estamos abriendo la caja de Pandora?*

Metabolic syndrome and obesity are major public health problems that lead to high rates of morbidity and mortality worldwide. The incidence of this chronic and progressive disease has nearly tripled since 1975. In 2016, more than 1.9 billion adults, 18 years and older, were considered overweight, and more than 650 million adults were obese. Overall, about 13% of the world's adult population (11% of men and 15% women) was obese in 2016.<sup>1,2</sup> An elevated Body Mass Index (BMI) is a risk factor to develop non-communicable diseases such as: cardiovascular disorders (mainly atherosclerotic heart disease and stroke), hypertension, diabetes, osteoarthritis, hyperlipidemia, chronic kidney disease and eventually some cancers including endometrial, breast, ovarian, prostate, liver, gallbladder, kidney and colon.<sup>3</sup>

Despite its multifactorial pathogenesis and variety of medical interventions available for treatment, metabolic and bariatric surgical procedures are the most effective and durable therapies. Numerous surgical techniques and procedures have been developed during the last 50 years; the advent of new surgical devices and instruments has increased its safety, efficacy and demand.<sup>2,3</sup>

The first metabolic surgery was attributed to Dr. Kremen in 1954, when the jejunio-ileal bypass was first performed. The procedure resulted major biochemical complications, with severe diarrhea and dehydration. In 1966 Dr. Mason proposed the first "bariatric surgical procedure" after realizing that patients who underwent subtotal gastrectomy for cancer experienced weight loss during the postoperative recovery period.<sup>4</sup> This technique initially consisted of a horizontal gastric transection with a loop ileostomy that was later optimized to smaller gastric pouches and stoma sizes. Some patients post-operatively developed severe bile reflux and finally a "Roux-en-Y" reconstruction was proposed to resolve the problem.

Years later, in 1994 a new era of the Metabolic and Bariatric Surgery (MBS) was ushered in with the performance of the first laparoscopic gastric bypass by Dr. Wittgrove. Continued growth of MBS procedures has been demonstrated during the last two decades, with an estimate of more than 340,000 procedures performed worldwide in 2011.<sup>5</sup>

The American Society for Metabolic and Bariatric Surgery (ASMBS) in June 2018 published a report describing the most common MBS procedures as follows: Sleeve Gastrectomy (SG) 59.3%, Roux en-y Gastric Bypass (RYGB) 17.8%, Adjustable Gastric Band (AGB) 2.7%, Intra-gastric Balloon (IGB) 2.7%, other (O) 2.4% and Biliopancreatic Diversion with Duodenal Switch (BPD/DS) 0.7%. Revision cases represent 14.1% of the total of procedure performed annually, with increased absolute numbers of patients who have previously undergone surgery. Of the revision cases, 26% were performed to correct complications from a primary operation, 63% were performed for weight regain after the initial operation, and the remaining 11% were performed for both indications.<sup>6</sup>

As data accrues, the effectiveness and longevity of MBS has been demonstrated but there are rates at which all procedures might be susceptible to secondary to inadequate weight loss, weight regain, or complications. There are different factors involved in worse clinical outcomes, including nutritional, psychological and surgery-related. Additionally, failure rates might vary according to the type of procedure and criteria used to evaluate the patients. Due to the variability of existing literature and the absence of controlled, multi-center studies with standardized definitions, consensus and guidelines regarding revisional MBS procedures are not currently available. We believe that revisional procedures will be the next chapter of the MBS history.<sup>6,7</sup>

This subset of patients may present unique challenges in terms of defining appropriate reasons for re-intervention and technical conduct of the operations themselves. An appropriate

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care management approach based on a multidisciplinary specialty model (capable bariatric surgeon, dietitians, gastroenterologist, endocrinologist, psychologist, social worker, and specialized nurse) may improve the rates of success and lead to better clinical outcomes.<sup>4</sup>

Surgical options for revising primary MBS procedures for either complications or inadequate weight loss include revision of the primary procedure or conversion to BPD/DS, SG, One Anastomosis Gastric Bypass (OAGB) or RGYB. Initial experiences have been published during the last two years describing patient characteristics and clinical outcomes of MBS patients undergoing revisional procedures.<sup>8</sup>

In 2018, Almalki et al. published a retrospective review of 116 patients with failed restrictive bariatric operations that underwent laparoscopic revisional bypass surgery (RYGB vs OAGB). Among 116, 81 had previous vertical banded gastroplasty (VBG) and 35 had AGB. An average age at revision surgery was 35.7 years and average BMI before the reoperation was (37.2) kg/m<sup>2</sup>. Revision surgery occurred after (58.8) months from the primary procedure. Reasons for reoperations were described: weight regain (50.9%), inadequate weight loss (31%) and intolerance (18.1%). Procedures were completed laparoscopically in all cases, however RYGB had significantly longer operative times than OAGB. Complications rate was (10%) without significant difference between both groups. They concluded that RYGB and OAGB are acceptable options for revising cases with equal safety profile even though OAGB was shown to be a simpler technique.<sup>9</sup>

Landreneau et al. showed a series of 89 patients that underwent conversion of SG to RYGB for weight recidivism or complications related to SG. Common complications were defined as: GERD (40.5%), sleeve stenosis (31.0%), gastrocutaneous (16.7%) or gastrophrenic (7.1%) fistula, and gastric torsion (4.1%). Mean age was 47.2 years and median BMI at the time of revision was 43.2 kg/m<sup>2</sup>. Laparoscopic approach was completed in (85.4%) and (31.5%) had complications which included surgical site infection (20.2%), reoperation (6.7%), anastomotic stricture (3.4%), one pulmonary embolism and there were not mortalities. Study concluded that this conversion approach is safe, technically feasible and showed a reasonable complication profile.<sup>5</sup>

Alsabah et al.<sup>10</sup> published a short-term results of revisional OAGB after SG experience due to a weight regain. A retrospective review was conducted with a total of 31 patients with history initial SG. (87.1%) were female, the mean BMI at the time of revisional surgery was 49 kg/m<sup>2</sup> and the average duration until patients underwent revisional OAGB was 5.1 years. The cause for revision was weight regain (86.1%), inadequate weight loss (10.3%), or the development of a complication (reflux) (6.5%). Only three (10.3%) morbidities were reported and thereafter successfully resolved during follow up. Conclusion affirmed that OAGB is safe and effective method in the short-term basis for the management of failed SG.<sup>11</sup>

Finally a questionnaire-based survey that included bariatric surgeons from around the world has been recently published by Mahawar et al. in 2018 as well. Considering the lack of evidence on various aspects of Revisional Bariatric Surgery (RBS) the study attempted to understand the variation in practices concerning RBS. A total of 460 responders from 62 countries were included in this survey. They found that the RYGB emerged as the commonest choice after both primary

AGB and primary SG (75.5% and 77.7% respectively). For revision after SG the second most common option was OAGB (37.2%). For revision after RYGB, surgical pouch reduction (49.1%), prolongation of bilio-pancreatic limb (30.0%), and surgical stoma size reduction (26.4%) were the most preferred options. As expected in this study, revisional bariatric surgeons expressed the importance of thorough evaluation by a multi-disciplinary team (dietician, psychologist, endocrinologist) before surgical re-intervention.<sup>12</sup>

Our initial experience at Cleveland Clinic Abu Dhabi (CCAD) shows RYGB as the main revisional procedure after failed SG, especially in patients with “de novo” GERD or sleeve technical complications.

One hundred twenty one patients underwent conversion or revision during the last three years, representing 20.5% of all bariatric procedures performed. The most common conversion was SG to RYGB (95%), or bypass distalization due to weight regain after previous RYGB (5%). The most common indications for conversion were GERD (*n*=40, 33%), weight regain (*n*=39, 32.2%), chronic nausea, vomiting, and/or dysphagia (*n*=36, 29.7%). Readmission rate within 30 days was (8.2%). Median BMI at 12-months was 30 (20-39 kg/m<sup>2</sup>). No mortalities at a median follow-up of 24 months.

RYGB appears to be a safe and effective conversion procedure after failed SG cases. RYGB provides adequate weight loss and GERD management with low risk for severe nutritional and metabolic derangements (that can be experienced with other surgical procedures such as the BPD/DS or its variations). The RYGB is our procedure of choice as revision because of a well-balanced risk/benefit equation. This is of importance in populations where loss of follow-up is higher and the BPD/DS is not a reasonable option.

Evidence in the existing scientific literature and guidelines put forth from leading surgical organizations can help guide surgeons to select the most appropriate and effective therapeutic interventions. With an increasing disease burden of obesity and metabolic disease and longer duration of data accruals, this information will increasingly guide decision-making processes for patients.<sup>13,14</sup>

Currently, there are limited large number, well-constructed data series to guide pathways and treatment algorithms.<sup>15</sup> Further studies are needed to confirm the long-term benefits and durability of initial experiences already published.<sup>7-9</sup>

In conclusion, considering the critical number of patients that experience weight regain and recurrence of comorbidities after primary bariatric procedures, there is a clear need for bariatric surgeons to define new treatment alternatives promptly, including surgical, intervention, medical, and lifestyle based therapies. A combination of these therapies will offer patients the best opportunity for durable and effective treatment of obesity and metabolic diseases.

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