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Conversion from mini bypass to laparoscopic Roux en Y gastric bypass in an emergency setting: Case report and literature review

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ABSTRACT

INTRODUCTION: It has been demonstrated that certain technique endpoints are key to the success for the OAGB and RYGB procedures but only a few texts in which post-operative complications are documented.
PRESENTATION OF CASE: 42-year-old male patient admitted to the emergency department for presenting abdominal pain located in the epigastrium for 4 days, melenic evacuations and syncope on one occasion. Two years prior to admission, the patient underwent a single anastomosis bypass for grade III obesity.

Gastric bypass mini revision surgery was performed an antecolic and antegastric gastrointestinal anastomosis was made with a 3 cm latero-lateral anastomosis; an intestinal-intestinal anastomosis was performed 60 cm from the gastric anastomosis. The length of the biliopancreatic loop (120 cm) and the feeding loop (60 cm) are reviewed.
DISCUSSION: Performing an "en bloc" resection of the anastomosis is essential since bile reflux is one of the irritation mechanisms of the anastomosis but not the only one. The size of the gastric pouch directly influences the frequency of marginal ulcers, so during the OAGBP revision, the gastro-jejunal junction must be resected to remodel it, reducing the size of the gastric reservoir that allows to perform the new anastomosis in less inflamed tissue. Roux-en-Y reconstruction should be performed once the length of the biliopancreatic loop is verified and it does not exceed 150 cm and a short alimentary loop to avoid nutritional complications.

Complications arising from bariatric procedures are varied, infrequent in well-trained surgeons, but severe in inexpert hands, leading to an increase in mortality rates.
CONCLUSIONS: We propose the laparoscopic conversion of OAGB to RYGB as a safe method, and feasible in hemodynamically unstable patients.

1. Introduction

Obesity and obesity related comorbidities has been shown to have become one of the most enormous challenges we face in healthcare as well as in the global economy [1,3].

The prevalence of obesity and Type 2 Diabetes Mellitus, not only reduced life expectancy, but has also increased financial burden [1]. Bariatric surgery has currently proven to be the only lasting way to treat obesity, and its primary objective is to attack the principal cause of an endless number of related secondary health problems, for example: type II diabetes, hypertension, metabolic syndrome, distress from sleep, gastroesophageal reflux disease, among others [3,5,4,8].

Over the past four decades, the prevalence of overweight and obesity has increased worldwide. In 2016, there were 340 million children and adolescents and 1.9 billion adults who were overweight or obese [1,2]. In Mexico, during 2016, the prevalence of overweight and obesity in children under five years was 6.1%, in school children 33.2%, in adolescents 33.6% and in adults 72.5% [1,2]. Obesity and its comorbidities have currently positioned themselves as one of the greatest challenges in the health and economic system worldwide, since not only decrease the quality and life expectancy of the population, but their care requires great amounts of economic, human and infrastructure resources, monopolizing a large percentage for health spending [4,5].

Bariatric surgery represents one of the greatest success stories in modern medicine, since 1970 with just 10 cases reported in major

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scientific journals in the United States of America, today it is an important component of the specialty of general surgery [5,8].

Many surgical procedures have been developed, however the principles that govern the standard procedures today follow two fundamental ideas, limiting gastric capacity (restrictive) and altering the absorption of the small intestine (malabsorptive) [5]. It is almost a rule that higher complexity procedures are associated with greater weight loss and better resolutions of most of the comorbidities such as diabetes and hypertension [24–26].

Owing to the restrictive and malabsorptive mechanism, Y-Roux gastric bypass seems to be a better procedure in weight reduction and Type 2 Diabetes mellitus remission rates, compared with Sleeve Gastrectomy [6–8]. However, Y-Roux Gastric bypass seems to be an inferior procedure compared with Sleeve Gastrectomy in terms of simplicity and reproductivity. Proposed from 2001, mini gastric bypass is a simple, effective, and safe procedure with only 1 loop gastro-jejunal anastomosis, which combines the merits of the other two procedures [5,6,8].

Now a days, only a few texts in which complications after OAGB are documented, comparing to those related with RYGB [8,9]. It has been demonstrated that certain technique endpoints are key to the success of these procedures, the size of the gastric pouch, the length of the biliary loop and digestive loop [10]. In some cases, despite the technique, the initial operation may not result in adequate weight loss or resolution of comorbidities, and complications may develop from the original surgery, necessitating further operations, but as discussed before, complications have traditionally been covered and little or none evidence is found [25,26].

Complications arising from bariatric procedures are varied, infrequent in well-trained surgeons, but severe in inexpert hands, leading to an increase in mortality rates [26].

The aim of this revision is to detect the existence of risk factors, technical surgical aspects and other characteristics that help preventing complications, improving the management and the result in those cases in which revision surgery is needed.

*This work has been reported in line with the SCARE criteria [23].

2. Presentation of case

42-year-old male patient admitted to the emergency department for presenting colic-type abdominal pain located in the epigastrium and mesogastrium for 4 days, melenic evacuations and syncope on one occasion. Two years prior to admission, the patient underwent a single anastomosis bypass for grade III obesity (initial weight of 125 kg) with a BMI of 41.5 kg/m2sc and insulin resistance. He refers lack of adherence to multidisciplinary treatment, smoking cessation since surgery with regular consumption of vaporizer. Current weight 82 kg, BMI 26. Upon admission, he presented a heart rate of 105 bpm, BP 80/50 mmHg, Temp 36, FR 23, Sat 02 92%. Integument pallor, diaphoresis, oropharynx without alterations. Chest without acute ventilatory compromise.

Abdomen soft, tender on palpation of epigastrium, with no evidence of peritoneal irritation. Laboratories show hemoglobin 6 mg/dL, hematocrit 35, leukocytes 5.5, platelets 200, C-reactive protein 15 mg/dL. Resuscitation is started with isotonic solutions and transfusion of two red blood cell concentrates. Panendoscopy was performed, which reported: 1) gastrojejunal anastomosis with a 3 cm fibrin-covered ulcer with raised borders, non-confluent edges, friable at biopsy, Forrest III, (Fig. 1) 2) erosion at the gastrojejunal junction, 3) bile reflux and acute erosive gastropathy, 8 cm longitudinal gastric pouch, rest of intestine without alterations. Biopsies report negative for H. pylori, gastro-intestinal mucosa with acute and chronic inflammation, edema, vascular/capillary congestion and reactive-regenerative changes. The patient is admitted to hospital for management with prokinetics, pump inhibitors, and sucralfate. During the first hours of hospitalization the patient presents melenic evacuations and pain in the epigastrium which does not subside despite pain killers. A colonoscopy was performed which reported: 1) a 1.5 cm pedicle polyp with an adenomatous appearance, 2) a 1 cm hyperplastic flat polyp. Polypectomies are performed. Biopsies report tubular adenoma with low-grade dysplasia.

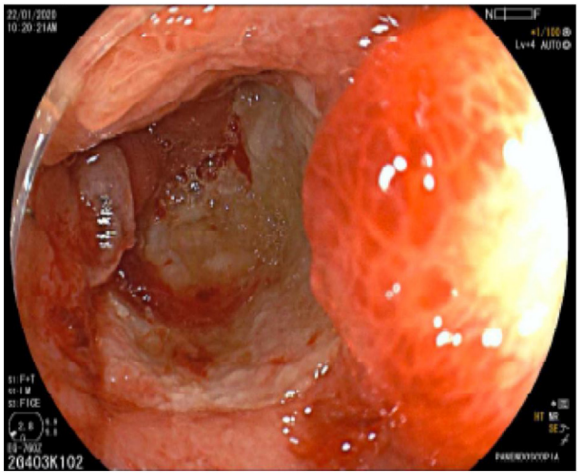

Fig. 1. Endoscopic image showing the anastomotic site ulcer classified as Forrest III.

48 h after admission, the patient presented hemodynamic instability with BP 80/50, tachycardia of 110 bpm, control studies were carried out, which showed hemoglobin of 6 g/dl, resuscitation was performed with 4 units of erythrocyte concentrates, 4 units of plasma fresh frozen and isotonic solutions. Due to the clinical evolution of the patient with a bleeding marginal ulcer, it was decided to schedule the patient for gastric bypass mini revision surgery.

2.1. Surgical technique

The patient is positioned in french position with the surgeon between the patient's legs, the assistant camera on the left, and the first assistant on the right. Supraumbilical incision is made and 1) 12-mm trocar is placed for the camera and pneumoperitoneum is performed with optical trocars, 2) accessory trocars are placed: 5-mm epigastrium for hepatic retractor, 12 mm left subcostal in the middle clavicular line at 3 cm from the costal margin, 10 mm right subcostal midline clavicular line 3 cm from the costal border and 5 mm left flank 5 cm from the costal border. A revision of the cavity was performed without finding free fluid or perforation. Omentum adhesions to the gastrojejunal junction are observed (Fig. 2). Adherenciolysis is performed and the 10 cm long tubular gastric pouch is reviewed from the gastric esophagus junction to the anastomosis. The small intestine was reviewed from the Treitz angle to the ileocecal valve, finding the gastrojejunal anastomosis 140 cm from the Treitz angle.

Dissection was performed on the anterior and posterior perigastric adhesions with harmonic scalpel. Mesentery is dissected to perform a "en bloc" resection of the gastro-jejunal anastomoses with a 60 mm linear stapler, dividing the gastric pouch 8 cm from the esophagogastric junction and the jejunum 3 cm from both sides of the gastric anastomosis (Figs. 3 and 4). A suture rein was placed on the bilio-pancreatic loop as a reference. Subsequently, an antecolic and antegastric gastrointestinal anastomosis was performed with a 3 cm latero-lateral anastomosis using a linear stapler, enterotomy suture with 2–0 absorbable barbed suture (Fig. 5). An intestinal-intestinal anastomosis was performed 60 cm from the gastric anastomosis with a linear stapler (Fig. 6) and an entero-

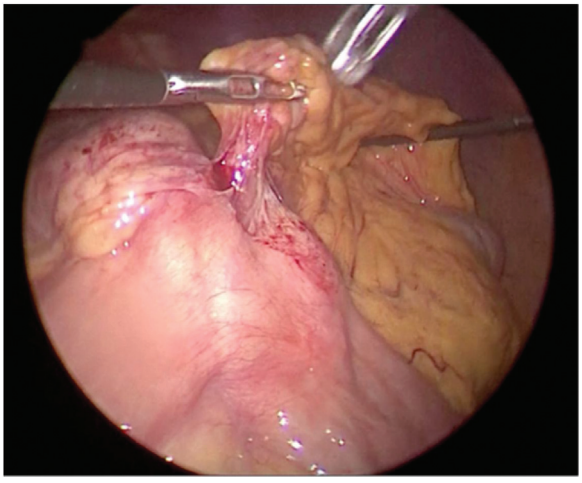

Fig. 2. Intraoperative image showing site of anastomotic ulcer.

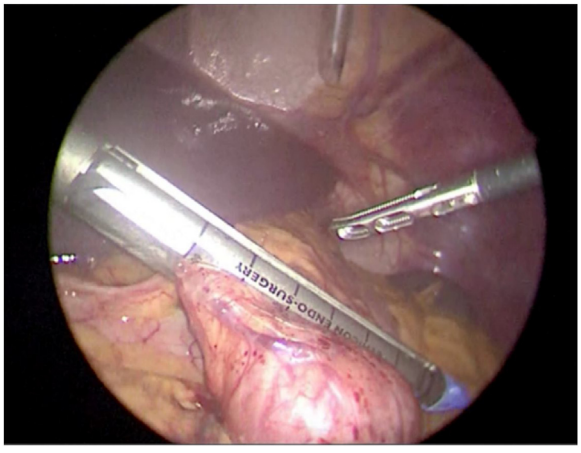

Fig. 3. Intraoperative image showing gastric pouch resection.

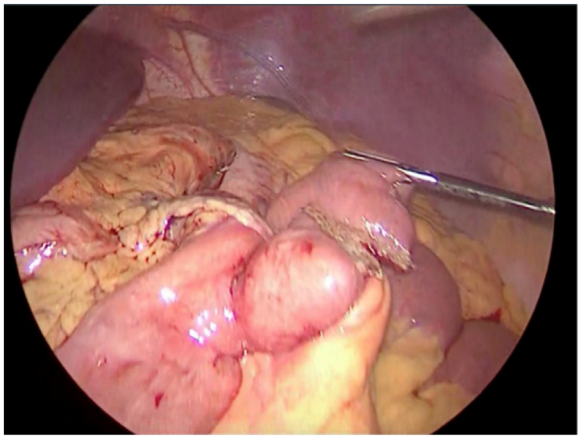

Fig. 4. Intraoperative image showing biliopancreatic limb En-bloc resection.

tomy was closed with a 2–0 absorbable barbed suture. The length of the biliopancreatic loop (120 cm) and the feeding loop (60 cm) are reviewed. A methylene blue test is performed, being negative. Peterson's space and mesentery are closed with a continuous suture of 2–0 non-absorbable suture. A specimen is removed with a bag.

The patient is admitted to hospital to continue management with pump inhibitors and pain relievers. A liquid diet is started 24 h after surgery and he is discharged with a soft diet on the 5th

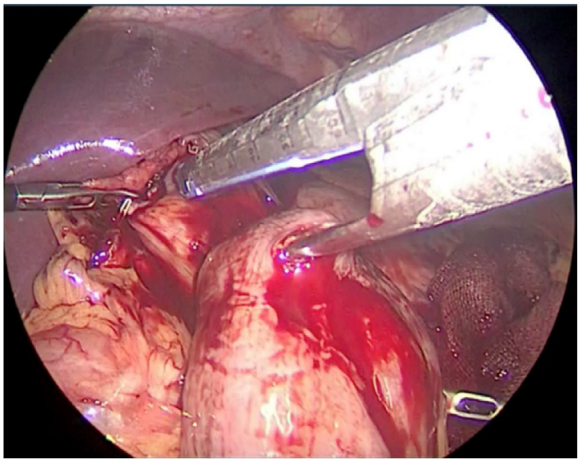

Fig. 5. Intraoperative image showing gastrojejunal anastomosis.

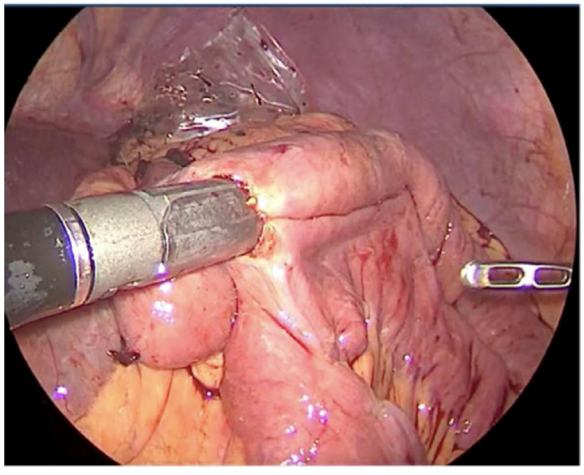

Fig. 6. Intraoperative image showing yeyunal- yeyunal anastomosis.

postoperative day. Control endoscopy is performed 6 months after surgery, which reports normal gastro-jejunal anastomosis.

3. Discussion

Obesity is a disease that has affected the entire world population and in Mexico it represents one of the pathologies that has increased the most in the population. During the period between 2012 and 2018 in our country, the prevalence of obesity has gone from 31% (95% CI 30.2–32.0) to 33.6% (95% CI 30.4–36-9), affecting women in 40.1% and men in 26.6% [1]. This represents one of the great challenges of public health since obesity causes different comorbidities such as diabetes, high blood pressure, digestive and cardiovascular diseases, different types of cancer and increases the mortality of different diseases such as pneumonia. by SARS-CoV-2 [2]. Treatments for obesity include lifestyle changes, nutrition, physical activity, exercise, psychological therapy, drug treatment, and bariatric surgery [3].

Bariatric surgery in the last two decades has had a significant growth and development. The selection of the patient, the perioperative management and the postoperative follow-up together with the technological evolution of the equipment for laparoscopic surgery and the improvement in the staple material have made surgery a safe treatment that produces the greatest weight loss and improvement of comorbidities in patients with obesity [4].

In 1970, in North American journals, only 10 articles related to bariatric surgery were published; in 2019 pubmed has regis-

tered more than 4,300 articles, which shows that obesity surgery is, today, an important component of the specialty of general surgery [5]. There are different types of bariatric surgery that cause different effects on the digestive system to achieve: 1) restriction and 2) malabsorption of nutrients, causing a deficit of ingested energy, an increase in gastrointestinal hormones and consequently weight loss.

The International Federation for Obesity and Metabolic Diseases Surgery (IFSO) in 2016 noted that 634,897 primary procedures (92.6%) and revision 50,977 (7.4%) were performed worldwide, with vertical gastrectomy (gastric sleeve) being the most widely performed surgery in 53.6% followed by Roux-en-Y bypass in 30.1% of cases. The single anastomosis bypass (OAGB) was performed in 4.8% [6].

Single anastomosis gastric bypass (OAGB) was described by Rutledge in 1997 and introduced in 2001 as a simple, effective and safe alternative to RYGB [7]. In the last 15 years, different studies have been reported on the advantages of this technique over the Roux-en-Y bypass [8–10], however, there is an intense debate regarding complications, early and late [19].

Maud et. to the reported their findings in the YOMEGA study, a multicenter non inferiority study between the OAGB and RYGB, with 2-year follow-up of 234 patients (117 per group). Weight loss was greater in the OAGB group (−87.9% vs. −85.8%), however, greater complications were reported in patients who underwent OAGB surgery, finding bile reflux in 16% of patients vs 0% in the group. from RYGB [11].

Lee, et al. published the results of 80 patients randomized to receive OAGB and RYGB. Weight loss and resolution of comorbidities at two years was markedly higher in the OAGB group. Highlighting among the advantages of OAGB, the lower learning curve and technical ease compared to traditional gastric bypass, however, in reference to gastrobiliary reflux, the authors did not carry out a follow-up or postoperative evaluation [12]. The same author published a review comparing the two studies. (YOMEGA and TAIWAN) concluding that both procedures have a similar weight loss with an increased risk of malnutrition and bile reflux in patients with OAGB [13].

Carbajo, Luque de León, et al. [14] published a series of 1200 consecutive patients operated in a 6-year period. 2% (26 patients) of the patients reported sporadic reflux and 0.5% (6 patients) presented with marginal or anastomotic ulcers, however the loss of 30% of the patients during the follow-up causes bias in their conclusions.

According to Parmar et al., 12,807 OAGB procedures have been published followed over time for at least 6–12 months, concluding with the following results: mortality of 0.1%, early complications of 4.67% and late complications in specific marginal ulcers of the 2.08% which appear slightly more than in RYGB. The conversions from OAGB to RYGB were described in 4% and of this percentage mostly due to the persistence of GERD without mentioning the existence or not of marginal ulcers. A number greater than 1.2% reported by Kassir in a retrospective analysis of 2,780 patients [15].

Recently published in a case report, Godina et al. documented the persistence of a bleeding marginal ulcer after three unsuccessful attempts at endoscopic management, where RYGB was performed in an emergency setting, effectively and safely for the patient. This study being the only case in the context of reported late complication [16].

Bolckmans and Arman in 2018 published a retrospective study including 28 patients who successfully underwent laparoscopic conversion of OAGB to RYGB. 8 of them presented marginal ulcer refractory to treatment, and one of them presented an emergency due to perforation at the ulcer site. No postoperative mortality was reported [17].

According to Rangan Sudan and Ninh T Nguyen out of 449753 bariatric operations were preformed during 2007–2012, with 6.3% of reoperations needed due to adverse events and severe adverse events, in which 69% were corrective procedures and 30% were conversions, showing a 30 day mortality for conversions in .21%, and 1 year mortality in .31%. Concluding a low mortality rate for reoperations in experts hands [25].

In our case, despite optimal conservative management and continuous monitoring, it was decided to perform a surgical review due to rebleeding of the ulcer and due to the associated mechanism of bile reflux and long vertical pouch [19–21]. We considered that conservative management would be unsuccessful and would increase the patient morbidity. We consider that performing a “en bloc” resection of the anastomosis is essential since bile reflux is one of the irritation mechanisms of the anastomosis but not the only one [21]. The size of the gastric pouch directly influences the frequency of marginal ulcers, so during the OAGBP revision, the gastrojejunal junction must be resected to remodel it, reducing the size of the gastric reservoir that allows to perform the new anastomosis in less inflamed tissue [18,19,22]. Roux-en-Y reconstruction should be performed once the length of the biliopancreatic loop is verified and it does not exceed 150 cm and a short alimentary loop to avoid nutritional complications.

4. Conclusions

Compared to the thousands of texts documenting the success of OAGB, there is very little evidence in the literature reporting complications, and the treatment of them, much less evidence has been documented of conversions from laparoscopic OAGB to RYGB in an emergency setting, as it was in our case due to acute bleeding with hemodynamic instability.

As we discussed before, complications arising bariatric procedures can be severe, and if not recognized and treating them aggressively, we can lead to an increase in morbidity and mortality. Also is important to emphasized that bariatric procedures and its techniques require a full training, therefore only bariatric certified surgeons should be the one treating these complex patients in order to minimized surgical complications.

In our experience, we propose the laparoscopic conversion of OAGB to RYGB as a safe method, and feasible in hemodynamically unstable patients. Our case shows that short, medium and long-term follow-up in post-operative patients for bariatric procedures should be mandatory, including a multidisciplinary team leaded by a certified bariatric surgeon, to achieve adherence to treatment, and the timely detection of possible complications.

Declaration of Competing Interest

The authors report no declarations of interest.

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There was no sponsorship for this study.

Ethical approval

There was no need for ethical approval.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author's contribution

Fernando Perez Galaz MD FACS: Study design.
Karen Modeano Rico MD: Study design.
Maria Elena Lopez-Acosta MD MD: Data collection, data analysis, writing the paper.
Issac Raffoul Cohen MD: Data collection, data analysis.
Oscar Cervantes Gutierrez MD: Data Collection.
Raul Cuevas Bustos MD: Study design.
Felix Alejandro Perez Tristan MD: data collection.
Marcos; Jafif Cojab MD: Data collection, data analysis, writing the paper.

Registration of research studies

None.

Guarantor

Fernando; Perez Galaz MD FACS.

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