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Original Article

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Simultaneous Complex Incisional Hernia Repair and Bariatric Surgery for Obese Patients: a Case Series of a Single-Center Early Experience

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ABSTRACT

Purpose: Obesity is associated with recurrence of complex incisional hernia repair (CIHR). Bariatric procedure during CIHR can improve recurrence rates without increasing morbidity. This study aimed to describe our results after CIHR in patients with obesity, in which a simultaneous bariatric procedure was performed.
Materials and Methods: We performed a retrospective observational study including patients who underwent surgery between January 2014 and December 2018, with a complex incisional hernia (CIH) according to the Slater classification and body mass index (BMI) ≥35. CIHR was the main indication for surgery. We collected demographic data, comorbidities, CIH classification according to the European Hernia Society, type of bariatric procedure, postoperative morbidity using the Dindo-Clavien classification, and short-term results. Computed tomography (CT) is performed preoperatively.
Results: Ten patients were included in the study (7 women). The mean BMI was 43.63±4.91 kg/m^2. The size of the abdominal wall defect on CT was 8.86±3.93 cm. According to the European Hernia Society classification, all CIHs were W2 or higher. Prosthetic repair of the CIH was selected. Onlay, sublay, preperitoneal, and inlay mesh placement were performed twice each, as well as one modified component separation technique and one transversus abdominis release. Gastric leak after sleeve gastrectomy was the only major complication. Short-term outcomes included one recurrence, and % total weight loss was 24.04±8.03 after 1-year follow-up.
Conclusion: The association of bariatric procedures during CIHR seems to be feasible, safe, and could be an option for surgical treatment in selected patients.

Keywords: Incisional hernia; Bariatric surgery; Hernia repair; Obesity

INTRODUCTION

Incisional hernia (IH) is a frequent condition after surgery. The IH rate estimated in the published literature is 12.8% after approximately 2 years [1], and obesity has long been recognized as one of the most relevant conditions predisposing to the development of this complication, typically after open procedures [2,3].

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Conflict of Interest

None of the authors have any conflict of interest.

Author Contributions

Conceptualization: Sebastián-Tomás JC, Diez-Ares JA, Peris-Tomás N; Data curation: Sebastián-Tomás JC, Diez-Ares JA; Formal analysis: Sebastián-Tomás JC; Validation: Sebastián-Tomás JC, Diez-Ares JA, Peris-Tomás N, Navarro-Martínez S, Periañez-Gómez D, Pérez-Rubio A, Martínez-Mas E, Trullenque-Juan R; Writing - original draft: Sebastián-Tomás JC; Writing - review & editing: Sebastián-Tomás JC, Diez-Ares JA, Peris-Tomás N, Navarro-Martínez S, Periañez-Gómez D, Pérez-Rubio A, Martínez-Mas E, Trullenque-Juan R.

Recurrence after IH repair is approximately 11% [4]. Obesity can be a contributing factor for recurrence after IH surgical repair, increasing the risk by a factor of 4.2 in patients with a body mass index (BMI) of 38 as compared to normal-weight patients with a BMI of 23 kg/m^2 [4]. Patients with IH and obesity or recurrence after previous mesh repair, above other factors, meet the criteria for a complex IH (CIH) [5]. CIH repair (CIHR) is associated with a high complication rate [6]. Although it varies considerably, rates as high as 50% are not uncommon when treating giant IHs [7].

There are several options for the treatment of IH in obese patients. Surgeons can decide to treat the hernia-first, obesity-first, or both at the same time. Currently, there is no consensus on the management of these patients [8]. Concomitant IH repair and bariatric surgery (BS) association have been widely reported, documenting the safety of implantation of mesh simultaneously with different bariatric or metabolic procedures, especially when a laparoscopic approach is performed [9,10]. Preoperative weight loss can be achieved with other therapies, such as preoperative very-low-calorie diets, pharmacotherapy, intragastric balloon therapy, and BS as a first-stage procedure before IH repair, with varying degrees of success [8].

A series analyzing specific cases of CIHR as the main indication for surgery in obese patients eligible for BS are scarce, even more, if we consider BS as an adjunctive treatment for postoperative weight loss [11]. Therefore, the present study aimed to evaluate the feasibility of CIHR associated with simultaneous BS in obese patients.

MATERIAL AND METHODS

1. Patients

This was a retrospective case series of consecutive patients with obesity (BMI ≥35 kg/m^2) who underwent CIHR with adjunctive BS between January 2014 and December 2018 at our center. The original study was performed in accordance with the last version of the Declaration of Helsinki. Written informed consent was waived due to the retrospective nature of this study, according to the present legislation. The Preferred Reporting of CasE Series in Surgery guidelines and statements checklist was followed [12].

Data included demographic information, patient medical history, nutritional parameters, characteristics of IH, intraoperative and postoperative complications, mortality, and mid-term outcomes such as weight loss parameters, comorbidity resolution rates, and hernia recurrence evaluation.

All patients underwent a clinical evaluation and underwent computerized tomography (CT) with a Valsalva maneuver. All patients met the standard International Federation for the Surgery of Obesity criteria for BS (BMI >40 kg/m^2, or >35 kg/m^2 with at least 2 comorbidities and repetitive dietary failure). These patients underwent the usual preparation before surgery as established in our protocol, excluding any medical contraindication, and required a minimum of 10% preoperative weight loss to be candidates for surgery. Before surgery, a multidisciplinary team evaluated all candidates.

2. Operative procedures

Symptomatic CIH was the main indication for surgery in all cases. Patients who were scheduled for BS with simultaneous IH in which morbid obesity was the primary indication

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for surgery were excluded, as well as incidentally ventral hernias discovered during BS. The main reason for performing both interventions simultaneously was the life-limiting symptomatology of these patients, which did not allow us to delay the CIHR. Therefore, we attempted to achieve a gradual reduction in the increased risk of severe obesity by performing both procedures simultaneously.

CIHR techniques were individualized based on clinical evaluation, preoperative CT findings, and comorbidities. We performed onlay/sublay/preperitoneal/inlay mesh repair, modified component separation technique (MCST), and transversus abdominis release (TAR) to provide the best option available. An experienced abdominal wall surgeon decided the best procedure for each patient. Patients with large midline defects (>8 cm). were selected for onlay mesh placement and, after implementation in our department, for the MCST. For lateral hernias, preperitoneal mesh placement or, more recently, TAR was chosen. Sublay mesh repair (Rives-Stoppa technique) was used in patients with predominant upper midline defects. If the patient's risk of skin complications increased due to comorbidities, inlay mesh placement was proposed.

The MCST and TAR are novel techniques for CIHR. The MCST (**Fig. 1**) is used to provide adequate coverage for large midline abdominal wall defects and, based on the original description by Ramirez, it uses a myoplasty plus a large mesh [13,14]. TAR (**Fig. 2**) is a posterior component separation described by Novitsky et al. [15], which is suitable for both ventral and lateral defects. In this procedure, a sublay mesh is placed after division of the transverse abdominis muscle.

The BS procedures included sleeve gastrectomy (SG) and Roux-en-Y gastric bypass (RYGB). We determined the optimal bariatric procedure after a comprehensive preoperative evaluation, similar to other obese patients undergoing BS at our center. The laparoscopic or open approach was decided according to the CIH size and the chosen repair technique. BS was performed by experienced bariatric surgeons.

3. Follow-up

Routine follow-up after BS and CIHR was performed in all patients, with clinical and analytical evaluations at 1, 3, 6, and 12 months during the first year and then annually. CT was conducted only if any signs of clinical recurrence were identified. The patients' follow-up was at least 12 months, except for a loss to follow-up.

4. Definitions

Clinical IH was defined as a palpable fascial defect or visible protrusions at or near the surgical incision at rest or with the Valsalva maneuver and graded using the European Hernia Society (EHS) classification of primary and incisional abdominal wall hernias [16]. The radiologic hernia was defined as any protrusion of abdominal contents, including the anterior parietal peritoneum, visible as discontinuity of the fascial layers on the CT scan performed during follow-up.

Complex hernias were defined according to Slater's criteria for the definition of a complex abdominal wall hernia [5]. This classification has the advantage of listing almost all factors that are relevant for a complex hernia, discerning different grades of severity between “minor,” “moderate,” and “major” dependent upon an expected increase in perioperative measures and planning, risk of complications, and costs.

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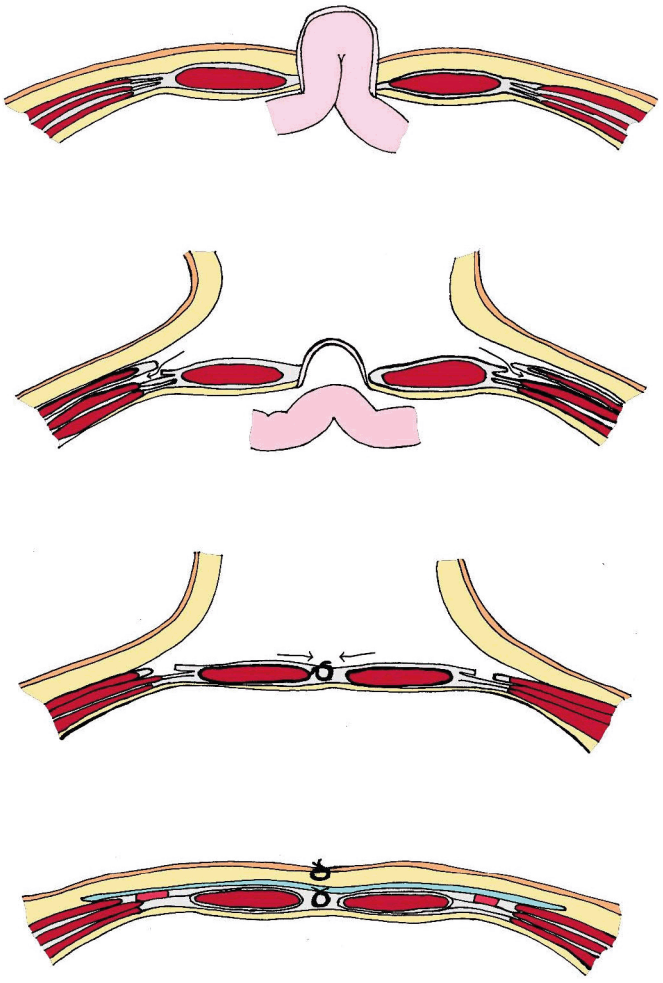

Fig. 1. Modified component separation technique. Carbonell-Bonafé's technique. This procedure began with elevation of the skin and subcutaneous fat from the rectus fascia and external oblique muscle and fascia. Subsequently, a vertical fasciotomy of the external oblique aponeurosis was performed at 0.5–1 cm lateral to the lateral rectus sheath border, and extended cranially and caudally to the costal margin and roof of the inguinal ligament, respectively. After the rectus muscles were re-approximated in the midline, the mesh was anchored to the costal margin, anterior iliac spine, and pubis, located between the internal and external muscles. A myoplasty was then performed to fix the external oblique muscle border.

Intraoperative complications were graded using the CLASSIC classification [17], with CLASSIC ≥III considered as major. Conversion was defined as any incision made earlier than initially planned to complete the bariatric procedure. Postoperative mortality was defined as the number of deaths occurring during the first 90 days after surgery, and postoperative morbidity was defined as the number of complications occurring within the first 90 days after surgery. Complications were grouped according to the Clavien-Dindo classification [18], with Clavien ≥IIIa as a major postoperative complication.

Weight loss after follow-up was determined by the annual BMI and percentage of total weight loss (%TWL) [19]. The degree of improvement was evaluated for the remaining comorbidities, as commonly reported.

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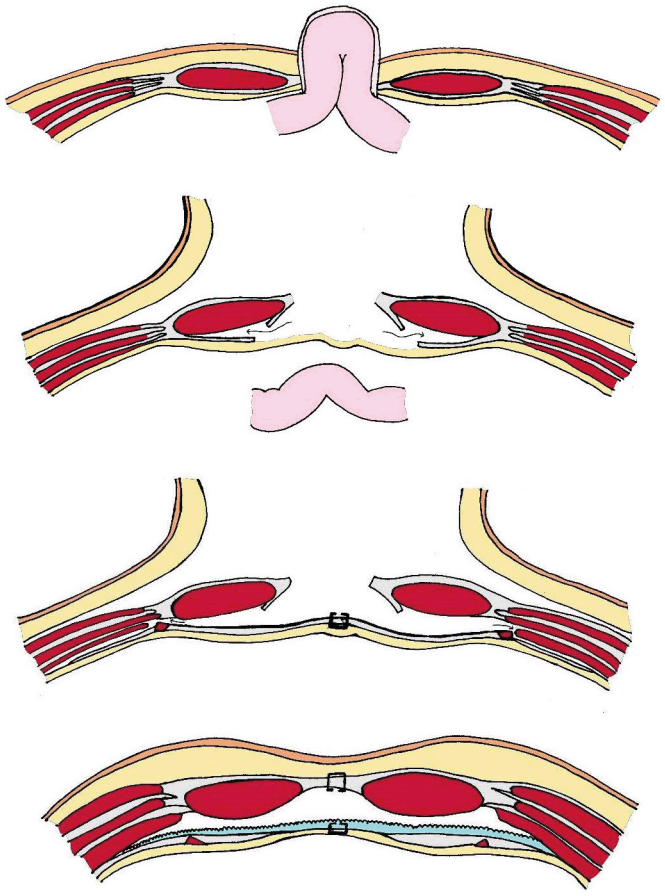

Fig. 2. Transversus abdominis release. In this procedure, the retromuscular space is developed laterally to the edge of the rectus sheath. The posterior rectus sheath is incised at 0.5–1 cm medial to the linea semilunaris to expose the medial edge of the transversus abdominis muscle. The muscle is then divided, allowing entrance to the space anterior to the transversalis fascia. The posterior rectus fascia then is advanced medially. The mesh is placed as a sublay and the linea alba is restored ventral to the mesh.

RESULTS

During the study period, 106 patients with CIH underwent CIHR. There were 7 onlay, 31 sublay, 16 preperitoneal, and 5 inlay mesh repairs; 38 MCST and 9 TAR. Recurrence occurred in 9 (8.49%) patients during follow-up. During the same period, 243 BS procedures were performed. They included 208 laparoscopic RYGB, 8 open RYGB, 19 laparoscopic SG, 6 open SG, and 2 revision procedures. We identified 10 (4.12%) postoperative complications, without mortality. The 1-year %TWL was 38.73±4.68.

Finally, ten patients met the inclusion criteria (7 women, 3 men) with a mean age of 48.40±8.09 years. The mean BMI at the first evaluation was 43.63±4.91 kg/m^2. The epidemiological features and comorbidities are shown in **Table 1**.

On the day of the intervention, the mean BMI was 38.74±6.74 with a percentage of preoperative weight loss of 14.16±6.89%, achieved in a mean of 63±8 days. According to Slater's classification, there were 5 (50%) minor and 5 (50%) moderate CIH. There were 3 (30%) lateral and 7 (70%) medial CIH. The size of the minimum transverse defect in the

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Table 1. Demographics and comorbidities (n=10)

Characteristics	Values
Age (years)	48.40±8.09
Sex	
Male	3 (30)
Female	7 (70)
BMI at the first evaluation	43.63±4.91
BMI before surgery	38.74±6.74
Preoperative weight loss (%)	14.16±6.89
ASA score I/II/III/IV	0/6/3/1
Arterial hypertension	4 (40)
Diabetes	1 (10)
Obstructive sleep apnea-hypopnea syndrome	2 (20)
Heart disease	0 (0)
Chronic pulmonary disease	0 (0)
Renal disease	1 (10)
Peripheral vascular disease	1 (10)
Liver disease	0 (0)
Smoker	1 (10)

Data are shown as mean±standard deviation or number (%).
BMI = body mass index, ASA = American Society of Anesthesiologists.

preoperative CT scan was ≥4 cm, which corresponds to W2 hernias in the EHS classification with a mean size of 8.86±3.93 cm. In 8 (80%) patients, these were recurrent CIH. Detailed epidemiological data, types, and classifications of CIH are described in **Table 2**.

Six (60%) RYGB (5 laparoscopic, 1 open) and 4 (40%) open SGs were performed. CIHR techniques were onlay/sublay/preperitoneal/inlay mesh repair in 2 cases each: 1 MCST and 1 TAR. In all cases, mesh placement was performed using an open approach. No additional procedures were performed. The mean operative time was 241.60±78.17 minutes. Three (30%) minor intraoperative complications were registered: 1) conversion to open surgery was needed in one patient due to severe adhesions; 2) gastric perforation in the removed stomach during SG; and 3) resection of the jejunal segment after performing gastrojejunal anastomosis. The detailed intraoperative course, bariatric procedures, and type of CIHR are described in **Table 3**.

Four (40%) minor and 1 (10%) major postoperative complications were recorded. The perioperative outcomes are displayed in **Table 4**. All minor complications were related to CIHR (2 seroma and 2 wound bleeding). A patient with long-term systemic corticosteroid therapy, in which an open SG and TAR were administered, developed an early gastric leak managed successfully with percutaneous drainage and endoscopic stent placement. No

Table 2. Patients' detailed preoperative evaluation (n=10)

Patient	Age	Sex	Smoking	Initial BMI	Preoperative BMI	%PWL	Slater	Lateral	Midline	Width	Recurrence	Diameter	Preoperative therapies[a]
1	56	Female	No	48.33	37.55	22.30	Moderate	L2	M2	W3	R2	12.1	None
2	54	Female	No	35.10	33.33	5.06	Minor		M2	W2	R3	6.9	None
3	47	Male	No	51.00	43.00	13.93	Moderate		M2	W3	R3	12.3	None
4	43	Female	No	43.70	38.88	11.43	Moderate	L4	M2	W2	R2	7.0	None
5	48	Male	No	49.93	45.83	8.22	Moderate		M3	W3	R2	13.0	None
6	54	Male	No	35.80	27.78	22.41	Minor		M2	W2	R1	7.5	None
7	48	Female	No	42.60	36.00	14.66	Minor		M3	W2	0	4.2	None
8	58	Female	No	45.00	39.00	12.38	Minor		M2	W2	R1	4.0	None
9	46	Female	No	47.50	44.00	6.67	Moderate	L2		W3	0	8.0	None
10	30	Female	Yes	45.30	34.00	24.53	Moderate		M5	W2	R1	4.0	None

BMI = body mass index, %PWL = percentage of preoperative weight loss.
[a]Preoperative botulinum toxin/pneumoperitoneum.

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Table 3. Patients' detailed intraoperative outcomes (n=10)

Patient	Bariatric procedure	Mesh placement	Mesh type	Mesh size	OT (minutes)	CLASSIC	Coversion	I. Drain	Days	S. Drain	Number	Days	NPWT	Antibiotic
1	LRYGB	Onlay	Polypropylene	30×30	352	II	Yes	Yes	5	Yes	3	5	No	Co-amoxiclav
2	ORYGB	Inlay	Polyester/collagen		210	0	No	Yes	5	Yes	2	6	No	Co-amoxiclav
3	OSG	Onlay	Polypropylene	30×30	311	I	No	Yes	4	Yes	4	20	No	Co-amoxiclav
4	LRYGB	Preperitoneal	Polypropylene	20×20	302	I	No	Yes	2	Yes	2	5	No	Co-amoxiclav
5	OSG	MCST	Polypropylene	50×50	228	0	No	Yes	2	Yes	2	8	PICO®	Co-amoxiclav
6	OSG	Sublay	Polypropylene		129	0	No	No		Yes	1	6	No	Co-amoxiclav
7	LRYGB	Inlay	Ventrio®	11×14	165	0	No	Yes	2	Yes	1	1	No	Co-amoxiclav
8	LRYGB	Sublay	Polypropylene	30×30	263	0	No	Yes	2	Yes	1	5	No	Co-amoxiclav
9	OSG	TAR	BioA Gore® + Polyp.	50×50	311	0	No	Yes	2	Yes	3	28	No	Co-amoxiclav
10	LRYGB	Preperitoneal	Ventrio®	11×14	145	0	No	Yes	4	Yes	1	6	No	Co-amoxiclav

OT = operative time, I. Drains = intra-abdominal drain, S. Drains = subcutaneous drain, NPWT = negative pressure wound therapy, LRYGB = laparoscopic Roux-en-Y gastric bypass, ORYGB = open Roux-en-Y gastric bypass, OSG = open sleeve gastrectomy, MCST = modified component separation technique, TAR = transversus abdominis release.

Table 4. Intraoperative and postoperative outcomes (n=10)

Characteristics	Values
Bariatric procedures	
RYGB (laparoscopic/open)	6 (60) (5/1)
SG (laparoscopic/open)	4 (40) (0/4)
Type of CIH mesh repair	
Onlay/sublay/preperitoneal/inlay	2 (20)/2 (20)/2 (20)/2 (20)
Modified component separation technique	1 (10)
Transversus abdominis release	1 (10)
Operative time (minutes)	241.60±78.17
Conversion to open	1 (10)
Intraoperative complications	
Global	3 (30)
CLASSIC ≥III	0 (0)
90-days postoperative complications	
Global	5 (50)
Clavien ≥III	1 (10)
ICU admission	6 (60)
Hospital stay (days), median (IQR)	6.5 (10)
90-days mortality	0 (0)
Follow-up (months)	21.90±15.81
CIH recurrence	1 (10)
1-year BMI	27.94±3.76
1-year %TWL	24.04±8.03

Data are shown as mean±standard deviation or number (%).
RYGB = Roux-en-Y gastric bypass, SG = sleeve gastrectomy, CIH = complex incisional hernia, IQR = interquartile range, ICU = intensive care unit, IH = complex incisional hernia, BMI = body mass index, %TWL = percentage of total weight loss.

mortality was observed. Six (60%) patients with high comorbidities required intensive care unit admission. The patient with gastric leak stayed during the first 96 hours after the onset of septic shock. The median length of hospital stay (LoHS) was 6.5 (interquartile range=10) days. In the 2 cases, the LoHS was significantly longer. One of them, who developed self-limited postoperative bleeding, had severe chronic kidney disease that led to prolonged hemodialysis sessions for recovery of renal function. The other patient was a previously mentioned patient with a gastric leak who required various non-surgical interventions to treat it, such as repeated endoscopic evaluations with stent changing due to distal migration and multiple percutaneous drainages.

The detailed postoperative complications and follow-up are described in **Table 5**. After a mean follow-up of 21.90±15.81 months, only 1 (10%) patient had an IH recurrence,

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Table 5. Patients' detailed postoperative outcomes (n=10)

Patient	Clavien Type	Complication	ICU	ICU days	Hospital stay	Readmission	Mortality	Follow-up (months)	1-year BMI	1-year %TWL	1-year recurrence	Late complications
1	I	Seroma	Yes	1	7	No	No	23	32.72	12.87	No	No
2			Yes	1	7	No	No	55	23.11	30.67	No	No
3	II	Bleeding[a]	Yes	1	50	No	No	14	28.70	34.37	No	No
4			No		5	No	No	45	31.63	18.63	Yes	No
5	I	Seroma	Yes	1	4	No	No	4				
6	I	Bleeding[a]	Yes	1	9	No	No	16	24.35	12.22	No	No
7			No		3	No	No	18	26.45	27.27	No	No
8			No		5	No	No	12	29.59	21.74	No	No
9	IIIA	Gastric leak	Yes	4	30	Yes	No	13	31.64	28.57	No	No
10			No		6	No	No	19	23.31	30.00	No	Marginal ulcer

ICU = intensive care unit, BMI = body mass index, %TWL = percentage of total weight loss.
[a]Wound bleeding related to complex incisional hernia repair.

discovered by clinical examination 6 months after surgery. One patient (10%) developed a marginal ulcer at the gastrojejunal anastomosis with chronic abdominal pain. This was identified during follow-up by endoscopic evaluation. The mean BMI after a 1-year follow-up was 27.94±3.76 and the mean 1-year %TWL was 24.04±8.03. One patient was lost to follow-up because of a limiting condition that made it very difficult to visit our outpatient clinic.

DISCUSSION

The present results suggest that concomitant CIHR and BS for obese patients with symptomatic CIH seem to be feasible and can be performed with acceptable short-term results. In our study, the 1-year recurrence rate was 10%, as described in both obese and non-obese populations. The recurrence rate after IH repair has been established to be between 8.7% and 32% [20]. Raftopoulos and Courcoulas [21] described their experience with ventral hernia repair (VHR) in obese patients (BMI ≥35 kg/m^2), reporting an 18.5% recurrence rate after 15 months of follow-up. In our opinion, weight loss and individualized procedures are the main factors that can explain the lower recurrence rate.

One of our main limitations is the variability of the procedures performed for both CIHR and BS. It is important to note that some of the CIHR procedures described, such as MCST and TAR, were implemented later and were not available at the beginning of the study. Currently, we use the MCST for hernias with an orifice diameter of over 8–10 cm. However, these patients have an excess of subcutaneous fat; therefore, onlay IH repair and MCST should be used with caution because of the higher risk of skin complications or wound seroma formation. Thus, sublay IH repair when feasible (up to 7–8 cm of orifice diameter), or even TAR, is a good option in these cases. TAR is especially useful in patients with wide lateral IH, such as kidney-transplant recipients. Regarding BS, beyond the comprehensive preoperative evaluation, one of the main limiting aspects is the presence of severe adhesions during the intervention. When it occurs, SG avoids small-intestine adhesiolysis and prevents adhesiolysis-related morbidity.

We believe that preoperative patient weight loss is mandatory. A minimum weight loss of 10% is required before concomitant CIHR and BS, as in the rest of the bariatric candidates. This improves postoperative treatment adherence and can be achieved without delay in surgical intervention. The mean BMI after a 1-year follow-up was 27.94±3.76 kg/m^2 and

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the mean 1-year %TWL was 24.04±8.03. BMI decreased by 20 kg/m^2 between the first preoperative evaluation and 1-year follow-up. The 1-year %TWL was based on international standards (>20% at 1–2 years) [22], but lower than the percentage obtained in bariatric patients operated during the same period at our center.

Although postoperative complications occurred in 5 patients (50%), we recorded only 1 (10%) major postoperative complication of Clavien IIIa after SG. Four (40%) minor complications were associated with CIHR. After IH repair, complication rates vary widely, ranging from 20% to 60% [7,20,23]. Lindmark et al. [23] reported 6% of Clavien IIIb-IV complications after VHR. Our results are similar to those described in these articles, and the association between CIHR and BS does not seem to increase postoperative complications. Postoperative LoHS can be considered relatively high, but we should consider that both interventions were performed simultaneously, avoiding 2 different hospital admissions.

After a review of the literature, we noticed that the series of patients receiving CIHR and BS simultaneously were scarce. Praveenraj et al. [11] reported their experience in treating recurrent ventral hernias in morbidly obese patients with laparoscopic intra-peritoneal mesh repair and concomitant BS. In these 23 patients, postoperative complications were 4 seromas, and no recurrence was noted at a median follow-up of 3.3 years. The number of CIH cases was low. Kondratenko et al. [24] included patients with ventral IH and obesity and comparted concomitant IH repair and BS with staged treatment with BS first. During the follow-up period after BS and hernioplasty, hernia recurrence occurred in 3 (9.1%) patients, and after hernioplasty in 11 patients (33.3%). However, this study has several limitations, and the optimal sequence for the management of these patients remains unclear.

We consider that performing both procedures simultaneously has several benefits: 1) it reduces the number of surgical interventions and admissions with supposed similar morbidity than staged procedures, which could probably be reflected in a reduction of cost; 2) treatment is optimized, obesity and IH are treated together, making the process more comfortable for the patients; 3) In staged sequence, BS is usually performed first and CIHR is delayed, so the possibility of IH complications could be reduced if BS and CIHR are the same. The use of special types of meshes in some CIHR procedures can improve the management of BS complications, particularly if surgical reintervention or percutaneous drainage is required. The location of the IH makes an initial laparoscopic approach advisable in some cases, such as lateral IH or those M4 or M5, in which open BS would require an upper midline incision.

The retrospective, descriptive design of our study and the small number of patients with concomitant CIHR and BS are the limitations of our study. Additionally, follow-up is not too long in some patients to make conclusions regarding hernia recurrence and only allows for describing short-term outcomes. The inclusion of patients with ventral, lateral, W2, and W3 CIH according to the EHS classification makes the ample of patients less homogeneous and prevents us from performing a standardized approach to both BS and CIHR. The small number of patients with this type of surgical treatment does not allow us to perform a comparative analysis with other approaches. With this study, our main goal is to describe our combined results of both approaches and their possible benefits, avoiding staged interventions. Comparative analysis to evaluate differences with other sequences requires multi-institutional well-conducted prospective randomized trials, which could be a good line of research for future studies.

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CONCLUSION

In conclusion, the association of concomitant CIHR and BS in obese patients with CIH seems to be safe and feasible. The major postoperative complications and IH recurrence rates were low. This modality of treatment could be an option in this group of patients, with a potential reduction in IH recurrence rates.

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REFERENCES

1. Bosanquet DC, Ansell J, Abdelrahman T, Cornish J, Harries R, Stimpson A, et al. Systematic review and meta-regression of factors affecting midline incisional hernia rates: analysis of 14,618 patients. PLoS One 2015;10:e0138745.
PUBMED | CROSSREF
2. Cleveland RD, Zitsch RP 3rd, Laws HL. Incisional closure in morbidly obese patients. Am Surg 1989;55:61-3.
PUBMED
3. Sugerman HJ, Kellum JM Jr, Reines HD, DeMaria EJ, Newsome HH, Lowry JW. Greater risk of incisional hernia with morbidly obese than steroid-dependent patients and low recurrence with prefascial polypropylene mesh. Am J Surg 1996;171:80-4.
PUBMED | CROSSREF
4. Sauerland S, Korenkov M, Kleinen T, Arndt M, Paul A. Obesity is a risk factor for recurrence after incisional hernia repair. Hernia 2004;8:42-6.
PUBMED | CROSSREF
5. Slater NJ, Montgomery A, Berrevoet F, Carbonell AM, Chang A, Franklin M, et al. Criteria for definition of a complex abdominal wall hernia. Hernia 2014;18:7-17.
PUBMED | CROSSREF
6. Deerenberg EB, Timmermans L, Hogerzeil DP, Slieker JC, Eilers PH, Jeekel J, et al. A systematic review of the surgical treatment of large incisional hernia. Hernia 2015;19:89-101.
PUBMED | CROSSREF
7. Eriksson A, Rosenberg J, Bisgaard T. Surgical treatment for giant incisional hernia: a qualitative systematic review. Hernia 2014;18:31-8.
PUBMED | CROSSREF
8. Menzo EL, Hinojosa M, Carbonell A, Krpata D, Carter J, Rogers AM. American Society for Metabolic and Bariatric Surgery and American Hernia Society consensus guideline on bariatric surgery and hernia surgery. Surg Obes Relat Dis 2018;14:1221-32.
PUBMED
9. Raziel A, Sakran N, Szold A, Goitein D. Concomitant bariatric and ventral/incisional hernia surgery in morbidly obese patients. Surg Endosc 2014;28:1209-12.
PUBMED | CROSSREF
10. Krivan MS, Giorga A, Barreca M, Jain VK, Al-Taan OS. Concomitant ventral hernia repair and bariatric surgery: a retrospective analysis from a UK-based bariatric center. Surg Endosc 2019;33:705-10.
PUBMED | CROSSREF
11. Praveenraj P, Gomes RM, Kumar S, Senthilnathan P, Parthasarathi R, Rajapandian S, et al. Concomitant bariatric surgery with laparoscopic intra-peritoneal onlay mesh repair for recurrent ventral hernias in morbidly obese patients: an evolving standard of care. Obes Surg 2016;26:1191-4.
PUBMED | CROSSREF
12. Agha RA, Borrelli MR, Farwana R, Koshy K, Fowler AJ, Orgill DP, et al. The PROCESS 2018 statement: updating consensus Preferred Reporting Of CasE Series in Surgery (PROCESS) guidelines. Int J Surg 2018;60:279-82.
PUBMED

13. Heller L, McNichols CH, Ramirez OM. Component separations. Semin Plast Surg 2012;26:25-8.
PUBMED | CROSSREF

14. Torregrosa-Gallud A, Sancho Muriel J, Bueno-Lledó J, García Pastor P, Iserte-Hernandez J, Bonafé-Diana S, et al. Modified components separation technique: experience treating large, complex ventral hernias at a University Hospital. Hernia 2017;21:601-8.
PUBMED | CROSSREF

15. Novitsky YW, Elliott HL, Orenstein SB, Rosen MJ. Transversus abdominis muscle release: a novel approach to posterior component separation during complex abdominal wall reconstruction. Am J Surg 2012;204:709-16.
PUBMED | CROSSREF

16. Muysoms FE, Miserez M, Berrevoet F, Campanelli G, Champault GG, Chelala E, et al. Classification of primary and incisional abdominal wall hernias. Hernia 2009;13:407-14.
PUBMED | CROSSREF

17. Rosenthal R, Hoffmann H, Clavien PA, Bucher HC, Dell-Kuster S. Definition and classification of intraoperative complications (CLASSIC): Delphi study and pilot evaluation. World J Surg 2015;39:1663-71.
PUBMED | CROSSREF

18. Dindo D, Demartines N, Clavien PA. Classification of surgical complications: a new proposal with evaluation in a cohort of 6336 patients and results of a survey. Ann Surg 2004;240:205-13.
PUBMED | CROSSREF

19. Corcelles R, Boules M, Froylich D, Hag A, Daigle CR, Aminian A, et al. Total weight loss as the outcome measure of choice after Roux-en-Y gastric bypass. Obes Surg 2016;26:1794-8.
PUBMED | CROSSREF

20. van Silfhout L, Leenders LAM, Heisterkamp J, Ibelings MS; Ventral Hernia Group Tilburg. Recurrent incisional hernia repair: surgical outcomes in correlation with body-mass index. Hernia 2021;25:77-83."https://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=33200326&dopt=Abstract"
PUBMED | CROSSREF

21. Raftopoulos I, Courcoulas AP. Outcome of laparoscopic ventral hernia repair in morbidly obese patients with a body mass index exceeding 35 kg/m^2. Surg Endosc 2007;21:2293-7.
PUBMED | CROSSREF

22. Grover BT, Morell MC, Kothari SN, Borgert AJ, Kallies KJ, Baker MT. Defining weight loss after bariatric surgery: a call for standardization. Obes Surg 2019;29:3493-9.
PUBMED | CROSSREF

23. Lindmark M, Strigård K, Löwenmark T, Dahlstrand U, Gunnarsson U. Risk factors for surgical complications in ventral hernia repair. World J Surg 2018;42:3528-36.
PUBMED | CROSSREF

24. Kondratenko BM. Choice of the treatment tactics in patients, suffering postoperative hernia of anterior abdominal wall with concomitant morbid obesity. Klin Khir 2015:13-6.
PUBMED