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Barbed suture for the closure of mesenteric defects after laparoscopic gastric bypass: has the incidence of internal hernia changed in our series?

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Abstract

Closure of mesenteric defects (MD) after laparoscopic Rouxen-Y gastric bypass (LRYGB) continues to be a controversial issue. In our team, MD closure is performed systematically with continuous, non-absorbable suture. Usually, it was done with a monofilament suture, however, coinciding with the rise of barbed sutures, since 2018 we started using them in this closure. This study aims to determine if the barbed suture has changed the incidence of internal hernia (IH). A descriptive retrospective observational analysis of patients who underwent LRYGB between 2017 and 2021 was performed. In addition, it was investigated whether there is a statistical association between the type of suture and the appearance of IH. 143 patients underwent LRYGB. In all cases,

both MD were closed with nonabsorbable continuous suture. Barbed suture was used in 73 patients and monofilament suture in 70. The incidence of IH was 6 cases, 4 in the barbed suture group and 2 in the monofilament group (p > 0.05). We concluded that there was no statistical association between the type of suture used to close the MD and the appearance of IH.

Keywords:

- Gastric bypass •
- Internal hernia
- Mesenteric defects ٠
- Barbed suture

Introduction

LRYGB is one of the most performed procedures for the treatment of morbid obesity. IH is a well-known complication feared by the bariatric surgeon after performing a LRYGB (1,2). The incidence of HI varies between 1 and 12% with the defect in the closing of the mesenteric gap being described as more frequent (1,2). The systematic closure of MD generated after LRYGB remains controversial, although there are authors and societies such as the American Society for the Surgical Treatment of Obesity and Metabolic Diseases (ASMBS) that recommend the systematic closure of MD, alluding to the fact that the incidence of this complication, which normally occurs late and can become potentially lethal, is significantly reduced. The other current, argues that the IH is an uncommon complication and defends that the closure of MD is not an easy maneuver in the obese patient, which can involve an extension of the operating time and is not exempt from complications

such as bleeding, obstructions or intestinal kinking. In addition, they stress that if the closure is not done correctly and the MD is partially closed, it would carry an even greater risk of IH than if the closure is not performed.

It is not only controversial whether the MD is closed, but also the type of suture to be used (glues, type of thread) and how it is done (cut-off stitches, running suture). Probably, the greatest consensus is found in the type of suture where most authors agree to use the non-absorbable type.

Starting in 2018, coinciding with the rise of bearded sutures, we began to close the MD in the same way that we did previously (running non-absorbable suture), but changing the monofilament for the barbed type.

We hypothesize that the barbed suture, being unidirectional, self-locking, equally non-absorbable and easily manageable, could facilitate the closure of MD, being this closure more effective and therefore, lowering the incidence of IH.



Material and methods

Patients underwent LRYGB in our hospital between January 2017 and April 2021 with a minimum follow-up period of 24 months were included.

All patients were performed an antecolic and antegastric LRYGB. The study included patients who underwent LRYGB as a second procedure after a sleeve gastrectomy.

Both the Petersen space and the mesenteric gap defect were systematically closed with a running non-absorbable suture. In 2018 there was a change in our MD closing technique, until then, the closure was carried out with non-absorbable monofilament suture and from that date, we started to use the barbed suture equally non-absorbable.

Statistical analysis

A descriptive retrospective observational study of patients who underwent LRYGB in the aforementioned period was perfomed. In addition, it was investigated whether there was a statistical association between the variables type of suture and the incidence of IH, for which an analysis was carried out between qualitative variables of the X2 type (Fisher's exact test). For data analysis, the statistical package SPSS version 29.0.0.0 was used.

Results

During the period described, 143 patients underwent LRYGP, 15 of whom (10.48%) were conversions from sleeve gastrectomy due to uncontrolled gastroesophageal reflux or ponderal reganance.

The mean follow-up was 39.59 ± 16.6 months.

74.8% of the operated patients were women and 25.2% were men. The mean age was 46.52 ± 8.3 years. The mean Body Mass Index (BMI) was 42.81 ± 7.5 kg/m2.

There were no immediate surgical complications related to the closure of the mesenteric defects such as bleeding, torsion, or intestinal obstruction.

Non-absorbable barbed suture was used in 73 cases (51%) and non-absorbable monofilament suture was used in 70 (49%).

The analysis between qualitative variables was performed using Fisher's exact test (see table 1). No statistical association was found between the type of suture used and the appearance of IH (p=0.681).

Table 1. Contingency tablev

| | | | Hint ¹ | Hint ¹ | |
|--------------------|----|----------------|-------------------|-------------------|-------|
| | | | No | Si | Total |
| Barba ² | No | Count 68 2* | | 2* | 70 |
| | | % within barba | 97.1% | 2.9% | 100% |
| | Si | Count | 69 | 4* | 73 |
| | | % within barba | 94,5% | 5.5% | 100% |
| | | Count | 137 | 6 | 143 |
| Iotal | | % within barba | 95.8% | 4.2% | 100% |

¹ Hint = Internal hernia. 2 Barba = barbed suture.

* No statistical significance (p = 0,681)

The incidence of IH was 6 cases (4.19%), all after primary LRYGB (no cases after the second stage).

All patients presented compatible clinic, epigastric pain being the most frequent symptom.

All cases were confirmed intraoperatively after compatible imaging test or persistent clinical symptoms (see figure 1).



Figure 1. Internal hernia in Petersen's space

3 patients presented IH in Petersen's space, 2 through the mesenteric defect generated by making the entero-enteric anastomosis and 1 case with a double hernia (see table 2).

| Age (years) | Sex | BMI | PPP | Suture type | IH | Time from the LGBPY (months) |
|----------------|-----|-----|-----|----------------|------------|------------------------------------|
| 50 | F | 44 | 4 | Monof | Petersen | 41 |
| 51 | F | 41 | 17 | Monof | Double | 2 |
| 40 | F | 41 | 16 | Barbed | Mesenteric | 34 |
| 41 | М | 47 | 21 | Barbed | Petersen | 57 |
| 57 | F | 39 | 4 | Barbed | Petersen | 2 |
| 62 | F | 42 | 13 | Barbed | Mesenteric | 33 |

Table 2. Descriptive analysis of patients with IH

PPP = preoperative weight loss, Monof = Monofilament, F = Female, M = Male

4 of the IH cases occurred in the group of patients in which barbed suture was used and 2 in the monofilament suture group. The time from surgery to the onset of the complication was variable, 2 early cases (in the first 2 postoperative months) and 4 late cases. 4 of the patients with IH had underwent LRYGB by surgeons with their full training (full competency level/ SECO expert) and 2 by "novel" surgeons in training.

4 patients underwent emergency surgery and 2, scheduled surgery. The initial approach was by laparoscopy in all cases, requiring conversion to an open approach in half of the cases. No bowel resection was necessary in any case. We were systematic in the MD closing technique when we performed a "novo" LRYGB, however, there were a lot of heterogeneity both in the suture material and in the technique used when reoperating patients for IH.

Discussion

The incidence of IH in our study was 4.19%, slightly higher than what is described in the literature if compared with groups that perform systematic MD closure. However, our incidence was relatively lower than what was reported by groups that did not systematically close the defects, whose percentage ranged from 8-15.5% of IH (3).

Our results were probably due to the prolonged follow-up that we carried out on our patients, which allowed us to diagnose late cases, and to the precocity when requesting imaging tests as soon as the patient manifested compatible symptoms. Although the latter were negative for IH, if the patient continued to be symptomatic, we indicated an exploratory laparoscopy. This allowed us to detect cases that would otherwise have gone unnoticed. More and more bibliography and even scientific societies such as ASMBS were recommending the systematic closure of MD whenever technically feasible. Kristensen et al. (3) described in his clinical trial an incidence of IH after MD closure of 6.5% compared to 15.5% when the defect was not closed, after 5 years of follow-up. In this context, Saba et al. (4) stated that systematic closure decreased the percentage of IH by 50%. While Geubbels et al. (5), in a meta-analysis that included 45 articles, described that the lowest incidence of IH was for the antecolic variant LRYGB with closure of both MD. We would like to highlight that in our series we always performed antecolic, antegastric LRYGB and, as we have described, our incidence of IH, despite performing this technique, was not negligible.

Regarding the materials and the suture technique used, there are different opinions in the literature.

If we talk about the technique, most authors agree to use a running suture to close the MD (6,7). Higa et al. (7) stated that the cut-off stitches, by conferring less tightness, caused a higher failure rate, considering the postoperative weight loss and the progressive thinning and elongation that the mesos of this patient will suffer.

In terms of materials, the most widely used in the literature are non-absorbable sutures. In the retrospective study by Yang et al. (6) it could be observed how the group with MD closure and non-absorbable suture presents fewer cases of IH, although its results were not statistically significant.

Yao et al. (8), on the other hand, carried out a clinical trial in rats where he created 5 groups and used different materials to close the MD in each of them. He concluded that the MD remained closed in both groups with both absorbable and non-absorbable sutures or glue after a 2-month follow-up period. In this study, it is necessary to take into account the limited follow-up time and the fact that it was basic research (study carried out in animals and not in humans).

In recent years, new techniques and materials have begun to be used to close MD. Kristensen et al. (3) analyzed the closure of the MD using clips (3), obtaining statistically significant results in favor of closure. In 2021, Skidmore et al. (9) published a retrospective study comparing different materials, non-absorbable suture, glue, and a combination of non-absorbable suture and biological mesh. He advocated the use of mesh for the closure of Petersen space but described complications in closing the mesenteric gap with the risk of IH and intestinal occlusion due to adhesions.

On the other hand, as mentioned by Schneider et al. (1) in their article, despite the closure of MD, postoperative weight loss by itself posed a high risk of IH due to the creation of new mesenteric spaces that over time tended to increase in size, favoring the entry of intestinal loops and their incarceration. In our group, despite not finding statistical significance with the type of suture used, we believe that the closure of MD with a barbed suture brings benefits because, being easier to handle, it always facilitates the technique.

We would like to highlight, and always bearing in mind that the cases of IH in our study are very few, with the statistical limitations that this entails, that 4 out of 6 patients with IH were operated on by surgeons with a complete/expert level of SECO, then it does not seem to be a determining factor the level of training of the main surgeon.

Our study has the limitation of being a retrospective analysis with few cases, which must be considered when drawing conclusions.

However, despite these limitations, we support the systematic closure of all MD whenever feasible, taking into account that the closure will decrease or minimize the incidence of IH. On the other hand, this complication must always be considered because there are variables such as the elongation and laxity of the tissues, which together with postoperative weight loss, favor its appearance and will always be present.

Although IH is one of the most feared complications of bariatric surgeon, fortunately its incidence is not very high. For this reason, a very high volume of patients is necessary to reach statistically significant conclusions. It would be interesting to make long-term and multicenter records that would allow conclusions to be drawn on a subject still in controversy. non-absorbable suture closure of the jejunal mesenteric defect reduce the incidence and severity of internal hernias after laparoscopic Roux-en-Y gastric bypass? Langenbecks Arch Surg. 2021; 406(6):1831-1838.

2. Petrucciani N, Martini F, Kassir R, et al. Internal Hernia After One Anastomosis Gastric Bypass (OAGB): Lessons Learned from a Retrospective Series of 3368 Consecutive Patients Undergoing OAGB with a Biliopancreatic Limb of 150 cm. Obes Surg. 2021; 31(6):2537-2544.

3. Kristensen SD, Gormsen J, Naver L, Helgstrand F, Floyd AK. Randomized clinical trial on closure versus non-closure of mesenteric defects during laparoscopic gastric bypass surgery. Br J Surg. 2021; 108(2):145-151.

4. Saba J, Bravo M, Pérez-Castilla A, Rivas E, Fernández R, Zajjur J. Effect of the closure of mesenteric defects in laparoscopic Roux-en-Y gastric bypass: a prospective study. Surg Obes Relat Dis. 2019; 15(11):1903-1907.

5. Geubbels N, Lijftogt N, Fiocco M, Van Leersum NJ, Wouters MW, de Brauw LM. Meta-analysis of internal herniation after gastric bypass surgery. Br J Surg. 2015; 102(5):451-60.

6. Yang J, Guan B, Huang S, et al. Different surgical techniques that influenced internal hernia prevalence rate after laparoscopic roux-en-Y gastric bypass: a retrospective analysis of 331 cases. BMC Surg. 2020; 20(1):48.

7. Higa K, Boone K, Arteaga I, López-Tomassetti E. Cierre mesentérico en el bypass gástrico laparoscópico: técnica quirúrgica y revisión de la literatura. Cirugía Española. 2007; 82 (2): 77-88.

8. Yao L, Dolo PR, Shao Y, et al. Absorbable suture can be effectively and safely used to close the mesenteric defect in a gastric bypass Sprague-Dawley rat model. BMC Surg. 2020; 20(1):8.

9. Skidmore A, Aarts EO. Preventing Peterson's space hernia using a BIO synthetic mesh. BMC Surg. 2021; 21(1):236.

Conclusions

There is no statistical association between the type of suture used to close the MD and the incidence of IH in our study. Expanding the study with more patients and follow-up will likely yield more data to help clarify a still-controversial issue, such as the closure of MD after laparoscopic gastric bypass. ©2024 seco-seedo. Published by bmi-journal. All rights reserved

References

1. Schneider R, Schulenburg M, Kraljević M, et al. Does the

