

Hand-Sewn Running Barbed Suture versus Endoscopic Stapler Closure of the Mesenteric Defects in Retrocolic and Retrogastric RYGB: A Comparative Case-Matched Study

V. Simonelli*, G. Orlando, A. Zolotas, C. Arendt, L. Arru, V. Poulain, J. S. Azagra, M. Goergen

Centre Hospitalier de Luxembourg, Luxembourg Ville, Luxembourg

Email: vincyg@hotmail.it

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Abstract

Background: Obesity is nowadays a major health concern in Western countries and the number of bariatric surgical procedures being performed worldwide is vertiginously rising. The Laparoscopic Roux-en-Y gastric bypass (LRYGB) has become the gold standard bariatric procedure. The retrocolic retrogastric approach is closer to normal anatomy and it is associated to a lower rate of anastomotic leak, a lower rate of gastrojejunal stricture and a lower rate of marginal ulcers; therefore the problem of small bowel obstruction due to internal hernia (IH) has to be faced. The meticulous closure of all possible mesenteric defects with running, non-absorbable sutures may reduce the rate of this complication, but it can be challenging for the surgeon and it rises the operating time (OT). This study has conducted in a context of optimization of our “Fast Track-type” recovery protocol and it aims to compare the rate of early IH and the OT difference when mesenteric defects are closed using running non-absorbable barbed suture or an endoscopic stapler. **Materials and Methods:** From December 2014 to February 2015 a single-surgeon consecutive series of 22 patients undergoing retrocolic restrogastric LRYBP in our high volume obesity centre has been retrospectively extrapolated from our prospective longitudinal database. We recorded the overall OT and relative rate of IH in patients who received a 15-cm non-absorbable V-Loc™¹ (group A, 11 patients) or Endopath™ EMS, endoscopic multifeed stapler² (group B, 11 patients) defect. **Results:** The mean OT was 77.36 minutes in the group A and 60.90 minutes in the group B (P value 0.066). 0 patients (0%) in the group A versus 4 patients (36.3%) in the group B developed IH within 30

*Corresponding author.

¹Covidien, Mansfield, MA, USA.

²Ethicon Endo-Surgery, LLC, Guaynabo, Puerto Rico, USA.

days (two-tailed P value at chi-square test: 0.02). **Conclusion: Early rate of small bowel obstruction due to IH is extremely higher with the use of an endoscopic stapler instead of non-absorbable barbed suture and there is not significant difference in the OT; more prospective randomized trials observing bigger series of patients with longer follow-up are needed to validate our study.**

Keywords

Laparoscopy, Gastric Bypass, Fastrack, Internal Hernia

1. Introduction

Obesity has become a major health concern in Western countries. This has resulted in a steady rise in the number of bariatric surgical procedures being performed worldwide. Of these, the Laparoscopic Roux-en-Y gastric bypass (LRYGB) has become the gold standard bariatric procedure to which all the others are compared [1] and accounted for about 45% of all bariatric surgeries performed worldwide in 2013, whereas in 2015 IFSO data show the rise in prevalence of Sleeve Gastrectomy [2].

LRYGB can be accomplished using either an antecolic or retrocolic approach.

Many surgical teams prefer the antecolic LRYGB because it is easier to perform with a reduction of operating time (OT) and hospital stay [3], as many others prefer better the retrocolic, retrogastric approach because it is closer to anatomical structure; it is associated to a lower rate of anastomotic leaks [4], a significant lower rate of gastrojejunal strictures [5] and a significant lower rate of marginal ulcers [6]; therefore the retrocolic approach seems to be a risk factor for intestinal obstruction and internal hernia (IH) compared to the antecolic one when the mesenteric defects are not well closed [5] [7].

The onset of an IH can be a severe complication (1% to 9%) and produce catastrophic consequences if not diagnosed and treated on time. To reduce the rate of this complication in the retrocolic, retrogastric LRYGB it's mandatory to close meticulously all possible defects with running, non-absorbable sutures [8] and that is possible but more challenging for the surgeon and also it needs longer OT.

This study has been conducted in a context of optimization of our "Fast-Track" type recovery protocol and it aims to compare the incidence of short-term IH and the OT difference when mesenteric defects are closed using hand-sewn running non-absorbable suture or an endoscopic stapler.

2. Materials and Methods

A retrospective review of our prospectively collected database has been conducted in our high volume obesity centre, "Centre Hospitalier de Luxembourg", Luxembourg, from December 2014 to February 2015.

Twenty-two consecutive single-surgeon obesity patients undergoing retrocolic retrogastric LRYBP have been entered in our comparative case-matched study.

All the patients considered participated in a "Fast Track-type" recovery protocol.

We recorded all patients that received an hand-sewn running suture (group A) or automatic mechanical endostapling device (group B).

Surgical Technique

All the patients included underwent 5 trocars retrocolic retrogastric LRYBP; they all have been operated from the same surgeon.

The first time of the operation, with the surgeon on right side of the patient, consist in the creation of a passage through the transverse mesocolon in order to get the posterior gastric wall from the infra-mesocolic space. A biliary limb is stapled at 50 cm from the Treitz ligament; the meso between the resulting two limbs is not divided so that the Petersen defect is virtual in our technic and doesn't need to be closed. Then 120 cm are measured from the staple line of the alimentary side and a side-to-side jejunojejunostomy is here performed full-mechanically.

In the group A the jejunojejunostomy site (JJ) mesenteric defect closure is performed with a 3-0, 15-cm-long,

non-adsorbable V-Loc™¹.

In the group B the JJ mesenteric defect closure is performed, with a single stapling line employing the endoscopic multifeed stapler Endopath™ EMS².

The alimentary limb is then leaded through the mesocolic passage into the epiploic retro-cavity and the transmesocolic (TM) defect is closed with a 3-0, 15-cm-long, non-absorbable V-Loc™ in the group A and with a single stapling line employing the endoscopic multifeed stapler Endopath™ EMS in the group B.

The second time of the operation, with the surgeon in front of the patient set-up in French position, consist in the creation of a gastric pouch of 10 ml; then the alimentary limb is stapled with the gastric pouch side-to-side and the gastrojejunostomy is finally completed using a 3-0 absorbable V-Loc™.

The overall OT in both the groups has been compared and the incidence of early small bowel occlusion for IH within 30 days from the operation has been then evaluated.

3. Results

Between December 2014 and February 2015 twenty-two single-surgeon consecutive obesity patients underwent a LRYBP in our obesity centre.

No selection criteria have been applied but patients with bad controlled diabetes, chronic heart failure and Gold III COPD or higher and all the redo surgeries have been excluded.

The group A is composed of eleven patients (9 women and 2 men) with a mean age of 44.00 years (range, 19 - 63 years) and a mean BMI of 46.32 (range, 34 - 58.2 Kg/m²); the group B is composed of eleven patients (9 women and 2 men) with a mean age of 46.63 (range, 33 - 59 years) and a mean BMI of 44.20 (range, 35.4 - 52 Kg/m²) (Table 1).

There was no perioperative death or complication.

The mean OT from incision to closure was 77.36 minutes (range, 45 - 100 minutes) in the group A and 60.90 minutes (range, 45 - 90 minutes) in the group B ($p = 0.066$) (Table 2).

0 patients (0%) in the group A versus 4 patients (36.3%) in the group B developed IH within 30 days (two-tailed P value at chi-square test: 0.02) (Table 2, Figure 1).

4. Discussion

Morbid obesity is a growing epidemic in the Western world that adversely affects the quality of life and life expectancy [9]-[11]. For that reason the number of bariatric surgical procedures is extremely rising worldwide and the LRYGB is generally considered the gold-standard operation [12]. In high volume obesity centres the choice of the good surgical technique is important to improve outcomes, to reduce the overall OT and to avoid perioperative complications, so that also the recovery costs can be reduced.

In our obesity surgical team we strongly believe that the retrocolic retrogastric approach is associated with a lower rate of anastomotic leak, a lower gastrojejunal stricture rate and a lower rate of marginal ulcers; therefore

Table 1. Main characteristics of the patients in the two groups. (n): number of patients.

	(n)	Women	Men	Age, mean	BMI, mean
Group A	11	9	2	44.00 (19 - 63)	46.32 (34 - 58.2)
Group B	11	9	2	46.63 (33 - 59)	44.20 (35.4 - 52)

Table 2. Comparison between operative time in minutes and internal hernia rate in the two groups. Mean OT P value = 0.066 (Student's test not significant). IH rate two-tailed P value = 0.02 (chi-square test significant). OT: operating time. SD: standard deviation. IH: internal hernia.

	Group A	Group B	P values
OT, mean	77.36 (45 - 100)	60.90 (45 - 90)	>0.05 (not significant)
SD	19.15	15.55	
IH rate	0%	36.3%	<0.05 (significant)

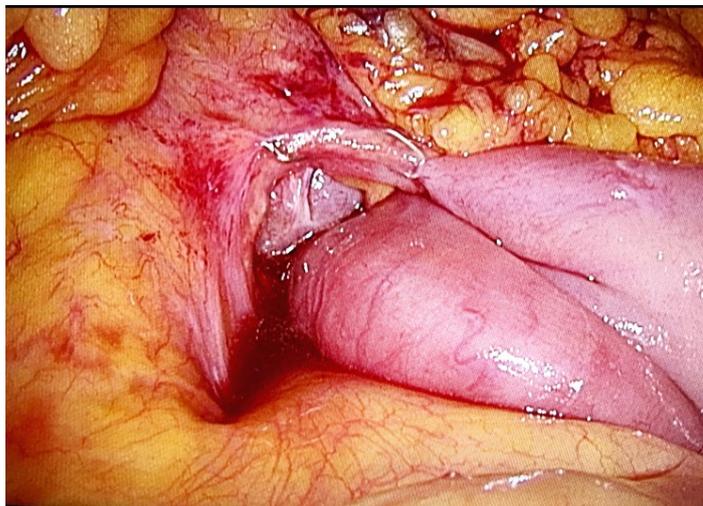


Figure 1. Per-operative picture showing the opening in the transverse mesocolon after reduction of an internal hernia in a patient where the defect had been closed with staples.

the problem of small bowel obstruction due to IH has to be faced with this approach [13]. Various groups advocate the meticulous closure of all possible mesenteric defects with running, non-absorbable sutures may reduce the rate of this complication [8] [13] [14].

To close the mesenteric defects is feasible with several materials and techniques, as separated running (traditional or barbed) non-absorbable stitches or an endoscopic stapler, but the choice can influence the OT.

“Time is money” and in Luxembourg 1 minute use of the operation room costs 16 euros, so reducing the overall OT without rise the rate of complications is very important.

In our study the mean OT is relatively short and not significantly different in the 2 groups observed.

In our technique we don't split the mesentery of biliary and alimentary limbs, so the Petersen defect is virtual and it doesn't need to be closed.

The advantages of using non-absorbable barbed sutures are well known and they are the following: they are safe and reproducible with a short learning curve [15]; assistance is not required to maintain suture tension; the suture does not slip [16]; it shortens the total OT [17] and it seems to have similar 30-day outcomes when compared with traditional suture [18].

The endoscopic stapler is really easy and fast to use for the closure of the mesentery, the only difficulty that we experienced it has been the fact that the two branches of the staple are not well visible with a 0° optic, so the device has for that a lack of precision.

Only short-term results within 30 days have been studied in our study, the long-terms results for both of the closure methods are still unknown.

Our series is short but we have been obliged to interrupt the study because the IH rate was already too high and not acceptable for us in the group B with the first eleven patients (**Figure 1**).

Maybe closing the mesenteric defects with 2 or more line of staples could have reduced the IH rate, but anyway there is any significant difference in the mean OT in the 2 groups.

5. Limitations

The main limitation of our study is the retrospective design. However this may represent a starting point for the implementation of randomized controlled trials on larger samples in order to assess which approach is associated with better long-term outcomes with regards to mesenteric defects closure. Moreover a longer follow-up is needed in order to assess long-term outcomes in this setting.

6. Conclusion

The rate of small bowel obstruction due to IH is extremely higher with the use of an endoscopic stapler instead

of non-absorbable barbed suture and there is not significant difference in the relative mean OT; however more prospective randomized trials observing bigger series of patients with longer follow-up are needed to validate our study.

Disclosure Statement

Simonelli Vincenzo, Orlando Gennaro, Zolotas Aias, Arendt Charlie, Arru Luca, Poulain Virginie, Azagra Juan Santiago, Goergen Martine have no conflict of interest to declare.

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