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Original research

Totally hand-sewn anastomosis using barbed suture device during laparoscopic gastric bypass in obese. A feasibility study and preliminary results

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Q3 HIGHLIGHTS

- Laparoscopic intracorporeal hand-sewn anastomosis is the most difficult to perform.
- Several types of suture have been proposed and used, resorbable and not absorbable, both requiring the thread to be kept constantly in tension.
- A knotless barbed suture device has been proposed to make the intracorporeal sutures easier, but there are only few studies in the literature that propose its use for intestinal anastomosis.
- We proposed the use of the barbed suture device for intestinal anastomosis during laparoscopic gastric bypass, secured at the end with an absorbable clip.

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ABSTRACT

Introduction: Barbed sutures are routinely used for laparotomy, peritoneal and mesenteric closure, but few studies have reported their use for intestinal anastomosis. We proposed their use for totally hand-sewn anastomosis during laparoscopic gastric bypass secured at the end of the suture with an absorbable clip. **Materials and Method:** Two totally hand-sewn single-layer extramucosal running sutures were performed for side-to-side gastrojejunal and jejuno-jejunal anastomosis during laparoscopic gastric bypass. Each run (anterior and posterior layer) was locked at the end by an absorbable poly-p-dioxanone suture clip. **Results:** A total of 96 hand-sewn anastomoses were performed. A total of two leaks occurred originating from the jejunaljejunal anastomosis. No cases of leakage from gastrojejunostomy were recorded. Two stenoses of the gastrojejunal anastomosis were recorded. They were successfully treated with three sessions of endoscopic balloon dilatation. No bleeding occurred. **Conclusion:** In our experience, the suture-related complication rate is comparable with the data reported in the literature. Further studies are needed to address the safety and efficacy of the self-maintained suture in digestive surgery.

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1. Introduction

Laparoscopic gastric bypass (LGB) is the most effective bariatric surgery in reducing weight and improving quality of life and obesity related diseases such as diabetes and hypertension [1–3].

Although several different types of anastomotic technique are available (hand-sewn, linear stapled and circular stapled

anastomosis), the ideal one has yet to be identified [4]. Certainly hand-sewn anastomosis is the most difficult one to perform and requires the longest learning curve [5]. Laparoscopic intracorporeal suturing and knot tying for anastomosis are technically demanding tasks even for well-trained laparoscopic surgeons due to the need to maintain the correct tension of the thread along the run of anastomosis.

In the bariatric field, laparoscopic intracorporeal suture can be used to close the mesenteric defects, to create a totally gastro-jejunal and jejuno-jejunal hand-sewn anastomosis, or to close the intestinal opening, if the mechanical anastomosis was performed.

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The manual anastomotic technique required running sutures for each anastomosis, while the closure of the intestinal opening left after the mechanical anastomosis required a single extramucosal suture.

Over time, several types of suture have been proposed and used, resorbable and not absorbable, both requiring the thread to be kept constantly in tension.

A knotless barbed suture device has been proposed to make the intracorporeal sutures easier, but there are only few studies in the literature that propose its use for intestinal anastomosis [6–9].

The aim of this retrospective study was to understand whether or not this new suture with an absorbable clip secured at the end of the suture is capable of obtaining a safe totally hand-sewn anastomosis during laparoscopic gastric bypass (primary outcome), thus saving surgical time and money (secondary outcomes). We evaluated the incidence rate of anastomosis-related complication as early, leakage and bleeding, and late (stenosis) occurring during the follow-up program.

2. Methods

A retrospective study of patients undergoing elective LGB between August 2011 and April 2013 was performed in our department. All consecutive consenting patients were included in the study in accordance with the international guidelines: age 18–65 years, a body mass index (BMI) of 40 kg/m² or between 35 and 40 kg/m² with obesity-related co-morbidities, well-informed and motivated patients with acceptable operative risks, failure of non-surgical treatments, declared compliance to follow lifelong medical surveillance [10]. The preoperative workup included psychiatric and nutritional appraisal, upper gastrointestinal endoscopy with gastric biopsy to seek *Helicobacter pylori* bacteria, respiratory and cardiac evaluation and a complete blood test. Before surgery all patients were well informed about the surgical technique and the surgical risks. The surgeon ensured that the patient understood the information received and the patient signed a full informed consent for the operation. The use of the device was already documented in the literature, therefore we asked the approval of the department ethical board committee.

All the procedures were performed by one senior surgeon expert in laparoscopic surgery and two trained but not experienced surgeons and the standardized surgical technique did not differ for any patient during the study.

The side-to-side gastro-jejunal and jejuno-jejunal anastomosis were created using the V-loc 90 (Covidien, Mansfield, MA, USA) 3/0 absorbable monofilament suture. Two totally hand-sewn single-layer extramucosal running sutures were performed for both anastomoses. Each suture (anterior and posterior layer) was then locked by an absorbable suture clip made of poly-p-dioxanone

(Lapra-TY II, Ethicon Endo-Devices, Cincinnati, OH, USA) (Fig. 1) (see Fig. 2).

During the postoperative hospital stay, a standardized postoperative management program is applied to all patients before the discharge, in order to recognise early clinical symptoms and signs of serious complications (Fig. 2). The patient's pulse and blood pressure, respiration and oxygen saturation, fever and pain were recorded every 3 h in first postoperative day (POD) and then every 6 h. The content of the abdominal drains are measured every 3 h in first POD and then daily. The blood tests were required in first POD and just before the discharge and the contrast swallow study was performed on POD 3. Drains were removed after the radiological control and then food oral intake was allowed.

Before discharge, the patients were advised to avoid fast sugars and invited to take multivitamin supplements, calcium, iron, folate and vitamin B12. An oral intake protocol and dates for medical visit were given to all patients. They were enrolled in a follow-up program including medical visit and clinical examination every 3 months plus extensive blood tests every 6 months during the first post-operative year; during the second and third post-operative years the clinical examination and blood tests are carried out every 6 months, and once a year thereafter.

Data including age, sex, BMI, co-morbidities, previous failed bariatric surgery, length of hospital stay, early (within 30 days after surgery) and late complications, re-interventions and follow-up time were recorded.

We compared the operation time needed to perform manual anastomosis during LGB using the barbed suture and other non absorbable monofilament suture used in our surgical equipe prior to introducing V-loc in a comparable group of patients.

The statistical analysis was performed using Microsoft Excel 2007 (Microsoft Excel 2007, Redmond, WA, USA) and continuous variables are expressed as mean ± standard deviation.

2.1. Surgical technique

Patients were placed in the supine position with both arms extended and both legs abducted, the operating table was positioned in gentle reverse Trendelenburg position. All patients were given 2 g of cefazolin intravenously in the operating room, after general anaesthesia induction, as antibiotics prophylaxis.

After the creation of pneumoperitoneum by Veress needle in the left hypochondrium [11], five abdominal trocars were inserted. A T1 optical trocar was inserted in the midline 15 cm under the xiphoid process; two operator's trocars were positioned: T2 in the left lumbar region along the left mid-clavicular line and T3 5 cm under the costal margin in the right mid-clavicular line. Two retraction trocars were placed in the epigastric position (T5) and in the left anterior axillary line close to the costal margin (T4) respectively.

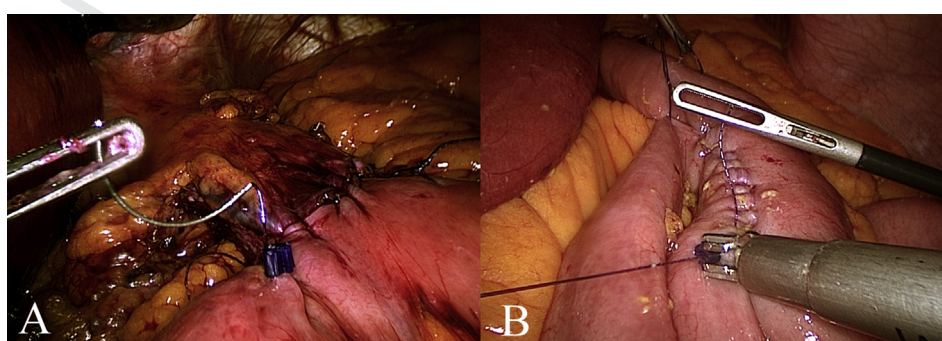


Fig. 1. Absorbable clip at the end of the barbed suture. A: gastrojejunal anastomosis; B: jejunojejunal anastomosis.

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