

Transgastric laparoscopic polypectomy in giant gastric polyps not susceptible of endoscopic management: novel surgical technique and case series

Polipectomía transgástrica laparoscópica en pólipos gástricos gigantes no susceptibles de manejo endoscópico: nueva técnica quirúrgica y serie de casos

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Abstract

Background: The identification of gastric polyps incidentally in endoscopies of the upper digestive tract has increased its incidence, varying between 0.5% and 23%. 10% of these polyps have symptoms, 40% are hyperplastic. We allow ourselves to propose a laparoscopic technique for the management of giant hyperplastic polyps associated with a pyloric syndrome, not susceptible to endoscopic resection. **Method:** A series of patients approached by laparoscopic transgastric polypectomy due to the giant gastric polyps associated with pyloric syndrome, in Bogotá, Colombia, from January 2015 to December 2018. **Results:** Seven patients, 85% female, with an average age of 51 years, who were admitted for pyloric syndrome and were taken to laparoscopic management, with an average surgical time of 42 min, intraoperative bleeding 7-8 cc, tolerance to the oral route 24 hours, no conversion, without mortality. **Conclusions:** Transgastric polypectomy for the management of benign giant gastric polyps that cannot be resected endoscopically turns out to be a feasible method, with a low rate of complications and without mortality.

Keywords: Hyperplastic polyp. Polypectomy. Endoscopy submucosa dissection.

Resumen

Antecedentes: La identificación de pólipos gástricos de manera incidental en endoscopias de vías digestivas altas ha aumentado su incidencia, que varía entre el 0.5% y el 23%. El 10% de estos pólipos presentan síntomas y el 40% son hiperplásicos. Nos permitimos proponer una técnica laparoscópica para el manejo de los pólipos hiperplásicos gigantes asociados a síndrome pilórico no susceptibles de resección endoscópica. **Método:** Serie de pacientes llevados a polipectomía transgástrica laparoscópica por hallazgo de pólipos gástricos gigantes asociados a síndrome pilórico, en Bogotá, Colombia, de enero de 2015 a diciembre de 2018. **Resultados:** Un total de siete pacientes, el 85% de sexo femenino, con edad promedio de 51 años, ingresaron por síndrome pilórico y fueron llevados a manejo laparoscópico, con un tiempo quirúrgico promedio de 42 minutos, sangrado intraoperatorio de 7-8 cc, tolerancia a la vía oral a las 24 horas, no conversión, sin mortalidad. **Conclusiones:** La polipectomía transgástrica para el manejo de pólipos gástricos gigantes benignos que no pueden ser resecados por vía endoscópica resulta ser un método factible, con una baja tasa de complicaciones y sin mortalidad.

Palabras clave: Pólipo hiperplásico. Polipectomía. Disección submucosa endoscópica.

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Date of reception: 03-09-2021

Date of acceptance: 12-10-2021

DOI: 10.24875/CIRUE.M21000513

Cir Cir (Eng). 2023;91(2):212

Contents available at PubMed

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Introduction

Gastric polyps are epithelial lesions that protrude into the gastric lumen and require histopathological examination to determine their mucosal or submucosal origin. The widespread use and availability of upper GI endoscopies have facilitated the detection of these lesions, whose prevalence ranges from 0.8% to 2.4% in the overall population and range from 0.5% to 23%. However, only 10% are symptomatic, 14% to 40% of which are hyperplastic polyps associated with *Helicobacter pylori* infection^{1,2}.

These findings are incidentally found in patients who present with multiple GI symptoms. At the time of endoscopic visualization, differential diagnosis with neuroendocrine tumors or ectopic pancreatic tissue is considered, and due to their malignant potential, their proper characterization is mandatory. Additionally, they may be associated with hereditary syndromes, such as hereditary familial polyposis and the Peutz-Jeghers syndrome²⁻⁴.

Hyperplastic gastric polyps fall into this group of diseases which require resection when they exceed 10 mm, in the presence of any degree of dysplasia in the histopathology examination, regardless of their size, or the presence of complications. Multiple resection methods have been described when they are giant and cannot be encircled with a polypectomy snare. However, in lesions > 3 cm, en bloc resection is difficult to perform. Therefore, we propose a minimally invasive surgical technique to treat giant hyperplastic polyps associated with pyloric syndrome, which are not amenable to endoscopic resection, thus demonstrating our experience with laparoscopic transgastric polypectomy^{5,6}.

Method

This was a retrospective case series conducted from January 2015 through December 2018 in our center. Seven patients with a diagnosis of giant polyps not amenable to endoscopic management were included in the laparoscopic approach. Sociodemographic and clinical variables are shown in table 1.

Sociodemographic variables such as age, sex, comorbidity, ASA (American Society of Anesthesiologists) score, body mass index, reason for ER consultation; preoperative variables, such as pedicle thickness, suitability for endoscopic resection, and pathology report from the biopsy; and surgical

Table 1. Sociodemographic variables (n = 7)

Characteristics	
Age, mean (range)	51 (45-57)
Sex (M: F)	1:6
Comorbidity (n)	
Hypertension (5)	
Hypothyroidism (6)	
Diabetes mellitus type 2 (2)	
Compensated heart failure (1)	
ASA score (n)	
I (5)	
II (2)	
Average BMI	23

ASA: American Society of Anesthesiologists; BMI: body mass index.

variables, such as intraoperative time, early and late complications (bleeding, intraabdominal infections, fistulas), need for conversion to open surgery, need for intensive care unit or hospital stay, need for reintervention, and mortality were evaluated. Follow-up included assessment of hyperplastic polyp recurrence, stenosis, and the need for reintervention. Clinical and endoscopic follow-up was conducted for, at least, 6 to 12 months. All patients underwent a preoperative multidisciplinary evaluation by the gastroenterology and surgery departments.

The study protocol was approved by each center research ethics committee and implemented in full compliance with the Helsinki Declaration and good clinical practice guidelines. All patients had the surgeon's e-mail address and cell phone number to ensure strict follow-up and continuity of clinical monitoring.

Surgical technique

PATIENT PREPARATION

Preoperative evaluation included a review of the patients' hemodynamic and systemic status, ruling out infectious foci and other extragastric causes that could cause symptoms, using computed tomography. Based on the findings, corrections were made for any hydroelectrolytic changes to the patients, and antibiotic prophylaxis and pharmacological and mechanical thromboprophylaxis were initiated.

All patients underwent preoperative assessment by a multidisciplinary team including medical staff from the gastroenterology and general surgery units. Upper GI endoscopy was performed with, at least, 6 biopsies of the polyp, and 4 biopsies of the gastric mucosa, total colonoscopy, endoscopic gastric ultrasonography, and contrast-enhanced abdominal computed tomography to rule out malignancy.

Based on the findings, patients were proposed for laparoscopic transgastric polypectomy to perform en bloc resection of the hyperplastic polyp, thus avoiding antrectomy plus Roux-en-Y gastrojejunostomy. Both the patients and their families were briefed on the surgical risks, potential need for additional trocars, conversion to open surgery, and mortality risk involved.

Laparoscopic transgastric polypectomy

Under general anesthesia, the patient is placed in the lithotomy position with mechanical fixation to facilitate maximum tilt with lateral rotation of the operating table.

Afterwards, the surgeon stands between the patient's legs, the first assistant to the right of the surgeon, and the scrub nurse to the right of the first assistant. Pneumoperitoneum is created using the open Hasson technique at umbilical level. A 12 mm port is inserted, and with at a 40 L/min flow, and a pressure of 14 mmHg, a 30° laparoscope is advanced. Three ports are placed under direct vision: a 5 mm port in the right flank, a 12 mm port in the left flank, and a 5 mm port in the right hypochondrium. A gastrotomy is, then, performed anteriorly at the level of the corpus-antral junction using an ultrasonic Harmonic® scalpel (Ethicon, Inc., Cincinnati, OH, United States (Fig. 1) to identify the polyp (Fig. 2). The polyp is, then, grasped with endoscopic forceps (Ethicon, Inc., Cincinnati, OH, United States) and everted by lifting it toward the parietal peritoneum to expose the base of the polyp pedicle (Fig. 3). With a 10 mm margin from the base of the gastric mucosa, polypectomy is performed using a laparoscopic cutting-type vascular suture in sand color (Ethicon, Inc., Cincinnati, OH, United States) (Fig. 4). Hemostasis is checked (Fig. 5), and the anterior gastrotomy is closed using continuous simple seromuscular mucomucosal PDS 4-0 sutures (Ethicon, Inc., Cincinnati, OH, United States), with laparoscopic endo-knots (Fig. 6). The surgical specimen is removed in an endobag through an enlargement of the umbilical port. The cavity is aspirated, and the ports removed under direct vision. The

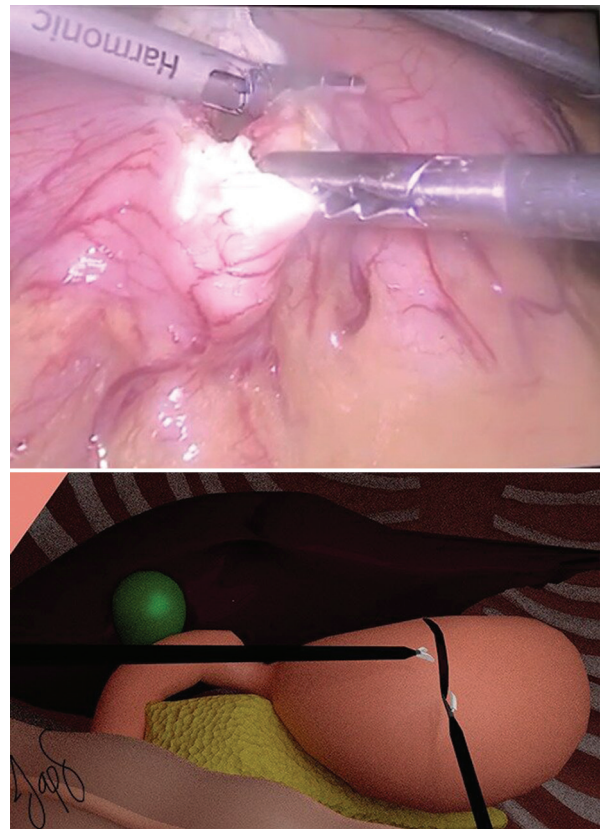


Figure 1. Creation of the anterior gastrotomy at corpus-antral junction level.

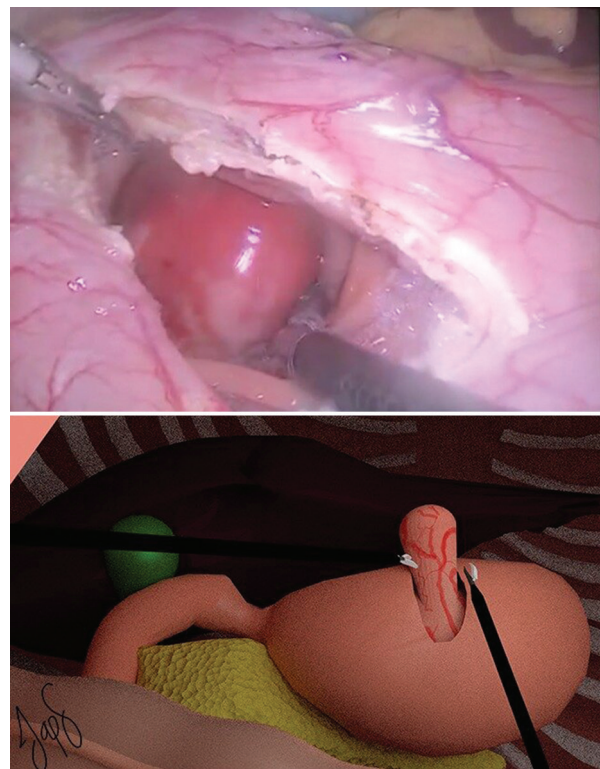


Figure 2. Direct laparoscopic view of the giant hyperplastic polyp through the anterior gastrotomy.

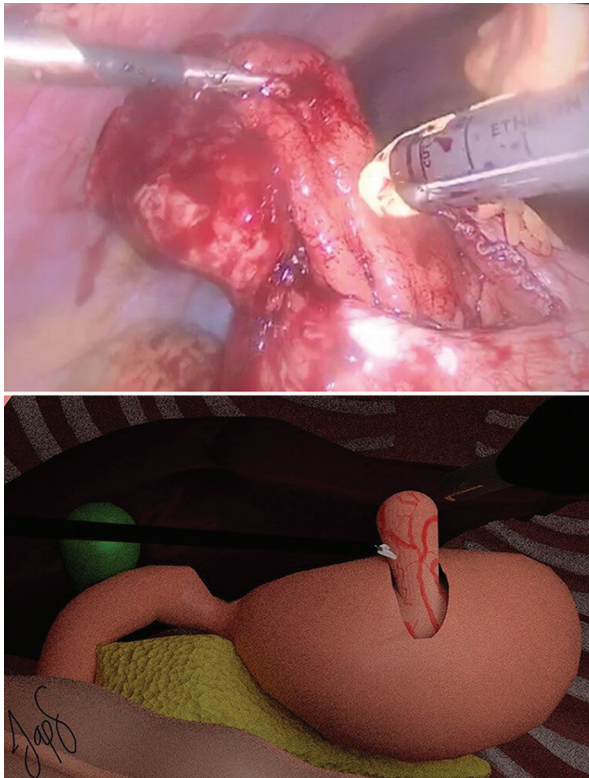


Figure 3. Laparoscopic eversion of the giant hyperplastic polyp through the anterior gastrotomy.

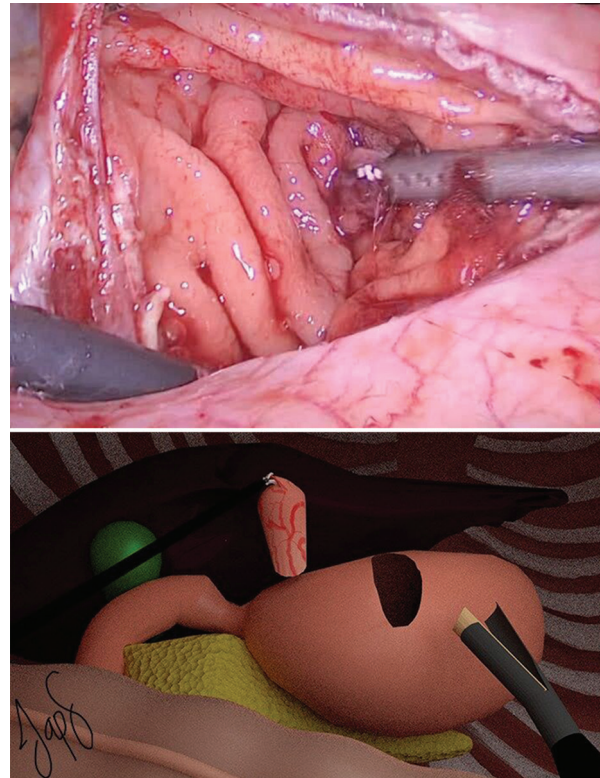


Figure 5. Hemostasis review on the suture line over the gastric mucosa.

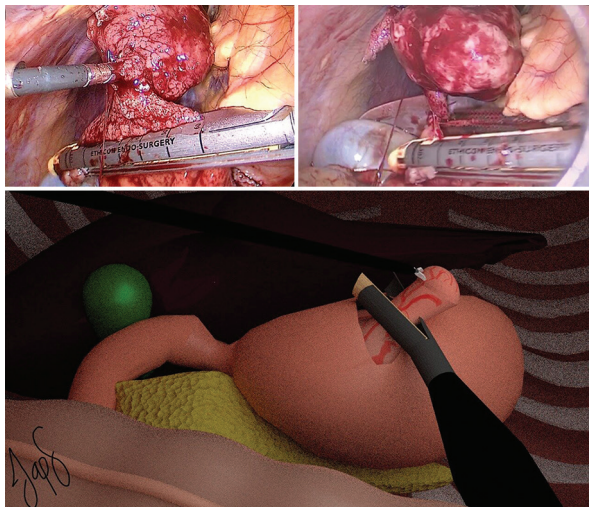


Figure 4. Laparoscopic transgastric polypectomy of the giant hyperplastic polyp using a vascular-type cutting laparoscopic suture in sand color (Ethicon, Inc., Cincinnati, OH, United States).

pneumoperitoneum is evacuated, and the aponeurosis closed with simple PDS 0 sutures (Ethicon, Inc., Cincinnati, OH, United States) at the two 12 mm ports. The skin is closed with intradermal Prolene 3-0 sutures (Ethicon, Inc., Cincinnati, OH, United States).

Results

Over a period of 4 years, 7 patients (6 women and 1 man), with a mean age of 51 years, presented to the ER with symptoms of abdominal pain, nausea, and vomiting. Six patients had upper GI bleeding confirmed by upper GI endoscopy, with findings of symptomatic giant benign gastric polyps due to pyloric syndrome not amenable to endoscopic treatment, which is why they underwent treated laparoscopically.

Among the preoperative findings made, all patients had giant gastric polyps located at the antrum, with a mean size of 6.6 cm (6.2 cm to 7.1 cm) and a mean pedicle thickness of 4.4 cm (4 cm to 4.9 cm). All patients had *H. pylori* findings, and *H. pylori* eradication treatment was initiated by the gastroenterology service.

The mean surgical time was 42 min (37 min to 46 min), with intraoperative bleeding of < 10 cc. In all cases, en bloc resection with negative margins was achieved. No postoperative leaks were diagnosed, and oral tolerance was initiated at 24 hours with liquid diet and subsequent progression.

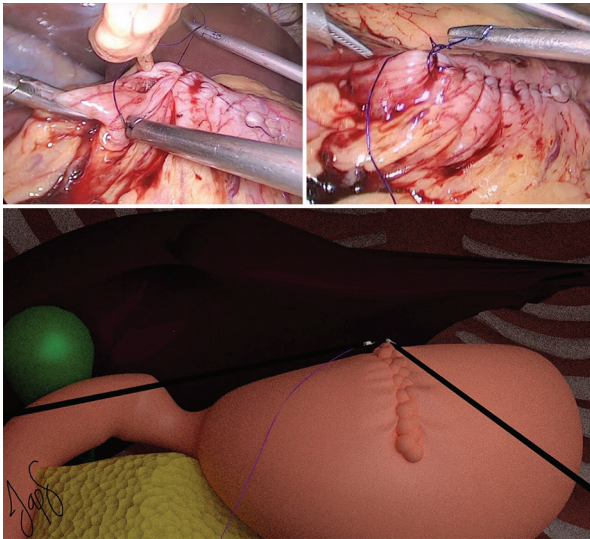


Figure 6. Closure of the anterior gastrotomy with continuous seromucosal mucomucosal stitches of PDS 4-0 (Ethicon, Inc., Cincinnati, OH, United States) using laparoscopic endo-knots.

During the 1-year follow-up, patients underwent, at least, 2 upper GI endoscopies, with no findings or need for interventions.

Discussion

Hyperplastic polyps are the second most common type of gastric epithelial polyps. In endemic areas for *H. pylori*, like ours, they can account for up to 75% of gastric polyps. They originate from the epithelial cells of the stomach and are characterized by a pedunculated or sessile appearance during endoscopy, primarily in the antrum. However, macroscopically, they cannot be differentiated from other types of polyps. Therefore, it is important to obtain histopathological confirmation due to the potential malignancy associated with these lesions to rule out dysplasia and achieve diagnosis^{1,7,8}.

The most common symptoms associated with giant hyperplastic polyps are GI bleeding, anemia, and intermittent distal obstruction due to polyp prolapse into the pylorus, as seen in our study^{1,2,7,8}.

Lesions < 5 mm are managed with biopsy using standard endoscopic forceps, since the histopathological diagnosis is achieved in > 97% of the cases. For lesions > 10 mm, which account for over 30% of all hyperplastic polyps described, there is a high risk of missing dysplasia or in situ carcinoma, with chances of malignant transformation showing focal intestinal metaplasia (5% to 37%), focal dysplasia (2% to 20%),

and established adenocarcinoma (2% to 6%). Therefore, complete polypectomy, along with random biopsies of the gastric mucosa is advised to rule out other synchronous preneoplastic lesions, which can occur in up to 7.1% of the cases. Additionally, *H. pylori* eradication therapy should be administered in the presence of an active infection, as demonstrated by Nam et al.⁹ in their cohort study, where *H. pylori* was associated with an increased development of hyperplastic polyps, and its eradication favored 11.7 times the absence of new polyps compared to control subjects^{9,10}.

Symptomatic lesions—those larger than 10 mm—and those with dysplasia or cancer should be subjected to polypectomy with a snare. Similarly, large lesions, such as those reported in our study, require endoscopic submucosal dissection to achieve en bloc resection, with a low recurrence rate (0% to 3%). However, the rate of incomplete resection ranges from 2.2% to 26.3%¹¹⁻¹³.

Endoscopic submucosal dissection has also been reported for the resection of recurrent or residual lesions. This procedure is challenging due to significant fibrosis and the formation of scar ulcers. Bae et al. reported a 93.8% curative resection rate in 16 patients undergoing secondary endoscopic submucosal dissection, while Oka et al. achieved a 93.3% success rate in completing en bloc resection with secondary endoscopic submucosal dissection for residual or recurrent lesions after endoscopic mucosectomy^{14,15,16,17}.

In patients with lesions > 3 cm, the possibility of performing en bloc resection through endoscopic submucosal dissection drops from 96% down to 83%, as reported by Larghi and Waxman¹⁸, and Pimentel-Nunes et al.¹⁴ in the 2015 European guidelines for the management of GI endoscopy.

The results obtained with laparoscopic transgastric polypectomy are similar or even better than those of endoscopic submucosal dissection, in terms of surgical time and length of stay. In Jung et al.'s study¹⁵ of 1623 patients who underwent endoscopic submucosal dissection, 28 required a second endoscopic submucosal dissection, with a mean surgical time of 55.1 min for the first procedure and 78.2 min for the secondary endoscopic submucosal dissection, with bleeding rates from 1 cc to 15 cc. In our study, the mean surgical time was 42 minutes, and bleeding was < 10 cc. Regarding postoperative complications, Jung et al.¹⁵ reported a 3.8% complication rate, mainly due to perforations in 37 patients, unlike our procedure, which showed a 0% morbidity rate. They achieved en bloc resection in 98.7% of the patients and a cure rate of 86.87%, which

are rates similar to ours. The mean length of stay reported in the medical literature is 3.5 days, which is longer than our 1-day stay¹³⁻¹⁸.

Following en bloc resection, it is important to conduct follow-up endoscopies, especially if dysplasia or in situ carcinoma is identified in the polyp itself or the gastric mucosa. In polyps > 10 mm, a total colonoscopy should be performed every 6 to 12 months, as several studies have reported a 3-fold higher risk of synchronous colorectal adenomas in patients with gastric hyperplastic polyps. In case of multiple polyps, hereditary polyposis syndrome should be ruled out, as was done in our study¹⁹⁻²¹.

Conclusions

Laparoscopic transgastric polypectomy is a feasible technique for the resection of giant hyperplastic polyps with excluded malignancy and dysplasia, which cannot be managed endoscopically. The procedure could reduce the need for antrectomy with Roux-en-Y gastrojejunostomy, therefore having a direct impact on the patients' morbidity and mortality rates. However, further studies are needed to replicate these results.

Funding

None declared.

Conflicts of interest

None declared.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

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