

# Robot-assisted laparoscopic gastrectomy for Menetrier's disease

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**Abstract** Menetrier's disease, also known as hypoproteinemic hypertrophic gastropathy, is a rare condition characterized by the presence of gastric hypertrophy with foveolar infiltration that replaces the normal glandular architecture. We present a case of a 65-year-old female patient who had epigastric pain after meals which progressed to oral intolerance and weight loss. Upper endoscopy was performed showing prominent folds in the gastric mucosa and stenosis at the antrum–pylorus. Biopsy was taken and showed foveolar reactive hyperplasia and reactive glandular epithelium changes suggestive of Menetrier's disease. An abdominopelvic CT was performed showing a dilated stomach and gastric wall thickening. The patient was taken into the operation room for a robot-assisted total gastrectomy with esophagus–jejunum anastomosis. The patient's progress was satisfactory and he was discharged on the eighth postoperative day. Robot-assisted laparoscopic gastrectomy is a feasible and safe option that facilitates the performance of complex procedures.

**Keywords** Menetrier's disease · Surgery · Laparoscopy · Robotic surgery

## Introduction

Menetrier's disease, also known as hypoproteinemic hypertrophic gastropathy, is a rare condition characterized by the presence of gastric hypertrophy with foveolar infiltration that replaces the normal glandular architecture. These changes occur primarily at the gastric body and is associated with hypoproteinemia, hypochlorhydria or achlorhydria [1].

A relationship between Menetrier's disease and gastric adenocarcinoma presentation has been observed in approximately 10 % of the cases. There is an increased risk due to hypertrophic changes of the gastric mucosa, which lead to increased cells proliferation, promoting carcinogenesis. Another risk factor is the association of this disease with *Helicobacter pylori* colonization, which is a predisposing factor for the development of gastric cancer [2, 3]. Otherwise, the hypertrophy even without malignancy can produce outflow tract obstruction and pyloric syndrome as result. Without proper treatment, the disease has a high morbidity and mortality due to gastric obstruction, hemorrhage and malignancy progression. Total or partial gastrectomy is indicated in cases where surgical treatment is needed.

The aim of this publication is to present the first case of complicated Menetrier's disease due to outflow tract obstruction and its surgical resolution using a laparoscopic robot-assisted approach.

## Case description

We present the case of a 65-year-old female patient who presented with epigastric pain, oral intolerance and weight loss. Personal history included arterial hypertension in

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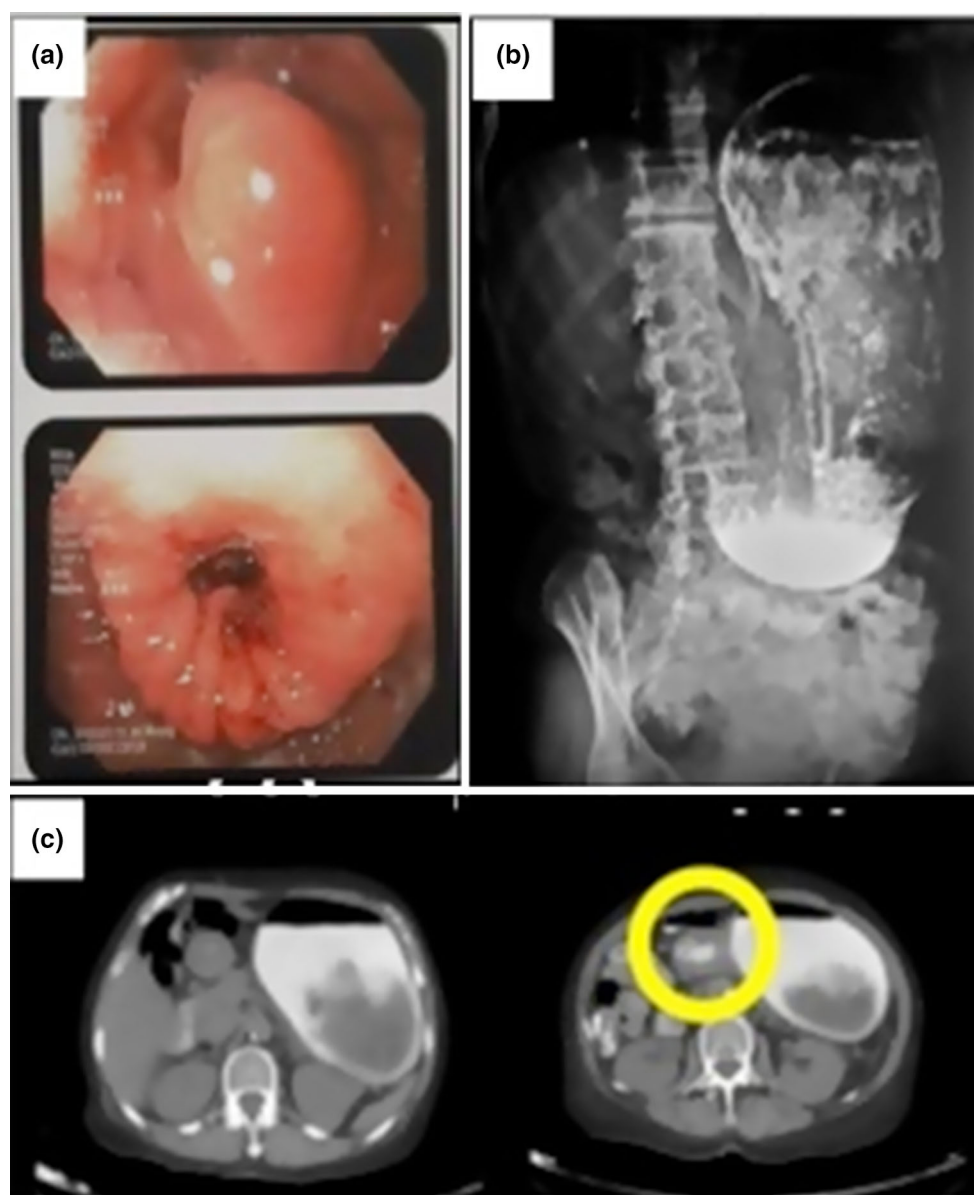
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regular treatment and laparoscopic cholecystectomy. Family history was not contributory. The only abnormal finding in laboratory studies was hypoalbuminemia (3 g/dl). The patient underwent an upper gastrointestinal tract endoscopy, where prominent folds were evidenced in the gastric fundus with stenosis at the gastric antrum producing an important reduction of its diameter (Fig. 1a). A sample was taken for biopsy and showed foveolar reactive hyperplasia, chronic active non-atrophic gastritis and reactive changes suggestive of Menetrier's disease.

Barium swallow showed a dilated stomach with pylorus obstruction, which made a contrast passage toward the

duodenum impossible (Fig. 1b). An abdominopelvic CT was performed showing a dilated stomach and pylorus wall thickening (Fig. 1c). The patient underwent an endoscopic ultrasound in which pathological gastric folds were observed in the medium and distal antrum of probably benign etiology. Samples with ultrasound-guided fine needle (FNA) were taken, reporting severe inflammatory infiltration suggestive of Menetrier's disease. A diagnosis of Menetrier's disease complicated with gastric outlet obstruction was made. The patient was scheduled for a laparoscopic robot-assisted total gastrectomy with esophagus–jejunum anastomosis.



**Fig. 1** Diagnostic approach of **a** upper gastrointestinal tract endoscopy: prominent folds in the gastric fundus with stenosis at the gastric antrum. **b** Barium swallow: retention in the stomach with

pylorus obstruction. **c** Abdominopelvic CT: increased gastric chamber and pylorus wall thickening is evidenced

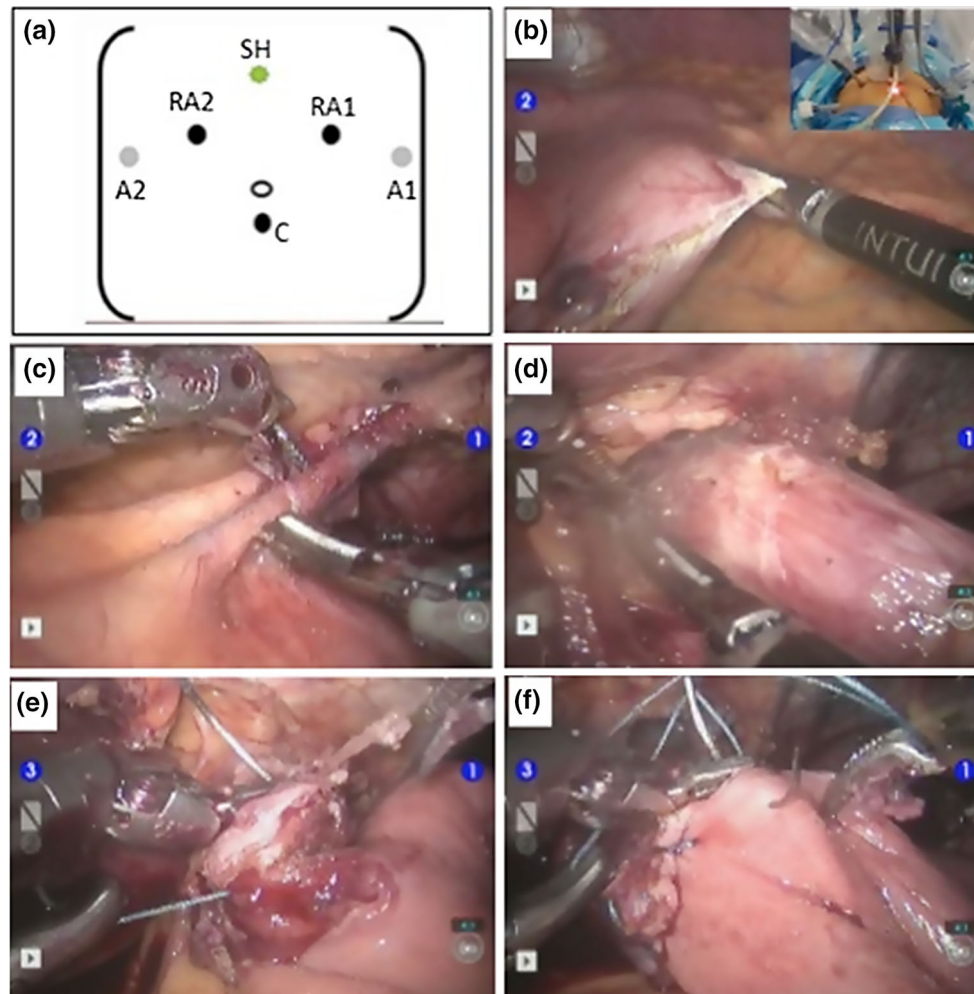
The patient was taken into the operation room for a laparoscopic robot-assisted total gastrectomy with esophagus–jejunum anastomosis. First, we performed trocars placement and cephalic robot docking (Fig. 2a). Then, devascularization of the greater curvature with a Harmonic scalpel (Ethicon Endo-Surgery, Cincinnati, Ohio)(Fig. 2b) and ligation of the gastric vessels with Hem-o-lok L (Weck Closure Systems, Triangle Park, NC) (Fig. 2c) were performed, followed by that of the duodenal section with an endoscopic linear cutter stapler (60 mm cartridge). After that, esophagus section was made 1 cm above the gastroesophageal junction. The robotic system was removed for confection of lateral–lateral anastomosis at 80 cm of the Treitz ligament with an endoscopic linear cutter stapler (60 mm cartridge). The anastomosis gap was sutured with intracorporeal continuous knots with Ethibond 2-0 (Ethicon, Somerville, NJ). The robotic system was docked again and the esophagus–jejunum anastomosis was performed in one layer with intracorporeal and continuous suturing using

2-0 Ethibond (Ethicon, Somerville, NJ) (Fig. 2d–f). The Alexis retractor was placed to extract the surgical piece. Two surgical drainages at the duodenal stump and the esophagus–jejunum junction, respectively, were placed.

The patient progressed satisfactorily. Oral tolerance was initiated at the fifth postoperative day. Drains were removed on the eighth postoperative day and the patient was discharged. Histological analysis was reported as reactive atypia in the glandular epithelium, foveolar hyperplasia, hyperproliferative intestinal metaplasia and thickening of the muscular layer, which are all characteristic findings of Menetrier's disease.

## Discussion

Menetrier's disease (MD) is a rare condition that was first described in 1988 by the French pathologist Pierre Menetriere. It affects men more often than women in a 4 to 1



**Fig. 2** Trocars placement and surgery procedure **a** Trocars placement: *HR* hepatic retractor, *C* camera, *RA1–2* robotic arms 1 and 2, *A1–2* assistants 1 and 2. **b** Devascularization of the major curvature

with Harmonic scalpel. **c** Dissection of gastric vessels. **d–f** Esophagus–jejunum lateral-end anastomosis in one layer with intracorporeal and continuous suturing

proportion and a total prevalence lower than 1 of 200,000 inhabitants. It is characterized by hypoproteinemia, hypo or achlorhydria, gastric hypertrophy and increased risk of gastric adenocarcinoma. Histopathologically, it is evidenced by foveolar infiltration which replaces normal glandular architecture and, in some cases, *Helicobacter pylori* colonization [1].

The cause of MD is still unknown, but is believed to have some relation with the transforming growth factor alpha (TGF- $\alpha$ ), a ligand receptor of the epidermal growth factor (EGF-R). TGF- $\alpha$  molecule causes in vitro proliferation of gastric epithelial cells and reduces the dose-dependent gastric secretion, two key elements of this pathology [4]. In MD patients, an increased expression of TGF- $\alpha$  (4.8 times more) compared to patients with normal gastric mucosa has been demonstrated [4, 5].

MD has characteristic symptoms such as epigastric pain (65 %), asthenia, anorexia, weight loss and postprandial emesis that could lead to oral intolerance. The protein loss produces hypoalbuminemia, leading in some cases to generalized edema. The complementary studies that are used for the diagnosis of this condition are barium swallow and double-contrast CT that are useful to detect diffuse thickening of the gastric wall, which can be corroborated by EUS. The cornerstone evaluation test for Menetrier's disease diagnosis is upper gastrointestinal endoscopy, where the characteristic findings are giant rugged folds, predominantly in the superior portion of the stomach and less frequently in the antropyloric portion and also allows biopsy and subsequent pathological study. The key finding on histological evaluation is foveolar infiltration as well as hyperplastic and tortuous epithelium [6–8].

Given the low incidence of MD, a gold standard treatment has not been determined for this condition. For this reason, internationally accepted guidelines have not been developed yet. MD is often treated with nutritional support that consists of high protein intake diets, especially when the symptoms are mild. Treatments consisting of monoclonal antibodies that neutralize EGF-R are used (cetuximab). The publication of Fiske et al. shows an almost complete histological remission of gastric tissue in four of seven patients treated with cetuximab, considering it as a treatment option in patients with uncomplicated MD or infection of *Helicobacter pylori* [9]. Another therapeutic option is the use of somatostatin analogs (octreotide), which has shown a lowering of the EGF-R on the cell surface [4]. In patients with severe MD, complicated with intestinal obstruction, severe hypoproteinemia or absence of response to previous treatments, a gastrectomy, whether partial or total, is the best option, providing thus the benefit of eliminating the risk of gastric adenocarcinoma presentation [6].

There are few cases of gastrectomy for Menetrier's disease reported in the literature [10]. This procedure can

be performed by laparoscopy, bringing the advantages of minimally invasive surgery to a complex procedure such as gastrectomy, as described by Byun et al. and Sanchez et al. [11, 12]. The laparoscopic approach benefits are enhanced by the Da Vinci surgical system (Intuitive Surgical, Sunnyvale, California, USA) providing three-dimensional vision, increasing freedom of movements, eliminating the fulcrum effect and decreasing the essential tremor of the surgeon. Notwithstanding, there are no reported cases in the literature of the application of this system on Menetrier's disease management. A comparison between open gastrectomy assisted by robot versus laparoscopic gastrectomy for gastric cancer demonstrated that both approaches were equally acceptable in terms of intra- and postoperative complications, although it became apparent that the da Vinci Surgical System (Intuitive Surgical, Sunnyvale, CA, USA) can overcome the technical limitations presented by conventional laparoscopy [13–15]. As reported in this case, esophageal–jejunum anastomosis was achieved satisfactorily with intracorporeal suture and knotting, showing how this laparoscopic procedure of high complexity can be comfortably performed by robotic surgery.

The robot-assisted laparoscopic approach is safe and effective and probably the best therapeutic option, due to the advantages of minimally invasive surgery being added to the aforementioned advantages of the robot.

**Conflict of interest** Omaira Rodriguez, Jose Rosciano, Genesis Jara, Luis Medina, Liumariel Vegas and Raquel Fernandez declare that they have no conflict of interest. Alexis Sanchez is the proctor of robotic surgery.

**Ethical standard** All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000

**Consent section** Written informed consent was obtained from the patient for publication of this Case Report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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