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## Case Report and Review of the Literature

# Endoscopic Removal of A Nasogastric Tube Accidentally Stitched During Bariatric Surgery: A Case Report and Review of the Literature

Giada Di Donato<sup>1</sup>, Annalisa Capannolo<sup>2\*</sup>, Marco Valvano<sup>3</sup>, Giovanni Cianca<sup>1</sup> and Loreto Lombardi<sup>2</sup>

<sup>1</sup>Department of Biotechnological and Applied Clinical Sciences, Department of General Surgery, University of L'Aquila, San Salvatore Hospital, L'Aquila, Italy

<sup>2</sup>Diagnostic and Surgical Endoscopy Unit, S. Salvatore Hospital, Via L. Natali, L'Aquila, Italy

<sup>3</sup>Gastroenterology Unit, Department of Life, Health and Environmental Sciences, University of L'Aquila, L'Aquila, Italy

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### ABSTRACT

To mistakenly suture a nasogastric tube (NGT) at an anastomotic site is a rare surgical occurrence during gastrointestinal operations. Therapeutic options are substantially represented by endoscopic management or surgery.

Here we report our experience in the successful endoscopic removal of a NGT, sutured at the level of the gastrojejunal anastomosis after the performance of a mini-gastric bypass.

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### Introduction

To mistakenly suture a nasogastric tube (NGT) at an anastomotic site is a rare surgical occurrence during gastrointestinal operations. Therapeutic options are substantially represented by endoscopic management or surgery. No guidelines about how to manage this situation is to date available. Here we report our experience in the successful endoscopic removal of a NGT, sutured at the level of the gastrojejunal anastomosis after the performance of a mini-gastric bypass.

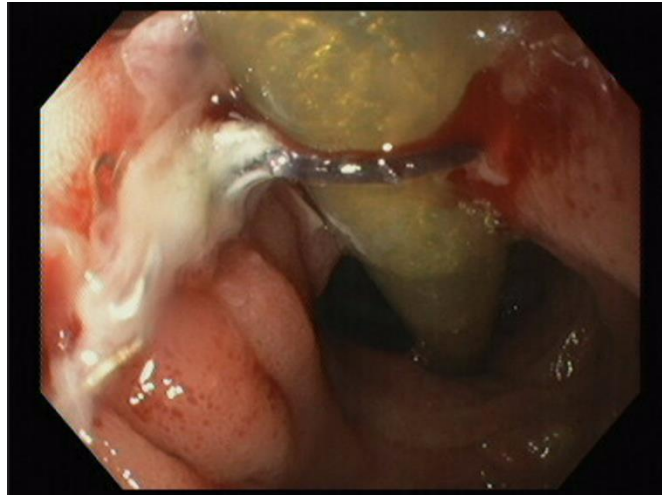
### Case Report

A 41-year-old obese woman (BMI 39.7), without any other known disease, underwent a laparoscopic mini-gastric bypass. On the first postoperative day, an attempt to remove the 16-Fr NGT was made, without success. On the suspicion of a sutured extremity of the NGT, an endoscopic consultation was requested. A preliminary attempt to cut a

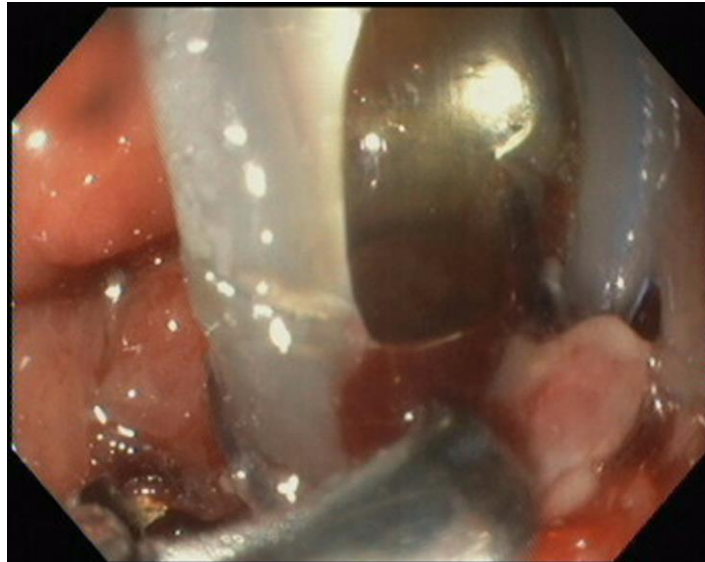
similar NGT with a polyp snare was made before the procedure, but due to the diameter and the stiffness of the tube, it wasn't successful.

On the fifth day after surgery an upper endoscopy was performed, confirming that just below the oesophago-gastric junction, an absorbable suture of V-Lock 3/0 wire was tightly anchored to the distal extremity of the NGT (Figure 1). Due to the very narrow working space, the cautious use of air, and the hard and slick surface of the tube, it was impossible to grasp or cut the stitch with the use of rat tooth forceps and endoscopic scissors. An attempt with a coagrasper was also made, but without success. To expose the distal, lateral hole of the tube at the wire level, the proximal end of the NGT was slightly tractioned through the mouth of the patient (Figure 2). Taking advantage of the space through the hole, the stitch was cut with endoscopic scissors (Olympus Medical, Tokyo, Japan) and the NGT was removed (Figure 3). No immediate nor late complications occurred during the hospitalization, so the patient was discharged two days after the procedure. At the one-week outpatient follow-up, the patient was in good condition and on a free diet.

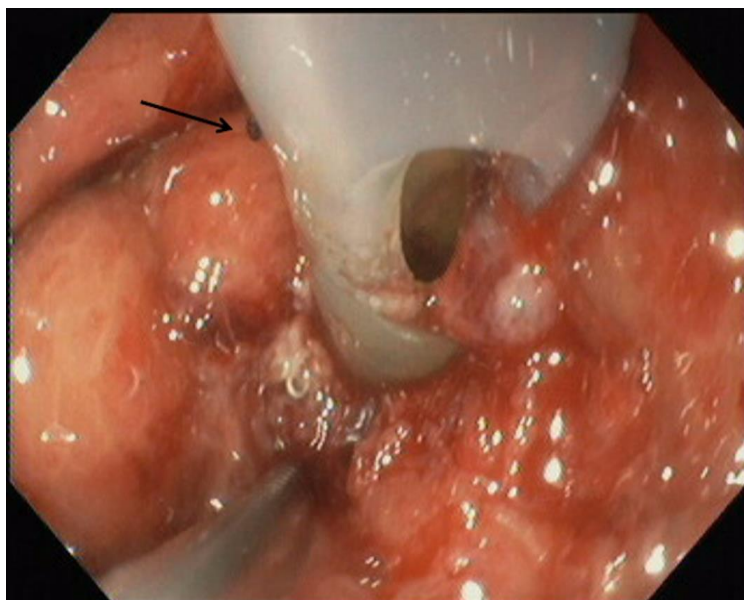
\*Correspondence to: Annalisa Capannolo, Diagnostic and Surgical Endoscopy Unit, S. Salvatore Hospital, Via L. Natali 1, L'Aquila; Tel: +390862368560; E-mail: [annalisacap@tiscali.it](mailto:annalisacap@tiscali.it)



**Figure 1:** An absorbable suture wire anchored to the distal extremity of the NGT.



**Figure 2:** The distal, lateral hole of the NGT at the wire level exposed by a slight traction through the mouth of the patient.



**Figure 3:** The stitch (arrow) cut with endoscopic scissors.

## Discussion

The advancement of surgical techniques requires great attention to many operative details; moreover, the widespread use of staplers and robotic systems in gastrointestinal surgery can be burdened by a variety of technical complications, some related to the absence of direct handling of the anastomosis. That is the case for the fastened NGT, which rarely occurs with manual sutures during an operation [1]. Ensuring that the tube is positioned well above the anastomotic site and testing its mobility before the suture are useful suggestions to prevent such an occurrence [2].

We made a review of the literature to find all published reports of endoscopic removal of a NGT mistakenly sutured during surgery. Thirteen case reports have been described in several interventions, such

as the Nissen fundoplication, Dor fundoplication, partial gastric resection total gastrectomy, oesophageal resection, oesophago-colon-gastroplasty, robotically assisted laparoscopic biliopancreatic diversion with duodenal switch, open abdominal surgery for primary repair of a gastro-duodenal perforation, laparoscopic pancreaticoduodenectomy [1-13]. Six of them were performed manually [1, 3, 4, 10, 11, 14]. Concerning the endoscopic device, the most used were mechanical modalities (rat-tooth forceps, snares, endoscopic scissors) and monopolar or bipolar electrocautery. Even Argon Plasma Coagulation (APC) was used to attempt to degrade or dislodge the tube [12]. Galasso and colleagues realized a homemade endoscopic guillotine, made by combining the metal sheath from a mechanical lithotripter and a polypectomy snare to sever the tube [9]. Studies are summarized in (Table 1).

**Table 1:** Summary of the case reports.

Study -year	Intervention	Timing	Endoscopy device
Urschel <i>et al.</i> 1990 [2]	Partial gastrectomy (Billroth II)	20 days	Endoscopic snare
Reissman <i>et al.</i> 1994 [3]	Nissen fundoplication and gastrostomy	n.a.	Laparoscopic scissors under endoscopic view
Chen <i>et al.</i> 1997 [1]	Gastrojejunostomy	2 weeks	Biopsy forceps
Han <i>et al.</i> 1999 [6]	Antrectomy with Billroth II and Roux-En-Y jejunostomy	12 days	Endoscopic suture cutter (Olympus FS-3L)
Mahmood <i>et al.</i> 2007 [8]	Distal esophagectomy	7 days	n.a.
Shaaban <i>et al.</i> 2009 [4]	Dor fundoplication	1 day	Diathermic snare
Wilkinson <i>et al.</i> 2011 [12]	Pancreaticoduodenectomy	2 days	Endoscopic scissors (after failing with rat-tooth forceps, loop wire cutters, snares, endoscopic scissors, monopolar/bipolar electrocautery)
Sucandy <i>et al.</i> 2011 [10]	Robotically assisted laparoscopic biliopancreatic diversion with duodenal switch	1 day	Endoscopic cutter through sideview ERCP scope
Galasso <i>et al.</i> 2013 [9]	Surgery on a proximal colon-gastric anastomosis	3 weeks	Homemade endoscopic guillotine: combination of the metal sheath of a mechanical lithotripter and a polypectomy snare
Knežević <i>et al.</i> 2013 [5]	Gastric resection, with Billroth II	7 days	Precut papillotomy needle and alligator jaw foreign body forceps
Kim <i>et al.</i> 2016 [11]	Repair of a duodenal perforation	6 days	Endoscopic loop cutter
Morais <i>et al.</i> 2017 [14]	Gastric ulcer suture	7 days	Hot biopsy forceps
Azzam <i>et al.</i> 2018 [7]	Total gastrectomy with a Roux-en-Y oesophagojejunostomy	6 weeks	Endoscopic snare

In no one of such reports, complications were described after the procedure. As with most of surgical complications, reoperation is not considered the best choice both for the surgeon and for the patient; laparoscopic management of post-surgical complications can be technically challenging with a high rate of morbidity as well as conversion to laparotomy, moreover, prolonged hospitalizations and further, serious complications should be taken into account [14].

Endoscopy has the advantage of being minimally invasive, it prevents potential general anaesthetic complications, it doesn't need a sterile environment, it is able to exactly determine the site of the foreign body entrapment and, if feasible, it permits the preservation of the created suture. Performing endoscopy in the immediate postoperative period, however, is controversial as it entails the risk of anastomotic dehiscence due to the insufflation of air during the exam.

Some authors suggested performing endoscopy only after the healing time for gastrointestinal anastomosis, estimated to be of 2-3 weeks, but we also found a report of endoscopic removal of NGT performed after 6 weeks, after a temporary measure [1, 2, 6, 7, 9]. More recently, earlier endoscopic attempts have been described, from 6-7 days after surgery, up to 1-2 days postoperative [4, 5, 10-13].

A combined laparoscopic and endoscopic management was also proposed by Reissman and colleagues [3]. Although there is no consensus on the optimal timing, the safety of early endoscopic intervention after surgery seems to be established. It emerges also by the therapeutic algorithm proposed by García- García for post-operative early gastrointestinal bleeding occurring between the first and the sixth day after bariatric surgery. The authors conclude by recommending endoscopic examination with minimal air insufflation and caution in cases of bleeding [15].

We can conclude that endoscopy represents a safe and possible solution to manage NGTs accidentally sutured, even when the procedure is performed early after surgery, cautiously, with minimal air insufflation or, with the use of CO<sub>2</sub> if possible. A laparoscopic approach with possible repair/re-creation of the anastomosis should be reserved as the next option only when the endoscopic approach fails.

### Article Guarantor

Giada Di Donato.

### Author Contributions

Giada Di Donato: design and drafting of the work, acquisition of data; Annalisa Capannolo: drafting and revising of the work; Marco Valvano: design and drafting of the work; Giovanni Cianca: critical revision of the work, final approval; Loreto Lombardi: critical revision of the work, final approval.

### Conflicts of Interest

None.

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### Informed Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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