



Modified Nissen Fundoplication for Late Dumping Syndrome After Roux-en-Y Gastric Bypass

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Received: 3 January 2021 / Revised: 15 February 2021 / Accepted: 23 February 2021
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Abstract

Introduction Postoperative dumping syndrome (DS) is a common complication after Roux-en-y gastric bypass (RYGB) for morbid obesity. DS is mostly treated conservatively through dietary or pharmacologic measures. In case of non-responding to or contraindication for conservative treatment, surgical intervention may be considered. Various procedures have been described, as there is currently no gold standard technique. We present a new approach by performing a modified Nissen fundoplication.

Case A 34-year-old female consulted at our outpatient clinic. In her history, she had a laparoscopic RYGB 6 years earlier because of morbid obesity (BMI 37.6 kg/m²). Two years postoperatively, she developed a late DS, for which she was successfully treated with long-acting octreotide. Because of pregnancy wish, octreotide needed to be halted. A laparoscopic modified Nissen fundoplication was performed, creating a cuff around the oesophageal-gastric junction with the fundus of the remnant stomach. This slows down the passage of food through the gastric pouch. Postoperatively, the octreotide treatment was halted without any problems. At 6 months, the patient is still free of dumping complaints.

Discussion Postoperative DS is a common complication after bariatric surgery. Dietary measures form the first treatment of DS, followed by pharmacologic treatment. Since octreotide is contraindicated in pregnancy, a surgical intervention was opted for. Our case is the first documented modified Nissen fundoplication to treat late postoperative DS after RYGB for morbid obesity.

Conclusion A laparoscopic modified Nissen fundoplication could be a promising surgical alternative in the treatment of late dumping syndrome after RYGB for morbid obesity.

Keywords Dumping syndrome · Gastric bypass · Modified Nissen fundoplication · Bariatric surgery · Obesity · Nissen fundoplication · Pregnancy

Introduction

Dumping syndrome is a common complication after Roux-en-y gastric bypass for morbid obesity. It can be classified as early and late DS. Most of the patients are clinically easily treatable by dietary measures. In patients who fail to respond, pharmacologic intervention is indicated.

When conservative treatment fails to address symptoms, surgical intervention may be indicated as a last resort. Various surgical strategies have been proposed, as there is currently no gold standard technique. In this

video, we present a new approach by performing a modified Nissen fundoplication.

Case report

A 34-year-old female consulted at our outpatient clinic. In her history, she had a laparoscopic RYGB in another institute 6 years earlier because of morbid obesity. Her weight at the time of bypass was 105 kg (BMI 37.6 kg/m²). She lost weight to a nadir of 58 kg, with weight regain to 79.5 kg at presentation (BMI 28.9 kg/m²).

Three years postoperatively, she developed a late DS, consisting of postprandial perspiration, tremor, fatigue and presyncope. The symptoms typically occurred 2–3 h after every meal and were worse after a sugary meal. The suspected postprandial hyperinsulinemia with reactive hypoglycemia was confirmed by an oral glucose tolerance test (Table 1).

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Table 1 Oral glucose tolerance test

Time after oral glucose administration (hh:mm)	Glycemia (mg/dL)	Insulinemia (μ U/mL [pmol/L])
+00:00	80	6.3 [43.9]
+00:30	185	231.3 [1619.4]
+01:00	123	286 [2002.2]
+01:30	55	41.8 [292.3]
+02:00	34	9.9 [69.6]
+03:00	58	4.5 [31.6]

She was initially put on a regime of acarbose 50 mg 3 times/day with a full relieve of symptoms. However, despite augmentation to 100 mg 3 times/day, the symptoms reoccurred. She was now successfully being treated with intramuscular long-acting octreotide 30 mg every 21 days since 1 year.

Because of pregnancy wish, for which octreotide is a contraindication [1], an alternative treatment option was discussed within the multidisciplinary team.

The modified Nissen fundoplication after RYGB consists of wrapping the fundus of the remnant stomach around the oesophageal-gastric junction [2]. Since we had good short-term results with the modified Nissen fundoplication for patients with reflux after RYGB [3], we opted to perform the same procedure to slow down the passage of food through the gastric pouch.

The patient was positioned and trocars were placed according to our standardised method [4]. Adhesiolysis was performed between gastric pouch and remnant stomach. The crurae were liberated from the esophagus and gastric pouch. The fundus of the remnant stomach was mobilised. First, a posterior cruroplasty was performed using 2 stitches of Ethibond Excel® 2/0 (Ethicon, Johnson&Johnson, Somerville, NJ). After creation of a retro-gastric tunnel, the fundus was wrapped around the gastric pouch. The Nissen cuff was created using 3 stitches of Ethibond Excel® 2/0, 2 of which also taking the anterior oesophago-gastric junction. A 40 French gastric tube was used to calibrate the cuff and assure passage.

The postoperative course was uneventful. The octreotide treatment was stopped postoperatively. At 6-month follow-up, the patient has only 2 episodes of late DS per month.

Discussion

With a reported prevalence of 40–75% [5–7], DS is an important side effect after gastric bypass. Early DS is characterised by gastro-intestinal (bloating, nausea, abdominal pain, diarrhoea) and vasomotor (fatigue, tachycardia, hypotension, desire to lie down) symptoms 0–60 min postprandially. Late DS presents with hypoglycemic symptoms and adrenergic

reaction 60–180 min postprandially (fatigue, syncope, perspiration, tremor).

The pathophysiology behind DS is not completely understood. Early DS is believed to be related to rapid passage of hyperosmolar content to the small bowel. This provokes a fluid shift from the intravascular space to the intraluminal bowel space, causing relative hypovolemia. Late DS is attributed to high postprandial glucose concentrations in the small bowel, causing a hyperinsulinemic response with subsequent hypoglycemia [5, 6, 8]. The discrimination between early and late DS can be arbitrary, as DS often presents as a spectrum of signs and symptoms. Moreover, early and late dumping syndrome may be closely related events that have a similar pathophysiological mechanism at its origin [7]. In our case, the patient presented with typical hypoglycemic late DS (perspiration, tremor, vertigo, fatigue).

Currently, there is no optimal validated tool to diagnose postoperative DS. The diagnosis should be suspected through thorough anamnesis and symptom evaluation. It can be further confirmed by symptom-based questionnaires, glycemia monitoring, or in an oral provocative test [9] as was the case in our patient. In a recent Delphi consensus article, a modified OGTT (ingestion of 75 g of glucose in solution after an overnight fast) was determined the preferred diagnostic method for DS. It is considered positive for early DS in case of increased haematocrit level (>3%) or increased pulse rate (>10bpm) 30 min after ingestion. For late DS, it is considered positive in case of development of hypoglycaemia (<50 mg/dL 60–180 min after ingestion) [6].

The treatment of postoperative DS consists primarily of dietary modifications (reduce amount of food and rapid sugars, delay fluid intake after meal). In patients who fail to respond, pharmacologic intervention is indicated [5]. Acarbose slows carbohydrate digestion in the small bowel, thereby reducing the peak in postprandial hyperglycemia and by this reactive hyperinsulinemia. In our case, the symptoms reoccurred under acarbose.

Somatostatin-analogues delay gastric emptying, inhibit the release of gastro-intestinal hormones, insulin secretion and postprandial vasodilation. Our patient showed good clinical improvement after octreotide administration. It is however contraindicated during pregnancy because fetal growth

restriction has been documented after octreotide administration in hyperinsulinemic patients [1]. The described surgical interventions in the treatment of postoperative DS after RYGB are heterogenous and their place remains uncertain.

The lesser invasive procedures consist of gastric pouch restriction through ring placement or adjustable banding. These procedures aim to slow the passage of ingested food through the gastric pouch, thereby slowing the entry of carbohydrates and hyperosmolar content into the small bowel.

This should lower the glucose concentration and osmolar gradient in the small bowel and thus limit the reactive hyperinsulinemic response and volume transfer to the intestinal lumen respectively.

Bypass reversal or (total or partial) pancreatic resection form the more invasive procedures. A meta-analysis of 75 patients that were treated surgically for late DS after RYGB showed symptom resolution in 67% after pancreatic resection (34/51), 76% after bypass reversal (13/17) and 82% after added restriction. However, most studies were small, with heterogenous methodology and short follow-up. Moreover, some patients received multiple interventions. Complications such as weight regain, diabetes or reoccurrence of DS are described [10].

The modified Nissen fundoplication after gastric bypass was first documented by Kawahara as an anti-reflux procedure [2]. The rationale behind our approach is using the modified Nissen fundoplication not only as an anti-reflux procedure but also as an additional mechanical barrier in order to slow down the passage of food through the gastric pouch.

Our case is the first documented case where the modified Nissen fundoplication is performed for postoperative dumping syndrome after gastric bypass. More cases with longer follow-up are needed to better assess its indication in treating DS.

Conclusion

Postoperative dumping syndrome refractory to pharmacological treatment, or in case of a contraindication for pharmacological treatment, can be a challenge. Currently, no surgical gold standard procedure exists.

Our case demonstrates that a laparoscopic modified Nissen fundoplication can provide good short-term outcomes in treating patients with severe late DS after RYGB for morbid obesity.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s11695-021-05310-3>.

Declarations

Ethics Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest The last author has consultancy agreements with Johnson&Johnson and Medtronic. The other authors have no conflict of interest to declare.

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