

## CASE REPORT

# Small bowel obstruction after laparoscopic Roux-en-Y gastric bypass presenting as acute pancreatitis: a case report

N. Henning<sup>1</sup>, R.K. Linskens<sup>2</sup>, E.E.M. Schepers-van der Sterren<sup>3</sup>, B. Speelberg<sup>1</sup>

Department of <sup>1</sup>Intensive Care, <sup>2</sup>Gastroenterology and Hepatology, and <sup>3</sup>Surgery, Sint Anna Hospital, Geldrop, the Netherlands.

## Correspondence

N. Henning - noraly\_henning@hotmail.com

**Keywords** - Roux-en-Y, gastric bypass, pancreatitis, pancreatic enzymes, small bowel obstruction, biliopancreatic limb obstruction.

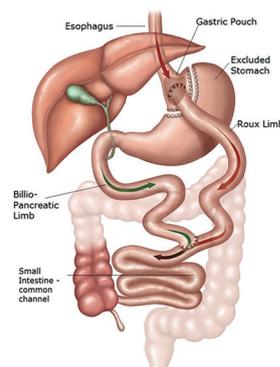
## Abstract

Small bowel obstruction is a common and potentially life-threatening complication after laparoscopic Roux-en-Y gastric bypass surgery. We describe a 30-year-old woman who previously underwent gastric bypass surgery. She was admitted to the emergency department with epigastric pain and elevated serum lipase levels. Conservative treatment was started for acute pancreatitis, but she showed rapid clinical deterioration due to uncontrollable pain and frequent excessive vomiting. An abdominal computed tomography scan revealed small bowel obstruction and surgeons performed an exploratory laparotomy with adhesiolysis. Our patient quickly improved after surgery and could be discharged home. This case report emphasises that in post-bypass patients with elevated pancreatic enzymes, small bowel obstruction should be considered and early computed tomography scan is required in these patients.

## Introduction

Laparoscopic gastric bypass surgery is the most commonly performed bariatric procedure worldwide.<sup>[1]</sup> In the Netherlands alone, approximately 8,139 gastric bypass operations are performed annually. Laparoscopic Roux-en-Y gastric bypass (LRYGB) is considered the gold standard for the treatment of severe obesity in patients with a body mass index (BMI) >40 kg/m<sup>2</sup> or >35 kg/m<sup>2</sup> with obesity-related comorbidity.<sup>[2]</sup> General surgeons, emergency physicians and other clinicians will more frequently encounter postoperative LRYGB complications because of the increasing number of patients undergoing bariatric surgery.<sup>[1-4]</sup>

Small bowel obstruction is described as a common complication after LRYGB surgery and has an incidence of 1.27-5%.<sup>[1,4-6]</sup> The obstruction can be difficult to diagnose due to the changed anatomy of the gastrointestinal tract and symptoms may vary. During LRYGB, the upper part of the stomach is stapled to form a small pouch and is connected to the jejunum, bypassing the remnant stomach, duodenum, bile ducts and a proximal part of the jejunum (*figure 1*). This bypassed part forms the biliopancreatic limb, which delivers bile and pancreatic enzymes to the common intestinal channel. Physicians should have a thorough knowledge of post-bypass anatomy and should be extra attentive to suspecting small



**Figure 1.** Roux-en-Y gastric bypass ©Ethicon, Inc. 2017. Reproduced with their kind permission.

bowel obstruction within this population, because misdiagnosis can have disastrous outcomes.<sup>[1,3-5,7]</sup> In this report we describe the difficulty of diagnosing small bowel obstruction in post-LRYGB patients and why elevated pancreatic enzymes can indicate an obstruction in these patients. The purpose of this manuscript is to emphasise that in post-bypass patients with abdominal pain and elevated pancreatic enzymes, small bowel obstruction should be considered and that this condition requires rapid diagnosis using computed tomography. Contrary to other conditions, such as acute pancreatitis, surgical intervention is needed in most cases.

## Case report

A 30-year-old woman was referred by a general practitioner to our emergency department (ED) with complaints of continuous epigastric pain, despite 10 mg of morphine intramuscularly one hour prior to presentation. Her medical history revealed that she had undergone more than 15 abdominal operations, including gastric band placement (2011), laparoscopic Roux-en-Y gastric bypass (2013), laparoscopic cholecystectomy (2017) and laparotomic adhesiolysis due to obstruction of the biliopancreatic limb (2017). In the ED we saw a woman in severe pain, with nausea and vomiting. Her last bowel movement was that day and her vital signs were normal. Physical examination revealed a soft abdomen with normal bowel sounds, but maximal abdominal tenderness in the epigastric region and rebound tenderness. Laboratory tests revealed hyperlipasaemia with hyperamylasuria and a minor elevation of liver function tests (*table 1*). Unfortunately, serum amylase levels were not measured. Abdominal radiography showed mildly dilated small bowel loops with some air-

fluid levels. An abdominal ultrasound did not expose gallstones or dilated intrahepatic or extrahepatic bile ducts. The pancreas could not be visualised due to intestinal gas, but slightly dilated bowel loops were seen with normal peristalsis. We considered that our patient was suffering from acute pancreatitis. She did not use alcohol or eliciting drugs, had not recently undergone an endoscopic retrograde cholangiopancreatography and her calcium and triglyceride levels were normal. Therefore, the cause of the pancreatitis could be gallstones that were not visualised on ultrasound. She was admitted to the ward with conservative treatment: nil by mouth, intravenous fluids, pantoprazole, antiemetics and analgesics. The patient refused a nasogastric tube due to unpleasant experiences with previous tubes. On the ward, our patient had uncontrollable abdominal pain, despite paracetamol, diclofenac and pethidine. She had severe persistent vomiting and on physical examination her abdomen was rigid and bowel sounds were absent. The patient was transferred to the intensive care unit (ICU) because of this clinical deterioration, where she received morphine intravenously. At the ICU, her laboratory tests revealed progressively elevated liver function tests (*table 1*), suggesting that acute biliary pancreatitis might still be the cause of our patient's symptoms. However, the severity of pain, the excessive vomiting and the new findings on physical examination did not match this diagnosis. At this point we considered a torsion or obstruction of the biliopancreatic limb.

An abdominal computed tomography scan was ordered and showed dilated small bowel loops with a change in calibre and collapsed loops in the pelvic area (*figure 2*), suggesting small bowel obstruction. No signs of pancreatitis were observed. The patient required surgical treatment that same day. Surgeons performed an exploratory laparotomy with adhesiolysis 50 cm distal to the jejunojejunostomy. The patient quickly showed clinical improvement after surgery; she was no longer vomiting and her pain diminished. Also, her lipase level and liver function tests returned to normal (*table 1*). The patient could be transferred to the surgical ward and was discharged home on postoperative day 4.

## Discussion

We present a case of a young woman with a history of Roux-en-Y gastric bypass surgery, who presented with epigastric pain, vomiting, hyperlipasaemia and elevated liver function tests. These findings were misinterpreted as acute biliary pancreatitis and the patient was treated conservatively, as is required in acute pancreatitis. However, after clinical deterioration, computed tomography revealed small bowel obstruction without any signs of pancreatitis. The patient underwent an exploratory laparotomy with adhesiolysis, after which she rapidly improved and could be discharged home on postoperative day 4.

### *Small bowel obstruction after Roux-en-Y gastric bypass*

Small bowel obstruction after LRYGB can be difficult to diagnose. The most common symptoms include abdominal pain, nausea and vomiting.<sup>[1,3-6]</sup> Our patient vomited upon admission and progressed to excessive vomiting on the ward despite antiemetics. A variety in the expression of symptoms is described among post-bypass patients. Vomiting is reported as retching or small amounts of

**Table 1.** Laboratory results

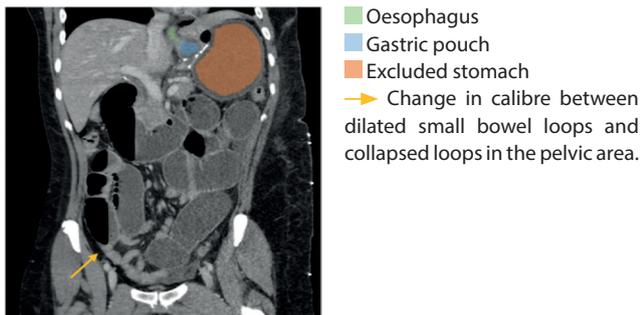
	t0	t1	t2	
Haemoglobin	7.3	6.8	6.4	mmol/l
Leukocytes	14.4	6.4	7.5	10 <sup>^</sup> 9/l
Thrombocytes	264	234	258	10 <sup>^</sup> 9/l
Sodium	141	139	140	mmol/l
Potassium	3.6	3.6	3.6	mmol/l
Urea	3.0		3.9	mmol/l
Creatinine	65	47	60	µmol/l
eGFR	>90	>90	>90	ml/min
Calcium	2.41	2.30		mmol/l
Bilirubin	14.5	69.3		µmol/l
Bilirubin (conjugated)		82		%
ASAT	89	701	192	U/l
ASAT	39	473	338	U/l
GGT	11	37	37	U/l
Alkaline phosphatase	173	268	263	U/l
LDH	275	483	318	U/l
Triglycerides		0.53		mmol/l
Albumin	43.9	40.8		g/l
Lipase	8600	2168		U/l
CRP	<2	47	81	mg/l
Urine amylase	18596			U/l

t=0 presentation at the ED, t=1 admission at the ICU, t=2 postoperative.

clear emesis, due to the small stomach pouch.<sup>[1,7]</sup> Biliious vomiting indicates an obstruction at or below the site of the jejunojejunostomy.<sup>[1,5]</sup> However, vomiting might also be absent when the obstruction only involves the biliopancreatic limb.<sup>[7]</sup> This illustrates the difficulty in recognising symptoms of small bowel obstruction in post-bypass patients and why attending physicians should have knowledge of the post-bypass anatomy.

The diagnosis can also be challenging because of the low sensitivity of radiological studies in post-LRYGB patients.<sup>[1]</sup> The abdominal radiograph of our patient did show some signs of small bowel obstruction, but the computed tomography scan diagnosed the adhesive obstruction. This corresponds with a study which found a sensitivity of 33.3% for plain abdominal radiography to diagnose small bowel obstructions in the post-LRYGB population, compared with a sensitivity of 70-80% in the general population. This study also found a sensitivity of 51.1% for computed tomography scans to diagnose small bowel obstruction in the post-LRYGB population, compared with 80-90% in the general population.<sup>[1]</sup> This means that negative radiological studies do not rule out small bowel obstruction in the post-bypass population. Therefore, in this case where abdominal radiography did not explain the symptoms, a computed tomography scan should have been performed immediately. In case of negative radiological studies, a strong clinical suspicion is leading in decisions to perform laparoscopic exploration and should be done without delay.<sup>[1,6,7]</sup>

Our patient developed small bowel obstruction four years after her LRYGB, caused by adhesions that obstructed the common intestinal channel. The reported interval between LRYGB surgery



**Figure 2.** Computed tomography scan, made in a lateral position due to vomiting and risk of aspiration, demonstrating a small bowel obstruction in the patient

and surgical intervention for small bowel obstruction varies between 1 to 1,215 days after surgery, but seven years is also mentioned.<sup>[1,3]</sup> Our patient developed the obstruction quite late. However, she had already undergone adhesiolysis due to an obstruction earlier that year. This case also corresponds with studies stating that early small bowel obstructions mainly result from technical problems with the anastomosis, whereas late obstructions tend to affect the common channel and generally originate from internal herniation or adhesions.<sup>[4,6]</sup> Adhesions cause 13.7-27.5% of all obstructions.<sup>[1,4-6,8]</sup> Small bowel obstruction should have been suspected earlier, because of the patient's medical history of adhesions.

#### *Elevated pancreatic enzymes as an indicator of small bowel obstruction after Roux-en-Y gastric bypass*

An association between small bowel obstruction after LRYGB and elevated amylase or lipase levels has been reported before.<sup>[4,7]</sup> The lipase level in our patient was 8,600 IU/l with elevated amylase urine levels and slightly elevated liver function tests. This misled us in diagnosing acute (biliary) pancreatitis in our patient. One study measured elevated serum amylase and/or lipase levels in 48% of small bowel obstructions after LRYGB. In 28.6% of patients both enzymes were elevated, whilst some patients only had amylase (46.4%) or lipase (25%) elevation. The range of amylase levels in this study was between 127-328 IU/l (mean 152.1) and lipase levels between 53-148 IU/l (mean 87.9), which is lower compared with the levels in acute pancreatitis.<sup>[7]</sup> The same study concludes that elevated pancreatic enzymes have a high sensitivity for detecting acute small bowel obstructions (64%), especially in the biliopancreatic limb (94%).<sup>[7]</sup> Although our patient had an acute obstruction of the common intestinal channel, the elevated lipase level should have suggested small bowel obstruction.

In small bowel obstructions, elevated pancreatic enzymes result from the inability of the pancreas to secrete its enzymes against the increased intraluminal pressure in the duodenum. The same aetiology exists for elevated liver function tests.<sup>[5,7,8]</sup> In this case, the extremely high level of lipase could imply some inflammation of the pancreas due to stasis of pancreatic enzymes, despite the normal aspect of the pancreas on computed tomography. Thereby, elevation of these markers in post-bypass patients may be misleading and can indicate an obstruction of the biliopancreatic limb or distal to the jejunojunostomy.<sup>[5]</sup>

Misdiagnosis of small bowel obstruction as acute pancreatitis can have disastrous consequences because of the non-surgical management, whilst the obstruction can rapidly worsen to bowel ischaemia, perforation and even death.<sup>[5,7]</sup> Guidelines for acute pancreatitis recommend a computed tomography scan when there is diagnostic uncertainty, when clinical findings suggest severe acute pancreatitis, when there is no response to conservative treatment or in case of clinical deterioration. The initial scan should be performed at least 72-96 hours after the onset of symptoms, because necrosis may not yet be visible and early imaging does not affect the management or prognosis.<sup>[9]</sup> In post-bypass patients with elevated pancreatic enzymes, computed tomography should be performed early due to diagnostic uncertainty and the possible life-threatening complications of small bowel obstruction that require direct operative management.

#### Conclusion

An increasing number of patients undergo laparoscopic Roux-en-Y gastric bypass, so complications will be seen more frequently at the emergency department and intensive care unit. A well-known complication is small bowel obstruction. This can be difficult to diagnose, due to the altered gastrointestinal anatomy that gives a variety of symptoms and a lower sensitivity of radiological studies. Misdiagnosis of small bowel obstruction as acute pancreatitis can be catastrophic due to the non-surgical management. Elevated pancreatic enzymes can indicate small bowel obstruction in post-LRYGB patients and a computed tomography scan early in the course of the illness is mandatory in these patients because of diagnostic uncertainty and possible bowel ischaemia or perforation. In case of negative laboratory or radiological results, high clinical suspicion should be leading in the decision for surgical exploration.

#### Disclosures

All authors declare no conflict of interest. No funding or financial support was received.

#### References

- Husain S, Ahmed A, Johnson J, Boss T, O'Malley W. Small-Bowel Obstruction After Laparoscopic Roux-en-Y Gastric Bypass. *Arch Surg*. 2017;142:988-93.
- Dutch Institute for Clinical Auditing. DATO Jaarrapportage 2014 en 2016.
- Rogula T, Yenumula PR, Schauer PR. A complication of Roux-en-Y gastric bypass: Intestinal obstruction. *Surg Endosc Other Interv Tech*. 2007;21:1914-8.
- Cho M, Carrodeguas L, Pinto D, et al. Diagnosis and management of partial small bowel obstruction after laparoscopic antecolic antegastric Roux-en-Y gastric bypass for morbid obesity. *J Am Coll Surg*. 2006;202:262-8.
- Brooks S, Phelan MP, Chand B, Hatem S. Markedly elevated lipase as a clue to diagnosis of small bowel obstruction after gastric bypass. *Am J Emerg Med*. 2009;27:7-9.
- Hwang RF, Swartz DE, Felix EL. Causes of small bowel obstruction after laparoscopic gastric bypass. *Surg Endosc*. 2004;18:1631-5.
- Spector D, Perry Z, Shah S, Kim JJ, Tarnoff ME, Shikora SA. Roux-en-Y gastric bypass: Hyperamylasemia is associated with small bowel obstruction. *Surg Obes Relat Dis*. 2015;11:38-43.
- Vettoretto N, Pettinato G, Romessis M, Bravo AF, Barozzi G, Giovanetti M. Laparoscopy in afferent loop obstruction presenting as acute pancreatitis. *JLS*. 2006;10:270-4.
- Working Group IAP/APA Acute Pancreatitis Guidelines. IAP/APA evidence-based guidelines for the management of acute pancreatitis. *Pancreatol Off J Int Assoc Pancreatol*. 2013;13:e1-15.