

Radiological and Surgical Findings in a Case of Gastric Necrosis with a Remote History of Gastric Bypass Surgery: A Case Report

Sneha Bopche¹, Shahzad Yousaf², Ashok Bohra³, Ayesha Inam²

¹Specialist Radiologist, Department of Radiology, Mediclinic Parkview Hospital, Dubai, United Arab Emirates, ²Specialist Surgeon, Department of Surgery, Mediclinic Parkview Hospital, Dubai, United Arab Emirates, ³Consultant Surgeon, Department of Surgery, Mediclinic Parkview Hospital, Dubai, United Arab Emirates

Abstract

We report the case of a 49-year-old man with necrotic perforation of the redundant stomach after gastric bypass surgery that was performed 15 years prior for morbid obesity. The patient underwent computed tomography of the abdomen and pelvis followed by urgent laparoscopy, which revealed significant bilious fluid in all quadrants of the abdomen and patchy necrosis of the remnant nonfunctional part of the stomach. The patient had partial gastrectomy; the necrotic part of the stomach was removed. The patient's postoperative recovery was uneventful. Early and accurate diagnosis by radiologists is paramount in such cases with unusual presentation. During surgery, careful examination of the remnant stomach is recommended for patients with a history of gastric bypass surgery, particularly when a hollow viscus perforation is highly suspected. We also recommend that bariatric surgeons or acute care surgeons perform these surgeries.

Key words: Computed tomography, Gastric bypass surgery, Gastric ischemia, Laparoscopy, Perforation

INTRODUCTION

Gastric bypass surgery, also known as the Roux-en-Y procedure, is an important and widely performed procedure for weight loss. This bariatric surgical procedure involves creating a small stomach pouch to limit food intake and reduce caloric absorption by bypassing the distal and upper parts of the stomach.^[1] It is a highly effective procedure that helps reduce weight if lifestyle modifications are followed postoperatively. Post-operative anatomy in these cases is complex.^[2,3] Radiologists and acute care surgeons need to understand the surgical anatomy to effectively diagnose and treat the early and late complications of the surgery and to deal with any related uncommon and potentially lethal abnormality like gastric necrosis discussed in this report.

CASE PRESENTATION

The patient was a 49-year-old man with a known history of hypertension (well controlled on Micardis), gastric bypass surgery 15 years prior, and orchidectomy for testicular torsion 5 years prior. He also had attention-deficit hyperactivity disorder and Vitamin D deficiency.

The patient initially lost significant weight after gastric bypass surgery; however, he gained weight again because of his dietary habits. He reported no complaints for 15 years since the gastric bypass.

He presented to the emergency department reporting 36 h of intermittent generalized abdominal pain associated with nausea, multiple episodes of loose stools, loss of appetite, weakness, and dizziness while standing. The patient denied experiencing any other symptoms. He was tachycardic but afebrile and normotensive.

Abdominal examination revealed a lax but generalized, tender abdomen. There was no evidence of guarding or rigidity. Bowel sounds were audible. The initial laboratory results were as follows: hemoglobin, 17.4 mg/dL; elevated

Access this article online



www.ijss-sn.com

Month of Submission : 04-2024
Month of Peer Review : 05-2024
Month of Acceptance : 06-2024
Month of Publishing : 06-2024

Corresponding Author: Dr. Sneha Bopche, Department of Radiology, Mediclinic Parkview Hospital, Dubai, United arab Emirates.

white blood cell count, $13 \times 10^3/\mu\text{L}$; C-reactive protein, 253 mg/L; lactate, 3.9 mmol/L; and procalcitonin, 1.21 ng/mL.

Abdominal and frontal radiographs of the chest were obtained. There was no evidence of gas under the dome of the diaphragm.

Due to unusual laboratory parameters, the patient received Tazocin and Flagyl and underwent a computed tomography (CT) scan.

CT of the abdomen and pelvis revealed an abnormal appearance of the wall of the excluded portion of the stomach. Wall thickening with mucosal and serosal enhancement and submucosal edema were evident. This is analogous to the target sign observed in bowel ischemia. There was poor definition of the wall of the remnant stomach at locations with the surrounding fluid. Moderate volumes of free intraperitoneal fluid were also observed. No free gas was detected in the peritoneum. No arterial or venous thrombus was identified. The clinical and radiological findings suggested gastric ischemia with perforations [Figures 1-3]. The patient was immediately transferred to the operating theater, and an emergent laparoscopy was performed, which revealed bilious fluid (1.5 L). The alimentary and biliopancreatic limbs showed no obvious abnormalities. The distal portion of the remnant stomach was unremarkable. Peterson's hernia defect was noted and surgically closed. There was a large amount of bile leakage and patchy necrosis of the fundus of the remnant nonfunctional part of the stomach with multiple perforations. Partial gastrectomy of the necrosed part of the stomach was performed [Figures 4 and 5].

Postoperatively, the patient stayed in the ward for 1 week and was monitored for ischemia. Echocardiography revealed mild left ventricular hypertrophy and trivial tricuspid valve regurgitation, with an ejection fraction of 61%. No cardiac source of the embolus was noted. Cardiac Holter monitoring excluded cardiac concerns. The patient was discharged in a stable condition with apixaban because an embolic phenomenon was implicated in the etiopathogenesis of his condition.

Histopathology report revealed benign gastric wall tissue with patchy areas of severe acute transmural inflammation, necrosis, and perforation. Multiple areas of bile pigment deposits were also observed. Acute inflammation involved the serosal surfaces of the gastric wall; however, granulomata, viral inclusions, foreign bodies, or parasitic microorganisms were not observed. No morphological features of dysplasia or malignancy were observed.

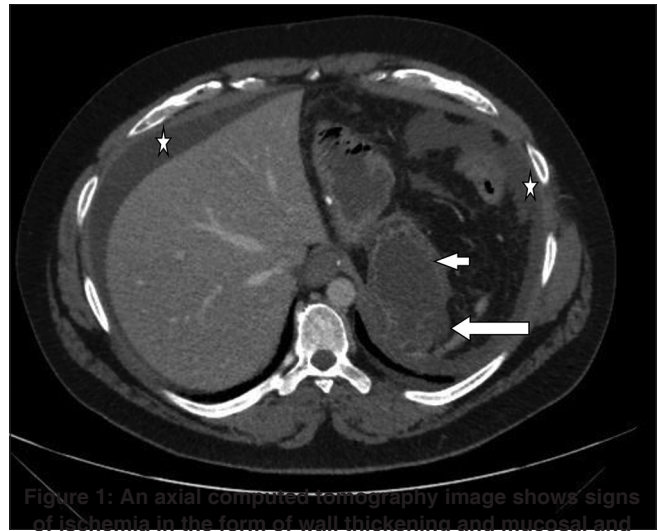


Figure 1: An axial computed tomography image shows signs of ischemia in the form of wall thickening and mucosal and serosal enhancement, with submucosal edema in the bypassed part of the stomach (small arrow). An indistinct margin of the stomach wall can be seen posteriorly with an adjacent fluid pocket in keeping with perforation (large arrow). Free fluid is seen in the upper abdomen (star)



Figure 2: Coronal computed tomography image showing signs of ischemia in the form of wall thickening, mucosal, and serosal enhancement with submucosal edema in the bypassed part of the stomach (small arrow). Free fluid is seen in the abdomen (star)

Timely response by well-trained bariatric surgeons prevented serious complications, prolonged hospital stays, and mortality. The patient had follow-up visits in the surgical outpatient department and showed satisfactory recovery.

DISCUSSION

The stomach is a well-vascularized organ because of the network of arteries around it, making it exceedingly rare to undergo necrosis and perforation.^[2]



Figure 3: Coronal computed tomography image showing signs of ischemia in the form of wall thickening, mucosal, and serosal enhancement with submucosal edema in the bypassed part of the stomach (small arrow). The indistinct margin of the stomach wall can be seen at places with adjacent fluid pockets in keeping with perforation (large arrow). Free fluid is seen in the abdomen (star)

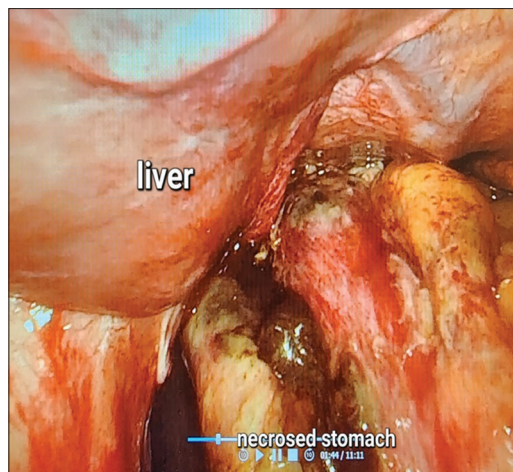


Figure 5: Image of the gastrectomy specimen



Figure 4: Intraoperative image showing necrosed part of bypassed stomach and it's relation to the liver

With the prevalence of obesity, surgical and non-surgical options such as gastric banding, sleeve gastrectomy, Roux-en-Y gastric bypass, one-anastomosis gastric bypass, and gastric balloon insertion are gaining popularity.^[1]

Surgical Anatomy and Complications of Roux-en-Y Gastric Bypass Surgery [Figure 6]

In this procedure, the stomach is divided into a small fundal pouch and a larger bypassed section using a stapler-cutting device. This pouch is connected to the Roux limb,

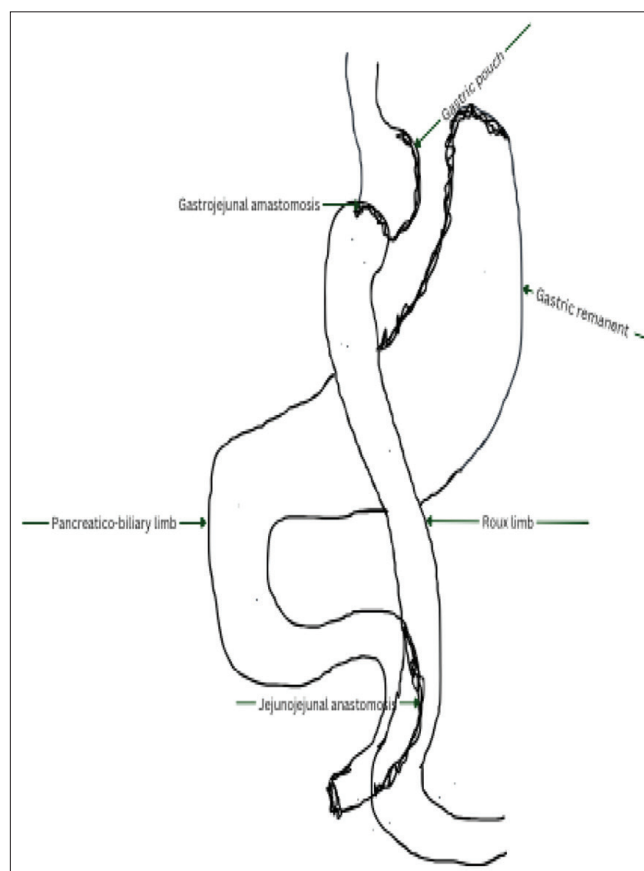


Figure 6: Schematic diagram of the complex anatomy of post-gastric bypass

a section of the jejunum typically 75–150 cm long. The Roux limb can be positioned in two ways: It can be brought up to the gastric pouch in front of the transverse colon (antecolic-antegastric) or behind the transverse colon (retrocolic-retrogastric). There are two main connections in this procedure:

- Proximal gastrojejunal anastomosis: This joins the gastric pouch and the Roux limb.

- Distal jejunojunal anastomosis: This connects the Roux limb to the biliopancreatic limb, which includes the excluded gastric remnant, duodenum, and proximal jejunum.^[4]

Like any other surgery, risks and complications are associated with the Roux-en-Y procedure. Complications are broadly classified into early post-operative complications, such as leakage, dehiscence of anastomosis, and bleeding, and late complications, such as internal hernia and strictures.^[3-5] Ischemic stomach necrosis is a rare finding after surgery, and its pathogenesis is not well established. One of the few risk factors for necrosis after gastric bypass surgery is obstruction at the gastrojejunostomy site, resulting from edema, adhesions, or internal hernia, causing gastric or jejunal wall necrosis.^[5,6] Stomach necrosis can also result from venous insufficiency due to increased intramural pressure caused by dilation.^[7] There is only one reported case of gastric ischemia in by-passed stomach-passed stomach in a 63-year-old female who presented 10 years after the surgery with this condition. Manipulation of the gastric arterial supply during the gastric bypass surgery and jejunojunal anastomotic obstruction were implicated in the etiopathogenesis in this case.^[8]

There was no evidence of anastomotic stenosis or gastric distension in the present case. The proposed cause of necrosis that led to perforations of the nonfunctional gastric remnant was thromboembolic, and its association with bariatric surgery remained unclear.

Findings on Imaging

Usual findings in viscus perforation are gas under diaphragm on radiograph and presence of extraluminal gas on CT scan. Gastric pneumatosis and submucosal edema are the signs of gastric ischemia on CT scan. Imaging findings can be subtle in cases of gastric remnant perforation and can easily be missed, especially if the radiologist is not well versed. Complex post-operative anatomy makes such cases very challenging.^[4] Gastric necrosis is a potentially lethal condition with a mortality rate of 50–80%, and timely diagnosis can significantly impact the patient outcome.^[3]

CONCLUSION

Gastric necrosis, following bypass surgery, is rare and difficult to diagnose. Reporting radiologists should be informed about the surgical history and be aware of the altered anatomy after bariatric surgery. Immediate surgical exploration in a non-responding and unstable patient by a trained and experienced acute care surgeon or bariatric surgeon is the key to better outcomes.

ACKNOWLEDGMENT

Dr. Ali Reza and Dr. Hussameldin B. from the Department of Surgery, Mediclinic Parkview Hospital, provided the necessary surgical details.

CONSENT

Written informed consent was obtained from the patient to publish clinical details and images.

REFERENCES

1. Wolfe BM, Kvach E, Eckel RH. Treatment of obesity: Weight loss and bariatric surgery. *Circ Res* 2016;118:1844-55.
2. Walker TG. Mesenteric vasculature and collateral pathways. *Semin Intervent Radiol* 2009;26:167-74.
3. Zvizdic Z, Jonuzi A, Djuran A, Vranic S. Gastric necrosis and perforation following massive gastric dilatation in an adolescent girl: A rare cause of acute abdomen. *Front Surg* 2019;6:3.
4. Levine MS, Carucci LR. Imaging of bariatric surgery: Normal anatomy and postoperative complications. *Radiology* 2014;270:327-41.
5. Kassir R, Debs T, Blanc P, Gugenheim J, Ben Amor I, Boutet C, *et al.* Complications of bariatric surgery: Presentation and emergency management. *Int J Surg* 2016;27:77-81.
6. Andrés M, Pérez M, Roldán J, Borruel S, de la Cruz Vigo J, Azpeitia J, *et al.* Roux-en-Y gastric bypass: Major complications. *Abdom Imaging* 2007;32:613-8.
7. Steen S, Lamont J, Petrey L. Acute gastric dilation and ischemia secondary to small bowel obstruction. *Proc (Bayl Univ Med Cent)* 2008;21:15-7.
8. Do PH, Kang YS, Cahill P. Gastric infarction following gastric bypass surgery. *J Radiol Case Rep* 2016;10:16-22.

How to cite this article: Bopche S, Yousaf S, Bohra A, Inam A. Radiological and Surgical Findings in a Case of Gastric Necrosis with a Remote History of Gastric Bypass Surgery: A Case Report. *Int J Sci Stud* 2024;12(3):5-8.

Source of Support: Nil, **Conflicts of Interest:** None declared.