



Case Report

The unfortunate events of bowel ischaemia post-Whipple surgery

Dinesh Alagoo¹, Harivinthan Sellappan¹, Thanesh Kumar Maiyauen¹, Guang Hong Ong¹, Zae Szen Anderson Yong¹, Firdaus Hayati² 

¹ Department of Surgery, Queen Elizabeth Hospital, Ministry of Health Malaysia, Kota Kinabalu, Sabah, Malaysia

² Department of Surgery, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia

ARTICLE INFO

Article history

Received: November 14, 2023

Accepted: December 27, 2023

Available online: February 27, 2024

Keywords

Pancreaticoduodenectomy

Pancreatic cancer

Mesenteric ischemia

Case report

Doi

<https://doi.org/10.29089/paom/177641>

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ABSTRACT

Introduction: Pancreaticoduodenectomy is an extensive procedure with multiple postoperative complications which include surgical site infections, bleeding, delayed gastric emptying, and anastomotic leakage. Among all, postoperative bowel ischaemia is the rarest complication that might be difficult to diagnose and ascertain the cause. If it is left untreated, it may lead to mortality.

Aim: The aim is to describe the management of bowel ischaemia post-Whipple surgery.

Case study: A 76-year-old female patient underwent a Whipple procedure for adenocarcinoma of the ampulla which was complicated by postoperative bowel ischemia. A series of investigations, namely endoscopy and imaging, revealed postoperative bowel ischemia beyond the gastro-jejunostomy anastomosis. The patient underwent a series of surgeries and was eventually discharged well. The final histology was consistent with pancreatic cancer and did not require adjuvant chemotherapy.

Results and discussion: Bowel ischemia in any major surgery occurs due to thrombosis. It is multifactorial including cancer patients, complex reconstruction and major surgery. Identification of thrombosis early in the postoperative follow-up is difficult due to non-specific symptoms, postoperative paralysis of the gastrointestinal tract and modified pain reaction after analgesia. Once diagnosed, the goal is for cessation of thrombosis and fibrinolytic destruction of the thrombus.

Conclusions: Bowel ischemia post-Whipple procedure is rare yet dreaded and requires a high level of clinical suspicion. Once diagnosed, an aggressive approach is needed, including relaparotomy and relook surgery. This complication is salvageable with a controlled fistula and adequate nutrition support.

Corresponding author: Firdaus Hayati, Department of Surgery, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, 88450 Kota Kinabalu, Sabah, Malaysia.

E-mail address: m_firdaus@ums.edu.my

1. INTRODUCTION

Pancreaticoduodenectomy is an extensive procedure with multiple postoperative complications. The common complications include surgical site infections, bleeding, delayed gastric emptying, and anastomotic leakage.¹ Postoperative bowel ischemia is one of the rare complications. Treatment requires an aggressive approach and close monitoring. Failure to detect early can lead to intestinal necrosis with sepsis, followed by multiple organ dysfunction, eventually leading to death.²

2. AIM

We here experience a 76-year-old woman who had undergone a Whipple procedure for adenocarcinoma of the ampulla and developed a complication of postoperative bowel ischemia.

3. CASE STUDY

We report a 76-year-old woman who first presented with painless jaundice and constitutional symptoms. Biochemical parameters were consistent with obstructive jaundice. Tumor markers were borderline raised with serum CA19-9 of 37 U/mL (normal range: less than 37 U/mL). The ultrasonography (USG) showed a dilated biliary system without any cause. Contrast-enhanced computed tomography (CT) of the abdomen revealed a periampullary mass (Figure 1A). A plastic stent was placed during endoscopic retrograde cholangiopancreatography (Figure 1B). An ulcerative mass at the ampulla was identified and biopsied. Histopathology revealed a well-differentiated grade 1 adenocarcinoma of the ampulla. Pancreatic protocol CT was performed and electively Whipple surgery was performed 3 weeks later.

The patient underwent the surgery as planned. It was complicated with a presence of dense adhesions and a blood loss of 800 mL. The patient developed oliguric acute kidney injury and metabolic acidosis postoperatively. On day 4, we noticed large amounts of coffee ground aspirate via the nasojejunostomy tube, whereby an oesophagogastroduodenoscopy (OGDS) showed areas of unhealthy mucosa with patchy necrosis beyond the gastrojejunostomy anastomosis (Figure 2). A CT scan revealed a small bowel ischemia but no obvious vascular thrombosis seen (Figure 3). After a family conference, we decided for a surgical exploration.

The relaparotomy revealed multiple areas of patchy ischemia over her small bowel (Figure 4). Intraoperative Doppler USG revealed good flow of the superior mesenteric artery / superior mesenteric vein (SMV), however no obvious thrombosis was seen. We concluded that the thrombosis could be a result of septic emboli. Blood cultures also did not reveal any growth. The patient was placed on a negative pressure wound therapy. At total, the patient underwent 5 surgeries including the Whipple surgery.

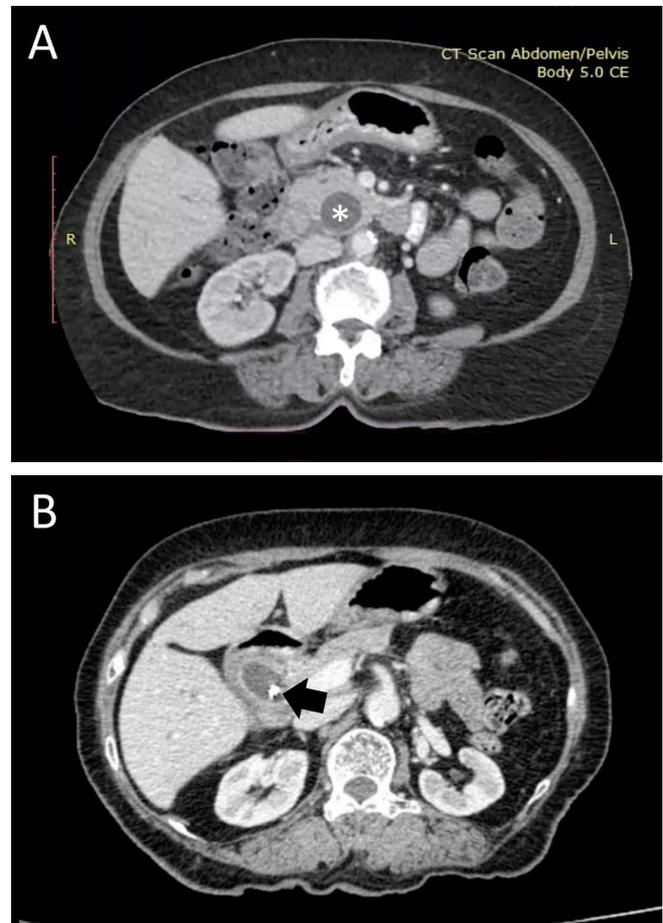


Figure 1. Pre-operative CT scan: (A) a dilated common bile duct (*) with an ampullary lesion; (B) a plastic stent (black arrow) in place.



Figure 2. Postoperative day-5 of the OGDS image showing a long and extensive, patchy, necrotic areas in the small bowel.

Post abdominal closure, we noticed a bile-stained fluid suspicious of an anastomotic leak in the drain, but an oral contrast study with a complementary CT showed no contrast leak. A fluid collection was seen around the jejunojunction of the ischaemic patch of the biliary limb of the initial Roux-en-y anastomosis. It was managed

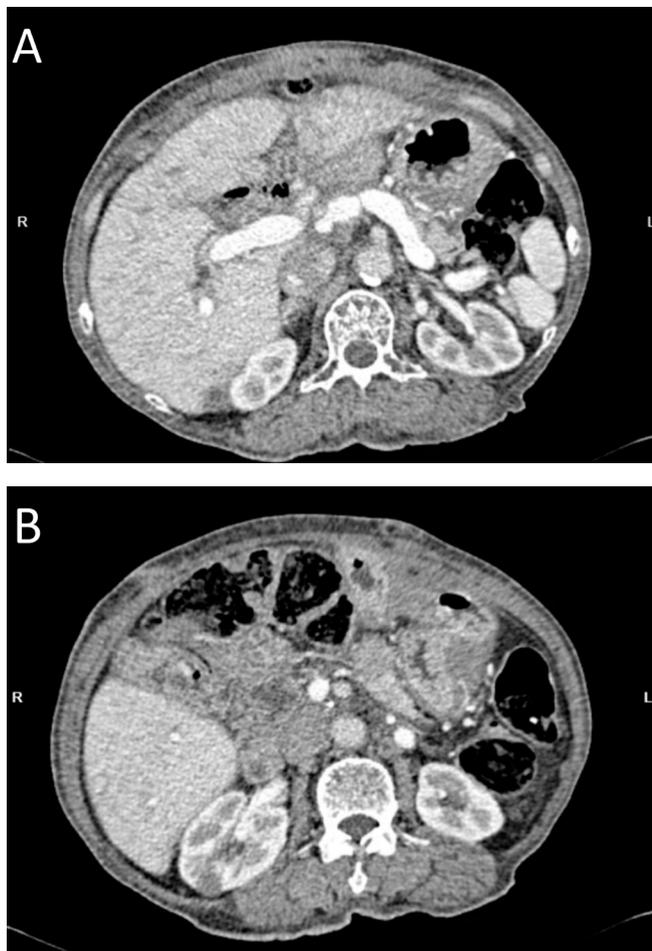


Figure 3. Postoperative CT: (A) a patent superior mesenteric artery / superior mesenteric vein with no obvious thrombosis; (B) along its branches with pneumatosis intestinalis.

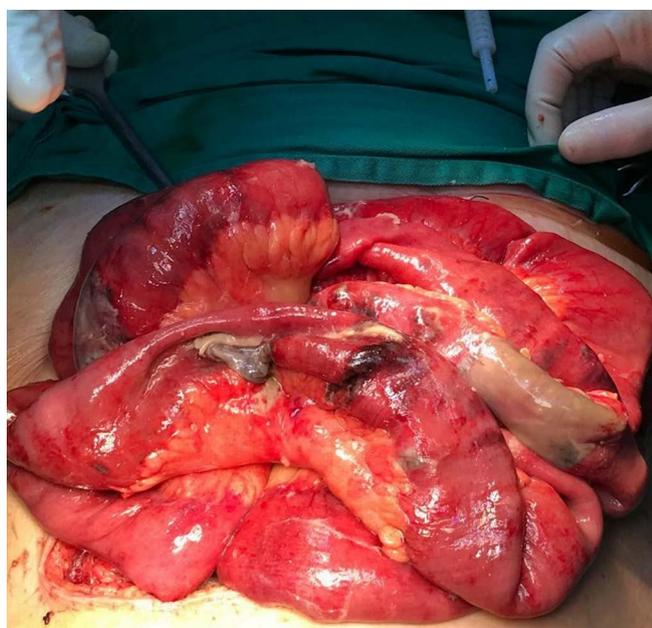


Figure 4. The small bowel with ischaemic patches during the first relaparotomy.

conservatively. A repeat OGDS after 1 week revealed intact anastomoses. The patient was discharged after establishing oral feeding with the drain in place. The drain was removed during clinic review 1 week after discharge.

The postoperative histopathology revealed an adenocarcinoma of the ampulla, T1bN1, well-differentiated, with no lymphovascular invasion and clear resection margins. Considering the age despite a stage II disease, the patient did not require adjuvant chemotherapy. Surveillance imaging revealed no recurrence after a year. The patient was otherwise well.

4. DISCUSSION

Acute mesenteric ischemia occurs after a suddenly decreased blood supply resulting in bowel ischemia. The common causes include acute mesenteric ischemia secondary to arterial thrombo-embolus (75%) and venous thrombosis (10%).^{2,3} The rest are usually due to non-obstructive cause such as cardiogenic or hypovolemic shock. Bowel ischemia in any major surgery, including Whipple surgery, occurs due to thrombosis.^{1,4} It is usually multifactorial, especially in cancer patients undergoing major surgery, as they are high-risk individuals. The duration of surgery also plays a pivotal role in developing bowel ischaemia.⁵ Proper measures on deep vein thrombosis prophylaxis including pneumatic calf pumps should be used during any major surgeries to avoid these complications.

According to the literature, a total of 17% of patients developed venous thrombosis after pancreaticoduodenectomy.^{6–8} The incidence can even be significantly higher after more complex reconstructions. Identification of thrombosis early in the postoperative follow-up is difficult due to non-specific symptoms, postoperative paralysis of the gastrointestinal tract and modified pain reaction after analgesic medications. Certain biomarkers may be useful in the diagnosis of gastrointestinal ischemia. D-dimer may also be used, however, despite its high sensitivity, it has low specificity and can be useful in excluding thrombosis. The diagnosis of venous thrombosis is practically made through axial and coronal images in CT scans. The presence of short-segment filling defects on the axial images is pathognomonic for venous thrombosis.⁹

Preoperative thrombosis risk stratification of patients going for surgery should ideally be done. Preventive measures from deep vein thrombosis, including prophylaxis and pneumatic calf pumps, should be used during any major surgery to avoid such complications. However, upon diagnosis of venous thrombosis, urgent intervention is mandatory. The initial goal is for cessation of thrombosis and fibrinolytic destruction of the thrombus. Systemic administration of heparin is essential to ensure bowel viability. In the presence of bowel ischemia, surgical exploration is a must. The surgical intervention aims at (1) facilitating venous flow and (2) assessing bowel vitality with resection of necrotic segments.^{7,10} However, given the lack of clinical studies, the cause of acute SMV thrombosis remains unknown.

5. CONCLUSIONS

- (1) Bowel ischemia post-Whipple procedure is a rare but dreaded complication.
- (2) Diagnosing it requires a high level of clinical suspicion.
- (3) Once diagnosed, an aggressive approach is needed, including relaparotomy and relook surgery. This complication is salvageable with controlled fistula and adequate nutrition support.

Conflict of interest

Authors declare that there is no conflict of interest.

Funding

None declared.

Acknowledgment

We would like to thank the Director General of Health Malaysia for his permission to publish this article as a case report.

Data availability

The data used to support the findings of this study are available from the corresponding author upon request.

Ethics

Patient's permission was obtained to publish this case report.

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