

Sequential Postoperative Bile Leak Following Laparoscopic Repair of Pre-Pyloric Perforation Revealing a Concomitant Duodenal Perforation: A Case Report

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ABSTRACT

Perforated gastroduodenal disease remains a time-critical surgical emergency. A postoperative bile leak after repair of an apparently limited pre-pyloric perforation raises concern for an unrecognized biliary or duodenal injury, particularly when initial imaging demonstrates pneumobilia, biliary dilatation, and inflammatory changes around the duodeno-pancreatic junction.

A 56-year-old chronic smoker presented with four days of epigastric pain, abdominal distension, tympanism, and epigastric guarding. Computed tomography showed an apparent antro-pyloric perforation, pneumobilia, air bubbles around the duodeno-pancreatic junction, biliary dilatation, and a distended sludge-filled gallbladder. Emergency laparoscopy found a 5mm pre-pyloric perforation, which was sutured with omental patching and drained. Early postoperative bile output through the subhepatic drain, persistent inflammatory markers, and repeat CT with water-soluble contrast demonstrated a suspected second perforation at D1. Emergency reoperation revealed bile in the subhepatic space, extensive fibrinous membranes, and a D1 perforation. Antegrade cholecystectomy, interrupted 3/0 polyglactin closure of the D1 defect, feeding jejunostomy, extensive peritoneal lavage, and multiple drains were performed. This case highlights the diagnostic difficulty of overlapping gastroduodenal and biliary pathology and the importance of interpreting postoperative bile drainage as a potential marker of an occult duodenal defect. Early cross-sectional reassessment and prompt source control are central to management.

KEYWORDS: Perforated peptic ulcer ; Duodenal perforation ; Bile leak ; Pneumobilia ; Cholecystectomy ; Emergency surgery ; Laparoscopy.

INTRODUCTION

Perforated peptic ulcer remains one of the most serious complications of peptic ulcer disease and requires rapid diagnosis, resuscitation, antimicrobial therapy, and definitive source control. Current international guidance recommends operative management for patients with perforation who are clinically unstable or who have diffuse peritonitis, while laparoscopic repair is an accepted option in appropriately selected stable patients when expertise is available.

Recent evidence continues to support minimally invasive repair in selected patients, although the quality and heterogeneity of comparative evidence remain important limitations. A 2025 systematic review of randomized trials found lower mortality, overall complications, wound complications, and length of stay with laparoscopic repair, without a statistically significant difference in postoperative leak or reoperation rates. Other 2025 evidence syntheses have emphasized that the technical components of laparoscopic repair and perioperative cointerventions are inconsistently reported.

The present case is unusual because an initial small pre-pyloric perforation was repaired laparoscopically, but early postoperative bile drainage led to repeat imaging and identification of a concomitant D1 perforation associated with a markedly abnormal gallbladder. The case illustrates the need to reconsider the initial diagnosis when postoperative drainage does not follow the expected course.

CASE PRESENTATION

A 56-year-old man, a chronic smoker, presented to the Emergency Department of CHU Ibn Rochd, Casablanca, with a four-day history of epigastric pain. On admission, he was conscious and clinically fatigued. Abdominal examination revealed epigastric guarding, abdominal distension, and tympanism. Plain abdominal radiography did not demonstrate air-fluid levels.

Sequential Postoperative Bile Leak Following Laparoscopic Repair of Pre-Pyloric Perforation Revealing a Concomitant Duodenal Perforation: A Case Report

An urgent contrast-enhanced abdominal CT scan was therefore performed. The imaging was interpreted as showing an antro-pyloric perforation, associated with pneumobilia, air bubbles in the duodeno-pancreatic region, dilatation of the biliary tree, and a distended gallbladder containing sludge. These findings raised the possibility of a complex upper gastrointestinal perforation with associated biliary pathology (Fig.1).

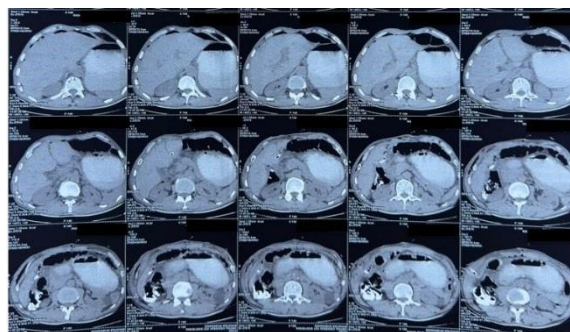


Fig. 1: Preoperative abdominal CT showing the upper abdominal inflammatory/perforation findings.

Emergency laparoscopic

exploration was undertaken. A 5-mm prepyloric perforation was identified (Fig. 2) and closed with interrupted sutures, followed by omental patching. A subhepatic drain consisting of a Salem-type tube was positioned. The gallbladder was not removed during the first operation because no preoperative liver function tests were available, and the intraoperative priority was control of the identified gastrointestinal perforation.



Fig. 2: Intraoperative laparoscopic image of our patient showing the prepyloric perforation.

The early postoperative course was complicated by bile drainage through the subhepatic drain. Laboratory testing showed hemoglobin 11.9 g/dL, leukocytosis of 19,000/mm³ compared with 16,000/mm³ previously, and C-reactive protein (CRP) 237 mg/L. In view of persistent bile output and inflammatory biological abnormalities, a second CT-scan was performed. It demonstrated a distended gallbladder with thick, layered walls measuring approximately 8 mm and sludge, together with findings suspicious for a D1 perforation. Given the ongoing bile leak and concern for an uncontrolled intraabdominal source, urgent reoperation was decided after informed consent.

At re-exploration, there were extensive epiploic adhesions involving the gallbladder and liver, a subhepatic bile collection, and fibrinous pseudomembranes in the inter-loop spaces and subhepatic region. The bile was evacuated and sampled. A perforation of the first portion of the duodenum (D1) was identified (Fig. 3).

Sequential Postoperative Bile Leak Following Laparoscopic Repair of Pre-Pyloric Perforation Revealing a Concomitant Duodenal Perforation: A Case Report



Fig. 3: Intraoperative view of our patient demonstrating the inflamed upper abdominal operative field and the perforated duodenal region (D1 perforation).

An antegrade cholecystectomy was performed (Fig. 4).



Fig.4 : Surgical specimen from our patient's cholecystectomy.

The D1 defect was closed using interrupted 3/0 polyglactin sutures. A feeding jejunostomy was constructed. Extensive peritoneal lavage with isotonic saline was performed. Two Delbet drains were placed in the preanastomotic/perforation region, a Salemtype tube was left in the subhepatic space, and another Salem-type drain was positioned in the pouch of Douglas.

On postoperative day 1 after the second operation, bile continued to drain through the Delbet drains and subhepatic drain. The patient remained hemodynamically and respiratory stable. Laboratory testing showed hemoglobin 11.9 g/dL, white blood cell count 19,000/mm³, and CRP 213 mg/L, compared with 237 mg/L previously.

A CT scan with oral water-soluble contrast (Gastrografin) was performed because of concern for persistent luminal leakage. It demonstrated a possible small extravasation of contrast at the antropyloric region. A nasogastric tube was therefore maintained for gastric decompression and drainage output was monitored serially.

By postoperative day 2, the Delbet drains were producing only a few millilitres of serohematic fluid. The patient remained hemodynamically and respiratory stable.

Sequential Postoperative Bile Leak Following Laparoscopic Repair of Pre-Pyloric Perforation Revealing a Concomitant Duodenal Perforation: A Case Report

This timeline has been summarized in the table below (Table 1):

Table 1: Table summarizing our patient's surgical timeline.

Time point	Clinical findings	Imaging / laboratory data	Management
Admission	4 days of epigastric pain; distension; tympanism; epigastric guarding	CT: suspected antropyloric perforation, pneumobilia, air around duodenopancreatic junction, biliary dilatation, sludge-filled gallbladder	Emergency laparoscopic exploration
First operation	5-mm pre-pyloric perforation	Intraoperative confirmation	Suture + omental patch; subhepatic Salem drain
Early postoperative period	Bile through subhepatic drain	Hb 11.9 g/dL; WBC 19,000/mm ³ ; CRP 237 mg/L	Repeat CT
Second imaging	Persistent bile leak; inflammatory syndrome	D1 perforation suspected; gallbladder 8-mm thick layered wall with sludge	Emergency reoperation
Second operation	Bile in subhepatic space; fibrinous membranes; D1 perforation	Operative diagnosis	Antegrade cholecystectomy; D1 suture; feeding jejunostomy; multiple drains; lavage
Postoperative day 1	Persistent bile drainage; clinically stable	Hb 11.9 g/dL; WBC 19,000/mm ³ ; CRP 213 mg/L; possible minimal antro-pyloric contrast leak	NG decompression; drain monitoring
Postoperative day 2	Clinical stability	Delbet drains: few cc serohematic output	Continued surveillance

RESULTS

The major diagnostic challenge in this case was the coexistence of several radiological signs pointing toward a complex upper gastrointestinal and biliary process. Pneumobilia in a patient with suspected gastroduodenal perforation can reflect abnormal communication between the gastrointestinal and biliary systems, prior instrumentation, or an inflammatory process involving the duodenum and biliary tract. In the present patient, the combination of pneumobilia, biliary dilatation, a distended sludge-filled gallbladder, and air around the duodeno-pancreatic junction should be interpreted as a warning that a

single small pre-pyloric perforation may not explain the entire clinical picture.

The postoperative appearance of bile through a subhepatic drain was particularly important. Bile output after repair of a prepyloric perforation is not an expected finding and should prompt immediate reassessment for a duodenal injury, biliary leak, gallbladder perforation, or another source of uncontrolled intra-abdominal contamination. In this case, repeat CT was decisive in directing the team toward a D1 defect.

For perforated peptic ulcer, the current WSES guidance emphasizes rapid source control, resuscitation, antimicrobial treatment, and selection of operative technique according to hemodynamic status, extent of contamination, defect size, and local expertise. Laparoscopic closure is appropriate in selected stable patients. Recent meta-analysis of randomized trials supports

Sequential Postoperative Bile Leak Following Laparoscopic Repair of Pre-Pyloric Perforation Revealing a Concomitant Duodenal Perforation: A Case Report

laparoscopic repair as an effective option, with lower pooled mortality and morbidity and shorter hospital stay, although postoperative leak and reoperation rates did not differ significantly.

The first operation in this case was consistent with contemporary management of a small perforation: direct closure reinforced by omentum and drainage. However, the subsequent bile leak demonstrated that the visible pre-pyloric defect was not the complete source of contamination. The second operation therefore required a different objective: comprehensive source control rather than simple reinforcement of the original lesion.

Persistent bilious drainage, marked inflammatory markers, and CT evidence suspicious for a D1 defect constitute a strong indication for urgent reassessment and, when an uncontrolled leak is suspected, a surgery to control the source must be performed. Delaying reoperation in the presence of ongoing bile contamination risks persistent peritonitis, intra-abdominal abscess, sepsis, and nutritional deterioration.

The second operation combined several principles : identification and closure of the duodenal defect, treatment of the abnormal gallbladder by antegrade cholecystectomy, decompression of the stomach, distal enteral access through feeding jejunostomy, extensive lavage, and strategically placed drains. The use of a feeding jejunostomy can be particularly useful when prolonged gastric or duodenal exclusion is anticipated, although its risks and benefits should be individualized.

The gallbladder was markedly distended, sludge-filled, and had a thick layered wall measuring approximately 8 mm on repeat CT. These findings are compatible with significant inflammatory gallbladder pathology, although imaging alone cannot establish the exact cause of the wall thickening. The decision to perform antegrade cholecystectomy during the second operation was reasonable in the context of a severely inflamed gallbladder encountered during exploration and the need to eliminate a potential biliary source.

The absence of a preoperative liver panel before the first operation complicated the initial decision-making. In emergency surgery, however, the absence of a complete biochemical work-up should not delay source control in a peritonitic patient. When time permits, liver enzymes, bilirubin, renal function, inflammatory markers, coagulation profile, and blood typing are useful for perioperative risk assessment and for detecting associated biliary obstruction.

Drain output should be interpreted dynamically rather than by volume alone. The colour and biochemical character of the fluid, trend over time, associated fever or abdominal signs, inflammatory markers, and imaging findings should be considered together. In this patient, the transition from bilious drainage to low-volume serohematic output by postoperative day 2, together with hemodynamic stability and a falling CRP, was reassuring, but it did not by itself prove definitive closure of the duodenal leak.

When a postoperative leak is suspected, CT with water-soluble oral contrast may help identify extravasation and associated collections. The 2025 literature also emphasizes that outcomes of perforated peptic ulcer repair depend not only on the closure technique but on the entire perioperative pathway, including antibiotics, drainage, nutrition, gastric decompression, and treatment of the underlying ulcer disease [4,5].

In summary, the following are the key learning points and clinical lessons derived from emergency surgical practice :

- A small visible perforation should not automatically be considered the only source when imaging shows pneumobilia, biliary dilatation, or air around the duodeno-pancreatic region.
- Unexpected postoperative bile drainage after repair of a gastric or pre-pyloric perforation should trigger prompt reassessment.
- Repeat CT is particularly valuable when the clinical and drainage course is discordant with the expected postoperative evolution.
- When a second duodenal perforation is identified, definitive source control should be prioritized over preserving the initial minimally invasive strategy.
- Drain output should be followed serially and interpreted with clinical status, inflammatory markers, and imaging rather than using a single volume threshold.

CONCLUSION

This case illustrates an uncommon and diagnostically challenging sequence in emergency upper gastrointestinal surgery : an apparently limited pre-pyloric perforation followed by persistent postoperative bile drainage and recognition of a concomitant D1 perforation in the setting of abnormal gallbladder and biliary findings. The key clinical message is that unexpected bilious drainage after gastroduodenal perforation repair should be regarded as a potential sign of an occult duodenal or biliary source. Early repeat imaging and timely reoperation enabled additional source control in this patient. Further follow-up is required before definitive conclusions regarding long-term outcome can be made.

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Sequential Postoperative Bile Leak Following Laparoscopic Repair of Pre-Pyloric Perforation Revealing a Concomitant Duodenal Perforation: A Case Report

Consent:

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

Ethical approval:

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

Conflict of interests:

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