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## Case Report and Review of the Literature

# Pyogenic Hepatic Abscess Formation after Roux-En-Y Gastric Bypass: A Case Report and Literature Review of an Infrequently Encountered Postoperative Complication

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### ABSTRACT

**Introduction and Importance:** Pyogenic liver abscess (PLA) is an uncommon postoperative complication of Roux-en-Y gastric bypass (RYGB). Radiological investigations such as abdominal ultrasonography (USG) and computed tomography (CT) are crucial to evaluate and diagnose intra-abdominal abscesses, especially hepatic collections.

**Case Presentation:** A 66-year-old female patient with multiple comorbidities, including urticaria requiring monoclonal antibody therapy (humera). She underwent an uneventful RYGB to treat her weight regain and reflux after a prior sleeve gastrectomy and presented with diffuse abdominal pain. This occurred on postoperative day 23 after the patient was discharged home. Patient evaluation was initiated by physical examination, laboratory investigations, and radiological diagnostic tools. Chest and abdominal X-rays together with abdominal ultrasonography were unremarkable. Then, abdominal computed tomography (CT) scans with IV contrast were done, and a liver abscess was detected. Image-guided percutaneous transhepatic liver abscess drainage through pigtail drain placement was performed. The patient's response was evaluated by serial abdominal CT scans. The liver abscess was successfully treated by percutaneous drainage for 5 weeks and IV antibiotic therapy.

**Clinical Discussion:** PLA is a rare entity that might occur after gastro-intestinal surgery such as Roux-en-Y gastric bypass. Patients with a history of immunosuppressive therapy may be at increased risk of this complication. This life-threatening complication can be prevented by treating liver abscesses early on by utilizing imaging-guided drainage and intravenous antibiotics.

**Conclusion:** Due to the unusual etiologic origin of hepatic abscess post-RYGB, we report the case of a 66-year-old female with diffuse abdominal pain, which was found to be caused by PLA.

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### Introduction

Bariatric surgeries, such as Roux-en-Y gastric bypass (RYGB), are widely used to treat morbid obesity. Besides its technical advantages, various post-operative complications were reported [1, 2]. Rarely, RYGB is complicated by abscesses of the liver postoperatively [1].

In spite of the fact that liver abscesses are the most common visceral abscess, only 5-15% of them are caused by surgical complications [1].

Laparoscopic Roux-en-Y bypass surgery entails a 1-6% incidence of leaks [2].

Here we report a 66-year-old female patient with multiple comorbidities, including urticaria, requiring monoclonal antibody therapy (humera), who presented with diffuse abdominal pain 23 days after RYGB that was found to be a pyogenic hepatic abscess. Our work has been reported in line with the SCARE Guidelines 2020 criteria [3].

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## Case Presentation

On her postoperative day 23 of Roux-en-Y gastric bypass, a 66-year-old female patient, with a background history of hypertension, bronchial asthma, and dyslipidemia, urticaria requiring monoclonal antibody therapy, last administered 2 weeks prior to surgery (humera), presenting

with a day history of diffuse abdominal pain that is associated with nausea, fever, dark stool, and cough.

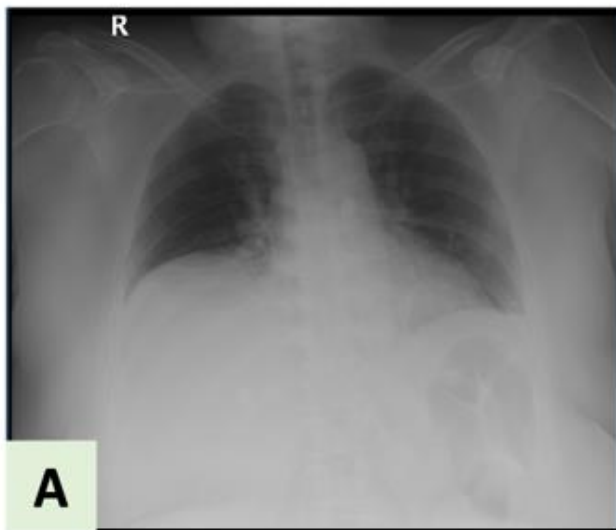
She had a surgical history of laparoscopic cholecystectomy and sleeve gastrectomy. On admission, she was vitally stable, abdominal examination revealed non-distended abdomen and right upper quadrant tenderness (Table 1).

**Table 1:** Patient's vital signs and laboratory investigations on admission.

Patient's vital signs		Hematology		Clinical Chemistry	
GCS	15/15	WBC	31.8	Amylase	16
BP	121/62 mmHg	Hb	126	Lipase	14
HR	110 bpm	Platelets	287	Total Bilirubin	27.4
RR	20 bpm	Neutrophils	28.60	Direct Bilirubin	13.8
SPO <sub>2</sub>	99 % on room air	Lymphocytes	1.79	Indirect Bilirubin	14
Body temperature	39.5 °C	Monocytes	1.36	Albumin	26.4
		Eosinophils	0.00	ALT	208
		PT	27.3	AST	286
				ALP	184
				Creatinine	56

Chest and abdomen X-rays were performed on admission and illustrated in (Figure 1). Abdominal ultrasonography was unremarkable post-gastric bypass study (Figure 2). CT with IV contrast of the chest, abdomen, and pelvis, findings (Figure 3). The liver showed a large multiseptated hypodense lesion noted at segments IV, VIII, and less extent V measuring about 9 × 10 × 11 cm in diameter with peripheral

wall and septal enhancement as well as surrounding fat stranding consistent with hepatic abscess. Evidence of gastric bypass with free oral contrast through the bowel loops till reaching the distal ileal loop. No evidence of oral contrast leakage or pneumoperitoneum was noted in the study.



**Figure 1:** Showing patient's X-rays on admission. **A)** Chest X-ray. **B)** Abdominal X-ray.

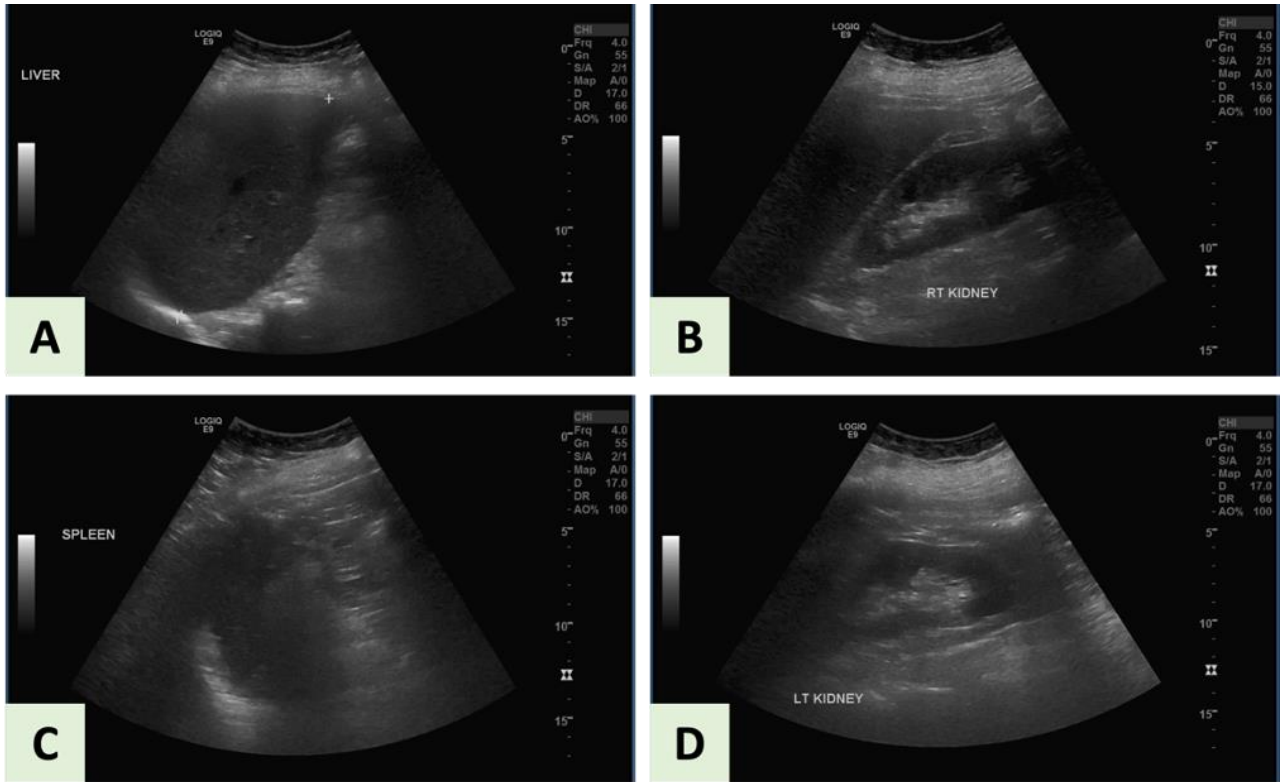


Figure 2: A-D) Showing abdominal ultrasonography with normal findings.

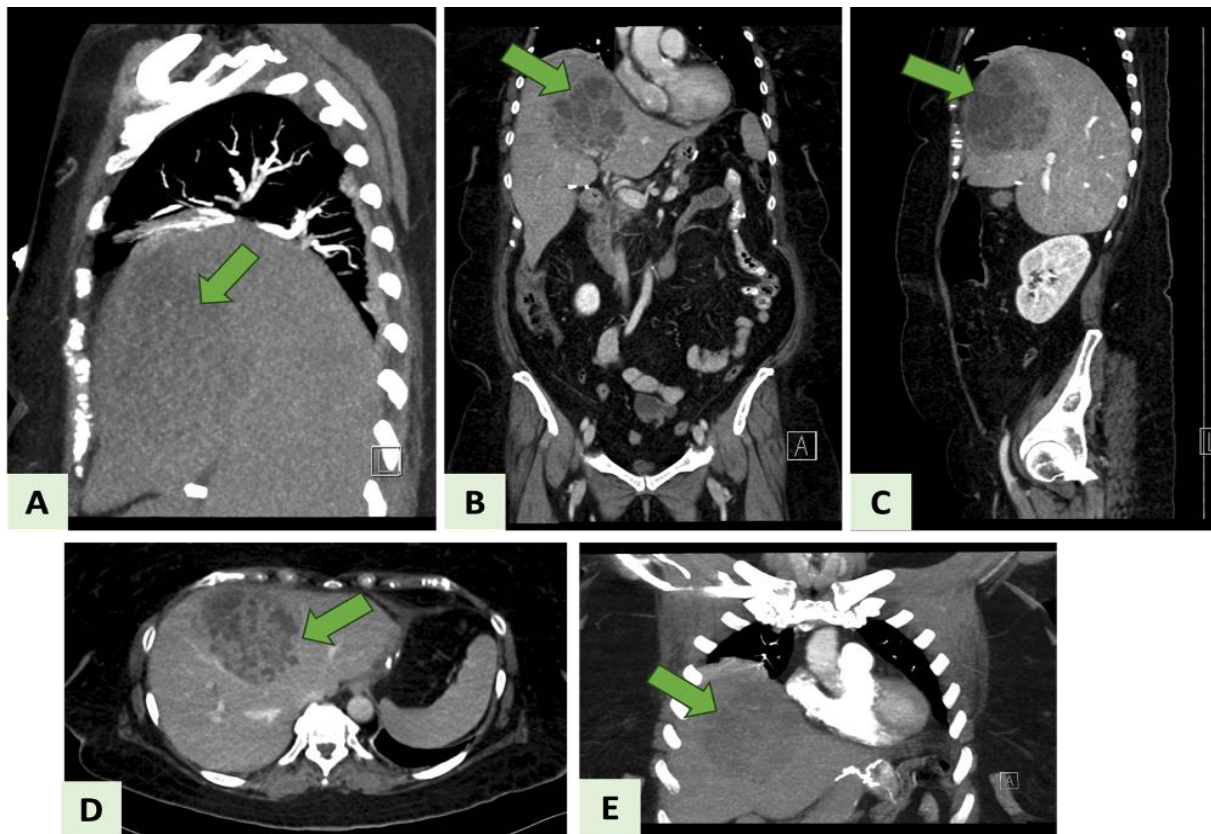
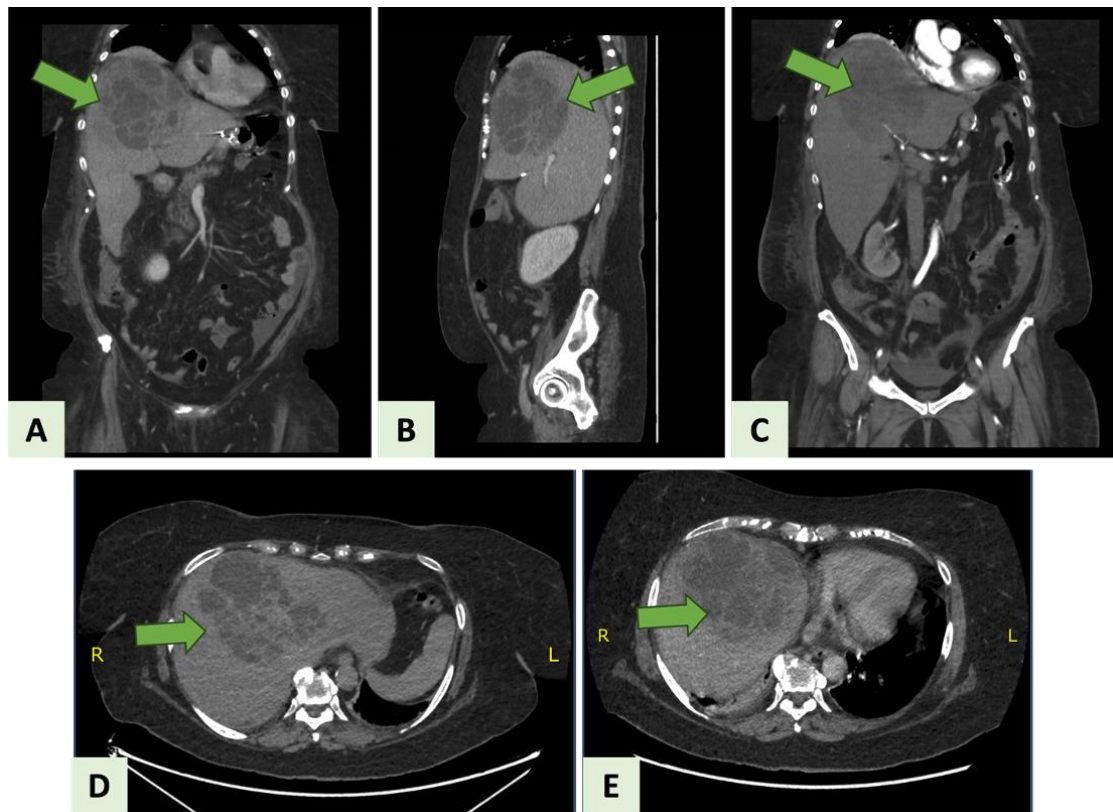


Figure 3: CT with IV contrast of the chest, abdomen, and pelvis. The green arrow points to the hepatic abscess. A, C) Sagittal view. B, E) Coronal view. D) Axial view.

At this point, the hepatic abscess was confirmed, and ultrasound and fluoroscopic-guided percutaneous transhepatic liver abscess drainage through drain placement. During the procedure, an 8 Fr locking pigtail catheter was placed, and after being fixed to the skin it was connected to

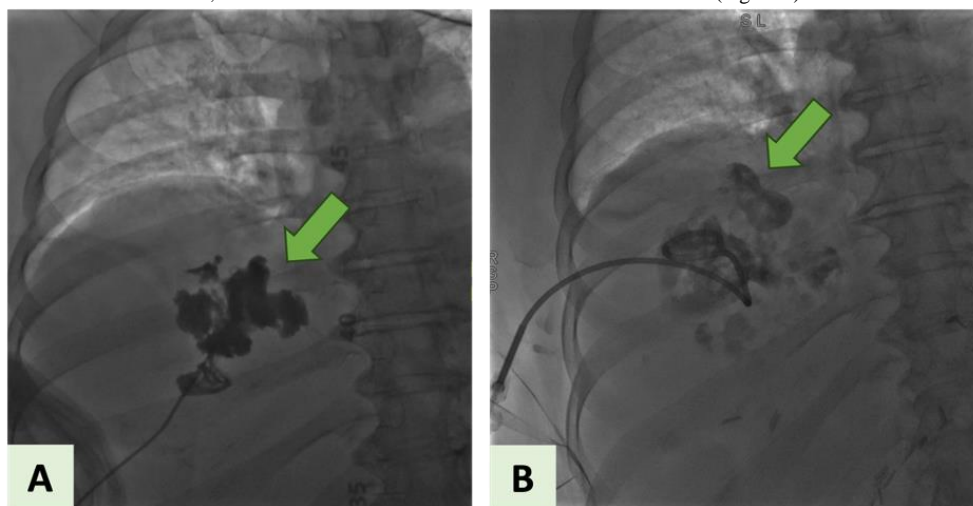
a collection bag. The pigtail was retained for a few weeks to allow maturation of the track. Subsequently, a new abdominal CT showed liver abscess cavity collapse (Figure 4).



**Figure 4:** The new abdominal CT. The green arrow points to the hepatic abscess. **A, C)** Coronal views. **B)** Sagittal view. **D, E)** Axial views.

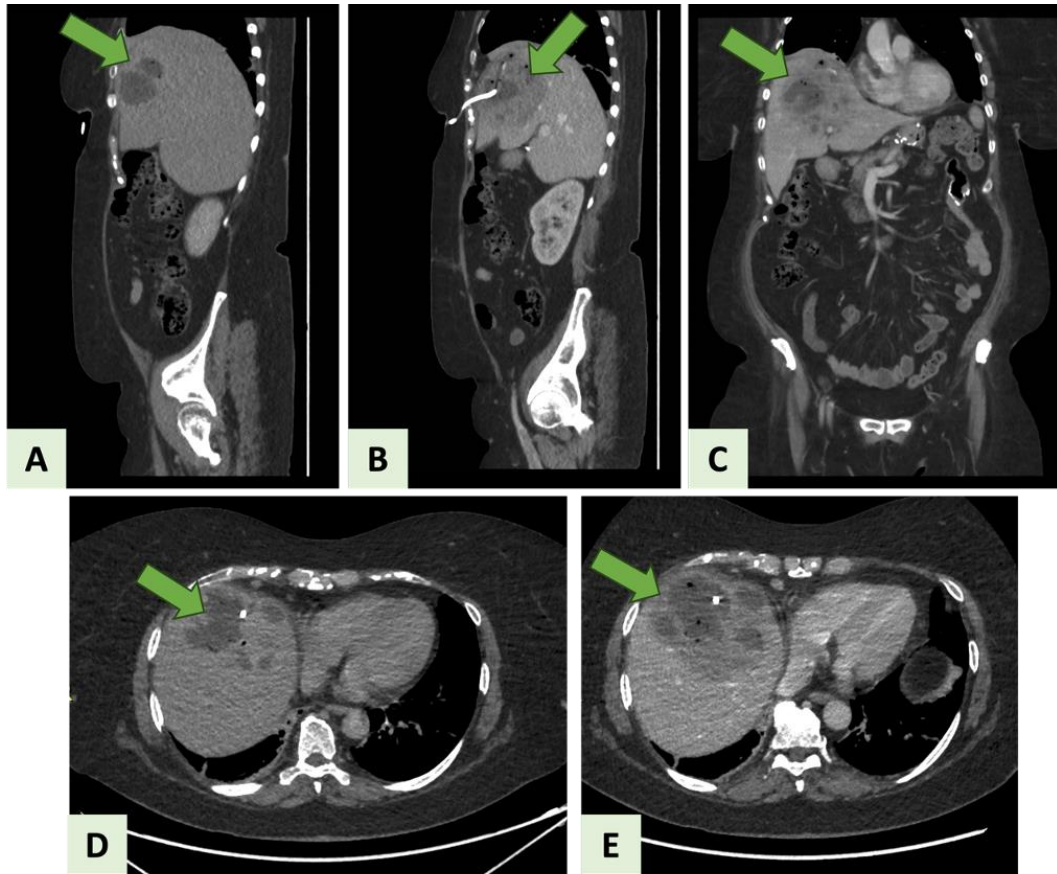
Then, the liver abscess was drained by interventional radiology technique and followed by CT with oral and IV contrast of the abdomen and pelvis done to evaluate the hepatic abscess prior to drainage. In comparison with the previously described large multiseptated lesions that were consistent with liver abscess, the new abdominal CT

demonstrated a minimal to mild increase in size, measuring  $10.3 \times 12.3 \times 13.5$  cm (Figure 5). Upon follow-up, liver abscess drainage assessment was done by abdominal CT. The recent abdominal CT study showed mild regressive interval change of the hepatic abscess size, measuring about  $9 \times 9 \times 9$  cm (Figure 6).



**Figure 5:** Ultrasound and fluoroscopic-guided percutaneous transhepatic liver abscess drainage through drain placement. **A)** The first attempt of drainage with catheter/pigtail insertion. **B)** The first attempt of drainage percutaneously.

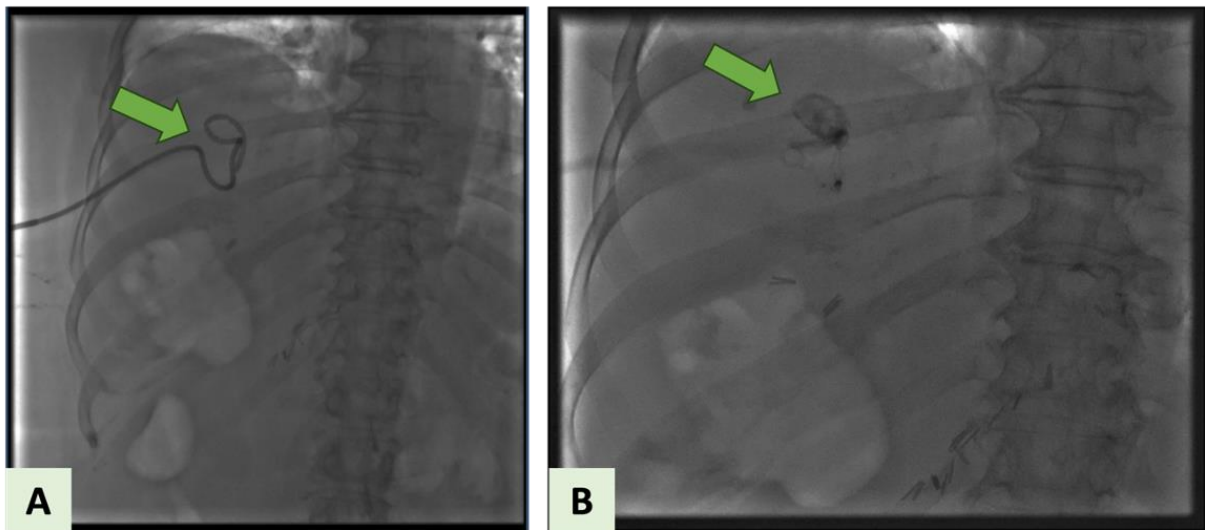




**Figure 6:** Abdominal CT for liver abscess drainage assessment. The green arrow points to the hepatic abscess. **A, B)** Sagittal views. **C)** Coronal view. **D, E)** Axial views.

The patient was discharged home after the second ultrasound and fluoroscopic-guided percutaneous transhepatic liver abscess drainage procedure, on day 13 of the hospital stay. Upon her follow-up in the surgical outpatient clinic, the right hepatic drain that was placed for hepatic abscess was checked by an abscessogram weekly. The patient's

last follow-up visit showed no significant fluid drainage and drain removal was planned (Figure 7). As a result, the pigtail removal, resulted in an uneventful pull-back tractogram and right hepatic abscess lobe drain removal.



**Figure 7:** Image-guided drain removal.

## Discussion

Globally, RYGB has rapidly become one of the bariatric interventions that patients with various levels of obesity undergo [1]. Gastric strictures, gastric hemorrhage, and/or leaks from the staple line represent three serious complications that might originate from RYGB [2]. Hepatic abscess formation is an extremely rare complication following bariatric surgeries such as RYGB operations [2]. The clinical manifestations of gastric leakage are abscesses, peritonitis, fistulas, sepsis, and organ failure. In splenic and liver abscesses, abdominal pain and fever are the common presenting features [2]. Our patient presented with diffuse abdominal pain on postoperative day 23 of RYGB.

Liver abscesses are classified mostly into pyogenic, or amoebic, and to a lesser extent into parasitic types [4]. The pyogenic type of liver abscess resulted from bacteria-related infections of the liver parenchyma that involve inflammation and pus formation. The typical sequence of abscess development involves intestinal leaking into the abdominal cavity and passage through the portal vein to the liver [4]. About 5% to 15% of these liver infections can be triggered by bacterial inoculation of the liver tissue via the hepatic artery or by direct drainage system of the portal vein [4, 5]. In 5%-10% and 1%-5% of instances, direct expansion from an adjacent site of infection and traumatic incidents, respectively, are thought to be the sources of infection [3, 6]. The pathogen can penetrate the liver either directly through proximity or via bile duct channels [4, 6, 7].

To diagnose pyogenic hepatic abscesses, radiological investigations are crucial [4, 6, 8]. These include contrast-enhanced CT scans and ultrasonography with a sensitivity level of 98% [4, 6]. The main contrast-enhanced CT radiological findings are identified as low-attenuation, circular masses with an augmenting peripheral rim [4]. In the presented case, numerous CTs with IV contrast of the chest, abdomen, and pelvis were carried out following admission, and each percutaneous drainage for assessment and the findings were previously mentioned in the case presentation section. The percutaneous image-guided drainage of the abscess is an effective safe alternative to surgical technique. This procedure involves percutaneous evacuation with or without catheter insertion [4, 8, 9]. Typically, the main treatment approach for a liver abscess is percutaneous drainage in conjunction with antimicrobial therapy [1, 4, 8]. The minimally invasive procedure in the current case was the ultrasound and fluoroscopic-guided percutaneous transhepatic liver abscess drainage through pigtail placement. The patient's response was evaluated by clinical improvement and repeated abdominal CTs.

However, if percutaneous drainage is unsuccessful or therapy of a coexisting intra-abdominal condition is required, surgery may be indicated [4, 8, 9]. There are two possible explanations for the liver abscess formation [4]. The primary explanation includes the bacterial migration to the liver parenchyma through the staple line leakage [1, 4, 7]. Secondly to leak-related accumulation, pylephlebitis of the portomesenteric veins results, triggering the ascending bacterial relocation from the portal venous system [4].

In the literature, one case reported an incidence of recurring perihepatic abscesses caused by a gastric fistula after a Roux-en-Y gastric bypass

procedure [5]. To our knowledge, this is the first case to be reported of a pyogenic liver abscess following the RYGB procedure.

## Conclusion

Despite the fatality and rarity of pyogenic liver abscesses post-RYGB, they should be considered in bariatric surgery complications. Radiological studies aid in the identification and diagnosis of intra-abdominal abscesses, especially pyogenic liver abscesses. To cure such cases, percutaneous image-guided drainage of the abscess is a viable treatment option. Our case highlights an extremely rare Roux-en-Y gastric bypass complication caused by a leaky and/or infectious hematoma that eventually led to peritonitis and hepatic abscess.

## Conflicts of Interest

None.

## Funding

None.

## Ethical Approval

Not applicable.

## Consent

Written informed consent was obtained from the patient to publish this case report and accompanying images. On request, a copy of the written consent is available for review by the Editor-in-Chief of this journal.

## Author Contributions

Athary Saleem: Literature review, paper writing, and editing, picture editing, and manuscript drafting. Saqer Alenezi: Paper writing, and editing. Nimer Al-Shadidi: Performed surgery, and paper editing. Khaleel Mohammad: Performed surgery, critical review, supervision, and final approval.

## Guarantor

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## Research Registration

Not applicable.

## Provenance and Peer Review

Not commissioned, externally peer-reviewed.

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