Cureus
Part of SPRINGER NATURE

Open Access Case Report

Decoding Biliary Obstruction: Intraoperative Diagnosis of Mirizzi Syndrome

Laura Savignon [1, 2], Lane Arkangel [2], Gudata Hinika [2]

1. General Surgery, Ross University School of Medicine, Miami, USA 2. Surgery, California Hospital Medical Center Foundation, Los Angeles, USA

Corresponding author: Laura Savignon, laurasavignong@gmail.com

Review began 09/18/2026
Review ended 11/15/2026
Published 11/16/2026

© **Copyright** 2026
Savignon et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

DOI: 10.7759/cureus.119777

Abstract

Mirizzi syndrome is a rare complication of gallstone disease in which a gallstone becomes impacted in the cystic duct, compressing the common hepatic duct or common bile duct. We report the case of a 59-year-old Hispanic male patient with a history of necrotizing pancreatitis and alcohol use. He presented to the emergency department with recurrent episodes of right upper quadrant and epigastric abdominal pain. Preoperative recognition of the condition would assist in facilitating timely intervention and appropriate surgical planning, minimizing delays in definitive management, and mitigating the risk of bile duct injury secondary to severe inflammation and distorted anatomy, in addition to other disease-related complications. Ultimately, diagnostic confirmation occurs through direct surgical visualization. Diagnostic modalities such as abdominal ultrasonography, magnetic resonance cholangiopancreatography (MRCP), and endoscopic retrograde cholangiopancreatography (ERCP) may demonstrate the impacted gallstone within the cystic duct, extrinsic compression of the common hepatic duct or common bile duct, proximal dilation of the biliary tree, and associated inflammatory changes while displaying the biliary anatomy. Although these studies may not demonstrate an intraductal gallstone within the common hepatic duct or common bile duct, ultrasonographic identification of a gallstone within the gallbladder neck, as in this case, in conjunction with the absence of visualization of the biliary tree on hepatobiliary iminodiacetic acid (HIDA) scanning, should raise suspicion for Mirizzi syndrome. Together, these findings suggest extrinsic biliary compression rather than primary intraductal obstruction, warranting further evaluation and guiding surgical planning. Surgical removal of the gallbladder is the definitive management.

Categories: General Surgery
Keywords: laparoscopic cholecystectomy in mirizzi syndrome, male cholelithiasis presentation, mirizzi's syndrome, mirizzi syndrome (ms), mirizzi syndrome type i, obstructive cholecystitis

Introduction

Mirizzi syndrome is a rare condition in which the common hepatic duct or common bile duct is extrinsically compressed by an obstructing stone in the cystic duct [1]. Due to the obstruction of the hepatic duct, symptoms of obstruction arise, including jaundice, increased direct bilirubin, and elevated alanine aminotransferase (ALT) and aspartate aminotransferase (AST) levels [1]. In addition, patients present with the characteristic symptoms of cholecystitis, including right upper quadrant pain and fever. Because the presentation of Mirizzi syndrome mimics common bile duct obstruction, it is often confused with a stone in the common bile duct, which is far more common.

According to recent data, among those between the ages of 20 and 74, 14 million women and 6 million men have gallstones [1]. As a person ages, the number of these stones tends to increase. However, most patients remain asymptomatic and never have related issues. It is important to note that there are specific risk factors that contribute to the formation of symptomatic gallstones. These include female sex, specifically women of reproductive age, increased estrogen levels, Hispanic ethnicity, American Indian race, obesity, and increasing age [1]. In a recent study, researchers found that the prevalence of gallstone disease increased from 7.4% to 13.9% [2]. Among these patients, Mirizzi syndrome is very uncommon, affecting only 0.1% of the population [3]. One study examined 6,800 cholecystectomy cases and found 60 intraoperative diagnoses of Mirizzi syndrome, yielding an estimated incidence rate of 0.07%, with 75% of the cohort being male, supporting a male predominance [4]. This reported finding contradicts established patterns in which female sex is associated with predominance [5].

Gallstones form from different substances, such as cholesterol or bilirubin, the latter being a breakdown product of red blood cells [1]. Gallstones are formed due to the stasis of bile flow [1]. When bile is unable to flow freely out of the gallbladder, sludge forms, which ultimately turns into stones. Although smaller stones may pass asymptomatically and subsequently be excreted from the body, a subset of patients with gallstones ultimately become symptomatic when stones increase in number or size. When gallstones are present in the gallbladder without obstructing any ducts, patients may present with transient right upper quadrant pain that worsens after consuming high-fat meals. Without proper treatment, a stone may eventually obstruct either the cystic duct or the common bile duct, leading to leukocytosis, infection, and severe pain, with

jaundice in the latter case.

Radiological imaging is an important diagnostic tool for gallstone diseases. While common gallstone diseases are easily visualized by ultrasound, Mirizzi syndrome requires a combination of more specific diagnostic tools, such as endoscopic retrograde cholangiopancreatography (ERCP), computed tomography (CT), and magnetic resonance cholangiopancreatography (MRCP), due to its complex anatomy [6]. ERCP may show a smooth stricture, CT may show a thickened gallbladder wall secondary to inflammation, and MRCP may show a large gallstone impacted in the gallbladder neck or cystic duct with dilation of the biliary tree [6]. However, it is important to note that the definitive diagnosis of this syndrome may be established through direct visualization during a surgical procedure.

Case Presentation

A 59-year-old Hispanic male with a past medical history of recurrent acute pancreatitis complicated by necrotizing pancreatitis and pancreatic pseudocysts presented with pain localized to the epigastric region and right upper quadrant. On admission, the patient was afebrile, with a temperature of 36.9°C; hypertensive, with a blood pressure of 142/82 mmHg; and bradycardic, with a heart rate of 49 beats per minute. The patient reported recurrent episodes of pain, with the most recent episode occurring two months before admission. At that time, elective surgery was recommended to minimize complications secondary to his presentation and history of alcohol abuse. Ultrasound performed in the emergency department (Figure *1*) revealed a large gallstone within the gallbladder neck and dilation of the common bile duct to 7 mm.

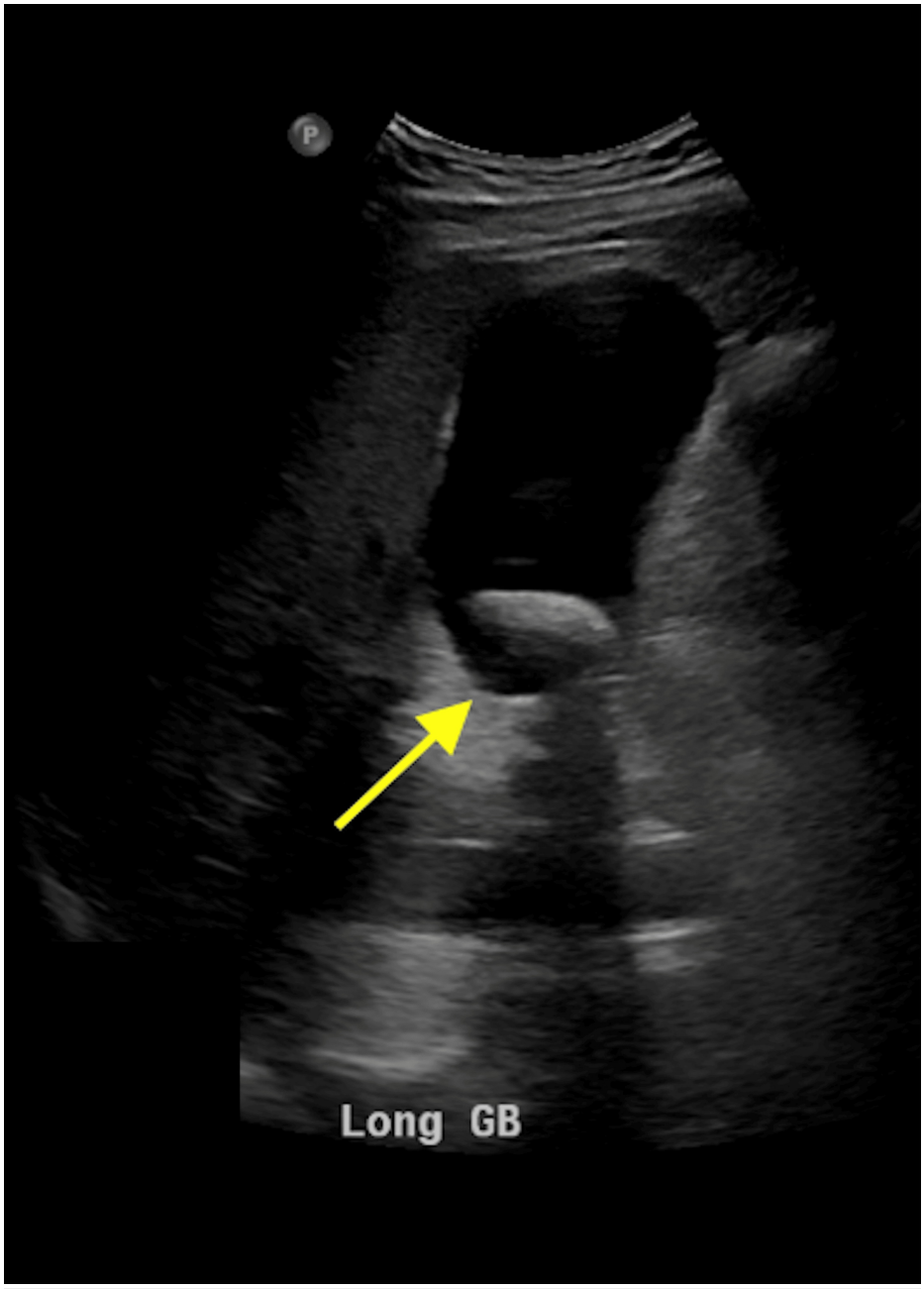


FIGURE 1: Right Upper Quadrant (RUQ) Abdominal Ultrasound

Yellow arrow: Single large gallstone within the gallbladder (GB) neck, measuring 3.4 cm. Not shown: Common bile duct measuring 7 mm. Mild intrahepatic biliary dilation was noted on ultrasound. No GB wall thickening was observed. The examination was negative for a sonographic Murphy's sign.

Further imaging, including MRCP and a hepatobiliary iminodiacetic acid (HIDA) scan, was requested. MRCP, as shown in Figure *2*, later revealed a distended gallbladder with a large gallstone measuring 3 cm within the gallbladder neck and a common bile duct measuring 6 mm.



FIGURE 2: Magnetic Resonance Cholangiopancreatography (MRCP)

White arrow: MRCP revealing a large gallstone measuring 3.0 cm within the neck of a distended gallbladder (GB). Mild intrahepatic biliary dilation was also seen. Not shown: Common bile duct (CBD) measuring 6 mm. No choledocholithiasis was evident on MRCP.

The HIDA scan increased the likelihood of a diagnosis of Mirizzi syndrome by showing no excretion of the radiotracer into the biliary system after four hours, as shown in Figure *3*. A gastroenterologist was consulted, and ERCP was performed, revealing a common bile duct measuring 3 mm with no filling defect and moderate intrahepatic dilation. Following this intervention, the gastroenterologist recommended surgery for definitive management of the patient's condition. The patient consented to surgical management and was prepared for surgery. After induction of general anesthesia, the patient was positioned in the reverse Trendelenburg position with a slight left tilt. Pneumoperitoneum was established, followed by placement of the ports under direct visualization. Using the robotic ports, the gallbladder fundus was retracted, allowing visualization of the hepatocystic triangle, which was carefully dissected until the critical view of safety was achieved. The cystic duct and cystic artery were then clipped and divided, allowing for dissection of the gallbladder from the liver using electrocautery. At this time, it was visually evident that the patient had type I Mirizzi syndrome. The gallbladder was placed in a specimen retrieval bag and removed through the port. The operative field was inspected for hemostasis and bile leakage before port removal and surgical site closure. The patient had an uncomplicated postoperative recovery.

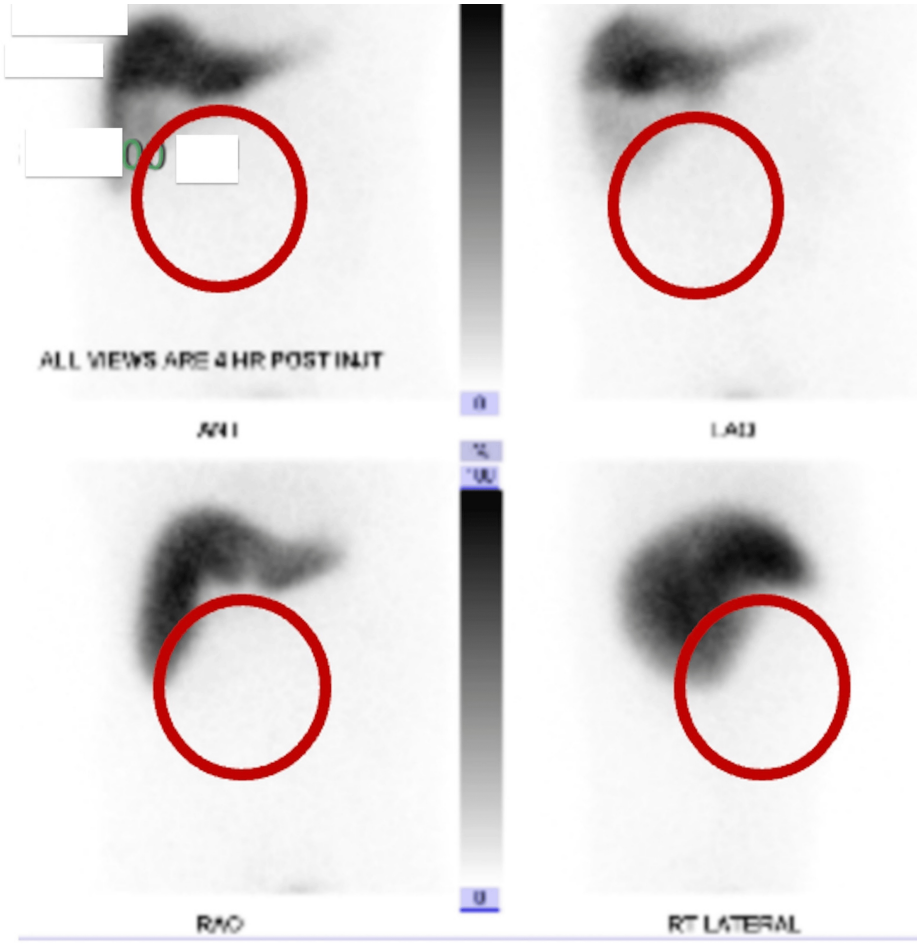


FIGURE 3: Hepatobiliary Iminodiacetic Acid Scan (HIDA)

HIDA scan showing no excretion of the radiotracer into the biliary system after four hours. Red circles indicate the area where the biliary tree should be evident four hours after administration of the radiotracer.

Discussion

This case highlights a rare variant of obstructive cholecystitis known as Mirizzi syndrome. There are five types of Mirizzi syndrome: types I through V. Type I involves extrinsic compression of the common bile duct by an impacted gallstone [7,4,8]. Mirizzi types II through IV involve the presence of a cholecystobiliary fistula involving one-third to the entire circumference of the bile duct [7,4,8]. Mirizzi type V occurs when a bilioenteric fistula forms, with or without the development of gallstone ileus [7,4,8].

As previously noted, the symptoms of Mirizzi syndrome mimic those of other gallstone diseases and are characterized by severe right upper quadrant pain, jaundice, and fever. While diagnosis of this syndrome is difficult before surgery due to the pathological ambiguity, once diagnosed, the treatment regimen is the same as that for other gallstone pathologies. Preoperative diagnosis continues to be a challenge, as evidenced by a 2024 study that found that 81% of Mirizzi syndrome cases were diagnosed intraoperatively [9]. Due to the anatomical variations as well as severe inflammation caused by the extrinsic compression, imaging alone cannot confirm Mirizzi syndrome, and it is often mistaken for other pathologies.

Overall, Mirizzi syndrome poses significant challenges preoperatively and intraoperatively due to the anatomical and pathological irregularities of this disease. Open laparotomy used to be the mainstay surgical procedure; however, minimally invasive laparoscopic procedures have largely taken over due to faster recovery times. A prospective study conducted in Pakistan found that 30.55% of patients undergoing laparoscopic cholecystectomy for Mirizzi syndrome had to undergo conversion to open surgery, citing the difficult anatomy of Mirizzi syndrome as the cause [5]. Furthermore, the study found that the intraoperative findings of severe fibrosis and anatomical abnormalities were associated with a higher conversion rate to open surgery, postoperative complications, and increased morbidity [5].

A study conducted by Froehlich found that laparoscopic procedures were successful in types I through IV Mirizzi syndrome, while type V Mirizzi syndrome required conversion from laparoscopic to open surgery [9].

In accordance with this, recommendations have been updated to include routine drain placement in patients with type V Mirizzi syndrome [9]. A study conducted by Moosa et al. further elaborated on the type of laparoscopic procedure and degree of hepatobiliary manipulation indicated by the varying types of Mirizzi syndrome. In the study, total cholecystectomy was identified as the recommended technique for type I Mirizzi syndrome, with types II through III requiring only subtotal cholecystectomy or the application of a fundus-first technique [5]. The management of type IV Mirizzi syndrome was Roux-en-Y hepaticojejunostomy [5].

In this case, the patient had no postoperative complications, which further illustrates the rarity of this case, as complication rates following cholecystectomy for Mirizzi syndrome average 25% [9]. Bile leaks occur in 0.2% to 2% of cholecystectomies and are more commonly noted following laparoscopic cholecystectomy compared with open cholecystectomy [9]. Bile leakage is the most common complication associated with cholecystectomy and may later require ERCP [9]. The etiology is secondary to an injury to a minor duct stemming from the common bile duct or to bile escaping from the cystic duct stump [9,10]. When bile leaks occur, patients present with nausea, vomiting, pain, fever, and jaundice due to local inflammation and systemic flare-ups [9]. The increased rate of bile leaks seen in cholecystectomies for Mirizzi syndrome stems from the distorted anatomy at Calot's triangle and the presence of dense adhesions due to significant inflammation [7,8].

Although laparoscopic cholecystectomy is minimally invasive and offers a shorter hospital stay, it still has significant potential for postoperative complications, so the fact that our patient recovered well without postoperative complications was remarkable.

Conclusions

The rarity of Mirizzi syndrome and its nonspecific presentation can create a perplexing clinical picture for any physician. While radiological investigations can contribute to the diagnosis of gallstone diseases, specific diagnostic tools such as ERCP, MRCP, CT, and ultrasound are unlikely to reveal the extrinsic compression of the common hepatic duct or common bile duct that occurs in Mirizzi syndrome. Preoperative diagnosis remained inconclusive due to the pathological ambiguity. The current diagnostic testing algorithm requires direct intraoperative visualization for definitive confirmation. There were no postoperative complications, including bile leakage, despite the patient’s substantial medical history, including necrotizing pancreatitis and alcohol use.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Laura Savignon, Lane Arkangel

Acquisition, analysis, or interpretation of data: Laura Savignon, Gudata Hinika

Drafting of the manuscript: Laura Savignon, Lane Arkangel

Critical review of the manuscript for important intellectual content: Laura Savignon, Lane Arkangel, Gudata Hinika

Supervision: Gudata Hinika

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

1. Weerakkody Y, Knipe H, Walizai T, et al. Mirizzi syndrome. Radiopaedia.org . (2026). Accessed: May 16, 2026: https://radiopaedia.org/articles/mirizzi-syndrome?lang=us.
2. Unalp-Arida A, Ruhl CE: Increasing gallstone disease prevalence and associations with gallbladder and biliary tract mortality in the US. Hepatology. 2023, 77:1882-95. 10.1097/HEP.0000000000000264

3. Jones MW, Weir CB, Marietta M: Gallstones (cholelithiasis). StatPearls [Internet]. StatPearls Publishing, Treasure Island (FL); 2026.
4. Yahia Y, Mohamed E, Afzal M, et al.: Mirizzi syndrome: mastering the challenge, characterization and management outcomes in a retrospective study of 60 cases. Curr Probl Surg. 2024, 61:101626. 10.1016/j.cpsurg.2024.101626
5. Moosa H, Jaffer S, Naeem Khan M, et al.: Mirizzi syndrome: clinical insights, diagnostic challenges, and surgical outcomes - a 5-year experience from a tertiary care hospital in Pakistan. Qatar Med J. 2025, 2025:8. 10.5339/qmj.2025.8
6. Koo JG, Tham HY, Toh EQ, Chia C, Thien A, Shelat VG: Mirizzi syndrome - the past, present, and future . Medicina (Kaunas). 2023, 60:10.3390/medicina60010012
7. Beltran MA, Csendes A, Cruces KS: The relationship of Mirizzi syndrome and cholecystoenteric fistula: validation of a modified classification. World J Surg. 2008, 32:2237-43. 10.1007/s00268-008-9660-3
8. Bellamlih H, Bouimetarhan L, En-Nouali H, et al.: Mirizzi's syndrome: a rare cause of biliary tract obstruction: about a case and review of the literature (Article in French). Pan Afr Med J. 2017, 27:45. 10.11604/pamj.2017.27.45.12469
9. Froehlich M, Sodomin EM, Fontenot T, Iftekhar N, Chan CN, Barber A: Mirizzi syndrome: the Trojan horse of gallbladder disease. Surg Open Sci. 2024, 18:103-6. 10.1016/j.sopen.2024.02.006
10. Tzovaras G, Peyser P, Kow L, Wilson T, Padbury R, Toouli J: Minimally invasive management of bile leak after laparoscopic cholecystectomy. HPB (Oxford). 2001, 3:165-8. 10.1080/136518201317077189