Octreotide as an Adjunct to Step-Up Nonoperative Management of a High-Output Strasberg Type C Bile Duct Injury After Laparoscopic Cholecystectomy: A Case Report.

Abstract:

Background: Strasberg type C bile duct injuries involve transection of an aberrant bile duct that remains open but is disconnected from the main biliary tree. This anatomical discontinuity limits the effectiveness of conventional endoscopic decompression and may result in persistent bile leakage, biloma, sepsis, and functional loss of the affected hepatic territory. Management ranges from drainage and observation to biliary reconstruction or hepatic resection. The role of somatostatin analogues in this setting remains uncertain.

Case presentation: A 32-year-old man underwent laparoscopic cholecystectomy for calculous cholecystitis. Intraoperative findings were classified as Parkland grade II. A satisfactory critical view of safety was documented by anterior and posterior doublet photography, with a score of 6/6, and no bile leakage was identified. Postoperatively, the patient developed a persistent high-output bile leak of 400-600 mL/day. Endoscopic retrograde cholangiopancreatography initially suggested a leak from the middle third of the common bile duct, and a 5-Fr plastic stent was inserted without a significant reduction in output. Magnetic resonance cholangiopancreatography subsequently demonstrated a 4-mm isolated aberrant right hepatic duct without communication with the main biliary tree, with active leakage into two subhepatic bilomas, consistent with a Strasberg type C injury. The collections were managed by percutaneous drainage. Because the patient remained clinically stable without sepsis and hepatopancreatobiliary surgical expertise was unavailable locally, octreotide was administered at 100 micrograms intravenously every eight hours. Biliary output decreased to approximately 20 mL/day within 72 hours. Treatment was continued for an additional 72 hours, followed by lanreotide administration; its dose could not be retrieved. The drain was removed on July 4, 2026. No subsequent clinical, biochemical, or radiological follow-up was available.

Conclusion: A step-up nonoperative strategy may be considered in selected stable patients with adequately drained Strasberg type C injuries. Octreotide may temporarily reduce biliary output, but current evidence does not support its use as definitive treatment or prove that it independently

induces fistula closure. The absence of follow-up limits the reported outcome to an early clinical response.

Keywords: bile duct injury; Strasberg type C; bile leak; aberrant bile duct; biloma; octreotide; laparoscopic cholecystectomy.

Introduction

The iatrogenic bile duct injury is among the most consequential complications of cholecystectomy because it may lead to repeated interventions, biliary stricture, recurrent cholangitis, impaired quality of life, and long-term mortality. Management depends on the mechanism and level of injury, continuity of the biliary tree, presence of collections, associated vascular injury, clinical condition, and expertise available at the treating center [1-4].

A Strasberg type C injury consists of transection of an aberrant bile duct that remains open and produces a bile leak but has no communication with the main biliary tree [1]. Unlike cystic-duct stump leaks or communicating subvesical-duct leaks, endoscopic sphincterotomy or stenting of the common bile duct does not directly decompress the isolated hepatic territory. Contemporary guidance emphasizes multidisciplinary management, control of sepsis and collections, and referral to hepatopancreatobiliary expertise when definitive repair may be required [2,3].

Management of an isolated sectoral duct injury may include percutaneous drainage and observation, bilioenteric reconstruction, hepatic resection, or selected interventional radiology techniques. No universal treatment algorithm exists because these injuries are uncommon and the literature consists mainly of retrospective series and case reports [5-8].

Somatostatin analogues reduce several gastrointestinal secretions and may decrease the output of external fistulas. However, evidence for octreotide in biliary fistulas is limited and predates current endoscopic and interventional approaches. No clinical trial has specifically evaluated octreotide in Strasberg type C injuries. This report describes the early response of a high-output isolated duct leak treated with drainage and adjunctive octreotide in a hospital without immediate hepatopancreatobiliary surgical support, and discusses the selection of nonoperative versus operative management.

Case Presentation

A 32-year-old man with no relevant medical history presented with a two-week history of right upper-quadrant pain, fever, and oral intolerance. Physical examination disclosed a positive Murphy sign.

Hepatobiliary ultrasonography demonstrated a thickened, edematous gallbladder wall measuring 7.2 mm and four echogenic gallstones with posterior acoustic shadowing. Laboratory tests obtained on April 29, 2026 showed a leukocyte count of 9.4 × 10^9/L, hemoglobin 15.8 g/dL, platelet count 363 × 10^9/L, total bilirubin 0.5 mg/dL, alanine aminotransferase 52 U/L, aspartate aminotransferase 27 U/L, and alkaline phosphatase 82 U/L, without biochemical cholestasis.

On May 6, 2026, laparoscopic 4port-cholecystectomy was performed. Intraoperative findings corresponded to Parkland grade II. The critical view of safety was achieved and documented in anterior and posterior views using doublet photography, with a score of 6/6. No bile leakage was identified during the operation.

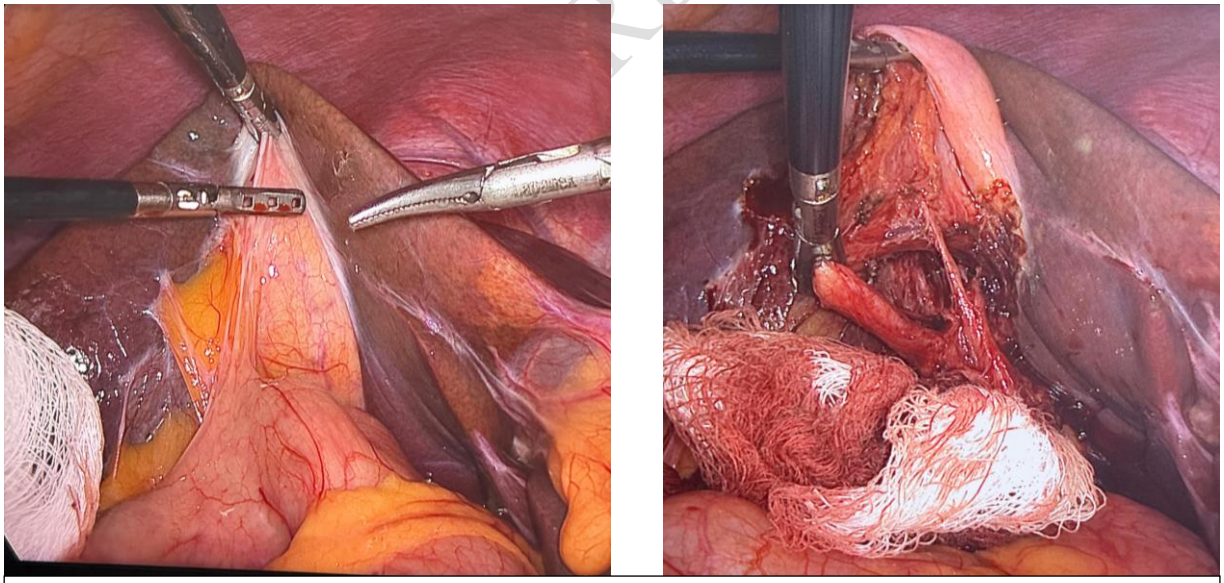


Image 1: Intraoperative doublet photography documenting the critical view of safety during laparoscopic cholecystectomy. (A) Anterior and (B) posterior views after clearance of the hepatocystic triangle and separation of the lower third of the gallbladder from the cystic plate, demonstrating only two structures entering the gallbladder (Doublet score, 6/6).

During the postoperative period, persistent bile-stained output was observed through the abdominal drain, measuring approximately 400-600 mL over 24 hours. On May 9, 2026, endoscopic retrograde cholangiopancreatography was performed. Contrast extravasation was

initially attributed to the middle third of the common bile duct, and a 5-Fr plastic biliary stent was inserted. No clinically relevant decrease in biliary output occurred after the procedure.

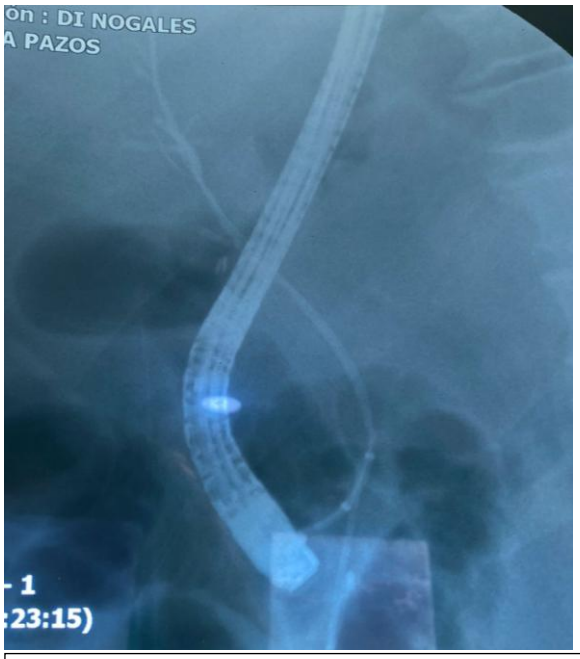
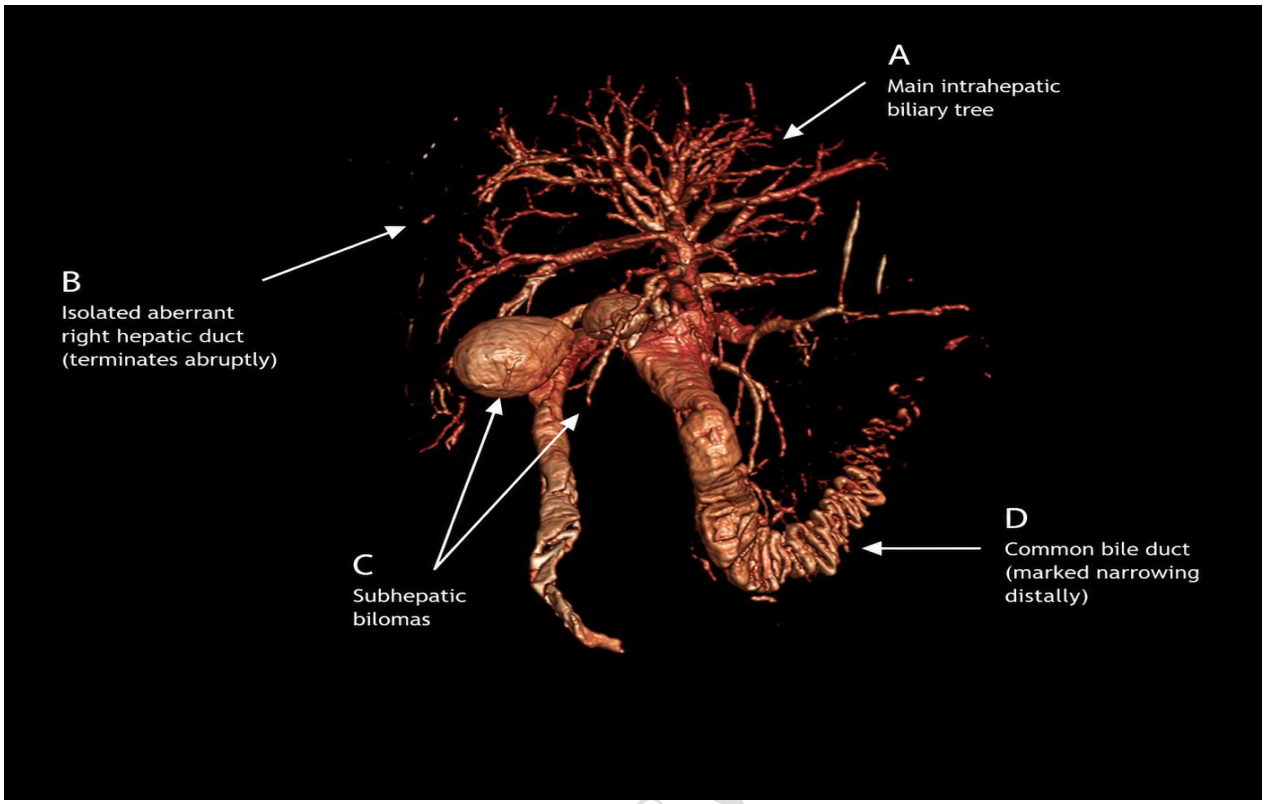


Figure 2. Endoscopic retrograde cholangiopancreatography showing opacification of the main intrahepatic and extrahepatic biliary tree, with a guidewire positioned within the common bile duct. The isolated aberrant right hepatic duct is not visualized, supporting the absence of communication with the main biliary system.

Because the leak persisted, magnetic resonance cholangiopancreatography was obtained on June 22, 2026. It demonstrated a 4-mm aberrant right hepatic duct, reported as draining segments V-VI, with no communication with the main biliary tree and abrupt pencil-tip termination. Active leakage extended into two communicating subhepatic bilomas measuring 28 × 42 mm and 24 × 17 mm. A percutaneous drain was in situ. The extrahepatic bile duct was markedly small, with a common bile duct diameter of approximately 1.5 mm. The findings were interpreted as a Strasberg type C bile duct injury.



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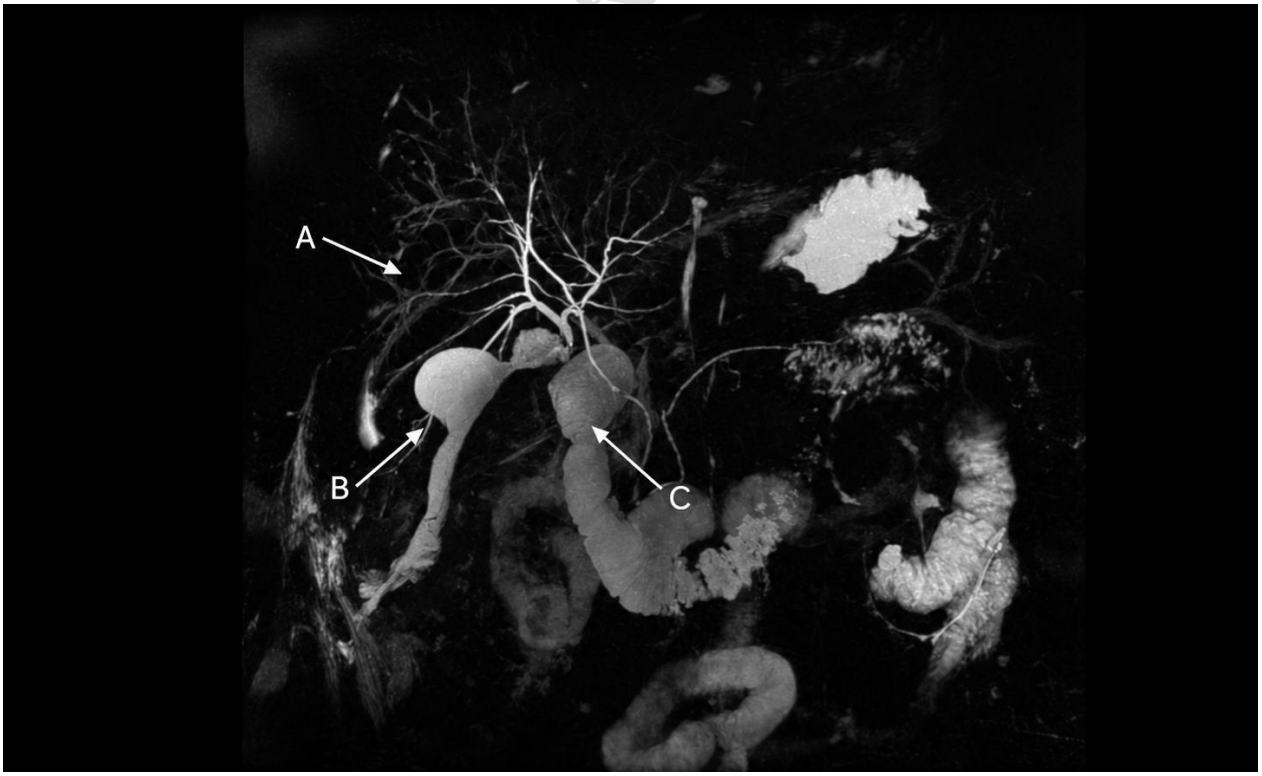
89 ***Figure 3. Three-dimensional MRCP reconstruction showing the main biliary tree (A), an isolated aberrant right hepatic duct with abrupt termination (B), and two subhepatic bilomas (C), consistent with a Strasberg type C injury.***



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91 ***Figure 4. Coronal thick-slab magnetic resonance cholangiopancreatography showing the main intrahepatic biliary tree (A) and two adjacent subhepatic fluid collections consistent with bilomas (B and C). No communication between the suspected isolated aberrant right hepatic duct and the main biliary tree was demonstrated. These findings were consistent with a Strasberg type C bile duct injury.***

The patient remained hemodynamically stable, without clinical evidence of sepsis, cholangitis, or biliary peritonitis. Because the institution did not have an on-site hepatopancreatobiliary surgical service and the collections were adequately drained, a step-up nonoperative strategy was continued.

Octreotide was supplied as 1 mg in 5 mL. A dose of 0.5 mL, equivalent to 100 micrograms, was administered intravenously every eight hours. Before treatment, biliary output ranged from 400 to 600 mL/day. During the first 72 hours, output progressively decreased to approximately 20 mL/day. Octreotide was continued for a further 72 hours, for a total treatment duration of six days. Lanreotide was subsequently administered before discharge, although the dose and formulation could not be recovered from the available record.

Follow-up ultrasonography demonstrated a residual simple fluid collection in the gallbladder fossa measuring approximately 28 × 33 × 29 mm, with an estimated volume of 14.6 mL and no free perihepatic fluid. The abdominal drain was removed on July 4, 2026. No later clinical, biochemical, or radiological follow-up was available; therefore, the outcome was classified as an early clinical response rather than definitive resolution.

Table 1. Clinical Timeline

Date	Clinical event
April 29, 2026	Initial assessment, hepatobiliary ultrasonography, and laboratory testing.
May 6, 2026	Laparoscopic cholecystectomy; Parkland grade II; doublet score 6/6; no evident intraoperative bile leak.
May 9, 2026	ERCP; leak initially attributed to the middle common bile duct; placement of a 5-Fr plastic stent.
May-June 2026	Persistent biliary drainage of approximately 400-600 mL/day.
June 22, 2026	MRCP demonstrated an isolated aberrant right hepatic duct and two subhepatic bilomas, compatible with Strasberg type C injury.
Date not documented	Octreotide 100 micrograms intravenously every eight hours was initiated.
After 72 hours	Biliary output decreased to approximately 20 mL/day.
Treatment day 6	Octreotide completed; lanreotide subsequently administered, dose unavailable.
July 4, 2026	Abdominal drain removedan subsequent clinical follow-up

Discussion

Anatomy and Diagnosis of the Injury

Strasberg type C injuries occur when an aberrant or sectoral bile duct is transected while its proximal end continues to drain a functioning hepatic territory. Because the injured duct is disconnected from the main biliary tree, ERCP may show an apparently intact common duct and fail to opacify the isolated territory. Persistence of a bile leak despite technically adequate transpapillary therapy should prompt consideration of a disconnected sectoral duct [1,5-8].

In a series of posterior sectoral duct injuries, an intact common bile duct combined with nonvisualization of the sectoral system on cholangiography was a key diagnostic clue. Drain-tube cholangiography or percutaneous transhepatic cholangiography may delineate the isolated duct when cross-sectional imaging is inconclusive [6,7].

In the present case, ERCP initially localized the leak to the middle third of the common bile duct. The absence of response to stenting and subsequent MRCP demonstration of an isolated 4-mm duct clarified the anatomy. This also explains the limited physiological effect of transpapillary decompression: pressure within the disconnected duct does not depend on the sphincter of Oddi gradient.

Injury Despite a Documented Critical View of Safety

A doublet score of 6/6 indicates satisfactory photographic documentation of the critical view of safety, but it does not exclude every mechanism of bile duct injury. The critical view is primarily intended to prevent misidentification of the common bile duct or common hepatic duct as the cystic duct. An aberrant duct coursing close to the gallbladder bed, entering the gallbladder, or joining the cystic duct region may still be injured despite correct identification of the cystic structures [11,12].

Accordingly, this case does not necessarily represent failure of the critical view of safety. The combination of Parkland grade II inflammation, satisfactory doublet documentation, and an isolated duct injury suggests an unrecognized anatomical variant, although the precise transection site cannot be established without review of the operative video and direct correlation with biliary imaging.

Selection for Nonoperative Management

Nonoperative management of a Strasberg type C injury should not be equated with octreotide administration alone. Its essential components are source control, drainage of collections, treatment of infection when present, fluid and electrolyte replacement, nutritional support, precise anatomical definition, serial output measurement, and access to escalation or referral.

WSES guidance supports drainage of localized bilomas and urgent operative source control when generalized biliary peritonitis is present [2]. The SAGES-AHPBA guideline conditionally supports either operative or nonoperative definitive management for appropriate bile duct injuries, based on very low-certainty evidence, and conditionally favors delayed definitive repair after six weeks when reconstruction is required [3].

Published series suggest that selected isolated sectoral duct injuries can close with drainage and observation. Mazer et al. reported nonoperative outcomes in seven patients with right posterior sectoral duct injury [5]. Perera et al. described both operative and nonoperative pathways, with cessation of leakage in conservatively managed patients occurring over several weeks rather than days [6]. Perini et al. emphasized the importance of detailed ductal imaging and reported that approximately half of their patients were ultimately managed without surgery [7].

Features favoring an initial nonoperative approach include hemodynamic stability, absence of generalized biliary peritonitis or uncontrolled sepsis, effective drainage of bilomas, preserved liver function, no associated vascular injury, a stable or decreasing output, and the ability to provide prolonged surveillance and specialist referral. In the present patient, these conditions were largely satisfied during the early treatment period.

When to Operate or Refer for Definitive Treatment

Urgent intervention is required when source control is inadequate. Indications include hemodynamic instability, diffuse biliary peritonitis, persistent sepsis despite antibiotics and drainage, an undrainable or inadequately drained collection, hemorrhage, associated vascular injury, hepatic ischemia, or necrosis [2,3]. In a hospital without hepatopancreatobiliary expertise, urgent surgery may appropriately be limited to lavage and drainage, followed by early transfer rather than an unplanned complex reconstruction.

After stabilization, definitive treatment should be considered when a high-output fistula persists, the drain cannot be removed, bilomas recur after drain withdrawal, segmental cholangitis or hepatic abscess develops, liver tests remain abnormal, the isolated duct becomes progressively dilated, symptomatic atrophy develops, or a substantial volume of viable liver remains dependent on the injured duct. Options include Roux-en-Y hepaticojejunostomy to the isolated duct, segmental or sectoral hepatic resection, and selected interventional radiology techniques designed to obliterate the duct or induce atrophy of the involved territory [3,6-8].

Repair at a nonspecialized center has been associated with a higher likelihood of treatment failure in pooled patient-level data, reinforcing the importance of referral when definitive intervention is contemplated [4].

Role of Octreotide

Somatostatin and its analogues inhibit several gastrointestinal functions and modify hepatobiliary physiology. In a small physiological study, octreotide delayed hepatic bile release and reduced gallbladder emptying, providing a plausible basis for an anticholeretic effect [10]. These findings demonstrate altered bile dynamics but do not establish closure of a transected duct.

Kocak et al. administered octreotide to patients with external biliary, pancreatic, and intestinal fistulas. Among the biliary fistulas, output decreased during the first day of treatment; however, the study was small, lacked a robust control group, and did not specifically evaluate post-cholecystectomy Strasberg type C injuries [9].

In the present case, the decrease from 400-600 mL/day to approximately 20 mL/day within 72 hours was temporally associated with octreotide administration. This observation is clinically notable but does not establish causality. Adequate drainage, spontaneous reduction in secretion from the isolated hepatic territory, resolution of inflammation, and the natural history of the fistula could also have contributed. Lanreotide administration after the six-day octreotide course further complicates interpretation of the subsequent course.

No randomized trial has compared octreotide with placebo, drainage alone, or surgery for Strasberg type C injury. No standardized dose or duration exists, and neither WSES nor SAGES-AHPBA guidance recommends somatostatin analogues as definitive treatment. Octreotide should therefore be described as an adjunct intended to reduce output, not as a reparative intervention.

Table 2. Clinical Factors Guiding Initial Management

Features supporting monitored nonoperative management	Features requiring urgent intervention or specialist referral
Hemodynamic stability	Hemodynamic instability or shock
No diffuse biliary peritonitis	Diffuse biliary peritonitis
No uncontrolled sepsis or cholangitis	Persistent sepsis or cholangitis despite treatment
Bilomas adequately drained	Undrainable collection or ineffective drainage
Anatomy clearly defined	Uncertain anatomy with clinical deterioration
No vascular injury or hepatic ischemia	Vascular injury, hepatic ischemia, or necrosis
Output stable or decreasing	Persistently high output without a downward trend
Preserved liver function	Progressive cholestasis, segmental cholangitis, or liver dysfunction
Reliable surveillance and access to referral	Inability to ensure surveillance or safe referral

Conclusion

Strasberg type C bile duct injuries present a distinct diagnostic and therapeutic problem because the injured duct is disconnected from the main biliary tree. This anatomy explains why transpapillary stenting may fail to control the leak.

In clinically stable patients without peritonitis or uncontrolled sepsis and with adequately drained collections, closely monitored nonoperative management may be attempted. Urgent source control or specialist referral is required when the patient deteriorates, drainage is inadequate, vascular injury or ischemia is present, or the leak persists with recurrent complications.

In this case, octreotide 100 micrograms intravenously every eight hours was temporally associated with a decrease in biliary output from 400-600 mL/day to approximately 20 mL/day within 72 hours. The observation supports a possible adjunctive anticholeretic role but does not demonstrate anatomical closure or replace specialist assessment. The lack of long-term follow-up prevents conclusions regarding definitive effectiveness.

Declarations

Conflicts of Interest: The authors declare no conflicts of interest related to this manuscript.

Data Availability: Clinical data are retained in the institutional medical record and are not publicly available because of patient confidentiality.

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