



## Percutaneous Alcohol Ablation of Post-Operative Biliary Leak Causing Repeated Infection - A Case Report

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### Abstract

We report a case of delayed biliary leak following left hepatectomy with bile duct excision causing repeated infection. The focal dilatation of bile duct system responsible for biliary leak through the liver surface from residual segment 4 was targeted selectively by CT guidance and ablated with alcohol causing complete resolution of the bile leak and the subsequent infection.

### Introduction

Biliary leakage is a common complication after hepatobiliary surgeries [1]. This bile leak being a good medium for bacterial growth leads to repeated infection [2]. Unless the leak is contained or stopped, infection cannot be completely eradicated. The standard way to treat post-operative bile leak is conservative, wait and watch strategy, however if the bile drainage is more than 100 ml even on 10<sup>th</sup> post-operative day suggest failure of conservative treatment and might need other interventional procedures [3]. Sometimes only biliary drainage procedure works best to treat the bile leak however it may not work always [4,5]. The other various ways of treating the post-operative bile leaks described are acetic acid sclerotherapy, alcohol ablation or laser ablation [6-9]. We report a case of elderly man who presented with recurrent collection due to delayed post-operative biliary leakage which was managed by selective intrahepatic ablation of the biliary duct using ethanol as sclerosant; following which patient showed complete recovery.

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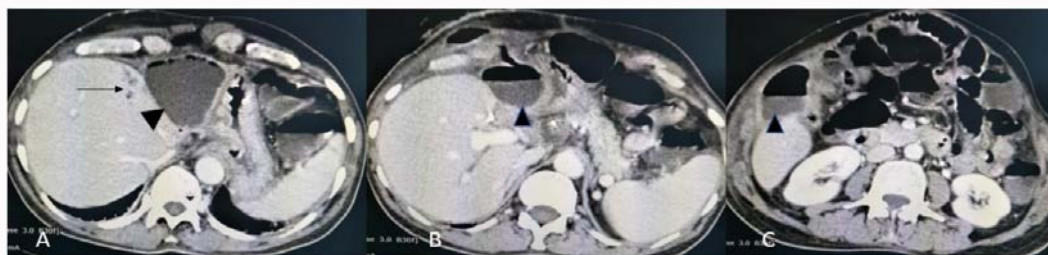
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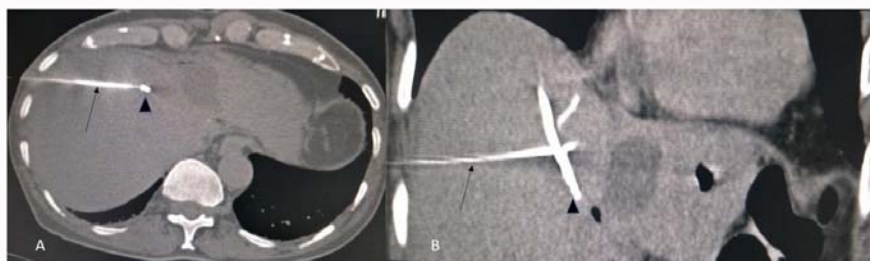
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### Case Presentation

A 73-year-old male presented to our hospital with history of pain in abdomen and obstructive jaundice. His blood investigations showed increased bilirubin values otherwise all other tests were normal. On investigations with CT scan (Siemens Somatom Sensation 64 slice), there was dilated biliary ducts in the left lobe of the liver with a well-defined mass lesion in the left hepatic duct measuring 23 mm × 13 mm which was extending up to the confluence of right and left main ducts-likely cholangiocarcinoma (not shown). Patient underwent a left hepatic resection along with bile duct resection and hepaticojejunostomy. On post-operative day 7, patient complained of pain in abdomen and repeat CT scan showed large hypodense collection near the cut surface of the liver (remnant of segment 4) presumed to be a biloma. Percutaneous drainage of the collection was done with placement of a 10F Malecot drainage catheter into the collection and patient showed satisfactory clinical improvement. The drain catheter was placed for almost one month and after the drainage was dry and sonography showed no residual collection, drainage catheter was removed. Patient developed recurrent symptoms of pain in abdomen with fever after five months of surgery. Blood investigations showed leucocytosis suggesting infection. Repeat CT scan showed large collection near the cut surface of the liver at same site of perioperative collection (Figure 1). This collection was then drained percutaneously which was bilious in nature. There was no obvious dilatation of biliary system except mild dilatation in the residual segment 4 with atrophy. The dilated bile ducts were seen reaching up to the cut surface of the liver. There was no obvious communication of the dilated bile system with the main hepatic duct. To establish any communication of the collection with bile duct, non-ionic contrast (ultravist) was injected into the collection however it did not reveal any reflux into the bile ducts. Then CT guided percutaneous transhepatic cholangiogram was done using a 21F Chiba needle and the segment 4 duct were opacified. The contrast was seen to drain into the collection confirming the presence of bile leak from a non-communicating segmental duct. After establishing the site of biliary leak, 0.5 ml of absolute alcohol was then injected into the duct after confirming the position of the needle (Figure 2). The needle was then removed and patient was



**Figure 1:** Axial post contrast CT scan images. In A, there is dilatation of biliary ducts (long black arrow), black arrow head in A to C shows collection with air-fluid levels.



**Figure 2:** A- Axial CT scan image, B-and coronal reconstruction. Long black arrow shows Chiba needle and black arrow head shows contrast in the dilated biliary system in residual segment 4. Note the contrast in biliary system is reaching up to the liver surface in B. Following contrast, absolute alcohol was injected into the biliary system.



**Figure 3:** Axial post contrast follow up image. Black arrow shows mild residual dilatation of biliary system in residual segment 4 of liver and minimal residual collection with air as shown by black arrowhead.

carefully monitored for any adverse effects. Since the patient did not report any discomfort, he was then discharged and asked to report for follow-up. Repeat CT scan done after 1 month showed minimal residual collection with reduction in dilatation of biliary system in residual segment 4 of liver (Figure 3).

Patient remained asymptomatic without any recurrent symptoms in last 3 years of follow up.

## Discussion

Post-operative biliary complications occurring after hepatic resections is one of the commonest and serious causes for major morbidity. Advanced age of the patient, high white blood cell counts in preoperative period, left sided hepatectomy and prolonged operative duration have been found to be the four major independent risk factors for the development of biliary complications [10].

The treatment of bile leak depends on its types. If the leak is communicating with the major duct like common bile duct then endoscopic sphincterotomy or stenting will cure the bile leak but if the leak is non-communicating with the major ducts and leaks from

the liver surface then the approach for treating the bile leak becomes different and difficult [11,12].

A uniform definition and grading system of bile leakage severity was proposed by International Study Group of Liver Surgery (ISGLS) according to its impact on clinical management. Grade A bile leak needs no change in management, whereas Grade B requires active non-surgical intervention and Grade C merits repeat laparotomy [13].

If the amount of bile leak exceeded 100 ml after 10 days of surgery, then conservative approach is considered to have failed and merits active interventional management [3].

Interventions for biliary leakage require a multidisciplinary approach for successful management. Management depends upon the severity of the injury and includes percutaneous, endoscopic and surgical interventions. Percutaneous intervention is performed for draining localized collections like bilioma/abscess, bile duct dilation, stenting, and ablation and for treatment of biliary-cutaneous fistulae. Endoscopic therapy (papillotomy with or without stenting) is used for reducing the intraductal pressure and diverting the biliary drainage into duodenum. Surgical therapy is best for most major bile duct injuries and for cases refractory to percutaneous/endoscopic therapy [10,14].

Few less invasive novel methods are described to treat especially non-communicating bile leaks with use of chemical substances or Laser therapy. Shimizu et al. have described ethanol ablation of an obstructed anterior bile duct which required instilling ethanol multiple times to achieve adequate results [15].

Similarly, acetic acid can also be used to ablate the bile leakage site [7].

Lauterio et al. [16] injected a tissue adhesive agent N-Butyl Cyanoacrylate (NBCA) percutaneously into the dilated biliary ducts with instant total occlusion of the bile leak [16].

Even Laser ablation is used to ablate a leaking biliary duct segment (4 cm) using laser delivering 147.15 Joules over 16.35 seconds [9].

As has been emphasized by many authors, ablation of leaking bile ducts can be done with various substances when the duct is not in communication with the main biliary tree. When the leaking duct is in communication with the biliary system, chemical ablation can still be performed once definitive isolation of the offending duct is assured by using balloon catheters or surgical techniques.

In our case, the bile leak was non-communicating type, chronic and slow leak from the liver surface following surgery. The main challenge we faced was that the leaking non communicating biliary system was not dilated and was difficult to target it percutaneously. But with CT guidance we were successful in hitting the targeted bile system and after confirmation with non-ionic contrast; absolute alcohol was injected into the minimally dilated biliary system without any complications. Follow up imaging showed significant reduction in dilatation of the biliary system in which absolute alcohol was injected and patient recovered completely. We could achieve this result with single session of alcohol injection although few authors have suggested multiple injections [15].

The mechanism of action of absolute alcohol includes damage to bile duct epithelium due to protein degeneration, cell death and causing permeation into liver parenchyma leading to fibrosis and reduction of bile secretion [17].

The possible complications include short term pain or low-grade fever which can be controlled by regular NSAIDs. Potential severe complications include damage to perilesional tissues and organs which need to be carefully monitored [8,18].

In summary, hepatobiliary surgeries are often associated with biliary complications and can cause major morbidity and mortality. Most patients can be successfully managed with conservative and non-surgical measures. Chemical ablation of leaking non communicating bile ducts is generally a safe and efficient method of treatment.

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