Bronchobiliary Fistula Treated Successfully With Endoscopic Microcoils and Glue

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A 29-year-old male developed bronchobiliary fistula after surgery for blunt abdominal trauma with liver laceration. Despite repeated endoscopic retrograde cholangiopancreatogram (ERCP) with stenting and surgeries, the fistula did not resolve. It was successfully sealed endoscopically, using microcoils and cyanoacrylate glue. This is the first report of bronchobiliary fistula managed with ERCP using microcoils and cyanoacrylate glue.


Bronchobiliary fistula is rare and difficult to treat. There is no recommendation in the literature regarding the management as there are no large series of reported cases. In the majority, the leak is from a peripheral bile duct and it is difficult to identify and seal. We are reporting a case of bronchobiliary fistula after blunt abdominal trauma, which was managed endoscopically with a unique technique using microcoils and glue. Research guidelines of the Ethical Committee, Lakeshore Hospital, Kochi, India, for the protection of human subjects were followed. Consent was obtained from the patient after full explanation of the purpose, nature, and risks of all procedures used.

A 29-year-old male underwent laparotomy at a peripheral hospital for blunt trauma abdomen with liver laceration. Postoperatively, he developed a bile leak that was managed with endoscopic retrograde cholangiopancreatogram (ERCP) and biliary stenting. However, the bile leak continued with development of large intraabdominal collections. He was referred to our hospital 1 week after the initial surgery. After resuscitation, emergency laparotomy was performed. At laparotomy, approximately 3 L of bilio-purulent fluid was present in the peritoneal cavity with dirty flakes on the serosal aspect of edematous small bowel. A thorough peritoneal lavage with drainage of the right subhepatic and left subdiaphragmatic area was done. The edematous bowel loops prevented primary abdominal closure; hence, laparotomy was done. The abdomen was closed with collagen mesh after 2 weeks. However, he did not improve. Cholangiogram revealed bile leak through the left duct and stents were placed in the left and right systems. He improved initially, but after 1 month he developed fever with bilious sputum suggestive of bronchobiliary fistula. A repeat ERCP revealed leak from a peripheral duct on the left side and the stent was exchanged. As he failed to respond and continued to have bilious sputum with fever he underwent laparotomy after 1 month. At laparotomy, a left subdiaphragmatic abscess communicating with the left pleural cavity and bronchial tree was present. The right lobe of the liver had infected hematoma and necrotic material. He underwent disconnection of a bronchobiliary fistula, nonanatomic resection of the left lateral segment of liver with drainage of intrahepatic hematoma of the right lobe of liver. After this surgery, he showed transient improvement but within a few days the bilious sputum increased. A repeat cholangiogram revealed bronchobiliary fistula with leak of contrast from the left ductal system (Fig 1).

Desperate for an endoscopic solution, a unique procedure to block the fistula with cyanoacrylate glue was attempted. Under fluoroscopy, 3 microcoils (embolization coil, MWCE; William Cook Europe, Bjaeverskov, Denmark) were deployed through a 5F catheter, close to the fistulous tract. Then a biliary balloon catheter was placed in the distal bile duct, inflated to prevent backtracking of glue, and 0.5 mL of cyanoacrylate (Samarth Life Sciences, Solan, India) injected. Dye study after a few minutes showed no leak, suggesting blockage of the fistula. A nasobiliary tube was placed to aid bile drainage. Post procedure, there was dramatic clinical improvement in terms of sputum production and intraabdominal collections. A check study after 4 days revealed minimal leak of the contrast from the same site (Fig 2); hence, a repeat

Fig 1. Endoscopic retrograde cholangiopancreatogram showing the bronchobiliary fistula arising from the left biliary duct prior to endoscopic coiling and glue injection.
blockage of the bronchobiliary fistula employing the same technique with 0.5 mL cyanoacrylate glue and 2 endocoils was performed. This time, the nasobiliary tube was removed and a 7F pigtail stent was kept in the left system. His fever subsided, the drain output came down further, the sputum became nonbilious, and he was discharged after 1 week. He recovered and gained 40 Kg weight during follow-up of 30 months after the procedure.

Comment
Bronchobiliary fistula is an abnormal communication between biliary channels and the bronchial tree [1]. The first case of bronchobiliary fistula was described by Peacock in 1850 [2]. Most cases are secondary to rupture of hydatid cysts of the liver [3, 4]. Management of this condition has not been widely discussed. In most cases, it occurs after liver pathology, particularly parasitic infections. Clinically, patients present with fever, dyspnea, cough, and bilioptysis, which is pathognomonic of fistula formation. Mild to moderate jaundice may occur in some cases.

Early diagnosis requires a high index of suspicion. Diagnosis can be easily confirmed by sputum analysis. Often, the clinical condition of the patients is poor due to an underlying chronic illness or previous surgical intervention. Treatment fails if the obstruction in the biliary channel persists. Therefore, the first step after diagnosis is ensuring unobstructed bile drainage into the duodenum, which will decrease the bile leakage. Management of a bronchobiliary fistula without biliary obstruction includes surgery with thoracotomy or a thoracoabdominal approach [2]. There is 1 report of closure of such a fistulous system by repeated fibrin and Histoacryl (TissueSeal, Ann Arbor, MI) sealing [5]. To our knowledge this is the first report of a bronchobiliary fistula managed with ERCP using microcoils and cyanoacrylate glue.

References