

# Hemobilia and Occult Cystic Artery Stump Bleeding after a Laparoscopic Cholecystectomy: Endovascular Treatment with N-butyl Cyanoacrylate

**Cagli B., Tuncel S. A., Sengul E., Temizoz O., Unlu E.,  
Genchellac H., Ozdemir H.**

Department of Radiology, Trakya University Medical Faculty, Edirne, Turkey

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**Abstract:** Hemobilia is a rare phenomenon. In this case report we present an emergent transcatheter glue embolization (in which N-butyl cyanoacrylate is used as an embolizing agent) due to arteriobiliary fistula occurred following the laparoscopic cholecystectomy in a 41-year-old woman.

**Mailing Address:** Bekir Cagli, MD., Department of Radiology, Trakya University Medical Faculty, 22030 Edirne, Turkey; Phone: +902 842 357 641/1060; Fax: +902 842 352 730; e-mail: bcagli2002@gmail.com

## Introduction

Hemobilia, defined as bleeding into the biliary ducts, has many causes and mostly encountered as a complication of laparoscopic cholecystectomy (LC). Accidental trauma, inflammation, gallstones, vascular malformations and hepatobiliary tumors, although less common, are also potential causes (Bloechle et al., 1994; Green et al., 2001). In our knowledge few study and case reports exist on endovascular treatment of the hemobilia with glue embolization in the English literature. In this case we used *N*-butyl cyanoacrylate (NBCA) as an embolizing agent. We aimed to define the technique and the efficiency of the transcatheter arterial embolization (TAE) treatment by using NBCA in a patient with arteriobiliary (AB) fistula as a complication of the LC.

## Case report

A 41-year-old female with a history of laparoscopic cholecystectomy in another institution about 18 months ago was admitted to our hospital with hematemesis. She also had melena, anemia and right upper quadrant pain without signs of infection. She had been rehospitalized shortly after discharge due to episodes of melena and several investigations including selective hepatic angiography had been performed which all failed to show the source of the bleeding. In addition, she had been transfused many times due to anemia. In our hospital, esophagogastrosocopy, colonoscopy and abdominal ultrasonography were performed and no evidence of active bleeding or any other significant impairment was found. However; computed tomographic (CT) examination of the abdomen revealed high attenuation of the mildly dilated intrahepatic bile ducts suggesting blood clots (Figure 1). Endoscopic retrograde cholangiopancreatography (ERCP) confirmed the diagnosis of hemobilia. Digital subtraction angiography (DSA) had to be performed urgently during a severe bleeding attack that had compromised the hemodynamic stability of the



Figure 1 – Intravenous contrast-enhanced CT shows the high-attenuation of the mildly dilated intrahepatic bile ducts suggesting blood clots (arrows).

patient. The celiac trunk injections revealed a normal left hepatic artery. The right hepatic artery was found originating from the superior mesenteric artery and multiple angiographic projections showed contrast media extravasation and pooling from the cystic artery stump to common hepatic bile duct on early, mid- and

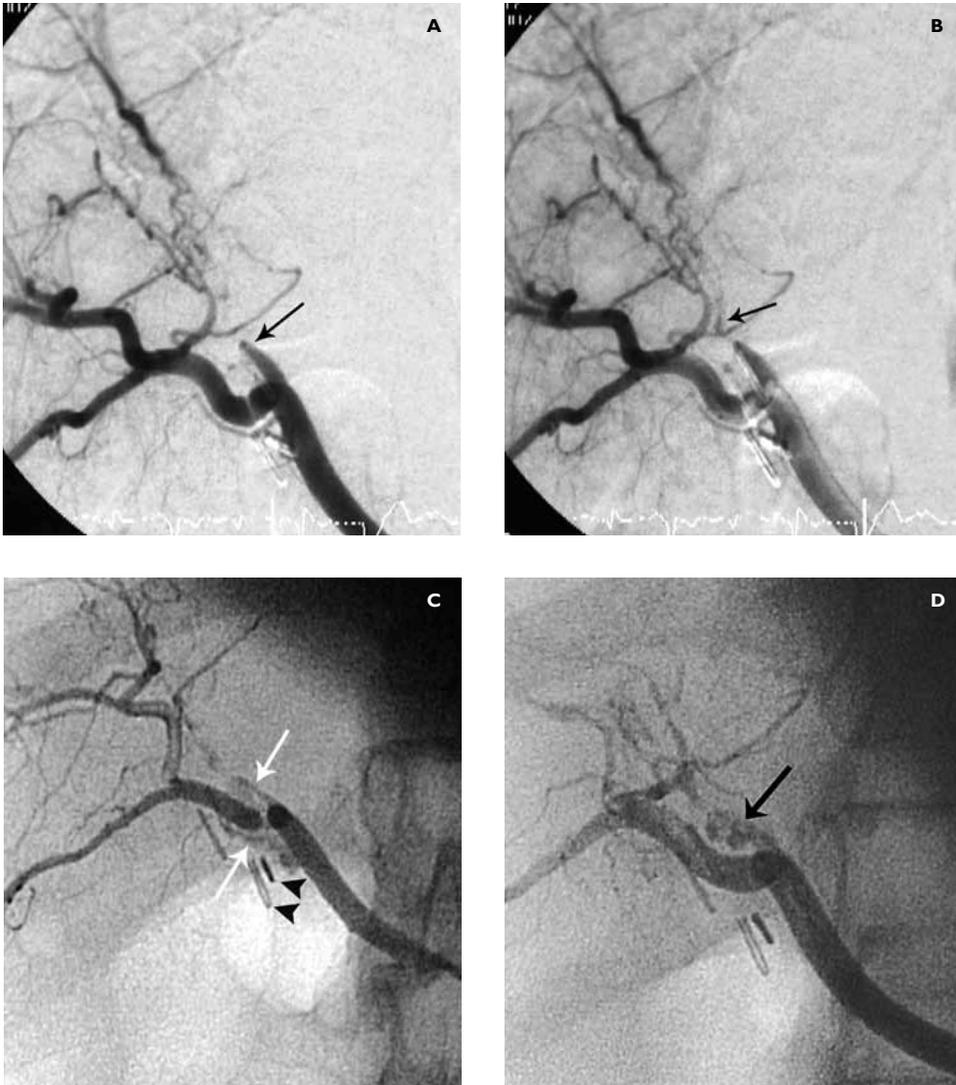


Figure 2a–d – Selective hepatic arteriograms. (a) Early arterial phase shows patent hepatic arteries and cystic artery stump (arrow). (b) Mid arterial phase shows a jet of extravasation from the cystic artery stump (arrow). (c) Late arterial phase shows prominent signs of extravasation (arrows). There were metallic surgical clips in the gallbladder fossa (arrowheads). (d) Following embolization, the control angiography showed neither filling in the cystic artery stump nor contrast extravasation. In the nonsubtracted image the opacity seen around the cystic artery stump (arrow) belongs to the embolizing agent.

late arterial phase images (Figure 2a–c). Hemobilia and arterio-biliary fistula with upper gastroenteric tract bleeding were confirmed angiographically. On the same session, microcatheter was placed to the lumen of the cystic artery stump co-axially through 5F cobra catheter. Embolization was achieved by 3 ml of mixture prepared with 0.9 ml NBCA and 2.1 ml lipiodol subsequently. To avoid potential leak of NBCA into biliary tract injection made slowly and with low pressure under fluoroscopic guidance. Control angiography showed neither filling in the cystic artery stump or contrast extravasation (Figure 2d). General health condition of the patient recovered rapidly and she has had no bleeding recurrence for the last 6 months.

### Discussion

Although overall incidence of the hemobilia is not well known, it is a rare phenomenon. Hemobilia and pseudoaneurysm following LC are increasingly being recognized. The severity of the clinic in patients with hemobilia differs and can be severe with massive bleeding or with slow leakage; presentation may be delayed weeks to months following the procedure. Depending on the bleeding rate hematemesis, melena, biliary tract obstruction due to clot, colicky pain on the right upper quadrant and jaundice may occur (Bloechle et al., 1994; Aideyan and Bjarnason, 2001). In our case the patient had right upper quadrant pain and discomfort, melena and anemia. Upper gastrointestinal endoscopic evaluation is necessary to rule out the bleeding from oesophagus, stomach and duodenum and to show the leakage of the blood from the ampulla of Vater. But, as in our case, with intermittent bleeding endoscopy may yield false negative results as much as more than 50% (Bloechle et al., 1994; Aideyan and Bjarnason, 2001). Beside endoscopy, CT is helpful in the evaluation of the aetiology of the hemobilia. Active or intermittent bleeding into the biliary tree may be seen as contrast media extravasation or hyperdense clots in biliary tree on CT.

To manage vascular complications following LC, selective celiac, hepatic and SMA catheter angiography is rapid and reliable method in order to show the origin and the endovascular treatment of the bleeding (Bloechle et al., 1994; Srivastava et al., 2006). Contrast media extravasation, pseudoaneurysm and AB fistula can be detected with DSA (Lygidakis et al., 1991; Okazaki et al., 1991; Nicholson et al., 1999). In our case, first and second look angiography of the selective celiac and hepatic artery could not show the origin of the bleeding. As in our case to be able to detect the low rate of bleeding, distal superselective injections on different projections have critical importance (Lygidakis et al., 1991; Okazaki et al., 1991; Nicholson et al., 1999). Nowadays, TAE which is simple, safe, less invasive and rapidly effective technique is widely used in the treatment of the hemobilia (Xu et al., 2005).

Currently many embolization approaches are available using gelfoam pledgets, detachable balloons, steel coils, polyvinyl alcohol (PVA) particles, and NBCA.

Gelfoam, PVA particules or steel coils are used frequently and efficiently as embolic agents alone or in combination (Xu et al., 2005; Srivastava et al., 2006; Nakase et al., 2008). The usage of the NBCA is not widespread. In our case the hemodynamically instable patient with AB fistula treated with TAE technique by using NBCA.

The liver necrosis, abscess formation, nontargeted embolization are rare complications related to the superselective embolization (Cardella et al., 1997). In our case no complication occurred.

Hemobilia has various causes and LC outweighs among others. Persistent anemia, melena following LC should arouse the suspicion of hemobilia and tomographic evaluation should be the first imaging modality; subsequently catheter angiography should be performed for the confirmation and treatment. If necessary, superselective injections should be added to show the leakage in patients with low rate of bleeding. Endovascular glue embolization is a very effective and minimally invasive alternative method to the surgery.

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