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Case report

Embolization of extrahepatic biliary leakage using NBGA ☆☆☆★

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ABSTRACT

Biliary fistula and bile leakage are complications that can occur during hepato-biliary or intestinal surgery and percutaneous biliary intervention. In some cases, spontaneous resolution is possible but more often re-intervention (surgical or percutaneous) is necessary. We present the case of a 45 y-o male patient who underwent duodenocefalopanresectomy (Whipple procedure) with bilio-digestive anastomosis for adenoma of the duodenal papilla of Vater, complicated by the formation of a fistula through the bilio-digestive anastomosis. Conservative treatment with percutaneous biliary drainage was attempted in order to promote spontaneous resolution of the fistula. The persistence of the fistula brought the patient to treatment through interventional techniques. Sealing of the bilio-peritoneal fistula was obtained using N-butyl-Cyanoacrylate .

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Introduction

Biliary fistula and bile leakage are complications that can occur during hepato-biliary or intestinal surgery (both open and

laparoscopic) and percutaneous biliary intervention. In some cases, spontaneous resolution is documented but more often re-intervention (surgical or percutaneous) is necessary.

Historically, such complications have been treated in a conservative manner with percutaneous transhepatic

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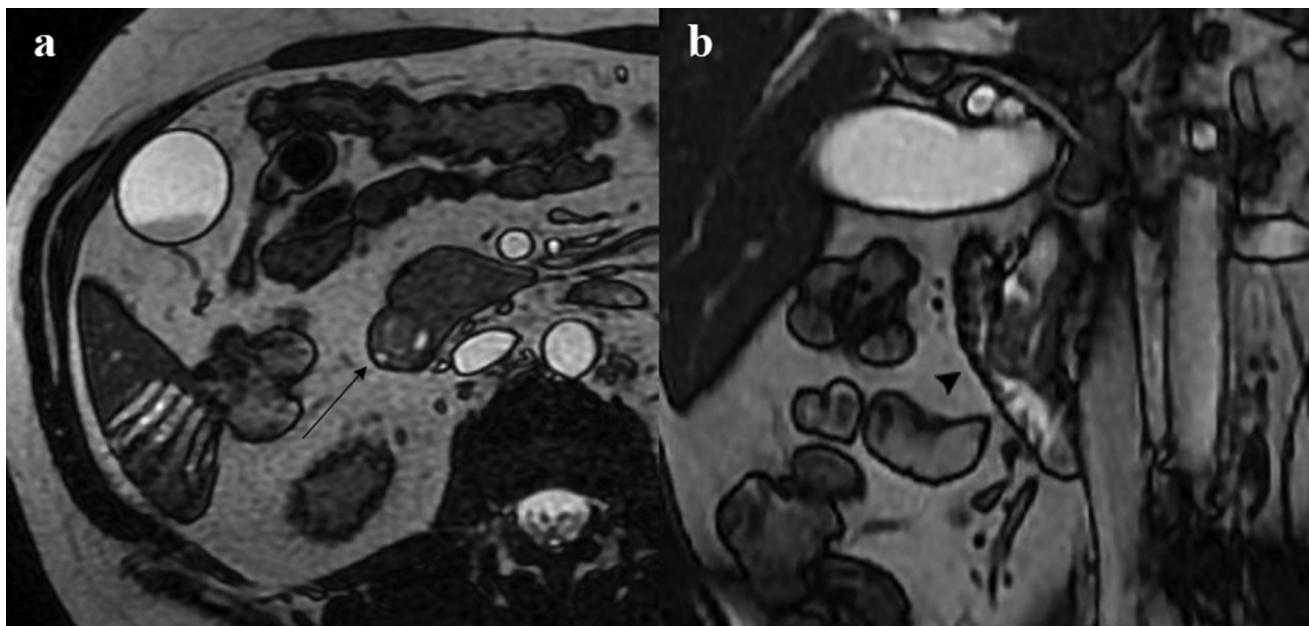


Fig. 1 – Axial (A) and coronal (B) MR TSE T2 images (MR performed before surgery); Images show slightly hyperintense ampullar mass protruding inside the lumen (black arrow in “a”), which determined intermittent jaundice and abdominal pain. Coronal view shows the mass bulging inside duodenal lumen (black arrowhead in “b”).

biliary drainage [1]. However, sometimes resolution is non-spontaneous and a second intervention is necessary.

Non-invasive techniques developed in interventional radiology have become more and more relevant in this field, considered that a great number of patients present a relevant risk for reintervention due to comorbidity.

NBCA is a very helpful product usually employed for vascular embolization, but recently an increasing use has been reported in the biliary tract treatment and for the management of peritoneal abscesses due to biliary leaks [1–4].

We present the case of a 45 y-o male patient who underwent duodenocephalopanresectomy (Whipple procedure) with bilio-digestive anastomosis for a benign cancer (adenoma) of the duodenal papilla of Vater, which developed a fistula through the bilio-digestive anastomosis.

Sealing of the bilio-peritoneal fistula was obtained using N-butyl-Cyanoacrylate.

This technique has already been reported in some papers as a useful tool for biliary tree obliteration; however, according to our knowledge, only one case, describing the use of glue, to seal a peritoneal fistula route, is available in literature [5].

Case report

A 45-year-old man underwent Whipple procedure, with biliodigestive anastomosis for an ampulloma (Fig. 1) which determined intermittent jaundice and abdominal pain.

After surgery presence of biliary fluid was reported from one of the surgical drainages and dehiscence of the bilio-enteric anastomosis was suspected.



Fig. 2 – CT scan performed 3 days after surgery (axial late arterial phase image). In the place of the bilio-digestive anastomosis a fluid collection developing towards mid line, anteriorly to the pancreaticojejunostomy is visible with free peritoneal air bubbles (white arrowhead); effusion and peritoneal fat stranding in the subhepatic region is also seen; free peritoneal fluid in parieto-colic groove, perisplenic space and anteriorly to retroperitoneum is not related to anastomotic dehiscence.

CT scan, with contrast medium, performed on the third day after surgery reported a fluid collection in the perianastomotic area (Fig. 2).

For this reason, percutaneous 8F drainage of the fluid collection was positioned with CT guidance which produced

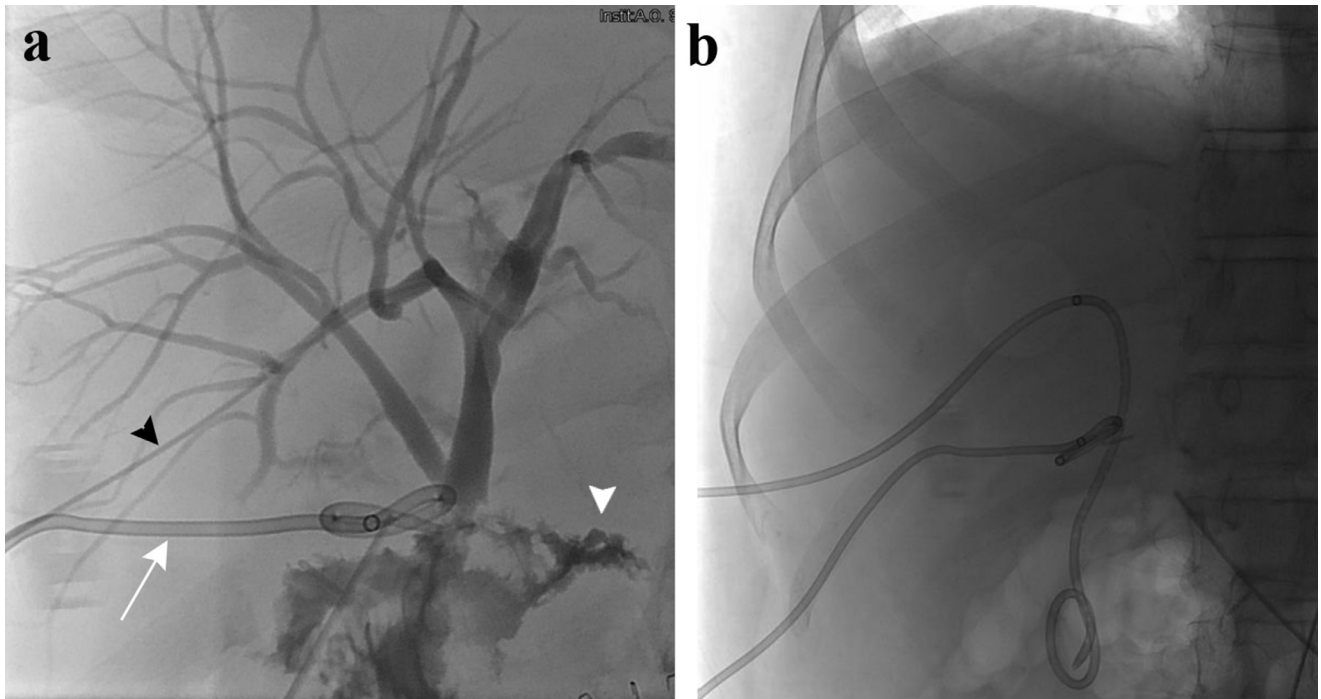


Fig. 3 – (A) Cholangiography performed on fourth day after surgery. Preliminary cholangiogram shows presence of biliary leakage (white arrowhead). From this projection the percutaneous drainage (white arrow) and the Chiba's needle (black arrowhead) are overlapping. (B) final X-ray acquisition shows the final result of the biliary drainage, with the tip positioned through the anastomosis in the jejunal loop.

biliary fluid, confirming the suspect of dehiscence of the anastomosis.

Multidisciplinary board decided for percutaneous biliary drainage, although the bile ducts were not dilated, in order to resolve the fistula without surgery, according to the International Study Group of Liver Surgery grading system, that suggests endoscopic or percutaneous procedures in grade B bile leak [6].

Mansueto et al. have proposed a classification for biliary leakage and, according to this classification, our patient presented a type 1 leak [7].

In order to study the fistula, percutaneous trans-hepatic cholangiography was performed by puncturing a bile duct with a 22-gauge Chiba needle through right tenth intercostal space. Through this route, an 8 Fr pigtail biliary drain was positioned, with the aim of a complete exclusion of the fistulous tract. The distal end of the drain was positioned in the jejunum, through the anastomosis (Fig. 3).

The biliary drainage revision performed ten days after showed permanence of the fistula (Fig. 4). Conservative treatment was chosen, therefore, we attempted to obliterate the fistula with NBCA [3].

An 8 Fr vascular introducer was positioned in place of the biliary drainage and, then, the point of leakage was reached, through the common bile duct, with a 0.035" hydrophilic guidewire (Radifocus Guidewire, Terumo, Tokyo, Japan) and a multipurpose 4F vascular catheter (Cordis, Fremont, California).



Fig. 4 – Cholangiography performed ten days after biliary drainage positioning. Dehiscence was still remarkable (white arrowhead).

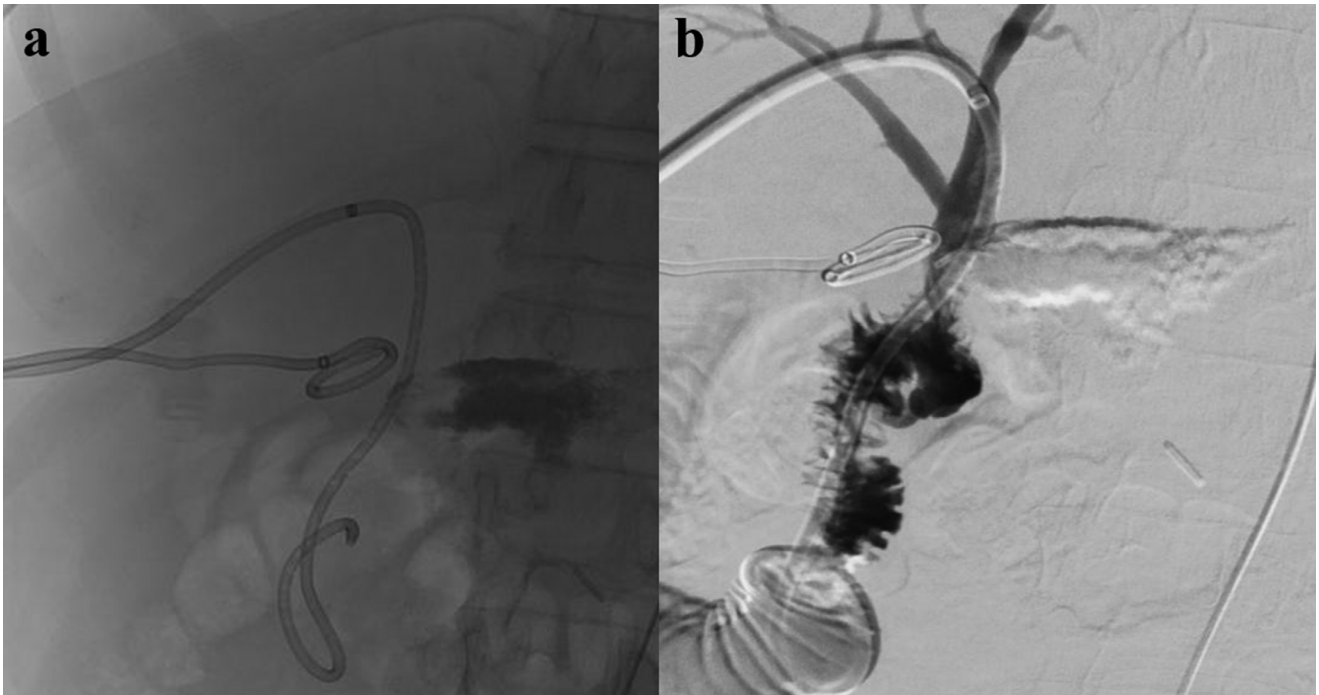
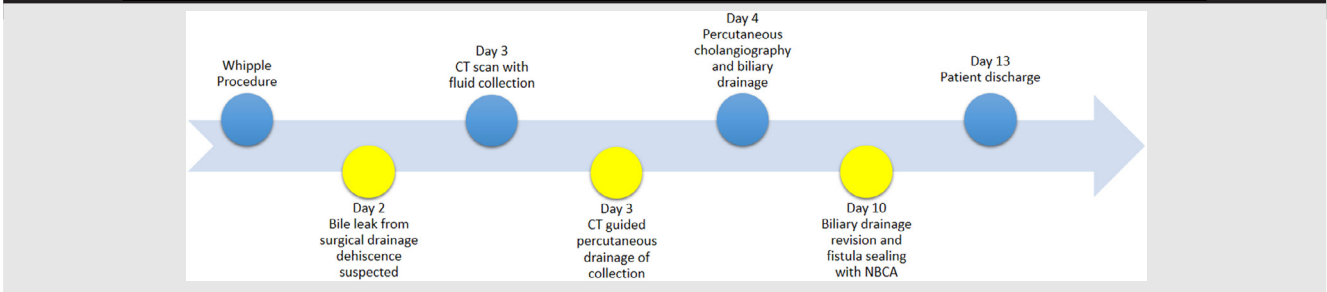


Fig. 5 – Procedure of biliary fistula sealing performed after biliary drainage revision on tenth day. (A) Fluoroscopy image after administration of mixture of Lipiodol and NBCA (1:1). Without DSA acquisition, image shows the mixture as a radiopaque cast of the fistula. (B) DSA acquisition with contrast medium shows complete obliteration of the fistulous tract.

Table 1 – Chronologic timeline shows timepoint of each procedure.



A mixture of Lipiodol (Guerbet, Villepinte, France) and N-butyl-Cyanocrylate (Glubran 2, GEM, Italy) was then injected to perform embolization. We used 12 ml of mixture with a dilution of 1:1. We opted for a lower dilution, with the aim of having greater control of the embolizing mixture and reducing risk of its migration into the biliary tract.

The final cholangiography demonstrated the complete obliteration of the fistula and no more bile leakage was observed (Fig. 5).

Patient was discharged after 3 days (chronologic order of procedures is resumed in Table 1).

Discussion

Iatrogenic bile duct injuries are often due to laparoscopic surgery (especially cholecystectomy) [1]. Bile duct injuries di-

agnosis and treatments are very important, because they lead to severe complications [8].

The principal causes of fistula are surgical procedures and trauma. Biliary fistulas are often treated surgically but, thanks to advances in interventional radiology, today percutaneous interventions have become an alternative to surgical treatment. Percutaneous radiological techniques are effective in the 40-85% of cases [8]. The high rate of morbidity and mortality, related to surgical reoperation in such delicate patients, makes endoscopic and interventional radiology techniques the best choice treatments [9–11].

The international Study Group of Liver Surgery suggests radiological or endoscopic management for patients with moderately compromised clinical conditions (Grade B leak), nonoperative management for patients with Grade A leak (little or no impact on patients’ clinical management) and reoperation for cases of severe leakage (Grade C leak) [6].

Due to its efficacy on biliary tree, in addition to its established role as embolic agent in different endovascular procedures [2,12,13], we decided to use NBCA to treat our patient, as the positioning of the biliary drainage had not given any result.

To our knowledge in literature, there is only a study describing similar treatment, with the use of NBCA after failure of spontaneous resolution of the fistula [5].

Firstly, the procedure performed by the Authors was considered the first line approach to the fistula, while, in our case, we first attempted to resolve the complication in a more conservative manner, as previously described in literature [13].

After that, Nunes et al. decided to perform the embolization by means of a microcatheter (2.9 F), through one of the orifices of a 12F biliary drainage, positioned in jejunum; instead, we removed the biliary drainage, that had been positioned before, and we performed the glue deployment inside the fistula, from a 5F multipurpose catheter [5].

Finally, while Nunes et al. opted for a 1:5 dilution for NBCA: Lipiodol solution, in order to ease migration of the mixture in the distal part of the fistula and reduce proximal reflux, we opted for a 1:1 dilution, because we assumed to have a greater control of the mixture; this expedient resulted sufficient to control proximal reflux of the mixture [5].

In conclusion, we find that NBCA can be successfully employed in this field, in order to improve patient comfort and shorten hospital stay.

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