Bilio–Cutaneous Fistula Formation after Percutaneous Liver Mass Biopsy. Embolization of the Tract with a Gelatin Matrix.

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Abstract

We report an unusual complication of US-guided percutaneous liver biopsy, in form of a persisting iatrogenic bilio-cutaneous fistula. A patient with liver hilar tumor and malignant obstructive jaundice was initially treated by successful placement of bilateral metallic stents and did well until mass biopsy was decided. The fistula created decreased patient's quality of life and since patient refused further interventions, fistula canniculation for embolization was proposed. We injected a Gelatin Matrix into the extrahepatic portion of the fistula and embolized the tract successfully.

Key words: Bilio-Cutaneous Fistula - Liver Biopsy Complications - Embolization

Case Report

A 62 years-old female patient presented to our hospital with painless obstructive jaundice and bilirubin elevation. Ultrasonography revealed a hypoechoic lesion at the liver hilum and multiple intrahepatic bile duct dilatations in both liver lobes. Patient underwent Endoscopic Retrograde Cholangiography, which failed to allow canniculation of the distal common bile duct. Subsequently percutaneous transhepatic cholangiography was performed, which confirmed the presence of intrahepatic duct dilatation and demonstrated multiple hilar strictures of the right and left lobe bile ducts (Figure 1). Under fluoroscopic guidance percutaneous puncture of one right and one left peripheral bile duct was successfully performed and two parallel to each other biliary catheters were inserted. Patient's condition was too poor for her to be considered for surgery irrespective of the diagnosis, so further percutaneous intervention was decided. So, four days later, two metallic biliary stents (Ultraflex Diamond, Boston Scientific, Watertown, MA, USA) were placed. Ten days later the biliary catheters were retrieved, without persistence of bilio-cutaneous fistulas.

The technique described, is the way we prefer to handle with debilitated patients presented to us with malignant obstructive jaundice. In this way, we wait for 3-4 days after initial drainage before metallic stent placement, in order to see how the patient responds. If bilirubin decreases and patient recovers, then we proceed to stenting. Then, in order to avoid further complications, such as bleeding or peritoneal bile leakage, we wait for another 10 days before catheter retrieval, so that the bilio-cutaneous tracts mature.

One month later the patient did very well, so that a percutaneous US-guided left lobe liver biopsy was asked in order to guide chemotherapy, and was performed in another district hospital. During biopsy, and despite US-guidance, we presume that the needle accidentically traumatized a dilated left lobe bile duct, so that bile leakage developed. We do not know if the reason for this iatrogenic complication was bad US quality or lack of experience. A bilio-cutaneous fistula persisted thereafter. The patient complained about bile leakage and was therefore resubmitted in our institution.

A cutaneous fistula was observed on the right upper abdominal wall, shortly under the lower costal line. Through the fistula, clear bile was leaking even with the patient in supine position. Injection of contrast medium was performed through the cutaneous fistula. A communication with a dilated left intrahepatic duct was revealed (Figure 2a and b). Patient initially refused new transhepatic puncture and intervention and asked for a less invasive therapeutic alternative. Only the extrahepatic part of the fistula was able to be canniculated with help of a short 4 French dilator, while a hydrophilic guide wire couldn’t be further advanced. A gelatin matrix (FloSeal, Baxter Healthcare Corporation, Fremont, CA, USA) was prepared and 1 ml was slowly injected through the dilator by retrieving the dilator during injection. Contrast medium was not allowed to be mixed with the matrix, so the injected material could not be fluoroscopically followed. Nevertheless, through its thick consistence and the curved fistula, we thought that it would not be possible for it to be advanced much deeper into the intrahepatic part of the tract. The bile leakage decreased immediately and sealed completely a couple of days later.

A CT scan performed two weeks later, revealed the dilated, liver segment II duct, also seen during the fistulography, without evidence of any active bile leakage or

intrahepatic/intraabdominal fluid collection (Figure 3). In the anterior subcutaneous fat a local hyperattenuated region was seen, which probably corresponds to the sealed fistula. Most of the previously dilated biliary ducts are decompressed, due to the adequately draining metallic stent.

Discussion

Percutaneous Liver Biopsy (PLB) is considered as one of the most frequently used diagnostic methods for liver disease evaluation (1). Wide use of ultrasound-guidance helped PLB to become a very safe procedure with low complication rate and high diagnostic accuracy (2, 3). Careful patient selection, performance of the procedure by experienced physicians and adequate monitoring and follow-up minimizes the risk factors (4).

Complications can be stratified on the basis of outcome (4): Major complications result in admission to a hospital for therapy, an unplanned increase in the level of care, prolonged hospitalization, permanent adverse sequelae, or death. Minor complications result in no sequelae, or they may require nominal therapy or a short hospital stay for observation. There can be two types, the generic and the organ-specific (4). Major generic complications include bleeding, infection, and unintended organ injury. Bleeding is the most frequent percutaneous liver biopsy complication, occurring in up to 4.5% of the cases (5). In general, major complications after PLB are between 0-1.4% (3, 6-9) and rarely higher up to 6.4% (5). The procedure related mortality lies between 0-1.6% (3, 5-10).

The complication reported here is a rare one and is technique related and organ specific. One should try to avoid injury of dilated bile ducts or large vessels during

liver mass biopsy causing obstruction of major biliary ducts. In our case, most of the bile ducts were draining through the previously inserted, bilateral placed, metallic stents. Segment II duct system did not drain adequately and remained dilated. The 18G biopsy needle used, probably traumatized the duct wall during sample gaining. As also mentioned above, we do not know if the reason for this iatrogenic complication was bad imaging quality of US guidance or the lack of percutaneous biopsy experience. As far as we know this technique related complication as a cause of iatrogenic induced bilio-cutaneous fistula is not previously reported.

Treatment of biliary fistulas is not easy. One can try to seal the fistula channel after canniculation of the tract with tissue-glue application or metallic coil placement (11, 12, 13). One problem with such fistulas is that they are quit narrow and collapsed due to the low fluid output. Also important is the fact that the fistula was created by a straight and rigid instrument but with time it becomes quit curvy, so that canniculation can become extremely difficult.

The most frequently used tissue-glue used substance is N-butyl-2-cyanoacrylate (NBCA) (Histoacryl,B.Braun,Germany) (11). NBCA is a radiolusent agent and it polymerizes rapidly in an ionic environment, therefore it is mixed with nonionic iodinated contrast agents before the injection. Multiple metallic coils can be placed alone, or in combination with Histoacryl, in order to seal a biliary fistula (12). Ethibloc is another embolic agent, used for fistula embolization (13).

Another elegant way to seal a bilio-cutaneous fistula is by using a covered metallic biliary stent (14). Nevertheless, this method is more invasive, since it needs repuncturing of the liver and drainage of the leaking duct.

Since the bile was leaking through a tract, iatrogenically formed by a biopsy channel and not by a local inflammatory process, our task was just to close it even in

its distal extrahepatic part, because the possibility of a new bilio-peritoneal fistula formation was rather low. We calculated this risk and decided to proceed to the embolization, also according to patient's wish, initially to avoid a new major transhepatic intervention. In case a new internal fistula would be formed, the patient was already consented to allow us to re-drain the dilated biliary duct and try to manipulate an internal catheter through the metallic stents.

The agent we used is a bovine-derived Gelatin Matrix. Normally it is provided as a set, together with a Thrombin component, in order to mix both and applicate the mixture intraoperatively for haemostatic purposes. The Gelatin Matrix consists of crosslinked gelatin granules and is provided sterile and non-pyogenic in a standard disposable syringe. The mixture should not be injected in blood vessels or used in patients with active infection or known allergies to materials of bovine origin.

At the time of case presentation, Histoacryl was not available in our institution. Also, deeper canniculation of the fistula was not achieved, so that multiple metallic coils could be advanced along the fistula tract. So, we decided to use the Gelatin Matrix, which was available, knowing that embolization failure was an option. The result was successful and the patient did well, so that we consider the use of this material as an alternative for such cases in the future.

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Legends

Figure 1: PTC was performed after puncturing of both liver lobes. Multiple hilar strictures were demonstrated with dilatation of all intrahepatic bile ducts. Subsequently, bilateral biliary drainage and metallic stent placement was achieved.

Figure 2: After superficial canniculation of the bilio-cutaneous fistula orifice with a short catheter, contrast medium was injected. The extrahepatic part of the fistula was demonstrated (A), but our manipulations failed to advance the catheter deeper into the intrahepatic tract. Further contrast injection, revealed the dilated segment II bile ducts, which communicated with the fistula (B) (arrow).

Figure 3: A CT-scan, two weeks after fistula embolization, revealed dilated liver segment II bile duct, without evidence of intra- or extrahepatic fluid collection. A local hyper-attenuation in the anterior abdominal subcutaneous fat, probably correspond to the sealed fistula (arrow).

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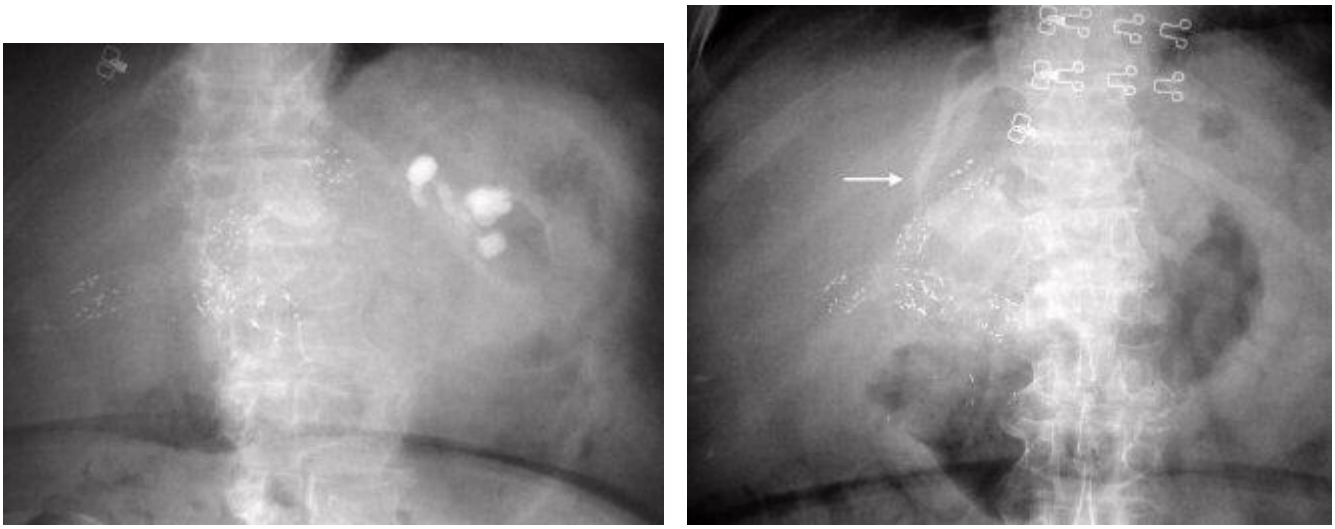

A B

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