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Percutaneous portal vein embolization for intractable hepatic biloma after radiofrequency ablation

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ABSTRACT

Intrahepatic biloma is a rare complication of radiofrequency ablation (RFA). When present, it can only be conservatively managed. Here, we report the case of a patient with hepatocellular carcinoma complicated by an intractable biloma after RFA. The biloma could not be managed via percutaneous catheter drainage and antibiotic administration for over 3 months. The intractable biloma was finally cured using percutaneous transhepatic portal vein embolization. The present case demonstrates a useful treatment option for intractable biloma after RFA.

1. Introduction

Radiofrequency ablation (RFA) has been widely accepted as a safe and effective treatment regimen for patients with hepatocellular carcinoma. Despite its excellent therapeutic effects, some complications related to bile duct injury can occur. Among these, the prevalence of a biloma after RFA of hepatocellular carcinoma (HCC) is 0.2 %–8 % [1–4]. In general, the formation of a biloma after RFA is rare, and even if it develops, it usually resolves spontaneously. Chang et al. reported that bilomas occurred in 109 (3.3 %) of 3,284 RFA sessions and 105 bilomas (97 %) spontaneously resolved as revealed by follow-up with computed tomography (CT) [5]. However, there are cases wherein bilomas cannot be managed conservatively, necessitating the use of other management options. In this study, we performed percutaneous transhepatic portal vein embolization (PTPE) because the biloma did not resolve even after two percutaneous catheter drainage (PCD) sessions with continuous antibiotic administration for over 3 months.

2. Case report

A 57-year-old man with complaints of abdominal pain and fever was admitted to our hospital. CT revealed the presence of a large biloma with rim enhancement in the right posterior section of the liver. He had a history of chronic kidney disease, hepatitis B, hepatitis C, liver cirrhosis, and HCC. He had undergone several RFA sessions following the diagnosis of HCC in the right posterior section of the liver. On admission, laboratory examinations revealed elevated C-reactive protein levels (11.12 mg/dl; normal range 0–0.4 mg/dl) but normal white blood cell count and bilirubin, aspartate transaminase, and alanine transaminase levels. Owing to the suspicion of an infected biloma in segment VI–VII, we performed PCD and aspirated bilious pus. We maintained PCD for 40 days. Meanwhile, fever and other symptoms subsided and the amount of drainage gradually decreased; however, we continued drainage of fluid of more than 10 mL per day. Therefore, we discharged the patient and performed ambulatory follow-up with PCD in place. During ambulatory treatment, the PCD catheter was inadvertently removed. After 50 days, the patient again presented to the emergency department with complaints of fever and abdominal pain. CT revealed the reoccurrence of the previous biloma. Based on this, we again performed PCD for biloma (Fig. 1). Despite conservative management including antibiotics, the biloma drainage persisted at a rate of 300–500 ml per day for 20 days. This prompted further management to control the persistent biliary leak.

We planned PTPE of the right posterior portal vein in order for the right posterior section of the liver to become atrophied and stop bile

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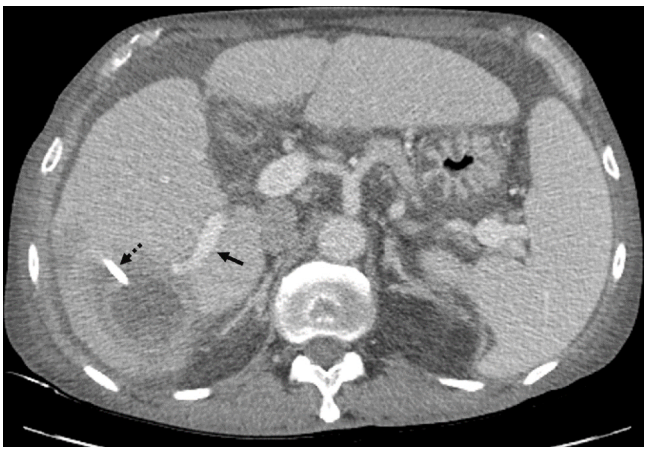

Fig. 1. Computed tomography prior to percutaneous transhepatic portal embolization (PTPE) showing biloma with inserted percutaneous catheter drainage (dashed arrow) in the right posterior section of the liver and right posterior portal vein (arrow), which is the target of PTPE.

production, resulting in healing without surgery. On preprocedural CT, the expected remnant liver volume after PTPE was sufficient to function. Using the percutaneous approach, we punctured the peripheral right anterior portal vein and inserted the catheter into the main portal vein. In addition, we performed portography for overall portal anatomy, which revealed centripetal portal flow (Fig. 2a) and used a 5Fr reverse catheter (Yashiro catheter; Terumo, Tokyo, Japan) to cannulate the right posterior portal vein (Fig. 2b). Furthermore, we infused a 1000–2000-μm gelatin sponge particle to slow down the portal flow. Then, we injected n-butyle cyanoacrylate (NBCA) and lipiodol mixture (at the NBCA:lipiodol ratio of 1:2) via a microcatheter. Completion portography revealed complete occlusion of the right posterior portal vein (Fig. 2c). Thereafter, bile discharge from PCD gradually decreased. Ten days after PTPE, PCD drainage was nearly negative and follow-up CT revealed complete embolization of the right posterior portal vein with resolution of the previous biloma (Fig. 3a). Then, the PCD catheter was removed. Last follow-up CT that was performed after 1 year revealed atrophied right posterior section of the liver and no recurrence of the biloma (Fig. 3b).

3. Discussion

Biloma formation is not a rare complication after RFA of HCC. Previous reports have shown that the incidence of biloma after RFA is 0.2 %–8 % [1–4]. In general, most bilomas are curable with only conservative management. However, in some cases, biloma does not respond to conservative treatment. At present, there is no standard treatment available for such intractable bilomas. Various treatments have been reported for intractable bilomas, including liver resection, bilioenteric anastomosis, endoscopic treatment, bile duct ablation, PTPE, and transcatheter arterial embolization (TAE) [6]. In our case, biloma was

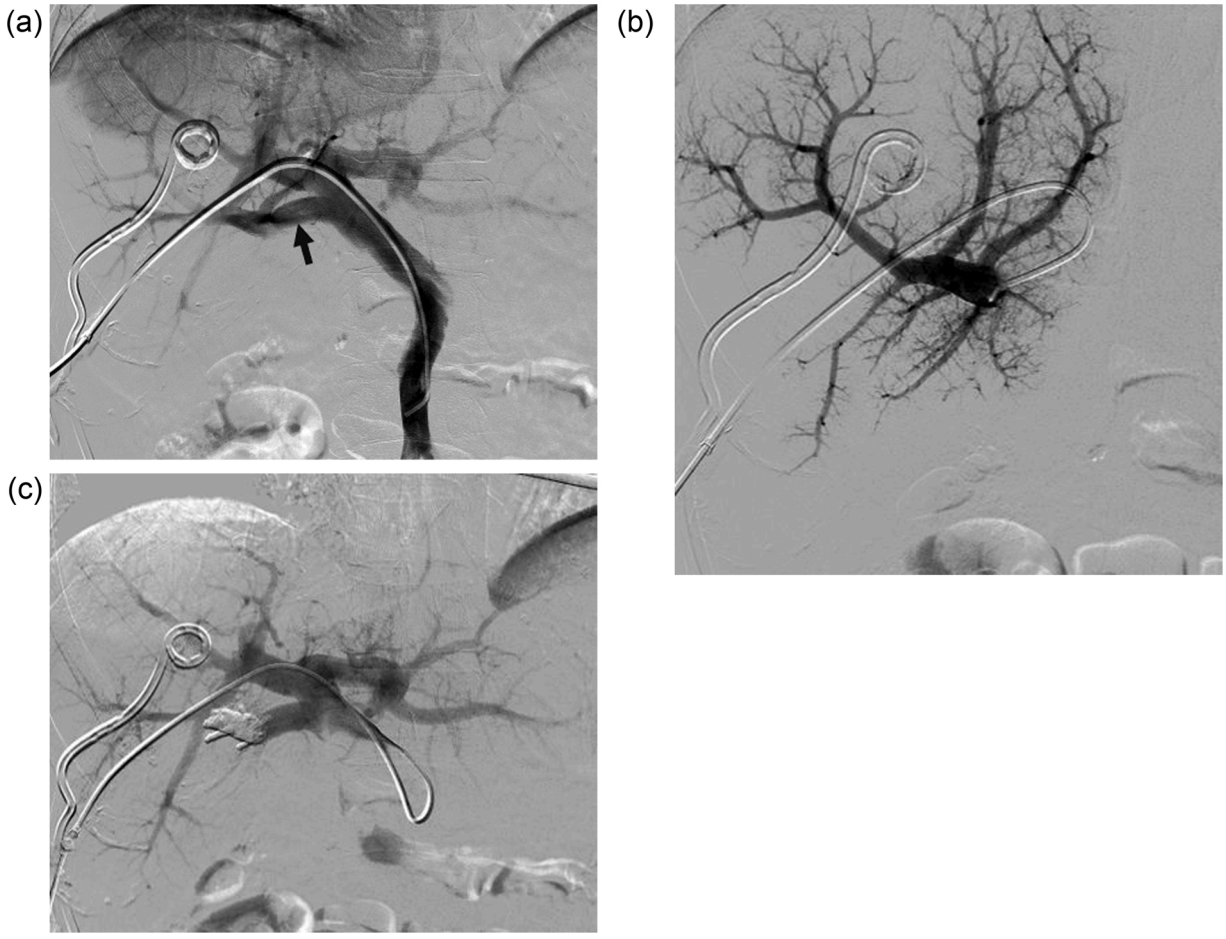

Fig. 2. Percutaneous transhepatic portal vein embolization (PTPE) procedure. (a) Portogrpahy performed using a 5Fr catheter in the superior mesenteric vein inserted via the peripheral right anterior portal vein showing the overall anatomy of the intrahepatic portal system, including the right posterior portal vein (arrow), which is the target of PTPE. (b) Selective right posterior portography was performed using a 5Fr reverse catheter (Yashiro catheter; Terumo, Tokyo, Japan). (c) After portal vein embolization with a gelatin sponge and NBCA and Lipiodol mixture, complete portography showing complete occlusion of the right posterior portal vein.

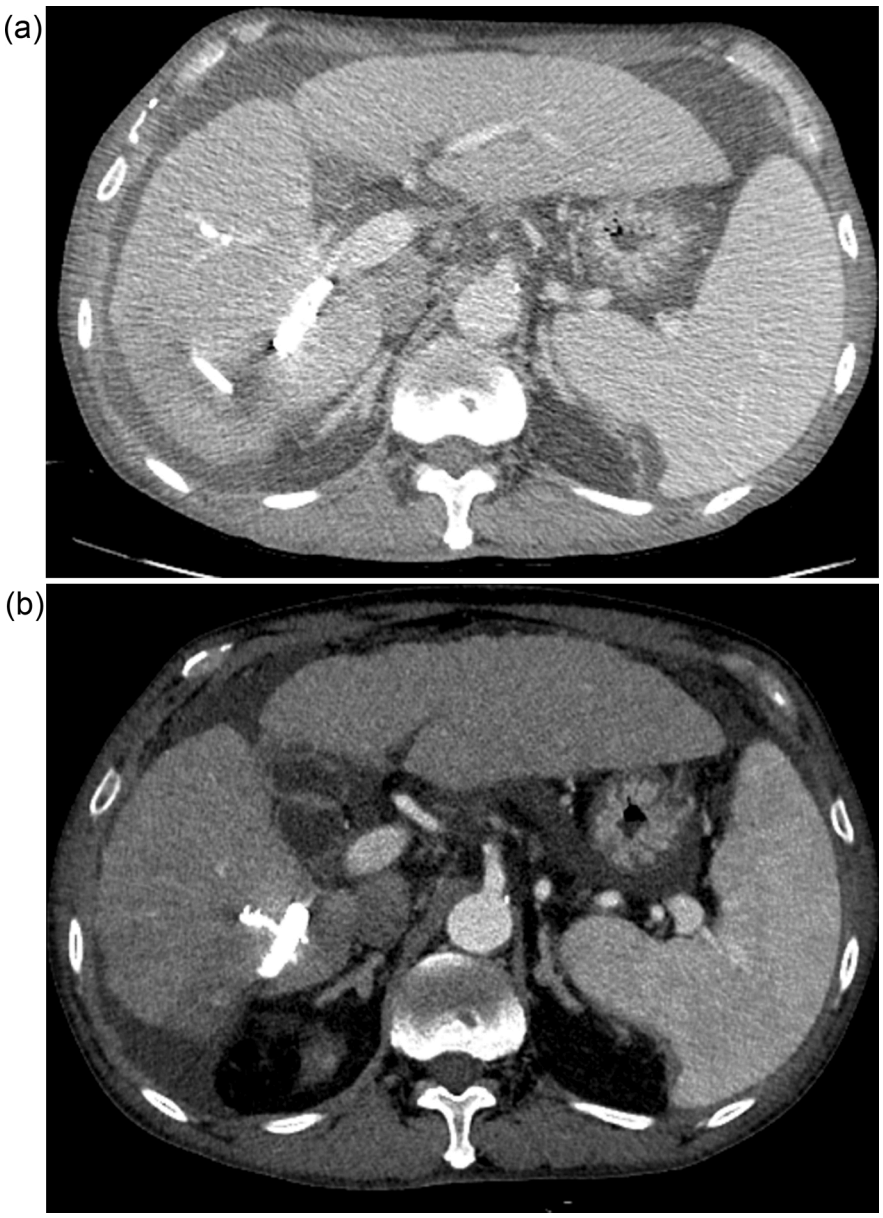

Fig. 3. Follow-up computed tomography (CT) after percutaneous transhepatic portal vein embolization (PTPE) (a) Follow-up CT 10 days after PTPE showing complete occlusion of the right posterior portal vein with n-butyle cyanoacrylate and Lipiodol mixture and nearly resolved biloma with the insertion of percutaneous catheter drainage. (b) Follow-up CT 1 year after the PTPE showing atrophied right posterior section of the liver without recurrence of the biloma.

incurable with PCD and antibiotics for more than 3 months until a corresponding portral vein embolization was performed.

As observed on follow-up, simple bilomas usually resolve spontaneously. However, in the case of an infected or symptomatic biloma, PCD (with or without antibiotics) should be considered. Bilomas that are intractable to PCD and antibiotics require a planned approach based on the patient's general status, liver function, liver volume causing the bile leakage, amount of drainage, and location. In the present case, several sessions of tubography using a PCD catheter in the biloma revealed no communication with the biliary tree. Therefore, we did not consider percutaneous transhepatic biliary drainage or endoscopic retrograde cholangiopancreatography. Due to the diverse and extensive involvement of the biloma in segments VI–VII, it was dangerous to perform TAE owing to the high complication rates due to parenchymal infarction. In high-output bilomas (as in our case), treatment ablation using alcohol or NBCA can be insufficient [6]. Our last non-surgical option was PTPE. PTPE significantly decreased the amount of bile drainage within 10 days, and there were no procedure-related complications. According to Lienden et al., these was 2.5 % of complication rate after PTPE. Among complications, there was no hepatic necrosis [7]. In respect of hepatic necrosis after embolization, risk factor might be hepatic arterial embolization with decreased or reversed portal flow, as liver cirrhosis or portal stenosis [8].

When performing PTPE, various embolic materials including gelatin sponge, NBCA, coil and ethylene vinyl alcohol copolymer (Onyx) can be used [9]. When using a coil, it has the advantage that it can embolize both proximal and distal portal vein by using it with PVA or gelatin sponge, but it takes a long time and needs more contrast agent. Ethylene vinyl alcohol copolymer (Onyx) has the advantage of controlled administration, but has the disadvantage of requiring a large amount and being very expensive. In the case of glue, it has been reported that the FLR hypertrophy rate is the highest [7], and the price is low and the procedure time can be reduced.

PTPE helps manage the biloma by causing hepatocyte atrophy and

decreasing the amount of bile production [10,11]. Five cases of the use of PTPE for the treatment of intractable bile leakage following hepatectomy have been reported, whereas those of the use of PTPE for intractable biloma after RFA have not been reported [11–15]. Among the three successful cases, two underwent PTPE (after failure of alcohol sclerotherapy) to treat the intractable bile leakage [13,15]. The other case was that of an intractable biloma that completely resolved after selective PTPE, similar to our case [11]. In the three cases, the interval between PTPE and PCD removal was 12, 6, and 14 days, respectively. In the two unsuccessful cases, PTPE was performed for intractable bile leakage; however, bile leakage was not completely resolved. Therefore, those two patients underwent resection of the affected liver and anastomosis between the jejunum and filstula, respectively [12,14].

PTPE can be considered when conservative treatment or PCD fails. However, not all PTPE procedures are effective, requiring additional surgical intervention [12,14]. In addition, it is necessary to meticulously check the patients' liver function and remnant liver volume before planning for PTPE.

4. Conclusion

PTPE can be useful as a treatment option for the management of intractable and high-output bilomas after conservative treatments. However, the patients' liver function and remnant liver volume should be considered before performing PTPE.

Human and animal rights

The authors declare that the work described has not involved experimentation on humans or animals.

Informed consent and patient details

The authors declare that this report does not contain any personal information that could lead to the identification of the patient(s) and/or volunteers.

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Author contributions

All authors attest that they meet the current International Committee of Medical Journal Editors (ICMJE) criteria for Authorship.

Transparency document

The Transparency document associated with this article can be found in the online version.

Declaration of Competing Interest

The authors reported no declarations of interest.

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