Gastroenterology Report, 2022, 1–3

https://doi.org/10.1093/gastro/goab058
Brief Report

BRIEF REPORT

Sharp recanalization using Chiba biopsy needle for the treatment of biliary occlusion after radiofrequency ablation

Bin Chen , Haitao Dai, Keyu Tang, Run Lin and Yonghui Huang*

Department of Interventional Radiology, The First Affiliated Hospital, Sun Yat-sen University, Guangzhou, Guangdong, P. R. China

*Corresponding author. Department of Interventional Radiology, The First Affiliated Hospital, Sun Yat-sen University, No. 58 Zhong Shan Er Lu, Guangzhou, Guangdong 510080, P. R. China. Tel: +86-13710397492; Email: hyongh@mail.sysu.edu.cn

Introduction

Biliary stricture is a less common complication after hepatic radiofrequency ablation (RFA) [1, 2]. Patients with biliary stricture often present with recurrent jaundice, fever or chills, and require endoscopic or percutaneous biliary drainage, and in some cases recanalization of the biliary tract [3]. Establishing guide-wire passage through the stricture is essential for biliary recanalization. However, in some cases of complete biliary obstruction, a more aggressive technique is needed when ordinary methods fail to establish. Herein, we report a novel technique of extraluminal recanalization for biliary strictures using a Chiba biopsy needle, which is similar to sharp endovascular recanalization.

Case report

A 36-year-old male underwent transarterial embolization for a hilar mass at a local hospital in December 2018. Although a needle biopsy of the mass in February 2019 revealed focal nodular hyperplasia, RFA of the mass was performed. The patient experienced gradually worsening, intermittent jaundice, and fever afterward, and was eventually admitted to our hospital (the First Affiliated Hospital, Sun Yat-sen University, Guangzhou, China) when the symptoms became aggravated. Endoscopic retrograde cholangiopancreatography was performed to place a drainage catheter from the right hepatic duct to the duodenum. However, this did not relieve the symptoms and the patient was readmitted to our hospital in April 2019 (Table 1).

Physical examination revealed xanthochromia of sclera and skin, without abdominal tenderness or rebound pain. The total bilirubin level was 140 μmol/L. The diagnosis was bile-duct stricture of Bismuth classification IV [2] that was due to the previous RFA. Percutaneous transhepatic cholangial drainage was performed on the left bile duct in April 2019. However, jaundice and intermittent fever did not completely resolve. Fluoroscopic cholangiography indicated there was no communication between the bile duct in segment 6 and the right hepatic ducts (Figure 1B). It was assumed that the junction at which the segmental ducts combined was occluded due to the prior RFA procedure. Thus, segmental biliary drainage was performed in July 2019. In November 2019, internal–external drainage was performed for the right and left lobes of the liver to reconstruct the intrahepatic biliary tract. Until December 2020, the total bilirubin level had decreased to 24 μmol/L and the patient no longer complained of chills or fever. Since the patient was young and desired a better quality of life, recanalization of the bile duct in segment 6 was planned. However, common methods of recanalization failed and thus sharp recanalization was proposed. The preoperative CT showed that the occluded bile duct was very close to the right portal vein (Figure 1A), requiring extreme caution during the operation to avoid injury to the portal vein and severe complications. A 6F sheath (Terumo Incorporated, Tokyo, Japan) was introduced into the bile duct in segment 6 and a 21-gauge Chiba biopsy needle (Cook Incorporated, Indiana, USA) was inserted through the sheath (Figure 1C). A Forgaty balloon (Edwards Lifesciences LLC, California, USA) was installed in the right

Submitted: 7 July 2021; **Revised:** 14 September 2021; **Accepted:** 27 October 2021

Table 1. Information from this case report organized into a timeline

Timeline
December 2018: transarterial embolization for liver hilar mass in local hospital
February 2019: the pathology of needle biopsy revealed focal nodular hyperplasia (FNH); a radiofrequency ablation was performed in local hospital for the treatment of FNH
February 2019: jaundice and fever occurred; endoscopic retrograde cholangiopancreatography was performed in our hospital
April 2019: the patient was readmitted to our hospital due to repeated fever, chills, and jaundice; the left bile duct was drained by percutaneous transhepatic cholangial drainage
July 2019: bile duct of segment 6 drainage was performed
November 2019: internal–external drainage of the right and left liver lobe was performed
December 2020: sharp recanalization was performed and a 7F drainage catheter was placed in the bile duct of segment 6; the internal–external drainage of the right lobe was removed
April 2021: a 14F drainage catheter was replaced in the segment 6 biliary duct; the left drainage was removed

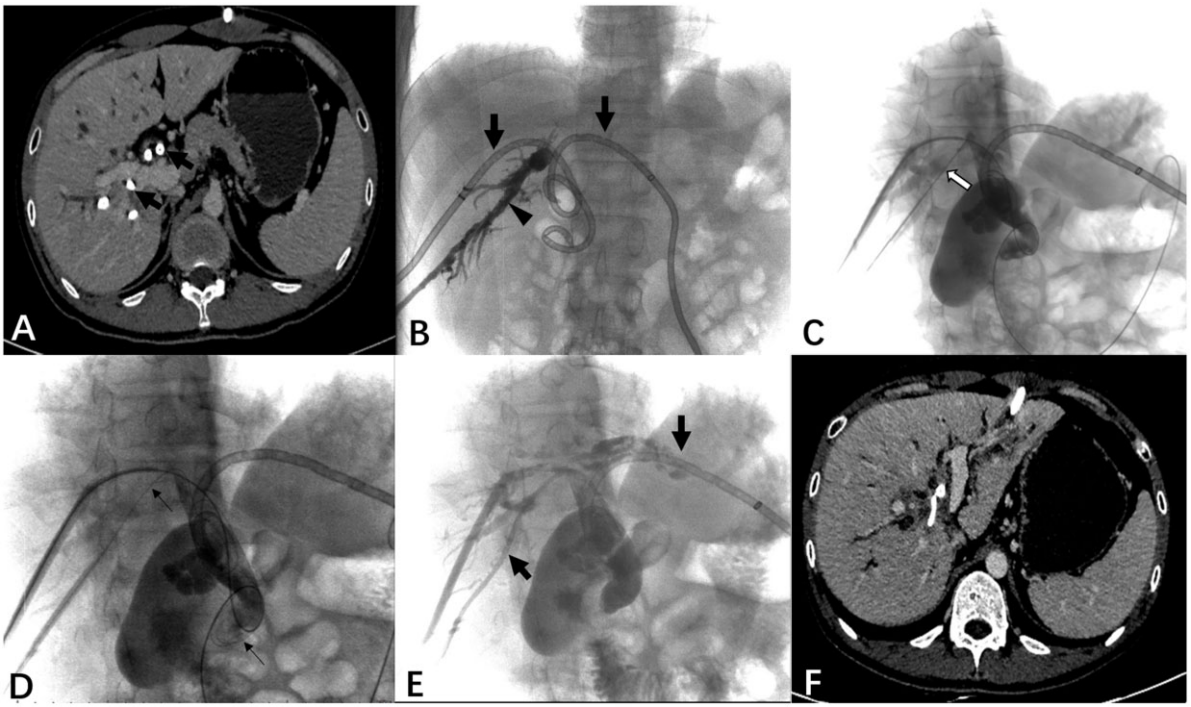

Figure 1. Procedure of sharp recanalization using Chiba biopsy needle in the study case. (A) preoperative CT showed that the occluded bile duct was very close to the right portal vein and drainage catheter (black arrow) was placed in the bile duct; (B) fluoroscopic cholangiography indicated there was no communication between the bile duct in segment 6 (black triangle) and the right hepatic ducts; (C) a 6F sheath was introduced into the bile duct in segment 6 and a 21-gauge Chiba biopsy needle (white arrow) was inserted through the sheath; (D) a 0.018 guide wire (thin black arrow) was introduced into the common bile duct through the lumen that the needle had created; (E) a 7F drainage catheter (black arrow) was placed from the bile duct in segment 6 to the common bile duct; (F) post-operative CT showed that biliary drainage entered the common bile duct through the previously occluded site and no bleeding was noted.

hepatic duct as the target for the puncture. The puncture direction was carefully modified using multi-angle fluoroscopic views. As the Chiba biopsy needle was advanced, the Forgaty balloon was deflated and a 0.018 guide wire was introduced into the common bile duct through the lumen that the needle had created (Figure 1D). Sequentially, a 7F drainage catheter (Cook Incorporated, Indiana, USA) was placed (Figure 1E). Consequently, the obstructed bile duct was reconnected to the common bile duct. Post-operative CT showed that biliary drainage entered the common bile duct through the previously occluded site and no evidence of internal bleeding was noted (Figure 1F). In April 2021, the symptoms had completely resolved and the 7F drainage catheter was replaced by a 14F drainage catheter for dilating the bile ducts. No peri-procedure complications occurred.

Discussion and conclusion

Biliary occlusion can cause chills, fever, and jaundice. The use of external drainage leads to poor quality of life, especially for patients with benign occlusion. Recanalizing the occluded bile duct to restore drainage function to the intestine is the best option for these patients. Sharp recanalization is a conventional technique in vascular interventions, such as percutaneous coronary recanalization and peripheral venous recanalization. At present, sharp biliary recanalization is gradually becoming a common and accepted procedure. Percutaneous biliary sharp recanalization is considered a salvage treatment after failure of the conventional methods. When the occluding lesion is short and straight, sharp recanalization can significantly improve the success rate of biliary recanalization.

Technically, several points should be considered prior to attempting sharp recanalization. (i) Dynamic computed tomography or magnetic resonance should be performed preoperatively to identify the characteristics of the obstruction and clarify the anatomy to avoid serious complications such as portal vein injury [3, 4]. (ii) The direction of percutaneous sharp recanalization is from the intralobular bile duct to the common bile duct (it is the reverse in endoscopic retrograde sharp recanalization). Rendezvous techniques may be necessary [5]. (iii) Multi-angle fluoroscopy and the identification of a target inside the bile duct can reduce the chance of failure. (iv) Fine needles are recommended, such a Chiba biopsy needle, transseptal needle, or the stiff end of a guide wire [6].

The novelty of the current case is the use of a Chiba biopsy needle to treat biliary occlusion, similar to the sharp endovascular recanalization [7]. The occlusion of the intrahepatic bile duct was recanalized and bile flowing to the common bile ducts was restored. Sharp recanalization is the final resort in the treatment of bile-duct occlusive diseases [8]. To the best of our knowledge, there are few reports of percutaneous sharp recanalization using Chiba biopsy needles for biliary occlusion [6, 9].

Complications of sharp biliary recanalization include adjacent tissue damage, bleeding, biliary fistula, and infection, which are different to those associated with sharp endovascular recanalization [7, 10]. It is noteworthy that the devices used in sharp biliary recanalization herein are those used in endovascular procedures, as there are no dedicated devices or standard protocols. Therefore, the development of novel devices and guidelines for sharp biliary recanalization warrants further attention.

In summary, sharp biliary recanalization is an effective alternative when a guide wire cannot be passed into the distal bile duct or the biliary system.

Funding

Not applicable.

Acknowledgements

None.

Conflict of Interest

None declared.

References

1. Fang C, Cortis K, Yusuf GT *et al*. Complications from percutaneous microwave ablation of liver tumours: a pictorial review. *Br J Radiol* 2019;**92**:20180864.
2. Ma MX, Jayasekeran V, Chong AK. Benign biliary strictures: prevalence, impact, and management strategies. *Clin Exp Gastroenterol* 2019;**12**:83–92.
3. Kapoor BS, Mauri G, Lorenz JM. Management of biliary strictures: state-of-the-art review. *Radiology* 2018;**289**:590–603.
4. Thomas S, Jahangir K. Noninvasive imaging of the biliary system relevant to percutaneous interventions. *Semin Intervent Radiol* 2016;**33**:277–82.
5. De Robertis R, Contro A, Zamboni G *et al*. Totally percutaneous rendezvous techniques for the treatment of bile strictures and leakages. *J Vasc Interv Radiol* 2014;**25**:650–4.
6. Horinouchi H, Ueshima E, Sofue K *et al*. Extraluminal recanalization for postoperative biliary obstruction using transseptal needle. *Surg Case Rep* 2020;**6**:304.
7. Cohen EI, Beck C, Garcia J *et al*. Success rate and complications of sharp recanalization for treatment of central venous occlusions. *Cardiovasc Intervent Radiol* 2018;**41**:73–9.
8. Cha JG, Lee SY, Han YS *et al*. Technical review of a single-center experience of biliary recanalization for liver transplantation-related benign biliary stricture. *Eur J Radiol Open* 2020;**7**:100301.
9. Habibollahi P, Benjamin JL, X Bai H *et al*. Percutaneous fluoroscopic-guided creation of neoanastomosis for the treatment of biliary occlusions. *Cardiovasc Intervent Radiol* 2020;**43**:1671–8.
10. Arabi M, Ahmed I, Mat'hami A *et al*. Sharp central venous recanalization in hemodialysis patients: a single-institution experience. *Cardiovasc Intervent Radiol* 2016;**39**:927–34.