

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

journal homepage: [www.elsevier.com/locate/radcr](http://www.elsevier.com/locate/radcr)

## Case Report

# External tamponade of pseudoaneurysm with balloon catheter ☆☆☆★

Brandon C. Anamah, MPH<sup>a,\*</sup>, Manuel Betancourt Torres, MD<sup>b</sup>, Bart J. Rose, MD<sup>c</sup>, Junjian Huang, MD<sup>b</sup>

<sup>a</sup>School of Medicine, Meharry Medical College, Nashville, TN, USA

<sup>b</sup>Department of Radiology, University of Alabama at Birmingham, Birmingham, AL, USA

<sup>c</sup>Division of Surgical Oncology, University of Alabama, Birmingham, AL, USA

## ARTICLE INFO

## Article history:

Received 26 October 2021

Revised 8 November 2021

Accepted 10 November 2021

## Introduction

Hemobilia related to arterial injury from percutaneous biliary intervention occurs in approximately 2% of cases and there are several methods of resolving this including angiography and embolization [1,2]. Common embolic agents include gelatin slurry, endovascular coils, particles, beads and glue and choice of embolic agent is typically dependent on clinical situation and anatomy. Herein is a case of a patient with a complicated medical history who developed hemobilia following placement of a percutaneous biliary catheter. Embolization was dissuaded by the patient's hepatobiliary surgeon due to the patient's reduced liver reserve and thus underwent intrabiliary balloon tamponade to temporize the arterial hemorrhage.

## Case description

A 54-year-old man with a large hepatic neuroendocrine tumor underwent extended right hepatectomy, wedge resections, ablations, and biliary reconstruction. This was complicated post-operatively by esophageal and duodenal ischemia related to COVID coagulopathy, subsequently requiring a total gastrectomy, partial duodenal resection, and delayed reconstruction. His treatment included placement of percutaneous biliary catheters into the left medial and lateral bile ducts. During his recovery, he presented with bright red blood in the left biliary catheter drain bag and hemoglobin drop from 10.1g/L to 6.8g/L over 6 hours. Interventional Radiology was then consulted to perform a cholangiogram, angiogram, and possible embolization.

☆ Acknowledgements: There was no research funding provided.

☆☆ Competing interests: None

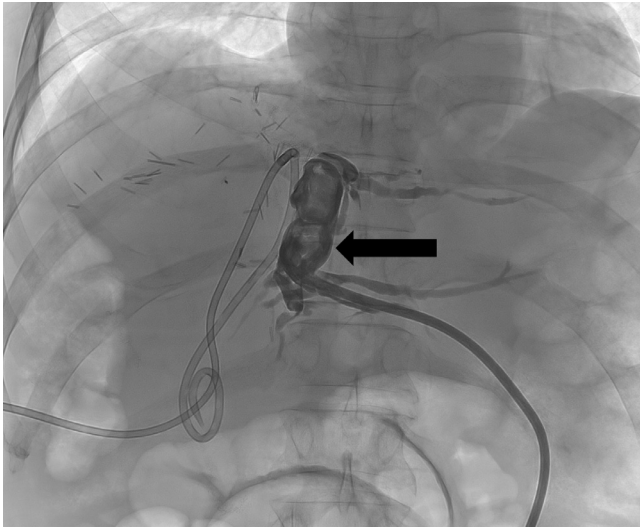
★ Patient consent: Written informed consent was given to us from the patient.

\* Corresponding author.

E-mail address: [banamah20@email.mmc.edu](mailto:banamah20@email.mmc.edu) (B.C. Anamah).

<https://doi.org/10.1016/j.radcr.2021.11.023>

1930-0433/© 2021 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)



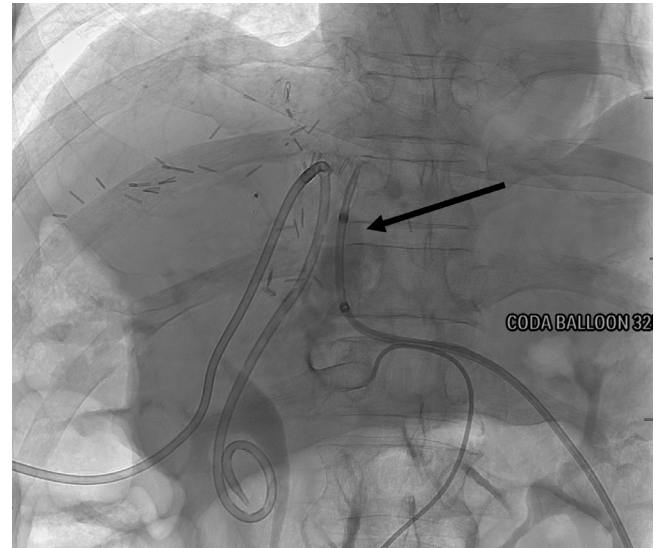
**Fig 1 – Frontal radiograph of drain injection performed through the left sided percutaneous biliary catheter demonstrating clot within the biliary system (black arrow)**



**Fig 2 – Digital subtraction angiogram during portal venous phase demonstrating contrast pooling consistent with a pseudoaneurysm (red arrow) (Color version of figure is available online)**

Over the wire cholangiogram was performed demonstrating clot within the left biliary tree (Fig. 1). A hepatic angiogram was performed demonstrating a pseudoaneurysm with active extravasation into the left biliary tree and a 2.8 Progreat microcatheter (Terumo Medical Corporation, Somerset, New Jersey) was used to subselect the segment 4 branch that gave rise to the pseudoaneurysm (Fig. 2).

Due to the patient's diminished liver reserve, the patient's surgeon specifically requested no regional embolization and the feeding artery was too tortuous to selectively coil embolize. The decision was made to externally tamponade the



**Fig. 3 – Digital subtraction angiogram demonstrating inflated CODA balloon in the biliary duct (black arrow)**

pseudoaneurysm with a 32mm x 120cm CODA balloon (Cook Incorporated, Bloomington, Indiana) placed into the left biliary tree through the catheter site. Completion angiogram demonstrated persistent pseudoaneurysm without extravasation (Fig. 3).

Over the course of the next 3 days, the patient required no additional transfusions and the balloon was exchanged for a new external biliary catheter on POD3 due to rising temperatures and liver function tests. He was without bleeding complication at 1-month follow-up. Since then, he has undergone cholangioscope guided biliary neo-anastomosis followed by angioplasty and is currently doing well 6 months post angiogram and balloon tamponade.

## Discussion

Hepatic arterial injury incidence in relation to biliary catheterization are reported to be around 2% and found to be higher in left sided biliary catheter placements and can present as bright red blood in the biliary drainage bag with accompanying hemoglobin drop [2,3]. Embolization is the main method to treat patients with continuous bleeding into the biliary tree. In a healthy liver, embolization of arterial branches is usually of little concern for ischemia because of the dual blood supply from the portal vein and hepatic artery [3].

Hepatic pseudoaneurysms are known complications of percutaneous biliary catheter placement and management is generally straightforward but, as in this case, can occasionally be complex due to patient circumstances. Specifically, this patient had undergone an extended right hepatectomy, additional wedge resection, ablation, and biliary reconstruction resulting in significantly reduced liver reserve and increased risk of liver failure following non-target embolization.

This case demonstrates an unorthodox and unique way to treat hepatic artery pseudoaneurysm and will hopefully expand the options available to patients with barriers to embolotherapy.

---

### **Ethical Consideration**

This study has not been published anywhere else.

### REFERENCES

---

- [1] Berry R, Han JY, Kardashian AA, LaRusso NF, Tabibian JH. Hemobilia: Etiology, diagnosis, and treatment. *Liver Res* 2018;2(4):200–8.
- [2] L'Hermine C, Ernst O, Delemazure O, Sergent G. Arterial complications of percutaneous transhepatic biliary drainage. *Cardiovasc Intervent Radiol* 1996;19(3):160–4.
- [3] Navuluri R. Hemobilia. *Semin interv radiol*. 2016 Dec;33(4):324–31.