Technique for Multiple, Long-term Indwelling Balloon Catheters in the Treatment of Refractory Benign Biliary Stricture

Sam Bartrom, BS[1] ● Jonathan Lee, MD[2] ● Andre Stovall, MD[3]
Indiana University School of Medicine[1] ● Summit Radiology[2,3] ● Lutheran Health Network[2,3]

Background

- Iatrogenic common bile duct injury is a potential complication of gallbladder and biliary tract procedures, requiring multidisciplinary treatment for optimal care {1}.
- Biliary stricture is one such complication. Its treatment is inherently complex with one method of treatment being progressive, percutaneous catheter upsizing over the course of months {2-3}.
- This method was initially used in the described patient with access through the left hepatic duct. Ultimately, this resulted in scarring of the right hepatic duct. An alternative approach was sought that would allow dilation of both hepatic ducts and the stricture site while minimizing patient discomfort.
- The first study to describe the use of long-term indwelling balloon catheters by Park SJ et al., defines the technique with the use of a single catheter system {4}. Their technique is favorable as it avoids the need for skin and subcutaneous tissue dilatation when compared to previously proposed approaches including gradual catheter upsizing which failed in this patient {5-6}. This study outlines an extended use of their technique by using two indwelling balloon catheter systems.

Case Information

- The patient described in this study was status post cholecystectomy with iatrogenic common bile duct injury. Initial repair of the common bile duct injury was with hepaticojejunostomy with a Roux-en-Y, which was complicated by stricture at the hepaticojejunostomy site.

Imaging

Figure 1. Pre-intervention. Patient has dilated right-sided biliary system and atrophied left-sided system. Hepaticojejunostomy anastomosis is narrowed.

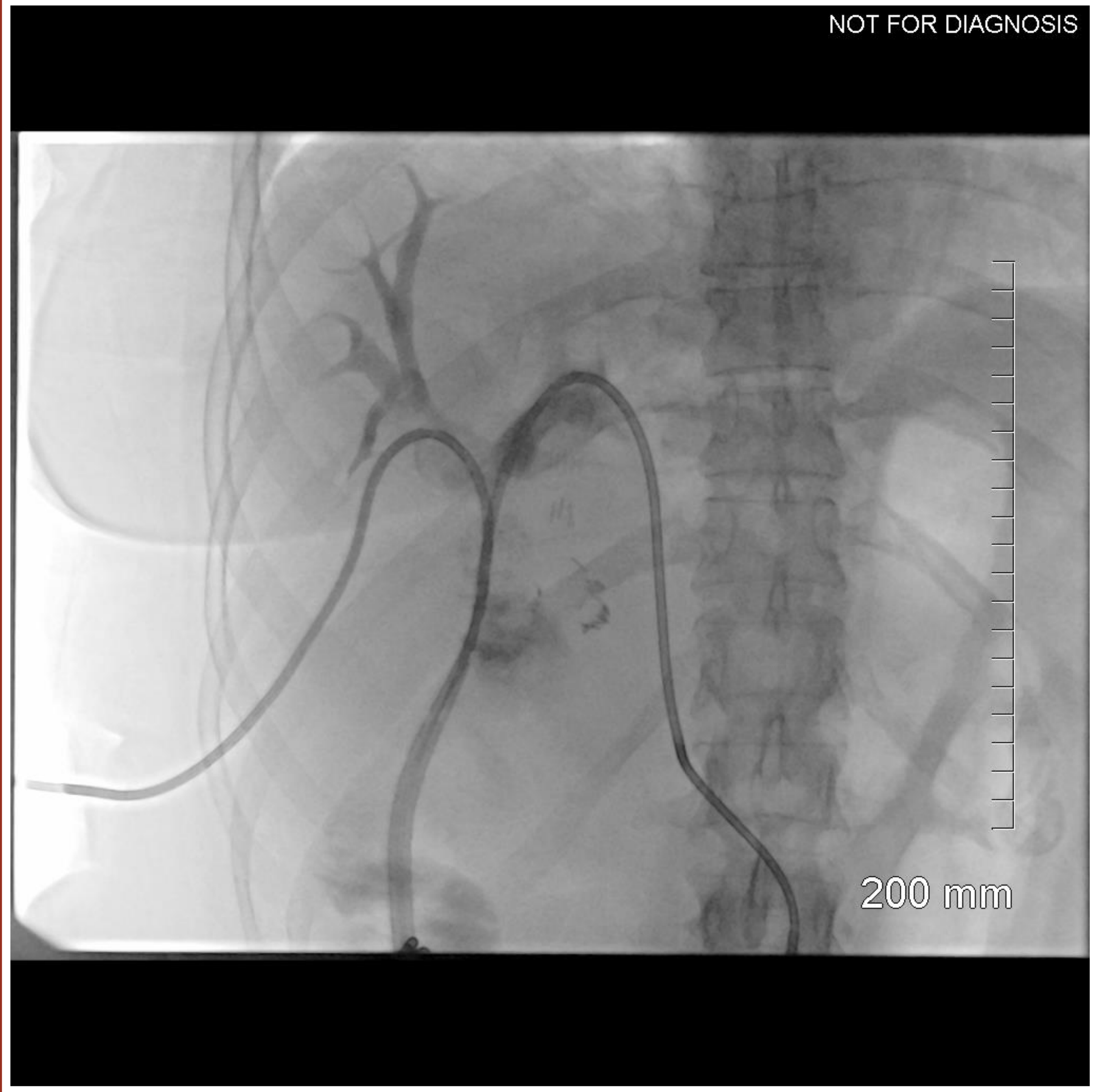

Figure 2. Drains. Bilateral 10 Fr biliary drains. Eventually upsized to 12 Fr drains.

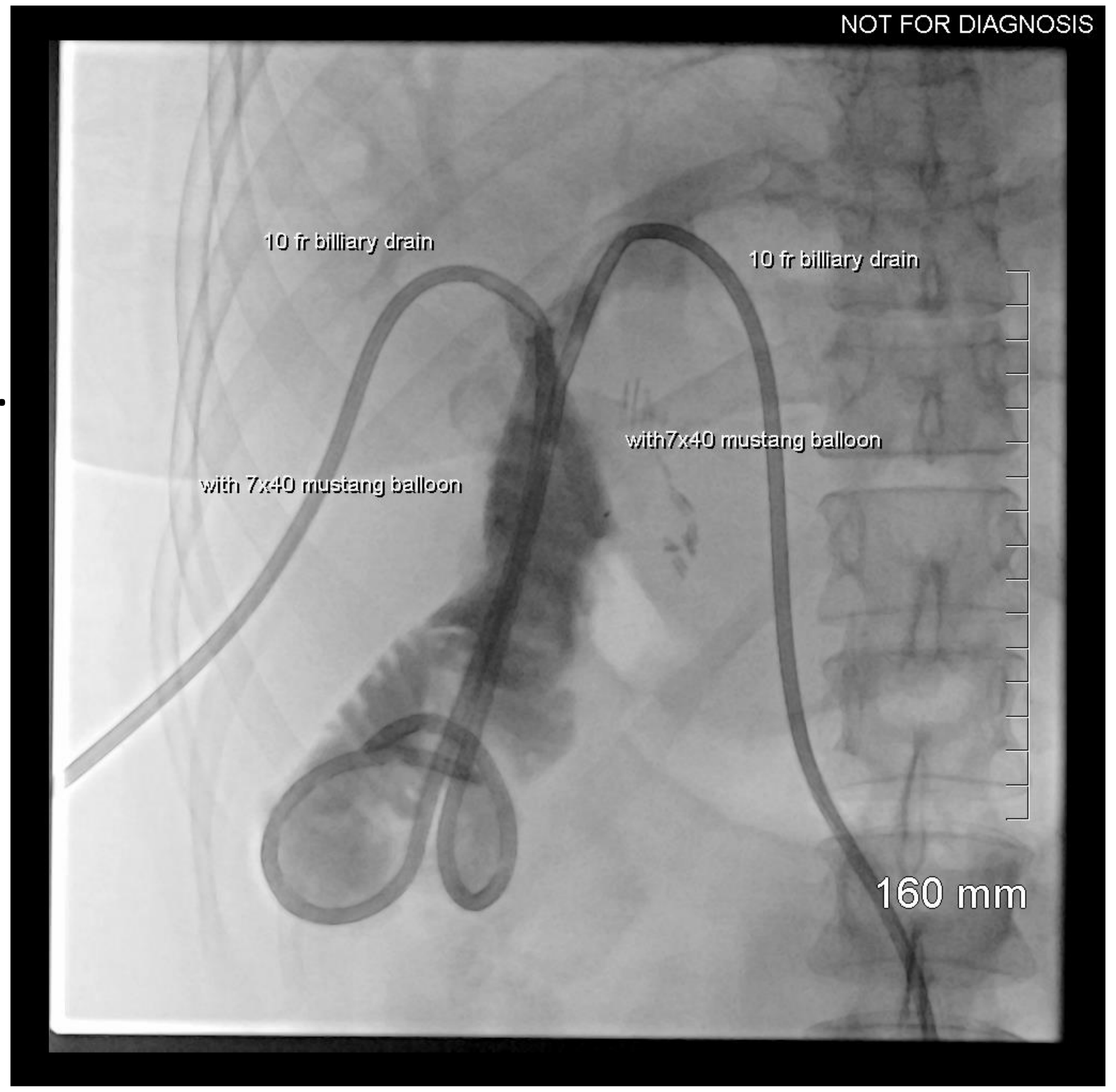

Figure 3. Balloon-Drain System. 7 x 40 mm Mustang balloons through 10 Fr biliary drainage catheters in bilateral hepatic ducts spanning hepaticojejunostomy site.

Figure 4. Post-intervention. Right and left-sided hepatic ducts are normal in size. Hepaticojejunostomy anastomosis is patent.

Procedure Details

- Percutaneous access was gained bilaterally into the left and right hepatic ducts with placement of 10 French drainage catheters bilaterally across the stricture site. 7mm x 40mm balloon catheters were placed in the side holes of each drainage catheter to allow for simultaneous drainage and dilation.
- The balloons spanned from their respected hepatic duct across the hepaticojejunostomy stricture. The balloons were inflated with diluted contrast media with reinflation and positional monitoring occurring every two weeks over a three-month period.
- Subsequently, the system was removed with decompression of the stricture site and both hepatic ducts appreciated. The patient tolerated the procedures well and has had no recurrence.

Outcome/Conclusion

- The use of two long-term balloon catheter systems in the described patient was an effective technique in the treatment of a biliary stricture to maintain patency of the left and right hepatic ducts.

References

1. Pitt HA, Sherman S, Johnson MS, et al. Improved outcomes of bile duct injuries in the 21st century. Ann Surg. 2013;258(3):490-499. doi:10.1097/SLA.0b013e3182a1b25b.
2. Rabkin JM, Orloff SL, Reed MH, et al. Biliary tract complications of side-to-side without T tube versus end-to-end with or without T tube choledochocholedochostomy in liver transplant recipients. Transplantation. 1998;65(2):193-199. doi:10.1097/00007890-199801270-00008
3. Thethy S, Thomson BNj, Pleass H, et al. Management of biliary tract complications after orthotopic liver transplantation. Clin Transplant. 2004;18(6):647-653. doi:10.1111/j.1399-0012.2004.00254.
4. Park SJ, Chung HH, Lee SH, et al. Long-term balloon indwelling technique for the treatment of single benign biliary stricture. Diagn Interv Radiol. 2019;25(1):90-94. doi:10.5152/dir.2018.18225.
5. Choo SW, Shin SW, Do YS, et al. The balloon dilatation and large profile catheter maintenance method for the management of the bile duct stricture following liver transplantation. Korean J Radiol. 2006;7(1):41-49. doi:10.3348/kjr.2006.7.1.41.
6. Gwon DI, Sung KB, Ko GY, Yoon HK, Lee SG. Dual catheter placement technique for treatment of biliary anastomotic strictures after liver transplantation. Liver Transpl. 2011;17(2):159-166. doi:10.1002/lt.22206.