VIDEO CASE REPORT

Jailbreaking a metal biliary stent through a duodenal stent

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Uncovered metal biliary stents have often been employed for malignant biliary strictures, and meta-analyses have shown decreased rates of stent migration compared to covered stents and prolonged patency compared to plastic stents.[1-3] Despite their efficacy, uncovered metal stents that remain in situ are prone to obstruction by tissue ingrowth or stone formation over the long term, potentially leading to cholangitis.[4] With improving chemotherapy and immunotherapy regimens, patients with malignant obstruction and uncovered metal stent placements are living longer than ever.

Stent trimming using argon plasma coagulation for stent revision has been previously reported.[5-8] Here, we present a case of cholangitis from an obstructed metal biliary stent and concurrent duodenal stent, treated with alternative argon plasma coagulation (APC) settings from prior literature, successfully used to "jailbreak" the existing duodenal stent (by the term "jailbreak," we mean using APC to obliterate the interstices of the duodenal metal stent overlying the biliary orifice and allow access to the biliary system and placement of a new metal biliary stent). This technique could also be applied to gain biliary access without placement of a new biliary stent or to pull the existing biliary stent through the duodenal stent. With this jailbreaking technique, the biliary stent is not confined by the surrounding duodenal stent. Potentially, this can lead to improved passage of devices into the biliary system; otherwise, these can catch on interstices at the junction of the duodenal and biliary stents.

A 72-year-old man presented to the emergency department. His medical history was notable for metastatic gallbladder adenocarcinoma resulting in malignant duodenal and biliary obstruction and cholangitis 4 months earlier, requiring placement of an uncovered metal biliary stent first, followed by duodenal stent placement. In this case, the biliary stent was placed against the duodenal stent, but not through it. In the emergency department, he was found to have a fever of 101.4°F, rigors, and an elevated direct bilirubin level of 1.8 mg/dL (reference range 0.2-1.3 mg/dL), which was acutely elevated from 0.3 mg/dL just 3 days earlier. Based on his presentation this time, he was diagnosed with acute cholangitis and started on piperacillin-tazobactam.

The next morning, he underwent endoscopic retrograde cholangiography, and both the biliary and duodenal stents appeared appropriately positioned based on fluoroscopy (Fig. 1). However, on endoscopy, there was significant tumor ingrowth of both the duodenal and

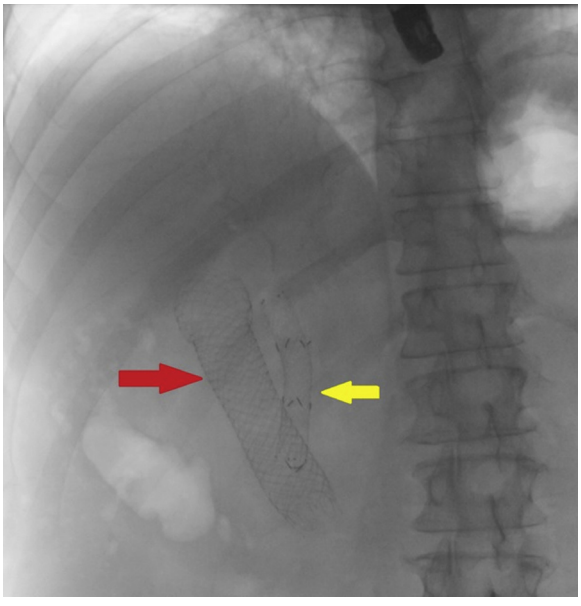

Figure 1. Fluoroscopic image of initial tangential biliary stent (*yellow arrow*) and duodenal stent (*red arrow*).

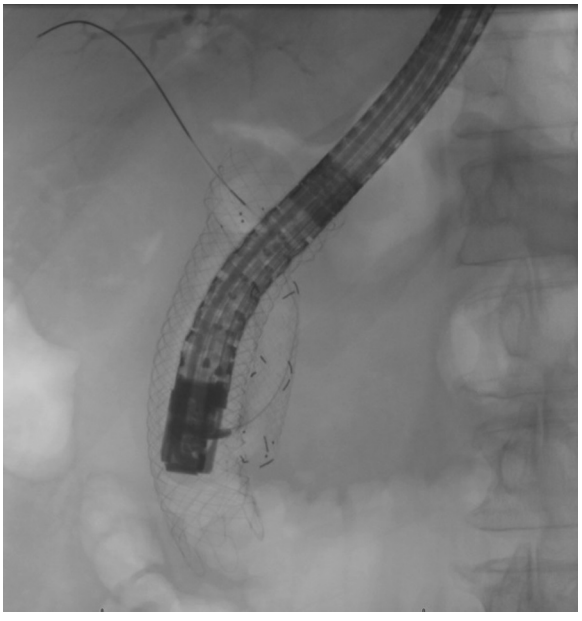

Figure 2. The right intrahepatic duct is cannulated to stabilize endoscopic position and secure biliary access.

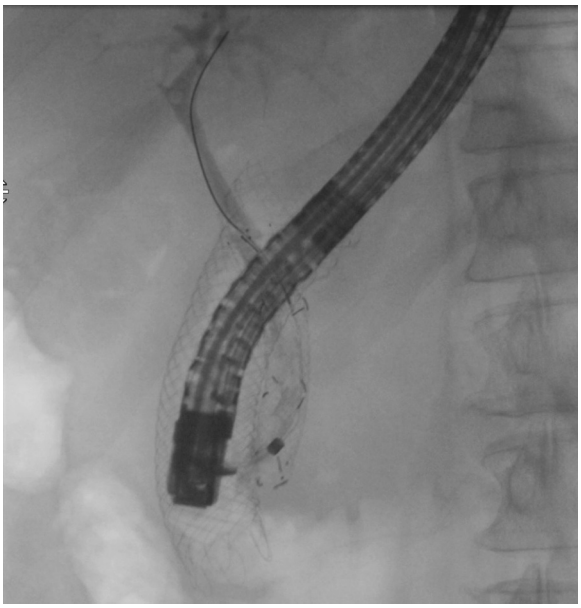

Figure 3. Cholangiogram after cannulation of the biliary orifice.

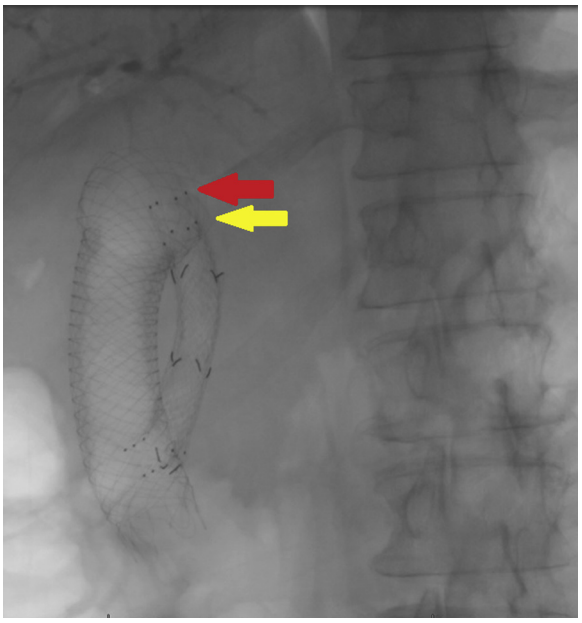

Figure 4. Final fluoroscopic view after stent trimming and balloon sweep, showing the coaxial stents with the new biliary stent through the pre-existing duodenal stent.

biliary stents, with associated obstruction of the latter. Despite tissue ingrowth, the bile duct could be cannulated with an 0.025-inch wire and was secured within the right intrahepatic duct to stabilize the endoscope position and guide subsequent stent manipulation (Fig. 2). From there, forced APC (settings 120 W and 1.0 L/min) was performed to first clear tumor and/or tissue ingrowth and better demonstrate the tines and interstices of the underlying stents (Video 1, available online at www.giejournal.org). APC at the same settings then was used to focally obliterate the interstices of the duodenal and biliary stents to allow for jailbreaking an open channel to the biliary system. A cholangiogram was performed (Fig. 3), and the biliary tree was then swept with a 12-mm stone extraction balloon starting at the bifurcation, with sludge and pus removed. In doing so, this demonstrated that our wire was not through any existing intraductal interstices. Finally, a 10-mm × 6-cm uncovered metal stent (365 Zilver, Cook Medical, Bloomington, Ind, USA) was placed through the previous biliary stent to maintain the channel. At the end of the procedure, bile flowed through the stent and the stent was in a good position fluoroscopically (Fig. 4).

Obstructed metal biliary stents can be a challenge and lead to cholangitis in patients with malignant biliary obstruction and a prolonged life expectancy. This is even more challenging in patients with concurrent duodenal stents placed for obstruction. APC of the interstices at the junction between the duodenal and biliary stents is one approach to improve drainage of the biliary system, with possible placement of a second coaxial biliary stent. In our practice, we initially started with the settings based on earlier reports, at 80 W and flow of 1 L/min, and slowly titrated this until we reached our current settings of forced APC power 120 W and flow 1.0 L/min, which was highly effective for stent trimming. In a typical case, we start with APC settings of 80 W and flow 1.0 L/min and rapidly titrate upward if there is significant overlap of interstices or trimming required.[5,9,10] Although theoretical risks could include pancreatitis or perforation, we have not experienced these in our practice. Furthermore, this patient did well with no adverse events and demonstrates the potential of this technique in patients with an obstructed metal biliary stent and a concurrent duodenal stent.

DISCLOSURE

Dr Amateau is a consultant for Merit Endoscopy, Boston Scientific, US Endoscopy/Steris, Heraeus, Olympus, and Cook Medical; an advisor for Olympus; and does research support for Cook Medical. All other authors disclosed no financial relationships.

Abbreviation: APC, argon plasma coagulation.

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