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Complication Forum

Percutaneous retrieval of a misplaced transjugular intrahepatic portosystemic shunt stent using the rigid endobronchial forceps

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ABSTRACT

Summary of Event: A transjugular intrahepatic portosystemic shunt (TIPS) stent (Viatorr) was misplaced into main portal vein and superior mesenteric vein. This misplaced covered stent was then successfully retrieved using the rigid endobronchial forceps.

Teaching Point: Before release the covered portion of the TIPS stent (Viatorr), it is necessary to confirm the position of uncovered portion in portal vein and covered portion in parenchymal tract. The endobronchial forceps technique is a safe and efficient method for retrieving a misplaced TIPS stent.

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Keywords: Device removal; Portosystemic shunt, transjugular intrahepatic; Stents

Event Details

A 54-year-old woman with a past history of non-alcoholic steatohepatitis related cirrhosis presented with intractable ascites. The interventional radiology service was consulted to place a transjugular intrahepatic portosystemic shunt (TIPS) to relieve the patient's ascites. A liver Doppler ultrasound showed no evidence of thrombosis, a transthoracic echocardiogram showed a normal ejection fraction, and her model for end-stage liver disease (MELD) score was 16.

TIPS procedures were performed under moderate sedation. The hepatic vein was accessed from a right internal jugular approach and CO₂ wedged hepatic venography was performed to localize the portal vein. The portal vein was then accessed with use of a Colapinto needle (Cook, Bloomington, IN, USA). Pressures were measured in the right atrium and portal vein to determine a pre-TIPS portosystemic gradient and portal venogram was obtained. The parenchymal tract was then pre-dilated with 8 mm balloon. A 10 × 50 mm covered stent (Viatorr; W. L. Gore & Associates, Flagstaff, AZ, USA) was advanced and deployed. Unfortunately, however, the covered stent was deployed within the main portal vein and superior mesenteric vein instead of the portal vein (uncovered portion) and parenchymal tract (covered portion) (Fig.

1A). Multiple wires, catheters, and snares were used in attempts to retrieve the misplaced covered stent without success. The 10 Fr sheath was then replaced by a 14 Fr sheath (Cook). The rigid endobronchial forceps (model 4162, 3 mm shaft diameter, 60 cm length; Bryan, Woburn, MA, USA) were then used to retrieve this TIPS stent. The proximal portion of the TIPS stent was grasped with the forceps, folded over, and pulled through the sheath, TIPS stent with forceps and sheath were removed while maintaining a safety wire (Fig. 1B). Again a 10 × 50 mm covered stent (Viatorr) was deployed, this time in the correct position. Subsequently a 10 × 60 mm covered stent (Fluency; Bard Peripheral Vascular, Tempe, AZ, USA) was then deployed overlapping with the Viatorr stent to extension to the hepaticocaval junction (Fig. 1C). Porto-systemic gradient has decreased from 19 to 7 mmHg.

Discussion

TIPS stent (Viatorr) deployment can be divided in two parts: 1) Release of the uncovered portion (2 cm length). The 10 Fr introducer sheath should be advanced into the portal system for at least 3 cm and then gently retracted to permit release of the uncovered portion within the portal vein. Once the stent is fully released, the whole system is gently retracted until a resistance is

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Fig. 1. (A) Portal venogram after transjugular intrahepatic portosystemic shunt (TIPS) stent (Viatorr; W. L. Gore & Associates) placement shows the covered stent (black arrows) was deployed within the main portal vein and superior mesenteric vein instead of the portal vein (uncovered portion) and parenchymal tract (covered portion). There is circumferential radiopaque marker (white arrow) at the junction of covered portion and uncovered portion. (B) The rigid endobronchial forceps were used to retrieve this TIPS stent. The proximal portion of the TIPS stent was grasped with the forceps, folded over, and pulled through the sheath, TIPS stent (black arrows) and sheath were removed while maintaining a safety wire. (C) A 10 × 50 mm covered stent (Viatorr) (black arrows) was deployed. Subsequently a 10 × 60 mm covered stent (Fluency; Bard Peripheral Vascular) (white arrows) was then deployed overlapping with the Viatorr stent to extension to the hepaticocaval junction.

Fig. 2. The rigid endobronchial forceps were used to retrieve misplaced Fluency stent (Bard Peripheral Vascular) in right atrium during transjugular intrahepatic portosystemic shunt revision procedure in another patient. The proximal portion of the Fluency stent was grasped with the forceps (A; black arrows), folded over (B; black arrows), and Fluency stent with forceps (C; black arrows) and sheath were removed while maintaining a safety wire (C; white arrows).

felt, thus indicating that the proximal portion of the covered portion has reached the junction of the portal vein and the parenchymal tract. 2) Release of the covered portion.¹ In this case, when whole system was retracted after full release of the stent, resistance was felt. So, we assumed that covered portion has reached the junction of the portal vein and the parenchymal tract and the covered portion was released.

Misplaced TIPS stent in main portal vein and splenic vein in this case likely results occlusion of portal vein branches or splenic vein due to covered portion of Viatorr stent and portal vein anastomosis issue at the time of future liver transplant. So, this misplaced stent must be retrieved. Previous studies have demonstrated the high success rate of percutaneous stent removal for patients with misplaced or dislodged endovascular stents after using

nitinol snare as the primary instrument.²⁻⁴ There was a case report of successful removal of misplaced Fluency stent graft in patient with femoral dialysis graft using rigid endobronchial forceps.⁵ The rigid endobronchial forceps technique also has been used for retrieval of tip-embedded inferior vena cava filters.⁶ These endobronchial grasping forceps with crocodile jaw (3 mm shaft diameter, 6 cm length) can easily be introduced into the rigid bronchoscope or 14 Fr sheath and are perfect for foreign body retrieval such as endobronchial stent, endovascular stent and inferior vena cava filter.

The endobronchial forceps technique is a safe and efficient method for retrieving a misplaced stent (Fig. 2). The endobronchial forceps are relatively easy to use and provide the firmest grasp of the stent.

Prevention

Before release the covered portion of the TIPS stent (Viatore), it is necessary to confirm the position of uncovered portion in portal vein and covered portion in parenchymal tract using venogram through the introducer sheath or comparing position with previous portal venogram.

Teaching Point

Before release the covered portion of the TIPS stent (Viatore), it is necessary to confirm the position of uncovered portion in portal vein and covered portion in parenchymal tract. The endobronchial forceps technique is a safe and efficient method for retrieving a misplaced TIPS stent.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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