Self-expandable metallic stent placement for malignant biliary stricture using a novel device delivery system

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CASE PRESENTATION

A 66-year-old man presented to our hospital with jaundice. Blood tests showed elevated liver enzymes, direct and indirect bilirubin, C-reactive protein, and white blood cell count. Contrast-enhanced CT showed a pancreatic head tumor and multiple liver tumors. Histologic examination of tumor biopsies revealed that the tumors were pancreatic adenocarcinoma with liver metastases. We performed ERCP and placed a 10-mm × 8-cm fully covered self-expandable metallic stent (SEMS) (X-Suit NIR; Olympus, Tokyo, Japan) for a distal biliary stricture. The patient's jaundice improved but soon recurred. Contrast-enhanced CT revealed a hilar biliary stricture and intrahepatic bile duct dilation owing to liver metastasis (Fig. 1). We again performed ERCP to treat the malignant biliary obstruction.

ERCP PROCEDURES

After removal of the SEMS placed in the distal bile duct, cholangiography revealed hilar and distal biliary strictures (Fig. 2). Therefore, we inserted a novel device delivery system (EndoSheather; Piolax, Kanagawa, Japan) (Fig. 3) into the right posterior bile duct over a guidewire (Fig. 4A). After removing the inner catheter, we delivered an uncovered SEMS (8 × 80 mm, BileRush Selective; Piolax) through the outer sheath (Fig. 4B) and deployed it at the target site (Fig. 4C). Next, we inserted the guidewire into the left hepatic duct through the mesh of the uncovered SEMS, and the novel device delivery system easily passed through the mesh into the left hepatic duct (Fig. 5A). We then placed a second uncovered SEMS (8 × 60 mm, BileRush Selective; Piolax) in the target bile duct using the same method we had used to deliver the first (Fig. 5B and C). Last, we placed a 10-mm × 6-cm fully covered SEMS (X-Suit NIR; Olympus) in the distal biliary stricture (Video 1, available online at www.giejournal.org). The jaundice improved 6 days after SEMS placement.

DISCUSSION

Several techniques for delivering devices into the bile duct have been described; however, these methods have operability, reliability, and safety issues.[1-4] We previously reported the effectiveness of a biliary stent delivery system for evaluating the superficial longitudinal extension of perihilar cholangiocarcinoma.[5] This system was originally developed for placing a plastic stent in the biliary duct, and it is composed of a guide catheter and pusher tube. The system allows easy insertion of biopsy forceps through the pusher tube into the target bile duct. However, this system's guide catheter and pusher tube have different outer diameters; thus, it may be unable to pass through a biliary stricture or the duodenal papilla, leading to device delivery failure or post-ERCP pancreatitis. Therefore, we developed a novel device delivery system

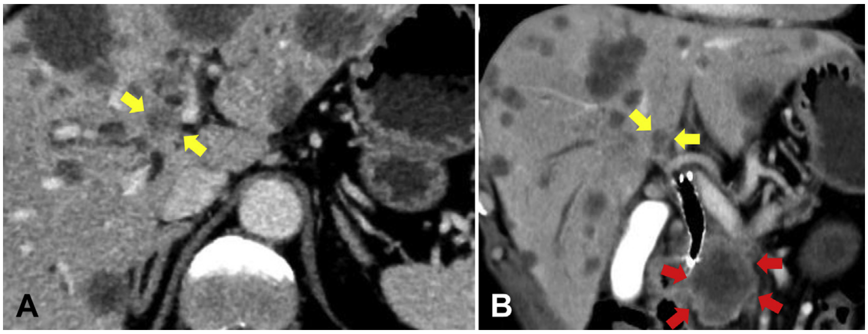

Figure 1. Abdominal CT images show a pancreatic mass (*red arrows*) and dilated intrahepatic bile ducts owing to a metastatic hilar liver tumor (*yellow arrows*).

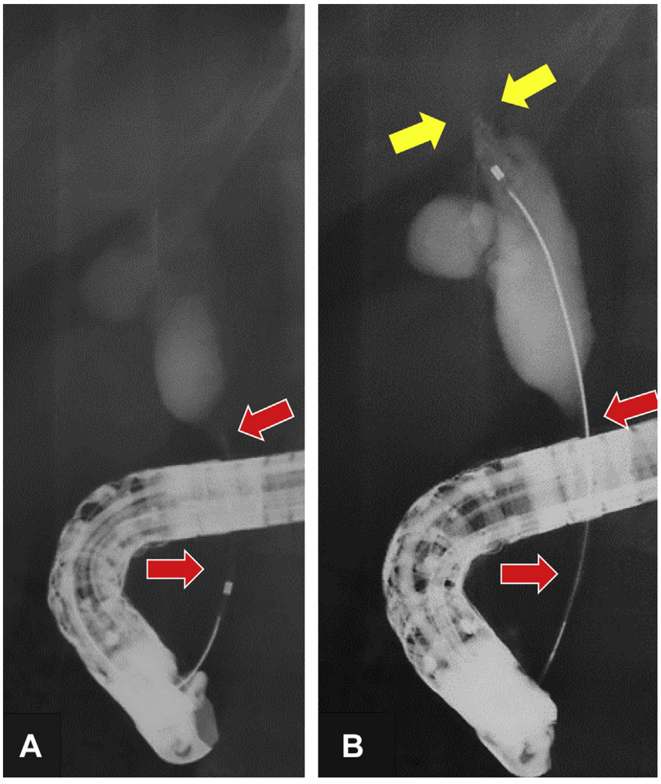

Figure 2. Endoscopic retrograde cholangiography images show biliary strictures at the distal bile duct (*red arrows*) **(A)** and the hilar bile duct (*yellow arrows*) **(B)**.

consisting of both a tapered inner catheter with the tip diameter of 1.13 mm and a 2.44-mm outer sheath (7.2F) with a radiopaque marker at its tip. This system is adapted to guidewires less than 0.035 inch. These components serve as a dilation catheter for strictures and a conduit for inserting various devices up to 1.9 mm in diameter, respectively. The key feature of the novel system is that there is almost no difference in the outer diameter at the transition from the inner catheter to the outer sheath (Fig. 3A), which enables this novel system to pass through severe strictures easily. These features make it posssible to easily and accurately guide various devices of 1.9 mm or less beyond the biliary stricture. This is particularly beneficial in cases of tight/severe biliary stricture. Indeed, in this case, our system allowed us to easily pass both the malignant biliary stricture and the initial SEMS mesh and accurately place the second SEMS at the target site without additional dilation using a balloon catheter (Fig. 5).

This novel device delivery system is a promising tool for accurate and swift delivery of various implements to target bile ducts.

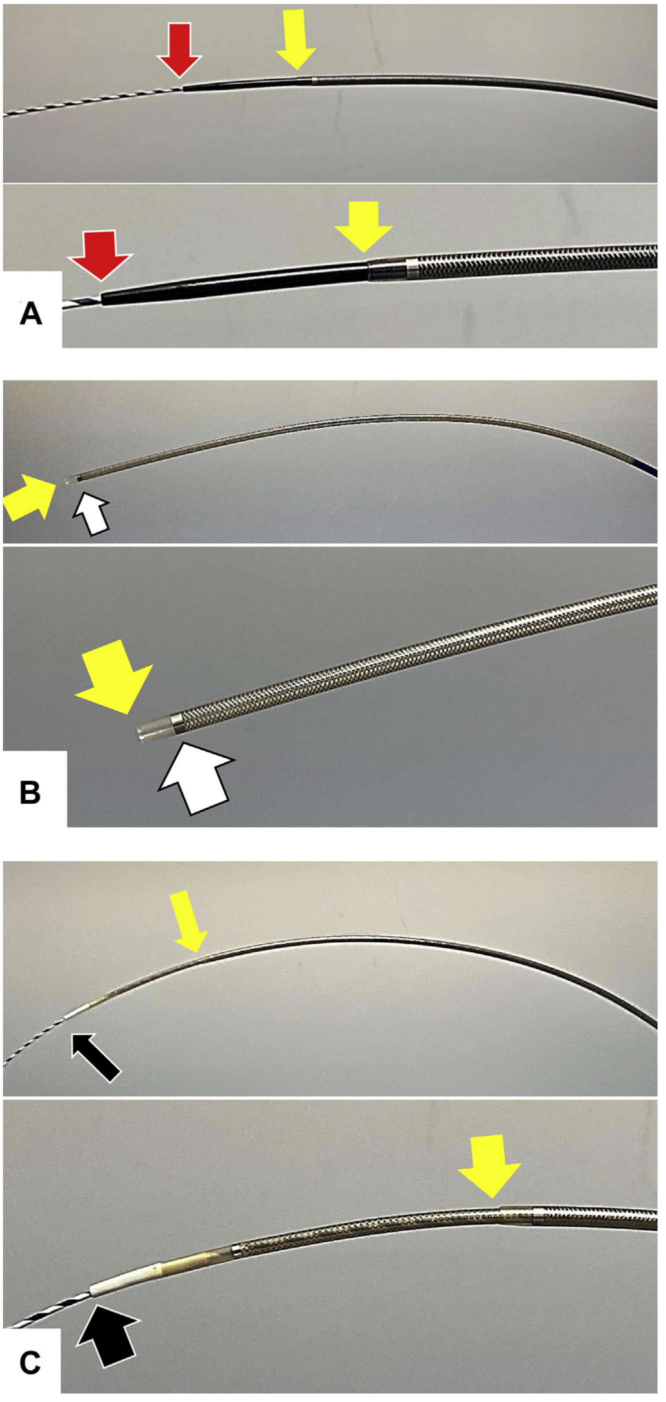

Figure 3. Images of the novel device delivery system (EndoSheather) consisting of a tapered inner catheter and an outer sheath. Near the tip of the outer sheath, there is almost no difference in the outer diameter between the inner catheter and the outer sheath **(A)**, the outer sheath after removing the inner catheter **(B)**, and the uncovered self-expandable metallic stent (SEMS), which passes through the outer sheath over a guidewire **(C)** (*red arrows*, inner catheter; *yellow arrows*, outer sheath; *white arrows*, radiopaque marker; *black arrows*, the tip of an uncovered SEMS delivery catheter).

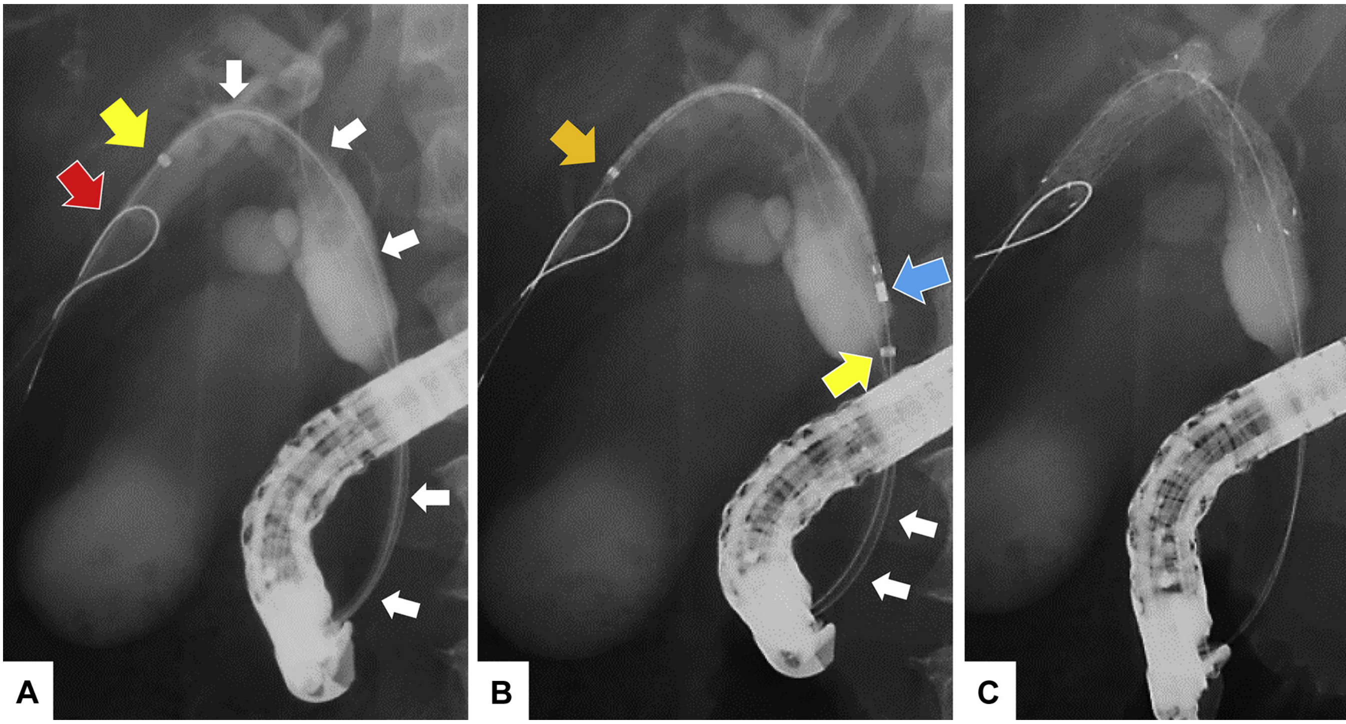

Figure 4. Endoscopic retrograde cholangiography images show the novel device delivery system deploying the initial uncovered self-expandable metallic stent (SEMS). Device insertion over a guidewire **(A)**, the first uncovered SEMS passing through the outer sheath **(B)**, and the initial uncovered SEMS deployment **(C)** (*red arrow*, inner catheter tip; *yellow arrow*, outer sheath tip; *white arrows*, the outer sheath shaft; *orange and blue arrows*, the proximal and distal edges of an uncovered SEMS, respectively).

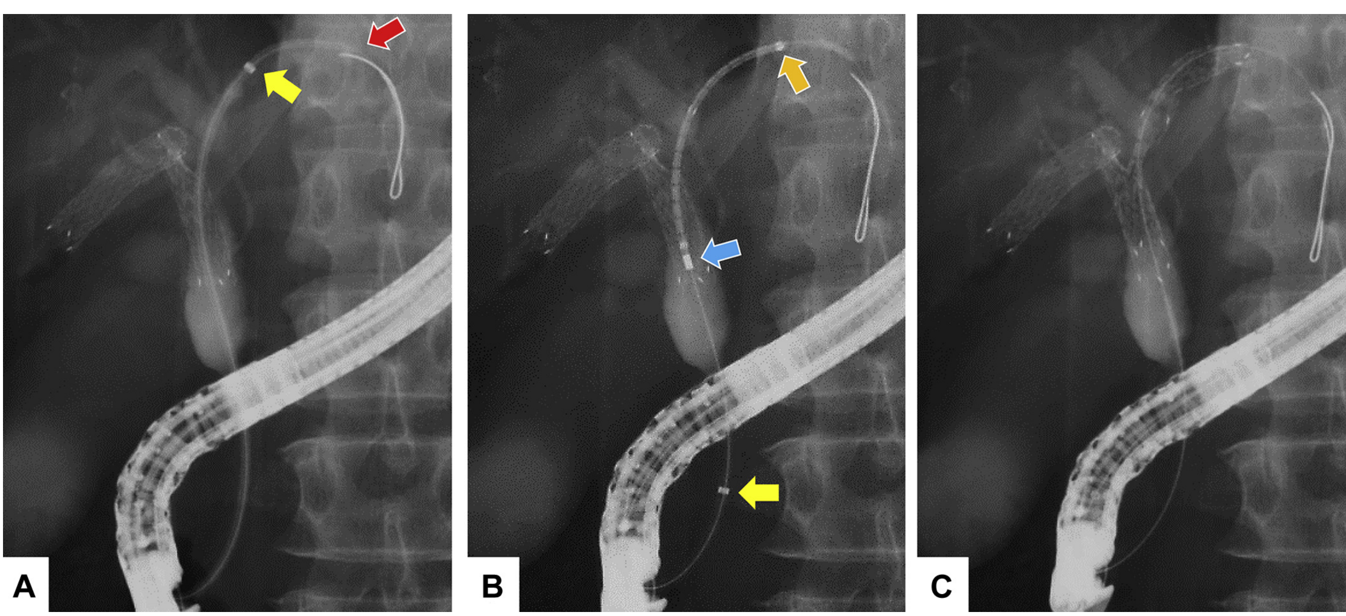

Figure 5. Endoscopic retrograde cholangiography images show the placement of the second uncovered self-expandable metallic stent (SEMS) using the novel device delivery system. Insertion of the novel device delivery system (EndoSheather) over the guidewire through the mesh of the initial uncovered SEMS **(A)**, the second SEMS insertion through the outer sheath **(B)**, and the second SEMS placement **(C)** (*red arrow*, inner catheter tip; *yellow arrow*, outer sheath tip; *orange and blue arrows*, the proximal and the distal ends of the second uncovered SEMS, respectively).

DISCLOSURE

All authors disclosed no financial relationships.

Abbreviation: SEMS, self-expandable metallic stent.

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