Removal of proximally migrated pancreatic stent using needle knife and capture forceps (with video)

Hiroyuki Matsubayashi, Shohei Ooka, Hirokazu Kimura, Toshitatsu Takao, Yuichiro Yamaguchi, Hiroyuki Ono

Division of Endoscopy, Shizuoka Cancer Center, Suntogun, Shizuoka, 411-8777, Japan

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Abbreviations: ERCP, endoscopic retrograde cholangiopancreatography; PS, Pancreatic stent; MPD, main pancreatic duct; PEP, post-ERCP pancreatitis

Introduction

Pancreatic stent (PS) is used as a preventative tool for post-endoscopic retrograde cholangiopancreatography (ERCP) pancreatitis.¹ For this purpose, one-side flap, one-side pig-tailed, or stick-shaped PS is widely used. This type of PS is thought to stay at ampulla while fasting and bowel arrest maintaining smooth pancreatic juice excretion, and then spontaneously migrated toward intestinal lumen after the restart of food intake. However, by a subtle mistake in usage, it may cause critical situation. We currently document a case of proximal migration of the PS and its' rescue technique by needle-knife incision of the pancreatic duct orifice and stent removal using capture forceps.

Case report

A 66-year-old Japanese woman underwent ERCP for evaluation of a duodenal carcinoma around the minor papilla. The main indication was to investigate dilatation of common bile duct and possible cancer invasion of the pancreatobiliary system. ERC and biliary intraductal ultrasonography was performed but no causative finding was detected, there was no stenosis of the bile duct, choledocholithiasis, or abnormal union of pancreatobiliary ducts (pancreatic-type amylase in bile was 1.0 U/L). The main pancreatic duct was not dilated (≤ 3 mm) (**Fig. 1**). After ERP, an attempt was made to place a stick-shaped (one-side pig-tailed) pancreatic stent (Pit stent, 5F, 3 cm, CATHEX, Sagamihara, Japan)(**Fig. 2**) over the guide wire left in the main pancreatic duct (MPD) for the prevention of post-ERCP pancreatitis (PEP). Unfortunately, upon withdrawal of guide wire, the pancreatic stent (PS) began to spin around and migrated into the MPD. After confirming what had happened by X-ray, a more experienced operator took over the procedure to rescue the migrated PS. The initial step of stent retrieval involved a small pancreatic papillotomy using a needle-knife incision (Needle knife, KD-1L-1, Olympus, Tokyo)(**Fig. 3A**). We first tried to insert a guide wire through the stent to aid stent retrieval but it failed. Use of a snare (SD-12U-1, Olympus)

Figure 1. Endoscopic retrograde cholangiography (ERC) demonstrated dilated common bile duct, but no evidence of choledocholithiasis, cancer invasion, or abnormal union of pancreatobiliary duct. In pancreatography, the main pancreatic duct was not dilated.

over the wire and basket (TetraCatchV™, FG-V436P, Olympus), to capture the migrated stent also failed because the accessories could not be advanced beyond the distal end of the stent or they could not be opened due to a lack of space in a normal size MPD. Tripod and balloon were not applied for the same reason. We finally used a pair of capture forceps (FG-42L-1, Olympus, Tokyo) by advancing the opened forceps close to the distal end of the PS and capturing the end of the stent. By grasping firmly, the PS was easily moved out of the ampullary orifice (**Fig. 3B**) and repositioned in a proper position. In the next morning, her serum amylase was within normal (107 U/L) and there was no complications. A day after starting oral feeding, the PS was confirmed to have migrated into the large intestine by abdominal X-ray.

*Correspondence to: Hiroyuki Matsubayashi; Email: h.matsubayashi@scchr.jp
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Figure 2. Stick-shaped pancreatic stent (pit-stent, 5F, 3cm, CATHEX, Japan). The black line was marked for the insertion limit (arrow), but it was actually not drawn in current case.

Figure 3. Tumor was located around the duodenal minor papilla (upward) and the pancreatic stent was not seen at the major papilla (center). Incision of the pancreatic duct orifice was about to be begun with the guide wire as a target (A). Migrated pancreatic stent was successfully removed by the forceps (B).

Discussion

Pancreatic stent (PS) has been used to prevent PEP¹, facilitating biliary cannulation in cases with difficult cannulation using the standard technique, and for therapeutic purpose in cases with pancreatic duct obstruction, accounting for 2.4%²–4.9%³ of total ERCP procedures. It is reported that the frequency of PEP is decreased remarkably by PS placement (1) (0%⁴–5%^{2,3}). Although uncommon, proximal migration of the stent into the MPD has been reported as a complication of PS placement (5–7). Depending on the indication, the shape and size of the PS differ. Different designs are available to prevent stent migration including external pig-tail flange^{3,8}, double external flanges³ and long-axis stent (8–12 cm⁹). However clinicians tend to choose the standard type [thin (3–5F)^{2,4,8,9} and short (2–4 cm)^{4,10} type] PS because of the ease of use. In the current case, we made a mistake in placing a stick-shaped (one-side pigtailed) stent. The most critical error was that a less-experienced operator tried to place this stent without marking the insertion limit as indicated in **Fig. 2**. Probably due to slight delay in stopping the pusher and due to straightening the distal curve of stent by the guide wire, the stent spun around upon stent deployment and migrated into the MPD in a short moment. This complication of inward stent migration could have been avoided by simply marking the insertion limit to provide visual guidance and avoid pushing the stent excessively into the MPD and secondly by keeping the scope tip a little further away from the papilla to observe and confirming loop formation of the distal tip to ensure proper stent position and deployment. In case of stent migration and failed endoscopic retrieval, invasive surgical management has to be performed¹¹, hence preparation and caution during stent placement is needed.

To date, endoscopic retrieval of proximally migrated PS has been done with various tools, such as snare^{5,6}, basket^{5,6}, tripod grasping forceps⁷, balloon^{5,6}, and forceps^{5,6}. In our current experience, removal using the above tools was difficult and two of them actually failed because these devices could not be opened properly due to the normal duct size of the MPD. In such case, the capture

forceps was thought to be the best choice. We did manipulate the guide wire to adjust the location of PS. We advanced the guide wire toward the uncus (anal side), to straighten the MPD and allow the PS to come near the pancreatic head. Targeting and capturing the migrated PS must be done gently using forceps in cooperation with guide wire manipulation, to avoid pushing the PS further into the MPD. With proper capturing of the PS, reposition or removal of the stent was quite easy because of the prior pancreatic papillotomy.

In conclusion, placement of stick-shaped (one-side pig-tail) pancreatic stent needs caution and stent marking helps the operator to recognize the release point. In case of proximal stent migration, a technique combining incision of the pancreatic duct orifice and forceps removal is thought to be effective, especially when the pancreatic duct is not dilated.

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