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Plastic Biliary Stent Migration During Multiple Stents Placement and Successful Endoscopic Removal Using Intra-Stent Balloon Inflation Technique: A Case Report and Literature Review

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Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
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Conflict of interest: None declared

Patient: Male, 77
Final Diagnosis: Biliary neoplasm
Symptoms: —
Medication: —
Clinical Procedure: Biliary stent removal using intra-stent balloon inflation techniqueextraction
Specialty: Gastroenterology and Hepatology

Objective: Diagnostic/therapeutic accidents

Background: Late migration of a plastic biliary stent after endoscopic placement is a well known complication, but there is little information regarding migration of a plastic stent during multiple stents placement.

Case Report: A white man was hospitalized for severe jaundice due to neoplastic hilar stenosis. Surgical eligibility appeared unclear on admission and endoscopy was carried out, but the first stent migrated proximally at the time of second stent insertion. After failed attempts with various devices, the migrated stent was removed successfully through cannulation with a dilation balloon.

Conclusions: The migration of a plastic biliary stent during multiple stents placement is a possible complication. In this context, extraction can be very complicated. In our patient, cannulation of a stent with a dilation balloon was the only effective method.

MeSH Keywords: Biliary Tract Neoplasms • Cholestasis • Device Removal • Stents

Full-text PDF: http://www.amjcaserep.com/abstract/index/idArt/896076

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Background

Multiple plastic biliary stents (PBS) placement is a widely accepted procedure for management of hilar neoplasms or dilation of benign biliary stricture [1–3]. Although this is a complex procedure, it is associated with few immediate adverse events. One of the main complications is proximal migration of the first stent as further stents are pushed in. There have been few reports on this complication, and the approach to resolve migration is inspired by the more numerous experiences in the extraction of stents that migrated late after endoscopic placement [4–9]. However, the predisposing factors for stent migration during placement probably differ from those reported in the post-placement migration and some suggested techniques may not be equally effective if migration occurs during the process of placement.

Case Report

A 77-year-old white male was admitted to our hospital due to painless jaundice (total bilirubin: 27.53 mg/dl, direct bilirubin: 23.68 mg/dl, ALP: 240 UI/l (VN <125 UI/l), gGT: 424 UI/l (VN <56 UI/l). CT and MRI showed stenosis of the hepatic hilum, type 1 of the Bismuth-Corlette classification. Abdominal lymphadenopathy or other localizations in hepatic parenchyma were absent; however, the CT scans also showed a mass of undetermined nature in the chest. In consideration of the unclear indication for surgery, intense jaundice, and pruritus, we decided to place a plastic biliary stent and subsequently investigate the thoracic mass.

An ERCP was performed 2 days after admission. We accessed the bile duct after biliary precut with fistulotomy; the stenosis was passed by a 0.035-inch guidewire and the main intrahepatic right duct was injected without obtaining visualization of the left ducts. Because we were worried about the possible presence of a stenosis type II of Bismuth Corlette classification, we decided to place 2 stents in both intrahepatic major ducts. We first introduced a plastic stent 9-cm long and 10-french diameter (Preload Advantx stent, Boston Scientific, Marlborough, Massachusetts, USA). At the end of placement, this stent was immediately beyond the stenosis but the distal flap was close to the edge of the fistulotomy (Figure 1). Subsequently, we attempted to place a second plastic stent 12-cm long and 7-french diameter (Preload Advantx stent, Boston Scientific, Marlborough, Massachusetts, USA) in the left main duct. The stenosis was severe and while we were pushing, we observed sudden migration of the first stent in the main biliary duct and its disappearance from endoscopic view (Figure 2).

At first we tried to extract the migrated stent, according to Caponi et al. [10], through cannulation with a sphincterotome,

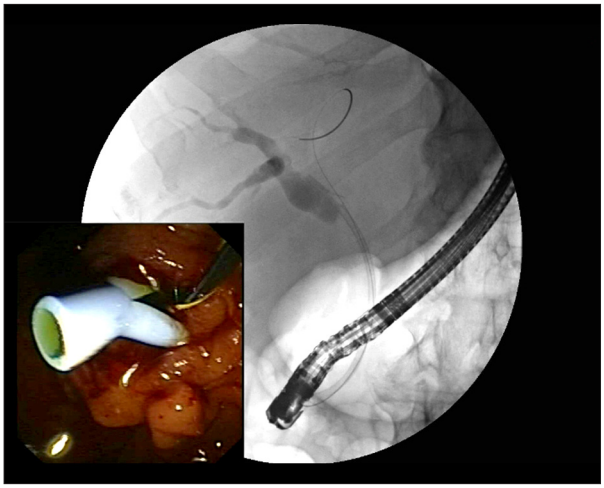

Figure 1. Endoscopic and radiologic views of the first stent before migration.

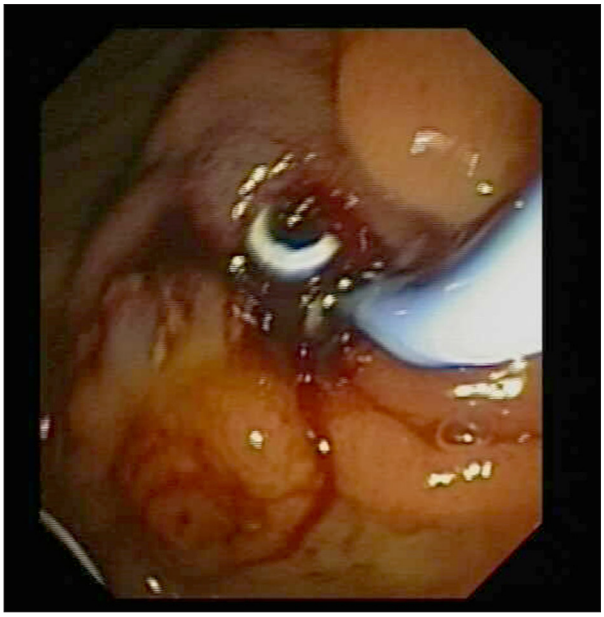

Figure 2. Endoscopic view of stent displacement (freeze-frame from video).

but this maneuver failed due to the tight stenosis (Figure 3A). We then tried to extract the stent with a snare over the same guidewire, but the maneuver was aborted due to the limited space within the choledochus (Figure 3B). At this point the procedure was stopped due to inability to extract the migrated stent (Figure 3C).

After a few days a second ERCP was carried out. A guidewire was passed through the proximally migrated stent, and a dilation balloon with a basal diameter of 5.8 french, an inflated diameter of 6 mm, and a length of 4 cm (Hurricane Rx Biliary Balloon Dilatation Catheter; Boston Scientific, Marlborough, Massachusetts, USA) was coaxially inserted over the guidewire

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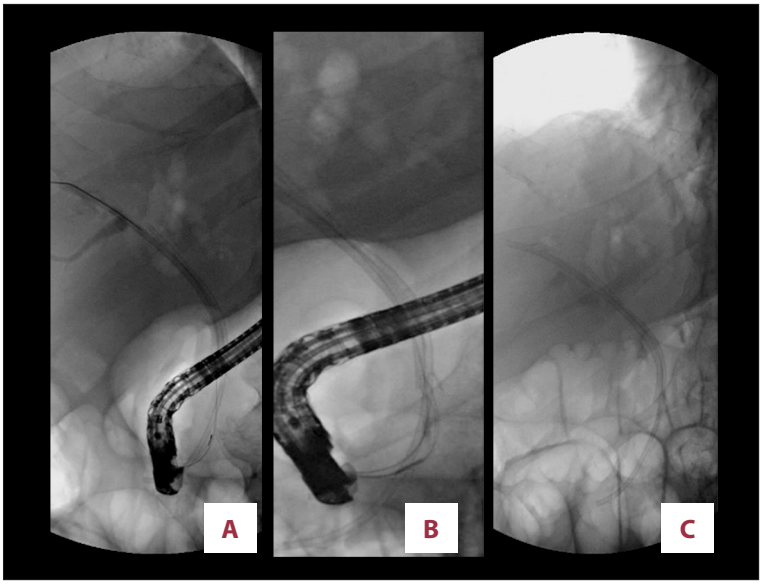

Figure 3. (**A–C**) Radiologic view of failed attempts with sphincterotome and snare and final view of first stent displaced by second stent.

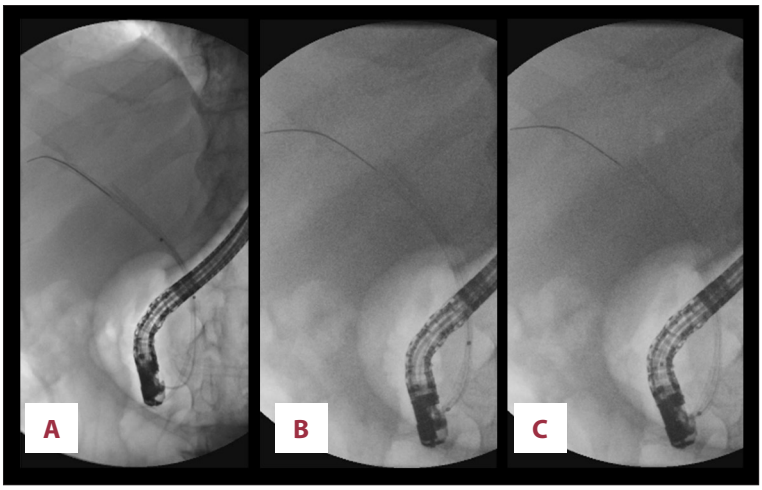

Figure 4. (**A–C**). Radiologic view of extraction procedure (dilation balloon inside stent).

and advanced to the distal portion of the stent, according to a technique inspired by Odemis et al. [11]. The balloon was at first inflated manually with a syringe, but the traction force was too low; subsequently the balloon was inflated up to 11 atm with an inflation system (Alliance II Boston Scientific, Marlborough, Massachusetts, USA) according to standard dilation procedure, and the balloon-stent system was withdrawn through the operative channel while the other stent remained in place (Figure 4A–C). Finally, we passed a plastic prosthesis 12-cm long and 10-french diameter (Preload Advantx stent, Boston Scientific, Marlborough, Massachusetts, USA) by the guidewire formerly used for balloon extraction. The intra-hepatic stents were correctly positioned at the end of the procedure (Figure 5).

Several days later, the thoracic mass was biopsied and the histological results were benign. Surgical resection was performed 2 weeks later and the patient remained in good health after being sent home.

Discussion

Risk factors for migration of a PBS during multiple stents placement are not well known. In our case we hypothesize that the risk of migration was increased due the following: stent placement without dilation, use of a first stent closely corresponding to the distance between papilla and proximal margin of the stenosis, attempts to push the stent (although we used a deployment device) with the possibility of suspending stent placement, and (perhaps) inadequate control of the procedure. Although we considered these possible risks, we know that stent migration during placement of multiple PBS is possible even in expert hands [12] and we found suggestions in the literature to prevent such complications. Hamada et al. [13] introduced a guidewire from the distal end of the first PBS through the distal side hole toward the third portion of the duodenum before inserting the second stent, using an “anchor-wire technique”. Dumonceau et al. [14] recommend initially

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Figure 5. Final radiologic view of stents correctly in place.

placing longer stents, or a dilation balloon inflated alongside stents already in place, to decrease the risk of proximal stent migration during further stenting. Nonetheless, the reports on this type of migration are very few with respect to literature regarding late migration of a PBS.

Late migration complicates 3.5% to 5% of PBS placements [4,5], especially if a single PBS is placed during treatment of benign mild stenosis or in absence of stenosis [1,8]. Our case demonstrates that a tight malignant stenosis increases risk of proximal migration during multiple PBS placement. Late migration is usually managed with snare, basket, Soehendra retrieval catheter, forceps, or balloon dilation. The choice of retrieval technique depends on several factors, including biliary ductal dilation, depth of stent migration, distal stent impaction, and biliary stricture distal to the migrated stent [6–9]. In a study focused on delayed PBS migration published last year by Kawaguchi et al. [5], the grasping technique using a basket or snare was effective for pig-tailed or thin (7-french) straight stents, whereas the guidewire cannulation technique by balloon catheter, cannula, or stent retrieval was effective for thick (>10-french) straight stents. Tarnasky et al. [7], in their historic article, reported that cannulating the stent lumen with a guidewire is often the best approach in patients with a biliary stricture or a non-dilated duct. In patients with a dilated duct, directly grasping the stent with a wire basket, snare, or forceps or indirect balloon traction is usually preferable.

We think that reports focused on delayed PBS migration are also useful in migration during multiple PBS placements. However, some maneuvers suggested in late migration might not be

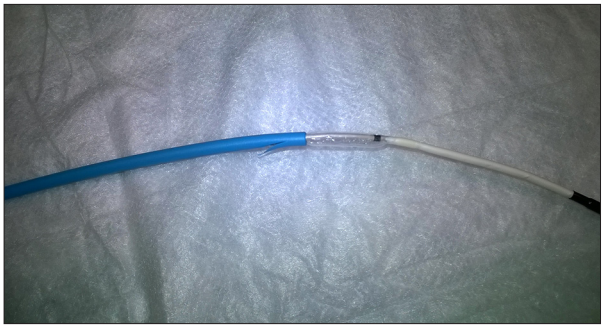

Figure 6. *In vitro* view of dilation balloon inside stent.

forceful enough to extract the migrated stent while leaving the other stents in place, as seen in our case.

In our procedure, the extraction of the migrated stent was finally achieved by performing a procedure inspired by Odemis et al. [11], but they used a stone extraction balloon, while we used a dilation balloon. Granata et al. [14] recently reported use of a dilation balloon to resolve a delayed stent migration with a technique very similar to ours. We think that a dilation balloon, as used by Granata and in our case, is generally preferable because it develops a traction force higher than that achieved with a stone extraction balloon. Dilation balloons are designed for use with high inflation pressure, which was mandatory in our case. We observed *in vitro* that a light inflation pressure anchored the dilation balloon inside the stent (Figure 6), but *in vivo* we needed an 11-atm pressure inside the balloon to withdraw the stent through the stenosis.

Conclusions

Proximal migration of a PBS during multiple stents placement is a rare complication. This situation differs from delayed stent migration because in our case the force that keeps the stent in an improper position is greater due the presence of more stents inside the stenosis.

We think that initially placing longer stents, using a dilation balloon inflated alongside stents already in place, or using anchor-wire technique [14,15] can prevent plastic biliary stent migration.

To the best of our knowledge this is the first case report describing migration during multiple PBS placements and reporting techniques used to resolve it.

In our case cannulation with a balloon dilation and forceful inflation to nominal dilation pressure was the only way to extract the migrated stent and we feel this is the best approach in such a situation.

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Conflicts of interests

None to declare.

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