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CASE REPORT

Late Migration of Two Covered Biliary Stents Through a Spontaneous Bilioenteric Fistula in a Patient with Malignant Biliary Obstruction

Miltiadis E. Krokidis, Adam A. Hatzidakis, Eirini G. Manousaki, Nicholas C. Gourtsoyiannis

Department of Radiology, University Hospital of Heraklion, 71500 Heraklion-Stavrakia, Crete, Greece

Abstract

We report a case of simultaneous late migration of two ePTFE-FEP covered biliary endoprostheses (Viabil, W.L. Gore, Flagstaff, AZ, USA) that were percutaneously implanted for the treatment of malignant obstructive jaundice. The first Viabil covered stent was placed successfully without any evidence of dislocation or other complication during follow-up. Occlusion of the stent occurred 4 months later and was treated with the placement of a second stent of the same type. Thirteen months later the patient became symptomatic. Percutaneous transhepatic cholangiography (PTC) revealed the presence of a choledocho-duodenal fistula and the disappearance of the two endoprostheses previously implanted. A third metallic stent was then percutaneously positioned through the bilioenteric fistula. The computed tomography scan that followed for the detection of the metallic bodies did not reveal the dislocated metallic stents. Stent migration is a well-known complication of uncovered metallic stents, though Viabil stent migration is assumed to be most unlikely to happen due to the stent's anchoring barbs. Furthermore, the stent had already been tightly fixed by tumor over- and ingrowth, as recognized in previous imaging. This is a very unusual case, describing the disappearance of two metallic foreign bodies encapsulated by tumor.

Key words: Covered metallic biliary stent—Malignant biliary obstruction—Stent migration

Percutaneous or endoscopic placement of metallic endoprostheses is a widely accepted palliative treatment for inoperable biliary malignant strictures [1]. Tumor in- and overgrowth and, less frequently, sludge formation or stones may lead to stent occlusion and the necessity for a new intervention [1–4]. More recently, covered metallic stents have been developed in an effort to prevent tumor ingrowth and increase stent patency [5–8]. Nevertheless, complications of covered stents, such as stent migration, cholangitis, cholecystitis, and pancreatitis, have been reported in the literature [9]. The newly developed stents covered with ePTFE/FEP have been shown to be safe, feasible, and effective in biliary drainage and are associated with a low complication rate [10, 11]. The presence of lateral anchoring fins in both stent ends is expected to prevent migration and the transmural drainage holes along the proximal end exist to prevent cholecystitis. We report a case of late migration of two Viabil endoprostheses in a patient who developed a spontaneous bilioenteric fistula.

Correspondence to: A.A. Hatzidakis; *email:* adamhatz@hotmail.com

Case Report

A 72-year-old man with a history of cholecystectomy and recurrent pancreatitis was admitted to our hospital with jaundice. Ultrasound showed dilatation of the biliary tree, the common bile duct (CBD), and the pancreatic duct. Computed tomography (CT) and magnetic resonance cholangio-pancreatography (MRCP) identified an inoperable mass located at the uncinate process of the pancreas.

After unsuccessful endoscopic retrograde cholangio-pancreatography (ERCP), the patient underwent a percutaneous transhepatic cholangiography (PTC) revealing a distal CBD obstruction. Successful percutaneous drainage was subsequently performed with the placement of an 8 Fr Flexima biliary catheter (Boston Scientific, Watertown, MA, USA). Metallic stenting followed 8 days later and a 10 × 60 mm Viabil (W.L. Gore, Flagstaff, AZ, USA) stent with proximal side holes was successfully implanted in the lower CBD.

The patient was readmitted with recurrence of jaundice 4 months later, and the new PTC showed tumor in- and overgrowth causing almost complete obstruction of the previously implanted stent lumen (Fig. 1). A second stent of the same size and type was implanted in the middle part of the CBD (Fig. 2).

During follow-up, there were no clinical signs of jaundice and blood tests were normal. The CT scan performed 9 months after insertion of the second stent documented the presence of the implanted endoprostheses (Fig. 3).

The patient presented again, 13 months after placement of the second stent, with a complaint of fatigue, weakness, and abdominal pain. Clinical examination and blood tests suggested stent occlusion. Ultrasound revealed dilatation of the CBD with probable presence of biliary stones proximal to the occlusion, without a clear evidence of the stents' position. PTC showed a dilated biliary tree due to an obstruction in the middle CBD. Interestingly, it also revealed the presence of a choledocho-duodenal communication that had not existed in the former PTCs and the absence of the two previously implanted stents.

The CBD had shortened, compared with its length in former PTCs (Fig. 4). Part of the tumor was assumed to have detached and formed this choledocho-duodenal fistula, then the neoplastic part migrated through the fistula together with the two previously implanted covered stents that were well anchored in the tissue due to tumor ingrowth. The anatomy of the region had changed, the CBD was 50% shorter, and the only communication available between the biliary tree and the bowel was through the

Fig. 1. PTC showing occlusion of the stent lumen due to tumor ingrowth and overgrowth.

fistula. We decided to position a third stent through this pathologic tract in order to preserve bilioenteric communication. A 10 × 69 mm Wallstent (Boston Scientific, Natick, MA, USA) was implanted through the newly formed tract and, in order to improve the drainage, an 8 Fr Flexima biliary catheter (Boston Scientific, Watertown, MA, USA) was maintained in the biliary tree. The CT scan that followed also failed to identify the migrated stents anywhere along the whole gastrointestinal tract. The blood bilirubin levels were normalized 4 days later and the patient underwent a surgical gastroenteric anastomosis in the following days (Fig. 5).

Discussion

Obstructive jaundice due to inoperable malignant biliary strictures has been treated with percutaneous or endoscopic placement of metallic stents for the last 20 years [1]. Metallic stents appeared very promising compared with the plastic ones used formerly, providing higher patency rates. Nevertheless, problems do exist. Reintervention after placement of metallic stents is often necessary, due to either tumor in- or overgrowth or, less frequently, simply because of the presence of food debris or bile sludge, or the formation of small stones [1–4].

In an effort to increase stent patency, postpone or avoid reintervention, and improve the patient's quality of life, covered metallic stents have been developed with the main aim of preventing tumor ingrowth. A variety of stents and several covering materials have been used for this purpose [5–8].

Another, rather infrequent, problem with plastic stents is their tendency to migrate into the bowel. This complication was essentially eliminated with the use of metallic stents. As shown from histologic studies, the metallic mesh becomes embedded in the bile duct wall several days after stent placement. This mechanism is based on mucosal hyperplasia between the stent

Fig. 2. Implantation of the new stent through the occluded one and satisfactory outflow of the contrast material. The arrows show the radiopaque markers of the new stent.

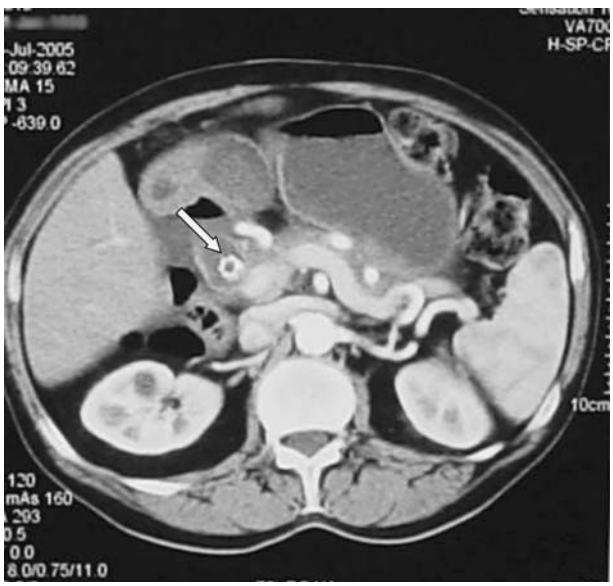

Fig. 3. CT showing the presence of the metallic stent (*arrow*).

Fig. 4. PTC showing the obstruction in the middle CBD and the presence of bilioenteric fistula (*arrow*). No metallic stents are visible.

Fig. 5. Transcatheter Cholangiography showing satisfactory patency of the biliary stent. The surgical gastro-enteric anastomosis is also patent (*arrow*). A temporary Inferior Vena Cava filter was implanted due to deep vein thrombosis.

struts and leads to complete integration of the stent in the normal bile duct epithelium, as well as in the ingrowing neoplastic tissue [12, 13]. Therefore metallic stent placement can be considered permanent.

In a multicenter European study performed by Rossi et al. in 240 patients with malignant biliary stenosis using 388 mesh metallic stents of four different types (Wallstent, Nitinol Strecker, Gianturco-Rosch Z stent, Tantalum Strecker), no case of stent migration was found [4].

Nevertheless, the possibility of migration does exist with the use of covered metallic stents. In a covered metallic stent the endoprosthesis coating may prevent anchoring of the struts to the tumor and the bile duct, since it prevents tumor embedding, and makes the stent more prone to migrate. Nakai et al., in a multicenter Japanese study in 69 patients with malignant biliary obstruction all treated with endoscopic placement of commercially available covered Wallstents, reported a migration rate of 5.8% [14]. Kahaleh et al. in a series of 80 patients with malignant biliary obstruction, also treated with endoscopic placement of 88 commercially available covered Wallstents, reported a migration rate of 6.25%. Twenty percent occurred as early migration (within the first 30 days) and 80% as late migration [15]. This last fact shows the difficulty of covered Wallstents embedding within the surrounding tissue.

In order to decrease the migration rate of covered stents, stent types have been designed with uncovered portions or anchoring mechanisms at each end with the aim of improving stent anchorage [16]. For this purpose, Viabil covered stents were manufactured with proximal and distal anchoring fins in opposite directions, in order to provide better stent fixation [10, 11]. Therefore, the migration rate of Viabil stents is likely to be lower than that of other covered stents. Schoder et al. in a multicenter European study with 42 patients, all with malignant biliary obstruction treated with percutaneous implantation of Viabil stents, reported no early or late migration [11].

In the case that we report, the first Viabil stent was definitely well incorporated in the neoplastic tissue, as shown in the follow-up by the presence of tumor in- and overgrowth. The second Viabil stent was placed proximal to the first one, and therefore its proximal anchoring fins were positioned in an area of non-neoplastic biliary tissue. When the patient presented the third time with obstructive jaundice, PTC revealed both the disappearance of the two previously implanted stents, and also some neoplastic tissue surrounding the stents. Distal migration of the second Viabil stent could be regarded as a possibility because of the unsatisfactory anchoring of the stent fins into the normal biliary epithelium. A complete alteration of the architecture of the CBD was also revealed, presenting as shortening accompanied by the formation of a choledocho-duodenal fistula. A transpapillary pathway for removal of the stent-tumor complex can not be excluded, but this is very unlikely because it should lead not to obstruction of the distal CBD area, but rather to an open communication with the duodenum. Thus, we assume that the bilioduodenal fistula is more likely to be the pathway of migration of the mass.

Bilioenteric fistulas are reported in the literature as incidental findings since their formation may occur without clinical symptoms [17]. Stagnitti et al. found 8.6% asymptomatic choledocho-duodenal fistulas in a study of 81 patients with spontaneous bilioenteric fistulas [18]. Choledocho-duodenal fistulas usually occur as a complication of duodenal ulcerative disease or choledocholithiasis or duodenal adenocarcinoma, or due to the use of medical instrumentation within the CBD [19–23].

Stent migration or simple distal dislocation can cause diverse injuries as reported in the literature. Simpson et al. reported small bowel obstruction after dislocation of a biliary stent [24], while others have reported duodenal perforation after distal biliary stent dislocation [25, 26]. Shah et al. reported hepatic perforation as a complication of proximal biliary stent migration [27]. We did not encounter such problems with our patient.

On the contrary, we found the presence of a bilioenteric fistula strangely accompanied by obstructive jaundice. It seems most

likely that the pathologic tract was not able to decompress the dilated biliary tree, as revealed by PTC.

We can not explain exactly the mechanism of the disappearance of the two covered stents. Probably part of the neoplastic tissue containing both the incorporated covered stents became necrotic, detached from the rest of the tumor, and was extruded through the fistula into the duodenum. The detached part is likely to have traveled along the digestive tract and been expelled without causing any distal injury or obstruction.

It seems that our case is a very rare one, combining several interesting factors, such as the double expulsion of two incorporated covered stents, presumably through a bilio-duodenal fistula, without causing any intestinal injury or obstruction.

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