



Size does matter: when a large plastic biliary stent ends up in the root of the mesentery

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Abstract

Duodenal perforations due to biliary stenting migration, although rare, can occur. We report a unique case of duodenal perforation due to a large in length plastic stent with no (or marginal) migration, which ended up in the root of the mesentery, explaining the normal laboratory values and minimal imaging findings observed. Any clinical symptom during the postprocedural period should raise the suspicion of a major complication and prompt quick management decisions.

Keywords Choledocholithiasis · Plastic stent · Duodenal perforation · Ercp · Mesentery

Introduction

Since Soehendra and Reynders-Frederix, first described almost 40 years ago the transpapillary bile duct drainage [1], biliary stenting has become the *sine qua non* for benign biliary tract disease like choledocholithiasis, where primary stone removal is unsuccessful [2]. In those patients, stent insertion via endoscopic retrograde cholangiopancreatography (ERCP) is associated with stone dissolution, allowing the endoscopist to “buy time” by ensuring drainage so as to proceed with delayed stone removal, as large biliary stones can become smaller, fragmented or, even, disappear [3].

However, biliary stenting is not without complications. Approximately, 5% of plastic stents migrate; this is especially true for benign biliary strictures and for single stents [4]. Migration can be either proximal (4.9%) or distal (5.9%) [5]. Even though mostly asymptomatic, as the majority of migrated stents pass through the intestine without incident,

luminal perforation has been reported (for both plastic and metallic stents), with duodenal perforation being the most common due to retroperitoneal fixation [6].

Case report

An 87-year-old male was admitted to our Department on January 2018 for a programmed 2nd session of ERCP for choledocholithiasis. The patient was hospitalized in our Department a few months ago for cholangitis; however, due to incomplete stone removal, a plastic biliary stent was inserted. The patient had been asymptomatic ever since. His laboratory exams on admission were unremarkable.

His past medical history included cholecystectomy, an abdominal aortic aneurysm, transurethral resection of the prostate, chronic obstructive pulmonary disease, arterial hypertension, atrial fibrillation, chronic kidney disease and pemphigoid.

A second ERCP was performed; the old plastic stent was removed and the common bile duct (CBD) was recannulated. Injection of the X-ray contrast agent revealed dilated intra- and extrahepatic biliary ducts (> 20 mm) along with multiple large filling defects all along the biliary tree (Fig. 1). Balloon and basket-assisted stone extraction along with mechanical lithotripsy resulted in the removal of 4–5 large stones with a diameter of more than 25 mm. However, due to incomplete stone removal, after careful measurement via the guide wire, a 10 Fr in diameter and 15 cm in length

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Fig. 1 ERCP image showing dilation of the intra- and extrahepatic bile ducts and large filling defects due to multiple choledocholithiasis



Fig. 3 The endoscopic image immediately after stent placement. Please note the presence of a large periampullary diverticulum

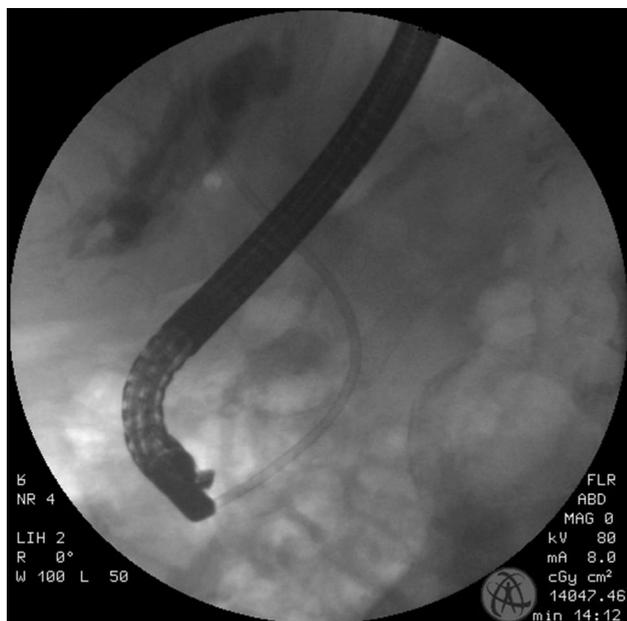


Fig. 2 A large 15 cm 10 Fr in diameter plastic stent has been placed in the left intrahepatic ducts following the end of the ERCP



Fig. 4 An abdominal X-ray of the patient revealing the plastic stent in situ

plastic soft straight radiopaque polyethylene stent (EndoFlex GmbH, Germany) was inserted in the left intrahepatic ducts (Figs. 2, 3); the right intrahepatic ducts could not be guide wire-cannulated, probably due to the presence of multiple intrahepatic stones.

The next day, and before being discharged, after having an uneventful night, the patient started to complain for a

diffuse abdominal pain of growing intensity. His initial laboratory work up was still unremarkable and an abdominal X-ray showed the stent in situ with no other major pathologic signs (Fig. 4). Due to increasing patient discomfort, an abdominal computed tomography (CT) was ordered, which revealed that the distal end of the stent in an extraluminal location, with the proximal end in the left intrahepatic ducts (Fig. 5).

An emergency laparotomy was performed which revealed the plastic stent protruding from the root of the mesentery (Fig. 6). After stent removal, a choledochotomy was



Fig. 5 Coronal section of the CT performed. The arrowheads depict the proximal end of the stent in the left intrahepatic ducts and the distal outside the lumen of the duodenum



Fig. 6 Surgical exploration with the stent protruding from the root of the mesentery

performed with multiple large stones being removed (Fig. 7). After thorough irrigation of the biliary tree with normal saline, the choledochotomy was repaired along with the perforation in the duodenal wall. Finally, two abdominal drains were placed; the first on the site of the choledochotomy and the second on the site of duodenal perforation. The surgeons opted not to insert a T-tube in the CBD due to its large size (> 20 mm) and the fact that a wide sphincterotomy was performed during the 1st ERCP, rendering the sphincter of Oddi virtually obsolete.



Fig. 7 Stones removed from common bile duct surgical exploration

The patient had an uneventful recovery and was discharged a few days later.

Discussion

Duodenal perforations during ERCP, although rare, can be retroperitoneal (usually from sphincterotomy or guide-wire manipulation) or intraperitoneal (typically resulting from endoscopic trauma or stent impaction). Fatima et al. reported that only 0.6% had postprocedural ERCP perforation, with stent placement accounting for 9% of the cases [7].

Researchers have shown that risk factors for plastic stent migration are the stent diameter and length; for benign disease like choledocholithiasis, shorter stents have a tendency for proximal migration as opposed to larger stents [8]. Biliary stent migration can lead to stent impaction in the distal bowel, probably due to fixation of the bowel wall. Complications are multiple (penetration, perforation, intra-abdominal sepsis, obstruction, fistula formation, colonic diverticulum perforation) [9]. This is especially true for patients with intra-abdominal adhesions (due to previous surgeries) that lead to diversion of the linear course of the intestinal tract, bowel diverticula and those with hernia sacs through which the intestine protrudes [10].

Our case report is rather unique for two reasons. First, our stent had no (or marginal) migration, since its proximal end was still in the left intrahepatic ducts. The length of the stent per se (15 cm) was, probably, what led to duodenal perforation, rendering the latter not the result of stent movement but of unsuitable size. However, due to large intrahepatic stones that could not be removed during ERCP, such a large in length stent, seemed the only endoscopic option. Perhaps, the use of another type of stent (double pigtail-type) might prevent perforation in cases of long stent placements.

Second, the retrieval of the distal end of the stent in the root of the mesentery is extremely rare; this explained that the clinical deterioration of the patient was not in parallel

with laboratory (no cholestasis) and imaging findings (no fluid collection or choleperitoneum in CT). Furthermore, the patient had not known major previous surgery or hernias that could be considered risk factors for stent perforation.

Any clinical symptom during the postprocedural ERCP period should raise the suspicion of a major complication (like duodenal perforation) and prompt quick management decisions. An early imaging study (CT scan) is of the utmost importance and should be performed for unexplained pain even if abdominal X-ray is unremarkable.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Human/animal rights All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008(5).

Informed consent Informed consent was obtained from the patients included in the study.

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