CASE REPORT

Early migration of biliary stent leading to free intra-peritoneal duodenal perforation — A case report

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Abstract

Intestinal perforation from a plastic biliary stent is a known but rare complication of endoscopic biliary stent placement. Intra-peritoneal perforation is less common but carries more morbidity and mortality. Only a few cases of early stent migration and perforation have been reported. We present the case of a duodenal perforation caused by early migration of plastic biliary stent that resulted in intra-peritoneal biliary peritonitis.

Keywords: Biliary stent, Bowel perforation, Early migration.

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Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) plays an important role in the management of patients with biliary and pancreatic conditions.[1] Although the introduction of less invasive techniques such as MRCP or EUS have reduced the role of ERCP as a diagnostic tool, it, however, still plays a role in therapeutic interventions.[2]

In experienced trained hands ERCP is safe and effective but there remains a risk of complications related to it.[3] Complications associated with ERCP include pancreatitis, haemorrhage, infection, and perforation.[4] Although duodenal perforation is rare, it holds significant morbidity for the patient. Despite early intervention in such cases it still has a high mortality rate.[5] Since their introduction in late 1970s, biliary stents have been used extensively for palliation of obstructive symptoms in patients suffering from unresectable hepatobiliary tract tumours as well as to provide temporary relief in obstructed biliary ducts due to stricture or stone in CBD.[6]

Plastic stents are cheaper as compared to metallic stents, however, they have a higher risk of migration. Stent dislocation has been noted to occur in between 5% to 14% of cases although in most cases the stent passed out from the body in the stool without much harm. Perforation has been reported only in 1% cases of migration of stent. The most common site of perforation is the duodenum. This type of perforation is usually delayed and occurs days to weeks after the procedure. Early perforation within 24 hours after stent insertion has rarely been reported.[7]

This report describes an unusual case of duodenal perforation caused by early migration of a plastic biliary stent which had been placed via ERCP to relieve obstruction of the common bile duct.

Case Report

A previously healthy 69-year-old female, presented to the Services Hospital, Lahore, in December, 2020, with complaints of yellow discoloration of the sclera and body along with generalised itching over her body which began five weeks earlier. She had a history of fullness in the right hypochondrium and pain for the past two weeks. On further inquiry she also reported a change in her stool colour which had become clay coloured. On workup, her liver function tests were deranged showing a total bilirubin level of 199 μmol/L (normal 5-21), direct bilirubin 189 μmol/L (normal <5), alkaline phosphatase 755 U/L (35-104), γ-glutamyltranspeptidase 1842 U/L (5-36), alanine aminotransaminase 410 U/L (0-33), and aspartate aminotransferase 311.1 U/L (0-32).

On ultrasound she was noted to have tapering of the common bile duct at the level of the head of pancreas resulting in the proximal dilated biliary channels. As possibility of slipped stone in CBD was considered, she underwent an MRCP which showed abrupt tapering of the distal end of the CBD with no stone in the CBD. Considering her age and history, neoplasm was now highly suspected and, therefore, a CT scan was performed which revealed a stricture at the level of the head of pancreas (Figure-1).

The patient underwent ERCP and stenting to relieve her symptoms. Her ERCP was done on January 06, 2021, that showed swollen, oedematous angry growth like mass at ampulla that was friable and bled to touch (Figure-2). Selective CBD cannulation was achieved, and dye was injected that showed irregular stricture extending from proximal CBD till the end of the CBD. It was dilated with Sohindra billiary dilator after which a plastic stent of

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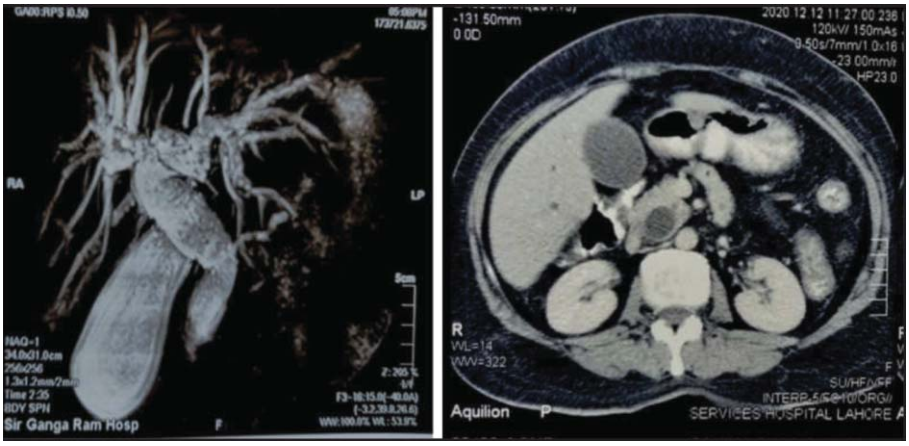

Figure-1: Pre-operative investigations showing Dilated CBD due to Obstruction on MRCP and Dilated CBD with Distended Gall Bladder on CT SCAN.

10Fr×10cm was passed successfully. Pancreatic duct was also dilated and free flow of bile was seen. Multiple biopsies were taken as well.

Although her obstructive symptoms were relieved, the next day the patient started complaining of pain in the right hypochondrium and epigastrim. The intensity of pain increased despite medication and investigations were done which showed increased levels of serum amylase (669IU/L) and lipase 249IU/L while her chest X-ray was also performed as she had guarding in the epigastric region which showed free air under the right diaphragm (Figure-3). Diagnosis of duodenal perforation was made and emergency exploratory laparotomy was done. On exploration, a duodenal perforation on the anti-mesenteric side of the third part of the duodenum was revealed. The stent was seen coming out of that perforation (Figure-4) with localised bile collection and haematoma of about 5×3cm. Modified Graham's patch repair was done for duodenal perforation after removing the plastic stent, and cholecystostomy was done to provide drainage of bile. Gross calcium deposition was also noted on pancreatic surface.

The patient remained admitted in the HDU for the next 24 hours. She remained vitally stable and had no complaint of fever or pain. She was mobilised on the second post-operative day and shifted to the ward for further observation. Inflammatory markers were resolved. The patient was allowed food orally and the drain was removed on the fourth day. She was discharged on the fourth day. Biopsies taken on ERCP showed only inflammatory changes with no evidence of malignancy. After a detailed discussion with the patient and her family, she refused to have any further major surgical intervention or a repeat ERCP. Three months after this episode she underwent a cholecystojejunostomy to provide bypass to her obstructive symptoms and removal of the cholecystostomy. Post-operative the patient remains symptom free over a follow-up of six months since her second surgery.

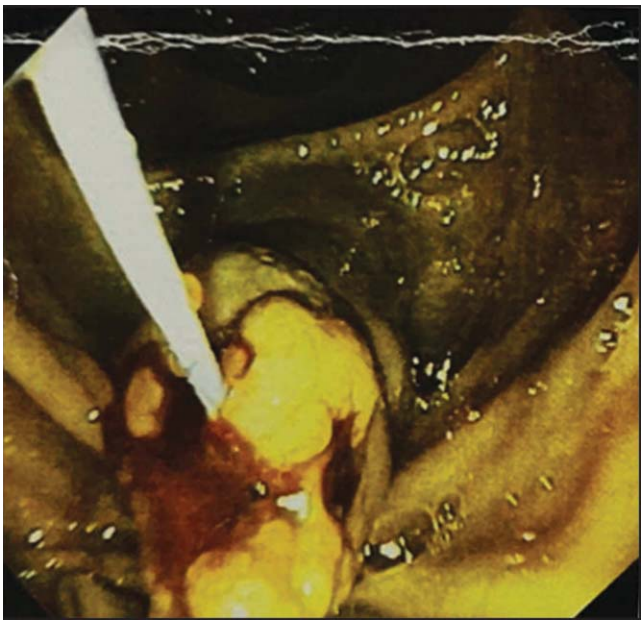

Figure-2: ERCP pictures showing mass at ampulla and Stent in Situ.

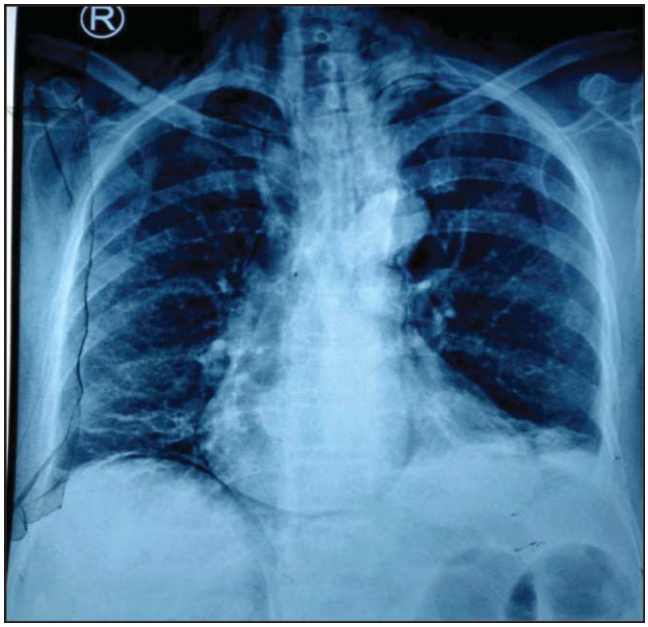

Figure-3: Air under diaphragm on the right side.

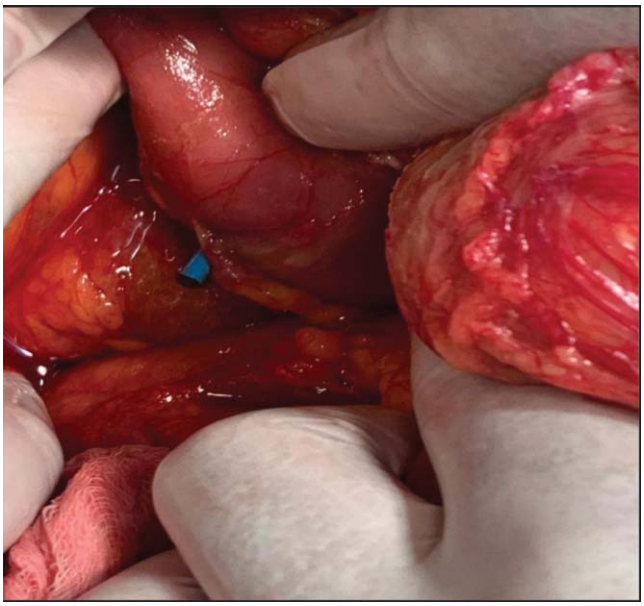

Figure-4: Stent coming out of the duodenal perforation.

Discussion

Despite plastic stent migration being reported in up to 14% of all the cases who have stent placement, it rarely causes symptoms. Majority of the displaced stents are passed out of the body uneventfully. However, in 1% of displaced cases there may be perforation of the bowel, especially the duodenum as it is thin walled and fixed to the posterior abdominal wall.[8] Majority of the reported perforations are retro-peritoneal. Retro-peritoneal perforation may produce ill-defined symptoms or may be asymptomatic especially when the defect is small but they may also result in bilioma or abscess which may present with features of sepsis. Intra-peritoneal perforation is, however, much more dangerous and caries a worse outcome. Only a few cases of stent related intra-peritoneal perforations have been described.[9]

Most of the cases of perforation due to stent migration are reported to occur within days to weeks after the placement. Early migration and perforation is extremely rare.[10] In our patient symptoms of perforation and peritonitis appeared within 48 hours after placement of the stent. After an extensive literature search we were able to find two similar reported cases.[10,11] Our patient underwent biliary stenting via ERCP for her obstructive jaundice. Within 24 hours she had developed symptoms of acute abdomen as a result of duodenal perforation. She underwent an emergency laparotomy during which she was noted to have a small perforation in the third part of the duodenum along the anti-mesentric border. Bile was seen coming out of the stent. There was localised bile collection as well. The biliary stent was carefully removed through the perforation itself. Modified Graham's patch repair was done for duodenal perforation after removing the plastic stent and cholecystostomy was done to provide drainage of the bile.

Table-1: Stapfer's division of perforation caused by ERCP along with proposed type V by Wu.

Type 1	Duodenal wall perforation, endoscope related
Type 2	Periampullary perforations, sphincterotomy related
Type 3	Ductal or duodenal perforations due to endoscopic instruments
Type 4	Guidewire-related perforation with presence of retroperitoneal air at X-ray
Type 5 (proposed by Wu)	Duodenal perforation caused by biliary stenting due to improper placement of stent with excessive rebound force on opening

Stapfer[12] in 2000 divided the perforation caused by ERCP into four types (Table-1), while a fifth type has been proposed by Wu in 2020. Type V was defined by Wu as a type of duodenal perforation caused by the improper placement of the stent which results in an excessive rebound force upon opening, thus causing early perforation.

Decision to manage the perforation depends on the condition of the patient, co-morbidities, site and size of perforation, and availability of facilities. Our patient had symptoms of peritonitis and free gas under the diaphragm, therefore an urgent laparotomy was carried out to avoid unnecessary delay and morbidity.

Conclusion

Duodenal perforation due to stent migration should be considered as one of the differentials in patients who present with abdominal pain after ERCP and stenting. A high index of suspicion should be maintained. It should be remembered that stent may migrate as early as within 24 hours after ERCP.

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Conflict of Interest: The person who signed the ethical review statement is also a co-author of the manuscript.

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Ethical Approval: This case report is not a research study, so this approval is not applicable. Consent was taken from the patient for reporting of her case.

Consent: Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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