

Plastic stent migration in ERCP; a tertiary care experience

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Abstract

Objective: To evaluate the entire spectrum of endoscopic retrograde cholangiopancreatography procedure including site of stent migration, techniques of stent retrieval, success and complications.

Methods: The retrospective study was conducted at Dr Ruth Pfau Civil Hospital Karachi, and comprised data from January 2010 to January 2017 of patients who underwent endoscopic retrograde cholangiopancreatography for the retrieval of stent migrated in the common bile duct, pancreatic duct or pancreatic pseudocyst or were found to have migrated stent during either stent removal or exchange and where attempts were made to remove the stent. A team of expert endoscopists had performed all the procedures. SPSS 17 was used for statistical analysis.

Results: There were 5700 procedures performed on 4800 patients. Pancreato-biliary stenting was done in 1229(21.56%) patients; 745(60.61%) with benign conditions and 484(39.38%) with malignant. Stent migration was found in 51(4.14%) patients; 30(58.8%) males and 21(41.2%) females. In terms of clinical presentation, right upper quadrant pain was the most common 9(17.6%). Technical success was achieved in all (100%) cases, with first-procedure success in 45(88.2%). There was no complication or procedure-related mortality.

Conclusion: In patients with stent migration, endoscopic retrograde cholangiopancreatography was found to be a safe and effective modality for stent retrieval.

Keywords: Endoscopic retrograde cholangiopancreatography, Stent migration, Migrated biliary stents, Migrated pancreatic stents. (JPMA 69: 1099; 2019)

Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) is a standard procedure for a variety of pancreato-biliary disorders. Since the advent of ERCP, its main role has been diverted from an investigative to a therapeutic procedure. Endoprosthesis in ERCP started in 1979, and since then it has played an important role in the management of various obstructive pancreato-biliary diseases.¹ Plastic pancreato-biliary stents are usually made of polyethylene and their diameter range is 3-12F.² Biliary indications that may need stents include malignant or benign biliary strictures, biliary leaks and fistula, irretrievable bile duct stones, cholangitis and anastomotic strictures after liver transplantation. Pancreatic stent insertion indications are pancreatic strictures, pancreatic leaks/fistulae, pancreas divisum and for the prevention of post-ERCP pancreatitis. Pancreatic stenting has reduced the incidence of post-ERCP pancreatitis by 20%, especially in patients with difficult biliary cannulation.³ Stent migration is a rare complication of biliary or pancreatic stenting and is seen in 5-10% of cases.^{1,4} Reasons of stent migration are not very clear.⁵ Stent migration causes a decreased drainage leading to stasis, infection or perforation of these ducts, as it is an intracorporeal foreign body. Stent retrieval and re-

stenting is required in these cases.⁶ The current study was planned to evaluate the frequency, clinical indications, site of migration, techniques of stent retrieval, technical success and complications of the procedure.

Materials and Methods

The retrospective study was conducted at the Endoscopy Suite of Surgical Unit 4 at Dr Ruth Pfau Civil Hospital Karachi, and comprised data from January 2010 to January 2017 of patients who underwent ERCP for the retrieval of stent migrated in the common bile duct (CBD), pancreatic duct or pancreatic pseudocyst or were found to have migrated stent during either stent removal or exchange and where attempts were made to remove the stent. Data was retrieved from the Endoscopy database after approval was obtained from the institutional review board.

Data of patients was further evaluated for age, gender, indications for ERCP and stenting, stricture site, stent type, diameter and length, direction of migrated stent (proximal or distal in CBD), sign and symptoms, complications, method of stent removal as well as its complications and overall success of the procedure. All procedures had been performed by trained endoscopists after written informed consent from all the patients. Procedures had been performed under conscious sedation by a combination of nalbuphine and midazolam. Antibiotic prophylaxis with third-generation

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cephalosporin was the standard protocol for the procedure. ERCP had been performed using adult therapeutic duodenoscope (TJF 180: Olympus). Urografin had been used to opacify the bile and the pancreatic duct. For the current study, successful stent retrieval was defined as complete removal of stent or where the distal tip of the stent was left in the duodenum.⁷ Proximal CBD migration was defined as when the lower end of the migrated stent was present above the cystic duct in the CBD. Distal CBD migration was defined as when the lower end of the migrated stent was present below the cystic duct in the CBD.

Balloon, forceps (Olympus FG-49L), snare, Dormia basket and Soehendra stent retriever had been the main methods of stent retrieval in both dilated and non-dilated CBD, and had been used at the discretion of the endoscopist concerned. A forcep (FG-49L-1; Olympus, America Inc.) had been inserted into the CBD to grasp the lower end of stent, pulling it out of the CBD.⁸ The basket or snare technique was used in patients with dilated CBD. The opened Dormia basket or snare had been used to grasp the lower end of the stent and its subsequent removal.⁸ In balloon retrieval method, the balloon had been inserted into the CBD to lie on the side of the stent. The balloon was then initiated and the catheter withdrawn slowly to pull the stent by traction.⁸ In Soehendra retrieval technique, the lower end of the stent had been cannulated with a guide wire. The retriever was then introduced over the guidewire and screwed into the distal end of the stent facilitating the removal of the stent.⁸ In case of unsuccessful stent retrieval, another stent had been placed for biliary drainage and were followed up with a repeat procedure after 8 weeks, or earlier if there was a recurrence of symptoms. Technical success of the procedure was defined as retrieval of the migrated stent with distal end outside for subsequent removal or replacement.⁸ ERCP was defined as directly affecting the patient management if the migrated stent was removed, symptoms of patients were relieved and potential surgery was avoided. Difficulty was defined as a procedure prolonged for more than 20 minutes or when multiple techniques were required to take the stent out.

Data was analysed using SPSS 17. Descriptive statistics, including mean, median, standard deviation (SD), range and frequencies, were calculated.

Results

There were 5700 procedures performed on 4800 patients. Pancreato-biliary stenting was performed in 1229(21.56%) patients. Of them, 745(60.61%) had benign conditions and 484(39.38%) malignant. Stent migration

Table-1: Demographics.

	Frequency n(%)
ERCPs	5700
Patients	4800
Stenting	1229 (21.56%)
Stent migration	51 (4.14%)
Site of migration	
CBD	39 (76.4%)
Pancreas	9 (17.6%)
Pancreatic pseudocyst	3 (5.8%)

ERCP: Endoscopic retrograde cholangiopancreatography

CBD: Common bile duct.

was found in 51(4.14%) patients (Table-1). Among these 51 patients, 30(58.8%) were males and 21(41.2%) were females, with an overall mean age of 48.88 ± 3.22 years (range: 15-80 years; median: 52 years [interquartile range (IQR) 40-60 years]). Clinical presentation included right upper quadrant pain in 9(17.6%), fever 6(11.7%), clinical jaundice 6(11.7%), nausea 6(11.7%), epigastric pain 5(9.8%), vomiting 2(3.9%), raised alkaline phosphatase 6(11.7%), raised bilirubin 3(5.8%), moderately increased white cell count 6(11.7%) and alanine aminotransferase (ALT) 2(3.9%). The indications for ERCP were also noted (Table-2).

Site of stent migration was CBD in 39(76.4%) patients, pancreas 9 (17.6%) and pancreatic pseudocyst 3(5.8%). All the patients had endoscopic sphincterotomy with a single straight stent in situ and none of the patients had more than one migrated stents. CBD was dilated in 30(58.8%) patients with a median diameter of 1.60cm [interquartile range (IQR) 1-3 cm]. Pancreatic duct (PD) was dilated in 9(17.6%) patients with a median diameter of 0.90 cm [interquartile range (IQR) 0.75-1.1 cm]. Site of CBD stent migration was proximal in 18(35.3%) and distal in 21(41.2%) patients. PD stent migration was seen in 6(11.7%) patients in the major duct and 3(5.8%) in the minor duct. besides, 3(5.8%) patients had stent displacement in the pancreatic pseudocyst; 2(3.9%) were

Table-2: The indications for ERCP.

Indication	Frequency n(%)
Cholelithiasis	27 (52.9%)
Benign CBD stricture	9 (17.6%)
Chronic pancreatitis	6 (11.8%)
Pancreatic pseudocyst	3 (5.9%)
Bile leak	3 (5.9%)
Pancreas divisum	3 (5.9%)

ERCP: Endoscopic retrograde cholangiopancreatography

CBD: Common bile duct.

pigtail and 1(1.9%) straight. Straight stent was used in 49(96.1%) and pigtail in 2(3.9%) patients. The median size of stents was 10Fr [interquartile range (IQR) 10Fr-10Fr] and median length was 10cm [interquartile range (IQR) 8cm-10cm]. Endoscopic methods used for retrieving migrated pancreato-biliary stents were indirect balloon traction in 8(15.6%) and indirect basket traction in 4(7.8%) patients. Direct technique was used with basket in 6(11.7%), forceps in 12(23.5%), and snare in 9(17.6%) cases. Stent cannulation technique was applied in 9(17.6%) patients, 3(5.8%) with the help of balloon extraction and 6(11.7%) with Soehendra stent retriever. Paediatric endoscope was used in 2(5.8%) and indirect basket technique in 1(1.9%) patient for pancreatic pseudocyst stent migration and were removed in the first attempt. Technical success was achieved in all (100%) cases, with first-procedure success in 45(88.2%) patients. Difficulty was encountered in 18(35.3%) patients and all of them had their stents migrated proximally in CBD. A second stent was placed in all the cases where it was not possible to retrieve the migrated stent. Follow-up procedure was done in 6(11.8%) patients and all the migrated and substituted stents were removed successfully. There was no complication or procedure-related mortality in the sample.

Discussion

Pancreato-biliary stent migration is a rare complication of ERCP. Experience with the techniques for stent retrieval in the local population is scarce. Studies have reported stent migration rate to be 5-10%.^{1,4,9} Proximal stent migration of PD stents has been reported to occur in 5% and the majority of these stents can be retrieved endoscopically, but sometimes the procedure can be very challenging.^{10,11} In our study the stent migration rate was 4.14% which is comparable to previously reported rate of 3.1-4.9%.^{12,13} Arhan et al.¹ cited out several contributing factors for the stent migration in CBD. These include malignant strictures, shorter and larger stents and distal strictures. All the patients with migrated stents in our study had benign biliary disease, which is very unusual, and we did not have any case of stent migration in malignant strictures. Various publications have indicated that proximal displacement may occur in 9% of the patients with malignant stricture.⁸ Presumably many with a malignant disease in this study may have died or were too unwell to have a repeat ERCP and, hence, did not have a diagnosis of stent migration. This needs to be further clarified with more local studies taking into account the re-admission rates and the re-endoscopy rates in patients undergoing stenting for malignant strictures.

Common clinical presentations of stent displacement are

either recurrent biliary obstruction or infection. Patients maybe asymptomatic and stent migration is found incidentally during routine stent exchange.¹⁴ Most of our patients were clinically asymptomatic; only six patients had cholangitis. Retrieval of migrated stent in CBD is generally easy in most cases, but can become challenging and difficult. In this study we had a higher success rate as all the migrated stents in our study were retrieved successfully (100%), coinciding with the previous studies with varying results by Chaurasia et al.¹⁵ (90%) and Arhan et al.¹ (100%).

Different technical approaches can be used to retrieve migrated stents. Factors influencing the technique are the site of distal end of the stent and the presence or absence of previous sphincterotomy. If the distal end of the stent is near the papilla, it can be extracted with the help of an extraction balloon. Guidewire is passed along side the stent or high up with the balloon taken up. At the level of the stent, balloon is inflated and pulled down; stent usually comes along with it in the duodenum.⁴ We successfully retrieved eight cases through this technique. Basket can be used by using the same technique and gently juggling the basket alongside the upper end of the stent until it catches within the wires of the basket and is then gently pulled down under fluoroscopic guidance. Cannulation technique is very effective but sometimes becomes difficult when the distal stent tip is either impacted against the bile duct wall or oriented proximally or the stent is blocked, as with a kinked stent. Attempts can be made to dislodge the stent distally by balloon traction, or other techniques can be applied.⁴ We successfully retrieved all the migrated stents by using balloon, basket or Soehendra, either using single technique or combined, according to the location of the stent, aetiology and discretion of the endoscopist.

PD stent migration is a serious complication after stent placement. Every effort should be made to retrieve the stent as it may cause damage to PD and pancreatitis. Proximal (upstream) migration of pancreatic stents (PMPS) occur with a reported incidence of 5.2%.^{16,17} Retrieval of PMPS has previously been reported by some studies with a success rate of more than 75%¹⁰ and 100%.¹⁸ In difficult cases the wire-guided Soehendra stent retriever and SpyGlass-assisted stent retrieval techniques have been described in literature.⁹ Sometimes it is very difficult to retrieve the PMPS, mainly due to the ductal anatomy or technical challenges, and can end up requiring surgery. We retrieved all the migrated stents successfully from the major as well as minor PDs by applying varying techniques.

It has been reported that stent migration into pancreatic pseudocysts after endoscopic cystogastrostomy ranged 2.2-18.2%.¹⁹ The reason for this displacement is not well-described in literature and there is no special device specifically designed for endoscopic cyst drainage.²⁰ Two types of stents are in use for the drainage of pancreatic pseudocysts; one is straight and the other is double pigtail. Double pigtail stents are better due to a lesser chance of displacement and decreased incidence of post-placement bleeding. Both straight plastic and pigtail stents were used in patients who were part of the sample in the current study. We successfully retrieved stents in all three patients with the help of a paediatric endoscope pushed in the pseudocyst in two, and with basket retrieval in one.

Conclusion

Stent migration is an uncommon situation encountered by endoscopists. Every effort should be made to retrieve migrated stent safely endoscopically by employing various techniques, thus avoiding potential complications and obviating the need of a radiological procedure or surgery.

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