

Perforation of the sigmoid colon secondary to biliary stent migration. Case report

Perforación del colon sigmoides secundaria a migración de endoprótesis biliar. Reporte de un caso

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Palabras clave:

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ABSTRACT

The endoprosthesis is a well-accepted therapeutic modality for numerous bile duct diseases. Distal migration is a rare complication that can lead to severe complications. The first perforation of the left colon secondary to a plastic biliary stent was reported in 1996, and since then, forty more cases have been reported. We present the case of a patient who developed an acute abdomen thirteen months after stent placement. The stent was located through a diverticulum in the sigmoid colon during surgery. Primary closure was performed, with a satisfactory clinical outcome, convenient evolution, and discharge due to improvement and an appropriate external follow-up.

RESUMEN

La endoprótesis es una modalidad terapéutica bien aceptada para numerosas enfermedades de la vía biliar. La migración distal es una complicación rara que puede llevar a complicaciones graves. En 1996 se reportó la primera perforación del colon izquierdo secundario a una prótesis biliar plástica, desde entonces se han reportado 40 casos más. Presentamos el caso de una paciente que desarrolló un abdomen agudo 13 meses después de la colocación de una endoprótesis. Durante la cirugía se localizó la prótesis a través de un divertículo en el colon sigmoideo. Se realizó un cierre primario, con un desenlace clínico adecuado, conveniente evolución y egreso por mejoría, así como un seguimiento externo apropiado.

INTRODUCTION

The use of stents for managing bile duct pathology was described in 1980. Since then, their use has become an accepted therapy for benign and malignant biliary tract diseases.¹ One of the complications described concerning the placement of stents, especially plastic ones, is migration, which can be either proximal or distal and occurs in 3 to 8% of patients.^{2,3} Although distal migration in the gastrointestinal tract is followed by spontaneous expulsion of the stent and stool in most cases, it can lead to severe complications such as perforation, abscesses, sepsis, and the development of fistulas.⁴

The first report of a biliary stent that migrated to the left colon and caused a perforation appeared in 1996. The first review about migrated stents with perforation to the left colon was published in 2007, describing one case and reporting 11 more.⁵ By 2014, there were only 25 reported cases in the English literature of biliary stents migrating to the colon.⁶ In most cases, the perforation occurred most often in a diverticulum of the sigmoid colon.

This paper reports a patient with an Amsterdam-type plastic biliary stent that accidentally migrated into the sigmoid colon, causing a free perforation managed with surgery without colostomy.

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CASE PRESENTATION

A 72-year-old woman was admitted to our hospital with a diagnosis of Mirizzi syndrome. Endoscopic retrograde cholangiopancreatography (ERCP) and placement of a 10 Fr 10 cm long Amsterdam-type biliary stent were performed in another hospital. Laparoscopic cholecystectomy was attempted on a scheduled basis, but due to the severe inflammatory process, it was decided to convert to open cholecystectomy. We performed trans cystic cholangiography, identifying a common bile duct filling defect (*Figure 1*). We performed a choledochotomy, the common bile duct stone was removed without the need to mobilize the stent, and a fenestrated subtotal cholecystectomy was performed. A closed suction drain was placed in the subhepatic space. The patient developed a low-output biliary fistula, which was resolved satisfactorily on an outpatient basis without needing specific management. After 15 days, the drainage was removed, management with ursodeoxycholic acid at 15 mg/kg orally was started, and an abdominal ultrasound was requested, which was performed six months later. It showed the intra- and extra-hepatic biliary tract of



Figure 1: Transcystic cholangiography. The filling defect at the level of the common bile duct is appreciated and compatible with Mirizzi syndrome. The stent distal to the obstruction site can be seen.

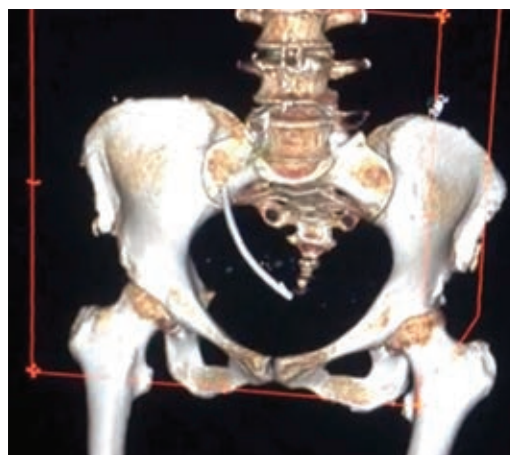


Figure 2: Three-dimensional reconstruction of a CT scan showing a high-density tubular opacity to the left of the midline, consistent with a biliary stent at the level of the sigmoid colon.

standard caliber without other alterations; the prosthesis was not visualized at the level of the biliary tract. Liver function tests (LFTs) showed a decrease in transaminase levels concerning preoperative, with aspartate aminotransferase (AST) 24 U/L versus 35 U/L, alanine aminotransferase (ALT) 28 U/L versus 23 U/L, and alkaline phosphatase (ALP) 111 U/L versus 275 U/L without reaching normal levels, and γ -glutamyl transferase at 108 U/L. No further action was taken.

The patient presented three months later for consultation with clinical data of mild diverticulitis. Laboratory tests were normal, including improved FFP. A physician outside the hospital had initiated management with oral trimethoprim-sulfamethoxazole at an unspecified dose. The antibiotic was continued to complete seven days.

Two months later, the patient presented again with acute abdominal pain. She had signs of peritonitis in the left lower quadrant of the abdomen. Laboratory tests showed leukocytes $16.8 \times 10^3/\mu\text{L}$, serum lactate 2.5 mmol/L, and lactate dehydrogenase 611 U/L. An abdominopelvic CT scan was performed, which showed findings suggestive of diverticulitis complicated with perforation and a hyperdense tubular image measuring approximately 90×5 mm at this level (*Figure 2*).

The patient underwent exploratory laparotomy, where a one-centimeter diameter perforation was found through a sigmoid colon diverticulum secondary to the stent (*Figure 3*) and multiple uncomplicated sigmoid diverticula. The stent was removed, the intestinal edges were debrided of healthy tissue, and primary closure was performed in two planes, the internal by continuous suture with 3-0 caliber polyglactin 910 and the external through Lembert type stitches with 3-0 caliber silk. There was no evidence of localized or generalized peritonitis, but in any case, a 12 Fr caliber closed suction drain was placed, directed to the parietocolic slide and pelvis. Postoperative evolution was uneventful; ceftriaxone 2 mg every 24 hours intravenously and metronidazole 500 mg every eight hours were administered; the patient was discharged on the fourth postoperative day, with an indication to complete five more days of metronidazole 500 mg every eight hours orally.

DISCUSSION

In our environment, endoscopists most frequently use plastic biliary stents. Patients with these stents require close follow-up for early removal or periodic replacement to avoid obstruction, rupture, infection, or migration. Performing the change every three months is

recommended, although this period can be extended up to six months.

It has been observed that migration occurs more frequently with plastic prostheses than with metallic ones. Distal migration of stents has a variable incidence ranging from 4 to 8%.^{2,3,7} Distal migration is more frequent in cases of benign stenosis of the biliary tract, possibly because migration is favored when the inflammatory process and edema of the biliary tract mucosa disappear.⁴

The most frequent location of distal migration is the duodenum; most distally migrating prostheses pass through the intestinal lumen without complications and are evacuated with feces. On rare occasions, the prostheses do not have a typical passage through the digestive tract and become lodged in the intestinal wall, resulting in a series of complications; the most frequent causes of impaction are considered to be the presence of irregularities of the intestinal wall or the presence of fixation mechanisms of the intestine itself, such as the ligament of Treitz, parastomal hernias, ventral hernias, post-surgical adhesions, and colonic diverticula. Most of the complications associated with stent migration have occurred with straight stents. This type of migration is attributed to the external retention flaps, which cause easier adhesion to the bowel wall, with subsequent pressure necrosis and bowel perforation.⁴

One of the first retrospective studies that looked at the occurrence of prosthesis migration and risk factors was done by Johanson and colleagues, a single-institution retrospective study over four years. In 322 prostheses, they found 16 cases of proximal migration with a rate of 4.9% (95% confidence interval [CI], 3.1 to 8.5%) and 19 distal migrations with a rate of 5.9% (95% CI, 3.9 to 9.2%).²

In another study by Katsinelos and colleagues, the experience of three referral centers in Greece regarding stent migration was revised. In the study period, 378 biliary stents were placed, 57.4% for malignant causes and 42.6% for benign causes. Only 51 (13.5%) stents migrated, and 30 (58.8%) migrated distally, for an overall migration rate of 7.9%. Patients with migration had symptomatology of cholangitis or jaundice, while 13 (43%) patients with distal migration



Figure 3:

The stent is observed at the level of the antimesenteric border of the sigmoid colon.

remained asymptomatic. No colonic perforations were described in this series and only three patients with impaction of the prosthesis at the ileocecal valve.⁷

In another study from a referral center, 524 plastic prostheses were placed in 353 patients over 15 months. The overall migration rate was 8.58%; 21 patients had distal migration, for a distal migration rate of 4.0%. The migration frequency was significantly higher in benign than malignant stenosis (13.7 versus 5.3%, $p = 0.001$).³ As in the previous study, no severe gastrointestinal complications occurred.⁷ The explanation is that a close surveillance policy is carried out in these referral centers, so low morbidity is expected in this way.

In a recent retrospective study by Yuan et al., they sought to determine risk factors for distal migration in plastic prostheses and duodenal lesions. They studied 248 patients with 402 ERCPs and found that the presence of a benign biliary stricture and the length of the prosthesis above the proximal end of the stenosis were determining factors for distal migration; in addition, they detected 25 cases of distal migration, for a rate of 6.2%⁸ (Table 1).

Of the 42 cases reported in the literature, only six have been treated with primary closure,⁹⁻¹³ as in our case, and one was performed laparoscopically.¹⁴ Primary closure can be performed when an early diagnosis is made or when there is a high index of suspicion. None of the patients treated with primary closure had a fatal outcome (Table 2).

Table 1: Incidence in the literature of biliary stent distal migration.

Author	Patients (N)	Distal migration (N)	Incidence (%)
Johanson ²	378	19	5.9
Katsinelos ⁷	378	30	7.9
Arhan ³	524	21	4.0
Yuan ⁸	402	25	6.2

CONCLUSIONS

Distal migration to the colon of a biliary stent is a rare medical event, but most occur without any sequelae; however, they may lead to severe complications.

Sigmoid colon perforation secondary to migration of a biliary prosthesis is a rare complication. It should be suspected in patients with acute abdominal pain and an

Table 2: Cases treated by primary closure.

Author	Age	Gender	Diagnosis	Benign biliary stenosis	Perforation site	Perforation of diverticulum	Death
Lenzo ⁹	82	Female	Cholangitis	No	Sigmoid	Yes	No
Storkson ^{14*}	86	Male	Choledoco-lithiasis	No	Sigmoid	No	No
Senosiáin ¹⁰	80	Female	Lemmel syndrome	No	Sigmoid	No	No
De Andrés ¹¹	70	Male	Cholangitis	No	Sigmoid	Yes	No
Marcos ¹²	65	Female	Choledoco-lithiasis	No	Sigmoid	Yes	No
Ponce ¹³	65	Male	Choledoco-lithiasis	No	Rectosigmoid junction	No	No
Osorio [‡]	72	Female	Choledoco-lithiasis	No	Sigmoid	Yes	No
			Síndrome de Mirizzi				

* Case treated by laparoscopic surgery. ‡ Present case.

ERCP history. Early surgery is recommended to avoid potentially dangerous complications that may lead to death. Suppose perforation caused by a stent is confirmed. In that case, a primary closure may be done to avoid a colon resection or the realization of a stoma if the patient's clinical conditions allow it.

Patients with benign bile duct stenosis have a higher frequency of distal migration. In contrast, patients with previous surgeries, wall hernias, stomas, and diverticular colon disease are at risk of developing complications secondary to distal migration of the stents.

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