

Complications and treatment of migrated biliary endoprosthesis: A review of the literature

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Received: March 9, 2007 Revised: July 23, 2007

Abstract

Endoscopic biliary stent insertion is a well-established procedure. It is especially successful in treating postoperative biliary leaks, and may prevent surgical intervention. A routine change of endoprosthesis after 3 mo is a common practice but this can be prolonged to 6 mo. We reported a colonic perforation due to biliary stent dislocation and migration to the rectosigmoid colon, and reviewed the literature.

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Key words: Biliary endoprosthesis; Migrated biliary stent; Colonic perforation; Biliary stent complications

Namdar T, Raffel AM, Topp SA, Namdar L, Alldinger I, Schmitt M, Knoefel WT, Eisenberger CF. Complications and treatment of migrated biliary endoprosthesis: A review of the literature. *World J Gastroenterol* 2007; 13(40): 5397-5399

<http://www.wjgnet.com/1007-9327/13/5397.asp>

INTRODUCTION

Endoscopic biliary stent insertion is a well-established treatment for hepatic, biliary or pancreatic disorders (e.g., chronic pancreatitis or pancreatic carcinoma). It is especially successful in treating postoperative biliary leaks, and may prevent surgical intervention^[1,2]. Stenting of the biliary duct can be performed with a variety of prosthesis that can

differ by size, design and material^[3,4].

The available biliary endoprosthesis can be classified by material into two categories: plastic (i.e., polyethylene, polyurethane and "Teflon") and metallic stents. Plastic endoprosthesis are less expensive but have a higher risk of clogging and dislocation^[5]. On the other hand, they are easier to remove or to change.

A routine change of an endoprosthesis after 3 mo is common practice, but this can be prolonged to 6 mo^[6]. To avoid stent migration, the biliary stent should be placed across the sphincter of Oddi^[7]. Distal stent migration is an infrequent late complication, but occurs in up to 6% of cases^[3,8]. The majority of biliary endoprosthesis pass through the intestine without any problems. Infrequently, however, stents get stuck in the bowel, leading to complications.

Endoscopic retrieval is often possible and surgical intervention is rarely necessary^[9,10]. The most common site of a migrated biliary stent is the duodenum^[11-17], whereas complications in the rest of the small intestine^[18,19] or colon^[20-30] are rare.

CASE REPORT

A 65-year-old female patient presented with 4 d of persistent diffuse colicky abdominal pain and localized peritonitis in the supra-symphysial area. Normal leukocytes, elevated C-reactive protein (14.5 mg/dL; normal value < 0.5) and simultaneous cystitis (6500 bacteria/ μ L; normal value < 600) were found. Three months previously, the patient had undergone a laparoscopic cholecystectomy 4 wk after acute cholangitis with choledocholithiasis. The intraoperatively placed easy-flow drainage showed early postoperative biliary secretion. Endoscopic retrograde cholangiography was performed and showed a small peripheral leakage from the liver. A residual bile duct stone that was causing partial obstruction was removed. A 12 French 10 cm plastic stent was placed in the common bile duct without sphincterotomy. Biliary drainage stopped concurrently. The patient was discharged on the ninth postoperative day. A biliary stent extraction was advised at 4-6 wk later, but this was not carried out because of the patient's non-compliance.

A computed tomography (CT) scan was performed because of extensive pain. A biliary stent dislocation and migration to the rectosigmoid colon was detected. The CT scan showed rectal perforation, and the stent was found in

Table 1 Colonic perforation due to biliary stent migration. Review of the literature to January 2007

Reference	Year	Stent	Material	Type of bile duct lesion	Time to migration	Complication	Therapy
Anderson <i>et al</i> ^[26]	2006	Uk	Uk	Benign	5 mo	Sigmoid diverticula perforation	Endoscopy
Wilhelm <i>et al</i> ^[27]	2003	Straight	Uk	Benign	18 mo	Colovesicular fistula	Surgery
Diller <i>et al</i> ^[19]	2003	7 French, 10 cm	Teflon	Benign	1 mo	Stuck in sigmoid diverticula	Endoscopy
Elliott <i>et al</i> ^[21]	2003	10 French, 10 cm 10 French, 10 cm	Uk	Benign	4 mo	Sigmoid perforation	Surgery
Figuera <i>et al</i> ^[29]	2001	Straight	Polyethylene	Benign	3 mo	Colocutaneous fistula	Surgery
Klein <i>et al</i> ^[26]	2001	Straight 7 French, 5 cm,	Teflon	Benign	3 yr	Sigmoid diverticular perforation	Surgery
Storkson <i>et al</i> ^[30]	2000	Straight	Plastic	Benign	2 wk	Sigmoid perforation	Surgery
Lenzo <i>et al</i> ^[22]	1998	7 French, 7, 5 cm	Polyethylene	Benign	1 mo	Sigmoid diverticula perforation	Surgery
Baty <i>et al</i> ^[20]	1996	Uk	Polyethylene	Malign	1 mo	Sigmoid diverticula perforation	Surgery
Schaafsma <i>et al</i> ^[23]	1996	Straight	Uk	Benign	6 mo	Sigmoid perforation	Surgery
D'Costa <i>et al</i> ^[24]	1994	Uk	Uk	Malign	Uk	Sigmoid perforation	Surgery

Uk: unknown.

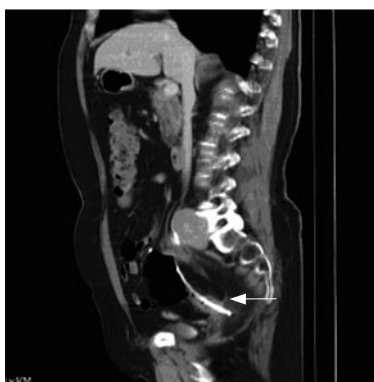


Figure 1 CT-scan of colonic perforation caused by migrated biliary endoprosthesis. Arrow marks dislocated stent.

the rectal mesentery (Figure 1). A rectal resection was performed. After an uncomplicated postoperative recuperation, the patient was discharged on the seventh postoperative day.

DISCUSSION

The incidence of postoperative biliary fistula is elevated in settings of acute or chronic inflammation^[32-34]. Treatment options are surgical biliary leak repair, percutaneous biliary drainage, and endoscopic biliary drainage.

Endoscopic placement of a biliary endoprosthesis is a well-established procedure for treatment of biliary outflow obstruction. The most frequent complication associated with bile duct stents is early occlusion caused by clogging, with resultant cholangitis, or by tumor over-growth. Stent dislocation and proximal or distal migration are uncommon, with an overall incidence of up to 6%^[3]. Several complications of stent migration have been reported and can be classified into categories of penetration, intestinal perforation, and obstruction. Other organs are usually unaffected^[9,10].

Most ingested foreign bodies pass through the intestine without major problems. Neither size nor shape of the stent predicts the likelihood of successful conservative management. In all patients, a close follow-up after biliary stent placement is mandatory. Patients with diverticular disease, hernia or intra-abdominal adhesions, are

especially at risk. Intestinal-wall weakness and increased resistance during bowel movement can produce localized complications^[26,39].

Lesions of the intestinal wall due to biliary-stent migration have been reported in the duodenum, and are related to retroperitoneal fixation of this intestinal segment. Penetration requires adherence between the perforated and the penetrated organ, and does not induce intra-abdominal contamination, but eventually causes fistulae (i.e., interenteric or biliocolic^[36], colovaginal^[25] or colovesicular^[27]).

Downstream migration is more frequent in benign than in malignant biliary duct strictures^[9,35]. Benign stenoses are not as tight because of regression of inflammatory reactions after placement of the stent. By contrast, tumor growth can anchor a stent in malignant stenoses.

In the case of intestinal perforation, surgical stent removal and drainage of consecutive intra-abdominal or retroperitoneal abscesses is mandatory. A pelvic abscess^[28], and colovesicular^[27] or colocutaneous^[29] fistula are typical consequences (Table 1). A case of necrotizing fasciitis due to colonic perforation has also been reported^[31].

A review of the literature published to January 2007 has revealed 11 cases of colonic perforation due to biliary stent migration, with the majority being straight plastic endoprostheses^[10,17,26,27,29,38,40].

In conclusion, endoscopic insertion of biliary stents is a useful and powerful procedure for short-term decompression of the biliary system. In the case of long-term therapy, stent-migration-associated complications have to be considered as a differential diagnosis that may lead to life-threatening situations. A correct diagnosis is sometimes difficult to make because of the absence of typical symptoms.

A migrated biliary stent, symptomatic or not, should be removed immediately^[19]. In cases of intestinal perforation, immediate surgical therapy is required. In cases of benign lesions of the bile duct, the stent should be either removed early to decrease the risk of secondary complications, or replaced regularly to prevent stent obstruction, infection or migration.

Caution should be exercised when straight plastic stents are inserted, and these should be closely followed-up.

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S- Editor Liu Y L- Editor Kerr C E- Editor Li JI