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Migrated plastic biliary stent causing colon perforation: analysis of emergency admission and literature review**

Migracja protezy żółciowej powikłana perforacją jelita grubego. Analiza przyjęć ostrodyżurowych i przegląd piśmiennictwa

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Keywords

biliary stent, perforation, colon, diverticulitis, pancreatic tumor

Słowa kluczowe

proteza żółciowa, perforacja, zapalenie uchyłków jelita grubego, guz trzustki

Summary

Placement of biliary stents is currently the primary therapeutic approach to the treatment of various benign and malignant hepatobiliary lesions. Distal stent migration with concurrent distal GI tract perforation is an exceptionally rare complication. During years 2011-2015 there were 7.162 emergency hospital admissions to the Department of General and Transplant Surgery in Norbert Barlicki Memorial Teaching Hospital. Out of that number we have selected 2 cases of migration of biliary prosthesis with concomitant perforation of distal part of the large bowel. Here we present 2 cases of such a complication and review of the literature. Both patients were successfully surgically treated. In the literature search we have fund that the sigmoid colon was the most affected part of the GI tract and in most of the cases perforation was present in diverticular ostium. Together with diverticular disease, conditions such as hernia or intra-abdominal adhesions are important risk factors of perforation in case of biliary stent migration.

Streszczenie

Implantacja protezy do dróg żółciowych jest obecnie zabiegiem stosowanym jako leczenie pierwszego rzutu w wielu nowotworowych oraz łagodnych chorobach dróg żółciowych. Migracja protezy z dróg żółciowych z perforacją dalszych odcinków przewodu pokarmowego to wyjątkowo rzadkie powikłanie związane z tą metodą leczenia.

W latach 2011-2015 w ramach „ostrego dyżuru" do Kliniki Chirurgii Ogólnej i Transplantacyjnej Uniwersyteckiego Szpitala im. Norberta Barlickiego przyjęto 7162 chorych. Spośród nich wybraliśmy dwa przypadki migracji protezy z dróg żółciowych powodujące perforację dystalnego odcinka jelita grubego – okrężnicy esowatej. Poniżej przedstawiamy opis dwóch takich przypadków wraz z przeglądem dostępnego piśmiennictwa. Oboje chorzy byli poddani skutecznemu leczeniu chirurgicznemu.

Na podstawie analizy dostępnego piśmiennictwa stwierdziliśmy, iż najczęściej dotkniętą perforacją częścią przewodu pokarmowego była esica, a w szczególności perforacja w obrębie ujścia uchyłka esicy. Obecność choroby uchyłkowej jelita grubego, przepukliny brzusznej lub zrostów wewnątrz jamy brzusznej stanowią ważne czynniki ryzyka perforacji przewodu pokarmowego w przypadku migracji protezy implantowanej do dróg żółciowych.

Conflict of interest
Konflikt interesów

None
Brak konfliktu interesów

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INTRODUCTION

Biliary stents deployed during endoscopic retrograde cholangiopancreatography (ERCP) are a well-established for the management of various biliary, hepatic or pancreatic diseases, both benign and malignant. Yet, their deployment should be entailed by routine stent exchange after 3 to 6 months. While stent migration is a relatively common complication with the incidence ranging from 5 to 10% (1), concurrent perforation of GI tract is a rare complication with the incidence of less than 1% (2). In general, such cases require urgent surgical intervention and further management depends on intraoperative findings (3). Though diagnosis itself is relatively easy, basing on routine imagining studies,

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one must keep in mind that further complications, for instance acute diffuse peritonitis or abscess formation is potentially life threatening, thus importance of proper management should be highlighted.

Aim of the study was analysis and literature review of less frequent complications such as large bowel perforation after biliary stent deployment due to hepatobiliary lesions.

All medical emergency cases of patients admitted to the Department of General and Transplant Surgery between 2011 and 2015 was analysed.

Analysis of the medical history and postoperative period was performed.

We have also performed review of the medical literature concerning that kind of complication using MEDLINE database.

During years 2011-2015 there were 7.162 emergency hospital admissions to the Department of General and Transplant Surgery in Norbert Barlicki Memorial Teaching Hospital. Out of that number we have selected 2 cases of migration of biliary prosthesis with concomitant perforation of distal part of the large bowel.

Analysis of the literature using MEDLINE revealed 23 cases of large bowel perforation caused by migrated biliary prosthesis. Mean age at the time of presentation was 70.5 years. Colon perforation mostly affected women (15 females vs. 10 males). Similarly, majority of reported patients had benign biliary lesion (20 vs. 5 malignant lesions). The most common cause of stent deployment was choledolithiasis, followed by postcholecystectomy bile leakage.

Herein we have described two selected patients' medical cases admitted due to our department.

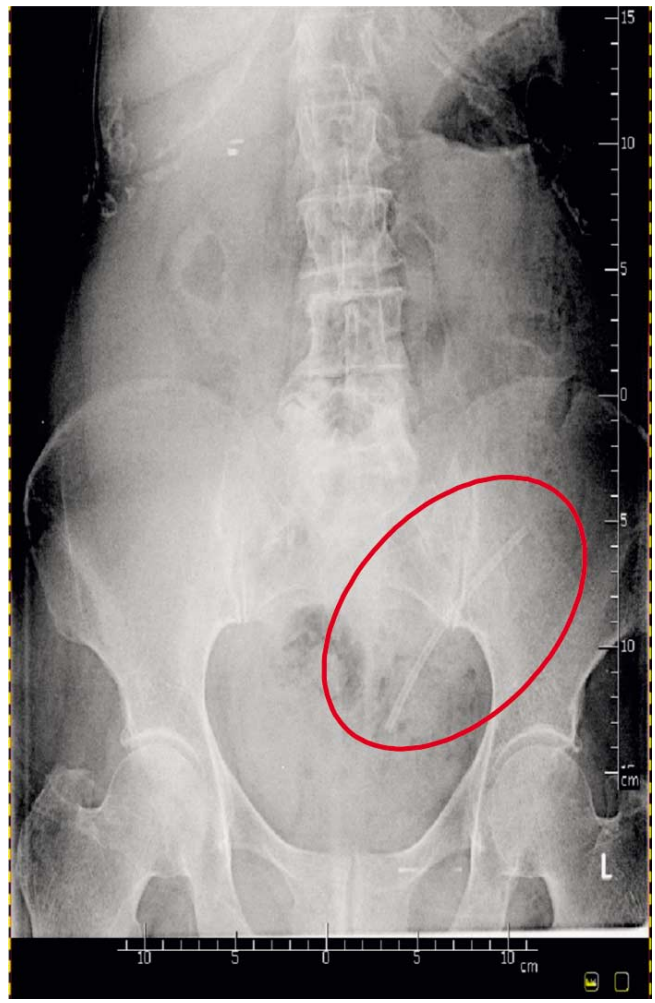

Fig. 1. Plain abdominal RTG showing migrated biliary stent in left iliac fossa

Case reports

Case 1

An 76-year-old female patient was admitted to the emergency department with a 3-day history of the umbilical and hypogastric regions pain. She negated any symptoms of intestinal obstruction. Otherwise, findings in physical examination were within normal range. She had underwent cholecystectomy 6 months earlier, following ERCP procedure with biliary stent deployment for choledocholithiasis. Due to lack of compliance the patient had omitted outpatient visits and the stent was left intact for 6 months. In the laboratory tests leukocytosis (15.81 x 10^3), and elevation of AST (74 IU/L), ALT (42 IU/L), amylase (188 IU/L) were revealed. Afterwards, patient underwent abdominal RTG and CT which revealed presence of migrated biliary stent in left iliac fossa (fig. 1 and 2a-d). Umbilical hernia and diverticulitis were also found. Because of these findings, she was qualified for surgical treatment. She underwent laparotomy, during which biliary stent was found in sigmoid colon, in a diverticular ostium. Therefore subsequent sigmoideostomy was performed. As 500 ml of purulent fluid was present in the abdominal cavity, peritoneal lavage was also performed and fluid for smear was taken. Patient's postoperative period was complicated with infectious diffuse peritonitis and after intensive antibiotic therapy she was discharged on 24th postoperative day in a good condition.

Case 2

An 68-year-old male patient presented with a 4-day history of the hypogastric region pain was admitted to our Department. He had underwent papillotomy with the deployment of 10 cm 7F biliary stent because of the cholestasis secondary to irresectable pancreatic head adenocarcinoma a month earlier. As for concomitant diseases he also had diabetes mellitus type 2 and osteoarthritis. Laboratory tests revealed hyperglycaemia (208 mg/dL), elevation of CRP (30.2 mg/dL) and amylase (172 IU/L). Similarly to the first case, biliary stent presence in rectum was confirmed by routine imagining studies. He also underwent urgent laparotomy, but since biliary stent was found in rectum, penetrating large bowel wall, transverse colostomy was performed. Peritoneal lavage and consecutive drainage were also made. He suffered from infectious diffuse peritonitis during his postoperative period and after antibiotic therapy he was discharged on 11th postoperative day.

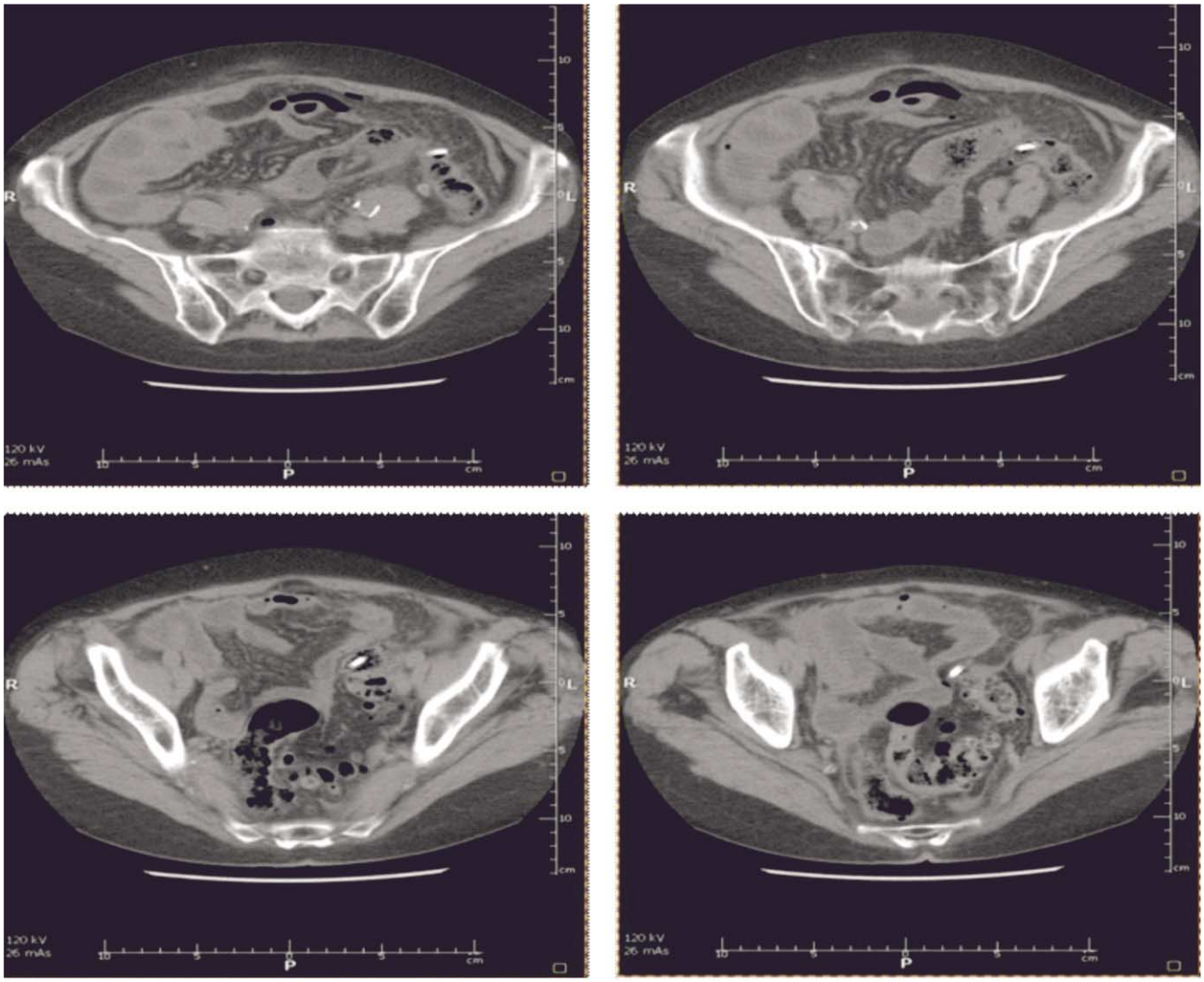

Fig. 2a-d. CT scans showing biliary stent perforating sigmoid colon

DISCUSSION

Distal migration of plastic biliary stent and subsequent colon perforation is an exceptionally rare complication. Recently, existence of 21 cases of such a complication in English literature was reported by Virgilio et al. while review from 2007 found 11 cases. Our search in PubMed and MEDLINE databases yielded 23 cases, which were then reviewed (tab. 1). When merging these results with our cases, patients mean age at the time of presentation was 70.5 years. Colon perforation mostly affected women (15 females vs. 10 males). Similarly, majority of reported patients had benign biliary lesion (20 vs. 5 malignant lesions), what falls into general trend of more frequent stent migration in patients with benign lesion. The most common cause of stent deployment was choledolithiasis, followed by postcholecystectomy bile leakage. Patients presentation usually suggest peritonitis as they are usually pyretic, have diffuse abdominal pain. Yet, in some cases presentation might be less obvious; for instance Anderson et al. reported patient with right leg pain and unilateral hip stiffness (4). The sigmoid colon was the most affected part of the GI tract and in most of the cases perforation was present in diverticular ostium (12 cases). This propensity is a result of relative rigidity and narrowness of sigmoid colon itself and a decrease of resistance in diverticula. Together with diverticular disease, conditions such as hernia or intra-abdominal adhesions are important risk factors (3, 5-7). Interestingly, our first patients had all above discussed risks factors (benign biliary disease, diverticulosis, umbilical hernia). As for treatment, in case of perforation the approach should be based on patient's clinical status and findings in imaging studies. Most patients were treated surgically, as this approach usually results in uneventful postoperative period and enables proper management of peritonism and/or abscess. Thus, immediate surgical intervention consisting in colostomy or primary anastomosis is a first line treatment (8, 9). However, if covered or limited perforation is present and there is no evidence of peritonitis, endoscopic retrieval is beneficial (10, 11). It was also proposed that in case of encountering distally migrated biliary stent during

Tab. 1. Literature review

Author	Year	Patient	Indication	Biliary stent	Time to symptoms onset	Perforation site	Treatment	Complications/ hospitalization length
Konstantinidis et al.	2014	69 yo. F	Choledolithasis	Not specified	2 mo	Sigmoid colon	Surgical treatment with primary anastomosis	Uneventful; 7 d
Chittlebrough et al.	2014	73 yo. M	Choledolithasis	5 cm 10 Fr	3 mo	Sigmoid colon (D)	Hartmann's procedure	Prolonged ileus; 18 d
Jones et al.	2013	66 yo. M	Benign bile duct stricture	Not specified	18 mo	Caecum	Endoscopic removal	Uneventful; overnight hospitalization
Kittappa et al.	2013	58 yo. F	Postcholecystectomy bile leakage	Not specified	18 mo	Sigmoid colon	Hartmann's procedure	Abscess formation
Depuydt et al.	2012	50 yo. F	Liver transplantation	Not specified	1,5 mo	Rectum	Stent extraction per anum antibiotic therapy bowel rest	Uneventful; 21 d
Alcaide et al.	2012	73 yo. M	Choledolithasis	12 cm 10 Fr	0,5 mo	Sigmoid colon (D)	Endoscopic removal with titanium clips closure	Pelvic abscess; 14 d
Jafferbhoy et al.	2011	82 yo. F	Postcholecystectomy bile leakage	7 cm 7 Fr	6 mo	Sigmoid colon (D)	Endoscopic removal with clips closure	Uneventful; 2 d
Malgras et al.	2011	73 yo. M	Management of resectable pancreatic carcinoma	5 cm 10 Fr	0.5 mo	Sigmoid colon (D)	Hartmann's procedure	Uneventful
Peter et al.	2011	69 yo. F	Benign distal bile duct stricture	7 cm 10 Fr	5 mo	Sigmoid colon (D)	Surgical treatment with primary anastomosis	Uneventful
Aryal et al.	2008	57 yo. F	Postcholecystectomy bile leakage	7cm 10 Fr	1 mo	Sigmoid colon (D)	Transverse colostomy	Uneventful
Anderson et al.	2007	80 yo. F	Choledolithasis	Not specified	9 mo	Sigmoid colon (D)	Endoscopic removal	Abscess formation
Namdar et al.	2007	65 yo. F	Postcholecystectomy bile leakage	10 cm 12 Fr	3 mo	Rectum	Surgical treatment with primary anastomosis	Uneventful; 7 d
Blake et al.	2004	65 yo. F	choledocholithiasis	Not specified	„several mos"	Sigmoid colon	Elective, low anterior resection	Uneventful
Diller et al. Case 1	2003	58 yo. M	Liver transplantation	10 cm 7 Fr	1 mo	Sigmoid colon (D)	Endoscopic removal + sigmoid resection	Uneventful
Diller et al. Case 2	2003	64 yo. M	Management of irresectable pancreatic carcinoma	Wallstent (10 mm)	6 mo	Distal tip in colon (biliocolic fistula)	Cystojejunostomy + gastrojejunostomy	Fatal
Elliott et al.	2003	80 yo. F	Choledolithasis	10 cm 10 Fr	4 mo	Sigmoid colon	Hartmann's procedure	Uneventful
Wilhelm et al.	2003	85 yo. F	Choledolithasis	Not specified	2 y	Sigmoid colon + urinary bladder	Surgical treatment with primary anastomosis	Uneventful; 10 d
Figueiras et al.	2001	47 yo. M	Benign bile duct stricture	10 cm 10 Fr	3 mo	Splenic flexure of colon	Stent removal by fistulous tract + choledochoduodenostomy	Colocutaneus fistula, ascites, portal vein thrombosis
Storkson et al.	2000	86 yo. M	Duodenal diverticulum	5 cm 7 Fr	3 y	Sigmoid colon	Laparoscopic repair	Uneventful; 5 d
Lenzo et al.	1998	82 yo. F	choledocholithiasis	7.5 cm 10 Fr	1 mo	Sigmoid colon (D)	Primary surgical perforation repair, peritoneal lavage	Peritonitis; 11 d
Baty et al.	1996	86 yo. F	Management of irresectable pancreatic carcinoma	Not specified	1 mo	Sigmoid colon (D)	Sigmoideostomy	Uneventful; 10 d (died after 2 mo)
Schaafsma et al.	1996	77 yo. F	Choledolithasis	Not specified	6 mo	Sigmoid colon (D)	Surgical treatment	Uneventful
D'Costa et al.	1994	73 yo. M	Malignant common hepatic duct stricture	Not specified	Not specified	Sigmoid colon	Surgical treatment	Uneventful

D – within diverticula

routine examination in patient with perforation risk factors, endoscopic retrieval should be applied rather than expectant approach. Rapid introduction of proper management is crucial, as colon perforation might result in severe complications as fistulae (for instance colocutaneus, biliocolic, colovesicular) or prolonged hospitalization. Finally, it must be also underlined that proper patient's surveillance is of paramount importance. Analyzing time from stent deployment to symptoms onset, it seems that in many cases patients did not follow instructions and did not show up for routine examination. This also applies to our cases, as patients received written information about routine examination following stent deployment, yet they did not comply. It might be hypothesized that their compliance would result in lack of this serious complication.

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