Endoscopic Treatment of Duodenocolic Fistula Caused by Migrating Biliary Stents

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Conflict of interest:
None declared

Patient:
Male, 35-year-old

Final Diagnosis:
Abnormalities in liver function • duodenocolic fistula

Symptoms:
Abdominal pain

Clinical Procedure:
Endoscopic treatment of duodenocolic fistula

Specialty:
Gastroenterology and Hepatology • Surgery

Objective:
Unusual clinical course

Background:
Endoscopic biliary stent implantation is a recognized and effective method for the treatment of benign and malignant diseases of the bile duct and pancreas, ensuring smooth bile drainage. Currently, stent migration is considered a long-term and complex process, and in most cases, stents are removed through endoscopy or expelled from the body through the intestinal cavity. In rare cases, stents lead to formation of duodenocolic fistulas.

Case Report:
We report a case of duodenal colon fistula caused by a biliary stent penetrating the duodenum and entering the ascending colon. We removed the stent through endoscopy and clamped the fistulas of the colon and duodenum separately with titanium clips. Due to the presence of large common bile duct stones, nasobiliary drainage was performed again. Later, laparoscopic choledocholithotomy was performed, and the patient was discharged after rehabilitation.

Conclusions:
ERCP endoscopy must consider the possibility of stent displacement in patients with biliary stents. In the case of CBD biliary stent dislocation in the patient, continuous abdominal plain films and physical examinations are required until spontaneous discharge is confirmed. In addition, for patients with benign bile duct stenosis undergoing biliary drainage, doctors should urge them to return to the hospital on time to remove the stent. For patients with postoperative abdominal pain or peritonitis symptoms, abdominal CT scan confirmation is required and early intervention should be considered.

Keywords:
Cholangiopancreatography, Endoscopic Retrograde • Fistula • Stents

Abbreviations:
ERCP – endoscopic retrograde cholangio-pancreatography; CBD – common bile duct; WBC – white blood cell; CT – computed tomography

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**Background**

Endoscopic biliary stent implantation is a recognized and effective method for the treatment of benign and malignant diseases of the bile duct and pancreas [1]. Plastic stents are usually implanted inside the bile duct to ensure smooth bile drainage. Currently, stent migration is considered a complex process, although in most cases the stents can be removed through endoscopy, pass through the intestinal cavity, or remain there [1,2]. In extremely rare cases, stents lead to formation of duodenal colon fistula. Here, we present an endoscopic treatment method for duodenocolic fistula caused by a biliary stent penetrating the duodenum and entering the ascending colon. This is a very rare case that has important learning and guidance significance for medical personnel.

**Case Report**

A 35-year-old man was hospitalized due to abdominal pain. Two years ago, he underwent endoscopic retrograde cholangio-pancreatography (ERCP) and laparoscopic cholecystectomy for common bile duct (CBD) stones and gallbladder stones. No chills or fever, nausea, vomiting, or orange-colored urine were observed, and a physical examination showed local tenderness in the upper right quadrant (without rebound tenderness). At the same time, we also noticed the patient’s icteric sclera. The test results showed a white blood cell (WBC) count of 11.78/10^9/L, 80.70% neutral granular cells, and 14.2 g/dL hemoglobin level. In addition, the test results showed significant abnormalities in liver function (serum total bilirubin result was 8.0 mg/dL, and aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase, and gamma-glutamyl transferase were 75 IU/L, 172 IU/L, 138 IU/L, and 201 IU/L, respectively).

Computed tomography (CT) plain scan showed mild dilation of the intrahepatic and extrahepatic bile ducts, with the presence of stents in the bile ducts and no visualization of the gallbladder. Due to abnormal liver function accompanied with pain in the upper right abdomen, the possibility of acute cholangitis caused by obstruction of the biliary stent was considered. The initial diagnosis was common bile duct stones with acute cholangitis and postoperative biliary stent placement. During gastroscopy, it was found that the tail end of the plastic biliary stent penetrated the duodenal wall (Figure 1); therefore, we further performed whole-abdominal CT with contrast and three-dimensional reconstruction. The results suggested that the biliary stent penetrated the duodenal wall and entered the transverse colon, forming a duodenocolic fistula (Figure 1). Considering that the fistula had already formed and there was no abdominal infection or peritonitis, endoscopic repair was considered feasible. First, colonoscopy was performed, where the tail end of the bile duct stent could be seen near the hepatic curvature of the ascending colon. The stent was inserted into the sinus using foreign-body forceps, and the colon sinus was closed with titanium clips (Figure 2). Then, gastroscopy showed that the biliary stent passed through the intestinal cavity of the descending segment of the duodenum. The bile duct stent was removed with foreign-body forceps and the sinus was closed with titanium clips (Figure 3). Finally, a duodenoscope was inserted for ERCP examination, and cholangiography showed significant dilation in the middle segment of CBD, and stones with diameters of approximately 1.6×1.1 cm and 1.0×0.4 cm were visible in the middle section of the CBD. The lower end of the bile duct did not dilate, and a stone removal basket was used to remove some small stones. The larger stones could not be removed, and the nasobiliary duct was retained in the right intrahepatic bile duct (Figure 4) to facilitate laparoscopic choledocholithotomy for removal of common bile stones.

![Figure 1](image1.png)

**Figure 1.** (A) Computed tomography (CT) scan displaying a duodenocolic fistula caused by biliary stent displacement; (B) 3D imaging of migrating biliary stents.
duct stones in the later stage. The patient recovered well after the operation and was discharged. Sanchez Ocaña et al [3] reported a case of endoscopic management of duodenal colon fistula in 2016, but with a different approach from ours. In the present patient, we performed a preoperative CT examination to assess for presence of a duodenocolonic fistula, and simultaneously performed gastroscopy, colonoscopy, and ERCP under intravenous anesthesia. After diagnosis, we closed the fistulas in the duodenum and transverse colon using titanium clips through endoscopy to prevent fistula and abdominal infections. At the same time, it also provides a new approach and method for doctors who encounter such problems. Here, to the best of our knowledge, we provide the first published description of this method of endoscopic treatment for duodenocolic fistula. The patient provided informed consent to publish this case report, which was authorized by the Ethics Review Committee of Ganzhou People’s Hospital.

**Discussion**

The incidence of biliary stent displacement after endoscopic biliary stent surgery is approximately 5-10% [4]. The risk factors for biliary stent displacement to the distal intestine are still unclear. Research has found that the migration rate of plastic biliary stents is much higher in benign biliary diseases than in malignant biliary diseases [5]. Distal migration is associated with long stents and postoperative biliary strictures,
while proximal migration is closely related to short stents and preoperative biliary strictures [6].

Plastic biliary stents that have already entered the colon through the narrow small intestine rarely cause symptoms [7]. Duodenal colon fistula caused by the migration of biliary plastic stents is extremely uncommon. The sigmoid colon is one of the most common sites of intestinal perforation. The intestinal perforation caused by displaced biliary stents is often related to abnormalities or variations in intestinal structure, such as postoperative intestinal adhesions, diverticulosis, stenosis, or hernia [8,9]. The potential reasons for this patient’s occurrence may be related to the following factors. First, the patient did not follow the doctor’s advice to return to the hospital 2 months later to remove the biliary stent, resulting in the stent being left for too long. In addition, biliary tract infection caused abdominal adhesions, resulting in duodenal deformation and obstructed stent discharge. The migrated biliary stent penetrated the duodenal wall and entered the transverse colon.

The clinical manifestations of intestinal fistula lack specificity, and the anatomical characteristics of the fistula are diverse. Therefore, the evaluation of intestinal fistula in clinical practice relies on imaging and endoscopic examination. Ultrasound and CT are the most commonly used imaging examinations for screening [10]. With the help of endoscopic examination, the digestive tract can be more directly observed, the location and degree of the lesion can be determined, and a biopsy can be taken to clarify the diagnosis and guide treatment. In this case, the diagnosis of duodenal colon fistula was clear, and no abdominal abscess or other intestinal fistulas were found.

Overall, the management of intestinal fistulas in clinical practice is complex, and the treatment plans for different types of intestinal fistulas vary depending on the shape and origin of the fistula, mainly including surgical treatment, endoscopic treatment, or conservative treatment [11]. The diagnosis of our patient was clear, and the duodenal colon fistula was related to previous biliary stents, with mild symptoms of peritonitis. The first-choice procedure was to close the fistula, and after communicating with the patient, endoscopic closure of the fistula was ultimately chosen.

Conclusions

We report a case of duodenocolic fistula caused by biliary stent displacement. ERCP endoscopy must consider the possibility of biliary stents displacement. In the case of CBD biliary stent dislocation in the patient, continuous abdominal plain film and physical examination are required until spontaneous bowel discharge is confirmed. In addition, for patients with benign bile duct stenosis or biliary drainage, doctors should urge the patient to return to the hospital on time to remove the stent. If the patient experiences symptoms of peritonitis, it is necessary to improve abdominal CT scanning in the Emergency Department and consider early active intervention.

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References: