Acute appendicitis induced by biliary stent migration: A rare cause of acute abdominal pain. A case report

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Background: Acute appendicitis is the most common cause of surgical acute abdomen worldwide. Its incidence is highest among individuals between 20 and 30 years of age, with no significant sex predilection. Clinical presentation can be variable, making early diagnosis challenging; therefore, imaging studies are essential to confirm the diagnosis. The vermiform appendix demonstrates considerable anatomical variability in both location and length, contributing to differences in clinical presentation. Despite established clinical criteria, diagnostic uncertainty persists in approximately 30–40% of cases, and surgical intervention based solely on clinical suspicion may result in normal appendices in 15–30% of procedures.
Conversely, biliary stents are widely used in the management of various biliary and pancreatic conditions. Although stent migration is an uncommon complication, it is a recognized event. While distal migration typically remains asymptomatic, isolated cases of severe complications have been reported in the medical literature, including intestinal perforation, stent impaction, and gastrointestinal hemorrhage.

Keywords: Appendix; Acute appendicitis; Appendectomy; Biliary stent; Choledocholithiasis; Endoscopic Retrograde Cholangiopancreatography.

The vermiform appendix is a tubular structure located on the posteromedial wall of the cecum, approximately 1.7 cm below the ileocecal valve, at the point where the colonic teniae converge. Its average length is 91.2 mm in men and 80.3 mm in women. Anatomically, the appendix is considered a true diverticulum, as its wall is composed of mucosa, submucosa, longitudinal and circular muscular layers, as well as serosa. Its blood supply is provided by the appendicular artery, a terminal branch of the ileocolic artery, which travels through the mesoappendix. This structure exhibits morphological and dimensional variability, contributing to the common diversity in the anatomical position of the appendix (4–5).

Regarding biliary endoprostheses, most plastic stents used correspond to the Amsterdam design, characterized by a straight central axis with slightly curved tips that facilitate anchoring and reduce the risk of migration. Nevertheless, a global migration rate of 8.58% has been reported, including 4.58% proximal and 4.00% distal migration (15). Although distal migration is often asymptomatic, isolated cases of severe complications have been described, including intestinal perforation, stent impaction, and hemorrhagic events (16).

Case report

We report the case of a 58-year-old female patient with a history of severe cholangitis two months prior to the current evaluation, treated with endoscopic retrograde cholangiopancreatography (ERCP) and placement of a biliary stent, without procedural complications.

She presented to the emergency department with a 24-hour history of abdominal pain that initially appeared in the epigastrium and subsequently migrated to the right iliac fossa. Physical examination revealed focal peritoneal irritation, including positive McBurney, Rovsing, and Blumberg signs.

Laboratory tests showed leukocytosis with a left shift and elevated inflammatory markers. A plain abdominal radiograph demonstrated the biliary stent located in the right iliac fossa (Figure 1).

Given the suspicion of appendicitis secondary to distal stent migration, urgent surgical intervention was performed. Exploratory laparotomy revealed a grade II appendicitis associated with the presence of the stent within the appendiceal lumen. The device was removed through the appendix (Figures 2 and 3), followed by appendectomy using the Pouchet

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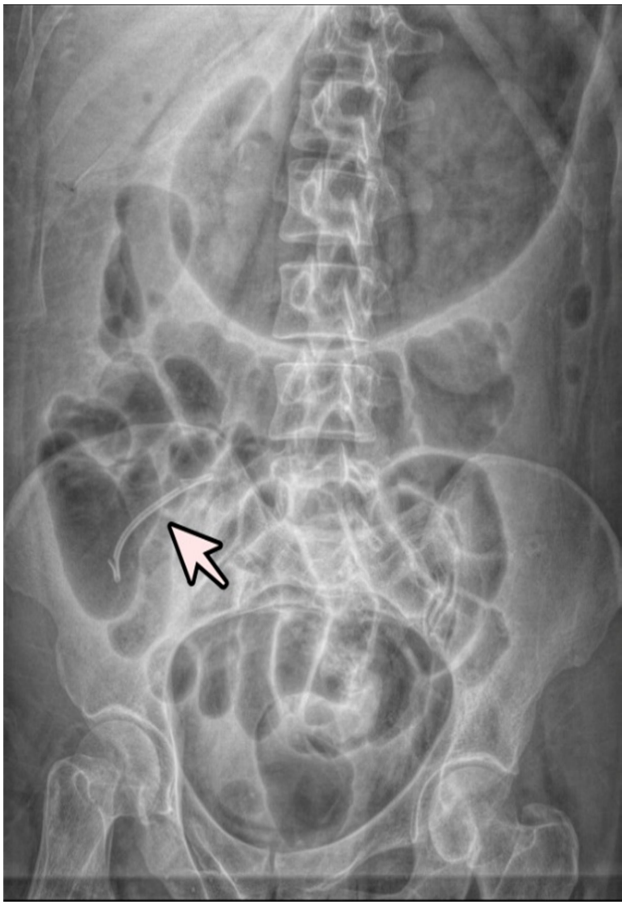

Figure 1. Abdominal plain radiograph demonstrating the presence of a biliary stent located in the right iliac fossa.

technique with Z-shaped Zuckermann stump inversion.

The postoperative course was uneventful, allowing hospital discharge 48 hours after admission.

Discussion

Acute abdomen is a clinical term describing a sudden-onset condition characterized by severe abdominal pain associated with signs of peritoneal irritation, which in most cases requires urgent surgical intervention. Among its etiologies, acute appendicitis—defined as inflammation of the vermiform appendix—represents the leading cause of surgical acute abdomen worldwide. It is the most common non-elective abdominal pathology, with a lifetime risk of 7–8% (1) and an annual incidence estimated at 96.5 to 100 cases per 100,000 inhabitants (2).

Embryologically, the appendix arises from the midgut, along with the small intestine, cecum, ascending colon, and the right portion of the transverse colon; all of these structures receive arterial supply from the superior mesenteric artery. The appendix is present by the eighth week of gestation, and lymphoid tissue development begins around week fifteen (3).

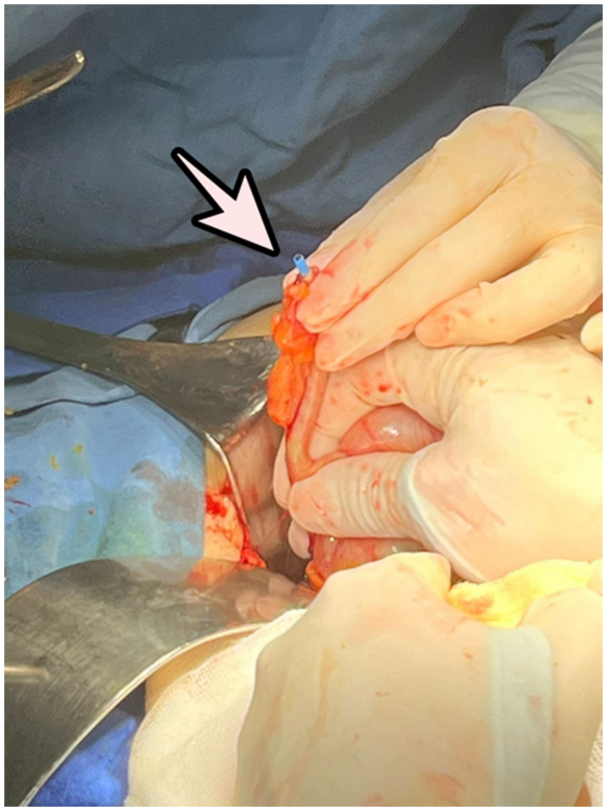

Figure 2. A biliary stent is observed protruding through the vermiform appendix, consistent with a stage II appendicitis (arrow).

Anatomically, the vermiform appendix is a tubular structure located on the posteromedial wall of the cecum, approximately 1.7 cm below the ileocecal valve, corresponding to the convergence point of the colonic teniae. Its average length is 91.2 mm in men and 80.3 mm in women. It is considered a true diverticulum due to the presence of all intestinal wall layers: mucosa, submucosa, circular and longitudinal muscular layers, and serosa. The appendicular artery—terminal branch of the ileocolic artery—runs through the mesoappendix to supply this structure. The anatomical variability of the appendix accounts for the wide spectrum of positional presentations (4–5).

Epidemiologically, up to 12% of individuals may develop acute appendicitis during their lifetime, with a higher frequency in men. The highest incidence occurs between 10 and 20 years of age, and the condition is uncommon in children under 2 and adults over 60 years (6). Abdominal pain is the predominant symptom and is often accompanied by fever, nausea, anorexia, and bowel habit changes such as constipation or diarrhea (7–8).

Pain typically progresses over 12–24 hours and is present in up to 95% of cases. It usually begins in the periumbilical or epigastric region and subsequently migrates to the right iliac fossa; however, this characteristic migration occurs in only 50–60% of patients (9). The point of maximal tenderness

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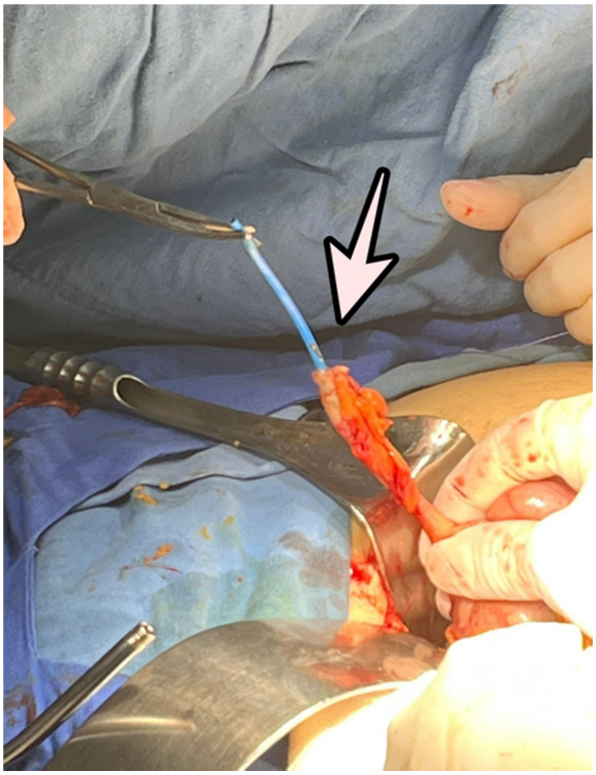

Figure 3. Intraoperative extraction of a biliary stent traversing the vermiform appendix (arrow).

corresponds to McBurney's point, located at the junction between the medial two-thirds and lateral one-third of the line connecting the umbilicus and the right anterior superior iliac spine (10).

Biliary stent migration

Endoscopic retrograde cholangiopancreatography (ERCP) is an essential diagnostic and therapeutic procedure in the management of biliary tract diseases, both benign and malignant. Placement of biliary stents is critical to ensure adequate bile drainage and prevent complications related to obstruction.

Biliary stents are used in various pancreatobiliary disorders, and although the procedure is considered safe, reported complications include cholangitis, perforation, bleeding, and pancreatitis (11–12). Different types of stents are available, including plastic (polyethylene, polyurethane, or Teflon) and metal variants (covered and uncovered), as well as stents made of stainless steel, nitinol, or platinol (13). Plastic stents are the most commonly used due to lower cost; however, they are associated with a higher risk of obstruction and migration compared to metallic stents, limiting their use primarily to temporary biliary drainage for 3 to 6 months (14).

Most plastic stents correspond to the Amsterdam type, characterized by a straight shaft and slightly curved ends to facilitate anchoring and reduce the risk of displacement. Despite this design, an overall migration incidence of 8.58% has been reported, including 4.58% proximal and 4.00% distal migration (15). Although distal migration rarely results in complications, isolated cases of perforation, device impaction, and hemorrhage have been documented (16).

Conclusion

Distal migration of biliary stents is an uncommon complication of endoscopic retrograde cholangiopancreatography, and its presentation as a cause of acute appendicitis is exceptional, with very few cases reported in the literature. This case highlights the importance of considering rare adverse events associated with endoluminal devices in the differential diagnosis of acute abdomen in patients with a history of ERCP and biliary stent placement.

Timely recognition, appropriate use of imaging studies, and early surgical intervention are essential to prevent potentially severe complications. Furthermore, this case underscores the need for standardized follow-up protocols in patients with biliary stents, particularly those made of plastic, in order to reduce the risk of migration and its consequences. The uniqueness of this presentation reinforces the value of clinical vigilance and reporting unusual complications to strengthen existing evidence and guide clinical practice.

Conflicts of interests

The authors declare no conflicts of interest related to this manuscript.

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