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Case Report

Surgical clip migration after laparoscopic cholecystectomy and Roux-en-Y bypass: a case report and literature review

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ABSTRACT

Surgical clip migration into the common bile duct (CBD) after laparoscopic cholecystectomy or transcystic CBD exploration is a rare but significant complication that may lead to recurrent obstructive jaundice, pancreatitis, cholangitis, or biliary colic. We report the case of a 57-year-old man presenting with postprandial epigastric pain and pale stools for four days. His medical history included a laparoscopic Roux-en-Y gastric bypass in 2010 and a laparoscopic cholecystectomy with CBD exploration nine months prior to admission. Physical examination revealed mild tenderness in the right upper quadrant without fever, nausea, or vomiting. Laboratory findings demonstrated a cholestatic pattern with elevated AST (123 U/l), ALT (440 U/l), AP (340 U/l), GGT (640 U/l), and total bilirubin (4.3 mg/dl). Imaging with CT and MRCP showed an obstruction of the distal CBD, consistent with a solitary choledocholithiasis measuring 7–12 mm. Due to the altered anatomy from the previous gastric bypass, laparoscopic CBD exploration was performed. Following a transverse choledochotomy, choledochoscopy revealed a fixed stone at the ampulla of Vater encapsulating a migrated hem-o-lok clip surrounded by bile debris. The clip was successfully retrieved using a Dormia basket, and the duct was irrigated and closed with interrupted PDS 4/0 sutures. The postoperative course was uneventful, with normalization of liver function tests and discharge on postoperative day four. This case highlights that although rare, clip migration should be considered in patients presenting with late biliary obstruction after cholecystectomy, and laparoscopic retrieval offers a safe and effective treatment option.

Keywords: Post cholecystectomy clip migration, Laparoscopy, Roux-en-Y bypass, Bile duct exploration

INTRODUCTION

Surgical clip migration into the common bile duct (CBD) is a rare but recognized complication after laparoscopic cholecystectomy. It may lead to obstructive jaundice, biliary colic, acute pancreatitis, or cholangitis.[1-3] Several studies have reported these complications in clinical practice.[2] Literature review demonstrates that endoscopic retrograde cholangiopancreatography (ERCP) is the most commonly employed and successful treatment.[4] However, in patients with a history of Roux-en-Y gastric bypass, ERCP is often not feasible, making surgical exploration of the CBD necessary. In this report, Authors describe a case in which migrated surgical clips were retrieved laparoscopically using a flexible cholangioscope and a Dormia basket.

CASE REPORT

Authors present a 57-year-old man with a history of postprandial epigastric pain and acholic stools for four days. His medical history included a laparoscopic Roux-en-Y gastric bypass in 2010 and a laparoscopic cholecystectomy with CBD exploration nine months prior. Physical examination revealed only mild tenderness in the right upper quadrant. The patient was afebrile and reported no nausea or vomiting. Laboratory tests showed a cholestatic liver function pattern: AST 123

U/l (<40), ALT 440 U/l (<50), ALP 340 U/l (30–115), GGT 640 U/l (5–35), and total bilirubin 4.30 mg/dl (<1.20). C-reactive protein was elevated at 152 mg/l.

Abdominal CT showed distal CBD obstruction, which was confirmed on MRCP as a solitary choledocholithiasis (7.2–12 mm) (Figure 1). In consultation with the gastroenterologist and abdominal surgeon, laparoscopic CBD exploration was indicated. Empirical treatment with amoxicillin-clavulanic acid was initiated. A transverse choledochotomy was performed. Upon introduction of a flexible cholangioscope, a fixed stone at the papilla of Vater was visualized. Using a Dormia basket, a Hem-o-lok clip encapsulated in bile salt debris and sludge was extracted (Figure 2). The CBD was irrigated, and the choledochotomy was closed with interrupted 4-0 PDS sutures. The patient had an uneventful recovery, with normalization of liver function tests by postoperative day 4, at which point he was discharged.

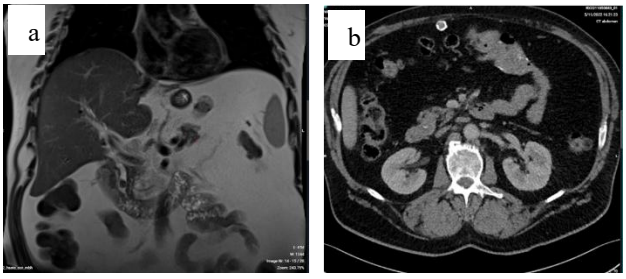

Figure 1: CT abdomen. (a) MR abdomen (Coronal imaging) shows significant dilation of the bile duct, with a distal biliary stone (b) Axial imaging show a linear density proximally from Vaters papil.

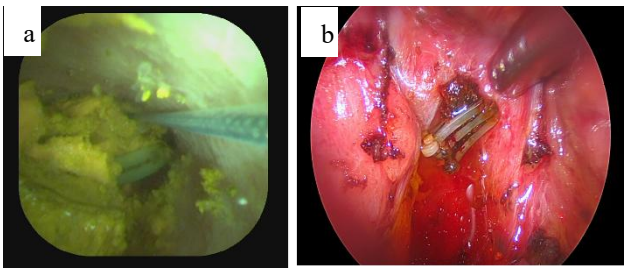

Figure 2: Intra-operative image (a) Migrated Hem-o-Lok clips obstructed proximal of Vaters papil. (b) The migrated clips after extraction out of the CBD

DISCUSSION

Laparoscopic cholecystectomy has become a widely performed procedure to its numerous benefits, including faster recovery, shorter hospital stays, decreased morbidity, and smaller incisions.[5] However, like any surgical procedure, it is not without complications. The most reported include biliary injury, bile leak, biliary stricture, retained common bile duct stones, post cholecystectomy syndrome, diarrhoea, vascular injury, abscess formation and bowel injury.[6] One rare complication that can arise after laparoscopic cholecystectomy is post-cholecystectomy clip migration (PCCM). PCCM can serve as a nidus for the formation of biliary stones and other bile related complications. Although more than 100 cases have been reported, it remains a relatively uncommon complication.[4] In a review of 69 cases conducted by Chong et al the common diagnostic presentations of PCCM included obstructive jaundice, cholangitis, biliary colic and acute pancreatitis.[4] Clinically reported studies indicate that in 1979 a first case of PCCM was reported, in which the clip leaded to the development of cholangitis.[7] Following this, various other institutions began to report similar cases, confirming the potential complications associated with clip migration. It is crucial to recognize that the true incidence of this condition may be underreported, possibly due to the gradual release and recognition of multiple cases over time.[8] A recent literature review further confirms the rarity of clip migration, yet highlights its significant clinical impact.[9]

The exact pathogenesis of PCCM remains unclear. Several processes have yet been proposed to explain its origin. Inaccurate clip placement during surgery can lead to bile duct injuries, triggering a local inflammatory response.[10] Concurrent bile leakage can result in the formation of a biloma, which forms an environment prone to infection. This inflammatory response and infection can subsequently lead to the embedding of the clip in the bile duct wall. Eventually resulting in the development of a biliary stricture.[4] According to Kitamura et al, clip migration occurs in four stages. External compression of surrounding tissue by the clip, inversion of the clip into the lumen of the CBD, necrosis of the CBD wall, allowing internalization of the clip, the CBD becomes covered by surrounding tissue.[11] The number of clips used for ligating the cystic duct may also influence the frequency of clip migration, as the use of more than four clips has been associated with a higher risk.[1]

Bile duct leakage

After establishing that cystic bile leaks are a contributing factor to post-cholecystectomy clip migration, it seems interesting to evaluate how we could optimize this by comparing various sealing options. Dijck et al conducted a comprehensive analysis to evaluate the efficacy of diverse techniques employed in transecting the cystic duct during laparoscopic cholecystectomy to mitigate the risk of bile duct leakage. The investigated methods encompassed simple non-locking clips, locking clips such as Hem-o-Lok, ligatures like Endoloop, absorbable clips, and vessel sealing devices such as Ligasure and Harmonic scalpel. In this extensive study, a total of 38,683 patients underwent cystic duct closure, with non-locking clips being the predominant choice in 81.5% of cases. Locking clips, ligatures, absorbable clips, and vessel sealing devices were employed in 3.9%, 7.6%, 2.7%, and 4.3% of cases, respectively.[13] Pooling data from the study revealed the incidence of bile duct leakage

for each method: non-locking clips (0.0025%), locking clips (0.0022%), ligatures (0.0006%), and vessel sealing devices (0.0065%). Notably, selection bias might influence these results, as more challenging cholecystectomies tended to involve vessel sealing devices, potentially contributing to a higher leakage rate. Conversely, a lower incidence of cystic bile leakage was observed with the use of ligatures securing the cystic duct with Endoloops. In the comparison between locking clips (1,579 patients) and non-locking clips (700 patients), the pooled odds ratio of 0.17 (95% confidence interval: 0.03-0.93) signified a significant advantage in favour of locking clips. Moreover, when vessel sealing devices (462 patients) were compared with non-locking clips (548 patients), a discernible preference for clips in reducing the occurrence of cystic bile leaks was evident. Another retrospective study comparing surgical outcome between Hem-o-Lok clips with metallic clips showed comparable results.[14] Hem-o-Lok clips have the advantage of a variety in size and locking mechanism, making the safer for use in wide cystic ducts.[15]

The optimal cost-effectiveness of different methods and devices used in laparoscopic cholecystectomy, including those for clip placement and cystic duct transection, is not well-studied. Considering the rarity of PCCM and the potential expense associated with vessel sealing devices, Locking clips (Hem-o-Lok) remain the gold standard for clip placement during laparoscopic cholecystectomy.

CONCLUSION

Surgical clip migration into the common bile duct is a rare complication of laparoscopic cholecystectomy, with or without transcystic CBD exploration. Treatment options typically include ERCP or if not possible (in case of Roux-Y gastric bypass history) surgical exploration of the CBD. In that case, successful retrieval of the migrated clip is recommended using a flexible cholangioscope and a Dormia basket. Notably, the presence of a previous gastric bypass necessitated a laparoscopic CBD exploration, underscoring the importance of adapting surgical techniques to individual patient anatomies in complex cases. To avoid this rare complication, a maximum of 4 locking clips is recommended.

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