Migration of Clips after Laparoscopic Cholecystectomy; A Case Report and Literature Review

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ABSTRACT

Postcholecystectomy clip migration is rare and can lead to complications such as clip-related biliary stones. Most of such incidents have been reported as case reports. This study reviews a case of postcholecystectomy clip migration. It can occur at any time but typically occur at a median of 2 years after cholecystectomy. Clinical presentations are similar to those with primary or secondary choledocholithiasis. Most cases can be managed successfully with ERCP.

KEYWORDS
Cholecystectomy; Complications; Clip migrations; Iatrogenic biliary stones; Endoscopic retrograde cholangiopancreatography

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INTRODUCTION

Introduced into the armamentarium of digestive surgery, laparoscopic cholecystectomy is now rapidly replacing conventional cholecystectomy.[1] This new procedure takes longer than open cholecystectomy/ but has numerous advantages such as: reduction of post-operative pain, shorter hospital stay and earlier return to full activity, and minimal abdominal incision and subsequent scar.[2,3]

Despite the fact that many published cases have been managed by very skillful surgeons, serious complications have been reported.[4] Certain complications such as gallbladder bed hemorrhage require a subsequent intervention by conventional open surgery, while others such as bile duct injury, or jejunal perforation require a laparotomy within a few days after the procedure. In this report we describe a case of complication, which occurred two months after laparoscopic cholecystectomy.

CASE REPORT

A 44-year-old woman was admitted to our center with 48 hours of intense abdominal pain, fever, and jaundice. A laparoscopic cholecystectomy had been performed for cholelithiasis two month earlier. Several days after the laparoscopic cholecystectomy a subhepatic collection was diagnosed and drained via ultrasound guidance through cutaneous drainage. The follow-up period was uneventful.

On admission in our center, she was febrile (39°C) and with jaun-

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dice. The liver was not palpable. Liver function tests were abnormal: alanine aminotransferase was 135 U/L (1 to 50 U/L), aspartate aminotransferase was 124 U/L (1 to 50 U/L), alkaline phosphatase was 270 U/L (37 to 111 U/L), and total bilirubin was 3 mg/dL. Endoscopic retrograde cholangiopancreatography (ERCP) showed bile ducts with normal caliber, no bile leakage from the cystic duct, and the clips were located in the distal part of the common bile duct (figure 1). The clips were easily removed using a Dormia basket following an endoscopic papillotomy. At one month follow-up the patient was asymptomatic. She was still symptom free and doing well 6 months after discharge from hospital.

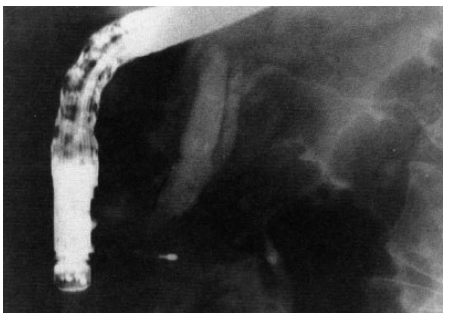

Fig 1:Cholangiogram obtained by ERCP

DISCUSSION

Cholelithiasis is common and cholecystectomy is the treatment of choice for the symptomatic disease. Cholecystectomy is one of the most common operations in clinical practice. In the United States, over half a million such procedures are carried out annually.[1] Since the introduction of laparoscopic technique, laparoscopic cholecystectomy (LC) has become the gold standard for the management of symptomatic gallstones disease.[1,2] Complications associated with LC have been reported to be <5%; however, it is still higher than that of open cholecystectomy.[3–5] Recent reports have shown lower and comparable complications rates.[6]

Complications can be categorized into early or late.[7] Early complications include bile duct injuries, bleeding, and wound infections. Most of such complications are minor and can easily be managed. However, serious early complications such as major bile duct injuries are associated with prolonged hospital stay, requirement for further surgeries, and potential long-term complications such as strictures, which all may result in increased health care costs.[7,8] They are also associated with litigation.[9]

Late complications include biliary strictures and postcholecystectomy clip migration (PCCM).

Since its introduction, surgical hemostatic clips have been widely used and are generally considered very safe. Migration of clips into the bile duct with resultant stone formations is well recognized.[10] The first case of PCCM was reported in 1978.[11] Despite the increasing number of cholecystectomy being performed annually, PCCM remains rare. Apart from migration into the biliary tree, PCCM leading to other complications such as duodenal ulcer or clip embolism have also been reported.[12–14] We reviewed and presented the characteristics and treatment outcome of a case of PCCM that had resulted in biliary complications.

Clinical symptoms are abdominal pain, jaundice, fever, nausea/vomiting, loss of appetite, pruritus, weight loss, obstructive jaundice, cholangitis (± septic shock), biliary colic, acute pancreatitis, incidental finding, abnormal liver function test/pruritus, and clip in abnormal position on radiography.

PCCM with resultant biliary complications are uncommon with only about 100 cases reported despite the large number of cholecystectomies carried out annually. Most of the published reports were originated from the three major continents (North America, Europe, and Asia), reflecting the large number of cholecystectomies performed in these regions. The number of reported PCCM in the literature peaked in the period of 1994–1998 and this correlated with the introduction of LC. This also correlated with higher complication rates of LC reported during the initial period and was attributed to the learning curve for this procedure.[13] As LC became the standard management of gallstones disease coupled with better training programs, complication rates of LC declined. This probably accounted for the subsequent decline in the number of cases reported. There were only 13 cases reported in 12 publications in the last 5-year period (2004–

2008).[14-17]

The sex and age predilections for PCCM reflected the epidemiology of gallstones disease, which is more common among women and the older age group.[4] Similarly, the manifestations of PCCM-related biliary complications were not different from the non-iatrogenic choledocholithiasis.

Most of the affected patients present with typical symptoms of choledocholithiasis. Imaging will be required to distinguish between post cholecystectomy primary common bile duct stones from PCCM-related biliary complications. Simple abdominal radiography may show abnormal positions of the metal clips.

The management of PCCM with biliary complications are similar to that of non-iatrogenic choledocholithiasis. Based on current recommendations, ERCP should be the modality of choice with surgery or percutaneous transhepatic cholangiography reserved as rescue procedures especially in the presence of difficult biliary strictures or large stones.[18, 19] Surgical extractions were utilized in the earlier period as ERCP techniques were still at its infancy and facilities and expertise were not widely available. This fact is highlighted by the cases where surgical interventions were chosen as the intervention to deal with biliary complications of PCCM.[19] Overall, surgical interventions had a success rate of 93.3%. The only case that had failed was due to the failure to detect a CBD stone during surgery.[20] The complicated nature of this particular case was probably an important factor. With respect to details of management and outcomes of PCCM, with a few types of interventions like ERCP with successful clearance (%89.9), ERCP became the modality of choice in the later period (previous 10 years) with a good success rate. This is consistent with the success rate reported for non-iatrogenic choledocholithiasis.[5,8] Even if we had included the publications that had reported on the six cases of PCCM that were successfully managed with ERCP, the overall success rate was only slightly better at 86.4%.[4] In most cases, only a single ERCP attempt was required for successful clearance. Two ERCP sessions were required in two cases.[3,7] Like the management of non-iatrogenic choledocholithiasis, it is important that an adequate endoscopic sphyncterotomy, is performed as it may facilitate spontaneous passage even if the initial ERCP extraction had failed. Most spontaneous passages of clip/stones had occurred within weeks of ERCP. The presence of strictures or stones that were too big or orientated in difficult positions was an important factor contributing to failures of ERCP extractions.

The exact pathogenesis of PCCM is unknown but is likely to involve complex sets of events occurring simultaneously as previously reported.[10] The underlying pathogenesis probably shares some similarities to the migrations of other foreign bodies into the biliary tree that included surgical sutures, ingested materials such as seeds, vegetables, and toothpicks, and projectile objects such as bullet and shrapnel.[10] The process involves the initial migrations of clip into the biliary tree and followed later by stone formations.

There are many factors that contribute to the migration process. These include inaccurate clip placements with resultant bile duct injuries, local suppurative inflammatory processes, bile leak with resultant biloma formation, and local infective processes.[10] In fact, it has been shown that, once a clip gets embedded within the bile duct wall, the process of clip migrations will continue.[7] The location of the stricture indicated the probable site of clip injury and migration. Inadvertent placement of clips inside the bile duct during the initial operation has also been suggested.

This can lead to early manifestations and probably accounted for those cases of early presentations soon after the initial surgeries. The number of clips used during the initial surgery is also an important factor. The use of more than four clips had been shown to be associated with clip migrations.[7] The median numbers of clips used in the cases of PCCM were six.

The indications for cholecystectomy were also important. In the acute inflammatory settings of acute cholecystitis or pancreatitis, dense adhesions and inflammations will distort the anatomy, increasing the risk for injuries. In our review, com-

plicated gallstones disease accounted for 23.2% of cases with PCCM with resultant biliary complications. However, this number might have been higher as the full details of the initial surgeries were not available in some of the reports.

LC itself may be a risk factor for complications.20 Generally, LC is technically more difficult and complications rates have been reported to be slightly higher compared with open cholecystectomy. Previous abdominal surgeries will further increase the risk.[8] Apart from biliary complications, PCCM resulting in non-biliary complications such as duodenal ulcer and embolizations had also been reported and the underlying pathogeneses are probably similar.[20,21]

In order to avoid PCCM complications, all the discussed factors need to be considered and avoided. Ideally, only two clips should be left behind after cholecystectomy. Others have advocated to the use of absorbable clips. However, PCCM have also been reported where absorbable clips had been used.[21] Clipless cholecystectomy using ultrasound activated harmonic scalpel may be an option. It has been shown to be effective, efficient, and a safe alternative for dissection and hemostasis.[9] In addition, harmonic scalpel has also been shown to be associated with fewer complications (mild or major bile leaks and gallbladder perforation) and shorter operation time. Its use in acute cholecystitis has also shown to be safe.[20]

Along with technologic advancements, newer and less invasive techniques are being developed and adapted for the management of many clinical disorders including gallstones disease. These techniques include the use of fewer or single port LC and the natural orifice transluminal endoscopic surgery. In fact, such modalities have been shown to be feasible for the management of gallstones disease and are already being used in some centers.[20,21] Therefore, it will be interesting to see if there will be an increase in the number of complications related to these newer modalities as complications are associated with the learning curve for these procedures.

Overall, PCCM is rare. However, it is possible that the true incidence of PCCM with resultant biliary complications is underestimated. Firstly, clip migrations may go unnoticed as spontaneous clip passages had been reported. Seven of the reported cases had spontaneous clips/stones migrations either after failed ERCP extractions or after LC. All had endoscopic sphynctrotomy done during ERCP.[20] Therefore, the routine use of precholecystectomy ERCP with endoscopic sphynctrotomy may be an important factor.

Secondly, it is possible that additional publications especially in non-English journals that might not be indexed in reputable indexing systems have been missed. Finally, cases of PCCM might have gone unreported or have been included as part of other type of publications.[4] However, the overall number of missed cases is likely to be small. In conclusion, although rare, PCCM with biliary complications need to be considered in the differential diagnosis for patients presenting with typical symptoms even many years after cholecystectomies. The clinical manifestations are similar to that of primary or secondary non-iatrogenic choledocholithiasis and ERCP is currently the treatment of choice. The recent number of reported cases of PCCM with biliary complications has shown a declining trend, probably as a result of better training programs. However, it will be interesting to see if the there will be any increase in the complication rates of cholecystectomies, including PCCM, as newer techniques are being introduced for the management of symptomatic gallstones disease.[21]

CONFLICT OF INTEREST

The author declares no conflict of interest related to this work.

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