

# CBD Stone Formation Over Migrated Surgical Clip: A Rare Complication Developed Fourteen Years after Laparoscopic Cholecystectomy

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## Abstract

### Keywords

- ▶ common bile duct stone
- ▶ endoscopic retrograde cholangiopancreatography
- ▶ laparoscopic cholecystectomy
- ▶ surgical clip migration

Laparoscopic cholecystectomy (LC) is currently the treatment of choice for symptomatic gallstones. Migration of surgical clips into common bile duct (CBD) is a rare complication after LC. Migrated surgical clips may lead to further complications like cholangitis, choledocholithiasis. We report a rare case of CBD stone formed over migrated surgical clips, 14 years after LC. A 41-year-old male with history of LC 14 years back, presented with repeated episodes of biliary colic. Computed tomography (CT) scan abdomen showed CBD stones with metallic foreign bodies and prominent CBD. Patient was managed successfully with endoscopic retrograde cholangiopancreatography. Patient became asymptomatic thereafter. This case is a rare complication developed after a very commonly performed surgery.

## Introduction

Surgical clip migration into common bile duct (CBD) is a rare complication of laparoscopic cholecystectomy (LC). The exact pathophysiological mechanism of clip migration is poorly understood. Migrated surgical clip in CBD acts as nidus for stone formation. Most of such patients present with cholangitis, obstructive jaundice, or biliary colic. The time frame between LC and clip migration varies from few days to 17 years with a mean of 26 months.<sup>1</sup> This case report describes a patient who underwent LC 14 years back, now presented with biliary colic due to CBD stone formed over a migrated surgical clip.

## Case

A 41-year-old male presented with biliary colic of 2 months duration. Past surgical history included LC in the setting of acute calculous cholecystitis 14 years back, excision of lipoma over left anterior abdominal wall 3 years back, and left inguinal hernioplasty 1 year back. Physical examination revealed tenderness in right hypochondriac

region. Laboratory parameters including liver function tests were within normal limits. Ultrasound of abdomen revealed CBD dilatation with CBD stones. Computed tomography scan of abdomen showed CBD dilatation with CBD calculi and metallic foreign body within CBD calculi (▶ Fig. 1). Clinical scenario was suggestive of CBD stone formed over migrated surgical clip. An endoscopic retrograde cholangiopancreatography (ERCP) was performed, which showed dilated CBD with two filling defects and central radiopaque densities within filling defects. Sphincterotomy with sphincteroplasty was performed with successful extraction of two CBD stones formed over migrated surgical clips (▶ Fig. 2). Post ERCP, magnetic resonance cholangiopancreatography was done which confirmed normal CBD diameter with disappearance of CBD stones and metallic foreign bodies (▶ Fig. 3).

## Discussion

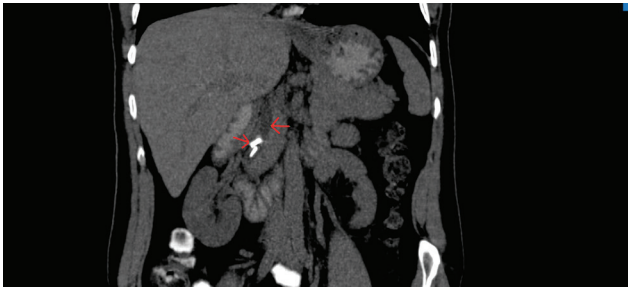
Laparoscopic cholecystectomy is a standard treatment for symptomatic gallstones. Exposure of Calot's triangle and securing gall bladder vessels and cystic duct are important

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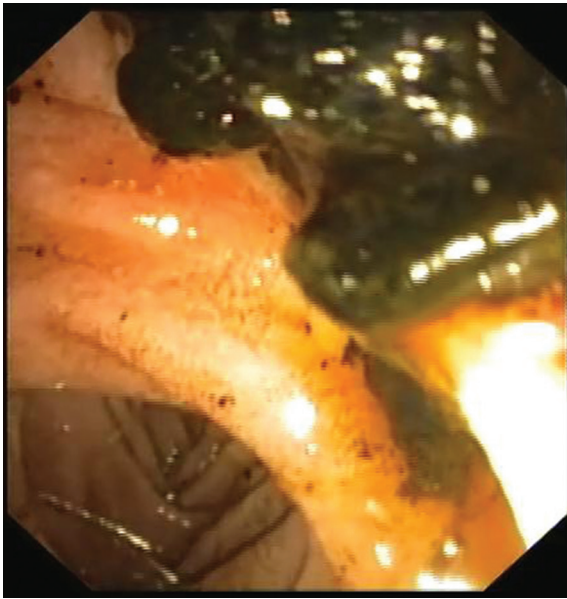
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**Fig. 1** CT scan image showing CBD stone with metallic foreign body (arrow) and CBD dilatation. CBD, common bile duct; CT, computed tomography.



**Fig. 2** Endoscopic image showing retrieved CBD stones formed over migrated surgical clips. CBD, common bile duct.

steps of LC. Usually, surgical clips are applied for securing cystic duct and artery. Application of clips over cystic duct and cystic artery is quite safe and effective in most of the cases. Migration of clip is a less frequent and less discussed complication after LC. First case of clip migration into CBD after LC was reported in 1992.<sup>2</sup> To the best of our knowledge, fewer than hundred cases of clip migration have been reported in the English literature till date. Exact pathophysiological mechanism of migration of surgical clips is poorly understood. One of the postulated mechanism is, involution or inversion of cystic duct stump with attached clip into the lumen of CBD as a result of compression by local structure, mainly liver.<sup>3</sup> Another possible mechanism may be erosion of bile duct because of pressure exertion by clip. Movement of clip within abdominal cavity leads to erosion of CBD and migration of clips along the path of least resistance.<sup>4</sup> Factors which may predispose to migration of clip are short cystic duct stump, weakened cystic duct stump due to ischemic or infective necrosis, number of clips used is more than five, manipulations after clipping (uncontrolled irrigation and aspiration, retraction of porta hepatis, etc.), and LC done in the setting of acute cholecystitis or pancreatitis.<sup>5</sup> Absorbable



**Fig. 3** MRCP image (Post ERCP) showing normal diameter CBD with disappearance of CBD stones and metallic foreign bodies. CBD, common bile duct; ERCP, endoscopic retrograde cholangiopancreatography; MRCP, magnetic resonance cholangiopancreatography.

suture material and clips have also been tried but they may still act as nidus for stone formation. Migrated surgical clips may lead to several complications like choledocholithiasis, clip embolism, cholangitis, biliary colic, acute pancreatitis, biliary-colic fistula, and duodenal ulcer.<sup>6-8</sup> Migrated clip into CBD acts as nidus for stone formation. Duration of migration of clips after LC is observed to be 11 days to 17 years with a mean of 26 months.<sup>1</sup> Clinical presentation of CBD stone formed over migrated clip is usually similar to noniatrogenic choledocholithiasis. Treatment of choice in such clinical scenario is ERCP. In experienced hands, such cases are managed successfully by ERCP. To prevent migration of clips, following technical factors should be considered at the time of surgery: minimizing the number of clips, confirming the relationship of Calot's triangle during dissection, avoiding LC during acute pancreatitis and acute cholecystitis, minimal manipulations after application of clips, and avoiding short cystic duct stump.<sup>5</sup> In our case, possible factors which might have played role in the migration of clips into CBD would have been LC done in the setting of acute calculous cholecystitis. Though case of clip migration after LC has been reported to be as late as 17 years, but more than 5 years duration is hardly observed.<sup>1</sup> Our case developed clip migration into CBD after 14 years of LC which is also quite rare.

In conclusion, surgical clips applied in LC may migrate into CBD leading to various complications. Due care should be taken while selecting candidates for LC and clip application. Also, clinician should have high index of suspicion of complications related to clip migration after LC.

**Conflict of Interest**

None declared.

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