

CASE NOTE

Unexpected bile duct stones formed around surgical clips 4 years after laparoscopic cholecystectomy

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Fig. 1. An endoscopic retrograde cholangiopancreatography scan shows a filling defect with 2 metallic surgical clips inside at the proximal part of the common bile duct, suggesting clip-induced bile duct stones.

Laparoscopic cholecystectomy is considered the first choice treatment for symptomatic cholecystolithiasis. This generally safe procedure has few perioperative complications such as major bleeding, wound infection, bile leakage, and biliary and bowel injury. Long-term postcholecystectomy complications, even years after surgery, are the postcholecystectomy syndrome and recurring complaints owing to bile duct stones that are either retained postoperatively, recur due to stasis of (infected) bile or, rarely, are the result of stone formation around a foreign body. We describe the case of a patient with stones that developed around migrated clips after cholecystectomy.

CASE REPORT

A 65-year-old woman underwent elective laparoscopic cholecystectomy for symptomatic bile duct stone disease. The surgery report described a wide cystic duct (CD) that surgeons were only able to partially clip before removing the gallbladder and clipping the CD further. Five days after surgery, she experienced cramping abdominal pain and subfebrile temperature. Subsequent laparotomy revealed a pus-filled cavity located in the right paracolic gutter. Fluid cultures showed *Escherichia coli*, for which cefuroxim was prescribed. There was no bile leakage at the primary surgical site.

Four years later, the patient presented at the emergency department with colicky right upper abdominal pain, without fever or jaundice. Liver enzymes were elevated. Abdominal ultrasound revealed concretions in a nondilated (diameter 0.6 cm) distal common bile duct. Endoscopic retrograde cholangiopancreatography (ERCP) showed 2 gallstones formed around cholecystectomy clips (Fig. 1). We performed a sphincterotomy and moved the clips into the common bile duct. Upon attempting to grasp them with a Dormia basket, we found that the material around the clips appeared to be soft and crumbled easily. We therefore left the denuded clips to pass the sphincterotomy spontaneously. After this procedure, the patient's cholestatic parameters normalized, and she recovered well. An abdominal radiograph 1 day after ERCP showed 2 clips in the common bile duct (Fig. 2); these were no longer visible 4 weeks later, most likely because they had migrated into the duodenum and were excreted with the stools (Fig. 3).

DISCUSSION

Clip-induced bile duct stones have been a rare but emerging complication of cholecystectomy ever since clips came into use in surgery. Walker and colleagues¹ were the first to describe this phenomenon in 1979. Since then, many case



Fig. 2. A plain abdominal radiograph 1 day after endoscopic retrograde cholangiopancreatography shows the 2 denuded metallic clips mobilized to the distal end of the common bile duct. The remaining clips are present at the cystic duct site.



Fig. 3. A control plain abdominal radiograph 2 weeks after endoscopic retrograde cholangiopancreatography. The clips in the common bile duct have likely passed through the sphincterotomy spontaneously. The other surgical clips are still in situ.

reports appeared, but to our knowledge, exact incidence data are not available.

Symptoms of clip-induced gallstones are essentially the same as those of non-clip induced gallstones. Abdominal ultrasound is the most accurate method to reveal bile duct stones. Plain abdominal radiographs may reveal migration of clips by their unexpected location. Most often, however, clip stones are not diagnosed until an ERCP is done: clip stones are seen during fluoroscopy or after ERCP into the removed material. Additionally, abdominal computed tomography and magnetic resonance cholangiopancreatography can be useful diagnostic tools. Endoscopic removal is the treatment of choice. Occasionally, this is unsuccessful when clips are too firmly embedded into the bile duct wall,² in which case a laparotomy or stone removal by percutaneous transhepatic cholangiography might be needed.

The time lag between cholecystectomy and symptomatic gallstones varies from months to years. Once in the common bile duct, clips serve as a nidus for stone formation. Clearly, this is a slow process. A similar mechanism is seen in the urinary bladder, in which foreign material like indwelling Foley catheters or intravesical suture material can lead to stone formation.³

It is unknown how surgical clips are able to pass the intact layers of the choledochal ducts. First, local bile duct-associated factors occur, including a short CD stump after cholecystectomy, CD ischemic necrosis and infective complications resulting in necrosis, and weakening of the CD stump.⁴ Use of immunosuppressives can aggravate these factors. Second, technical factors occur, including inadvertent clip dislodgement or incorrect placement, each of which can leave clips easy to loosen and dislocate. Moreover, difficulties in clipping the CD owing to anatomic variations (e.g., wide or curly duct) can lead to temporal bile leakage, providing an entry site for clips into the common bile duct. Most physicians consider technique-related factors as pivotal in the process of migration and stone formation. In our patient's case, insufficient clipping of the CD and post-operative intra-abdominal pus collections leading to weakening of the choledochal wall might have been causative factors.

Prevention of clip-induced stone formation has proven to be difficult. Most importantly, surgeons should apply clips carefully and use the minimum number of clips necessary. Blind application of clips must be prevented. Surgeons should identify bleeding

focuses carefully to allow proper clip placement. However, it is known that even well-placed clips can migrate owing to local ischemic damage or suppurative complications.⁴

In conclusion, symptomatic clip stones due to migrated CD stump clips are a rare but established complication of cholecystectomy. Surgeons should consider stones in the differential diagnosis of patients with biliary colics or cholangitis after cholecystectomy, even years after surgery.

Competing interests: None declared.

References

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