Choledochal stenosis and lithiasis caused by penetration and migration of surgical metal clips

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Abstract A 71-year-old woman, who had undergone laparoscopic cholecystectomy 1 year previously at our hospital, presented with abdominal pain, high fever, and jaundice. She was diagnosed with choledochal stenosis caused by migration of the clips that were used at the previous operation. At reoperation, the common bile duct was successfully dissected, including the stenotic site, where a metal clip was found to be penetrating the duct wall. The stenotic site was sufficiently resected, when a black-brown gallstone was found proximally to the stenosis. Interestingly, the stone was found to contain two metal clips, which were considered to have migrated into the bile duct and to have acted as a nidus for stone formation. The common bile duct was reconstructed by direct end-to-end anastomosis. Surgeons must exercise caution in the use of metal clips, keeping in mind the potential risk of clip migration.

Key words Surgical clips · Migration · Common bile duct · Stenosis · Gallstone

Introduction

In laparoscopic cholecystectomy, metal clips are usually used to deal with vessels and the cystic duct. It is rare, however, that the clips migrate into the common bile duct (CBD) and act as a nidus for gallstone formation. We experienced an unusual case of CBD stenosis, which seemed to be caused by a clip that had penetrated the duct wall; this stenosis was associated with a CBD stone, the nidus of which was considered to be surgical metal clips that had migrated to the CBD.

Case report

A 71-year-old woman was referred to us because of abdominal pain, high fever, and jaundice. She had had endoscopic sphincterotomy for choledocholithiasis and laparoscopic cholecystectomy for acute cholecystitis with cholelithiasis, performed at our hospital 1 year previously. At that operation, many clips had been used on the Calot triangle to control bleeding attributable to severe inflammation. Perioperative postcholecystectomy cholangiography had shown no evidence of residual stones or stenosis of the CBD. Her postoperative course had been uneventful.

Endoscopic retrograde cholangiography demonstrated a significant stenosis in the CBD, which seemed to be caused by the surgical clips (Fig. 1). Computed tomography (CT) also seemed to show that the clips caused the stenosis. Two clips had migrated into the CBD and another had penetrated the CBD wall (Fig. 2).

At operation, the CBD was successfully dissected, including the stenotic site, which was thickened and adhered tightly to the surrounding tissues. The stenotic site was segmentally resected. A black-brown stone was found in the CBD proximal to the stenosis. Interestingly, the stone was found to contain two metal clips (Fig. 3). The CBD was reconstructed by anastomosing two cut-ends directly, with the placement of a transhepatic bile duct drainage tube in the CBD. The patient’s postoperative course was uneventful. She was discharged 3 weeks postoperatively.

Histologically, the stenotic site in the CBD showed non-specific, chronic inflammation with diffuse inflammatory round-cell infiltration, thinning mucosa, and fibrous thickening of the wall.
Discussion

In the literature, various foreign bodies have been reported to provide a nidus for stone formation in the biliary tract. Ban et al. classified biliary tract foreign bodies into three main categories: operative residuals, missiles, and ingested items, reporting that silk ligatures were the most frequent nidus for stone formation in the group with operative residuals.

In 1979, it was first reported, by Raoul et al., that surgical vessel clips had migrated into the biliary tract and caused formation of a CBD stone after cholecystectomy with laparotomy. Since then, there have been approximately ten reported cases similar to the first one. Raoul et al. also first reported the migration of surgical clips into the biliary tract acting as a nidus for stone formation, after laparoscopic cholecystectomy, and suggested that clip migration might be a new complication of this procedure. Furthermore, in a prospective evaluation of the fate of clips placed at laparoscopic cholecystectomy in 71 patients, it was found that 11 patients presented some evidence of clip migration within 1 year. The clips had migrated from their initial sites at various intervals, most frequently (7 of 11) within the first month postoperatively. One patient in this series developed a brown pigment gallstone containing a clip as the nidus 26 months postoperatively.

With regard to the pathogenesis of clips migration into the CBD, Raoul et al. hypothesized that the clips might have been improperly applied, and therefore did not ensure complete closure of the cystic duct, allowing the development of biloma. This biloma probably drained off later into the common bile duct via the cystic...