FULL CASES

Endoscopic management of a major bile duct stricture from surgical clips following laparoscopic hemicolectomy

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SUMMARY

Benign postoperative bile duct strictures are usually complications of cholecystectomies. However, development of obstructive jaundice and biliary stricture as a result of surgical clips after laparoscopic right hemicolectomy is rare and has not been reported in the literature. We present a case of a 64-year-old woman who presented with sudden onset jaundice and abdominal pain, 1 week following right hemicolectomy. Laboratory reports suggested obstructive jaundice. Subsequent imaging studies showed biliary dilation of both intrahepatic and extrahepatic ducts with no evidence of bile duct stones. The endoscopic retrograde cholangiopancreatography (ERCP) showed an abrupt, complete obstruction of the common bile duct at the level of the surgical clips. The bile duct stricture formed at the site of surgical clips improved significantly after serial incremental biliary dilations with successive placement of increasing number of endoprotheses side-by-side at repeat ERCP sessions.

BACKGROUND

Benign postoperative bile duct strictures are a major iatrogenic catastrophe and generally occur as complications of both open and laparoscopic surgeries for gallbladder stones.¹ Laparoscopic colectomies are often performed for large endoscopically unresectable polyps, colon cancer, medically refractory Crohn's disease, recurrent diverticulitis and bleeding from diverticulae or arterial venous malformations. However, the development of biliary stricture after laparoscopic right hemicolectomy is an extremely rare condition and has not been reported in the literature. There is no definitive treatment for these iatrogenic biliary strictures. We present the management of a patient with a common bile duct (CBD) stricture that developed following right hemicolectomy due to multiple surgical clips placed across the CBD.

CASE PRESENTATION

A 64-year-old Caucasian woman had a laparoscopic hemicolectomy for a large endoscopically unresectable polyp at an outside hospital (OSH). There were no recorded intraoperative complications or any identified biliary injury. One-week postsurgery, she developed sudden onset jaundice with dark urine, nausea and increasing epigastric and right upper quadrant abdominal pain. She was seen at the OSH and she denied any bowel complaints, fever, chills or pruritus. Her medical history was

not significant for gastrointestinal disorders or any previous abdominal surgeries except for the right hemicolectomy 1 week prior. Physical examination revealed jaundice as well as mild tenderness in the right upper abdominal quadrant, but no palpable mass or ascites. The surgical scar had healed appropriately. Imaging revealed dilated intrahepatic and extrahepatic bile duct and distended gallbladder. The initial attempt at the OSH to do an endoscopic retrograde cholangiopancreatography (ERCP) failed and was complicated by post-ERCP pancreatitis. Attempt at percutaneous transhepatic cholangiography (PTC) also failed. A cholecystostomy tube was placed at the OSH, and a cholangiogram performed through the cholecystostomy tube noted non-visualisation of CBD below the level of surgical hemicolectomy clips in multiple projections (figure 1). The patient was then transferred to our institution for further management.

INVESTIGATIONS

Initial laboratory reports at the OSH revealed a total bilirubin of 10.8 mg/dl, direct bilirubin of 6 mg/dl, alkaline phosphatase of 306 U/l, alanine aminotransferase 307 U/l and aspartate aminotransferase 181 U/l. Ultrasound of the abdomen showed both extrahepatic and intrahepatic biliary dilation with no evidence of bile duct stone obstruction. It also showed a distended gallbladder with a large amount of sludge. Attempt at ERCP was unsuccessful and complicated by acute pancreatitis (amylase 4800 U/l and lipase 16 281 U/l). She then underwent a CT scan for worsening abdominal pain, which was consistent with distended gallbladder, intrahepatic ductal dilation and pancreatitis without evidence of necrosis.

On admission at our hospital, the patient's laboratory reports were consistent with obstructive jaundice and pancreatitis, although her pancreatic enzymes were trending down. An ERCP was performed, which showed an abrupt, complete obstruction at the middle third of the CBD at the level of the previously placed surgical clips from right hemicolectomy suggestive of clips on the bile duct (figure 2). C-arm fluoroscopy was utilised in the case and multiple projections were consistent with the CBD obstruction.

TREATMENT

At the first ERCP session a successful biliary sphincterotomy was performed and balloon dilation of the bile duct was performed over a wire at the level

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Figure 1 (A–C) Cholangiogram showing filling of the gallbladder, cystic duct as well as filling of the right intrahepatic ducts, common hepatic duct and proximal common bile duct, which are mildly dilated. There is no appreciable filling of the distal common duct or flow of contrast into the duodenum.

of obstruction after a 0.035 inch wire was advanced across the obstruction. Finally, a 10FR×12 cm biliary stent was placed successfully across the obstruction. Postprocedurally, the patient improved clinically with resolution of pain and resolution of liver function test abnormalities.

OUTCOME AND FOLLOW-UP

A repeat ERCP after 8 weeks from first ERCP for re-evaluation and stent upsizing was performed. The previously placed 10FR stent was removed and selective cholangiogram revealed a single 17.4 mm long, irregular stricture of benign appearance at the middle third of the CBD in the region of the previously placed surgical clips (figure 3). The diameter was then progressively dilated. Two 10FR×15 cm biliary stents and one 8.5FR×12 cm biliary stent were placed across the obstruction. Postprocedure, the patient's liver function tests were normal.

Repeat ERCP 18 weeks after second ERCP showed an improved benign stricture as compared with the previous. The three plastic stents placed in the biliary ducts were removed and after successful progressive dilation, four 10FR×12 cm biliary stents were placed (figure 4). Follow-up ERCP 6 months after the third ERCP showed further improvement in the biliary stricture, but since there was persistent narrowing, a fully covered removable metal 10 mm×80 mm biliary wallstent was placed after removal of the four plastic stents.

Six months after the fourth ERCP, the fully covered metal stent was removed. Selective cholangiogram showed complete resolution of the complex iatrogenic stricture (figure 5).

Follow-up liver function tests carried out at 2, 3, 6, 12 and 24 months after hemicolectomy were within normal limits. The

patient remained completely asymptomatic and there were no complications at a follow-up of more than 3 years.

DISCUSSION

Laparoscopic colectomy offers a safe and effective management for colonic polyps that are either too large or are at colonoscopically inaccessible sites.² Bile duct injury and stricture formation is not a known complication of right hemicolectomy and has not been reported in the literature to the best of our knowledge. Most benign bile duct strictures are iatrogenic, resulting from operative trauma mostly from gallbladder surgeries. The reported incidence of bile duct injuries is up to 0.6% for laparoscopic versus 0.1% for open cholecystectomy.¹ Anastomotic bile duct strictures are also seen following bile duct reconstruction or orthotopic liver transplant.³ Bile duct injuries are very serious due to the associated morbidity, prolonged hospitalisation and mortality.⁴

Although not reported in the literature, theoretically bile duct injury following laparoscopic right hemicolectomy is a possibility given to the anatomical proximity of right side of colon, especially the hepatic flexure and proximal transverse colon to the hepatobiliary area. The CBD obstruction and stricture formation could have been a result of direct trauma (clip placement), or hepatic artery ligation during hemicolectomy. We believe that bile duct injury in this patient was most likely the result of direct trauma to CBD from misplacement of surgical clips across the CBD rather than an ischaemic injury. This can be explained by the fact that a cholangiogram performed through the cholecystostomy tube and cholangiogram performed at ERCP showed no appreciable filling of the common

Figure 2 Complete obstruction of common bile duct at the level of surgical clip.

Figure 3 Complex strictured appearance of the common bile duct in the region of the previously placed surgical clips following removal of stent.

Figure 4 Four biliary stents.

duct beyond the surgical clips. In addition, endoscopic therapy resulted in migration of clips from previous position/orientation. Erroneous placement of surgical clip could be the result of negligence or misidentification due to poor visualisation, improper technique and/or difficult anatomy. Surgical clip migration and biliary complications after cholecystectomy have been reported in literature.⁴ The migration of the clip was unlikely in this case as the time from hemicolectomy to start of symptoms (approximately 1 week) was not enough for the clip to migrate and completely obstruct the CBD. If the duct is clipped, patients usually present within days postoperatively.³

Initially, the surgical clip caused sudden onset obstructive jaundice, and abdominal pain. Trauma to the bile duct from this surgical clip may cause local inflammation, and fibrosis eventually leading to bile duct stricture formation. Secure and correct placement of surgical clips could help prevent this iatrogenic catastrophe.

Early diagnosis of these biliary strictures is imperative to prevent irreversible fibrosis and life-threatening complications, such as ascending cholangitis, liver abscess and secondary biliary cirrhosis.³ Several studies have suggested that ERCP is a safe, effective, minimally invasive treatment for bile duct strictures

after cholecystectomy.^{3 5 6} Prior to endoscopic therapy, postoperative bile duct injuries had been treated by surgical repair, a biliodigestive anastomosis mostly a proximal hepatico-jejunostomy with Roux-en-Y jejunal loop.⁷ Today endoscopic treatment is preferred and should be the initial method of treating these bile duct injuries, as its failure will not compromise the following surgical treatment whereas endoscopic treatment is more difficult once a Roux-en-Y loop has been constructed.^{3 5 6}

Our treatment plan was serial incremental biliary dilatation with successive placement of an increased number of biliary stents to develop luminal patency. Sphincterotomy was performed due to the necessity for repeated stent exchanges and side-by-side stent placement. There was a significant clinical improvement in the patient's condition after the first ERCP. The stricture showed progressive improvement and eventually resolution through subsequent ERCPs.

In summary, this was a rare case of an obstructive jaundice posthemicolectomy from bile duct stricture secondary to clipping of the CBD, which was treated successfully with endoscopic stent placement. The successful result obtained in our patient suggests that if an iatrogenic injury to the bile duct is suspected following surgery, ERCP should be attempted and endoscopic therapy should be employed as a less invasive, first-line management approach. The advantages of endoscopic treatment are its simplicity, safety, minimal invasiveness, favourable long-term outcomes and lower costs.

Learning points

- ▶ Postoperative bile duct strictures are usually complications of gallbladder surgeries but other abdominal surgeries such as laparoscopic hemicolectomy may also result in obstructive jaundice and bile duct stricture.
- ▶ Early diagnosis of these biliary strictures is imperative to prevent irreversible fibrosis and life-threatening complications, such as ascending cholangitis, liver abscess and secondary biliary cirrhosis.
- ▶ If the biliary stricture secondary to surgical clip after any surgical procedure is susceptible to dilation and stent insertion, endoscopic dilation and stent insertion should be adopted as a less invasive, first-line management approach.

Figure 5 Complete resolution of common bile duct stricture.

Competing interests None.

Patient consent Obtained.

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