Endoscopic cystic duct stent as primary treatment for intrahepatic gallbladder perforation with abscess formation

P Williams, R French, B Paranandi, C Wilson, R Charnley

Freeman Hospital, Hepatobiliary and Pancreatic Surgery, Newcastle upon Tyne, UK

ABSTRACT

Intrahepatic gallbladder perforation with abscess formation is an uncommon presentation of biliary disease. There is no consensus on how to treat this condition, with strategies varying from percutaneous drainage to open cholecystectomy and washout. We present a case of a novel, minimally invasive treatment, using endoscopic retrograde cholangiopancreatography to place a transcystic drain as a bridge to laparoscopic cholecystectomy.

KEYWORDS

Intrahepatic gallbladder perforation – Cystic duct stent – Hepatic abscess

Accepted 4 February 2017

CORRESPONDENCE TO

Paul Williams, E: Paul.williams2424@gmail.com

Perforation of the gallbladder is a rare presentation of gallstone disease, with recent literature showing an incidence of 3.2%.^{1,2} Niemeier classified gallbladder perforations into three types:

type I: acute perforation into the abdomen, with biliary peritonitis

type II: sub-acute pericholecystic abscess development

type III: a consequence of chronic cholecystitis with formation of a bilioenteric fistula.^{1,2}

The most recognised sequelae are an acute abdomen with free fluid in the peritoneal cavity or fistulation into a hollow viscus.^{1,2} The formation of an intrahepatic abscess is rare, with only anecdotal cases in the world literature, but it carries a significant mortality of 5.6%.²

We report a case of intrahepatic abscess formation as a consequence of gallbladder perforation and a novel approach to the management of this condition.

Case history

A 61-year-old man presented with right upper-quadrant pain, fever and vomiting. His blood tests demonstrated a normal white blood cell count with an elevated C reactive protein (CRP) 16 (mg/L). His liver function tests (LFT) were normal except an elevated alkaline phosphatase at 269 u/L. Prothrombin time and albumin levels were normal. Computed tomography (CT) of the abdomen and pelvis revealed a 5-mm perforation of the lateral wall of the gallbladder, which communicated with a 4.8-cm intrahepatic abscess in segment V (Fig 1). There was concomitant thickening of the gallbladder wall, with a large stone impacted in the

gallbladder neck (Fig 2). Initially, management was intravenous antibiotics, followed by an endoscopic retrograde cholangiopancreatography (ERCP) and cystic duct stenting.

ERCP Technique

The common bile duct was cannulated using the double-wire technique. An initial cholangiogram showed no

Figure 1 A 5-mm perforation in the posterolateral gallbladder wall.

Figure 2 Large stone impacted at gallbladder neck with 4.8cm segment V liver abscess.

abnormality of the extrahepatic biliary tree. On injection of contrast, pus was seen to extrude from the major duodenal papilla. In light of this, a sphincterotomy was performed and a 9-cm, 7 French gauge plastic common bile duct stent passed into the cystic duct.

The patient had an uneventful recovery and was discharged three days following the ERCP. He completed six weeks of oral co-trimoxazole (as per microbiology advice). Upon outpatient review, seven days after discharge, he reported no complications from the procedure and exhibited no signs or symptoms of sepsis. CT of the abdomen at six weeks revealed a reduction in abscess size to 2.8cm (Fig 3) with good drain position (Fig 4). Keen for a definitive solution, the patient opted for laparoscopic cholecystectomy with simultaneous endoscopic stent retrieval. This was successfully performed with no immediate complications and the patient has now been discharged from routine follow up.

Discussion

Gallbladder perforation with intrahepatic abscess formation is an extremely rare condition, with only around ten cases documented in the world literature.¹ For perforation to occur, the cystic duct must become occluded. In the context of cholecystitis this is usually due to calculi. The stone acts as a ball valve, allowing bile to enter the gallbladder but not to exit. This results in gallbladder distension and a rise in intraluminal pressure, in turn preventing venous and lymphatic drainage of the gallbladder wall. The resulting vascular compromise leads to necrosis and perforation.

In bypassing the ball valve mechanism produced by the occluding calculus, the gallbladder is effectively decompressed. Decompression is usually achieved by ultrasound-guided percutaneous drainage;¹ however, this procedure

has its own risks, including fistula formation, bleeding and displacement of the drain. Percutaneous drainage acts as a bridge to laparoscopic cholecystectomy, depending upon the patient's fitness for surgery. Even after abscess drainage, these operations remain technically challenging and have a high rate of conversion to open surgery. Other authors have proposed antibiotic therapy with en-bloc resection of both gallbladder and the abscess itself.² The studies suggesting

Figure 3 Follow up CT scan showing reduction in abscess cavity size to 2.8cm.

Figure 4 Transverse section showing drain placement.

open cholecystectomy as primary intervention have not reported any surgical complications. However, both teams commented on the technical difficulty involved in such an operation owing to the presence of adhesions, with one team opting for subtotal cholecystectomy to reduce the risk of bile duct injury.^{1,2}

ERCP is routinely used for the retrieval of stones from the common bile duct and stent placement in malignant and benign lesions of the biliary tree. Placement of a stent into the cystic duct for benign disease is not routinely attempted, as it is technically challenging with a risk of perforation, especially in the presence of impacted stones or cholecystitis.³ Despite the risks, gallbladder stent placement has been shown to be an effective treatment for acute cholecystitis in the world literature, although it has not yet become widely accepted.^{3,4} In the case of malignant disease, ERCP has been used for drainage of abscesses related to both the left and right hepatic ducts and higher parts of the intrahepatic biliary tree.⁵

In another case, transcystic stenting has been used as a 'salvage' procedure after a percutaneous drain became dislodged. Serial CT showed reduction in abscess size and resolution of septic symptoms following endoscopic transcystic drain placement. The patient was followed-up for seven months, during which time they had no recurrence of symptoms or complications of the procedure.

We are not aware of any other reported cases of transcystic stent placement as primary therapy in the literature.⁵ The case we report followed a similar course, with a reduction in the size of the abscess following drain placement and resolution of septic symptoms. Similarly, the patient had no immediate complications from the procedure and, at six months

follow-up, he remained symptom free with no late complications of the procedure. He went on to have laparoscopic cholecystectomy and simultaneous removal of the stent.

Conclusions

Although hepatic abscess as a complication of gallbladder perforation is rare, it carries a significant mortality. Owing to the rarity of this presentation, there is no consensus regarding management, which ranges from antibiotic therapy to open cholecystectomy. This study provides a novel approach to internal drainage, using ERCP to place a drain into the gallbladder via the cystic duct. The technique was effective as a bridge to laparoscopic cholecystectomy. Future applications could either be as a definitive treatment in those not fit for surgery or as a bridge to laparoscopic cholecystectomy in fitter patients.

References

1. Hussain T, Adams M, Ahmed M *et al.* Intrahepatic perforation of the gallbladder causing liver abscesses: case studies and literature review of a rare complication. *Ann R Coll Surg Engl* 2016; **98**(6): e88–91.
2. Donati M, Biondi A, Basile F *et al.* An atypical presentation of intrahepatic perforated cholecystitis: a modern indication to open cholecystectomy. Report of a case. *BMC Surg* 2014; **14**(1): 1–4.
3. Lee TH, Chun S, Korea S. Endoscopic transpapillary gallbladder stenting for symptomatic gallbladder diseases. *Video J Endosc* 2013; **1**(2): 462–464.
4. Maekawa S, Nomura R, Murase T *et al.* Endoscopic gallbladder stenting for acute cholecystitis: a retrospective study of 46 elderly patients aged 65 years or older. *BMC Gastroenterol* 2013; **13**: 65.
5. Kang MS, Park DH, Kwon K Du *et al.* Endoscopic transcystic stent placement for an intrahepatic abscess due to gallbladder perforation. *World J Gastroenterol* 2007; **13**(9): 1,458–1,459.