Endoscopic management of postcholecystectomy biliary leaks

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Abstract

Objective To evaluate the nature of bile duct injuries following cholecystectomy and the success of endoscopic retrograde cholangiopancreatography (ERCP) in their identification and management.

Design All patients referred for ERCP with a diagnosis of a postcholecystectomy bile leak were identified prospectively from October 1994 to August 2008.

Setting The study was carried out in a district general hospital with the endoscopies performed by a single operator.

Patients All patients had undergone imaging with at least two of abdominal ultrasound scanning, CT scanning or MR cholangiopancreatography.

Interventions ERCP with treatment of a biliary leak by sphincterotomy and insertion of a temporary 7 Fr plastic biliary stent.

Main outcome measurements Clinical healing of the injury was assessed as resolution of symptoms with normalisation of liver function tests, cessation of external drain output and a repeat ERCP with removal of the indwelling stent within 2–8 weeks and no further complications.

Results 46 patients were identified, of whom 42 responded well to endoscopic treatment. Four patients ultimately needed surgery, of whom three had recurrent strictures. One patient had complete transection of the biliary duct and endoscopic treatment was not attempted.

Conclusion ERCP, with sphincterotomy and temporary plastic stent placement, is successful in the early management of patients with postcholecystectomy biliary leaks, which most commonly involve the cystic duct stump. ERCP carried out in a district general hospital identifies those patients requiring further specialised hepatobiliary care in a tertiary centre.

Introduction

Laparoscopic cholecystectomy (LC) has in the past two decades become the preferred operation for gallstones as absence of a large scar is cosmetically appealing and the immediate postoperative course is smoother, allowing for

early discharge from hospital and a faster recovery. However, LC is associated with an increased risk of intraoperative injury involving the bile ducts, bowel and vascular structures. Biliary leaks and their complications along with thermal and laser injuries to the duct system are, in particular, associated with LC and were originally reported as being seen in up to 1% of all cases.^{1–7} Causes of these injuries include misidentification of anatomy, failure to clip the cystic duct adequately, leaks from the gall bladder bed and strictures resulting from thermal or laser cautery.⁸ Regardless of the nature of the injury, the majority of biliary injuries are not recognised during the initial LC and the patients present with persistent abdominal pain, biliary drainage from postsurgical intra-abdominal drains or overt biliary peritonitis or intra-abdominal sepsis.

Early identification and endoscopic intervention with sphincterotomy and/or biliary stent placement is accepted as an effective way of managing biliary leaks, in that it decompresses the biliary system and allows healing of the damaged or leaking duct. In this report we have evaluated all the patients referred for endoscopic management of a suspected biliary leak after cholecystectomy and report the endoscopic findings along with the outcome of treatment.

Patients and methods

All patients referred for endoscopic retrograde cholangiopancreatography (ERCP) with a diagnosis of a postcholecystectomy bile leak were identified prospectively from October 1994 to August 2008. Our hospital functions as an acute district general hospital for a local population of 260 000 and also serves as the Kent Cancer Centre. It carries out a range of routine laparoscopic procedures with no specialised hepatobiliary surgery and has one ERCP endoscopist, but patients referred from elsewhere in the Maidstone

and Tunbridge Wells Trust and other surrounding hospitals were also included. Patients were only included if deemed fit for an ERCP and had provided informed written consent. All patients had undergone imaging with ultrasound and CT scanning. In five cases, evidence of a leak from MR cholangiopancreatography scanning was also present but MRI ceased to be used for this indication at our centre when guidelines were published which restricted its use in the early postoperative period.

All ERCP procedures were performed by a single operator (GB) using standard techniques with intravenous sedation or general anaesthesia if indicated. After instillation of contrast, treatment of a biliary leak was carried out, in the first instance, by insertion of a temporary 7 Fr plastic biliary stent. If bile duct stones were identified a sphincterotomy and stone removal were also carried out. No attempt was made to cannulate selectively the pancreatic duct. Intravenous antibiotics were administered to all patients. Post-ERCP pancreatitis was graded according to Apache 11⁹ and Ransom's criteria.¹⁰

Clinical healing of the injury was assessed as resolution of symptoms with normalisation of liver function tests, cessation of external drain output (when present) and a repeat ERCP or endoscopy with removal of the indwelling stent within 2–8 weeks completed with no further complications.

Results

Forty-six patients (12 (26%) men and 34 (74%) women with a median age of 62 (range 24–87 years)) were identified with postcholecystectomy bile leaks between 1994 and 2008 (2.2% of a total of 2062 ERCP procedures). All the patients had undergone a laparoscopic approach but in two cases the operation had been converted into an open procedure when a cystic duct stump leak was identified. In a further five cases intraoperative difficulties had been documented but these had not been converted to an open procedure.

The median time to presentation was 5 days (range 1–25). The commonest presenting symptom

in these patients was abdominal pain in 36 (78%) followed by fever 15 (33%), persistent drainage 8 (17%), abdominal fullness 2 (4%) and in one patient common bile duct (CBD) damage was suspected at the time of surgery (table 1).

Before the ERCP, six patients had intraperitoneal collections, of whom one patient underwent peritoneal lavage and five were drained radiologically. All six were treated with appropriate intravenous antibiotics. One patient was noted to have a raised international normalised ratio secondary to warfarin.

Of the 46 patients undergoing ERCP, 32 (70%) were identified as having cystic stump leaks, 5 (11%) had increased drainage from the T-Tube with stones in the CBD, 3 (7%) had common hepatic duct leaks, 2 (4%) had leaks from the CBD, 3 (7%) had strictures in the CBD and 1 (2%) had complete transection of the CBD (table 2). There were no patients with congenital abnormalities of the biliary tree or leakage from ducts of Luschka.

Sphincterotomy was performed in all cases except for the patient with the raised international normalised ratio and the patient with complete transection of the CBD.

Plastic stents (7 Fr) were inserted in 45 patients and only two patients needed the stent to be changed to a 10 Fr stent owing to persistent drainage via the external drain. CBD stones were removed using a balloon or dormia basket in the five patients identified. All the stents were removed 2–8 weeks after ERCP.

Four patients ultimately underwent surgery after ERCP and outpatient follow-up: three had recurrent strictures of the CBD requiring a Roux-en-Y hepaticojejunostomy and the one patient with complete bile duct transection had reconstructive surgery.

Post-ERCP complications were noted in the form of mild pancreatitis only in one patient, which settled in 3 days with conservative treatment.

Discussion

In our series of suspected bile leaks after cholecystectomy the commonest site of the leak was at the

Table 1 Presenting symptoms in patients with biliary leaks

Patients (n=46)	Pain	Fever	Persistent external bile drainage	Intra-abdominal collection	Abdominal fullness
Female n=34 (76%)	36 (78%)	15 (33%)	8 (17%)	6 (13%)	2 (4%)

Table 2 Site of leak in postcholecystectomy patients

Cystic duct stump	Retained stones (T-Tube)	CHD	CBD	CBD stricture	CBD transection
32 (70%)	5 (11%)	3 (7%)	2 (4%)	3 (7%)	1 (2%)

CBD, common bile duct; CHD, common hepatic duct.

cystic duct stump, with a few cases in which the CBD and the common hepatic duct were damaged, which was in keeping with previously published studies.^{11–13} We found in our study that ERCP diagnosis of the leak site was straightforward and endoscopic management of the leak was successful with simple measures in all cases except where damage had arisen to the CBD. Patients referred for this indication had a wide range of symptoms and in our group of patients it was unusual for more detailed information about the nature or site of the leak to be available before endoscopy. This study only evaluates the outcomes of ERCP in those patients referred to a gastroenterologist for endoscopic management of biliary leaks and does not attempt to address more widely the incidence of biliary leaks after gall bladder surgery. Furthermore, it provides no information about the number of postsurgical leaks managed by further surgery and the possibility that a number of trivial leaks go undiagnosed and settle with conservative treatment only.

The treatment options available for these patients are surgical repair, percutaneous drain, nasobiliary drain and endoscopic biliary drain. Surgical repair is associated with a significant morbidity and mortality.^{14–16} Fistula recurrence and stricture formation after surgical repair of the bile duct can require multiple operations. Percutaneous transhepatic drainage also carries a very high morbidity rate and, moreover, puncturing of the non-dilated biliary system is technically difficult.¹⁷ Nasobiliary drains have proved to be effective and do not require an endoscopy for removal. Limitations include accidental tube removal and general patient acceptability, resulting in many centres abandoning them altogether.¹⁸

Previous studies have evaluated the range of options available to the endoscopist for intervention in patients with biliary leaks. These include sphincterotomy, stenting of the CBD or combining the two.^{18–26} These interventions cause a reduction in the pressure in the duct caused by the sphincter of Oddi, and stent placement, whether proximal or distal to the site of injury, causes decompression of the biliary system allowing healing if a leaking duct should occur. It has been postulated that stent insertion will also prevent stricture formation, although this was not achieved in our three cases with CBD leaks. Recent reports of endoscopic management of biliary leaks where patients have been treated with stenting and sphincterotomy as opposed to sphincterotomy alone, have reported better results with more rapid resolution of leakage in the former group.^{27–30} One study attempted to determine the optimal size of stent for management of postcholecystectomy bile leaks but found no difference between the use of a 7 or 10 Fr plastic stent.²³ Another group suggested that 10 Fr stents were associated with higher risk of pancreatitis if sphincterotomy was not performed at the

time of stent placement but their findings were not statistically significant.²⁶

In conclusion, we found that patients referred with biliary leaks after cholecystectomy show a range of damage to the biliary tree. In our experience biliary leaks after cholecystectomy are not associated with congenital abnormalities of the biliary tree and are most commonly due to a leaking duct stump, which heals well with sphincterotomy and stenting. Less commonly, leaks from the CBD and common hepatic duct are encountered. In these cases stenting will cure the leak but surgery may be required subsequently.

We recommend that ERCP as available in a district general hospital is used to investigate and treat biliary leaks arising after cholecystectomy. Drainage is best carried out using sphincterotomy in combination with placement of a plastic stent. Those patients with CBD and common hepatic duct injury will require further assessment at a specialised hepatobiliary centre.

Competing interests None.

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