Audit

Delayed cholecystectomy for gallstone pancreatitis: re-admissions and outcomes

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Objective: Timing of cholecystectomy after gallstone pancreatitis and use of pre-operative cholangiography varies considerably between surgeons. We examined outcomes in a district general hospital where most patients underwent delayed cholecystectomy following pre-operative cholangiography.

Methods: A retrospective review of admissions with gallstone pancreatitis over a 5-year period was conducted.

Results: A total of 77 patients with gallstone pancreatitis were identified of whom 58 underwent laparoscopic cholecystectomy (LC) at a median of 67.5 days after index admission. Of these patients, 21% had unplanned re-admission while awaiting LC rising to 25% of those who waited for more than 4 weeks. Surgery at 4 weeks would have been associated with a 6% re-admission rate. Re-admissions were due to pancreatitis (4 cases), cholecystitis (3 cases), biliary colic (4 cases) and pseudocyst (1 case). In all, 49 patients had pre-operative cholangiography and 13 had pre-operative endoscopic extraction of stones from the common bile duct.

Conclusions: Delay of LC for greater than 4 weeks after gallstone pancreatitis is associated with a high, unplanned re-admission rate, even with liberal use of pre-operative cholangiography.

Key words: Pancreatitis – Cholelithiasis – Laparoscopic cholecystectomy

Cholecystectomy is usually performed following an episode of gallstone pancreatitis to prevent recurrent pancreatitis. The timing of surgery is debated. Early surgery has the potential disadvantages of operating on a systemically unwell patient and increased difficulty of dissection due to inflammation in the region of the gallbladder. On the other hand, delayed surgery places the patient at risk of recurrent pancreatitis or other complications of cholelithiasis. In cases of mild pancreatitis, the UK guidelines for the management of acute pancreatitis¹ recommend definitive management of gallstones, ideally within 2 weeks and no longer than 4 weeks. In reality,

cholecystectomy is often delayed,² though the consequences are not well documented in the literature.

As gallstone pancreatitis represents a complication of choledocholithiasis, cholangiography is usually performed as part of the treatment strategy. Pre-operatively, magnetic resonance cholangiopancreatography (MRCP) is a non-invasive option but it does not allow treatment of choledocholithiasis. While endoscopic retrograde cholangiopancreatography (ERCP) has an associated morbidity and mortality, sphincterotomy and stone clearance may decrease the risks of recurrent gallstone pancreatitis. However, many stones pass soon after an attack

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Figure 1 Outcomes in patients with gallstone pancreatitis.

of gallstone pancreatitis, so intra-operative cholangiography (IOC) can reduce unnecessary pre-operative procedures. If common bile duct (CBD) stones are found at the time of IOC, treatment options include open or laparoscopic common bile duct exploration or postoperative ERCP. Postoperative ERCP runs the risk of failure of access.

We reviewed the experience of management of gallstone pancreatitis in a district general hospital, where most patients underwent delayed laparoscopic cholecystectomy (LC) and IOC was rarely performed. The majority of patients had pre-operative ERCP or MRCP. In particular, we were interested in the frequency of admissions for complications of gallstones while awaiting LC.

Patients and Methods

The hospital notes of patients admitted to Cheltenham General Hospital with a diagnosis of pancreatitis over the 5-year period 1997–2001 were identified from a computer database and examined retrospectively. Patients were diagnosed as suffering from gallstone pancreatitis and

included in the study if they had acute upper abdominal pain, a serum amylase of greater than 500 IU/l (normal range, 30–110 IU/l), and gallstones demonstrated on ultrasound scan (USS) or ERCP. Patients from other regions who were referred to their local hospitals following their emergency admission were not included.

Data were collected regarding pre-operative investigations (blood tests, USS, ERCP and MRCP), unplanned re-admissions, timing of surgery and difficulty of surgery. The timing of surgery and pre-operative cholangiography varied according to the policy of the different treating surgeons. It was also affected by the availability of operating time and co-morbidity of the patients. MRCP became available in late 1999.

Results

In all, 77 patients were identified who met the definition above for gallstone pancreatitis of whom 50 were female (65%). This was an elderly patient population with a range in age from 17 to 91 years, a mean age of 63 years and a median age of 68 years.

Figure 2 Use of cholangiography in patients with gallstone pancreatitis.

The age of the 58 patients undergoing LC ranged from 17 to 87 years with a mean of 57 years and a median of 60.5 years. The time from admission to LC ranged from 5 to 720 days with a mean wait of 93 days and median wait of 67.5 days.

Management without LC

Of the study group, 19 patients did not undergo LC after gallstone pancreatitis (Fig. 1). One patient had a LC the year prior to admission with pancreatitis. Debris was removed from the common bile duct at ERCP. Four patients died before LC could be undertaken; three of complications of acute gallstone pancreatitis while one patient recovered from the initial attack of pancreatitis but succumbed to post ERCP pancreatitis.

In the remainder of cases, a deliberate decision was made not to perform LC due to old age and poor health. Of these 14 patients, 9 had an ERCP, 4 had a sphincterotomy and 3 had extraction of stones from the CBD (Fig. 2). One patient died of cholangitis 2 years later. At her initial presentation, ERCP without sphincterotomy showed dilated ducts but no CBD stones. She subsequently declined endoscopic sphincterotomy. Another patient had three admissions with upper abdominal pain but normal amylase and white cell count over the next 3 years. He had a normal ERCP without sphincterotomy after his admission with gallstone pancreatitis. He eventually died of an exacerbation of chronic obstructive pulmonary disease. None of the other patients who did not have LC are known to have experienced further pancreatitis or biliary disease.

Unplanned re-admissions prior to LC

Of the 58 patients, 12 (21%) undergoing LC had an unplanned re-admission due to gallstone-related illness while awaiting LC. None of the 10 patients who had LC within 28 days of gallstone pancreatitis had an unplanned re-admission while 25% (12/48) of patients who waited for more than 28 days for LC had unplanned re-admissions. However, 3 of the unplanned re-admissions occurred within 4 weeks of an episode of gallstone pancreatitis, and one within 2 weeks. If all patients with LC delayed for more than 4 weeks had had cholecystectomy at 4 weeks, the re-admission rate would have been 6% (3/48). If all patients with LC delayed for more than 2 weeks had had cholecystectomy at 2 weeks, the re-admission rate would have been 2% (1/53).

Four patients had a further attack of pancreatitis at 17, 55, 63 and 72 days after initial admission. One of these patients had two recurrent episodes of pancreatitis (days 55 and 77) before her gallbladder was removed during the

third admission. Three patients were admitted with cholecystitis at 17, 46 and 66 days after the initial admission. Four patients were admitted with upper abdominal pain but normal amylase, white cell count and temperature at 10, 34, 94 and 309 days after initial admission (the last patient had no gallstones identified on an initial USS). In these cases, the presumed diagnosis was biliary colic. One patient was admitted 38 days after the initial admission with abdominal pain attributed to a small pseudocyst which resolved spontaneously.

Pre-operative cholangiography

Prior to LC, 13 patients had a MRCP and 37 had an attempted ERCP (one had both). In two cases, the ampulla of Vater could not be cannulated, one of which had a subsequent MRCP. One patient had IOC, while only 8 had no form of cholangiography. Sixteen patients had an endoscopic sphincterotomy and 13 had endoscopic extraction of stones from the CBD. Only 25 of the 49 (51%) of the pre-operative cholangiograms were performed within 1 week of the index case and 16 (33%) waited more than a month.

None of the 4 patients with recurrent pancreatitis had sphincterotomy prior to re-admission. One had a normal MRCP before the second episode of pancreatitis, while the other three were still awaiting pre-operative cholangiography. A separate patient, who had a normal ERCP 7 days after initial admission, and LC at day 33, was admitted with recurrent acute pancreatitis at day 223. ERCP at this stage revealed a 4 mm stone in the CBD, which was extracted.

In two patients, LC was delayed as gallstones were not seen at initial USS. Both patients had normal ERCPs without sphincterotomy at the time of the initial episode of pancreatitis. Some 17 months later, one patient had a further episode of mild pancreatitis treated as an out-patient and USS demonstrated multiple stones. At repeat ERCP 3 months later, the ampulla was unable to be cannulated despite needle-knife sphincterotomy. After the procedure, the patient developed severe pancreatitis, which progressed to multi-organ failure and death. The other patient presented with upper abdominal pain but normal amylase, 309 days after an episode of pancreatitis. Repeat USS demonstrated small gallstones with normal ducts.

Difficulty of surgery

Most patients had straight-forward dissection at the time of surgery. Seven patients (12%) had conversion of LC to open cholecystectomy due to adhesions or uncertain anatomy. These operations were performed an average of

87 days after gallstone pancreatitis with a range of 13–146 days. In five cases, the operative notes recorded a difficult dissection due to inflammation or oedema but the operation was completed laparoscopically. These difficult operations were performed an average of 51 days after gallstone pancreatitis with a range of 5 to 141 days. Although only one of the 11 operations performed within the first month required conversion to open surgery; in three other cases, the dissections were noted as difficult.

Discussion

Unplanned re-admissions

The incidence of recurrent pancreatitis following gallstone pancreatitis has been evaluated by a number of authors in the pre-laparoscopic era. Burch *et al.*³ looked at 102 patients who were discharged after recovery and scheduled for elective surgery. Of the 102 patients, 37 (36%) were lost to follow-up, refused further treatment or were operated on elsewhere. Of the 65 patients who remained in their care after discharge, 29(44%) suffered recurrent pancreatitis (35%) or biliary tract disease (9%) before elective surgery. Most recurrences (66%) occurred within 3 months and two occurred within 1 week. Poloyan *et al.*⁴ found 31 of 41 patients had recurrent pancreatitis when cholecystectomy was delayed to a separate admission. The average time of recurrence following the first attack was 108 days, with 15 occurring within 30 days. Smaller studies found recurrent pancreatitis rates between 23% and 61% with initial discharge and elective cholecystectomy.^{5–7}

However, more recent reports have suggested that ERCP can decrease the risk of recurrent pancreatitis. Liu *et al.*⁸ described 48 patients who underwent elective LC 2–12 weeks following an attack of gallstone pancreatitis. All patients had an ERCP during the initial admission. No patients had recurrent pancreatitis while awaiting surgery. Similarly, Schachter *et al.*⁹ found that none of 19 patients (all of whom had an early ERCP) had recurrent gallstone pancreatitis while awaiting LC 8–12 weeks following the initial admission. Indeed Gislason *et al.*¹⁰ described endoscopic sphincterotomy as definitive treatment for gallstone pancreatitis with cholecystectomy reserved for those with persistent biliary colic or cholecystitis. On the other hand, Srinathan *et al.*¹¹ in the laparoscopic era found 14 of 58 patients (24%) had biliary or pancreatic complications (in 6 cases this was recurrent pancreatitis) with interval surgery and the incidence of complications was higher in those who had undergone ERCP.

In our series, there was a 25% unplanned re-admission rate in patients who waited for more than a month for LC

despite most having pre-operative cholangiography. Although priority was given to cases with raised liver function tests or dilated bile ducts on USS, ERCP or MRCP was often performed non-urgently. This delay may have reduced the potential benefits of cholangiography, sphincterotomy and duct clearance in preventing re-admissions. However, there were two cases of pancreatitis following a normal ERCP or MRCP presumably due to subsequent passage of stones into the CBD. Although no patient who had a sphincterotomy developed recurrent pancreatitis, a number of the re-admissions were due to cholecystitis or biliary colic, which would not be prevented by sphincterotomy.

Our findings support the national guidelines¹ as we estimate that surgery at 4 weeks would have resulted in a 6% re-admission rate while only one patient was re-admitted within 2 weeks (a 2% re-admission rate).

On the other hand, no patient died or needed prolonged re-admission due to recurrent gallstone disease. Early surgery does create logistical difficulties for planning of theatre lists, especially if operating theatre time is limited. A recent review of five British audits² of the management of gallstone pancreatitis found that cholecystectomy was performed within 4 weeks of the index case in only 49% of cases.

Optimal timing of LC

In the pre-laparoscopic era, three schools of thought regarding optimal timing of biliary surgery following gallstone pancreatitis were advocated. Traditionally, biliary surgery was delayed until complete recovery from the illness. In the 1970s, same-admission surgery was increasingly described as a means of preventing recurrence. Subsequently, a number of authors recommended emergency surgery, within 72 h and often within 24 h of admission.^{12–14} It was felt that early removal of CBD stones, with or without sphincterotomy, could prevent progression of pancreatitis and decrease mortality. However, Ranson⁵ found an increased mortality in patients undergoing definitive biliary surgery in the first week of treatment, especially those with severe pancreatitis. A prospective randomised trial found a mortality of 15% in patients assigned to surgery within 48 h of admission as opposed to a mortality of 2% if surgery was delayed until 4–10 days after admission.¹⁵ Burch *et al.*³ reviewed 15 studies which related mortality to timing of surgery. A mortality of 12% in 299 emergency operations (within 72 h) was noted. Mortality was 28% in 100 operations performed in patients with deteriorating conditions. On the other hand, 1170 patients underwent surgery after recovery, either during the same admission or at a later admission, with a 1% mortality.

There was no mortality or major morbidity following LC in our series. Three patients died of complications of gallstone pancreatitis, none of whom had a LC or ERCP. These were elderly patients with a mean age of 80 years. Only one patient had a raised bilirubin, which resolved spontaneously and his USS showed no duct dilatation or choledocholithiasis.

With the advent of laparoscopic cholecystectomy, early surgery was found to be feasible and safe but technical difficulty is often increased after gallstone pancreatitis compared with surgery for uncomplicated cholelithiasis.¹⁶ For this reason, many surgeons prefer interval cholecystectomy. Tang *et al.*¹⁷ found no difference in conversion rates for early surgery compared with later surgery if pancreatitis was mild, but increased conversion rates for early surgery in patients with 3 or more Ranson's criteria. Conversion rates of 4% and 10% for interval LC are reported.^{8,9} In our series, the majority of cases were completed laparoscopically without undue difficulty although most were performed after the first month. Difficult dissections were encountered with both early and late operations.

Pre-operative cholangiography

The role of pre-operative ERCP is debated. In a randomised trial, Neoptolemos *et al.*¹⁸ found reduced complication rates in patients with severe pancreatitis who underwent ERCP within 72 h and Fan *et al.*¹⁹ demonstrated a reduction in biliary sepsis in patients with mild and severe pancreatitis who were randomised to ERCP within 24 h. However, a subsequent randomised trial found no benefit for ERCP within 72 h of onset of symptoms in patients without obstructive jaundice.²⁰ In most cases of gallstone pancreatitis, stones in the CBD will pass spontaneously. A recent trial²¹ studied patients with mild-to-moderate gallstone pancreatitis considered at high risk for persisting CBD stones. The authors found reduced hospital stay and costs with no increase in treatment failure rates in patients randomised to IOC and selective postoperative ERCP compared with those randomised to pre-operative ERCP.

The majority of our cases were mild pancreatitis and ERCP was performed on a non-urgent basis. Only 17 of the 77 patients had a stone removed from the CBD. ERCP itself has risks as demonstrated by the death from post ERCP pancreatitis. For this reason, we now prefer to use MRCP as a pre-operative investigation. However, this can lead to delays which could be avoided with IOC.

Conclusions

Delayed LC for gallstone pancreatitis is associated with a high re-admission rate, even with liberal use of pre-operative

cholangiography. Delayed surgery can still be difficult. For many patients, MRCP or IOC is more appropriate than routine pre-operative ERCP. Planning of operating lists should accommodate early LC following gallstone pancreatitis as recommended in the UK guidelines.

References

1. Glazer G, Mann NW. United Kingdom guidelines for the management of acute pancreatitis. *Gut* 1998; **42** (Suppl 2): 1–13.
2. Barnard J, Siriwardena AK. Variations in implementation of current national guidelines for the treatment of acute pancreatitis: implications for acute surgical services provision. *Ann R Coll Surg Engl* 2002; **84**: 79–81.
3. Burch JM, Feliciano DV, Mattox KL, Jordon GL. Gallstone pancreatitis: the question of time. *Arch Surg* 1990; **125**: 853–60.
4. Poloyan D, Simonowitz D, Skinner DB. The timing of biliary tract operations in patients with pancreatitis associated gallstones. *Surg Gynecol Obstet* 1975; **141**: 737–9.
5. Ranson JHC. The timing of biliary surgery in acute pancreatitis. *Ann Surg* 1979; **189**: 654–63.
6. Semel L, Schrieber D, Fromm D. Gallstone pancreatitis: support for a flexible approach. *Arch Surg* 1983; **118**: 901–4.
7. Frei GJ, Frei VT, Thirlby RC, McClelland RN. Biliary pancreatitis: clinical presentation and surgical management. *Am J Surg* 1986; **151**: 170–5.
8. Liu CL, Lo CM, Fan ST. Acute biliary pancreatitis: diagnosis and management. *World J Surg* 1997; **21**: 149–54.
9. Schachter P, Peleg T, Cohen O. Interval laparoscopic cholecystectomy in the management of acute biliary pancreatitis. *HPB Surg* 2000; **11**: 319–23.
10. Gislason H, Vetrhus M, Horn A, Hoem D, Sondenaa K, Soreide O *et al.* *Eur J Surg* 2001; **167**: 204–8.
11. Srinathan SK, Barkun JS, Shailesh NM, Meakins JL, Barkun AN. Early surgery for acute gallstone pancreatitis. *J Gastrointest Surg* 1998; **2**: 385–90.
12. Acosta JM, Rossi R, Galli OMR, Pellegrini CA, Skinner DB. *Surgery* 1978; **83**: 367–70.
13. Stone HH, Fabian TC, Dunlop WE. Gallstone pancreatitis: biliary tract pathology in relation to time of operation. *Ann Surg* 1981; **194**: 305–12.
14. Mercer LC, Saltzstein EC, Peacock JB, Dougherty SH. Early surgery for biliary pancreatitis. *Am J Surg* 1984; **148**: 749–53.
15. Kelly TR, Wagner DS. Gallstone pancreatitis: a prospective randomised trial of the timing of surgery. *Surgery* 1988; **104**: 600–5.
16. Tate JJT, Lau WY, Li AKC. Laparoscopic cholecystectomy for biliary pancreatitis. *Br J Surg* 1994; **81**: 720–2.
17. Tang E, Stain SC, Tang G, Froes E, Berne TV. Timing of laparoscopic surgery in gallstone pancreatitis. *Arch Surg* 1995; **130**: 496–500.
18. Neoptolemos JP, Carr-Locke DL, London NJ, Bailey IA, James D, Fossard DP. Controlled trial of urgent endoscopic retrograde cholangiopancreatography and endoscopic sphincterotomy versus conservative treatment for acute pancreatitis due to gallstones. *Lancet* 1988; **3**: 979–83.
19. Fan ST, Lai ECS, Mok FPT, Lo CM, Zheng SS, Wong J. Early treatment on biliary pancreatitis by endoscopic papillotomy. *N Engl J Med* 1993; **328**: 228–32.
20. Folsch UR, Nitsche R, Ludtke R, Hilgers RA, Creutzfeldt W. Early ERCP and papillotomy compared with conservative treatment for acute biliary pancreatitis. *N Engl J Med* 1997; **336**: 237–42.
21. Chang L, Lo S, Stabile BE, Lewis RJ, Tooles K, de Virgilio C. Preoperative versus postoperative endoscopic cholangiopancreatography in mild to moderate gallstone pancreatitis: a prospective randomised trial. *Ann Surg* 2000; **231**: 82–7.