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Open cholecystectomy in the age of the laparoscope

Adam L Widdison DM FRCS
Surgical Registrar

Christopher P Armstrong MD FRCS FRCSEd
Consultant Surgeon

Sally Norton MB BS
Surgical SHO

Department of Surgery, Frenchay Hospital, Bristol

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We reviewed our experience with open cholecystectomy since laparoscopic cholecystectomy became the treatment of choice for symptomatic gallstones. Over a 3 year period 35 open (6%) and 578 laparoscopic cholecystectomies (94%) were performed. Fourteen trainee surgeons performed only 16 open cholecystectomies and assisted at 19. The proportion of open cholecystectomies declined through the study period. Ten emergency cholecystectomies were performed for empyema, gallbladder perforation, severe acute cholecystitis, liver abscess, and cholangitis. In 12 patients, laparoscopic surgery was converted to an open procedure because of severe inflammation, empyema, dense adhesions, carcinoma of the gallbladder, cholecystoduodenal fistula, and perforated small bowel. Ten patients underwent open cholecystectomy and bile duct exploration after failure to clear duct stones endoscopically, and three patients had Mirizzi's syndrome.

Open cholecystectomy is infrequently performed giving trainee surgeons little experience. However, such cases are occasionally inevitable and laparoscopic surgeons need to have the appropriate skills.

Open cholecystectomy is infrequently performed now that laparoscopic cholecystectomy has become the treatment of choice for symptomatic gallstones *(1)*. It was our impression that when open surgery was required it was technically difficult. We were concerned that the experience of surgeons in training with open cholecystectomies was inadequate. We therefore reviewed our experience with open cholecystectomy since laparoscopic cholecystectomy became routine.

Correspondence to: Mr A L Widdison, 14 Quarry Way, Stapleton, Bristol BS16 1UP

Methods

In the 3 years up to April 1994 all patients presenting to one consultant with symptomatic gallstones were considered for laparoscopic cholecystectomy *(1)*. Those with acute pancreatitis, jaundice or a history of jaundice, abnormal liver function tests or a dilated common bile duct had preoperative endoscopic retrograde cholangiopancreatography (ERCP). This was the only procedure in elderly patients or those presenting a significant anaesthetic risk. Open surgery was performed if bile duct calculi were not cleared endoscopically and on emergencies presenting with peritonitis.

Results

In all, 35 (6%) open and 578 (94%) laparoscopic cholecystectomies were performed. A mean of 6.6 (range 5–8) open cholecystectomies were performed in each 6 month period (Fig. 1). The proportion of open cholecystectomies declined over the 3 years ($r = -0.9$, t test $P = 0.04$). The number of procedures performed by different grades of surgeon are presented in Table I.

Laparoscopic cholecystectomy was converted to an open procedure in 12 patients (2% of attempts). The indications were severe inflammation (5), gallbladder abscess (2), dense adhesions (2), carcinoma of the gallbladder (1), cholecystoduodenal fistula (1), and perforated small bowel (1).

ERCP was attempted in 193 patients. Three had Mirizzi's syndrome and underwent open surgery. Bile duct calculi were present in 118 patients and were cleared successfully in 108. Elective open cholecystectomy and bile duct exploration was performed in the remaining 10, in whom calculi were large (> 10 mm) or impacted. Open

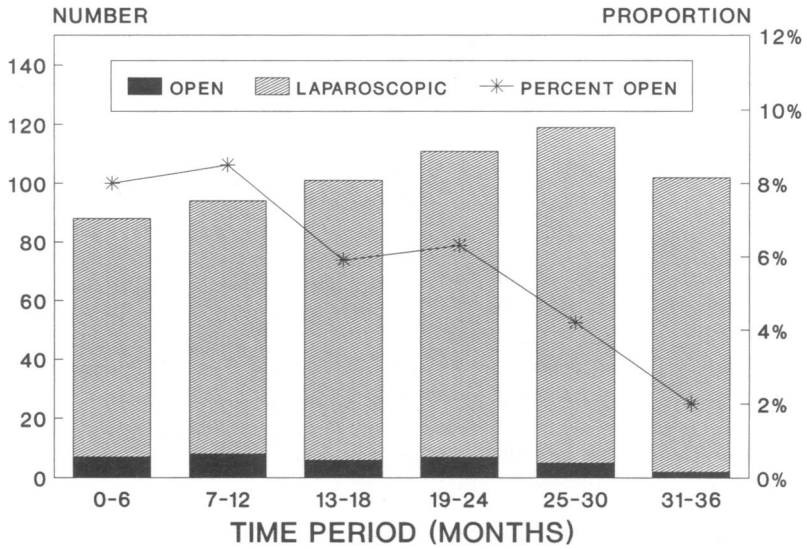

Figure 1. Number of open and laparoscopic cholecystectomies, and proportion of all cholecystectomies performed open in consecutive 6 month periods through the study.

Table I. Number of procedures performed by different grades of surgeon

Grade of principal surgeon	*Number of surgeons*	*Number of laparoscopic cholecystectomies*	*Number of open cholecystectomies*
SHO	10	65 (11%)	0 (0%)
Registrar	8	192 (33%)	16 (45%)
Consultant*	1	321 (56%)	19 (55%)
Total		578	35

* Most of these procedures were used to teach junior grades until they were sufficiently competent to perform the procedure as the principal surgeon

cholecystectomy was performed as an emergency in 10 patients with peritonitis. The operative findings were empyema (3), severe acute cholecystitis (2), perforated gallbladder (2), liver abscess (2), and cholangitis (1).

The median age of patients requiring emergency open cholecystectomy, 75 (interquartile range (IQR) 22) years, or open cholecystectomy and bile duct exploration 69 (IQR 9) years was older than those undergoing laparoscopic surgery 51 (IQR 10) years (Mann–Whitney U test, $P<0.05$). The sex ratios were similar (males : females = 1 : 2). The complications after open cholecystectomy were minor: wound infection (3), chest infection (2) and urinary tract infection (1). The complications after laparoscopic cholecystectomy were bile duct diathermy injury (1), cystic duct leak (1), small bowel volvulus (1), small bowel perforation (1), incisional hernia (1), and chest infection (3). There were no deaths.

Discussion

The frequency of conversion to open cholecystectomy was similar to that reported in other publications *(2–13)*. Most laparoscopic procedures failed because inflammation obscured anatomy in the region of Calot's triangle or access was blocked by densed adhesions. The open operation was also difficult in patients converted. Similarly, emergency open surgery was technically demanding. These patients were older, with complicated gallbladder disease; factors associated with increased morbidity and mortality *(14,15)*.

Bile duct exploration is attempted laparoscopically in some units *(16–19)*. However, this is not our practice because endoscopic clearance is successful in nine out of ten attempts and with few complications *(1)*. Endoscopic duct clearance usually failed when duct stones were large or impacted *(20)*. These stones would be difficult to extract laparoscopically. Correction of Mirizzi's syndrome is technically difficult and, although laparoscopic methods have been described *(21)*, few surgeons are likely to attempt it *(22)*. It is possible that in the future these patients will be referred to laparoscopic centres with proven expertise in duct clearance.

Current surgical trainees are adept at laparoscopic surgery but rarely see or perform open cholecystectomy. As laparoscopic experience increases and techniques improve the decline in the proportion of open cholecystectomies performed will continue. However, conversion is still occasionally inevitable. Such cases require immediate treatment, referral to a biliary surgeon is impractical. Access, visibility and tactile sensation are dissimilar in the two operations and different skills and techniques are required. Although these can only be gained with experience, all laparoscopic trainees should know when conversion is indicated and how to perform an open cholecystectomy safely. This should be an integral part of laparoscopic courses and a responsibility of surgical trainers. Until trainees prove their open surgical expertise they should be closely supervised by experienced biliary surgeons.

We conclude that the need to perform open cholecystectomy occurs infrequently giving trainee laparoscopic surgeons little experience. However, such cases are

occasionally inevitable, and when they do occur they are technically demanding. Laparoscopic surgeons also need to be familiar with open biliary surgery.

References

1 Widdison AL, Longstaff AJ, Armstrong CP. Combined laparoscopic and endoscopic treatment of gallstones and bile duct stones: a prospective study. *Br J Surg* 1994; **81**: 595–7.

2 Larson GM, Vitale GC, Casey J *et al.* Multipractice analysis of laparoscopic cholecystectomy in 1983 patients. *Am J Surg* 1992; **163**: 221–6.

3 Martin IG, Holdsworth PJ, Asker J *et al.* Laparoscopic cholecystectomy as a routine procedure for gallstones: results of an 'all-comers' policy. *Br J Surg* 1992; **79**: 807–10.

4 Holohan TV. Laparoscopic cholecystectomy. *Lancet* 1991; **338**: 801–3.

5 Morris JB, Margolis R, Rosato EF. Safe laparoscopic cholecystectomy without intraoperative cholangiography. *Surg Lap Endosc* 1993; **3**: 17–20.

6 Herbst CA, Elliott L, Koruda M, Maxwell JG. Laparoscopic cholecystectomy: comparison of university and community experience. *Surg Lap Endosc* 1993; **3**: 95–9.

7 Bailey RW, Zucker KA, Flowers JL, Scovill WA, Graham SM, Imbembo AL. Laparoscopic cholecystectomy. Experience with 375 consecutive patients. *Ann Surg* 1991; **214**: 531–40.

8 Ferzli G, Kloss DA. Laparoscopic cholecystectomy: 111 consecutive cases. *Am J Gastroenterol* 1991; **86**: 1176–8.

9 Cuschieri A, Dubois F, Mouiel J *et al.* The European experience with laparoscopic cholecystectomy. *Am J Surg* 1991; **161**: 385–7.

10 Voyles CR, Petro AB, Meena AL, Haick AJ, Koury AM. A practical approach to laparoscopic cholecystectomy. *Am J Surg* 1991; **161**: 365–70.

11 Wilson P, Leese T, Morgan WP, Kelly JF, Brigg JK. Elective laparoscopic cholecystectomy for 'all-comers'. *Lancet* 1991; **338**: 795–7.

12 Fried GM, Barkun JS, Sigman HH *et al.* Factors determining conversion to laparotomy in patients undergoing laparoscopic cholecystectomy. *Am J Surg* 1994; **167**: 35–41.

13 Cox MR, Wilson TG, Luck AJ, Jeans PL, Padbury RTA, Toouli J. Laparoscopic cholecystectomy for acute inflammation of the gallbladder. *Ann Surg* 1993; **218**: 630–4.

14 Addison NV, Finan PJ. Urgent and early cholecystectomy for acute gallbladder disease. *Br J Surg* 1988; **75**: 141–3.

15 Davidson CM. The biliary system. In: Keen G, ed. *Operative Surgery and Management*. Bristol: Wright, 1987: 272–90.

16 Hunter JG. Laparoscopic transcystic common bile duct exploration. *Am J Surg* 1992; **163**: 53–8.

17 Reddick EJ, Olsen D, Alexander W *et al.* Laparoscopic laser cholecystectomy and choledocholithiasis. *Surg Endosc* 1990; **4**: 133–4.

18 Pier A, Gotz F, Ibald R, Thevissen P. Laparoscopic placement of T-drainage in choledocholithiasis. *Chirurg* 1991; **62**: 691–3.

19 Sackier JM, Berci G, Phillips E. The role of cholangiography in laparoscopic cholecystectomy. *Arch Surg* 1991; **126**: 1021–6.

20 Lauri A, Horton RC, Davidson BR, Burroughs AK, Dooley JS. Endoscopic extraction of bile duct stones: management related to stone size. *Gut* 1993; **34**: 1718–21.

21 Paul MG, Burris DG, McGuire AM, Thorfinnson HD, Schonekas H. Laparoscopic surgery in the treatment of Mirizzi's syndrome. *J Laparoendosc Surg* 1992; **2**: 157–63.

22 Neuhaus H, Feussner H, Ungeheuer A, Hoffmann W, Siewert JR, Classen M. Prospective evaluation of the use of endoscopic retrograde cholangiography prior to laparoscopic cholecystectomy. *Endoscopy* 1992; **24**: 745–9.

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