

Laparoscopic cholecystectomy: the first 155 patients

Brian I Rees FRCS

Consultant Surgeon

Hywel R Williams FRCS

Registrar

University Hospital of Wales, Cardiff

Key words: Laparoscopy; Cholecystectomy

Laparoscopic cholecystectomy has been attempted in 155 patients. Eight patients required conversion to open cholecystectomy (5%): three owing to lack of clear anatomical detail, two procedures were abandoned because of instrument failure, two had a dilated common bile duct on cholangiography, and one owing to a very adherent mucocele of the gallbladder.

Cholangiography was performed selectively; successfully completed in 45 (22% of all patients). Common bile duct stones were found in two patients.

All patients were drained, with two bile leaks, one requiring a laparotomy. There was one ductal injury. Most patients (85%) were discharged within 48 h. This initial experience suggests laparoscopic cholecystectomy is the procedure of choice for most patients with symptomatic cholelithiasis.

Cholelithiasis affects approximately 6.23% of people in the UK (1,2) and cholecystectomy is now the commonest elective abdominal operation. Owing to the morbidity associated with open cholecystectomy other therapeutic operation have been used including lithotripsy, dissolution therapy, percutaneous dissolution and minilaparotomy for cholecystectomy. However, they have obtained little success when consideration is given to the time required, the expense, morbidity and the recurrence rate.

The introduction of laparoscopic guided cholecystectomy by Mouret in 1987, Dubois in 1988 and McKernan/Saye in the same year has opened up a new dimension in minimally invasive surgery. A number of reports have highlighted the advantages of reduced hospital stay, decreased morbidity, early return to work and cost

effectiveness (3–5). We report our initial experience with laparoscopic guided cholecystectomy in 155 consecutive patients.

Patients and methods

From June 1990 to June 1991 165 patients with gallbladder disease were seen by a single surgeon (BIR) at the University Hospital of Wales, Cardiff. Three patients had asymptomatic stones and were advised not to undergo surgical treatment. One patient preferred to have the traditional open laparotomy cholecystectomy. Four patients had jaundice and common bile duct stones which could not be removed by Endoscopic Retrograde Cholangiopancreatography (ERCP) and sphincterotomy. Two patients had had multiple previous operations and it was believed that open laparotomy was safer.

Laparoscopic cholecystectomy was attempted in the remaining 155 patients, all operations were performed by the senior author (BIR). There were 48 men and 107 women; neither weight (range 50–126 kg) nor age (20–86 years) were used as exclusion criteria.

Indications for operation were biliary colic secondary to gallstones (108 patients), acute cholecystitis (41 patients) admitted as emergencies and in most cases allowed to settle with appropriate treatment and operated on at a later date, and pancreatitis secondary to gallstones (four patients). Two patients with jaundice had successful ERCP/sphincterotomy with successful removal of gallstones from the common bile duct before laparoscopic cholecystectomy.

All the patients had the diagnosis confirmed by ultrasound (133), oral cholecystogram (22); CT scan was used in six patients with jaundice.

Surgical techniques

All patients had a general anaesthetic with endotracheal intubation. A naso- or orogastric tube and urinary catheter were placed to avoid injury to the stomach and urinary bladder and to permit adequate laparoscopic visualisation of the abdominal viscera. All instruments, including the insufflator, light source, monitors, camera and surgical instruments were checked personally by the senior author before the procedure. A three-dose cephalosporin prophylaxis was used starting at induction of anaesthesia. Graded compression stockings were used in all patients, but specific chemoprophylaxis against deep venous thrombosis was not used.

With the patient in the Trendelenburg position pneumoperitoneum was established using CO₂ via a Veress needle inserted supraumbilically (Fig. 1). An electronic, high-flow automatic insufflator set at an initial flow rate of 1 litre/min at a pressure of 15 mmHg was used for the first 3–4 litres, thus establishing a suitable pneumoperitoneum. The insufflator was then set to automatic which delivers 4–6 litres CO₂/min allowing for leaks during instrumentation. The Veress needle was then replaced by a 10 mm trocar and sheath. A 10 mm, 0° diagnostic laparoscope with attached video camera was introduced through the umbilical sheath and all subsequent trocars and sheaths were introduced under direct visualisation. The patient was then placed in a reverse Trendelenburg position to allow visualisation of the upper abdomen, occasionally left rotation of the operating table may be required. The positions of the other trocars are shown in Fig. 1, the lateral 5 mm trocar is used to grasp the fundus of the gallbladder, which is retracted cephalad, the other 5 mm trocar and the 10 mm trocar allow instrumentation to take place by a 'two handed technique' so that Calot's triangle can be delineated clearly. Operative cholangiography can be performed where clinically indicated. When the cystic duct and cystic artery have been clearly demonstrated, a clip applicator (single or multiple endoclip Auto-Suture®) was used to ligate these structures. The gallbladder was then removed from its bed using either electrocautery or laser energy (KTP/YAG laserscope). Before complete removal of the gallbladder, the gallbladder bed was checked for complete haemostasis. During

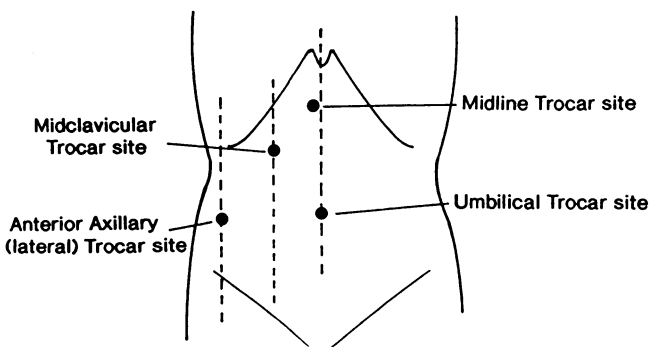


Figure 1. Trocar insertion sites for laparoscopic cholecystectomy.

this procedure lavage and aspiration was performed using heparinised saline (5000 IU heparin/litre) under a pressure of 300 mmHg.

An Exudrain® (size 14G) was placed into the foramen of Winslow via the lateral portal. The laparoscope and camera was then transferred to the epigastric position. Using heavy grasping forceps, the gallbladder was delivered into the umbilical incision and decompressed by a small incision then aspirated to remove the bile, if necessary. When there were multiple small stones these sometimes had to be removed via the gallbladder to reduce the volume. Alternatively, the incision had to be enlarged or the sheath stretched slightly.

When the gallbladder was delivered, the finger of the operator was inserted into the umbilical incision to maintain the pneumoperitoneum. A final check was made to ensure satisfactory haemostasis. The cannulas were removed and the CO₂ was expressed to reduce postoperative discomfort.

The umbilical and epigastric incisions were closed with absorbable fascial and subcutaneous sutures. The urinary catheter and nasogastric tubes were removed in the recovery room.

Results

In the 155 consecutive patients 147 procedures were completed successfully. Eight patients required conversion to open procedures. Of these, two procedures were abandoned due to instrument failures (either camera or insufflator were not suitable, early in the series), satisfactory delineation of the anatomy could not be made during three procedures and in one patient there was a large mucocele. After aspiration of the mucocele the gallbladder was torn and a very large stone entered the peritoneal cavity. Two patients had CBD stones and therefore laparotomy was performed.

There were two postoperative bile leaks. One patient had a laparotomy on the 5th postoperative day but no bile duct injury or source for the leak could be found, and a tube drain was placed down to a cystic duct stump and the patient then made a good postoperative recovery. The second bile leak settled after 7 days, but the patient was admitted 3 months postoperatively with jaundice and intermittent cholangitis. An ERCP showed a stricture at the confluence of the right and left hepatic ducts. The patient underwent a hepaticoenterostomy and made a complete recovery. Reviewing the operative findings and the ERCP it was thought that the endoclip was placed too close to the common hepatic duct causing injury and a subsequent stricture.

There was no mortality in any of the patients undergoing laparoscopic surgery or laparotomy. No wound infections were seen. Two patients were readmitted with abdominal pain which settled on observation. Subsequent ERCPs on these patients were normal. Most patients (132) were discharged after 48 h, but the stay varied from 24 h to 9 days. The mean operative time was measured in the first 75 procedures and in the second 75

procedures. In the first 75 procedures the operative time ranged from 45 min to 2 h 45 min (median 1 h 45 min), while in the second 75 procedures operative time ranged from 35 min to 2 h 15 min (median 1 h 15 min). From this it can be seen that there is a considerable reduction in operative time as the experience of the surgeon and team increases. Operative cholangiography was attempted in 50 patients and it was successfully completed in 45 patients (22% of all patients). The indications for operative cholangiography were a history of possible preoperative transient jaundice, 15 patients; dilatation of the common bile duct and ultrasound scan, 10 patients; and in 20 patients dissatisfaction with intra-operative anatomy. In 43 patients there were normal ducts, two patients had stones in the common bile duct and laparotomy and exploration of the common bile duct was performed.

Three patients were on heparin for cardiovascular disease; no problems were encountered but they were kept in hospital for longer periods to control the warfarin therapy after it had been discontinued preoperatively. Drainage varied from 10 ml to 500 ml (median 55 ml), the drain being removed within 24 h in 132 patients (90%).

Postoperative pain was controlled initially by intramuscular opiates, but after the first 30 patients by infiltration of the wounds with 0.5% bupivacaine. After the introduction of local anaesthetic infiltration only one dose of intramuscular opiate was required to control the immediate postoperative pain in 90 (60%) patients. Antiemetics were prescribed in 60 patients (40%).

Discussion

In England and Wales over 30 000 cholecystectomies are performed each year (6). It has been estimated that by using laparoscopic methods the saving to the Health Service resulting from a reduction in bed days alone would be £21 million (7). This financial benefit is enhanced by the very obvious advantages to the patient; there is much less postoperative pain, reduction in time in hospital, less scarring and earlier return to full activity.

Early in the authors' experience it became evident that the laparoscopic method of removal of the gallbladder should be made available to all those patients requiring cholecystectomy. It was believed that there were very few absolute contraindications to laparoscopic surgery; these possibly were abdominal sepsis or peritonitis, major bleeding disorders and pregnancy. However, patients in the present series had acute cholecystitis, previous abdominal surgery and minor bleeding disorders. Neither age nor extreme obesity was a bar to performing laparoscopic surgery.

Although common bile duct stones have been removed during laparoscopic surgery, this method is not currently being widely practised. Therefore, if possible, attempts should be made to identify patients with common bile duct stones preoperatively. The usual careful attention to

history, clinical examination, as well as obtaining high-quality imaging studies that demonstrate the size of the common bile duct should exclude the majority of patients with common bile duct stones. Although intraoperative cholangiography is not being practised routinely, surgeons performing laparoscopic cholecystectomy should have the ability and instruments to perform intraoperative cholangiograms, not only to exclude common bile duct stones but, where necessary, to identify the biliary anatomy (8). In the present series there were four procedures where the biliary anatomy could not be defined clearly, but was greatly helped by intraoperative cholangiography.

The method of excising the gallbladder from its bed will be debated; there will be proponents of both laser and electrocautery. However, there are studies (9) suggesting that electrocautery may be cheaper and quicker. It was our experience that electrocautery was certainly quicker and equally as haemostatic as the laser. The disadvantages of lasers are also discussed by Nathanson *et al.* (10).

There will be a definite 'learning curve' for the new procedure, and to avoid unnecessary complications surgeons must learn the technique of laparoscopy, familiarise themselves with the new instruments, develop hand-eye coordination and understand that gallbladder surgery still has the same mortality risks. With the advent of so rapid a change it is difficult for surgeons to obtain the necessary expertise; there are teaching videos, workshops and teaching seminars. The author believes that surgeons should make sure that as much training as possible has been received before undertaking surgery.

Many thanks to my Registrars and colleagues during the initial phase of learning these techniques. Also to Mr D L Crosby for his encouragement and Mr A Shandall for reading the script, also Miss U Taylor my secretary.

References

- 1 Bainton D, Davies GT, Evans KT, Gravelle IH. Gall bladder disease: prevalence in a South Wales industrial town. *N Engl J Med* 1976;**294**:1147-9.
- 2 Heaton KW, Braddon FEM, Mountford RA, Hughes AO, Emmett PM. Symptomatic and silent gallstones in the community. *Gut* 1991;**32**:316-20.
- 3 Reddick EJ, Olsen DO. Laparoscopic laser cholecystectomy: a comparison with mini lap cholecystectomy. *Surg Endosc* 1989;**3**:44-8.
- 4 Dubois F, Icard P, Berthelot G, Levard H. Coelioscopic cholecystectomy: a preliminary report of 36 cases. *Ann Surg* 1990;**211**:60-2.
- 5 Zucker KA, Bailey RW, Gadacz TR, Imbembo AL. Laparoscopic guided cholecystectomy. *Am J Surg* 1991;**161**:36-44.
- 6 Ministry of Health. *Hospital In-patient Inquiry for England and Wales*. London: HMSO, 1977.
- 7 Wastell C. Laparoscopic cholecystectomy. *Br Med J* 1991;**302**:303-4.

- 8 Reddick EJ, Olsen D, Span A *et al.* Safe performance of difficult laparoscopic cholecystectomies. *Am J Surg* 1991; **161**:377-81.
- 9 Voyles CR, Meena AL, Petro AB, Haick AJ, Koary AM. Electrocautery is superior to laser for laparoscopic cholecystectomy. *Am J Surg* 1990;**160**:457.

- 10 Nathanson LK, Shimi S, Cuschieri A. Laparoscopic cholecystectomy: the Dundee technique. *Br J Surg* 1991;**78**: 155-9.

Received 8 July 1991