

## True day surgery or 23-hour admission for unselected elective laparoscopic cholecystectomy?

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### Abstract

**Background:** Day case laparoscopic cholecystectomy in the UK is reported in selected patient groups but its role in managing the majority of patients with symptomatic gallstones is unclear. We examined use of the ambulatory surgery unit (ASU) for unselected elective laparoscopic cholecystectomy.

**Methods:** Data were collected for 1 year. High-risk patients with known bile duct calculi, BMI > 40 and/or previous upper abdominal open surgery were excluded from ASU laparoscopic cholecystectomy. Standard surgical or anaesthetic protocols were used and standard criteria for discharge were employed.

**Results:** In 1 year, 258 of 275 patients (94%) admitted for elective laparoscopic cholecystectomy via the ASU were discharged within 23 h of admission including 62 patients (23%) discharged on the day of surgery. There were 16 (5%) conversions to open surgery and 10 (4%) unplanned readmissions to inpatient beds. Forty ‘high-risk’ patients underwent laparoscopic cholecystectomy from inpatient beds of which 29 (73%) were discharged within 23 h.

**Conclusion:** The ASU is the optimal location for elective laparoscopic cholecystectomy to maximize day case throughput and minimize impact on inpatient bed occupancy.

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### 1. Introduction

True day case laparoscopic cholecystectomy (DCLC), defined as discharge on the day of surgery, is becoming established in the United Kingdom (UK) [1–3] and continental Europe [4,5] after a large number of studies, predominantly from North America, have established its safety, patient acceptance and cost-effectiveness [6–11]. However, most UK reports are based on carefully selected patient groups, leaving a large proportion of patients requiring elective laparoscopic cholecystectomy via the conventional inpatient route [1–3]. DCLC is included in the British Association of Day Surgery list of approved procedures and the UK Audit Commission

“basket” of day surgery procedures but only 1% of laparoscopic cholecystectomies performed in the UK are true day cases [12,13]. Although DCLC is clearly feasible, its role in the overall management of the UK symptomatic gallstone population is not clearly defined.

In September 2002, surgical services in Edinburgh were consolidated in separate hospitals (oesophagogastric and hepatopancreaticobiliary surgery in the Royal Infirmary of Edinburgh (RIE) and colorectal surgery in the Western General Hospital). In addition, relocation of the RIE to a new building in April 2003 saw a reduction in inpatient bed numbers and the development of an expanded 5-day ambulatory surgery unit (ASU). These changes prompted development of a unit policy aiming to perform elective laparoscopic cholecystectomy within the ASU for as many patients as possible, with deliberate extension of normal day surgery selection criteria.

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All patients followed a clinical pathway, with inpatient care limited to patients with severe co-morbidity or high surgical risk.

The aim of this study was to assess the place of DCLC within our unit policy for elective management of gallstone disease in its first year by auditing duration of admission and reasons for delayed discharge.

## 2. Patients and methods

All elective laparoscopic cholecystectomy cases performed in the Royal Infirmary of Edinburgh between May 2003 and April 2004 were included. Patient details were retrieved from the Lothian Surgical Audit database and cross-checked with the record of admissions from the ASU and inpatient wards. Data on operative details and factors responsible for delayed discharge were obtained from the Lothian Surgical Audit database and/or from review of individual case records.

Surgical exclusion criteria for laparoscopic cholecystectomy in the ASU were patients with known common bile duct calculi or perceived high risk of conversion to open surgery (e.g. previous open upper abdominal surgery). Patients assessed preoperatively as having a high risk of bile duct calculi (biliary dilatation on ultrasound, a history of jaundice or markedly deranged liver function tests) underwent magnetic resonance cholangiography and/or endoscopic retrograde cholangiography to identify and where necessary remove ductal calculi; these patients were then considered suitable for treatment within the ASU.

All patients underwent nurse-led preoperative assessment according to unit protocol. Patients with myocardial infarction within 3 months of the proposed date of surgery or BMI > 40 were excluded from surgery in the ASU. All other co-morbid conditions were considered acceptable unless severely restricting daily activities. In borderline cases additional investigations (e.g. pulmonary function tests, echocardiography, etc.) were performed after discussion with anaesthetic or surgical staff.

Surgery was performed by, or by trainees under the supervision of, 14 consultant surgeons and 13 consultant anaesthetists. A standard four-port technique was employed with

carbon dioxide pneumoperitoneum insufflated to 12 mmHg. Decisions regarding intraoperative cholangiography and placement of abdominal drains were left to the discretion of the operating surgeon. Bupivacaine 0.5% was infiltrated into skin wounds at the end of the procedure. Anaesthesia was performed according to individual anaesthetist preference and included routine nausea prophylaxis and multimodal pre- and post-operative analgesia. The ASU was staffed 24 h per day on a 5-day basis. Standard criteria for discharge were employed. Nursing staff prospectively documented the reason(s) why patients could not be discharged on the day of surgery.

## 3. Results

A total of 315 patients were admitted electively for laparoscopic cholecystectomy at RIE from May 2003 to April 2004, 275 via the ASU and 40 via inpatient beds (Table 1). There was no significant difference between the groups by median age or male:female ratio. Of the ASU group, 62 patients (23%) underwent laparoscopic cholecystectomy as true day cases and 196 patients (71%) were discharged after a single overnight stay (23-h admission). Seventeen patients (6%) required admission beyond 24 h: 16 after conversion to open cholecystectomy and one patient who developed an early bile leak (treated by endoscopic retrograde cholangiography and insertion of a biliary stent). Ten patients (4%) required unplanned readmission to an inpatient bed within 30 days of surgery, of whom one required ultrasound-guided percutaneous drainage of a subhepatic fluid collection. In the remaining nine patients, tests to exclude significant post-operative complications or retained ductal calculi were normal and symptoms settled with simple analgesia. There were no other major post-operative complications in patients discharged within 24 h. There were no deaths.

Of the 40 patients admitted to inpatient beds, 12 had bile duct calculi, 11 had severe co-morbidity, 5 underwent a concurrent procedure and 3 had previous open upper abdominal surgery. Ten patients would have been suitable for surgery within the ASU. Of these, 7 were scheduled for Friday theatre lists and because the ASU is a 5-day unit were admitted directly to inpatient beds. In three patients, case-note review

Table 1

Comparison of patient demographics, duration of admission, conversion and readmission rates for elective laparoscopic cholecystectomy in ASU and inpatient units at Royal Infirmary of Edinburgh, May 2003–April 2004

	ASU (n = 275)	Inpatient (n = 40)	P
Age (median, range)	51 (16–84)	59 (16–81)	0.076
Male/female ratio	207/68	28/12	0.112
Duration of admission			
True day case	62 (23%)	–	
23-h admission	196 (71%)	29 (73%)	
>24 h	17 (6%)	11 (27%)	
Conversion to open surgery	16 (5%)	4 (10%)	
Unplanned readmission within 30 days	10 (4%)	3 (7%)	

Table 2  
Reasons documented for overnight admission after ASU elective laparoscopic cholecystectomy

Anticipated overnight admission		Unanticipated overnight admission	
Afternoon theatre list	73	Surgical drain	21
High co-morbidity	23	Conversion to open surgery	16
Social support absent	22	Pain	16
		Nausea/vomiting	14
		Surgeon preference	10
		Drowsiness	6
		Urinary retention	4
		Other/not documented	8
Total	118		95

identified no clear reason for inpatient admission. Twenty-nine of the 40 inpatients (73%) were discharged within 23 h after a single overnight stay whilst the remainder required admission for a median of 2 days (range 2–11 days). The rate of conversion to open surgery was higher for inpatients than for ASU cases (10% versus 5%). Three patients (7%) required emergency readmission with post-operative abdominal pain and after investigation as above required only additional analgesia. There were no deaths or major complications in the inpatient group.

Reasons documented for inability to discharge patients from ASU on the day of surgery are shown in Table 2. Anticipated overnight admission was required for 73 patients undergoing surgery on afternoon theatre lists, high co-morbidity (23 patients) and social constraints (22 patients). The most frequent reasons for unanticipated overnight admission were presence of a surgical drain (21 patients), conversion to open surgery (16 patients), pain (16 patients) and nausea/vomiting (14 patients).

#### 4. Discussion

The ideal day case operation is simple, short, uncomplicated and low-risk: laparoscopic cholecystectomy does not meet these requirements. Technical problems are not easily predicted and the operation may take in excess of the day surgery limit of 90 min with the additional possibility of conversion to open surgery. There is a significant incidence of early complications such as haemorrhage or bile leakage, which may require further surgical or endoscopic intervention. The first reports of day case laparoscopic cholecystectomy appeared soon after its introduction but surgical caution has delayed the widespread implementation of a routine day case policy for the procedure. However, surgeons have gained increasing experience with laparoscopic techniques which are now part of routine work. Complication rates are falling. Surgeons are better able to predict likely technical difficulty and to identify early post-operative problems. This increased comfort with laparoscopic cholecystectomy, coupled with reduced access to inpatient beds and financial imperatives

have also played a role in driving a trend towards shorter hospital stays and wider consideration of day surgery. Whilst super-selection of patients for DCLC is possible with a high degree of success [1,2], it is difficult to assess from these reports how day surgery might fit into the overall pattern of gall stone management within the whole patient population.

In this study, we have audited our first year's experience of elective laparoscopic cholecystectomy experience in the relocated RIE. This is an expert centre where all surgeons perform a large number of varied laparoscopic cases and houses a regional hepatobiliary centre. A conscious and collective decision was made to divert as many laparoscopic cholecystectomy patients as possible to the ASU where the option of overnight stay existed, rather than aiming to select a group specifically for day case surgery. Eighty-seven percent of elective cases (275 of 315) were undertaken in the ASU setting and 20% (62 of 315) were performed as true day cases. The readmission rate for our ASU patients was 4% (comparable to that of recent reports from the UK [2] and North America [14]) and only one patient suffered a significant complication, suggesting our policy is safe. Despite minimal case selection, our rate of true DCLC is also comparable with recent UK studies of patients specifically selected for day case treatment: Leeder et al. [2] achieved day case laparoscopic cholecystectomy in 132 of a total of 357 (37%) cases in 2 years, whilst Ammori et al. [1] reported 117 of 744 (16%) over 6 years. Both of these studies employed stricter selection criteria than ours, for example excluding ASA III and IV patients.

In Table 2 we have listed reasons documented by nursing staff for failure to discharge patients on the day of surgery. It is immediately apparent that modest alterations might yield a major improvement in the rate of same day discharge. For example, patients undergoing surgery on afternoon lists might be moved to morning lists, or in a unit such as ours which is staffed 24 h per day, simply discharged later in the evening. The high number of surgical drains in this group was surprising; if required, these can be removed after a few hours observation and should not prevent same day discharge. Patient co-morbidity and social constraints may be valid reasons for overnight observation in some patients, but may also reflect reluctance of patients and staff to early discharge.

However, some reasons for delayed discharge are not predictable and may be more difficult to overcome. Armanath et al. reported a 29% admission rate in unselected patients admitted for DCLC whilst 20% of selected DCLC patients in a recent UK study required overnight admission [3,15]. Post-operative nausea, pain and drowsiness may be improved by tailored anaesthetic and analgesic protocols [16,17] but continue to be commonly cited reasons for unanticipated admission after day case laparoscopic cholecystectomy [18]. Our conversion rate of 5% of ASU cases is acceptable but higher than that quoted by other recent studies (2%, Leeder et al. [2]; 2%, Bal et al. [19]; 3%, Richardson et al. [20]). No individual amongst 14 surgeons in our group was more likely to convert to open surgery, but the higher conversion rate

suggests that the procedure should be limited to a core number of interested consultants; the average of approximately 20 laparoscopic cholecystectomies per consultant per year in this report is substantially less than annual numbers from other single-surgeon series [2,21].

In this series, 91% of 315 consecutive elective laparoscopic cholecystectomy cases were safely performed and discharged within 23 h of admission and 20% were discharged as true day cases. Managing these cases via the 5-day ASU has potential to maximize same day discharge but provides the option of an overnight stay if required whilst minimising inpatient bed occupancy. We feel that the ASU is the ideal environment for performing almost all elective laparoscopic cholecystectomies and only a few cases with high risk of conversion to open surgery or severe co-morbidity require elective admission to inpatient beds.

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