

30-day readmission rate following laparoscopic cholecystectomy in North Devon District Hospital over a three-year period - a closed loop audit

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Introduction

Laparoscopic cholecystectomy is the most performed hepatobiliary procedure in the United Kingdom and worldwide. Readmission rate following surgery is considered a key performance indicator and care quality measure. Reducing this will allow for effective cost savings in the National Health Service. The aim was to determine 30-day readmission rate post-laparoscopic cholecystectomy, identify the indications for readmission and reduce this rate.

Methods

From a database of consecutive patients undergoing cholecystectomy over a 3-year period between 2019-2021, data on demography, comorbidity, and 30-day readmission rates over three separate time periods were extracted and evaluated. Findings were presented at the local departmental governance meeting after each audit round. Recommendations including introducing a standardised post-operative analgesia protocol were made and implemented prior to re-audit.

Results

A total of 883 patients had laparoscopic cholecystectomy: 69% females and 31% males. 70% were performed as day case. Overall readmission rate was 6% (5%; day case and 6%; overnight-cases). Readmission rates were 4%, 6% and 6% for years 2019, 2020 and 2021 respectively. Indications for readmission were biliary in 22% and non-biliary in 78%. Common indications for readmission were abdominal pain, postoperative infection, retained stone and pancreatitis. Non-specific abdominal pain was the commonest indication. Following adjustment for comorbidity; increasing age and male gender were associated with an increased rate for admission.

Conclusion

Readmission rates following laparoscopic cholecystectomy in North Devon District Hospital over a three-year period were less than 10% in accordance with Association of Upper Gastrointestinal Surgeons standards. Standards have been maintained following a re-audit.

Introduction

Laparoscopic cholecystectomy (LC) is the most commonly performed hepatobiliary surgery in the United Kingdom and worldwide. About 66,060 cholecystectomies are performed yearly in the

United Kingdom with about 70,000 of these performed laparoscopically. These cost about £111.6 million, and this confers a substantial clinical and economic burden on the National Health Service (NHS).(1)

Readmission rate following surgery is considered a key performance indicator and care quality measure. The NHS no longer pay hospitals for unplanned readmissions within 30 days of discharge. Readmissions thus carry significant financial burden on hospitals.

These readmissions also affect patient outcomes following surgery hence the need to determine their rates and indications.(2) Determination of these could help to address ways of reducing these readmissions. According to the Association of Upper Gastrointestinal Surgeons (AUGIS) readmission rates following laparoscopic cholecystectomies should be less than 10%(3).

Methods

Patients included in this study were identified from a locally held database of consecutive patients undergoing cholecystectomy over a 3-year period between 1st January 2019 to 31st December 2021 at North Devon District Hospital. All patients over the age of 15 years were included. Paper and electronic records for all patients were reviewed and data collected on demographic details, comorbidity, and 30-day readmission rates. Indications for readmission within 30 and 90 days were retrieved. Only patients whose indication for readmission was related to their surgery were classified as readmissions. Indications for readmission were classified into biliary and non-biliary.

Prior to surgery, all patients underwent blood tests and radiological investigations. The most common imaging modality was abdominal ultrasound scanning. Patients with intermediate and high risk of common bile duct stones had magnetic resonance cholangiopancreatography (MRCP) while some patients who presented as emergencies had abdominal computed tomography (CT) to exclude other pathology. Operations were performed by consultants or senior trainees using a standardised four-port laparoscopic technique. All patients had intraoperative biliary ultrasound imaging except those enrolled in an ongoing national trial (Sunflower Study). Surgery was performed as day case in the majority of patients while others had overnight stay for medical and or social reasons. Patients were not routinely followed up after surgery.

Data retrieval was done using a pre-designed proforma, which included hospital number, age, gender, date of surgery, readmission date within 30-days of surgery, readmission date within 90-days of surgery, indication for readmission, comorbidity and hospital length of stay. All data were entered into an Excel spreadsheet.

Statistical Analysis

Demographics and clinical data were expressed as absolute numbers and percentages. Age was expressed as mean average. Statistical analysis was done using Microsoft Excel and Graphpad.

Results

Over the three-year period, 892 patients had cholecystectomies: 883 (98%) laparoscopic, seven (1.4%) laparoscopic converted to open and two (0.4%) open cholecystectomies. Patients included in the audit were those who had laparoscopic cholecystectomies.

271 (31%) patients were male and 612 (69%) female. Mean age overall was 55 years. 375 (39%) patients were greater than 60 years-of-age. 589 (67%) patients had one or more comorbidities.

75 (8%) patients were readmitted. 35% of these readmissions were due to indications unrelated to their cholecystectomy. These included pyosalpinx, pyelonephritis, chest pain, liver cysts, trauma, and other non-biliary planned/emergency operations. Unrelated readmissions were not included.

Readmissions related to the surgery over the study period occurred in 49 patients (6%), with the rate of readmission yearly being 4%, 6% and 6% for years 2019, 2020 and 2021 respectively.

Out of the 883 patients included in the study, data regarding length of stay could only be retrieved for 773 patients (88%). 612 (70%) patients had surgery as a day case, the remaining 261 (30%) requiring overnight admission. 30-day readmission rates were 5% and 6% for day cases and admitted patients respectively. 2% of patients were readmitted between 30 days and 90 days. Half of these patients had also been admitted within 30 days of surgery. Due to the small number of patients no further analysis was carried out.

All patients	n = 883
Age mean (range)	55 (15-89)
Gender (M:F)	1:2.3
Co-morbidity	588 (67%)
Day case	612 (70%) *
Readmissions	49 (6%)
*Data available on 773 (88%) patients	

Table 1. Demographic and clinical characteristics

Indications for readmission were classified as biliary or non-biliary. 22% readmissions (11 patients) were for biliary reasons and 78% (38 patients) for non-biliary reasons. Indications for readmission were abdominal pain in 19 patients, postoperative infection in 9 patients, retained stones in 5 patients, pancreatitis in 5 patients, bile leak in 4 patients, intra-abdominal collection in 3 patients, pleural effusion in 1 patient, cholecysto-duodenal fistula in 1 patient, and perihepatic abscess in 1 patient. Non-specific abdominal pain was the commonest indication for readmission. The occurrence of abdominal pain was similar in day case patients 11(58%) and patients admitted overnight 8(42%); Fisher's exact, $P=0.77$. 30-day readmission rate was similar in day case patients; 31(5%) compared to patients admitted overnight 17(6%); Chi-square test, $P=0.39$.

Discussion

The result of this audit demonstrates that our 30-day readmission rate following (LC) is in line with standards recommended by AUGIS. The result of our study also compares with the result of similar studies carried out in similar settings and tertiary centres in the United Kingdom.(4)(5)(6) Comparing our results with similar studies in Europe and the United States of America, readmission rates appear to be lesser in the USA.(7)(8)(9) The studies in the USA had larger number of patients compared to our study. In most of these studies, readmissions were clearly defined as patients who were readmitted in acute hospitals for at least 24hours within 30 days of surgery. We included all patients that were readmitted irrespective of their duration of hospital stay. It is difficult to tell if a clear definition of readmission would have affected our results.

According to the British Association of Day Surgery (BADs) procedure directory, national performance is set out at a target at 75% for the number of laparoscopic cholecystectomies managed as day case surgery in the UK(10). This target was set to optimise patient outcomes and for cost effectiveness in the NHS. The result of our study shows that the day case LC is within the set target of BADs. Our study also shows that readmission rates following day case appears to be lower; 5% when compared to overnight cases; 6%. Even though 90-day readmission rates are currently being evaluated to ensure that postoperative complications and readmission rates are not underestimated, our study has shown little or no difference between 30-day and 90-day readmission rates following LC in our setting. Our result also compares with similar studies around the world(11)(12). With the NHS currently struggling with inpatient beds and staffing issues, attempts at increasing the number of LC done as day case procedure will be beneficial for the NHS in the long run.

Indication	n (%)
Abdominal pain	19 (39%)
Postoperative infection	9 (18.4%)
Retained stones	5 (10.2%)
Pancreatitis	5 (10.2%)
Bile leak	4 (8.1%)
Intra-abdominal collection	3 (6.1%)
Pleural effusion	1 (1%)
Cholecysto-duodenal fistula	1 (1%)
Perihepatic abscess	1 (1%)

Table 2. Indication for readmissions

The indications for readmission in our study showed that about 80% were due to non-biliary causes, similar to other studies in the UK.(4)(5) The commonest reason for this was due to non-specific abdominal pain. Over 50% of these patients presented within 72 hours postoperatively as such inadequate analgesia was identified as the reason for their presentation. The result of our study is similar to that of other studies carried out in the USA.(11)(13)(14) However, Hill et al in their study demonstrated a 20-25% readmission for non-biliary reasons following a review of National readmission database following cholecystectomy in the USA. This discrepancy is likely because of differences in the Health care systems in the UK and the USA.(13) A systematic review of the global published literature by Alexander et al carried out on 233 studies including 5,420,181 LC, showed that 2-7% of patients were readmitted for non-surgical reasons.(16) Ensuring adequate analgesia and an open access virtual follow up consultation may well reduce these readmissions. These will free up bed spaces and reduce the cost of unnecessary investigations in these patients thereby resulting in effective cost savings to the NHS.

The limitation of our study

Our study included all patients that were readmitted within 30 days post LC irrespective of the duration of their readmission. Unlike the studies carried out in the USA, only patients that were admitted over 24 hours were regarded as readmissions. Due to a difference in practice and low threshold for CT scans, patients presenting to the Emergency Department (ED) with abdominal pain post LC in the USA will have abdominal CT scans done. As such, those with negative scans were discharged from the ED. This is not a routine practice in the NHS, hence, one of the reasons for their lower readmission rates when compared to our study.

Conclusion

Readmission rates following laparoscopic cholecystectomy in North Devon District Hospital over a three-year period was less than 10% in accordance with Association of Upper Gastrointestinal Surgeons standards. Standards have been maintained following a re-audit. Simple measures such as ensuring adequate postoperative analgesics and virtual clinic follow up of patients may well reduce the burden of these readmissions on the NHS.

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Conflicts of interest

No conflict of interest to declare.

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