Review Article

Feasibility of Day-Case Laparoscopic Cholecystectomy: A Narrative Review

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Abstract

Gallstone disease was considered a rare disease in West African subregion, however with increasing urbanisation and lifestyle change, the incidence of the disease is rising. Laparoscopic cholecystectomy is the best treatment for gall stone disease. Initially, laparoscopic cholecystectomy required inpatient care after surgery, but for the past 30 years, there is a shift toward performing the procedure as a daycase. Day-case laparoscopic cholecystectomy was first reported in early 1990s, but in most countries of West Africa, cholecystectomy is still an inpatient procedure and this has been an additional strain to the health-care community as the number of personnel needed for postoperative care can be directed toward the care of other patients if the surgery is performed as a daycase. It has also been reported that increased use of day surgery would reduce waiting times and reduce last minute cancellations by the hospital. Although laparoscopic cholecystectomy was added to the basket of day-case procedures in the early 1990s, initial progress was slow because the procedure was not widely accepted as suitable for day case surgery. In sub-Saharan Africa, only Sudan, Nigeria, Tanzania, and South Africa have reported attempts at day-case laparoscopic cholecystectomy with good outcome.

Keywords: Daycase, feasibility, laparoscopic cholecystectomy, review

Introduction

The gallstone disease prevalence is about 5%–27% in the general adult population.[1] Although most of the patients are asymptomatic, about 1%–4% of these patients became symptomatic every year and will require treatment.[2-8] The standard treatment of symptomatic gall stone disease is laparoscopic cholecystectomy.[2-9]

Gallstone disease was considered a rare disease in West African subregion, however with increasing urbanisation and lifestyle change,[10] the incidence of the disease is rising.[11-13] Eze *et al*. reported and incidence of 4.40% in southeast Nigeria, while Gyedu *et al*. reported and incidence of 5.9% in Ghana.[11,13] While global best practice indicates laparoscopic cholecystectomy is the best treatment for gall stone disease, in west Africa and most sub-Saharan Africa, there have been hesitancy in accepting this as an alternative for open surgery.[12,14-16] One of the reasons for the hesitancy is the model of health financing in these countries.[15-18] Most treatment cost is from out of pocket and a patients given a choice between open cholecystectomy and laparoscopic cholecystectomy almost always choses the open procedure because it is a cheaper procedure for the patients.[15-18] One of the disadvantages of open cholecystectomy compared to laparoscopic is longer duration of hospital stay, delay in commencing oral feeding, requirements of more parenteral medications and delay in return to full function.[19] All these result in additional cost to the patient. Moreover, it is also demanding on the surgical team because of prolonged postoperative management of patients that are on admission.

The initial reports regarding day-case cholecystectomy were reported in early 1990s,[20-24] and since then there have been numerous reports with expansion of the inclusion criteria and progressive reduction in the duration of hospital stay after surgery.[1-5,8,20-27] The Day Surgery Audit report suggests that

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increased use of day surgery would reduce waiting times and reduce last minute cancellations by the hospital.[28-31] Although laparoscopic cholecystectomy was added to the basket of day-case procedures in the early 1990s, initial progress was slow because the procedure was not widely accepted as suitable for day case surgery. British Association of Day Surgery recommends that at least 60% of laparoscopic cholecystectomy operations should be performed as day cases both for optimal patient outcomes and cost-effectiveness.[25,28-31] With these recent reports, we feel this will significantly improve the acceptance of laparoscopic cholecystectomy as the cheaper options for our patients as this will eliminate the need for admission, need for prolonged parenteral medications and this may ultimately bring down the cost to that of open surgery. It may also enhance acceptance by surgeons in our region as this will reduce the burden for patients that need close postoperative management.

This narrative review is aimed at highlighting the current practice related to day-case laparoscopic cholecystectomy.

Materials and Methods

Literature search was conducted by two independent researchers. The keywords used for the search were "daycase," "laparoscopic cholecystectomy," "ambulatory surgery," "outpatient surgery" and "cholelithiasis." The keywords were combined using Boolean logic and the search was conducted in PubMed, EMBASE, index medicus, Scopus and Google Scholar. Only studies published in English were included. Related articles and reference list were also searched manually to avoid omission. The titles of the studies were screened and abstract evaluated for inclusion. Due to the nature of available literature, we opted to present a narrative review format rather than a systematic meta-analysis.

Indication and Inclusion Criteria

The success of day-case laparoscopic cholecystectomy (DCLC) relies on careful patient selection to reduce complications, conversion, or readmission. The following criteria should be considered by surgeons before inclusion of patients for DCLC:[1,3,8,22,24,26-29,32-46]

1. Uncomplicated symptomatic cholelithiasis: cholelithiasis is the most common indication for laparoscopic cholecystectomy. However, if the cholelithiasis is complicated, it may result in conversion to open surgery which will necessitate patients' admission
2. American Society of Anesthesiologists (ASA) I-III: most surgeons and anesthetists consider DCLC for patients with ASA I-III as they are associated with less morbidity and their postoperative recovery is faster. Some surgeon, however, excludes ASA III patients, but there was not significant difference in outcomes between ASA III and ASA I or II after DCLC in most reviews
3. Age <65 years: the age of the patients is also an important consideration during DCLC, as elderly patients of >65 years tend to have a complex postoperative recovery
4. Patients' lives within 1 h drive to the hospital: This is an important component of discharge criteria as it allows ease of access to emergency care in case of unforeseen postoperative complications.[1-5,8,21,22,25-27,32,34,38-40,43-49] Some guidelines mention that patient should live within 50 km of the hospital,[32,46] but this may not be applicable in our case as there may not be a good access to the area and it may take more than an hour to get to the hospital despite living within 50 km of the hospital
5. Patients should have access to the telephone within the first 24 h after the surgery: The importance of telephone for day-case patients is to allow direct contact of the members of the surgical team and for the members to rapidly assess if there is need for the patient to come to the back to the hospital as an emergency
6. Patient lives with a responsible adult.

Exclusion Criteria

Patient evaluation for DCLC should be thorough and the past medical history and history of comorbidities should be sought as these may contraindicate DCLC. Some of the contraindications for DCLC include:[1,3,8,22,24,26-29,32-46]

1. Previous abdominal surgery: This is associated with intra-abdominal adhesions and increases the risk of conversion to open surgery or even injury to the common bile duct (CBD) during the procedure
2. Suspected ongoing cholecystitis: Ongoing cholecystitis has been associated with more difficulties during surgery because of edema, and increased risk of bleeding
3. Suspected malignancy: The role of laparoscopic cholecystectomy in gall bladder cancer had been subject to a lot of discussions with some surgeons considering malignancies as a contraindication for laparoscopic cholecystectomy. However, one thing is clear; gall bladder cancer should not be treated with DCLC
4. Patients in whom common bile duct exploration is indicated: Suspected stone in the common bile duct will need exploration and possible T-tube drainage. In such case, DCLC is contraindicated
5. Multiple comorbidities: Patients with multiple comorbidities will have difficult anesthetist management and unpredictable recovery pattern. Such patients should not undergo DCLC
6. Unavailability of competent adult to accompany the patient: Day-case surgeries require home base postoperative management and this is made possible by having a responsible adult with the patient at least for the first 24 h. If this cannot be guaranteed, then DCLC is contraindicated
7. ASA > III
8. Body mass index (BMI) ≥35 kg/m^2; obesity is associated with difficulty in cholecystectomy and increased risk of conversion to open surgery.

Preoperative Evaluation

Preoperative evaluation is an important tool in day-case surgery. This process allows the surgical team and the

anaesthesia team to interact with the patient and identify any factor that will result in failure to perform the day case procedure. These factors may be patient's factors like the presence of comorbidities or social factors like living at a far distance or lack of a competent adult to stay with the patient. The evaluation may reveal medical comorbidities that can be controlled.[30,33,34,37,39,50,51]

It also allows the education of the patients and caregivers regarding day surgery pathways especially information regarding planned procedures and postoperative care to help patients make informed decisions. Important information should be provided in writing.[30,33,34,37,39,50,51]

Admission Process

For centres with isolated day-case units, patients should be admitted to the day surgery unit as close as possible to the time of their surgery. To reduce waiting time for surgeries, the patient can be grouped into two. Morning patients can be admitted between 7:00 am and 10:00 am depending on the allocated time of surgery. Afternoon patients can be admitted between 11;00 am and 1:00 pm depending on the allocated time of surgery.[30,37,39,50,51] This grouping enables theatre lists to run smoothly, minimising delays and disruption for patients.[30] In Nigeria and most centre in west Africa, the daycases are usually part of the normal list.[52] In such cases, patients should be admitted by 7:00 am and they should be first on the list so that patients can be observed for 6–8 h postoperative before discharge.

Anaesthetist Management

Patients being planned for DCLC should be seen by the anesthetists about four weeks before the proposed date of surgery in the anesthesia clinic.[1,2,4,5,24,25,44-46] Antakia *et al*. proposed anesthetists review by a member of the surgical team and the nursing staff using a standard protocol. Only patients unsuitable for a day-case procedure like patients with BMI >45 and/or chronic pain issues were referred for a further anesthetists assessment.[26]

The role of premedication in DCLC varies among surgeons.[1,2,4,5,24,25,28,29,32,33,44-46,50] While some surgeons administer per oral midazolam 7.5 mg an hour before surgery[43] others do not routinely use premedication.[36] Prophylaxis against postoperative nausea and vomiting forms an integral part of DCLC. The use of parenteral metoclopramide, cyclizine, or ondansetron before induction of anesthesia has been reported.[1,4,5,26,46] Prophylactic antibiotic was also routinely used to prevent infection. The parenteral antibiotic was administered at the induction of anesthesia.[1,4,5,22,24-27,43-47]

Induction of anaesthesia was achieved in all patients using propofol, fentanyl, and atracurium and maintained using isoflurane ± nitrous oxide till gallbladder bed dissection was completed.[1,4,5,22,24-27,43-47]

Operative Technique

Most of the surgeons used the standard four-port technique of laparoscopic cholecystectomy,[1,4,5,22,24-27,44-47] only a single centre reported the use of three port cholecystectomy for DCLC.[43] Intra-abdominal CO_2 insufflation pressure was set at 10–12 mmHg. The port sites were injected with 20 ml of 0.25% bupivacaine. Drains were not placed routinely but used selectively where surgically indicated, for example, after particularly difficult dissection with unexpected bleeding.[1,4,5,22,24-27,44-47] Some surgeons use 0.5% bupivacaine for infiltration and the pneumoperitoneum was set at 15 mmhg.[43]

Recovery and Postoperative Management

Recovery

Recovery from anesthesia and surgery can be divided into three phases:[30]

Phase I

This phase of recovery lasts until the patient is awake, protective airway reflexes have returned and pain is controlled. This should be undertaken in a recovery area with appropriate facilities and staffing.

Phase II

This starts from when the patient steps off the trolley and ends when the patient is ready for discharge from the hospital. Postoperative problems such as pain and nausea as well as emergencies like hemorrhage usually happen around this time so they should be anticipated and dealt with as they arise.

Phase III

This phase of recovery starts from discharge and ends when the patient has made a full physiological and psychological recovery from the procedure. This may take several weeks.

Postoperative management

Immediately after surgery, surgeons should record their assessment of the procedure, whether they anticipated any problem during the postoperative period, and whether the patients were fit to be discharged as originally planned. Patients should be observed in a common recovery room. Parenteral diclofenac, metoclopramide, or ondansetron were used whenever indicated. Patients are assessed every 30 min by a member of the surgical team for pain, nausea, and vomiting. They are encouraged to sit up, drink as soon as possible, and go to the toilet under supervision.[1,2,4,5,12,28,29,32-35,46,50,53]

Admission criteria

Most of the patients prepared for DCLC are discharged successfully with a success rate of 85%–95% reported in most studies.[1,2,4,5,28,29,32-35,46,50,53] In sub-Saharan Africa, Ekwunife and Njike reported a success rate of 41.7% in Nigeria,[12] while Cullen *et al*. reported a success rate of 75.2% in Tanzania.[29] Overnight admission should be considered in some categories of patients.

Patients must be admitted if they fulfil the following criteria:[1,2,4,5,12,28,29,32-35,46,50,53]

1. Conversion to open cholecystectomy
2. Persistent nausea or vomiting
3. Persistent pain
4. Extensive dissection that requires placement of abdominal drains.

Discharge criteria

Patients should be encouraged to get up 4–6 h after surgery and to take a liquid diet. Before patients are discharged, the following criteria should be met:[1,2,4,5,8,24-27,45-47]

1. The surgeon did not anticipate any problem from the operation
2. There was minimal nausea or vomiting
3. Pain was controlled or minimal
4. Patient was able to go to the toilet without much difficulty (located about 25 m from the recovery room)
5. Patients were able to dress themselves.

Before discharge, all patients should be given 50 mg diclofenac intramuscularly and were prescribed diclofenac and metoclopramide or ondansetron tablets to be used regularly for three days and then used only if required. For patients in whom NSAIDS use is contraindicated, the use of tramadol or codeine phosphate has been reported.[1,2,4,5,8,22,24-27,42-49]

On discharge, patients should receive verbal and written instructions and be warned of symptoms that require urgent attention. These instructions should be given in the presence of the responsible person that is with the patient. Alcohol should be avoided and patients should not operate machinery or drive for 24 h. Telephone numbers of the ward, the resident on call, and the consultant should be provided to the patients or caregivers. All patients should be followed at the surgical clinic after one, two, and four weeks.[1,2,4,5,8,22,24-27,42-49]

Admission and Readmission

Although the plan during DCLC is to successfully discharge all patients, this is not always the case as some patients may require admission for overnight stay. The most common indications for overnight admission reported in most studies are drain placement after difficult dissection, conversion to open surgery, persistent pain, postoperative nausea and vomiting, and delayed recovery from anesthesia. The most common indications for readmission reported in most studies are persistent pain, wound hematomas, biloma, and subhepatic abscess.[1,2,4,5,8,22,24-27,42-49]

Improving Day-Case Laparoscopic Cholecystectomy and Predicting Success of Day-Case Laparoscopic Cholecystectomy

Evolutions and streamlining of both anesthetic and surgical techniques have been done to help facilitate same-day discharges after DCLC. There seems also to be a focus on improving patient selection to improve same-day discharge. However, both surgical and anesthetic factors are subjective and heavily depend on the members of the teams. This resulted in the variability of success of DCLC between centres. To improve this, El-Sharkawy *et al*. developed the Cholecystectomy As A Day Case (CAAD) score to ensure harmonization and prediction of success of DCLC across centres.[34] The CAAD score utilises data readily available in the patient's record to predict the success of DCLC. The total score is 15, with a score of ≤5 associated with a success rate of at least 80.8%. Successful discharge was recorded in 19.2% of patients with scores >5.[34] The detailed scores and components of CAAD are shown in Table 1.

Experience from Sub-Saharan Africa

The practice of laparoscopic surgery has spread across all specialties in surgery and every day surgeons are pushing the boundaries of minimal access surgery. The progression of laparoscopic surgery has been very slow in low- and middle-income countries to which most sub-Saharan African countries belong.[54,55] Literature on DCLC in sub-Saharan

Table 1: Cholecystectomy As A Daycase (CAAD) score

Patients and preoperative factors	Points
Age category (years)	
<30	0
30-60	1
61-70	2
71+	3
Gender	
Female	0
Male	1
ASA	
ASA 1	0
ASA 2	1
ASA 3+	3
Previous hospital admission[a]	1
Primary indication for surgery	
Biliary colic	0
Cholecystitis	1
Pancreatitis	1
Common bile duct stones	2
Others	0
Preoperative investigations[b]	
USS only	0
Radiological	1
Endoscopic	2
Ultrasound scan findings	
Thick walled gallbladder	1
Dilated CBD	1

ASA- American Society of Anesthesiologists physical status classification score. CBD- common bile duct. [a]Previous gallstone related emergency admission to the hospital. [b]Preopraative investigations: Radiological – CT and MR cholangiography (MRCP); endoscopic – endoscopic retrograde cholangiopancreatography (ERCP) and endoscopic ultrasound.

Africa is tenuous, with only two centres in three countries reporting their experience. Ekwunife *et al*. reported their experience with DCLC in Nigeria; they used the inclusion criteria of ASA I and II only as opposed to most reports. They also used the cutoff of 20 km as the maximum distance from the hospital as opposed to 50 km reported by most studies. The success rate reported in the study was 41.7%.[12] A report from Tanzania by Cullen *et al*. revealed that there was a trial of DCLC by their hospital in 2015 but it was not until late 2017 that DCLC was introduced as a routine case for consideration by the surgical team. A success rate of 75.2% was reported.[29] In Sudan, Ibnouf *et al*. reported that DCLC has been utilised since 2006 with a success rate of 22.6%. They also included only patients with ASA I and II. Patients with ASA III are usually admitted for overnight stays.[56]

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Conflicts of interest

There are no conflicts of interest.

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