

Feasibility of same day discharge after mini-laparotomy cholecystectomy — a simulation study in a rural teaching hospital

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Objective: Open cholecystectomy is still widely practised, more so in the developing countries, due to the high cost of laparoscopic cholecystectomy. However, the long traditional postoperative stay (7–8 days) prevents rapid turnover and adds to the waiting list. The aim of this study was to evaluate whether mini-laparotomy cholecystectomy (MLC) can be done as a day surgery or extended day surgery in a rural setting

Methods: A nonrandomized, uncontrolled study was done prospectively at the North Bengal Medical College and Hospital. The subjects underwent mini-laparotomy cholecystectomy under general or epidural anesthesia. Postoperatively they were encouraged to be ambulant early and to accept oral fluids. In the evening they were assessed, by preset criteria, for fitness for discharge. None were actually discharged but were observed overnight and reassessed the next morning, by the same criteria, for any adverse effects that could have occurred had they actually been discharged on the same day. They were discharged after removal of stitches. Any complications of the surgery were also noted.

Results: Thirty-two patients (26 females, 6 males) formed the study group. General anesthesia was given in 19 cases and epidural in 13. Using the scoring system, 25 (78.1%) patients were considered fit for discharge on the evening of surgery. The most prominent reasons for non discharge were vomiting and pain. Re-evaluation on the following morning showed that 30 (93.75%) patients were in a position to be discharged. None showed any complication that would have required readmission. There were no significant complications pertaining to the procedure itself.

Conclusion: Mini-laparotomy cholecystectomy as day surgery or extended day surgery is feasible and a safe, well tolerated procedure in a wide range of age groups. It may be a good alternative to laparoscopic cholecystectomy in developing countries, where resources are limited and waiting lists are long.

Objectif : La cholécystectomie ouverte est toujours très pratiquée, surtout dans les pays en développement, en raison du coût élevé de l'intervention par laparoscopie. La longueur habituelle du séjour après l'intervention (7 à 8 jours) empêche toutefois un roulement rapide et allonge les listes d'attente. Cette étude visait à déterminer s'il est possible de procéder à une cholécystectomie par minilaparotomie (CML) en chirurgie de jour ou en chirurgie de jour prolongée, en milieu rural.

Méthodes : On a procédé à une étude non contrôlée, non randomisée et prospective à l'Hôpital et Collège médical du Nord du Bengal. Les sujets ont subi une cholécystectomie par minilaparotomie sous anesthésie générale ou péridurale. Après l'intervention, on les a encouragés à marcher rapidement et à absorber des liquides. Le soir même, on les a évalués en fonction de critères pré-établis pour déterminer s'ils étaient aptes à recevoir leur congé, mais aucun patient n'a en fait reçu son congé. On les a gardés sous observation au cours de la nuit et on les a réévalués le lendemain matin, en

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fonction des mêmes critères, pour déterminer s'ils auraient eu des effets indésirables s'ils avaient effectivement obtenu leur congé le jour même. Ils ont reçu leur congé après le retrait des points de suture. On a aussi noté toute complication découlant de l'intervention chirurgicale.

Résultats : Le groupe d'étude était constitué de 32 patients (26 femmes, 6 hommes). On a administré une anesthésie générale dans 19 cas et une péridurale dans 13 cas. Selon le système d'évaluation, on a jugé que 25 (78,1 %) des patients auraient pu obtenir leur congé le soir même de l'intervention chirurgicale. Les vomissements et la douleur ont constitué les principales raisons pour lesquelles les patients sont demeurés hospitalisés. La réévaluation le lendemain matin a montré que 30 (93,75 %) des patients pouvaient quitter l'hôpital. Aucun n'a eu de complication qui aurait exigé une réhospitalisation. L'intervention elle-même n'a pas entraîné de complications importantes.

Conclusion : La cholécystectomie par minilaparotomie comme chirurgie de jour ou chirurgie de jour prolongée est faisable et sans danger, bien tolérée dans un vaste éventail de groupes d'âge. Elle peut offrir une bonne solution de rechange à la cholécystectomie par laparoscopie dans les pays en développement aux ressources limitées où les listes d'attente sont longues.

Introduction

In the past decade day surgery and laparoscopic cholecystectomy (LC) have almost replaced open cholecystectomy in advanced centres. However a majority of hospitals in developing countries, including those at the district and subdivision level, continue to perform open cholecystectomy routinely. The costs of LC, patients' economic conditions and lack of access to modern equipment are the driving factors. More gall bladders are taken out by the open route than by laparoscopy in developing countries.

With experience, a general surgeon can gradually reduce the size of the incision (mini-laparotomy) in open cholecystectomies. At the same time, the concept of early ambulation after surgery has been advanced to the first postoperative day. It has been suggested that morbidity begins in the operating room, not at home.[1] Early discharge after operation does not appear to increase the complication rate, perhaps because clinicians tend to be overly careful with a patient scheduled for early discharge.[2] It also reduces the risk of nosocomial infections. These considerations led us to believe that with meticulous care, improved technique and hospital support, patients can undergo mini-laparotomy cholecystectomy (MLC) in a day surgery or extended day surgery (held overnight) procedure. The present study was conducted to evaluate the feasibility of MLC as a day surgery procedure in a rural teaching hospital setting and to study the factors leading to prolonged hospital stay and the morbidity directly attributable to the procedure.

Methods

Medical setting

A prospective, uncontrolled study was done at the Department of Surgery, North Bengal Medical College and Hospital, a rural teaching hospital in Darjeeling district, India. In India, the village is the lowest unit of society, made up of a few hundred houses/families and basic amenities. Many villages together have a local self government called The Panchayat, whose headquarters are connected to a primary health centre (PHC). This is the lowest strata in terms of medical facilities and contains few beds, 1 or 2 doctors, nurses, a pharmacist and social workers. The PHC is involved in treating minor medical and surgical diseases, mainly on an outpatient basis, and minor emergencies, labour and delivery. They also do health promotion and prevention activities (e.g., vaccination, family planning measures). Many Panchayats will form a block, which has a headquarter and a block health centre. This is a bigger version of the PHC and has more responsibility. It does some categories of surgery and treats more medical illnesses. The next tier is the subdivision, with its subdivision hospital. It is usually a 50–100-bed secondary care hospital, depending on the population, and does most of the routine surgeries and treats major medical and obstetric illnesses. Many subdivisions form a district. The district has a district town with a district court and a district hospital. This is typically a 100–200-bed secondary care centre with few modern facilities and it is bigger than the subdivision.

This is the highest level of the health service in the district. Many districts will form a state (e.g., West Bengal is a state of India). The referral service of the district is to the medical college hospital, which is the tertiary centre and the highest level of health management, medical education and health policy development of the state. Typically, a few districts come under a medical college, which has a teaching hospital of 500 beds or more for referral services and tertiary care.

Study overview

The study group consisted of consecutive patients admitted for elective cholecystectomy. The study was a simulation (i.e., the patients were not actually discharged after their operations but were evaluated by preset criteria as to whether they were in condition to be discharged on the same day of their surgeries). The study was approved by the Hospital Ethics Committee.

Patients

Written informed consent was obtained. Selection criteria included: less than 55 years old with symptomatic gall stone disease and diagnosed on ultrasonography. Any evidence of dilated common bile duct, choledocholithiasis, pancreatic pathology or deranged liver function tests were indications for exclusion. Acute cholecystitis, comorbid conditions such as heart disease, hypertension or diabetes, or extension of surgery (e.g., common bile duct exploration, bilioenteric anastomosis) were reasons for exclusion. Gall bladder carcinoma detected on table, major peroperative complications, the need for postoperative drainage and complications related to anesthesia requiring close observation or intensive care were also excluded.

Procedure

The patients were worked up on an outpatient basis and admitted one day before surgery. They were kept fasting overnight. A wide bore nasogastric tube was inserted before induction, and the stomach contents were completely aspirated. An intravenous (IV) single dose of 1-g cefotaxime, and a single dose of ondansetron (Zofran) and pantoprazole (e.g., Demerol) were given before induction. The anesthesia was either general (GA) or epidural (EA), using bupivacaine. The abdomen was opened through a small transverse incision (5–6 cm) in the right upper quadrant. The rectus muscle was split or cut depending on convenience. Lighted narrow Deaver's retractors were used for better illumination and retraction. Titanium clips were used to secure the cystic artery and cystic duct stumps. In difficult situations where adhesions were present in Calot's triangle, a fundus first approach was made. Complete hemostasis was ensured, and the abdomen was closed without a drain. Before closure, bupivacaine was injected (10 mL of 0.25%) in all the layers of the wound in the patients who received GA, for better postoperative pain control.

In the postoperative period, analgesics, both nonsteroidal and/or opiates, were given on demand. Vital signs were checked at regular intervals, and vomiting, fever and urinary retention were noted. Six to 7 hours after surgery the patients were encouraged to sit up in bed with back support and clear fluids were allowed orally. If the patients were not vomiting, hydration was adequate and peristaltic sounds were present, IV fluids were stopped and oral fluids were progressively increased. Constant counselling and reassurance was required to explain what exactly was expected of them. Nursing care played a major role.

Assessment criteria were preset (Table 1) and scores were given for each parameter to assess the theoretical suitability for discharge in the evening (approximately 8 hours after surgery). Pain was assessed by a visual analogue scale. A patient with a score of 3 in any criteria was considered "unfit for discharge." All patients were closely observed through the night and reassessed by the same criteria at 9 am the following morning. This was done to determine the number who would have been readmitted had they been discharged on the previous evening and how many were fit for discharge by the next morning (extended day surgery). All patients were actually discharged after removal of stitches. During their stay in the hospital they were observed for the development of postoperative complications pertaining to the procedure, which potentially could have led to readmission. They were called for monthly follow up for 6 months.

Results

Thirty-two patients formed the study group, of which 26 were women and 6 men. Nineteen patients were given GA and 13 were given EA. Their mean age was 35.25 ± 7.4 years (range 22–51). The most common symptom was right upper quadrant pain. Mean duration of surgery was 63.1 minutes (range

44–82). Mean length of skin incision was 5.98 cm (range 4.8–8.5). In 3 patients the incision had to be extended to facilitate better dissection. Of these, 2 had dense adhesions in Clot's triangle and in the third the gall bladder was grossly contracted and densely adherent to the liver. The rectus abdominis was cut in 19 patients, mostly in large or obese patients. In the remainder it was split. Biliary spillage was present in 3 cases, cystic artery bleeding occurred in 2 cases and liver trauma occurred in 1, caused by the retractor. There were no cases of common bile duct or intestinal injury.

According to the scoring system 25/32 patients (78.1%) would have been considered fit for discharge at 8 pm on the day of surgery. Seven patients were unfit (Table 2). All of these had difficulty with self care and were unable to walk to the bathroom. None had intolerable pain as the single reason for being unfit for discharge. Vomiting was the most predominant symptom and more so in those who had GA. All patients were hemodynamically stable, and none had fever or urinary retention. There was no significant difference in age, body weight and duration of surgery between the dischargeable and non-dischargeable groups. However, the dischargeable group had a significantly shorter incision length, and those given EA had less postoperative pain and proportionately more of them were fit for discharge. Re-evaluation on the next morning showed 3 patients of the 5 who were vomiting and both the patients who had refused to take oral fluids the previous night were now fit for discharge. The remaining 2 patients who were vomiting refused to take oral feeds, and complained of severe pain at the incision site. They required IV fluids and analgesics and were considered unfit for discharge in the morning. None of the patients who were dischargeable on the day of surgery, when reassessed the next morning, had their designation altered. In terms of extended day surgery 30/32 (93.75%) patients would have been dischargeable.

All the patients were actually discharged after removal of stitches. The mean duration of hospital stay was 7.3 (range 6–14) days. The complications of the surgery were also studied. The perioperative complications were noted as above. In the early postoperative period vomiting was present in 5 (15.6%) patients. None had ileus, urinary retention or any respiratory complication. Two patients

Table 2. Patient parameters as assessed in the evening of the same day of surgery

Anesthesia, no. of patients	No. of patients: Fit for discharge	No. of patients: Unfit for discharge	Reasons*
Epidural *n* = 13	12	1 woman	Refusal to feed, non ambulant
General, *n* = 19	13	1 man	Vomiting
		4 women	Vomiting, non ambulant, severe pain
		1 woman	Severe pain, refusal to feed

*All 7 patients unfit for discharge had difficulty with self care.

Table 1. Scores for the preset criteria for simulated discharge on the same day* of surgery

Criteria	Score† 1	2	3
Vital parameters	Stable		Unstable
Pain‡	None or mild	Moderate	Severe or intolerable
Vomiting	Nausea / No vomiting	≤2 episodes	>2 episodes
Oral fluid intake	> 100 mL	< 100 mL	Nil
Self care (any two)			
Can reach out for objects by bedside	Yes		No
Can change clothes oneself	Yes		No
Self feeding from a cup or spoon	Yes		No
Can pull a sheet to cover oneself in bed	Yes		No
Walking to toilet (10 metres)	Unassisted	With assistance	Non-ambulant

*"Same day" was defined as "approximately 8 hours after surgery."
†A patient with a score of 3 in any criteria was considered "unfit for discharge."
‡Pain was assessed by a visual analogue scale.

(6.25%) had superficial wound infections, which were drained and secondarily stitched. Four (12.5%) had prolene granuloma, and hypertrophic scar was seen in 2 (6.25%) patients. None had deep dehiscence, incisional hernia, jaundice/biliary stricture, biliary fistula or recurrent intestinal obstruction on follow up.

Discussion

The concept of day surgery is not new.[3] The impetus has increased in the last few decades due to rising cost of surgical treatment, insurance liability and increased costs of hospitalization. The development of MLC in the 1990s represented an improvement over the conventional open cholecystectomy.[4,5] The introduction of LC soon after, the recognition of its potential, and its rapid replacement of the conventional open cholecystectomy never allowed MLC to gain wide popularity and confidence among surgeons. However, LC is not widely available in rural Bengal. Moreover, even where it is available it is costly and beyond the means of the large majority of the population who form the main bulk of cholecystectomies in the government nonteaching hospitals at the district and subdivision level. Hence open cholecystectomy is still widely practised in these centres. The long hospital stay following open cholecystectomy is a major factor preventing rapid turnover of patients, thus increasing the waiting list in these already overloaded hospitals. The combination of MLC and day surgery is an attractive option.

A long hospital stay after open cholecystectomy is traditionally accepted among both patients and surgeons. There is, in fact, little scientific data to support this.[6] To accept a reduction in duration of hospital stay, patients need to be counselled at every contact by doctors and, importantly, by well trained nursing personnel in the postoperative period so that it is actually possible for them to go home on the same day of surgery. This was especially difficult among patients who came from a lower socioeconomic bracket who were mostly from the working class. Better educated urban patients learned to cooperate and believed they could really be ambulatory a few hours after surgery, take a liquid diet and convalesce at home.

The important reasons for observing the patients overnight were pain and vomiting, as these 2 symptoms decrease the confidence of a postoperative patient for early ambulation. Following overnight observation, a high percentage (93.75%) was in a dischargeable position. It was interesting to note that those who had EA were "more fit" than their GA counterparts. This was probably because EA has more analgesic and less nauseating effects than GA and the patients remained fully conscious throughout. Most of the previous studies of this nature used only GA.[7–9] It remains to be evaluated statistically whether EA has a definite edge over GA in sending patients home early.

It was difficult to explain the reasons behind the refusal to accept oral liquids by some patients on the evening of the surgery, as objectively there was no reason for concern. These patients were mainly older women. It is likely that the old notions of not accepting food for some time after "major surgery," older age and the apprehension of early mobility were probably the factors responsible. In comparison, the younger patients fared better.

We used strict criteria, similar to other studies, for feasibility of discharge.[8,10] We think that with simpler criteria the percentage of discharge of patients should increase. Practically speaking, the minimum requirements for same day or "day after" discharge are tolerable pain, absence of vomiting, tolerance of early feeding and ambulation sufficient to use the toilet. To ensure this, we used preoperative anti-emetic and proton pump inhibitors to decrease gastric juice and postoperative vomiting. A nasogastric tube kept the stomach empty until the completion of surgery. If vomiting is decreased the incisional pain is lessened. The basic difference between LC and MLC in terms of postoperative recovery is the amount of incisional discomfort and pain and its effect on early physical activity and pulmonary function. If this can be controlled the time of recovery is likely to decrease. The small incision results in less postoperative pain than the conventional incision. We also routinely used bupivacaine for postoperative pain control in those who had GA. In cases of EA it seemed unnecessary as analgesic effect was prolonged.

In these study patients MLC was considered safe. The use of lighted retractors and clip applicators made the surgery easier and safer, and allowed the surgeon to work in a small space. This is reflected by the few complications pertaining to the surgery itself. None of these complications were considered as reasons for readmissions had the patients been discharged early. MLC itself leads to lesser morbidity than its conventional counterpart, and the muscle splitting option is an improvement over the muscle cutting incision.[11]

From the surgeon's perspective MLC has a long learning curve and also requires a significant

amount of exposure to conventional open cholecystectomy. In this era of LC, same day discharge is a routine benefit of the procedure, even in developing countries.[12] The problem remains in the smaller centres in a developing country like India where LC or health insurance is not widely available and the majority of the patients are from a lower socioeconomic bracket and are unable to afford the cost of LC. In these situations day surgery MLC is a good substitute to cut short the hospital stay and attendant expenditures. At home the patient feels more comfortable and confident and returns to normal activities earlier.[7]

Limitations

This study suggests that MLC is feasible as a day surgery and definitely as an extended day surgery. However the small sample size and the strict inclusion criteria might not be representative of the general population, particularly if exclusion criteria are relaxed. The feasibility of this approach needs to be demonstrated in a wider range of age groups and in cases where other factors such as choledocholithiasis, dilated common bile duct and probable pancreatic pathology exists.

The "Simulation" methodology itself makes the medical staff relaxed about the need for early discharge. There might have been a lack in commitment toward adequate counselling of the patients for early oral intake and ambulation, as these patients were mostly unwilling to comply. A more dedicated approach may increase the number of same day discharges. The common belief in rural Bengal is that delaying discharge until after stitch removal is desirable. This probably stems from the security afforded by the availability of the doctor and the medical facilities at all times to attend to any complications. This might not be so in the interior remote villages where medical facilities are meager and they are poorly connected to the district.

Since it was a simulation study, none of the patients was actually discharged in the evening. Since quite a number of them hailed from places more than 30 km from the hospital and others had little social support, the actual suggestion of early discharge might have prompted more subjective symptoms (e.g., pain, nausea, refusal to feed and walk) and might have altered the results of the study. We believe that if the hospital has a separate day surgery unit and if follow-up of patients who live some distance away is improved, the success rate of early discharge may increase and the chance of readmission may decrease.

Conclusion

MLC as day surgery or extended day surgery is feasible, and is a safe, well tolerated procedure in a wide range of age groups. It can be a good alternative to LC in developing countries where resources are limited and waiting lists are long.

Competing interests: None declared.

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