

World J. Surg. 28, 737–740, 2004
DOI: 10.1007/s00268-004-7376-6



WORLD
Journal of
SURGERY
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Original Scientific Reports

Laparoscopic Cholecystectomy as a Day Surgery Procedure: Implementation and Audit of 136 Consecutive Cases in a University Hospital

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Published Online: August 3, 2004

Abstract. Laparoscopic cholecystectomy (LC) has been routinely performed since 1989 at our institution, and patients were traditionally admitted for 2 days. In 1996 we implemented a protocol for LC as a day surgery procedure at our center. Although initially reported by others, it has not yet been introduced as routine in Switzerland. The objective of this prospective study was to determine acceptability and safety of LC as an outpatient procedure in a university hospital. Data were collected prospectively for 136 LCs between January 1996 and December 2001. Patients were selected for the study if they wanted to go home within less than 24 hours, had no previous jaundice, and had no anesthetic contraindication. Systematic preoperative liver function tests and hepatic ultrasonography were performed. All patients were admitted on the day of operation. LC was performed using a three-trocar technique. Systematic cholangiography was performed, and all the procedures were completed laparoscopically. There were no common bile duct explorations. Postoperative complications were the following: nausea in seven patients, a minor umbilical hematoma in two. According to patient preference, 101 (74%) were discharged after an overnight stay (less than 24 hours) and 32 (24%) on the same day. The unplanned admission rate was 2%, and none of the patients was subsequently readmitted. The reasons for unplanned admissions were two patients with persistent nausea and one patient for whom an overnight stay was scheduled who presented with a ruptured subcapsular hematoma of the liver. Altogether, 97% of the patients were satisfied with the care they received. Operative costs were not significantly different when comparing inpatient and outpatient LC. The main postoperative savings were in the postoperative costs. Our results confirm that LC as a day surgery procedure is safe, effective, and acceptable to patients and their relatives. These results were achieved by using selection criteria that considered not only the surgical pathology but also the individual and by using appropriate techniques and planned postoperative analgesia.

patient interest, we implemented a protocol whereby LC became an outpatient procedure. Although initially reported by others, this procedure has not yet been introduced as routine in Switzerland [1–10]. The objective of this prospective study was to determine the acceptability and safety of LC as an outpatient procedure in a university hospital.

Definitions

The Center

The Ambulatory Surgery Center is dedicated to procedures in the following categories (institutional definitions): (1) ambulatory, when the patient does not need a bed (mostly operations performed under local anesthesia); (2) same day, when admission and discharge are on the same day; and (3) 1 day, when an overnight stay is required (but it is less than 24 hours). Many patients benefit from a reimbursement package for outpatient surgery, which covers all three categories.

As a multispecialty unit, facilities are available once a week for general surgery procedures. The facilities include two operating rooms, a seven-bed recovery room, and an office. The multispecialty ambulatory surgery unit is located at the bottom floor of our hospital (one main building). In the case of an overnight stay, patients are transferred to the inpatient department. The center's permanent staff include three recovery room nurses, two scrub nurses, one nurse anesthetist, one circulating nurse, and one administrative assistant. Anesthesiologists are assigned to the center according to schedules determined by their department.

Preoperative Evaluation

Candidates are evaluated once a week in the hospital's outpatient clinic. The patients are asked to complete a screening checklist designed to identify co-morbid and social conditions that may contraindicate surgery. A fully trained surgeon is responsible for confirming the indications and eligibility for day surgery and the patient's motivation.

During the same visit, the patient is also evaluated by an anesthesiologist. Only patients belonging to risk classes I and II (as de-

Ambulatory surgery is increasingly accepted and encouraged throughout the world by both governmental and private agencies. Ambulatory surgery was formally introduced in Switzerland rather recently. This, combined with financial reforms in the Swiss health care system, stimulated the implementation of other centers of ambulatory surgery in Switzerland.

Laparoscopic cholecystectomy (LC) has been routinely performed since 1989 at our institution, and patients have traditionally been admitted for 2 days. In 1996, stimulated by both surgeon and

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fined by the American Society of Anesthesiologists [ASA]) were considered. Preoperative laboratory testing is requested according to a preestablished protocol [11]. The patients are then given written preoperative instructions and the date and time for surgery. No premedication is prescribed.

Perioperative and Postoperative Care

On the day of the operation, the patients stay in the recovery area before and after the procedure. They return home the same day if the discharge criteria are fulfilled, which are covered by the acronym AAAAM: awake, analgesia, ambulating, alimentation, miction. The patient must be taken home by someone and have company during the entire first postoperative night. Written instructions (discharge booklet) and emergency telephone numbers are provided. Analgesics are provided for the first 24 hours to avoid the need to stop at a pharmacy on the way home. Depending on the patients' preference, some are admitted overnight (hospital stay of less than 24 hours). A fax sent on the day of surgery to the referring physician contains the operative report and the recommended postoperative care.

Patients are contacted by telephone the next day to ascertain their adequate recovery and to evaluate pain control, the incidence of nausea or vomiting, and the general level of satisfaction. A visit to the hospital clinic is scheduled for the second and eighth days after surgery and then 6 weeks after the operation for final evaluation.

Methods

Data were collected prospectively for 136 laparoscopic cholecystectomies performed by two staff members between January 1996 and December 2001. Systematic preoperative liver function tests (bilirubin, transaminases, γ -glutamyltranspeptidase, alkaline phosphatase) and hepatic ultrasonography were performed to improve the accuracy of predicting the presence of common bile duct stones before LC. Patients were admitted on the day of operation. Each was given a prophylactic subcutaneous dose of low-molecular-weight heparin and intravenous antibiotics (amoxicillin-clavulanic acid) 1 hour preoperatively. A standardized anesthesia technique was used. Induction was performed with propofol (1.5 mg/kg)/fentanyl (3–5 μ g/kg); it was maintained with propofol (5–12 mg/kg)/fentanyl (1–2 μ g/kg). The LC was performed using a three-trocar technique with a pneumoperitoneum of 12 mmHg. Systematic cholangiography was undertaken, and bupivacaine was infiltrated into the intraperitoneum and trocar site(s). Standardized postoperative analgesic/antiinflammatory drugs were used and prescribed (tramadol 3 \times 50 mg/day and mefenamic acid 3 \times 500 mg/day).

Results

Data were collected prospectively for 136 LCs performed between January 1996 and December 2001. There were 114 women (85%) and 22 men (15%) with a mean age of 46 years (range 23–72 years) and a mean body mass index (BMI) of 26.5 (range 24–31).

Only motivated and ASA I and II patients were included. Distribution into ASA risk groups was as follows: 61 patients (45%) were ASA 1, and 75 (55%) were ASA 2.

The mean operating time, including systematic intraoperative

cholangiography, was 58 minutes (35–65 minutes). All the procedures were completed laparoscopically. There were no common bile duct explorations.

Indications for laparoscopic cholecystectomy ($n = 136$) included chronic cholecystitis with symptomatic gallbladder stones ($n = 116$), acute cholecystitis ($n = 8$), and acalculous cholecystitis ($n = 10$).

Postoperative pain assessment was performed with the visual analogue scale (VAS) at 6 and 24 hours after surgery. Altogether, 48% and 72% of the patients had no pain at rest with our standardized pain control regimen (tramadol/mefenamic acid) at 6 and 24 hours, respectively, after operation. The median pain score on VAS at 24 hours was 1 (0–5) at rest, 4 (0–6) with movement, and 4 (0–7) with coughing. Postoperatively, seven patients suffered from nausea, and two presented with an umbilical hematoma.

According to patient preference, 101 (74%) were discharged after an overnight stay (less than 24 hours) and 32 (24%) went home on the same day on average of 6 hours (5–9 hours) after surgery. The unplanned admission rate was 2%, and none of the patients was subsequently readmitted. The unplanned admissions involved two patients with persistent nausea. Seven days after surgery, 95% of the patients had resumed normal physical activity. A visit to the hospital clinic was scheduled for all patients during the sixth postoperative week for a final evaluation.

Five patients (5%) were lost to follow-up; all of the others provided adequate information. Among these patients, 97% were satisfied with the care they received. Four patients (3%) were not fully satisfied, mainly complaining of delays or changes in the operating schedule.

Operative costs were not significantly different for inpatient LC and outpatient LC. The main postoperative savings were in postoperative costs (institutional data).

Discussion

The audit is based on 136 LCs performed between 1996 and 2001 at the Ambulatory Surgery Center. The overall evaluation is encouraging. The surgical results compare favorably with those of other centers. The current study shows an excellent overall patient satisfaction rate and high acceptability for a procedure recently implemented and not yet introduced as a routine procedure in Switzerland. Outpatient surgery requires careful planning and preparation. Deviation from this concept may have been the cause of the dissatisfaction of some patients. At the time of the final evaluation 6 weeks after surgery, 97% of the patients were satisfied with the care they received in the outpatient setting. Four patients (3%) were not fully satisfied, mainly complaining of delays or changes in the operating schedule.

In the ambulatory setting, potential complications and postoperative treatment must be accurately anticipated and the referring physicians clearly informed. The preoperative visit is of paramount importance. Patients tend to feel more secure if examined by experienced physicians, ideally those who will be present in the operating theater. It also reduces errors in patient selection that may lead to cancellations or unplanned hospitalizations. The operations should be performed, or directly supervised, by fully trained surgeons and anesthesiologists. When such principles are not followed, there is a greater risk of delays in the schedule. Consequently, more patients may need to be admitted for overnight observation.

Teaching and training aspects, which are particularly important in a university hospital, must be carefully considered. It is desirable that trainees be exposed to all aspects of outpatient surgery, including patient selection and practice administration. This prepares them to provide surgical care that is increasingly shifted to outpatient care. It may also be advisable to limit the participation in ambulatory surgery to advanced trainees, as it allows them to practice many procedures that are commonly required in the surgical curriculum. In our department, trainees are usually assigned to this unit for 6 months.

Postoperative pain and nausea in this study were not significant problems as had been reported by others. Without the use of prophylactic antiemetics, the admission rate for postoperative nausea was low (1%), thereby not justifying their routine use as advocated by others [12].

None of the patients was admitted for postoperative pain. Intra-peritoneal and local administration of bupivacaine, even if not universally accepted as a standardized postoperative analgesic regimen, may have contributed to the excellent pain control [13–17].

The unplanned admission rate, which may reflect the quality of care in this area, was low (2%). None of the patients was subsequently readmitted [18].

Operative costs were not significantly different for the inpatient and outpatient LCs. The main postoperative savings were in postoperative costs (e.g., room costs) (institutional data), resulting in a 15% decrease in the total cost [19].

Our results confirmed that LC as a day surgery procedure is safe, effective, and acceptable to patients and their relatives. With the current economic pressure to contain costs and the use of hospital beds, LC as day surgery has now become an established practice for selected patients in our institution.

Conclusions

Laparoscopic cholecystectomy can be performed safely in an outpatient setting if there is careful selection and education of patients and the surgical team is experienced. Such good results can be achieved by using selection criteria that consider not only the surgical pathology but also the individual and by using appropriate techniques and planned postoperative analgesia.

Résumé. La cholécystectomie par coelioscopie (CC) est réalisée de façon régulière depuis 1989 dans notre institution mais les patients restent normalement à l'hôpital deux jours. Depuis 1996, la CC est pratiquée dans notre centre la CC en ambulatoire. Bien qu'initialement rapporté par d'autres, ce procédé n'est pas encore pratiqué de façon régulière en Suisse. L'objectif de cette étude prospective a été de déterminer l'acceptabilité et la sécurité de la CC en hôpital de jour dans un hôpital universitaire. On a colligé prospectivement les données concernant 136 CC entre janvier 1996 et décembre 2001. Les patients ont été sélectionnés s'ils acceptaient de rentrer chez eux en moins de 24 heures, s'ils n'avaient pas d'antécédent d'ictère ou d'autre contre-indication d'anesthésie. On a réalisé de façon systématique les tests de fonction hépatique et une échographie hépatique en préopératoire. Tous les patients ont été admis le jour de l'intervention même. La CC a été réalisée grâce à une technique de trois trocarts et la cholangiographie a été réalisée de façon systématique. Tous les procédés ont été complétés sous coelioscopie. Il n'y a eu aucune exploration de la voie biliaire principale. Les complications postopératoires ont été comme suit: nausées chez sept patients, un hématome périombilical mineur chez deux patients. Selon les souhaits des patients, 101 (74%) ont pu quitter l'hôpital après une nuit à l'hôpital (moins de 24 heures) et 32 (24%), le même jour. Le taux d'admission non prévue a été de 2% et aucun des patients n'ont été réadmis. Les raisons d'admission non prévue ont été des nausées persistantes chez deux patients, et un patient qui a rompu un hématome sous-capsulaire du foie. 97% des patients se sont dits satisfaits des soins

qu'ils ont eus. Les coûts opératoires ne différaient pas de façon significative entre les patients selon qu'ils ont été hospitalisés ou pas. La différence principale en coûts concernait les soins postopératoires. Nos résultats confirment que la CC est sûre, efficace et acceptable en hospitalisation de jour, pour les patients comme pour leur entourage. Il faut une sélection qui tient compte non seulement de la pathologie chirurgicale, mais aussi, du patient, et surtout il faut une technique planifiée et appropriée d'analgésie postopératoire.

Resumen. La colecistectomía laparoscópica (CL) se realiza rutinariamente en nuestra institución desde 1989 pero los pacientes tradicionalmente han sido hospitalizados por dos días. En 1996 comenzamos la implantación de la CL como procedimiento de un día. Aunque inicialmente informado por otros autores, el procedimiento no ha sido introducido como rutina en Suiza. El propósito del presente estudio prospectivo fue determinar la aceptabilidad y seguridad de la CL como procedimiento ambulatorio en un Hospital Universitario. Se recolectó información prospectiva de 136 CL en el periodo entre enero de 1996 y diciembre de 2001. Se seleccionaron aquellos pacientes que deseaban regresar a su hogar en menos de 24 horas, que no padecían ictericia previa o alguna contraindicación anestésica. Se practicaron sistemáticamente exámenes de sangre para función hepática y ultrasonografía hepática. Todos los pacientes ingresaron el día de la operación. La CL fue practicada usando una técnica de tres trocarts, con colangiografía en forma sistémica. La totalidad de los procedimientos fue completada laparoscópicamente. Las complicaciones postoperatorias incluyeron náusea en siete pacientes y hernia umbilical menor en dos. Según la preferencia de los pacientes, 101 (74%) fueron dados de alta luego de una noche de hospitalización (menos de 24 horas) y 32 (24%) el mismo día. La tasa de admisión no planeada fue 2% y ninguno de los pacientes tuvo que ser readmitido. La razón para la admisión no planeada fue dos pacientes con náusea persistente y un paciente en quien se planeó una estancia de una noche que se presentó con ruptura de un hematoma subcapsular del hígado. 97% de los pacientes manifestaron satisfacción con la atención recibida. Los costos operatorios no fueron significativamente diferentes en comparación con la CL ambulatoria. Los principales ahorros fueron en los costos postoperatorios. Nuestros resultados confirman que la CL realizada como procedimiento de un día es segura, efectiva y aceptable por parte de los pacientes y sus familiares. Esto se logra aplicando criterios de selección que consideren no solo la patología quirúrgica, sino también el individuo y mediante apropiadas técnicas y planificada analgesia postoperatoria.

References

1. Reddick EJ, Olsen DO. Outpatient laparoscopic laser cholecystectomy. *Am. J. Surg.* 1990;60:485–489
2. Farha GJ, Green BP, Beamer R. Laparoscopic cholecystectomy in a freestanding outpatient surgery center. *J. Laparoendosc. Surg.* 1994;4:291–294
3. Narain PK, DeMaria EJ. Initial results of a prospective trial of outpatient laparoscopic cholecystectomy. *Surg. Endosc.* 1997;11:1091–1094
4. Fiorillo MA, Davidson PG, Fiorillo M, et al. 149 Ambulatory laparoscopic cholecystectomies. *Surg. Endosc.* 1996;10:52–56
5. Lillemoe KD, Lin JW, Talamini MA, et al. Laparoscopic cholecystectomy as a "true" outpatient procedure: initial experience in 130 consecutive patients. *J. Gastrointest. Surg.* 1999;3:44–49
6. Keulemans Y, Eshuis J, de Haes H, et al. Laparoscopic cholecystectomy: day-care versus clinical observation. *Am. Surg.* 1998;228:734–740
7. Mjaland O, Raeder J, Aasboe V, et al. Outpatient laparoscopic cholecystectomy. *Br. J. Surg.* 1997;84:958–961
8. Bringman S, Anderberg B, Heikkinen T, et al. Outpatient laparoscopic cholecystectomy. *Ambul. Surg.* 2001;9:83–86
9. Forrest Calland J, Tanaka K, Foley E, et al. Outpatient laparoscopic cholecystectomy: patient outcomes after implementation of a clinical pathway. *Ann. Surg.* 2001;233:704–715
10. Curet MJ, Contreras M, Weber DM, et al. Laparoscopic cholecystectomy. *Surg. Endosc.* 2002;16:453–457
11. Roizen MF. Preoperative evaluation. In Miller RD, editors, *Anesthesia*, 4th edition, 827–882
12. Liberman MA, Howe S, Lane M. Ondansetron versus placebo for prophylaxis of nausea and vomiting in patients undergoing ambulatory laparoscopic cholecystectomy. *Am. J. Surg.* 2000;179:60–62
13. Narchi P, Benhamou D, Fernandez H. Intra-peritoneal local anaes-

- thetic for shoulder pain after day-case laparoscopy. *Lancet* 1991;338:1569–1570
14. Michaloliakou C, Chung F, Sharma S. Preoperative multimodal analgesia facilitates recovery after ambulatory laparoscopic cholecystectomy. *Anesth. Analg.* 1996;82:44–51
 15. Alexander DJ, Ngoi SS, Lee L, et al. Randomized trial of periportal bupivacaine for pain relief after laparoscopic cholecystectomy. *Br. J. Surg.* 1996;83:1223–1225
 16. Weber A, Munoz J, Garteiz D, et al. Use of subdiaphragmatic bupivacaine instillation to control postoperative pain after laparoscopic surgery. *Surg. Laparosc. Endosc.* 1997;7:6–8
 17. Kehlet H. Acute pain control and accelerated postoperative surgical recovery. *Surg. Clin. North Am.* 1999;79:431–443
 18. Greenburg AG, Greenburg JP, Tewel A, et al. Hospital admission following ambulatory surgery. *Am. J. Surg.* 1996;172:21–23
 19. Pradervand Mooser M, Gardaz JP, Capt H, et al. Relative anaesthesia-cost for laparoscopic cholecystectomy: fairly low. *Can. J. Anesth.* 2002;49:540–544