Day-case laparoscopic cholecystectomy: results of 211 consecutive patients

Jan Martin PROSKE (1), Ibrahim DAGHER (1), Claudiu REVITEA (1), Alessio CARLONI (1), Violaine BEAUTHIER (1), Thierry LABAILLE (2), Corinne VONS (1), Dominique FRANCO (1)

(1) Departments of Surgery and Anaesthesia (2), AP-HP, Antoine Béclère Hospital, University Paris XI, Clamart.

SUMMARY

Objectives — The purpose of this work was to evaluate the feasibility and outcome of elective laparoscopic cholecystectomy as a day-case procedure in a French university hospital.

Methods — Since the creation of a surgical day-care centre in 1999, patients without severe chronic disease and anticoagulant therapy were selected for elective laparoscopic cholecystectomy. They were admitted and operated on in the morning hours and discharged after a double check by the surgeon and an anaesthesiologist 4 to 6 hours later. They were contacted by telephone the day subsequent to surgery and were seen in the outpatient unit 8 to 10 days after.

Results — Two hundred eleven laparoscopic cholecystectomies were performed in day-care surgery from January 1999 to December 2005. The proportion of day-case management increased during the six-year period from 32% to 53%. Eighteen percent of patients had an overnight admission. The overall complication rate was 1.8%. None of the patients had an emergency readmission. Incapacity duration went from 1 to 15 days.

Conclusion — These results suggest that laparoscopic cholecystectomy can be routinely performed as a day-case procedure.

Introduction

Laparoscopic cholecystectomy has become the treatment of choice in symptomatic cholelithiasis even if there is no scientific evidence for the assumed superiority compared to a small-incision approach [1]. The evolution of surgical and anaesthetic management with the introduction of better postoperative pain control permitted a reduction of hospital stay and of the period of convalescence and made it technically feasible to perform laparoscopic cholecystectomy as a day-case procedure [2, 3]. This development was further promoted by economic motives. Although in some countries like the United-States or Canada the concept of day-case laparoscopic cholecystectomy has already been widely accepted, with recent reports focusing less on feasibility but rather on the possibility to apply wider patients inclusion criteria, in Europe, and namely in France, the treatment of symptomatic cholelithiasis on an outpatient basis is still infrequent [4].

A surgical day-care centre was constructed in our university hospital in 1999. Since its opening elective laparoscopic day-case cholecystectomy has been offered progressively to selected patients presenting symptomatic cholelithiasis. The purpose of this work was to evaluate the feasibility and the results of the...
laparoscopic day-case procedure and to describe the particularities of our surgical and anaesthetic management.

**Patients and Methods**

From January 1999, surgeons were encouraged to propose day-case cholecystectomy to patients with symptomatic cholelithiasis. Presurgical investigation included a physical examination, liver biological tests (gamma-glutamyl transferase, alkaline phosphatase, transaminases), ultrasonography of the gallbladder and the bile ducts and an anaesthetic evaluation. Patients with an American Society of Anaesthesiology (ASA) classification of I or II were considered eligible for an outpatient management, even in clinical suspicion of common bile duct stones or in case of previous abdominal surgery. Exclusion criteria were an ASA classification of III or IV, anticoagulation treatment, the presence of sleep apnea, age more than 75 years, home address more than 50 km from the hospital, no functional telephone line, and the absence of an adult willing to accompany them home and to stay with them overnight.

The opening hours of our day-case centre were from 7:30 AM to 6:30 PM. Patients were admitted one hour before surgery and operated on the morning list before 2:00 PM. The surgical procedure and the anaesthetic management were realized with respect to a predefined written protocol.

Laparoscopic cholecystectomies were performed by an experienced surgeon or a surgeon-in-training with an experienced surgeon as an assistant in the American position through four trocars. Low insufflation pressure (9 mmHg) was employed in all procedures. The Calot triangle was opened, and the cystic duct and artery identified. They were dissected free followed by bipolar coagulation of the cystic artery and an absorbable ligature of the cystic duct (3/0 polyglactin). Cholangiography was performed selectively. After separation of the gallbladder from its liver bed it was extracted through the umbilical incision in a glove. Abdominal drains were not used.

Operations were performed under general anaesthesia. Patients were given cefuroxime 1.5 g intravenously at the start of the procedure. The patients were anaesthetized with sufentanil 0.2-0.3 µg/kg and midazolam 5 mg/kg or propofol 2.5 mg/kg. Intraoperative analgesia was maintained with boluses of sufentanil (5-10 µg). At the beginning of the operation 50 mg ropivacaine mixed with saline was injected above the liver and on each side of the gallbladder beneath the liver. This was repeated at the end of the operation before extubation of the patient. Trocar puncture sites were not infiltrated. Before the end of surgery 1 g of paracetamol, 50 mg of ketoprofene and 1 mg of droperidol were systematically injected. In presence of risk factors for postoperative nausea and vomiting 4 mg of dexamethasone were additionally administered.

After surgery patients were transferred to the recovery room. For pain relief, boluses of morphine (3 to 5 mg IV) were given according to a ten-point visual analogue scale (VAS) to obtain a score equal or less to 4.

On return from the recovery room to the day-case centre, patients were encouraged to mobilize and start oral fluids if they were conscious and not nauseated. The nursing staff was allowed to provide analgesia if indicated. Paracetamol/codeine 500/30 mg was given every 4 to 6 hours (doubled in case of continued pain) and ketoprofene 50 mg up to 4 times per day. In case of postoperative nausea and/or vomiting 0.5 mg/kg of metoclopramide and in persisting symptoms 4 mg of ondansetron were administered. Discharge criteria were applied by means of a recovery score (modification of Aldrete score) (table I). If patients required oral pain medication only, tolerated oral fluids, could walk and had passed urine spontaneously the decision about discharge was made by both the surgeon and an anaesthetist before 6:30 PM. Paracetamol/codeine (500/30 mg three times per day systematically, doubled in case of continued pain) and ketoprofene (50 mg 4 times per day) were supplied to the patients at discharge and a written instruction highlighting general questions and indicating the direct telephone line of the surgical ward was handed out. No chest X-ray or biological studies were performed before discharge. Patients not fulfilling the day-case management criteria were admitted to the hospital for an overnight stay.

The day subsequent to surgery, patients were contacted by a day-care nurse and asked about their well-being. They were seen in the surgical outpatient unit 8 to 10 days later. There were no systematic visits with the general practitioner. Incapacity duration was fixed at the first consultation for 1 to 2 weeks according to the type of work and prolonged if necessary after a physical re-examination.

Data were processed and statistic analysis performed with the Excel administration-system (Excel software; Microsoft, Redmond, WA, USA).

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**Table I.** Modified Aldrete score: points were given for all criteria and added, discharge was authorised with a score of ≥ 9.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Result</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic blood pressure</td>
<td>&lt; 20% of preoperative value</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>20-40% of preoperative value</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>&gt; 40% of preoperative value</td>
<td>0</td>
</tr>
<tr>
<td>Ambulation</td>
<td>Walking without vertigo possible</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Walking with assistance possible</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No walking possible, vertigo</td>
<td>0</td>
</tr>
<tr>
<td>Nausea, Vomiting</td>
<td>Minor</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Severe</td>
<td>0</td>
</tr>
<tr>
<td>Pain</td>
<td>Minor (VAS 1-2)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Moderate (VAS 3-4)</td>
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</tr>
<tr>
<td></td>
<td>Severe (VAS &gt; 4)</td>
<td>0</td>
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<tr>
<td>Bleeding</td>
<td>Minor</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Severe</td>
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</tbody>
</table>
Results

Two hundred eleven elective laparoscopic cholecystectomies applying the day-case protocol were performed from January 1999 to December 2005. The mean patients age was 45 years (range: 21 to 75 years), the sex ratio 160: 51 (female to male) and the mean body mass index 23 (range: 18 to 35). Day-case management represented 47% of the overall elective laparoscopic cholecystectomy activity, augmenting from 32% in 1999 to 53% in 2005. This proportion was greatly dependent upon the participating surgeons ranging from 20% to 83%. Causes of exclusion from the day-care procedure were an ASA classification of III or IV (17% of patients), the presence of a sleep apnea (7% of patients), an anticoagulation treatment (4% of patients), age more than 75 years (53% of patients) and non-medical reasons i.e. convenience of the patient and/or the surgeon (19% of patients).

There were no conversions to open cholecystectomy nor operative complications. The mean operation time was 86 ± 14 min, mean recovery room stay 156 ± 20 min and mean stay in the day case centre 154 ± 25 min.

Thirty-eight patients (18%) had an overnight admission. In three of them this resulted from the intra operative discovery and laparoscopic treatment of common bile duct stones. In the 35 other patients overnight admission was due to prolonged sleepiness (20 patients, 52% of overnight admissions), residual pain (9 patients, 24%), nausea (5 patients, 13%), and bladder retention (1 patient, 3%). All patients but one remained only one night in the hospital. There were significantly more overnight stays in patients whose surgery ended after 11:00 AM than in those whose surgery ended before. None of the patients treated with the day case protocol had an emergency readmission.

Postoperative complications occurred in 4 patients (1.8%). Three patients had incisional infection at the umbilicus successfully treated on an outpatient basis by repeated wound dressings. The fourth patient developed biliary peritonitis. He presented with slight abdominal discomfort on the third postoperative day. Diagnosis was suspected on the eighth postoperative day by clinical examination and was confirmed by an abdominal CT-scan showing diffuse abdominal fluid collections. An exploratory laparoscopy found bile leakage from a Luschka canal which had not been recognised at the time of cholecystectomy. It was treated by peritoneal lavage, suture of the canal and abdominal drainage. This required a 7 days hospitalisation. No other patient required hospital readmission.

Incapacity duration was 7 ± 2.1 days (range: 1 to 15 days).

Discussion

Clinical pathways to perform day-case surgery must incorporate several distinct measures concerning technical and organisational aspects: a minimal invasive surgical technique with a low complication rate coupled with an anaesthetic protocol to further prevent or minimize postoperative consequences like pain, nausea and sleepiness but also the conception of a day-care centre, the reorganisation of the operation list to permit an earlier discharge, the institution of the postoperative follow-up on an outpatient basis and finally, the creation of an economic surrounding which encourages efforts to establish a growing day-care activity [7, 8].

In the case of elective laparoscopic cholecystectomy the morbidity has been reported to be between 2 and 4%, but the incidence of major complications requiring urgent operative management is much lower (0.15 to 0.6% for bile duct injury and less than 0.05% for arterial bleeding). Additionally pilot studies have demonstrated a 4 to 6 hours observation interval to be sufficient to detect early complications [9]. Bile duct injuries are most often detected during surgery or become symptomatic only several days after laparoscopic cholecystectomy [10].

The only patient in our series presenting a major postoperative complication was regularly seen in the outpatient unit. The clinical diagnosis on postoperative day 8 was still difficult and we are in doubt as to whether a conventional management would have detected it earlier. However, it demonstrates the importance of a restrictive outpatient control after discharge.

Our results suggest that day case procedure can be offered to more than half of patients undergoing elective laparoscopic cholecystectomy with selective inclusion criteria. Outpatient laparoscopic cholecystectomy has been demonstrated to be safe even for older and high risk (ASA grade III) patients undergoing elective operations and a larger proportion, as the 53% of patients observed in the end of our study, should be considered for day-care management in the future [11].

Eighteen percent of patients needed an overnight observation. This is in keeping with most other series of day-case cholecystectomies [3, 12, 13]. Prolonged sleepiness, residual pain and nausea accounted for most overnight admission. The use of morphine in the recovery room may be responsible for some of these cases and should be revisited. Patients whose cholecystectomy ended after 11:00 AM were more prone to stay overnight than others. We consider that the early hour of closure of the day-case centre (6:30 PM) does not permit sufficient observation after surgery and are planning to extend the opening hours until 8:00 PM.

Patient selection criteria have also an impact on the admission/readmission rate. Only one case of a readmission indicates that our selection criteria were appropriate and that well informed patients can cope with some degree of pain. The surgeon-dependency of the day-case activity in our study could be explained by personal motivation. During the study period this difference decreased progressively.

Several reasons for further promotion of the day-care management exist: the number of nosocomial infection could be decreased and even for psychological reasons the patients may prefer to recover at home. Because no benefit of clinical observation after laparoscopic cholecystectomy could be demonstrated, the costs that can be saved with day-care treatment will become important [14, 15]. Compared to other European countries or the United States, in France, there are only a small proportion of patients being treated in day-care surgery. Only one other French series of laparoscopic cholecystectomy with this kind of management has been published to date [16]. This could partly be explained by economic reasons. The French hospital refund system (“T2A”) already takes into account the cost savings shown to be achieved by applying day case-management [17]. Further efforts should be made to settle an economic motivation not only based on refund amounts but on global cost savings e.g. by reducing night nursing staff and to progress day-care management in France. An evaluation of expenditure and receipts is currently underway in our hospital.

These results of our study suggest that day-case laparoscopic cholecystectomy can be routinely performed. A growing experience should allow enlargement of patient inclusion criteria.

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REFERENCES