Factors Determining Convalescence After Uncomplicated Laparoscopic Cholecystectomy

Thue Bisgaard, MD; Birthe Klarskov, RN; Jacob Rosenberg, MD, DSc; Henrik Kehlet, MD, PhD

Hypothesis: Detailed information on duration and limiting factors for convalescence after uncomplicated laparoscopic cholecystectomy is lacking. Duration of convalescence may be associated with patients’ expectations, given recommendations, and postoperative complaints such as pain and fatigue.

Design: Prospective, descriptive study.

Setting: A university hospital.

Patients: Two hundred consecutive patients who underwent uncomplicated elective laparoscopic cholecystectomy.

Intervention: For sedentary, light, or moderate workload or main recreational activity, we recommended 2 days of postoperative convalescence; for strenuous workload or recreational activity, we recommended 1 week.

Main Outcome Measures: Duration and reasons for absence from work.

Results: Convalescence from work (n=85) and recreational activity (n=198) was 6 days (range, 0-28 days) and 2 days (range, 0-24 days), respectively, in patients recommended for 2 days’ convalescence. In patients recommended for 1 week of convalescence, convalescence from work (n=25) was 10 days (range, 0-52 days), and convalescence from main recreational activity (n=2), 8 days (range, 5-11 days). Among 87 patients who resumed work or activity later than recommended, pain was a contributory cause in 41 patients, fatigue in 35 patients, and convalescent period falling on a weekend in 26 patients, while 29 patients had arranged vacation or sick leave preoperatively. Preoperative expectation of convalescence and pain were independent contributory factors (P<.01) for convalescence from work for longer than 2 days in patients recommended for 2 days’ convalescence.

Conclusions: The period of convalescence after uncomplicated laparoscopic cholecystectomy is about 1 week from work and 2 days from recreational activity when 2 days of convalescence is recommended. Improved pain relief and patient information may further reduce convalescence.

Arch Surg. 2001;136:917-921

CONVALESCENCE after laparoscopic cholecystectomy is often used as an outcome parameter, owing to its large socioeconomic impact and patient discomfort.1-4 Compared with open traditional cholecystectomy, laparoscopic cholecystectomy confers advantages such as reduced postoperative pain, immune and inflammatory responses, and pulmonary dysfunction.5 In randomized studies comparing different surgical techniques for cholecystectomy (traditional open, mini-incisional, and laparoscopic cholecystectomy),1-4 the median or mean postlaparoscopic cholecystectomy convalescence is surprisingly long, ranging from 1 to 3 weeks to resume recreational activities1-4 and 2 to 5 weeks to resume work.1,3-6 However, to our knowledge, no large-scale study has analyzed convalescence after uncomplicated laparoscopic cholecystectomy using short well-defined convalescence recommendations. Furthermore, specific information on the factors responsible for convalescence after laparoscopic cholecystectomy is lacking, and there is no scientific data to argue for prolonged convalescence after uncomplicated laparoscopic cholecystectomy. We have therefore prospectively analyzed limiting factors for short convalescence using standardized convalescence recommendations in patients undergoing uncomplicated laparoscopic cholecystectomy.

RESULTS

Clinical Data

During the period from October 22, 1997, to June 25, 1999, 268 patients under-
PARTICIPANTS AND METHODS

Our aim was to obtain valid prospective data on convalescence from 200 consecutive patients undergoing uncomplicated elective laparoscopic cholecystectomy. Patients with acute cholecystitis were not included. The setting was semi-ambulatory (patients were encouraged but not forced to be discharged from the hospital on the day of surgery) within a gastroenterologic surgery department in a public university hospital with unsolicited referral of patients. Collection of data was based on structured interviews and self-administered standardized questionnaires. All patients were contacted by telephone 1 week postoperatively for clinical control and to secure return of postoperative questionnaires. A 1-month follow-up for postoperative morbidity was performed in all patients.

RECOMMENDATIONS FOR CONVALESCENCE

In case of strenuous physical workload (ie, construction workers, day-care workers, furniture movers) or recreational activity (ie, energetic sporting activity), 1 week of convalescence was recommended (ie, 8 days’ absence including the day of surgery). Two days of convalescence (ie, 3 days’ absence including the day of surgery) was recommended for all other types of sedentary, light, or moderate work (ie, clerk, teacher, journalist, businessperson, postal worker) or recreational activity (sedentary hobby, watching television, going to the movies, walking, biking, shopping, gardening, exercising). All patients were informed that there were no postoperative restrictions and that work or recreational activity was allowed from the first postoperative day.

DURATION OF CONVALESCENCE

Convalescence data are given in the Table together with the main reasons for not following our recommendations to resume work and recreational activity. The duration of convalescence of those patients returning to work was significantly longer than the duration for those returning to recreational activity (P<.001) (Figure 1). Convalescence from work (n=155) and recreational activity (n=198) was 6 days (range, 0-28 days, including the day of surgery) and 2 days (range, 0-24 days), respectively, in patients recommended for 2 days’ convalescence. The overall convalescence (pooled data from work and main recreational activity in patients recommended for 2 days’ convalescence) was 3 days (range, 0-28 days).

In patients recommended for 1 week of convalescence, convalescence from work (n=25) was 10 days (range, 0-52 days), and convalescence from main recreational activity (n=2) was 8 days (range, 5-11 days). The overall convalescence period (pooled data from work and main recreational activity in patients recommended for 1 week of convalescence) was 10 days (range, 0-52 days).

Among the 87 patients who resumed work later than recommended, pain was contributory for 41 patients and fatigue in 35. In 26 patients, an interposed weekend hindered return to work within 2 days, and 29 patients had arranged vacation or sick leave prior to the operation. In 2 patients, PONV was reported as a contributory factor for not resuming work as recommended. Absence from main recreational activities was mainly owing to pain and fatigue (Table). Two patients reported that PONV was contributory for not resuming recreational activity as recommended. Fatigue scores were significantly increased until the fifth postoperative day (P<.001, Friedman test; P<.005 for days 1-4, Wilcoxon test; Figure 2). Among

Preoperative assessment

At the first preoperative examination (prior to receiving information about the postoperative course and our recommendations), patients filled out a short questionnaire regarding their expectations of the duration of convalescence (convalescence was defined as sick leave or the period during which normal functions or activities were hindered). The categorical variables were given in 3 levels: 0 to 4 days, 1 week, and 2 weeks or more. To examine the influence of preoperative neuroticism on the duration of convalescence, a psychometric vulnerability test questionnaire was sent to patients preoperatively. Clinical information (preoperative health and physical examination, demographics, intraoperative data, etc) was obtained on preprinted forms. Information about occupation and recreational activities were obtained at personal interviews, and patients were stratified according to paid work (employee, self-employed) or not working (retired or unemployed) and to the level of main activity (sedentary, light, moderate, or heavy/strenuous) during work and/or recreational activity.

ANESTHETIC, ANALGESIC, AND SURGICAL TECHNIQUE

All patients received a similar general anesthetic regimen, including cisatracurium besylate (for induction, 0.15 mg/kg),...
fentanyl citrate (for induction, 0.003 mg/kg), propofol
(maintenance, 10 mg/kg per hour), and supplemental
doses of allantoin hydrochloride (0.5-1.0 mg) if required.
Premedication was not used. Fifty-three patients received
incisional local anesthetics. The anesthetic regimen and
infiltration technique for local anesthetics has been
described in detail elsewhere.α For postoperative analgesia
all patients received intravenous ketorolac tromethamine
(30 mg) approximately 20 minutes before the end of sur-
gery, and in the recovery room, patients received acetami-
nophen (2 g) as suppositories. Three hours postopera-
tively, oral treatment with ibuprofen (600 mg every 8
hours for 4 days) was commenced (tablets were distrib-
uted to patients for self-administration). During hospital-
ization additional morphine was administered on request.
All operations were conducted or supervised by experi-
enced laparoscopic surgeons (J.R.) who used two 10-mm
and two 5-mm trocars.

POSTOPERATIVE ASSESSMENT

Participants completed a questionnaire on the day of re-
turning to work and/or main recreational activity. If work
and/or recreational activity were resumed later than rec-
commended, responsible reasons (patients were allowed to
give multiple reasons) were stated (pain, fatigue, wound
problems, advice from general practitioner, hindered ow-
ing to weekend, planned vacation or sick leave prior to op-
eration, or “other” [in case of other, details could be
specified]). For 108 consecutive patients, numbered 93 to
200, fatigue and postoperative nausea and vomiting (PONV)
were registered. Fatigue was registered on a 10-point in-
terval scale covering the preceding 24 hours (1, fit; 10, fa-
tigued)β the day before surgery and daily during the first
postoperative week. Nausea was registered on a verbal rat-
ing scale (0, no nausea; 1, light; 2, moderate; 3, severe),
and vomiting episodes were noted covering 3 intervals: the
day before surgery, and postoperative hours 0 to 6 and 6
to 24.

STATISTICAL ANALYSES AND ETHICS

The Pearson χ² test with Yates correction, Fisher exact
test, Friedman 2-way analysis of variance by ranks, Mann-
Whitney rank sum test, and Wilcoxon signed rank test
with Bonferroni correction for mass significance were
used when appropriate. The duration of convalescence
from work and recreational activity was compared in
patients receiving the same recommendations for conva-
lescence by using Kaplan-Meier plots. Kaplan-Meier plots
and a univariate log-rank test were also used to assess the
influence of individual factors on convalescence from
work in patients recommended for 2 days’ convalescence.
For this group of patients, significant factors to influence
convalescence from work were included as categorial
variables in a Cox proportional hazards model using the
forward stepwise method (likelihood ratio). Data are
given as median and ranges and percentages when appro-
priate. A probability of less than .05 was accepted as sta-
tistically significant. The local Ethics Committee
approved the study, and patients gave their written
informed consent to participate.

the 108 patients registered, 28, 52, and 33 complained
of nausea before surgery and during postoperative hours
0 to 6 and 6 to 24, respectively. For the same intervals,
0, 19, and 7 patients vomited once or more.

ANALYSIS OF CONTRIBUTORY FACTORS FOR
CONVALESCENCE FROM WORK IN PATIENTS
RECOMMENDED FOR 2 DAYS’ CONVALESCENCE

Univariate analysis of the effect on convalescence of the
following variables did not reach statistical significance:
age, sex, use of incisional local anesthetics, preoperative
neuroticism, type of workload (sedentary vs light vs mod-
erate), or the fact that postoperative vacation or sick leave
was planned preoperatively. Preoperative expectations to
convalescence (P<.001) and the following 3 self-
reported contributory factors were significantly related to
the duration of convalescence (univariate analysis): post-
operative pain (P<.001), fatigue (P<.02), and hindrance
owing to an interposed weekend (P<.04). The result of
the multivariate analysis showed that preoperative expec-
tations regarding the duration of convalescence and post-
operative pain were independently and significantly as-
associated with convalescence from work (P<.01).

COMMENT

Our study has demonstrated that convalescence after un-
complicated laparoscopic cholecystectomy for patients
recommended for 2 days’ convalescence lasted for roughly
1 week from work and 2 days from recreational activity.
Preoperative expectations to the duration of conva-
lescence, pain, fatigue, and weekends were important con-
tributory factors for prolonged duration of conva-
lescence from work.

In the present study, individual factors to influ-
ence convalescence from work were analyzed only in the
group of patients recommended for 2 days’ conva-
lescence. We did not analyze factors to explain conva-
lescence from recreational activity and work in the group
of patients recommended for 1 week of convalescence
because of the small number of patients (~25 patients)
with strenuous work who were recommended for 1 week
of convalescence.

In this study, convalescence data from patients con-
verted to open procedure or having complications
(wound infections, common bile duct stones) were not
included since convalescence in these circumstances is
variable and dependent on the nature of the given situa-
tion. In controlled studies investigating the effect of
laparoscopic cholecystectomy (vs open or mini-
incisional cholecystectomy) on convalescence, absence
from work varies from 2 to 5 weeks1,3,6,11 and 1 to 3
weeks from recreational activity or leisure time.1,2,4,11
These studies comprised data from all patients, includ-
ing patients with complications and operations con-
verted to open procedures. Other large-scale ran-
monized3 or retrospective descriptive studies12 of
uncomplicated laparoscopic cholecystectomy reported 3
weeks of convalescence from work. As specific recom-
mendations for the duration of convalescence were not given in any of the mentioned studies, it may be argued that these studies reflected, in part, tradition and medical treatment culture. Thus, Majeed et al\textsuperscript{13} reported that surgeons and general practitioners were recommended for 1 to 12 weeks' convalescence after laparoscopic cholecystectomy, depending on age and workload. Another study with 15 patients undergoing uncomplicated laparoscopic cholecystectomy\textsuperscript{6} used well-defined convalescence recommendations (if the patients were able to return to work, no further sick leave was allowed 1 week after surgery) and found that patients resumed work after a mean of 12 days.

In our study, we recommended 1 week of convalescence in case of strenuous workload or recreational activity. This differentiation was not scientifically based, but at the initiation of the study, we considered a recommendation of 2 days' convalescence for all types of work and activity too dramatic compared with current traditions. In 2 descriptive studies of patients undergoing laparoscopic cholecystectomy,\textsuperscript{1,2,11} the workload and status was significantly related to convalescence from work as patients with a moderate workload (vs heavy workload) and self-employed patients (vs employees) resumed work significantly earlier than others (about 2 weeks vs 3 weeks and 1 week vs 3 weeks, respectively). In our study, only 6 patients were self-employed, and this group was therefore not analyzed separately.

### Convalescence Data

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sedentary/Light/Moderate</th>
<th>Strenuous</th>
<th>Total*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of days off work (range)</td>
<td>6 (0-28)</td>
<td>10 (0-52)</td>
<td>7 (0-52)</td>
</tr>
<tr>
<td>Patients, No.</td>
<td>85</td>
<td>25</td>
<td>110</td>
</tr>
<tr>
<td>Not following recommendations, No.</td>
<td>72</td>
<td>15</td>
<td>87</td>
</tr>
<tr>
<td>Main contributory factors for not following recommendations, No. (n = 67)</td>
<td>Pain</td>
<td>41</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>Fatigue</td>
<td>35</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>Planned vacation</td>
<td>29</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>Weekend</td>
<td>26</td>
<td>...</td>
</tr>
<tr>
<td>Recreational activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Days away from activity (range)</td>
<td>2 (0-24)</td>
<td>8 (5-11)</td>
<td>2 (0-24)</td>
</tr>
<tr>
<td>Patients, No.</td>
<td>198</td>
<td>2</td>
<td>200</td>
</tr>
<tr>
<td>Not following recommendations, No.</td>
<td>66</td>
<td>1</td>
<td>67</td>
</tr>
<tr>
<td>Main contributory factors for not following recommendations, No. (n = 67)</td>
<td>Pain</td>
<td>42</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>Fatigue</td>
<td>33</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>Miscellaneous</td>
<td>11</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>Wound problems</td>
<td>6</td>
<td>...</td>
</tr>
</tbody>
</table>

*Ellipses indicate not applicable.

### Figure 1

A, Kaplan-Meier survival plot illustrating the duration of convalescence from work (n=85) and/or main recreational activity (n=198) for patients recommended to have 2 days' convalescence. The duration to resume work was significantly longer than the duration to resume recreational activity (P<.001, log-rank test). B, Duration of convalescence from work (n=25) and/or main recreational activity (n=2) for patients recommended to have 1 week of convalescence. Since only 2 patients were recommended for 1 week of convalescence for recreational activity, the log-rank test for comparison was not performed.

### Figure 2

Median self-registered fatigue scores after uncomplicated laparoscopic cholecystectomy in 108 consecutive patients (consecutive patients numbered 93-200). Fatigue was registered on a 10-point interval scale. Compared with preoperatively, fatigue scores were significantly increased (P<.001, Friedman test) until the fifth postoperative day (P=.04, day 3; P=.82, day 4; and P=.14, day 5, 6, and 7, Wilcoxon test) (Bonferroni correction for mass significance was P<.007).
The present study is, to our knowledge, the first large-scale study to provide specific clinical information on factors influencing convalescence after laparoscopic cholecystectomy. Preoperative expectations of convalescence and pain as well as fatigue and the presence of an interposed weekend were important contributory factors to explain convalescence from work for longer than 2 days. Consequently, we recommend 2 days’ convalescence as routine after uncomplicated laparoscopic cholecystectomy, but pain and fatigue may prolong convalescence in some patients.

This study was supported in part by grants from the University of Copenhagen, The Danish Medical Research Council (j nr 9601607), Laparoscopic Unit in the Copenhagen Hospital Corporation HS, and King Christian the 10th Foundation.

The authors thank Niels Bindslev, MSc, for statistical assistance.

Corresponding author and reprints: Thue Bisgaard, MD, Department of Surgical Gastroenterology 435, University of Copenhagen, Hvidovre Hospital, DK-2650 Hvidovre, Denmark (e-mail: bisgaard@dadlnet.dk).

REFERENCES