Establishment the Cost-Effectiveness through Set Criteria of Laparoscopic Cholecystectomy

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Objective: To assess the set criteria of laparoscopic cholecystectomy (LC) in reducing the length of hospital stay (LOHS), and total treatment expenditure.

Material and Method: The measurement outcomes were prospectively analyzed through the medical record, and self questionnaire of the patients.

Results: During the 1-year trial, a total of 122 patients were scheduled for LC. Among these, 85 cases had met the set criteria of low risk clients of; both preoperative indicator of a) American Society of Anesthesiologists (ASA) class 1 or 2, and postoperative indicators of b) no surgical drainage, and c) no immediate complication, while 37 cases were excluded due to ASA class 3 or 4, and various reasons. Distributed by the duration of hospital stay, the patients were classified in to three groups; group A was overnight hospital stay, 15 of 85 subjects (17.6%), group B was short hospital stay (within 3 days), 51 of 85 subjects (60.0%), and group C was long hospital stay (more than 3 days), 19 of 85 subjects (22.4%). The mean length of hospital stay (LOHS) was 24 ± 1.61 hours in group A, 55 ± 11.16 in group B, and 108 ± 21.59 in group C, while the average total expenditure was 531.22 ± 111.09, 665.5 ± 133.35 and 812.33 ± 158.62, respectively. For the overnight hospital stay group, the LOHS and the total treatment expenditure was significantly lower the other groups (p < 0.001). The majority of the overnight hospital stay group had rated the patient satisfaction as excellent.

Conclusion: The set criteria of laparoscopic cholecystectomy (LC) are helpful and establish the cost-effectiveness in terms of reduction of LOHS and total treatment expenditure.

Keywords: Laparoscopic cholecystectomy, Set criteria, Length of hospital stay

Gallbladder disease is the most common and most costly of all digestive disorders requiring hospitalization, and affect 10 to 15 percent of adults with 500,000 cholecystectomy annually in the USA[1-2]. Gallstones are often asymptomatic, increasing in prevalence with age. At 60 years of age approximately 30% of women and approximately 15% of men in European populations have gallstones[3].

Laparoscopic cholecystectomy (LC) has been routinely performed since 1989 and it is now considered the “gold standard” treatment for symptomatic gallstones and acute cholecystitis[4-6]. It is less traumatic than open cholecystectomy resulting in fewer postoperative complaints, rapid recovery, shorter hospital stay, and minimal cosmetic disfigurement[7-11].

In modern practice, it is recommended that standard LC patients should be admitted to the hospital for a total of 3 days, however a recent retrospective data of Songklanagarind Hospital has accounted the average length of hospital stay (LOHS) for LC patients was 5 days[12].

To develop the model of LOHS shortening and total treatment expenditure reduction, the set criteria for selection of low risk clients undergoing laparoscopic cholecystectomy was developed and complied in surgical procedure, considering cost-effectiveness.

Material and Method

Although laparoscopic cholecystectomy, removal of gallbladder through keyhole surgery, can
save treatment cost with patient safety. The set criteria varied, but most included only patients without other disease, and low risk basis. The recent set criteria, developed by the surgical patient care team of Songklanagarind Hospital since January 2007 and the consensus had been approved by the multilateral parties, involving surgeons and supporting staff. The criteria included; both preoperative indicator of a) American Society of Anesthesiologists (ASA) class 1 or 2 and postoperative indicators of b) no surgical drainage and c) no immediate complication.

The clients who had the fulfilled criteria voluntarily participated in the study, followed by documented informed consent procedures. According to the easy reach of the hospital and with a responsible adult to take care of them, the patients were offered the option to choose overnight hospital stay or short hospital day (within 3 days). The subjects were informed that the alternative choice hospitalization can be flexible and changeable, owing to the condition of postoperative surgical drainage and immediate complication.

The study was carried on from April 2007 to March 2008. Following surgical modality, the client was kept on a liquid diet, and given oral medication, normally paracetamol 500 mg 2 tablets every 6 hours, ibuprofen 400 mg 1 tablet three times daily and/or other non-steroidal anti-inflammatory drugs (NSAID), depending on the individual attending surgeon. Intravenous analgesics and/or other medications might be used at the surgeon’s discretion.

After overnight observation, the clinical condition of the patient was evaluated, and if they were able to tolerate a soft diet, without nausea or vomiting, and/or other complaints or complications. Whatever, the postoperative pain was satisfactorily controlled by oral analgesic medication, and comfortable with home stay. The client was positively advocated for having home care, as well as the patient information about the serious advert events, wound care, fat diet control, were provided and the patient was proposed to readmission any time of unplanned condition.

The statistical analysis was examined with Statistical Package for the Social Sciences (SPSS), with results expressed as mean, standard deviation, range, and frequency. Univariate comparisons were carried out using Chi-square test for discrete variables and student’s t-test for continuous variables. A two-tailed p-value less than 0.05 was considered statistically significant.

### Results

During the 1-year prospective study, there were 122 elective LC patients who met the pre and postoperative set criteria. Of these, 85 cases (69.7%) had met the set criteria of low risk clients, preoperative ASA class 1 or 2. While 37 cases (30.3%) were excluded due to ASA class 3 or 4 (4 cases), immediate postoperative complications (3 cases), postoperative drainage (29 cases), and more than one surgical procedure (2 cases).

After surgical procedure, among 85 cases of low risk clients, there were 66 cases (77.6%) who had met the set criteria of low risk clients; postoperative indicators of no surgical drainage, nor immediate complication. These patients can optionally choose to have the overnight hospital stay or short hospital stay, within 3 days. The remainder were considered to have the long hospital stay, more than 3 days. Ultimately, the subjects were categorized into three groups due to the duration of hospital stay; group A was overnight hospital stay, 15 of 85 subjects (17.6%), group B was short hospital stay (within 3 days), 51 of 85 subjects (60.0%) and group C was long hospital stay (more than 3 days), 19 of 85 subjects (22.3%).

The mean age of the subjects, enrolling in the study, was $53.02 \pm 12.36$ years (range of 27-79 years), 66 of 85 cases (77.6%) were female, and 11 of 85 cases (12.9%) had body mass index (BMI) of 30 kg/m² or more. The surgical characteristics of low risk patients undergoing laparoscopic cholecystectomy are

<table>
<thead>
<tr>
<th>Data (n = 85)</th>
<th>Number (%)</th>
</tr>
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<tbody>
<tr>
<td><strong>American Society of Anesthesiologists</strong></td>
<td></td>
</tr>
<tr>
<td>Class 1</td>
<td>15 (17.6)</td>
</tr>
<tr>
<td>Class 2</td>
<td>70 (82.4)</td>
</tr>
<tr>
<td><strong>Indication for surgery</strong></td>
<td></td>
</tr>
<tr>
<td>Symptomatic gallstones</td>
<td>73 (85.9)</td>
</tr>
<tr>
<td>Chronic cholecystitis</td>
<td>7 (8.2)</td>
</tr>
<tr>
<td>Post-removal of common bile duct stone</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td>Post-acute cholecystitis</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td>Calcified gallbladder</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td>Polyp</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td>Asymptomatic gallstones</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td><strong>Pathological report</strong></td>
<td></td>
</tr>
<tr>
<td>Chronic cholecystitis</td>
<td>82 (96.5)</td>
</tr>
<tr>
<td>Acute cholecystitis</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td>Normal</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td>Not sent</td>
<td>1 (1.2)</td>
</tr>
</tbody>
</table>
demonstrated in Table 1. The majority of the subjects (82.4%) were ASA class 2 and 85.9% were symptomatic gallstones with chronic cholecystitis (96.5%).

The mean operative time was 117.4 minutes (range of 70-225 minutes). The overall surgical complication was 7 of 85 cases (8.3%); 5 cases (5.9%) had superficial surgical site infection, 1 case (1.2%) had sterile intra-abdominal collection and 1 case (1.2%) had ascites leakage.

The mean length of hospital stay (LOHS) was 24.00 ± 1.61 hours, range of 22 to 26 in group A, 55 ± 11.16, range of 42 to 73 in group B, and 108 ± 21.59, range of 75 to 143 in group C, while the average total expenditure was 531.22 ± 111.09 USD, range of 238.31 to 727.43 in group A, 665.50 ± 133.35 in group B, and 812.33 ± 158.62 in group C, respectively, as shown in Table 2. In the overnight hospital stay group, the LOHS and total expenditure had significantly lower than the other groups (p < 0.001). The readmission rate was 2 of 85 cases (2.4%); one in the overnight hospital stay group, and one in the long hospital stay group. The majority of the overnight hospital stay group, 10 in 15 cases (66.6%), had rated their patient satisfaction as excellent.

Discussion
The recent set criteria used in the selection of the low risk clients undergoing laparoscopic cholecystectomy, and safely and significantly demonstrated the LOHS shortening and expenditure reduction in overnight hospital. The advantage of these criteria is it has comprised of dynamic compliance, with both preoperative and postoperative indicators.

The next step of set criteria development, should forward to day-surgery cholecystectomy, and requires not only home care facilities and support but also the additionally selective indicators to maximize the recovery of the clients(4,13). Firstly, the evidence based information accounted that the patient with BMI more than 32 kg/m² was considered not eligible for day-surgery setting(6,14), although a study suggested that BMI of more than 35 kg/m² was not a good candidate for day-surgery cholecystectomy(15).

Secondly, the routine laparoscopic cholecystectomy is contraindicated in the presence of obstructive jaundice due to gallstones or dilated ducts on ultrasound. Such a situation requires preoperative endoscopic retrograde cholangiopancreatography (ERCP) or perioperative laparoscopic exploration of the common bile duct(16). Finally, the success depends on well-trained staff and skilful operative technique together with safe anesthesia and, finally, it depends on appropriate patient selection and education(17). The selection of patients is important, especially at the initial development of the service; with experience, selection criteria may be broadened to wider spectrum of patients.

At present, there was no significant difference between day-case and overnight hospital stay group as regards complications, prolongation of hospital stay, re-admission rates, pain, quality of life, patient satisfaction, and return to normal activity and work. Day-case elective laparoscopic cholecystectomy seems to be safe and effective treatment in selected patients with symptomatic gallstones. Because of the decreased hospital stay, it is likely to save costs(13).

In conclusion, the set criteria of laparoscopic cholecystectomy (LC) are helpful and establish the cost-effectiveness in terms of reduction of LOHS and total treatment expenditure.

References


การวางรากฐานของประสิทธิภาพเมื่อเปรียบเทียบกับค่าใช้จ่ายผ่านชุดเกณฑ์ของการผ่าตัดถุงน้ำดีด้วยการส่องกล้อง

ศาสตราจารย์ เรืองสิน วิชช์ จุฑาภัทร, ชิด เพรชพิสุทธิฤทธิ์, พุทธศักดิ์ ทัศนียบุตร, สมเกียรติ สรรพวิศาล, สิริพงศ์ ชีวธนากรณ์กุล

วัตถุประสงค์: เพื่อประเมินชุดเกณฑ์ของการผ่าตัดถุงน้ำดีด้วยการส่องกล้องในการลดวันนอนโรงพยาบาลและค่าใช้จ่ายทั้งหมดในการรักษาผู้ป่วย

วัสดุและวิธีการ: การวัดผลที่ได้รับเป็นการวิเคราะห์แบบไปข้างหน้าด้วยบันทึกทางการแพทย์และแบบสอบถามตนเองของผู้ป่วย

ผลการศึกษา: ระหว่างการทดลองใช้ 1 ปี ผู้ป่วยรวมทั้งหมด 122 ราย ได้รับการจัดยาสำหรับการผ่าตัดถุงน้ำดีด้วยการส่องกล้อง ในจำนวนนี้ ผู้ป่วย 85 คน เข้ากับชุดเกณฑ์ของการผ่าตัดขนาดน้อย ด้วยการวัดค่าตัวชี้วัดก่อนผ่าตัด g) American Society of Anesthesiologists (ASA) ระดับ 1 หรือ 2 และตัวชี้วัดหลังผ่าตัด ข) ไม่มีการผ่าตัดระบบ และ ค) ไม่มีการแพทย์ชนิดที่อาจต้องการในขณะที่ผ่าตัด 37 ราย คัดออกเนื่องจาก ASA ระดับ 3 หรือ 4 และเหตุผลอื่นๆ กระจายตามระยะเวลาการนอนหลับ ผู้ป่วยแบ่งเป็น 3 กลุ่ม กลุ่ม เอ เป็นกลุ่มนอนโรงพยาบาลคืนเดียว จำนวน 15 ใน 85 ราย (ร้อยละ 17.6) กลุ่ม เบ เป็นกลุ่มนอนโรงพยาบาลระยะสั้น (ภายใน 3 วัน) จำนวน 51 ใน 85 ราย (ร้อยละ 60.0) และกลุ่ม ซี เป็นกลุ่มนอนโรงพยาบาลระยะยาว (มากกว่า 3 วัน) จำนวน 19 ใน 85 ราย (ร้อยละ 22.4) วันนอนหลับเฉลี่ยเท่ากับ 24 ± 1.61 ชั่วโมงในกลุ่ม เอ เท่ากับ 55 ± 11.16 ชั่วโมงในกลุ่ม เบ และเท่ากับ 108 ± 21.59 ชั่วโมงในกลุ่ม ซี ขณะที่ค่าใช้จ่ายทั้งหมดเฉลี่ยเท่ากับ 531.22 ± 111.09 ดอลลาร์สหรัฐในกลุ่ม เอ เท่ากับ 665.5 ± 133.35 ดอลลาร์สหรัฐในกลุ่ม เบ และเท่ากับ 812.33 ± 158.62 ดอลลาร์สหรัฐในกลุ่ม ซี ตามลำดับ สำหรับค่าใช้จ่ายรวมทั้งหมดคืนเดียว วันนอนหลับ แตกต่างไม่มีตัวชี้วัดมีตัวชี้วัดหลังผ่าตัด วันนอนหลับ และค่าใช้จ่ายระหว่างหมด ในการรักษาผู้ป่วยผลดังกล่าวมีอิทธิพลต่อการส่งผลต่อค่าใช้จ่ายและค่าใช้จ่ายรวมทั้งหมด ในการรักษาผู้ป่วย

สรุป: ชุดเกณฑ์โทษการผ่าตัดถุงน้ำดีด้วยการส่องกล้องไม่มีประโยชน์ และความรู้ฐานของประสิทธิภาพเมื่อเปรียบเทียบกับค่าใช้จ่ายในการรักษาผู้ป่วย ที่มีค่าใช้จ่ายในการลดลงในกลุ่ม(rest)

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