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# **ACTUAL PRIORITIES OF MODERN SCIENCE, EDUCATION AND PRACTICE**

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## **PREDICTING PROLONGED HOSPITAL STAY AFTER 4-PORT OR SINGLE-INCISION LAPAROSCOPIC CHOLECYSTECTOMY AND LAPAROSCOPIC CHOLECYSTOLITHOTOMY**

**Syvolap Dmitry,**  
Ph.D., Associate Professor  
Zaporozhye State Medical University

Laparoscopic cholecystectomy (LC) can provide less pain and wound scar for a patient after surgery. Single incision laparoscopic cholecystectomy (SILC) is the LC procedure that is applied through a single access device. It was reported for the first time by Navara et al. without a difference in the overall rate of complications, including biliary tract injury, bile leakage and wound infection, when compared with conventional LC. Cosmetic results of SILC were superior to that of conventional LC. However, some reports revealed that SILC was associated with a higher incidence of incisional hernia than conventional LC. The SILC procedure may not be familiar to the surgeon which may take longer operative time and higher perioperative complication rates than conventional LC [1].

Cholecystolithotomy was first described by Akiyama et al. and Kerlan et al. with the recognition of the precise functions of the gallbladder, surgeons are now aware that the gallbladder not only can concentrate and store bile but can also regulate the bile flow. Endoscopic-laparoscopic cholecystolithotomy, an operation for removal of gallstones and preservation of gallbladder, has become more and more common [2].

The main advantages of LC include less postoperative pain, shorter operation time, lower rate of postoperative complications and early ambulation leading to shorter hospital stay. In a study by Tsang et al., [3] independent predictive factors for longer postoperative stay included age over 60 years, time for diet resumption more than 8 hours, and oral analgesia intake of more than two tablets. Operative findings of acute inflammation or postoperative complications did not have any influence on the length of hospital stay.

Recently, Morimoto et al. [4] reported that the American Society of Anesthesiologists (ASA) score and LC difficulty were the most predictive factors for length of hospital stay prolongation. Other studies considered advanced age and intraoperative complications as predictive risk factors. Since an outpatient procedure is popular for LC, defining the indications and predictive factors associated with long postoperative hospital stay is essential for maximizing the benefits of LC. However, there are few published articles on factors influencing the length of postoperative hospital stay after LC [3, 4].

This **study aimed** to identify predictive factors for postoperative hospital stay more than 48 hours in cholecystolithiasis patients after gallbladder surgery (4-port or single-incision laparoscopic cholecystectomy and laparoscopic cholecystolithotomy).

**Materials and methods.** In total, 136 patients with cholecystolithiasis were included in a single-center open-label prospective study. The mean age was  $48.9 \pm 12.6$  years (from 22 to 78 years), 79.41% were women. Laparoscopic cholecystectomy was performed in 103 patients, of whom 53 underwent four-port (4-port laparoscopic cholecystectomy - 4PLC) and 50 - SILC. There were 33 patients to whom laparoscopic cholecystolithotomy (LCLT) was performed. Patient groups were comparable in age. Baseline findings of laboratory general and biochemical blood testing, ultrasonography of the hepatobiliary system, the duration of surgery and the length of hospital stay were assessed. Predictors were identified using binary logistic regression analysis.

**Results.** The mean duration of LC was  $61.06 \pm 13.27$  minutes, which was significantly longer than that of 4PLC ( $42.83 \pm 16.97$  minutes,  $p = 0.001$ ) and SILC ( $36.60 \pm 14.37$  minutes,  $p = 0.001$ ). The mean duration of SILC ( $36.60 \pm 14.37$  minutes) was significantly shorter than the mean duration of 4PLC ( $42.83 \pm 16.97$  minutes), ( $p = 0.039$ ). The mean postoperative (4PLC, SILC and LCLT) length of hospital stay did not exceed 4.2 days, and the shortest one was in patients after LCLT, although the difference did not reach the statistical significance. Most parameters, including anthropometric (weight, height, body mass index, age, sex), did not influence significantly the length of hospital stay in patients after surgery.

At the same time, a study [5] showed that 49% of 7426 elective cholecystectomies performed were discharged home the same day. Same-day discharge following cholecystectomy was less likely with older patients (OR 0.18, 95% CI 0.15–0.23), higher ASA scores (OR 0.19, 95% CI 0.15–0.23), complicated cholelithiasis (OR 0.38, 95% CI 0.31 to 0.48), male sex (OR 0.66, 95% CI 0.58–0.74), previous acute gallstone-related admissions (OR 0.54, 95% CI 0.48–0.60) and preoperative endoscopic intervention (OR 0.40, 95% CI 0.34–0.47).

According to our study, preoperative serum fibrinogen levels exceeding 2.2 g/l in cholecystolithiasis patients were associated with a 20-fold increase in the risk of prolonged (more than 48 hours) postoperative length of hospital stay (95% CI 2.97–136.61;  $p = 0.002$ ). Low preoperative hemoglobin levels ( $<135$  g/l) were also associated with a 2.48-fold (95% CI 1.16–5.29) increase in the odds ratio for prolonged hospital stay over 72 hours, while the odds ratio for prolonged hospital stay was 66% (HS = 0.34; 95% CI 0.1661–0.6885;  $p = 0.0028$ ) reduced if there was no fever on the first day after gallbladder surgery.

Through univariate analysis for perioperative factors, a study [6] revealed significant differences in operation time ( $p < 0.001$ ), perioperative transfusion ( $p=0.006$ ), emergency operation ( $p < 0.001$ ), acute inflammation ( $p < 0.001$ ), and surgical site infection ( $p=0.041$ ). A univariate analysis of patient factors showed significant differences in age ( $p < 0.001$ ), sex ( $p=0.036$ ), diabetes mellitus ( $p=0.011$ ), preoperative albumin level ( $p=0.024$ ), smoking ( $p=0.010$ ), and the ASA score ( $p=0.003$ ). On multivariate analysis, operation time ( $p < 0.001$ ), emergency operation ( $p < 0.001$ ), age ( $p=0.014$ ), and smoking ( $p=0.022$ ) were identified as independent factors influencing length of postoperative hospital stay.

**Conclusions.** The influence of laparoscopic surgery type (SILC, 4PLC, LCLT) on the length of postoperative hospital stay of cholecystolithiasis patients has not been

found. Preoperative fibrinogen level above 2.2 g/l were the predictor of prolonged hospital stay more than 48 hours after surgery in cholecystolithiasis patients. Preoperative hemoglobin levels less than 135 g/l were associated with the 2.48-fold (95% CI 1.16-5.29) increased risk for prolonged hospital stay over 72 hours, while the risk for prolonged hospital stay more than 3 days was 66% reduced if there was no fever post-surgery.

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