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Laparoscopic cholecystectomy is safe both day and night



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ABSTRACT

Background: It is reported that performing laparoscopic cholecystectomy (LC) at night leads to increased rates of complications and conversion to open. We hypothesize that it is safe to perform LC at night in appropriately selected patients.

Materials and methods: We performed a retrospective review of nonelective LC in adults at our institution performed between April 2007 and February 2015. We dichotomized the cases to either day or night.

Results: Five thousand two hundred four patients underwent LC, with 4628 during the day and 576 at night. There were no differences in age, body mass index, American Society of Anesthesiologists class, race, insurance type, pregnancy rate, or white blood cell count. There were also no differences in the prevalence of hypertension, diabetes, or renal failure. However, daytime patients had higher median initial total bilirubin (0.6 [0.4, 1.3] versus 0.5 [0.3, 1.0] mg/dL, $P = 0.002$) and lipase (33 [24, 56] versus 30 [22, 42] U/L, $P < 0.001$) values. There was no difference in case length, estimated blood loss, rate of conversion to open, biliary complications, length of stay (LOS) after operation, unanticipated return to the hospital in 60 d, or 60-d mortality. Daytime patients spent more time in the hospital with longer median LOS before surgery (1 [1, 2] versus 1 [0, 2] d, $P < 0.001$) and median total LOS (3 [2, 4] versus 2 [1, 3] d, $P < 0.001$) compared with night patients.

Conclusions: At our institution, we perform LC safely during day or night. The lack of complications and shorter LOS justify performing LC at any hour.

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Introduction

The acute care surgery (ACS) model has increased the ability to perform timely nonelective laparoscopic cholecystectomies (LCs) for acute benign biliary disease.^{1,2} Despite the potential to reduce hospital length of stay (LOS) and improve operating

room (OR) usage, performing LC at night is controversial. A number of studies in the last few years have published conflicting results as to whether or not it is safe to perform LC at night. Phatak *et al.*³ found that nighttime LC was associated with an increased rate of 30-d complications, and Wu *et al.*⁴ determined that nighttime LC was associated with an

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increased rate in conversion to open surgery without any difference in the rate of complications or LOS. In contrast, Siada *et al.*⁵ reported no difference in complication rates between patients who underwent LC during the day or during the night, and nighttime LC was associated with decreased LOS.

In light of these inconsistent results, we decided to review the nonelective LC cases done at our high-volume center. We hypothesize that in appropriately selected patients, it is safe to perform LC at night with no increase in the rate of complications or conversion to open.

Materials and methods

The University of Texas Southwestern Medical Center Institutional Review Board approved the study with waiver of consent.

A review of all patients who underwent nonelective LC at Parkland Memorial Hospital was performed using retrospectively gathered data from a database of all cholecystectomies done at the institution from April 2007 to February 2015. Parkland Memorial Hospital is a large urban tertiary referral hospital in Dallas, Texas, with an ACS service staffed by general surgery residents, surgical critical care fellows, and attending surgeons, who work in 24-h shifts. There is at least one OR room staffed at all times for the sole use of the ACS service.

The study population included all patients with inpatient or emergency status who were booked for LC for any indication from April 2007 to February 2015. Patients who underwent LC at the outpatient surgery center were excluded because these were elective cases, along with all patients whose cases were booked as open cholecystectomies. Daytime LC was defined as an operation that started between 7 AM and 6:59 PM, and nighttime LC was defined as an operation that started between 7 PM and 6:59 AM.

Data were divided into preoperative and outcome variables. Preoperative variables were age; sex; Hispanic race; body mass index (BMI); insurance type; American Society of Anesthesiologists (ASA) class; pregnancy status; history of hypertension, history of diabetes, or renal failure; initial labs including white blood cell count, total bilirubin, and lipase; and LOS before surgery. Outcome variables were case length, estimated blood loss, rate of conversion to open cholecystectomy, biliary complications, unanticipated return to the hospital in 60 d, 60-d mortality, LOS after operation, and total LOS.

Statistic analyses were performed using IBM SPSS Statistics (version 24). Continuous data are presented as medians with 25th and 75th interquartile ranges, and categorical data are reported as percentages. Univariate analysis was performed using Mann-Whitney U, chi-squared, and Fisher's exact tests with significance attributed to a Bonferroni-adjusted $\alpha = 0.0023$.

Results

During the study period, 9193 patients underwent cholecystectomy. Patients who had their surgeries booked as open

cholecystectomy (186, 2.02%) were excluded, as were patients who underwent LC at the outpatient surgery center (2803, 30.5%) because this was considered elective surgery. Another 1000 (10.9%) patients were excluded because of missing data. The remaining 5204 patients underwent nonelective LC. There were 4628 LC (88.9%) during the day and 576 (11.1%) at night.

When comparing patients who underwent daytime LC with patients who underwent nighttime LC, there was no difference in preoperative factors including age, BMI, ASA class, race, insurance type, pregnancy rate, and white blood cell count, or in the prevalence of hypertension, diabetes, or renal failure. However, patients who underwent LC during the day were more likely to have presented with higher median total bilirubin (0.6 [0.4, 1.3] versus 0.5 [0.3, 1.0] mg/dL, $P = 0.002$) and lipase (33 [24, 56] versus 30 [22, 42] U/L, $P < 0.001$) values (Table 1). When comparing outcome variables for the two groups, there was no difference in case length, estimated

Table 1 – Preoperative variables.

Characteristic	Day	Night	P value
Age	36 (28, 46)	36 (28, 45)	NS
Female sex	3811 (82.3%)	466 (80.9%)	NS
Hispanic race	3693 (79.8%)	458 (79.5%)	NS
BMI	30.8 (27.1, 35.4)	30.2 (26.7, 34.9)	NS
Insurance			NS
Blue shield	65 (1.4%)	6 (1.0%)	
Charity	1230 (26.6%)	156 (27.1%)	
Commercial	268 (5.8%)	39 (6.8%)	
FECA Black Lung	1 (0%)	0 (0%)	
Medicaid	571 (12.3%)	70 (12.2%)	
Medicare	205 (4.4%)	34 (5.9%)	
Pending	51 (1.1%)	8 (1.4%)	
Self-pay	2235 (48.3%)	263 (45.7%)	
Tricare	2 (0%)	0 (0%)	
ASA class			NS
1	569 (12.3%)	77 (13.4%)	
1E	349 (7.5%)	60 (10.4%)	
2	1932 (41.7%)	234 (40.6%)	
2E	1297 (28.0%)	139 (24.1%)	
3	289 (6.2%)	35 (6.1%)	
3E	180 (3.9%)	30 (5.2%)	
4	7 (0.2%)	0 (0%)	
4E	5 (0.1%)	1 (0.2%)	
Pregnancy	56 (1.2%)	4 (0.7%)	NS
HTN	910 (19.7%)	100 (17.4%)	NS
DM	488 (10.5%)	45 (7.8%)	NS
Renal failure	26 (0.6%)	6 (1.0%)	NS
WBC	10.8 (8.2, 13.4)	10.9 (8.1, 13.3)	NS
Total bilirubin	0.6 (0.4, 1.3)	0.5 (0.3, 1.0)	0.002
Lipase	33 (24, 56)	30 (22, 42)	<0.001
LOS before surgery	1 (1, 2)	1 (0, 2)	<0.001

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