

# Timing and Clinical Efficacy of Laparoscopic Cholecystectomy for Acute Cholecystitis at Different Stages

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**Abstract: Objective:** To investigate timing and clinical efficacy of laparoscopic cholecystectomy for acute cholecystitis at different stages. **Methods:** Clinical data of 100 acute cholecystitis patients admitted to our hospital from March 2018 to March 2019 were retrospectively analyzed. Clinical data of 48 patients who had surgery within 72 hours of symptom onset were classified as group A, and clinical data of 52 patients who had surgery at  $\geq 72$  hours of symptom onset were classified as group B. Clinical indicators, rate of conversion to open surgery, and complication were compared between the two groups. **Results:** Length of hospital stay, operation time, exhaust time and intraoperative blood loss in group A were lower than those in group B, and the differences were statistically significant ( $P < 0.05$ ). Comparison of rate of conversion to open surgery between group A (2.08%, 1/48) and group B (7.69%, 4/52) showed no statistically significant difference ( $P > 0.05$ ). Incidence of postoperative complication was 8.33% (4/48) in group A and 11.54% (6/52) in group B, the difference was not statistically significance ( $P > 0.05$ ). **Conclusions:** Laparoscopic cholecystectomy within 72 hours of symptom onset has better efficacy than after 72 hours for patients with acute cholecystitis. It could effectively reduce surgical trauma and promote recovery.

**Keywords:** Acute cholecystitis; Laparoscopic cholecystectomy; Different stages; Complication

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## 1 Introduction

Acute cholecystitis is a common clinical disease which is commonly accompanied by clinical symptoms such as abdominal tenderness, right upper quadrant pain, nausea and vomiting. In recent years, incidence of the disease has been increasing year by year. Laparoscopic surgery has advantages of minimal invasiveness, rapid recovery, less complication, and mild pain. It has certain therapeutic effect and has been widely used in clinical practice<sup>[1]</sup>. However, conditions of acute cholecystitis patients change rapidly, surgical timing will affect efficacy and increase the difficulty of surgery<sup>[2]</sup>. Therefore, surgical indications should be strictly selected and the most optimal surgery timing should be selected. In view of this, this study aimed to investigate surgical timing and clinical efficacy of laparoscopic cholecystectomy for acute cholecystitis at different stages. The report is as follows.

## 2 Materials and methods

### 2.1 General data

Clinical data of 100 patients with acute cholecystitis who received treatment in our hospital from March 2018 to March 2019 were selected for retrospective analysis. Clinical data of 48 patients who had surgery within 72 hours of symptom onset were classified as group A. Clinical data of 52 patients who had surgery at  $\geq 72$  h of symptom onset were classified as group B. Group A: 28 males and 20 females; aged 22–75 years old, mean age ( $43.23 \pm 3.48$ ) years old; body temperature  $37.3^{\circ}\text{C}$ - $39.2^{\circ}\text{C}$ , mean ( $38.25 \pm 0.36$ ) $^{\circ}\text{C}$ . Group B: 28 males and 24 females; aged 23–76

years old, mean age ( $45.46 \pm 3.74$ ) years old; body temperature  $37.3^{\circ}\text{C}$ - $39.2^{\circ}\text{C}$ , mean ( $38.31 \pm 0.34$ ) $^{\circ}\text{C}$ . General information of the two groups was compared, the difference was not statistically significant ( $P>0.05$ ) and the data could be compared.

## 2.2 Inclusion criteria

(1) Inclusion criteria: ① thickened gallbladder wall, edema or effusion around gallbladder by ultrasonographic examination; ② clinical manifestation of acute upper abdominal pain; ③ complete clinical data. (2) Exclusion criteria: ① accompanied by mental disorder; ② worsening of condition; ③ accompanied by severe cardiopulmonary dysfunction; ④ malignant tumor.

## 2.3 Methods

All patients were treated with spasmolytic, water and electrolyte correction and maintenance of acid-base balance upon admission. Laparoscopic cholecystectomy was performed for two groups of patient. Group A was performed surgery within 72 h of symptom onset and group B was performed surgery at or after 72 h of symptom onset. The specific surgical procedure was as follow: patient took supine position after general anesthesia, and 10mm incision was made at umbilicus. Pneumoperitoneum was established, with abdominal pressure maintained at 10–14 mm Hg. Trocar was then inserted. An incision was made at the front line of axillary, midline of clavicles under rib arch, and under xiphoid. Laparoscopy was inserted for examination, immediate decompression measures were taken to facilitate gallbladder grasping if gallbladder tension was significantly too large. Adhesions of

tissue were separated, gallbladder was punctured for decompression, and Calot was separated by blunt dissection. Gallbladder artery was cut off and ligated, gallbladder tube was clamped, gallbladder was removed and taken out through umbilical foramen, and drainage tube was inserted. All patients were operated on by the same physician.

## 2.4 Evaluation of indicators

(1) Clinical indicators (hospitalization time, operation time, exhaust time, and intraoperative blood loss) of the two groups of patient were compared. (2) Rate of conversion to open laparotomy between the two groups was compared. (3) Occurrence of complication (bile leak, abdominal infection, incision infection, lung infection) between the two groups was compared.

## 2.5 Statistical methods

SPSS18.0 software was used for data processing. Quantitative data was represented in the form of  $\bar{x} \pm s$ . Independent *t* test was applied for comparison between groups, paired sample *t* test was used for intragroup comparison.  $\chi^2$  test was applied for qualitative data. Difference with  $P<0.05$  was considered statistically significant.

## 3 Results

### 3.1 Clinical indicators

Length of hospital stay, operation time, exhaust time, and intraoperative blood loss in group A were lower than those in group B, and the differences were statistically significant ( $P<0.05$ ). See Table 1.

**Table 1.** Comparison of clinical indicators between two groups ( $\bar{x} \pm s$ )

Group	Operation time(min)	Length of hospital stay(d)	Intraoperative blood loss(mL)	Exhaust time(h)
Group A (n=48)	50.26±10.23	3.42±0.63	25.15±6.23	38.15±4.23
Group B (n=52)	80.63±11.12	6.55±0.83	41.62±6.26	75.62±5.46
<i>t</i>	14.177	21.108	13.175	38.136
<i>P</i>	0.000	0.000	0.000	0.000

### 3.2 Rate of conversion to open surgery

There was 1 case of conversion to open surgery in group A, rate of conversion to open surgery was 2.08% (1/48). In group B, there were 4 cases of conversion to open surgery, rate of conversion to open surgery was

7.69% (4/52). There was no significant difference in the rate of conversion to open surgery between two groups ( $\chi^2=0.683$ ,  $P=0.409$ ).

### 3.3 Complication

Incidence of postoperative complication was

8.33% (4/48) and 11.54% (6/52) in group A and group B respectively. The difference was

not statistically significant ( $P > 0.05$ ). See Table 2.

**Table 2.** Comparison of complications between the two groups, n(%)

Group	Celiac infection	Bile leak	Pulmonary infection	Incision infection	Total occurrence
Group A (n=48)	1(2.08)	0(0.00)	2(4.17)	1(2.08)	4(8.33)
Group B (n=52)	2(3.85)	1(1.92)	2(3.85)	1(1.92)	6(11.54)
$\chi^2$					0.040
$P$					0.841

## 4 Discussion

Acute cholecystitis is a common clinical acute abdomen disease which is mainly caused by bacterial infection and obstruction of gallbladder duct. Clinically, it is accompanied by nausea and vomiting, abdominal pain, paroxysmal colic at right upper quadrant, and prominent rectus abdominis; which are mainly due to gallbladder obstruction which stimulates gallbladder mucosa and causes inflammatory lesion and bacterial infection, leading to formation of acute cholecystitis. At initial stage, the symptoms are similar to biliary colic and clinical manifestations in patient are not specific. If not treated timely, symptoms such as gallbladder gangrene and stone can occur<sup>[3]</sup>. Clinical treatment of acute cholecystitis is usually by laparoscopic surgery, which poses less trauma and is beneficial to postoperative recovery of patients. However, acute cholecystitis is more common in elderly. Patients are often complicated by multiple symptoms and accompanied by different degrees of complication and gallbladder damage after surgery, which affects postoperative recovery of patients. Related studies pointed out that adhesion degree of local acute cholecystitis lesion is different at different stage. Therefore, appropriate surgical timing is particularly important for treatment and prognosis of patients with acute cholecystitis.

Results of this study showed that length of hospital stay, surgery time, intraoperative blood loss, and exhaust time were lower in group A than in group B. The differences in rate of conversion to open surgery and incidence of complication between the two groups were not significant. These indicated that laparoscopic cholecystectomy within 72 h of symptom onset had better efficacy than surgery after 72 h of symptom onset in patients with acute cholecystitis. It can effectively reduce surgical trauma and is conducive for physical recovery of patients. At early stage of acute cholecystitis, edema in gallbladder is not obvious, and

there is no adhesion phenomenon and congestion at proximity of gallbladder. At such, separation of loose connective tissues is not difficult. Over time, edema of gallbladder wall is prominent and adhesion symptoms appear, this increases difficulty of separation and prolongs operation time. This gives rise to a series of bleeding symptoms and complications of abdominal cavity, increasing difficulty of separation during surgery and possibility of conversion to open surgery which are extremely detrimental to treatment and prognosis of patient. Related studies pointed out that optimal timing of surgery for patients with acute cholecystitis is within 48–72 h of symptom onset, whereas conservative treatment is recommended for patients with more than 72 h of symptom onset<sup>[4]</sup>. However, some investigators pointed out that laparoscopic cholecystectomy can effectively reduce difficulty and risk of surgery, shorten operation time, and prevent occurrence of systemic symptoms caused by infection due to bile reflux arising from drainage tube obstruction<sup>[5]</sup>. Therefore, there is no clear clinical standard for early surgery.

The main factors for conversion to open surgery in laparoscopic cholecystectomy are related to adhesion degree of gallbladder triangle. Further, adhesion in gallbladder triangle is an important cause of intestinal injury and bile leak. Therefore, biliary injury should be avoided during separation. During laparoscopic cholecystectomy, operation should be standardized, cutting and electrocoagulation should not be performed randomly at will. During separation of gallbladder and common bile duct of patient, operation should be performed along the neck of gallbladder body to avoid causing damage in duodenum and transverse colon. For patients with severe illness, emergency treatment should be performed to relieve physical conditions. Surgical treatment should be performed after relief of physical condition, with adequate pre-surgery preparation. In view of limited sample size and short postoperative follow-up time in this study, sample

size should be increased and follow-up time should be extended in future studies. Efficacy of laparoscopic cholecystectomy for patients with acute cholecystitis at different stages should be further analyzed.

In summary, laparoscopic cholecystectomy within 72 h of symptom onset is effective in treating patients with acute cholecystitis, which can effectively reduce surgical trauma and promote recovery.

## References

- [1] Wang QF, Zhang M, Wang Y, et al. Clinical efficacy and surgical indicator observation of laparoscopic three-hole cholecystectomy in patients with acute cholecystitis [J]. *Guizhou Medicine*, 2018, 42(9): 1095–1097.
- [2] Yan WN, Xiao NB, Dong JL, et al. The relationship between timing of laparoscopic cholecystectomy and celiac infection in acute cholecystitis [J]. *Chinese Journal of Clinical Infectious Diseases*, 2017, 10(3): 209–211, 229.
- [3] Li ZH, Chen BL, Tian ZB, et al. Observation on efficacy of laparoscopic surgery for calculus cholecystitis [J]. *Modern Journal of Integrated Traditional Chinese and Western Medicine*, 2017, 26(21): 2344–2345.
- [4] Li DD, Jiang T, Zhou SR, et al. Efficacy and safety analysis of laparoscopic cholecystectomy for acute stone cholecystitis [J]. *Journal of Hepatobiliary and Pancreatic Surgery*, 2019, 31(8): 493–495.
- [5] Liu YK, Dong JJ. Appropriate selection of surgical method and timing for acute cholecystitis [J]. *Southwest National Defence Medicine*, 2018, 28(1): 87–89.