International Journal of Clinical and Experimental Medicine Research, 2022, 6(4), 366-371
https: //www.hillpublisher.com/journals/ijcemr/
ISSN Online: 2575-7970
ISSN Print: 2575-7989

Clinical Observation of Laparoscopic Cholecystectomy at Different Times in Patients with Acute Cholecystitis after Puncture and Drainage

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How to cite this paper: Bo Sheng, Jingjing Liu. (2022) Clinical Observation of Laparoscopic Cholecystectomy at Different Times in Patients with Acute Cholecystitis after Puncture and Drainage. *International Journal of Clinical and Experimental Medicine Research*, 6(4), 366-371.
DOI: 10.26855/ijcemr.2022.10.007

Received: September 10, 2022
Accepted: October 5, 2022
Published: November 10, 2022

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Abstract

Objective: To observe and analyze the clinical value of laparoscopic cholecystectomy at different times in patients with acute cholecystitis after puncture and drainage. **Methods:** A total of 80 patients with acute cholecystitis admitted to our hospital from May 2020 to October 2022 were enrolled. All patients were treated with acute cholecystitis puncture and drainage and laparoscopic cholecystectomy. They were divided into two groups by random number table method (short-term group and long-term group, with 40 cases in each group).The short-term group was treated with laparoscopic cholecystectomy within 1 months after the operation of acute cholecystitis puncture and drainage, and the long-term group was treated with laparoscopic cholecystectomy 1 months after the operation. The perioperative general conditions, inflammatory status, liver function and the incidence of perioperative adverse events were compared between the two groups. **Results:** The perioperative operation time, postoperative drainage time and perioperative hospital stay in the long-term group were shorter than those in the recent group, and the intraoperative blood loss was less than that in the recent group, and the differences were statistically significant ($P < 0.05$). After operation, the levels of C-reactive protein, interleukin-6 and other inflammatory factors in the two groups were lower than those before operation, and the indicators in the long-term group were lower than those in the short-term group, and the differences were statistically significant ($P < 0.05$). The incidence of perioperative adverse events in long-term group was lower than that in short-term group, and the difference was statistically significant ($P < 0.05$).After operation, the liver function indexes such as alanine aminotransferase and total bilirubin in the two groups were lower than those before operation, and the indexes in the long-term group were lower than those in the short-term group, and the differences were statistically significant ($P < 0.05$). **Conclusion:** Long-term laparoscopic cholecystectomy for patients with acute cholecystitis after puncture and drainage is helpful to improve the surgical effect and safety, and promote the improvement of early postoperative liver function and inflammatory status.

Keywords

Acute Cholecystitis, Puncture and Drainage, Laparoscope, Cholecystectomy, Different Timing, Liver function, Inflammatory Indicators

Acute cholecystitis is a common disease in modern medical institutions, which is manifested by typical symptoms and signs of acute abdomen such as elevated body temperature, right upper abdominal pain, and elevated white blood cell count level in peripheral blood [1]. There are various pathogenic factors for acute cholecystitis, among which stones are the main cause of this disease, accounting for about 85-90% [2]. Meanwhile, bacterial infection and chemical stimulation are also common causes of this disease [3].The main clinical treatment for acute cholecystitis is surgery [4]. Radical cholecystectomy is achieved by cholecystectomy. However, due to the influence of different factors such as weak tolerance and more underlying diseases, emergency cholecystectomy in some cases has poor prognosis and a certain risk of death.In order to improve the effect of acute cholecystitis surgery, avoiding the risk of emergency surgery is one of the hot spots in the medical field [5-6]. Puncture and drainage of acute cholecystitis is a treatment method proposed in this context. The symptoms and signs of acute cholecystitis are controlled by percutaneous transhepatic gallbladder puncture and drainage, and cholecystectomy is performed after relieving the condition to ensure the safety of treatment [7]. And at present, the best opportunity to puncture drainage of postoperative acute cholecystitis cholecystectomy, there is no unified conclusion, our hospital in recent years for patients with acute cholecystitis after puncture drainage was carried out by different timing of laparoscopic cholecystectomy, and on the basis of surgical intervention time roughly divided into recent and forward two stages, including the recent 1 months after puncture drainage for acute cholecystitis, The long-term was 1 months away. This study compared and analyzed the application effects of the two stages based on part of the case data.

1. Data and Methods

1.1. The general information

A total of 80 patients with acute cholecystitis admitted to our hospital from May 2020 to October 2022 were enrolled. All patients were treated with acute cholecystitis puncture and drainage and laparoscopic cholecystectomy. They were divided into two groups by random number table method (short-term group and long-term group, with 40 cases in each group). There was no significant difference in general data between the two groups ($P > 0.05$), as shown in Table 1.

Table 1. Comparison of general data between the two groups

group	gender	age	Time from onset of acute cholecystitis to admission	BMI
	(Male/female, case)	($\bar{x} \pm s$, age)	($\bar{x} \pm s$, h)	($\bar{x} \pm s$, kg/m^2)
Recent group/40	24/16	45.72±11.29	4.12±1.38	22.38±3.12
Forward group/40	22/18	46.20±11.05	3.94±1.42	22.75±3.30
χ^2/t	0.205	0.192	0.575	0.515
P	0.651	0.848	0.567	0.608

1.2. Standard set

1.2.1. Included in the standard

Patients meeting the diagnostic criteria of acute cholecystitis; Confirmed simple or suppurative acute cholecystitis; Patients with acute cholecystitis puncture and drainage, laparoscopic cholecystectomy surgical indications; No previous history of acute biliary tract disease; People with normal mental condition; Basic diseases such as diabetes, bronchial asthma control effect is ideal.

1.2.2. Exclusion criteria

Combined with other types of acute lesions such as acute gastritis, acute enteritis, etc.; Patients with malignant diseases of digestive system; Gangrenous acute cholecystitis; Patients with a history of abdominal or pelvic surgery within 11 months before enrollment; Patients with tumors; Patients with organic diseases of important organs; Patients with coagulation disorders; Patients with biliary tract surgery history; There is no puncture failure or peri-

operative complications in the perioperative period of acute cholecystitis. The common complications include bile leakage and sepsis.

1.3. Methods

After admission, patients in both groups received basic treatment of acute cholecystitis and puncture and drainage treatment of acute cholecystitis, including intravenous rehydration, cooling, anti-infection, sedation, etc. The attending physician explained the actual condition and treatment plan to the patients and their families, and improved the signing of the treatment-related informed consent. Two groups of patients were accepted puncture drainage with acute cholecystitis laparoscopic cholecystectomy surgery, including laparoscopic cholecystectomy surgery for timing differences, including the recent group of patients in acute cholecystitis, within 1 months after puncture drainage surgery, long-term group to carry out the operation after 1 months after surgery (to avoid all kinds of the influence of subjective factors, The surgical team of the two groups was the same medical team), and the surgical plan of laparoscopic cholecystectomy was the same, as detailed below.

The anesthesia method was general anesthesia with endotracheal intubation. After successful anesthesia, all openings were made under the umbilicus with a length of 10mm. Pneumoperitoneum needle was inserted to establish pneumoperitoneum and 10mmTrocar was inserted. Laparoscopes and other surgical instruments were placed in each incision. Laparoscopy was used to explore the abdominal cavity, and the gallbladder and adjacent tissues were observed and evaluated after identifying the specific location of the gallbladder. The gallbladder was bluntly separated from the adjacent adhesive tissue. The anatomical triangle should ensure that the common bile duct, cystic duct, and cystic artery are fully exposed, and the latter two should be cut off, and the gallbladder should be removed after dissection. The abdominal cavity was inspected again after washing the abdominal cavity. The drainage tube was indwelled after no active bleeding point or abnormal injury, and the surgical instruments were withdrawn. Postoperative diet management and anti-infection treatment were strengthened, and regular hospital admission was reviewed.

1.4. To observe

1.4.1. General statistics of perioperative period

The general perioperative conditions of laparoscopic cholecystectomy in the two groups were analyzed, including operation time, intraoperative blood loss, postoperative drainage time, perioperative hospital stay, etc.

1.4.2. Inflammatory status assessment

At the two stages before and after laparoscopic cholecystectomy, 3ml peripheral venous blood was collected from each case and sent to the laboratory for detection of inflammatory factors, including c-reactive protein and interleukin-6.

1.4.3. Statistics of perioperative adverse events

The incidence of perioperative adverse events in the two groups of patients undergoing laparoscopic cholecystectomy was analyzed, including new infection, conversion to open surgery, bile leakage, incision hematoma, etc.

1.4.4. Liver function assessment

At the two stages before and after laparoscopic cholecystectomy, 3ml peripheral venous blood was collected from each case and sent to the laboratory for liver function index testing, including alanine aminotransferase and total bilirubin.

1.5. Method of statistics

SPSS23.0 statistical software was used for processing, and perioperative general conditions, inflammatory conditions, liver function and other measurement data were expressed as ($\bar{x} \pm s$), The t test was used for comparison, the incidence of adverse events during perioperative period and other counting data were expressed as percentages, and the χ^2 test was used for comparison. $P < 0.05$ was considered statistically significant.

2. Results

2.1. Comparison of perioperative general conditions between the two groups:

The perioperative operation time, postoperative drainage time and perioperative hospital stay in the long-term group were shorter than those in the recent group, and the intraoperative blood loss was less than that in the recent group, the differences were statistically significant ($P < 0.05$), as shown in Table 2.

Table 2. Comparison of perioperative general conditions between the two groups ($\bar{x} \pm s$)

group	Operation time(min)	Intraoperative blood loss(ml)	Postoperative drainage time(d)	Perioperative hospital stay(d)
Recent group/40	88.57±17.42	26.48±4.92	4.39±0.81	7.10±0.95
Forward group/40	67.03±14.23	14.57±3.27	2.71±0.56	5.57±0.42
t	6.057	12.751	10.790	9.316
P	< 0.001	< 0.001	< 0.001	< 0.001

2.2. Comparison of inflammatory status between the two groups

After operation, the levels of inflammatory factors such as C-reactive protein and interleukin-6 in the two groups were lower than those before operation, and the indicators in the long-term group were lower than those in the short-term group, with statistical significance (P < 0.05), as shown in Table 3.

Table 3. Comparison of perioperative C-reactive protein and interleukin-6 levels between the two groups ($\bar{x} \pm s$)

group	C reactive protein(mg/L)		Interleukin - 6(ng/L)	
	preoperative	postoperative	preoperative	postoperative
Recent group/40	39.85±10.13	20.75±3.41 *	24.80±5.13	15.42±2.41 *
Forward group/40	40.28±9.52	15.47±2.38 *	25.38±4.71	11.15±1.95 *
t	0.196	8.030	0.527	8.711
P	0.845	< 0.001	0.600	< 0.001

Note: Compared with pre-operation, * P＜0.05

2.3. Comparison of perioperative adverse events between the two groups

The incidence of perioperative adverse events in the long-term group was lower than that in the short-term group, and the difference was statistically significant (P < 0.05), as shown in Table 4.

Table 4. Comparison of perioperative adverse events between the two groups (case ％)

group	New infections	Transfer laparotomy	Bile leakage	Incision hematoma	The total incidence of
Recent group/40	2(5.00)	2(5.00)	1(2.50)	3(7.50)	8(20.00)
Forward group/40	0(0.00)	1(2.50)	1(2.50)	0(0.00)	2(5.00)
χ^2					4.114
P					0.043

2.4. Comparison of liver function between the two groups

After operation, the liver function indexes such as alanine aminotransferase and total bilirubin in the two groups were lower than those before operation, and the indexes in the long-term group were lower than those in the short-term group, and the differences were statistically significant (P < 0.05), as shown in Table5。

Table 5. Comparison of perioperative liver function indexes such as alanine aminotransferase and total bilirubin between the two groups ($\bar{x} \pm s$)

group	Alanine aminotransferase (U/L)		Total bilirubin (μmol/L)	
	preoperative	postoperative	preoperative	postoperative
Recent group/40	90.75±11.48	39.57±6.23△	68.04±8.78	28.47±4.71△
Forward group/40	91.28±12.15	28.47±4.29△	67.48±9.25	16.38±3.29△
t	0.201	9.281	0.278	13.309
P	0.842	< 0.001	0.782	< 0.001

Note: Compared with pre-operation, △P＜0.05

3. Discussion

Acute abdomen is a common type of acute disease in clinical diagnosis and treatment. There are various types of lesions, such as acute appendicitis, acute cholecystitis and ectopic pregnancy rupture. Patients with acute cholecystitis with gall bladder cavity pressure as the main pathological change, the illness occurred suddenly, progress more rapidly, a timely and effective intervention, no accompany progression leads to the gallbladder and adjacent tissue such as common bile duct and hepatic duct adhesion [9], induce the gallbladder triangle series of pathological changes, lead to the increase of operation risk and difficult operation. Cholecystectomy is the main treatment for acute cholecystitis at present, which can directly eradicate the lesion. Under the background of the development of various minimally invasive techniques such as laparoscopy and arthroscopy, laparoscopic cholecystectomy has gradually become the first choice for the treatment of acute cholecystitis. Compared with the traditional open cholecystectomy, the application of laparoscopy greatly reduces the surgical trauma, and laparoscopy can provide a clear operative field for the operator, avoid the blind area of the traditional open surgery, carry out comprehensive exploration and treatment of lesions in all areas, and achieve minimally invasive treatment under the premise of damage control [10, 11].

Laparoscopic cholecystectomy is recognized as the medicine treatment of acute cholecystitis gold standard, patients with acute cholecystitis and acute cholecystitis puncture drainage is also commonly used surgical treatment, in the past were included in high-risk cases of surgical treatment of first choice, puncture drainage can effectively relieve the gall bladder pressure, is a kind of safe operation. And with medicine research gradually thorough, in view of the tendency to the treatment of patients with acute cholecystitis disease severity classification treatment, class II patients with acute cholecystitis need combined with the body's resistance, in levels of medical institutions and so on to carry out emergency laparoscopic cholecystectomy or elective cholecystectomy, and elective cholecystectomy treatment need through puncture drainage control condition, The Tokyo Guidelines (2018) (TG18) [12] clearly states that patients with grade III acute cholecystitis should be treated with puncture and drainage, followed by laparoscopic cholecystectomy. For patients with grade I acute cholecystitis, laparoscopic cholecystectomy is generally carried out directly. However, some patients cannot receive laparoscopic surgery directly when their body tolerance is weak, their physiological status is poor or they are complicated with bile duct diseases. Puncture and drainage can be used to relieve the condition and then elective surgery can be performed. Puncture and drainage can control the symptoms of patients with acute cholecystitis, but it cannot achieve a complete cure of the disease. Therefore, combined cholecystectomy is needed to improve the prognosis. However, there is no clear recommendation or uniform standard for the interval between puncture and drainage and cholecystectomy. Data in this study combined with part of the patients with acute cholecystitis, analyses the recent and forward the application effect of two kinds of time interval, the results show that the forward group of laparoscopic cholecystectomy perioperative surgical time, perioperative and postoperative drainage time length of hospital stay were shorter than the recent group, intraoperative blood loss less than recent group, and the forward set of perioperative lower incidence of adverse events in the near future, It is suggested that the interval between puncture drainage and cholecystectomy is more than 1 month, which can improve the general situation of cholecystectomy and reduce the risk of complications. In the comparison of early postoperative inflammatory indicators and liver function indicators, it was found that the levels of inflammatory factors such as C-reactive protein and interleukin-6, and liver function indicators such as alanine aminotransferase and total bilirubin in the long-term postoperative group were lower than those in the recent group, and the improvement of early postoperative liver function and the control of body inflammation were better than those in the recent group. Yin Xin [13] showed that the optimal interval between puncture and drainage and cholecystectomy was 40.5 to 61.7 days, which was consistent with the results of this study. Appropriate extension of the interval between two operations can provide sufficient time for inflammation control, so as to ensure the clarity of the anatomical structure of the gallbladder triangle during operation, control the difficulty and risk of surgery, and ensure the quality of surgery.

In conclusion, long-term laparoscopic cholecystectomy for patients with acute cholecystitis after puncture and drainage, that is, the interval between the two operations should be controlled at least 1 month, which has outstanding value in improving the general condition and safety of surgery, and promoting the improvement of early postoperative liver function and inflammatory status.

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