

Feasibility and problem in managements of the patients with acute cholecystitis: A historical study at a single province institute.

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Objectives: "Practice Guidelines for Acute Cholecystitis and Acute Cholangitis (in Japanese)," issued in 2005 in Japan, recommends early cholecystectomy in patients with acute cholecystitis. We evaluated the feasibility and problems in management of this condition.

Method: We analyzed the clinical and laboratory data of 120 consecutive patients in whom cholecystectomy was performed for treatment of acute cholecystitis between April 2003 and March 2010 in our hospital.

Results: After the Guidelines were issued, the rate of urgent operations increased (from 2.4% to 35.4%; $p < 0.001$) and the length of preoperative hospital stay decreased (from 12.5 days to 7.6 days; $p < 0.05$). Urgent operation, however, was chosen in only 35.4% of the patients even after the Guidelines were issued, mainly because of the shortage of surgeons and anesthesiologists. In these patients with moderate to severe acute cholecystitis, percutaneous cholecystostomy (PC) was performed without severe complications, followed by cholecystectomy.

Conclusion: Urgent operation for acute cholecystitis has the advantages of earlier alleviation of symptoms and shorter hospital stays than PC followed by surgery or elective operation. PC followed by surgery may be a suboptimal option for patients with moderate to severe acute cholecystitis who might be able to tolerate an urgent operation, given that appropriate human resources are not available.

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Introduction

Management of acute cholecystitis has been particularly controversial; for example, whether urgent cholecystectomy or elective cholecystectomy after subsiding of inflammation should be chosen has been unclear^{1,2}. In 2005, "Practice Guidelines for Acute Cholecystitis and Acute Cholangitis" (in Japanese) and, in 2007, "Tokyo Guidelines for the Management of Acute Cholangitis and Cholecystitis"³ were issued on the basis of evidence. According to these guidelines, early cholecystectomy within 96 hours of the onset of acute cholecystitis, especially by a laparoscopic approach

(LC), is recommended in the acute phase unless the patient's general condition does not allow a surgery to be performed.

In many institutes in Japan, including ours, "Practice Guidelines for Acute Cholecystitis and Acute Cholangitis (Guidelines)" has been referred to for the management of acute cholecystitis^{4,5}. We reviewed the data of the patients with acute cholecystitis in whom cholecystectomy was performed in the past 7 years and evaluated the feasibility and problems of management of acute cholecystitis.

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Materials and Methods

We reviewed the clinical and laboratory data of 120 consecutive patients with acute cholecystitis, but without choledocholithiasis, in whom cholecystectomy was performed between April 2003 and March 2010 at our hospital. To compare clinical factors depending on the types of management, we divided the patients into 3 groups according to processes carried out until surgery: (1) Urgent group included patients who underwent an operation within 96 hours of the onset of acute cholecystitis; (2) Drainage group included patients in whom percutaneous cholecystostomy (PC) was performed before the operation; and (3) Elective group included patients in whom an operation was performed after inflammation had subsided with conservative treatment. We compared clinical factors among the 3 groups and estimated the validity and problems of our strategy of treatment of the patients with acute cholecystitis. In addition, since the Japanese Guidelines were published in 2005, we compared the patients in a chronological manner; that is, until (Early) and after (Late) March 2006.

The diagnosis and the severity of acute cholecystitis were determined according to the Guidelines.

The data are presented as the mean \pm standard deviation. The Student's t-test was used for comparisons of continuous variables between two groups. The one-way ANOVA was used for continuous variables among three groups, and, if a p-value was <0.05 , Tukey-Kramer test was applied for multiple comparison. The chi-square (χ^2) test was used for categorical variables. A p-value of <0.05 was considered statistically significant. Statistical analysis was performed with StatMate III for Macintosh (ATMS Co., Ltd, Tokyo, Japan).

Results

Comparison of Clinical Factors Depending on Management

No operative deaths occurred during the study period. Further, PC was performed in all patients without major complications. The backgrounds of the patients in each group are shown in Table 1. The degree of inflammation indicated by the white blood cell (WBC) counts and the proportion of severe cases were higher in the Urgent and Drainage groups than in the Elective group. Table 2 shows the perioperative clinical factors of the patients in each group. While the preoperative hospital stay was significantly shorter for the patients in the Urgent group than for those in the

Table 1. Backgrounds of patients in each group.

	Urgent(n=29)	Drainage(n=34)	Elective(n=57)	p
Age (years)	67.0 \pm 14.7	71.7 \pm 11.0	65.1 \pm 14.5	0.09
Sex (male)	48.3%	50.0%	54.4%	0.89
WBC	14,020 \pm 4,891	16,196 \pm 4,916	10,877 \pm 4,247	<0.01
CRP	10.9 \pm 11.5	23.0 \pm 11.7	9.5 \pm 8.3	<0.01
Severe Cases	48.3%	47.1%	22.8%	<0.05

Abbreviations: WBC, white blood cell; CRP, C-reactive protein.

Table 2. Comparison of patients in each group.

	Urgent(n=29)	Drainage(n=34)	Elective(n=57)	p
Amount of Blood Loss (ml)	351 \pm 686	189 \pm 157	191 \pm 261	0.17
Operation Time (minutes)	134 \pm 74	131 \pm 38	128 \pm 52	0.89
Conversion to Open Surgery	34.8%	16.7%	32.5%	0.23
Preoperative Hospital Stay (days)	0.8 \pm 1.5	17.1 \pm 10.2	9.2 \pm 8.4	<0.01
Postoperative Complications	20.1%	18.2%	16.1%	0.55
Postoperative Hospital Stay (days)	10.0 \pm 9.4	10.0 \pm 5.4	10.4 \pm 11.7	0.91

other 2 groups, the other factors, including the amount of blood loss, operation time, rate of conversion to open cholecystectomy (OC) from LC, rate of postoperative complications including bile leakage, intraabdominal abscess, pancreatitis, skin burn, Steven-Johnson syndrome, urinary infection, brain infarction and respiratory failure, and postoperative hospital stay, were not different among the 3 groups.

Chronological Changes in the Management of Acute Cholecystitis

We compared the clinical factors of patients who underwent operations until (Early period) and after (Late period) March 2006. The rate of urgent operations was higher in the Late period than in the Early period (35.4% and 2.4%, respectively; $p < 0.001$; Figure 1). The preoperative hospital stay was shorter in the Late period than in the Early period (Table 3). After March 2006, LC has been attempted more frequently and the rate of conversion to OC from LC has decreased. The amount of blood loss, operation time,

postoperative complications, and postoperative hospital stays were similar between the 2 groups.

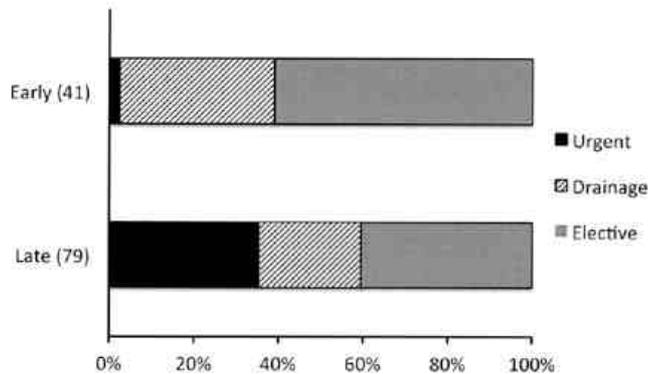


Figure 1. A comparison of the strategy for treatment of patients with acute cholecystitis between the Early and Late periods.

Table 3. Comparison of patients in each group.

	Early period (n=41)	Late period (n=79)	<i>p</i>
Preoperative Hospital Stay (days)	12.5 ± 9.6	7.6 ± 9.6	<0.05
LC	48.8%	77.2%	<0.01
Conversion to OC form LC	65.0%	18.0%	<0.001
Amount of Blood Loss (ml)	292 ± 268	197 ± 454	0.22
Operation Time (minutes)	136 ± 51	128 ± 58	0.46
Postoperative Complications	15.0%	18.2%	0.63
Postoperative Hospital Stay (days)	10.8 ± 9.2	9.9 ± 9.9	0.63

Abbreviations: LC, laparoscopic cholecystectomy; OC, open cholecystectomy.

Discussion

An examination of patients with acute cholecystitis showed that in patients with a higher degree of inflammation, almost equal of patients with more severe cases, urgent operation or PC was seemingly performed more frequently. Preoperative hospital stays were significantly shorter in the Urgent group than in both the Drainage and Elective groups, without an increase in morbidity, indicating that early operation for acute cholecystitis has the advantage of earlier alleviation of symptoms.

In Japan, changes in the management of acute cholecystitis

were reported after the Guidelines were issued in 2005; the proportion of patients who underwent early operations increased^{4,5}. We have tried to carry out early operation within 96 hours of the onset of acute cholecystitis since the Guideline issued, and in our study, a similar pattern was observed, and a shorter preoperative hospital stay was obvious in the Late period. Moreover, in the Late period, LC was chosen more frequently and the rate of conversion to OC was lower than that in the Early period. The reasons for these observations should partly be that LC has become a common procedure and the techniques of LC have improved.

The Guidelines recommended PC for patients with jaundice and poor general conditions. PC was performed without major complications and can be taken into account for patients with poor medical condition even though anticoagulant or antiplatelet agents are administered. The effectiveness of PC was reported as a bridge procedure before cholecystectomy in the case of critically ill patients with acute cholecystitis^{6,7}. In our study, we evaluated only the cases wherein operations were performed, and did not evaluate the cases of patients who had not undergone surgery after PC. Recurrence of acute cholecystitis was occurred in approximately 30% of patients with cholecystolithiasis after removal of the drainage tube without cholecystectomy^{8,9}. At our institution, we usually recommend that patients with PC undergo cholecystectomy after improvement of inflammation.

Yamashita et al. reported that only 57.3% of patients with acute cholecystitis underwent urgent operations after the Guidelines were issued, based on the circumstances of each institute, such as human resources and availability of operating rooms.⁴ Likewise, early operation could not be performed even in the Late period, mainly because of the shortage of human resources, i.e., our institute has 5 surgeons, including 2 residents, and one anesthesiologist, and about 600 surgical operations must be performed annually.

In conclusion, although early operation after the onset of acute cholecystitis has the advantage in terms of short hospital stays and prompt alleviation of symptoms, PC followed by cholecystectomy can be a reasonable suboptimal option for moderate to severe acute cholecystitis, for even patients who are able to tolerate operations, depending on the circumstance of each institute.

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