

A Comparative Outcome Assessment of Early vs Delayed Laparoscopic Cholecystectomy

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Abstract

Aim: The aim of the present study was to compare between early versus Delayed Laparoscopic Cholecystectomy for Acute Cholecystitis.

Methods: The study was conducted in the Department of General Surgery, Patna Medical College and Hospital Patna, Bihar, India. 100 patients with physical, laboratory, and ultrasound findings suggested acute cholecystitis, and who were operated on by laparoscopy were included in the study. The early operation group was operated on within 24 hours of admission (50 patients), whereas the late operation group was operated on after 6 to 8 weeks following the initial treatment (50 patients).

Results: The study groups, which underwent early or delayed laparoscopic cholecystectomy, showed no difference in age and sex distribution. Initial clinical findings and medical history were also similar between groups, except for fever, which was significantly higher in the early laparoscopic cholecystectomy group. Both groups revealed similar physical examination findings: all patients had tenderness and defense in the abdominal area (this term means tensing the muscles in the abdominal area, a clinical finding that may present when the internal organs are inflamed in some manner) and 90% had Murphy sign, and 12% in the early and 26% in the late laparoscopic cholecystectomy groups had rebound tenderness. Blood count and liver function results were not different between groups. Ultrasonographic findings were similar between groups. There was no significant difference between the early and the delayed laparoscopic cholecystectomy groups in terms of operation time and rates for conversion to open cholecystectomy.

Conclusion: Despite intraoperative and postoperative complications being associated more with early laparoscopic cholecystectomy compared with delayed intervention, early laparoscopic cholecystectomy should be preferred for treatment of acute cholecystitis because of its advantages of shorter hospital stay.

Keywords: Acute cholecystitis, early laparoscopic cholecystectomy, delayed laparoscopic cholecystectomy

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Introduction

Acute cholecystitis is the most common acute disease in hepatobiliary surgery and one of the most common diseases in digestive tract surgery in general [1]. With aging, the incidence increases from 4% in the third decade to 27% in the seventh decade of life [2]. Biliary calculus is undoubtedly a disease of modern man. At least 20% of the human population is thought to have cholelithiasis, but in the most developed countries of the world, this percentage is higher. It is estimated that there are about 20 million people in the United States suffering from cholelithiasis. About 500 000 cholecystectomies are performed annually in the United States. The fact is that this disease is much more common in areas where the diet is irrational (fat-rich and high-calorie diet). The incidence of the

disease increases with age. Women of childbearing age are more likely to suffer than men (1.5-3.0:1). The most common occurrence of cholelithiasis in women is blamed on pregnancy (increased bile production, increased serum progesterone concentration that causes the bile stasis), but also the effect of estrogen, which increases the secretion and saturation of cholesterol and bile.

During the past few decades, studies has been conducted to develop less aggressive and less costly methods in the treatment of gallbladder calculus. Oral desaturation, contact dissolution, and extra corporealnitrotripsy methods are limited by the structure, size, and number of concretions. These nonsurgical methods are inadequate for a large number of patients and cannot contribute to healing.

[3] Therefore, cholecystectomy remains as the method of choice in the treatment of gallbladder calculosis. Open cholecystectomy has been the gold standard for symptomatic cholelithiasis for a century. However, in the last two decades, the introduction of laparoscopic cholecystectomy has revolutionized the treatment of gallbladder calculosis. [4] The first laparoscopic cholecystectomy was performed by Flies in 1985, and the report was presented at the German Society of Surgeons in 1986. In September 1988, Reddick and Olsen developed the method currently in use. [5]

The aim of the present study was to compare between early versus Delayed Laparoscopic Cholecystectomy for Acute Cholecystitis.

Materials and Methods

The study was conducted in the Department of General Surgery, Patna Medical College and Hospital Patna, Bihar, India for six months

100 patients with physical, laboratory, and ultrasound findings suggested acute cholecystitis, and who were operated on by laparoscopy were included in the study.

Acute cholecystitis diagnosis was based on a combination of clinical and radiologic criteria. All of the following criteria together constituted an acute episode: right subcostal tenderness; positive Murphy sign; leukocytosis; thickened, edematous distended gallbladder; presence of gallstones; and pericholecystic fluid collection on ultrasound examination. Patients with common bile duct stones,

acute pancreatitis, previous upper abdominal surgery, or severe concomitant medical problems deeming them unfit for laparoscopic surgery were excluded from the study.

Each patient gave written informed consent before participation in the study. Approval for this study was obtained from the ethics committee of the hospital. The study was conducted in accordance with the latest version of the Declaration of Helsinki and local regulations.

Patients were randomized to the early or delayed operation group using the closed-envelope method. The early operation group was operated on within 24 hours of admission (50 patients), whereas the late operation group was operated on after 6 to 8 weeks following the initial treatment (50 patients). Patients in the delayed group were treated with intravenous fluids, antibiotics, and analgesics. Patients who responded to conservative treatment were discharged after a complete relief of symptoms. They were called for laparoscopic cholecystectomy after 6 or 8 weeks, when the acute episode had subsided.

Statistical Analysis

The statistical analyses were performed using a commercially available software (Statistical Package for Social Sciences version 15.0, SPSS Inc, Chicago, Illinois). The statistical level of significance was set to $P < 0.05$.

Results

Table 1: Basic clinical and demographic data of patients in the early and delayed laparoscopic cholecystectomy groups

	Early laparoscopic cholecystectomy (n = 50)	Delayed laparoscopic cholecystectomy (n = 50)	P Value
Age, y	58.02 ±10.46	60.40 ±16.60	0.684
Sex, No. (%)			
Male	17 (34)	22 (44)	.0.07
Female	33 (66)	28 (56)	
Pain duration, h	36.00 ± 22.58	28.94 ±20.52	0.422
History duration, d	5.57 6 10.72	5.23 6 10.90	0.912
Previous attack, No. (%)	26 (52)	30 (60)	0.604
Previous abdominal surgery, No. (%)	10 (20)	8 (16)	0.713
Fever, °C	37.31 ±0.62	36.79 ±0.31	0.001
Comorbidity, No. (%)	10 (20)	36 (72)	0.552

The study groups, which underwent early or delayed laparoscopic cholecystectomy, showed no difference in age and sex distribution. Initial clinical findings and medical history were also similar between groups, except for fever, which was significantly higher in the early laparoscopic cholecystectomy group.

Table 2: Physical, laboratory, and radiologic findings of patients in the early and delayed laparoscopic cholecystectomy groups

	Early laparoscopic cholecystectomy (n = 50)	Delayed laparoscopic cholecystectomy (n = 50)	P Value
Physical examination findings, No. (%)			
Tenderness	50 (100)	50 (100)	1
Rebound tenderness	6 (12)	13 (26)	0.182
Defence in the abdomen	50 (100)	50 (100)	1
Murphy sign	45 (90)	45 (90)	1
Laboratory			
White blood cell (NR, $4.3 \times 10^9/L$ to $11.3 \times 10^9/L$)	11.93 \pm 3.86	13.43 \pm 3.83	0.132
Alanine transaminase (NR, 0–41 U/L)	87.77 \pm 134.29	88.67 \pm 66.35	0.978
Aspartate transaminase (NR, 0–40 U/L)	114.93 \pm 217.05	74.03 \pm 58.57	0.327
Gamma glutamyl transferase (NR, 10–71 U/L)	120.13 \pm 206.30	134.47 \pm 265.42	0.832
Alkaline phosphatase (NR, 40–130 U/L)	84.90 \pm 54.13	108.57 \pm 36.06	0.052
Amylase (NR, 28–100 U/L)	85.90 \pm 101.47	107.50 \pm 39.38	0.240
Total bilirubin (NR, ≤ 1.4 mg/dL)	0.99 \pm 0.59	3.84 \pm 16.47	0.342
Direct/conjugated bilirubin (NR, ≤ 0.2 mg/dL)	0.41 \pm 0.42	0.23 \pm 0.16	0.034
Ultrasonography findings, No. (%)			
Calculi in the gallbladder	50 (100)	50 (100)	1
Increased thickness of the anterior gallbladder wall	38 (76)	35 (70)	0.743
Pericholecystic fluid	8 (16)	8 (16)	1
Intrahepatic bile duct dilatation	2 (4)	5 (10)	0.624
Extrahepatic bile duct dilatation	2 (4)	0 (0.0)	1

Both groups revealed similar physical examination findings: all patients had tenderness and defense in the abdominal area (this term means tensing the muscles in the abdominal area, a clinical finding that may present when the internal organs are inflamed in some manner) and 90% had Murphy sign, and 12% in the early and 26% in the late laparoscopic cholecystectomy groups had rebound tenderness. Blood count and liver function results were not different between groups. On ultrasonography, calculi in the gallbladder were detected in all of the patients, and thickness of the anterior gallbladder

wall was increased in 38 and 35 patients in the early and delayed laparoscopic cholecystectomy groups, respectively. Other ultrasonography findings were pericholecystic fluid (8 patients each from the early and delayed laparoscopic cholecystectomy groups), and intrahepatic (2 patients in the early and 5 patients in the delayed laparoscopic cholecystectomy groups) and extrahepatic (2 patients in the early laparoscopic cholecystectomy group) bile duct dilatation. Ultrasonographic findings were similar between groups.

Table 3: Intraoperative and postoperative findings of patients in the early and delayed laparoscopic cholecystectomy groups

	Early laparoscopic cholecystectomy (n = 50)	Delayed laparoscopic cholecystectomy (n = 50)	P value
Operation time, min	67.00 \pm 28.515	71.33 \pm 24.066	0.212
Hospitalization duration, d	5.20 \pm 1.40	7.80 \pm 1.65	0.07
Intraoperative and postoperative complications, No. (%)	12 (24)	0	0.007
Conversion to open cholecystectomy, No. (%)	6 (12)	0	0.114

There was no significant difference between the early and the delayed laparoscopic cholecystectomy groups in terms of operation time and rates for conversion to open cholecystectomy.

Discussion

Elective laparoscopic cholecystectomy has become the gold standard for treatment of symptomatic

gallstones.⁶ However, in the early days, acute cholecystitis was a contraindication of laparoscopic cholecystectomy, and patients with acute cholecystitis were managed conservatively and discharged for re-admission in order to have elective surgery performed for the definitive treatment. [7,8] Then, randomized controlled trials and meta-analyses had shown the benefits of early surgery

(within the acute admission period, which is 24 to 72 hours) compared with delayed cholecystectomy with respect to hospital stay and costs, with no significant difference in morbidity and mortality. [7,9,10] Thus, in the late 1980s early surgery for acute cholecystitis had gained popularity. The updated Tokyo Guidelines announced in 2013 by the Japanese Society of Hepato-Biliary-Pancreatic Surgery suggested that early laparoscopic cholecystectomy is the first-line treatment in patients with mild acute cholecystitis, whereas in patients with moderate acute cholecystitis, delayed/elective laparoscopic cholecystectomy after initial medical treatment with antimicrobial agent is the first-line treatment. [11]

The study groups, which underwent early or delayed laparoscopic cholecystectomy, showed no difference in age and sex distribution. Initial clinical findings and medical history were also similar between groups, except for fever, which was significantly higher in the early laparoscopic cholecystectomy group. Both groups revealed similar physical examination findings: all patients had tenderness and defense in the abdominal area (this term means tensing the muscles in the abdominal area, a clinical finding that may present when the internal organs are inflamed in some manner) and 90% had Murphy sign, and 12% in the early and 26% in the late laparoscopic cholecystectomy groups had rebound tenderness. In a retrospective analysis of 100 patients, Ohta et al [12] compared 4 timing groups of laparoscopic cholecystectomy (≤ 72 hours, 4–14 days, 3–6 weeks, and >6 weeks after onset of symptoms) and found that the best timing for laparoscopic cholecystectomy for acute cholecystitis is within 72 hours, which provides the shortest total hospital stay versus operations performed later. Falor et al [13] performed early laparoscopic cholecystectomy (within 48 hours of admission) in 117 of 303 patients with mild gallstone pancreatitis; for the rest of the patients, operation was delayed until the normalization of laboratory values. They suggested that early laparoscopic cholecystectomy is safe, resulting in shortened hospital stay and decreased use of endoscopic retrograde cholangiopancreatography without increased morbidity and mortality.

Blood count and liver function results were not different between groups. Ultrasonographic findings were similar between groups. There was no significant difference between the early and the delayed laparoscopic cholecystectomy groups in terms of operation time and rates for conversion to open cholecystectomy. Siddiqui et al [14] analyzed 4 clinical studies containing 375 patients and found shorter hospital stay and longer operation time in early laparoscopic cholecystectomy, but they found no significant difference in conversion rates between

early and delayed laparoscopic cholecystectomy. In a best-evidence topic that analyzed 92 papers (meta-analyses, randomized control trials, prospective controlled study, and retrospective cohort studies), it was concluded that early laparoscopic cholecystectomy for acute cholecystitis is advantageous in terms of the length of hospital stay without increases in morbidity or mortality. [15] A few recent studies have compared the costs of early and delayed laparoscopic cholecystectomy. In a decision-tree model on the cost-utility of early versus delayed laparoscopic cholecystectomy for acute cholecystitis, Wilson et al [16] showed that early laparoscopic cholecystectomy is less costly and results in better quality of life. Another decision analytic model from Canada confirmed the better patient quality of life and substantial cost savings in association with early laparoscopic cholecystectomy. [17] On the other hand, in a randomized, controlled trial of 72 patients, the cost-utility of early and elective laparoscopic cholecystectomies was found to be similar. In the present study, we showed that treatment-related costs were lower in the early laparoscopic cholecystectomy group. However, this may be due to a shorter hospitalization duration and lack of conservative treatment in early laparoscopic cholecystectomy.

Conclusion

Despite intraoperative and postoperative complications being associated more with early laparoscopic cholecystectomy compared with delayed intervention, early laparoscopic cholecystectomy should be preferred for treatment of acute cholecystitis because of its advantages of shorter hospital stay.

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