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A study of laparoscopic choleccystectomy for acute cholecystitis

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Abstract
The application of laparoscopic cholecystectomy (Lap. C) for acute cholecystitis (AC) remains controversial from the viewpoint of its higher rate of morbidity, and conversion to open surgery, in spite of the worldwide acceptance of Lap. C as the gold standard for the treatment of patients with symptomatic gallbladder diseases. The conversion rate has been reported to decrease with experience.

Local and overall complication rates were shown to correlate with the time delay between the onset of acute symptoms and the operation. Although percutaneous gallbladder drainage (PGBD) has been reported to be a safe and effective procedure for the treatment of AC, it should be limited to high-risk groups such as elderly or critically ill patients. Early cholecystectomy within 4 days from the onset is strongly recommended to minimize surgical complications and to increase the chance of a successful laparoscopic approach.

Keywords: laparoscopic, cholecystectomy, acute cholecystitis

Introduction

Elective laparoscopic cholecystectomy (Lap. C) using the pneumoperitoneum or abdominal wall-lifting techniques has been the gold standard for symptomatic cholelithiasis [1–4]. However, the laparoscopic approach has remained controversial for patients with acute cholecystitis (AC). Traditionally, acute cholecystitis had been considered to be a contraindication to Lap. C because of the technical difficulties, which might lead to higher complication rates; particularly major duct injuries [5]. The considerable experience acquired at several centers has led laparoscopic surgeons to attempt this approach for acute pathologic conditions [6–8].

In this article, we reviewed recent clinical research to attest the feasibility, safety, and potential benefits of the laparoscopic approach in patients with AC. Furthermore, the optimal timing for surgical intervention was estimated by analyzing the correlation of complication and conversion rates with the time delay between the onset of acute symptoms and the surgical operation.

The overall complication rates of Lap. C for AC range from 9.0% to 15.0%. [9-13]. These rates are similar to the rates historically observed in open series [14]. In a randomized trial, Kiviluoto *et al.* [15] showed that Lap. C for AC was safe and effective, but technically demanding; the postoperative complication rate was significantly lower than that in open cholecystectomy, and there was no death. Similar results have also been reported in nonrandomized trials [12, 16, 17].

Bile duct injury was the most common and most severe complication during Lap. C. [18, 19]. There were several reports of the increased risk of intraoperative injury to the common bile duct (CBD) during Lap. C in the management of AC, at injury rates of 0.7% to 1.3%, [20] with another report of an injury rate as high as 5.5%[6] (Table 1). These rates were comparable with those observed in open surgery for AC [17].

The data seemed to indicate that, just as in open surgery, AC is a risk factor for bile duct injury. However, surgeons must keep in mind that most reports of laparoscopic series performed for AC published in the literature come from experts in endoscopic techniques [22]. Therefore, we strongly recommend intraoperative cholangiography during Lap. C for patients with AC.

Careful interpretation allows for the intraoperative recognition of any damage to the biliary tree and for the diagnosing of CBD stones [20, 22]. Further studies will be needed, in the form of large multicenter trials, to evaluate the safety of Lap. C for AC in general surgical practice.

Feasibility of Lap. C for AC

In the presence of inflammatory conditions, technical difficulties, leading to conversion to open cholecystectomy, may occur and overshadow the advantages of the laparoscopic approach. The feasibility of the laparoscopic technique in the condition of AC was assessed and reported in a number of publications [9-11, 22]. It has been shown that laparoscopy for AC was feasible, with conversion rates ranging from 0.5% to 28%.

The conversion rate with Lap C for AC was evidently greater than that for elective cases. In AC, extensive inflammation, adhesions, and consequent increased oozing would make dissection of Calot's triangle and recognition of the biliary anatomy more hazardous and difficult. These factors were reported to be the most common reasons for conversion [10, 21].

In the literature, risk factors for conversion were postulated to be male sex, age over 65, the severity of the pathological status of the gallbladder, the delay time between the onset of acute symptoms and operation, gallbladder wall thickness of more than 5mm and the laparoscopic experience of the surgeon [16].

Undoubtedly, completion of the laparoscopic procedure for AC is technically more demanding than that in elective cases. The most frequently advocated reason for conversion was the

presence of tight inflammatory adhesions. These adhesions would lead to poor vision of the surgical field, increase in bleeding, and difficulties with the dissection of the cystic duct and artery. A powerful washing and aspiration device may be very important in such situations to improve visualization and allow good identification of the anatomical landmarks.

The following improvement in operative procedure would facilitate laparoscopic surgery for AC; a 25°-to- 30° angled telescope with optimal image equipment, early decompression of the gallbladder by aspiration of its contents, an additional port to retract the colon and/ or duodenum, solid graspers with toothed ends, blunt dissection, positioning in steep reverse Trendelenburg, and left tilt of the operating table.

Abdominal wall lifting is very useful when there are marked adhesions around the gallbladder, as it enables us to use ordinary forceps under direct vision through a small skin incision, if required [22].

Table 1: Injury of CBD during Lap. C for AC

Author	Year	Patients	Rate of injury (%)
Cox et al.[21]	1993	98	1.0
Kum et al.[5]	1996	54	5.5
Adamsen et al.[20]	1997	968	1.3
Suter and Meyer[22]	2001	268	1.1
Navez et al.[24]	2001	609	0.7

CBD, Common bile duct; Lap. C, laparoscopic cholecystectomy; AC, acute cholecystitis

Optimal timing of Lap. C for AC

Several prospective randomized trials revealed that early open cholecystectomy reduced hospital stay and hastened recovery, with no increase in morbidity when compared with initial medical therapy followed by delayed surgery.

Early versus delayed Lap. C for treatment of AC was prospectively evaluated. It has been shown that early Lap. C slightly reduced the operative time and conversion rate, with significant reductions in total hospital stay and hospital charges.

The conversion rates in patients who underwent surgery within and later than 3 days following the onset of symptoms were 27% and 59.5%, respectively, and the total hospital stay was significantly shorter in patients with early Lap. C.

Lo *et al.* and Lai *et al.* have demonstrated that early Lap. C is the preferred approach in the condition of AC. They have shown that an operation within 96h of symptom onset was associated with a significantly lower conversion rate. The boundary was postulated to be 4 days after the initial symptoms, which is in accordance with the findings of other authors and is coincident with the results of Garber *et al.* who demonstrated that an early operation, within the first 4 days, resulted in a lower morbidity rate.

Table 2: Optimal timing of Lap. C for AC

		No. of patients		Conversion (%)		Op time (min)		Complication (%)		Hospital stay (days)	
Author	Year	Early	Delayed	Early	Delayed	Early	Delayed	Early	Delayed	Early	Delayed
Garber et al.[10]	1997	109	85	1.8 <	31.7	100 <	120	2.7 <	13.0	NS	
Eldar et al.[11]	1997	64	56	4.5 <	28.5	NS				NS	
Lo et al.[42]	1998	45	41	11 <	27	NS		13 <	29	6 <	11
Lai et al.[43]	1998	53	51	NS		123	106	NS		7.6 <	11.6
Chandler et al.[40]	2000	21	22	NS		NS		NS		5.4 <	7.1
Pessaux et al.[41]	2000	85	47	27.0 <	59.5	NS		NS		5 <	7.9

NS, Not significant

Gallbladder drainage for AC

Laparoscopic surgery is no longer considered to be a contraindication for AC, and has become the procedure of choice due to decreased morbidity compared with conventional open surgery [16]. However, the appropriate management of AC in critically ill or elderly patients with underlying medical conditions still remains a controversial issue, because high postoperative morbidity and mortality rates were reported in these patients after emergency cholecystectomy.

Tube cholecystostomy followed by a delayed Lap. C, as an alternative treatment, had been proposed for the management of critically ill patients. Since the first report of percutaneous gallbladder drainage (PGBD) in a severely ill patient with empyema of the gallbladder, in 1984, PGBD has been used increasingly in patients with AC as a diagnostic and therapeutic procedure, with a success rate of 100%.

PGBD did not significantly improve, however, the outcome of Lap. C for AC as assessed by conversion and morbidity rates and hospital stay. Although PGBD seems to be a safe and effective emergency procedure for AC, it should be limited to higher risk groups, such as elderly or critically ill patients.

With Lap. C for AC, the postoperative hospital stay was significantly shorter than that with the open approach [11, 12, 15, 16]. The rates of postoperative herniation and wound infections related to emergency surgery can be decreased by employing laparoscopy, and the cosmetic results would doubtlessly be

improved. For these reasons, Lap. C can be beneficial for AC patients as long as it is successfully done.

Conclusion

When performed by an experienced laparoscopic surgeon, Lap. C for AC would be feasible, and as safe as an open cholecystectomy, with significant benefits to the patient. Early cholecystectomy, within 4 days of the onset of acute symptoms, was strongly recommended to minimize surgical complications and to increase the chance of a successful laparoscopic approach.

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