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BRIEF ARTICLES

Outcome of laparoscopic cholecystectomy is not influenced by chronological age in the elderly

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Abstract

AIM: To evaluate the outcome of laparoscopic cholecystectomy (LC) in patients aged 80 years and older.

METHODS: A total of 353 patients aged 65 to 79 years (group 1) and 35 patients aged 80 years and older (group 2) underwent LC. Patients were further classified into two other groups: those with uncomplicated gallbladder disease (group A) or those with complicated gallbladder disease (group B).

RESULTS: There were no significant differences between the age groups (groups 1 and 2) with respect to clinical characteristics such as age, gender, comorbid disease, or disease presentation. Mean operative time, conversion rate, and the incidence of major postoperative complications were similar in groups 1 and 2. However, the percentage of high-risk patients was significantly higher in group 2 than in group 1 (20.0% *vs* 5.7%, $P < 0.01$). Group A comprised 322 patients with a mean age of 71.0 ± 5.3 years, and group B comprised 51 patients with a mean age of 69.9 ± 4.8 years. In group B, mean operative time (78.4 ± 49.3 min *vs* 58.3 ± 35.8 min, $P < 0.01$), mean postoperative hospital stay (7.9 ± 6.5 d *vs* 5.0 ± 3.7 d, $P < 0.01$), and the incidence of major postoperative complications (9.8% *vs* 3.1%, $P < 0.05$) were significantly greater than in group A. The conversion rate tended to be higher in group B, but this difference was not significant.

CONCLUSION: Perioperative outcomes in elderly patients who underwent LC seem to be influenced by the severity of gallbladder disease, and not by chronologic age. In octogenarians, LC should be performed at an earlier, uncomplicated stage of the disease whenever possible to improve perioperative outcomes.

Key words: Elderly; Laparoscopic cholecystectomy; Octogenarians; Gallbladder; Cholecystitis

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INTRODUCTION

The Korean population is steadily aging. The percentage of the population 65 years of age and older was 5.8% in 1995 and was 9.1% in 2005. This age group is expected to grow from 14.3% in 2018 to 20.8% in 2026[1]. The prevalence of gallstone formation increases with age[2]. The reported incidence of cholelithiasis in the very elderly (80 years and older) is as high as 38%-53%[3,4]. This age group has a high incidence of complicated gallstone disease, such as acute cholecystitis, choledocholithiasis, and gallstone pancreatitis[5]. Laparoscopic cholecystectomy (LC) is currently the

procedure of choice for the management of gallbladder disease[6]. Many reports have demonstrated the relative safety and efficacy of LC, with low conversion rates and low postoperative morbidity compared to open cholecystectomy (OC)[7,8]. Currently, LC is being used with increasing frequency in elderly patients. Advanced age may be associated with increased postoperative complications and high conversion rates[9]. However, as life expectancy continues to increase, octogenarians are becoming a growing proportion of the population undergoing LC. Therefore, the purpose of this study was to evaluate the outcome of LC in patients aged 80 years and older compared to patients aged 65 to 79 years.

MATERIALS AND METHODS

Study group

A retrospective analysis of patients aged 65 years and older who underwent LC from November 1991 to January 2006 at Kangbuk Samsung Hospital, Sungkyunkwan University School of Medicine, Seoul, Korea was performed. A total of 353 patients aged 65 to 79 years (group 1) and 35 patients aged 80 years and older (group 2) underwent LC. According to disease presentation, patients were further classified into two other groups: one with uncomplicated gallbladder disease (group A) and one with complicated gallbladder disease (group B). The diagnosis of gallbladder disease was based on a combination of clinical, laboratory, and radiologic findings. The most common imaging techniques used were ultrasonography and computed tomography. The diagnosis was confirmed by pathologic evaluation and surgical inspection. Whenever choledocholithiasis was suspected, preoperative endoscopic retrograde cholangiopancreatography (ERCP) or magnetic resonance cholangiopancreatography (MRCP) was performed. Endoscopic sphincterotomy with stone extraction was performed as needed. Since March 2004, percutaneous transhepatic gallbladder drainage (PTGBD) has been performed at our institution for patients admitted with suspected complicated acute cholecystitis (gallbladder empyema, gangrenous cholecystitis, perforated acute cholecystitis, emphysematous cholecystitis, and pericholecystic abscess).

Surgical technique

All LC procedures were carried out by one surgeon who had previous experience of more than 3000 laparoscopic cholecystectomies, assisted by a resident. A 10-mm Visiport® trocar (Tyco, Norwalk, USA) was inserted at the subumbilical area as the first port site. Two additional laparoscopic cannulae were inserted; one in the right upper quadrant (5 mm) and the other in the epigastric area (12 mm). A soft silastic drain was used in all patients.

Statistical analysis

The clinical characteristics, duration of LC surgery, conversion rate, complication rate, and postoperative hospital stay were analyzed using a statistical analysis program package (SPSS 15.0, SPSS Inc. Chicago, IL, USA). The results are expressed as mean ± SD. The statistical significance of observed differences was tested using the χ^2 test, Fisher's exact test, or Mann-Whitney test. A probability of 0.05 or less was $P < 0.05$ considered statistically significant.

Table 1 Preoperative clinical characteristics *n* (%)

	Group 1, 65-79 yr (*n* = 353)	Group 2, ≥ 80 yr (*n* = 35)	*P* value
Age	69.8 ± 3.7	82.9 ± 2.9	< 0.001
Male	152	13	0.499
Comorbid disease	166 (47.0)	18 (51.4)	0.619
Diabetes mellitus	67 (19.0)	11 (31.4)	0.080
Hypertension	111 (31.4)	6 (25.7)	0.484
Chronic liver disease	9 (2.5)	1 (2.9)	1.000
Ischemic heart disease	4 (1.1)	0 (0.0)	1.000
Cerebrovascular accident	2 (0.6)	0 (0.0)	1.000
Other	10 (2.8)	1 (2.9)	1.000
Diagnosis			
Uncomplicated gallbladder disease	294 (83.3)	28 (80.0)	0.622
Complicated gallbladder disease	47 (13.3)	4 (11.4)	1.000
Gallbladder cancer	12 (3.4)	3 (8.6)	0.144
Preoperative ERCP	33 (9.3)	4 (11.4)	0.761
CBD stone	29 (8.2)	4 (11.4)	0.522
Prior abdominal surgery	78 (22.1)	8 (22.9)	0.918
Preoperative PTGBD	12 (3.4)	1 (2.9)	1.000
ASA score			< 0.01
1 + 2	333 (94.3)	28 (80.0)	
3 + 4	20 (5.7)	7 (20.0)	

ERCP: Endoscopic retrograde cholangiopancreatography; CBD: Common bile duct; PTGBD: Percutaneous transhepatic gallbladder drainage; ASA: American society of anesthesiologists.

RESULTS

Overview of patients

There were no significant differences among the age groups (group 1 and 2) with respect to clinical characteristics such as age, gender, additional disease, and disease presentation. However, the percentage of high-risk patients was significantly higher in group 2 (20.0%) than in group 1 (5.7%). High risk was defined as an American Society of Anesthesiologists (ASA) score of 3 or 4 (Table 1).

Perioperative outcomes

Three hundred and twenty-two patients (group A) underwent LC for uncomplicated gallbladder disease (recurrent biliary colic, gallbladder polyp, and chronic cholecystitis), 51 patients (group B) underwent LC for complicated gallbladder disease (acute cholecystitis, gallbladder empyema, gangrenous cholecystitis, perforated acute cholecystitis, emphysematous cholecystitis, pericholecystic abscess, biliary pancreatitis, and cholangitis), and the remaining 15 patients underwent LC for gallbladder cancer. Not all gallbladder

Table 2 Perioperative outcome according to age group *n* (%)

	Group 1, 65-79 yr (*n* = 353)	Group 2, ≥ 80 yr (*n* = 35)	*P* value
Operative time (min)	60.8 ± 38.4	82.6 ± 47.6	0.087
Conversions	9 (2.5)	2 (5.7)	0.260
Complications	15 (4.2)	2 (5.7)	0.659
Bile leakage	6	1	
Intraabdominal fluid collection	3	1	
Wound infection	3	0	
Subumbilical wound hernia	1	0	
Bleeding	2	0	
Postoperative hospital stay (d)	5.5 ± 4.2	5.1 ± 4.0	0.873

cancers were diagnosed before surgery. One patient in group 1 had a pT2 tumor and underwent complete radical surgery of the gallbladder bed with lymph node dissection. Preoperative PTGBD was performed for 12 patients in group 1 and for one patient in group 2. The timing of LC in patients with acute cholecystitis was variable (early, delayed, or scheduled after PTGBD) according to clinical factors such as specialist or operating theater availability and the patient's medical condition.

Mean operative time and the conversion rate to OC were similar for the two age groups. The reasons for conversion were difficulty in gallbladder exposure or dissection at the Calot triangle because of dense adhesions. The incidence of major postoperative complications was similar in the two groups; 15 patients in group 1 (4.2%) and 2 patients in group 2 (5.7%). Six patients in group 1 and one patient in group 2 developed bile leakage after surgery. All patients were treated conservatively and the leakage subsided spontaneously within 7 d. Three patients in group 1 and one in group 2 had intraabdominal fluid collection; all patients were treated by ultrasound-guided percutaneous catheter drainage and parenteral antibiotics. Two patients in group 1 presented with bloody discharge from the subhepatic silastic drain on the first postoperative day, but the bleeding was controlled conservatively without blood transfusion. Postoperative wound infection occurred in three patients in group 1. One patient in group 1 developed a subumbilical wound hernia (10 mm cannula wound), which was surgically treated. The length of postoperative hospital stay was similar in the two groups (Table 2).

Group A (uncomplicated gallbladder disease) comprised 322 patients with a mean age of 71.0 ± 5.3 years, and group B (complicated gallbladder disease) comprised 51 patients with a mean age of 69.9 ± 4.8 years. In group B, the mean operative time was 78.4 ± 49.3 min, and this was significantly longer than that in group A (58.3 ± 35.8 min, $P < 0.01$). The incidence of major postoperative complications was significantly higher (9.8% *vs* 3.1%, $P < 0.05$) and mean postoperative hospital stay was significantly longer (7.9 ± 6.5 d *vs* 5.0 ± 3.7 d, $P < 0.01$) in group B compared to group A. The conversion rate tended to be higher in group B (5.9%) compared to group A (2.2%), but this difference was not significant ($P = 0.144$) (Table 3).

Table 3 Perioperative outcome according to disease presentation *n* (%)

	Group A (*n* = 322) Uncomplicated	Group B (*n* = 51) Complicated	*P* value
Age	71.0 ± 5.3	69.9 ± 4.8	0.125
Preoperative WBC count (/mm^3)	7048 ± 2166	11 928 ± 4269	< 0.001
Operative time (min)	58.3 ± 35.8	78.4 ± 49.3	< 0.01
Conversions	7 (2.2)	3 (5.9)	0.144
Complications	10 (3.1)	5 (9.8)	< 0.05
Postoperative hospital stay (d)	5.0 ± 3.7	7.9 ± 6.5	< 0.01

DISCUSSION

Gallbladder disease is the most common indication for abdominal surgery in the elderly[4,10,11]. In Korea, the age distribution of gallstones shows a peak incidence in the seventh decade and common bile duct stones show a peak incidence in the eighth decade[12]. Management of gallstones is important in the elderly because of a high rate of complicated biliary disease, increased postoperative morbidity, and prolonged hospital stay compared to younger patients[13,14]. However, recent reports have documented a mortality rate of 0% after LC in octogenarians[15,16]. In the present study, the mortality rate was 0% in octogenarians, with a 5.7% morbidity rate. This morbidity rate was comparable to that found in other studies (2.2-18.5%)[15-18]. Furthermore, there were no significant differences in operative time, conversion rate, complication rate, and postoperative hospital stay between the two age groups (group 1 *vs* group 2). The only difference observed was in the preoperative ASA score. Kwon *et al*[17] also found that there were no significant differences in the conversion rate, morbidity, mortality, and length of hospital stay between a group aged 65 to 79 years and a group aged ≥ 80 years. However, Pavlidis *et al*[16] reported that LC in the very elderly was associated with a higher conversion rate, increased morbidity, and longer hospital stay. Conversion to OC and postoperative complications may be associated with severe complicated gallbladder disease[19]. In the present study, operative time, postoperative complication rate, and postoperative hospital stay were also greater in patients who underwent LC for complicated gallbladder disease. In uncomplicated gallbladder disease, the overall conversion rate to OC was only 2.2% and the postoperative complication rate was also lower (3.1% *vs* 9.8%). These results may indicate that perioperative outcome is not influenced by chronologic age in the elderly, but is influenced by disease presentation.

When LC is performed in patients with severe cholecystitis, the rate of conversion to open surgery and postoperative complications is usually high. The

rate of conversion to open surgery in cases of severe cholecystitis is 8.7%-35%[20-23]. The complication rate associated with LC performed for acute cholecystitis ranges from 3% to 40%[19-22,24,25]. Therefore, since March 2004, we have adopted a protocol that includes PTGBD in patients admitted with suspected complicated acute cholecystitis (gallbladder empyema, gangrenous cholecystitis, perforated acute cholecystitis, emphysematous cholecystitis and pericholecystic abscess). Twelve patients in group 1 (3.4%) and one patient in group 2 (2.9%) underwent PTGBD before LC, and the conversion rate to OC was zero in both groups. Watanabe *et al*[26] reported that the combination of ultrasonography-guided PTGBD and LC was a safe and effective treatment for patients with acute suppurative cholecystitis. There were age no conversions to OC when LC was performed at a mean of 34.3 d after PTGBD. Moreover, a conversion rate of 3% was observed in patients who underwent surgery for acute cholecystitis 4 d after PTGBD[27]. In the present study, preoperative PTGBD may have had a positive effect on LC in complicated gallbladder disease.

Preoperative ERCP was performed in 33 patients in group 1 (9.3%) and 4 patients in group 2 (11.4%) who had clinical, laboratory, and radiological suspicion of choledocholithiasis, and 29 (87.9%) and 4 (100.0%), respectively, had common bile duct stones. All these patients underwent successful endoscopic sphincterotomy with stone extraction. The reported incidence of choledocholithiasis rises with age (26% and 43% in patients aged 65-79 years and 80-95 years, respectively)[10]. Therefore, preoperative ERCP in the elderly should be performed for patients with clinical, laboratory, and radiological suspicion of choledocholithiasis.

If elderly patients tend to have higher conversion and postoperative complication rates, and a longer postoperative hospital stay, this may be due to a higher incidence of complicated gallbladder disease[15]. In the present study, there was no difference in disease presentation between the two age groups; complicated gallbladder disease was 13.3% in group 1 and 11.4% in group 2. Therefore, despite higher ASA scores in group 2, perioperative outcomes might not be significantly different between the two groups.

In conclusion, perioperative outcomes in the elderly seem to be influenced by the severity of gallbladder disease, and not by chronologic age. In the very elderly, such as octogenarians, LC is also relatively safe, with acceptable morbidity compared to elderly patients younger than 80 years of age, if they have uncomplicated gallbladder disease. Therefore, in this age group, LC should be performed at an earlier, uncomplicated stage of the disease as often as possible to improve perioperative outcomes.

COMMENTS

Background

The Korean population is steadily aging. As life expectancy continues to increase, octogenarians are becoming a growing proportion of the population undergoing laparoscopic cholecystectomy (LC).

Research frontiers

Perioperative outcomes in the elderly seem to be influenced by the severity of gallbladder disease, and not by chronologic age. LC is relatively safe in the very elderly, such as octogenarians.

Related publications

Many reports have demonstrated the relative safety and efficacy of LC, with low conversion rates and low postoperative morbidity compared to open cholecystectomy. Currently, LC is being used with increasing frequency in elderly patients. Advanced age may be associated with increased postoperative complications and high conversion rates.

Innovations and breakthroughs

If elderly patients tend to have higher conversion and postoperative complication rates, and a longer postoperative hospital stay, this may be due to a higher incidence of complicated gallbladder disease.

Applications

In the very elderly, LC should be performed at an earlier, uncomplicated stage of the disease as often as possible to improve perioperative outcomes.

Peer review

The authors reported that outcome of LC is not influenced by chronologic age. This result is interesting.

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