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Original Article

The analysis of 146 patients with difficult laparoscopic cholecystectomy

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Abstract: Introduction: Laparoscopic cholecystectomy (LC) is very commonly performed surgical intervention. Acute or chronic cholecystitis, adhesions due to previous upper abdomen surgeries, Mirrizi's syndrome and obesity are common clinical conditions that can be associated with difficult cholecystectomy. In this study, we evaluated and scored the patients with difficult surgical exploration during laparoscopic cholecystectomy. Material and Method: All patients who underwent LC from 2010 to 2015 were retrospectively rewieved. According to intraoperative findings DLC cases were described and classified. Class I difficulty: Adhesion of omentum majus, transverse colon, duodenum to the fundus of the gallbladder. Class II difficulty: Adhesions in Calot's triangle and difficulty in dissection of cystic artery and cystic duct Class III difficulty: Difficulty in dissection of gallbladder bed (scleroathrophic gallbladder, hemorrhage from liver during dissection of gallbladder, chirotic liver). Class IV difficulty: Difficulty in exploration of gallbladder due to intraabdominal adhesions including technical problems. Results: A total of 146 patients were operated with DLC. The most common difficulty type was Class I difficulty (88 patients/60.2%). Laparoscopic cholecystectomy was converted to laparotomy in 98 patients. Operation time was found to be related with conversion to open surgery ($P<0.05$). Wound infection rate was also statistically higher in conversion group ($P<0.05$). The opertion time was found to be longest with Class II difficulty. Conversion rate to open surgery was also highest with Class II difficulty group. Conclusion: Class II difficulty characterized by severe adhesions in calot's triangle is most serious problem among all DLC cases. They have longer operation time and higher conversion rate.

Keywords: Laparoscopic cholecystectomy, difficulty, analysis

Introduction

Laparoscopic cholecystectomy (LC) is one of the most commonly performed operation in surgical practice. It has generally accepted advantages, like a more comfortable, less painful postoperative period and a more rapid return to normal activities. Safe dissection is most important component of successfull LC. Acute or chronic cholecystitis, adhesions due to previous upper abdomen surgeries, Mirrizi's syndrome and obesity are common clinical conditions that can be associated with difficult cholecystectomy.

Difficult laparoscopic cholecystectomy is a distressing condition. The definition of (DLC) is not well established and may vary according to experience of surgeon. Several entities during LC may be accepted as DLC like increased operation time [1-3], difficulty in dissection of Calot's triangle or gallbladder and complications occuring during cholecystectomy.

There is no clear information in the literature about the scoring and classification of difficulty in LC specially related with operative findings. In this study, the aim was to evaluate and score the patients with difficult surgical exploration during laparoscopic cholecystectomy.

Material and method

All patients who underwent LC from 2010 to 2015 were retrospectively rewieved. Medical history and routine physical examination were carried out in all patients. Complete hemogram, liver function tests, Gama Glutamile Transferase, Alkalene phosphatase, Bilirubins were measured. Abdominal Ultrasonography (USG) were performed. Magnetic resonance cholangiography was performed in any patients with

Table 1. Demographic findings in patients with DLC

Parameter	Mean values Number (%)	Range
Age	55.5±15.2	24-86
Gender	62 Male/84 Female	
Symptoms		
Abdominal Pain	98 (67.1%)	
Nausea/Vomiting	44 (30.1%)	
History of acute cholecystitis	42 (28.7%)	
History of acute pancreatitis	24 (16.4%)	
Physical examination		
Normal	72 (49.3%)	
Tenderness in RUQ*	26 (17.8%)	

Table 2. Classification of difficulty in LC

Difficulty	Number of patients (%)
Class I Difficulty	88 (60.2%)
Class II Difficulty	10 (6.8%)
Class III Difficulty	24 (16.4%)
Class IV Difficulty	24 (16.4%)

suspicous of choledocholithiasis. The laparoscopic cholecystectomy was performed by surgeons at our clinic experienced in laparoscopic surgery. The each operation was defined as DLC according to the following criteria:

● Operation time longer than 75 minutes from insertion of veress niddle to the extraction of gallbladder.

● Any adhesion that was preventing exploration of gallbladder fundus and calot's triangle including intraabdominal adhesions from any reason.

c-Technical problems that were prolonged the operation time d-Problems with dissection of gallbladder from liver bed. According to intraoperative findings DLC cases were described and classified. Class I difficulty: Adhesion of omentum majus, transverse colon, duodenum to the fundus of the gallbladder. Class II difficulty: Adhesions in Calot's triangle and difficulty in dissection of cystic artery and cystic duct Class III difficulty: Difficulty in dissection of gallbladder bed (scleroathrophic gallbladder, hemorrhage from liver during dissection of gallbladder, chirotic liver). Class IV difficulty: Difficulty in exploration of gallbladder due to intraabdominal adhesions including technical problems.

Statistical analysis

Statistical analysis was performed by SPSS. Statistical software version 17.0 (SPSS Inc., Chicago, IL, USA). All continuous data were expressed as mean ± Standard Deviation (SD).

Results

A total of 146 patients were operated with DLC. There were 62 men and 84 women. The most common symptom was abdominal pain (98 patients-67.1%). Thirty four patients were evaluated preoperatively with MRCP due to suspicion of choledocholithiasis. There was only two patient diagnosed with choledocholithiasis. The demographic characteristics of patients were shown in **Table 1**. The most common difficulty type was Class I difficulty (88 patients/60.2%). All patients with difficulty classificaton were shown in **Table 2**. Laparoscopic cholecystectomy was converted to laparotomy in 98 patients. The comparison of patients whose operation had been finished with LC and converted to open surgery was shown in **Tables 3** and **4**. Operation time was found to be related with conversion to open surgery ($P<0.05$). Wound infection rate was also statistically higher in conversion group ($P<0.05$).

The opertion time was found to be shortest with Class I difficulty (**Figure 2**). Conversion rate to open surgery was also highest with Class II difficulty group (**Figure 1**). Wound infection was detected in 18 patients in conversion group. There was no wound infection in LC group. Transient biliary fistula was detected in two patient in each group. These fistulas were successfully treated with conservative measures.

Discussion

Difficult laparoscopic cholecystectomy has became a current problem after the widespread application of laparoscopic surgery. There is no clear and agreed definition about DLC.

Longer operation time, difficulty in explorating calot's triangle, conversion to open surgery are conditions that are usually termed as DLC by many surgeon. In the begining of LC, many conditions were accepted as contraindication

Table 3. Comparison of patients operated succesfully with LC and converted to open surgery

	Operated with LC (n=48)	Converted to open surgery (n=98)	*P* Value
Age	54.9±3.3	55.4±2.1	0.9
Male/Female	18/30	44/54	0.5
Duration of symptoms (day)	378±161	271±79	0.9
Symptoms			
Abdominal pain	42	56	0.1
Floatness	14	8	0.02*
Nouse/Vomiting	12	32	0.5
Acute cholecystitis	10	32	0.3
Acute pancreatitis	8	16	0.9
Number of Stones			
Single	18	28	0.5
Multiple	30	70	
Size of Stone			0.4
>1 cm	38	68	
Milimetrical	10	30	
Physical examination Murphy (+)	4	10	0.8
Operation time (minute)	76.7±4.6	130.4±5.7	<0.0001*
Complication (Wound infection)	0	18	0.03*

Table 4. Comparison of biochemical results between two groups

	Operated with LC (n=48)	Converted to open surgery (n=98)	P
AST	38.1±6.1	28.9±2.6	0.3
ALT	37.8±6.1	33.7±4.1	0.6
ALP	83.3±5.1	81.4±3.9	0.9
GGT	51.8±5.8	53.8±6.4	0.9
Amilaz	69.5±4.8	59.7±3.2	0.1
Total bilirubin	0.23±0.02	0.26±0.02	0.4

for laparoscopy including acute cholecystitis, empyema, Mirizzi's syndrome. A lot of cases that has been classified as DLC before, has been succesfully treated with LC, after the advences in laparoscopic skills in last years. The convertion rate to open surgery in LC has declined to 2-6% [4].

The major goal of this study was to classified the DLC cases according to operation findings. We also compared the patients treated with LC and converted to open surgery. The risks factors for convertion to open surgery in LC has been widely investigated [5-12]. Age, sex ASA score, Body mass index, previous abdominal surgery, history of cholecystitis and pancreatitis, increased in biliary obstructive enzymes (Gama glutamate transferase and Alkalene phosphatase) are most commonly studied factors for conversion to open surgery. Advanced age was found to be a important risk factor in many studies [6, 8-10]. It was stated that comorbidities in older people were associated with conversion. Male sex was also reported as a risk factor [13, 14]. When comparing two groups in our study (laparoscopically finished or converted to open surgery) we found that conversion rate was higher in patients with longer operation time.

We classified the DLC cases as class I to class IV according to the operation findings. The most common type of DLC was class I difficulty. Omentum, transverse colon and duodenum were detected organs in many patients while omentum was the most common organ with adhesion to fundus of the gallbladder. The omental adhesions were easily dissected in many patients. The conversion rate was minimum in these type of difficulty. The operation time was also shortest in this group. The conversion rate to open surgery was highest in class II difficulty. While only one choleduct injury has been occured during operation in this serial other patients were converted to open surgery due to avoiding an injury to biliary tree. The operation time was longest in classII and class IV difficulty. Intraabdominal adhesions and technical problems seems to be important problems that increased the operation time. Lal P et al reported a serial of DLC in 146 patients. The most common reason for conversion to open surgery was difficulties in dissection of cystic duct and artery in calot's triangle [15].

Many studies about DLC are related with acute cholecystitis in the literature [16-20]. Nowadays most of the patients with acute cholecystitis can be operated laparoscopically without laparotomy. There were no patients with acute cholecystitis during exploration in our serial. While

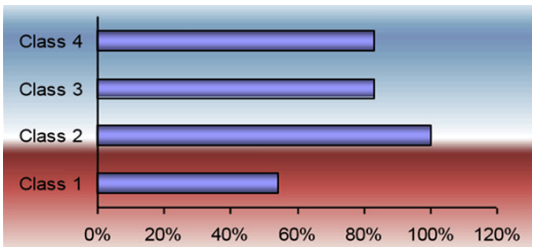

Figure 1. Conversion rate to open surgery in each difficulty class.

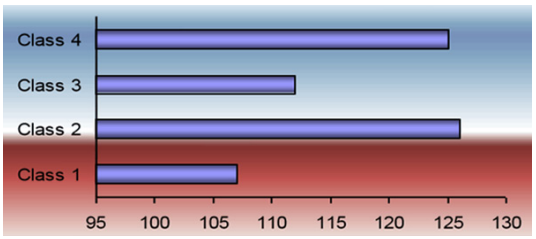

Figure 2. Operation time (minute) in each difficulty class.

any patient with acute cholecystitis is candidate for difficult cholecystectomy, it should be classified and managed as a different clinical entity.

There was no major biliary injury in our patients. Two transient biliary fistula were observed and successfully treated with conservative measures. There was eigtheen wound infection in converted group. There was no wound infections in patients treated with laparoscopic cholecystectomy. The difference was statistically significant.

In conclusion, Laparoscopic cholecystectomy has became one of the most commonly performed surgical operation worldwide. More DLC cases are encountered. The classification of DLC can be beneficial in terms of prediciting conversion to open surgery and postoperative complications. In this study, the most common difficulty type was class I difficulty which is mainly characterized by adhesions to the fundus of the gallbladder. Laparoscopic cholecystectomy was successfully performed about half of these cases. Class II difficulty characterized by severe adhesions in calot's triangle is most serious problem among all DLC cases. They have longer operation time and higher conversion rate. Larger clinical series investigating specially class II difficulty can be beneficial in management of DLC.

Disclosure of conflict of interest

None.

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