

# Conversion Of Laparoscopic Cholecystectomy

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## Abstract

This study has aim to reduce the risk of postoperative complications of surgical treatment of patients with acute cholecystitis on the base of elaboration of optimal tactics of laparoscopic cholecystectomy. This study has been performed on the base of research results of 162 patients with acute cholecystitis who had laparoscopic cholecystectomy finished with conversion cholecystectomy. Clinical experience of using traditional and conversion laparoscopic surgery in patients with acute and chronic cholecystitis, with cholelithiasis has been integrated on this material, and also comparative assessment of this methods performed. The analysis of the causes of conversion of the laparoscopic cholecystectomy to traditional cholecystectomy done, and also estimate of probability of such conversion has been implemented. Complex of organizational-methodical and tactical-technical prevention measures of intra- and postoperative complications of traditional and conversion Endosurgery has been worked out and introduced by authors.

**Keywords:** acute cholecystitis, chronic cholecystitis, gallstone disease, laparoscopy, laparoscopic cholecystectomy, conversion.

## I. Introduction.

At this moment laparoscopic surgery is used in the all world and it is one of the best methods of the surgical treatment. The obvious question is: do not endovideosurgers have reassessment of opportunities of this method? According to the some authors, complications due to laparoscopic cholecystectomy are up to 24.5%, and mortality is 1.1% (Sopuev et al., 2012; Ukhanov et al., 2010; Mamakeev et al., 1998; Tajibaev & Nomanbekov, 2008; Le et al., 2012). In the 3-14% cases of the complications of laparoscopic cholecystectomy it is necessary to perform open surgery (Gyulaliev et al., 2010; Zvyagintsev et al., 2010; Ivanov et al., 2007; Anand et al., 2007).

In pursuance of aforecited, finding a significance of the conversion of the laparoscopic cholecystectomy to traditional cholecystectomy and determination of role of this conversion in the decreasing the postoperative complications after cholecystectomy is important scientific and clinical task.

**Aim of the study:** decreasing of risk of the postoperative complications after cholecystectomy based on the development of optimal completion tactics in laparoscopic cholecystectomy.

## II. Materials and methods of research.

Materials are 3434 patients` data with acute and chronic cholecystitis, with cholelithiasis, who had laparoscopic cholecystectomy (2000-2012 years) (Table 1).

**Table 1.** Distribution of patients by age and sex.

Sex	Total		Age					
	Abs.	%	<20	21-30	31-40	41-50	51-60	>60
Male	489	14.2	2	16	85	122	95	169
Female	2945	85.8	30	240	523	684	628	840
Total	3434	100	32 (0.9%)	256 (7.5%)	608 (17.7%)	806 (23.5%)	723 (21.1%)	1009 (29.3%)

Males were 14.2%, females were 85.8%. If we consider age aspect, then at the age up to 20 years there were 32 (0.9%) patients, at the age of 30-60 years were 2137 patients (62.2%). Patients over 60 years of age were 1009 (29.3%). 21.1% of patients were at the age of 50-60 years.

More than half of patients were at the age over 50. 2671 (77.8%) patients had acute cholecystitis. 763 (22.2%) patients had chronic cholecystitis. Thus, laparoscopic cholecystectomy in the case of acute cholecystitis performed 3,5 time as many, than in chronic cholecystitis. 574 (21.5%) patients were operated due to acute catarrhal cholecystitis, 1788 (66.9%) patients - acute phlegmonous cholecystitis and 309 (11.6%) patients - acute gangrenous cholecystitis. 2097 (78.5%) patients had destructive forms of acute cholecystitis.

Main clinical material of study is clinical findings of 162 patients with acute cholecystitis, who had laparoscopic cholecystectomy finished by conversion cholecystectomy. The vast majority of patients were femals (80.3%), and also elderly and senile persons (83.3%). In most patients (62.7%) acute phlegmonous cholecystitis was found. 16% patients had acute gangrenous cholecystitis. 14.9% patients had complicated cholelithiasis.

We used generally accepted methods of examination, as well as methods of examination used in gastroenterology and surgery. Ultrasound examination of the liver and bile ducts (with the device of company "Olympus" (Japan)), and also laparoscopy (with the device Auto-Suture) were performed by generally accepted methods.

### III. Results and Discussion.

Depending on the stage of development and implementation of laparoscopic cholecystectomy in National Surgery Center all operated patients were divided into 2 clinical groups. 1446 (54.1%) patients with acute cholecystitis are included into

the control group, who operated in the period of time 2000-2008 years. It was time of active mastering of laparoscopic cholecystectomy and elaboration of optimal term of operation, and indications and contraindications were being reviewed. 1225 (45.9%) patients with acute cholecystitis operated in the period of time 2009-2012 years were included into the main group.

In the control group among 1446 patients 17.9% were male and 82.1% were female. 42% of patients were at the age >60 years old, including 11% of patients >70 years old. 30% of patients in this group had severe concomitant diseases. 7 females were operated during pregnancy 20-24 weeks.

72.7% of patients hospitalized 24 hours after illness onset had destructive changes in the gall bladder (acute phlegmonous cholecystitis in 88.6% of patients and acute gangrenous cholecystitis in 11.3%). In 64.3% of patients in this group clinical manifestations delayed from dynamic of morphological changes in the gall bladder. Most of the laparoscopic cholecystectomy (60.8%) done on the day of hospitalization, and before 48 hours from the day of hospitalization operated 94.6% of patients and only 5.4% of patients operated in 48-72 hours from the day of hospitalization.

Cholecystectomy with laparoscopic method increased from 11.5% in 2000 year up to 94.5% in 2012 year. Significant technical difficulties found during laparoscopic cholecystectomy in 40.2% of patients with acute cholecystitis. According to absolute indications the transition to conversion laparoscopic cholecystectomy had been made in 80.2% of cases, and out of prudence in 19.8% of cases. Out of prudence conversion laparoscopic cholecystectomy was used due to impossibility of differentiation of anatomical structures, in view of pronounced inflammatory process in the area of the hepatoduodenal ligament, pronounced

adhesive process in the area of operation, gangrene of the gall bladder in 47% of cases.

Intraoperative complications during laparoscopic cholecystectomy arised in 70 (4.8%) patients. Postoperative complications occurred in 3.1% of patients, among them bile flow from the bed of the gallbladder, infiltrates or abscesses of the bed of the gallbladder and subhepatic space. Relaparotomy performed for 10 patients (0.6%) due to subdiaphragmatic and subhepatic abscesses, failure of choledochoduodenostoma, strictures of the choledochus, failure of the stump of the cystic duct.

In the main group we used modified method of laparoscopic cholecystectomy consisting of 3 approaches. An endograsper is carried out through the laparoport, which performs traction of the neck and the Hartmann pouch of the gallbladder, and on the stage of dissection of the gallbladder from the its fossa-rotation and traction without fixing the fundus of the gallbladder. When adhesive process is pronounced in the subhepatic space adhesiolysis and dissection of the gallbladder from its bed could be performed using only 2 instruments. Adhesiolysis is performed also with coagulation hook or scissors. In the case of diffuse bleeding

hemostasis is done when it just started using electrocoagulation. Infiltrated gallbladder is removed in cellophane or plastic bag through the trocar in the epigastric region. When gallbladder is full, at first we do puncture and evacuate the bile, after remove the gallbladder from the abdominal cavity. At the present time we fix the neck of the gallbladder with extractor extracting the gallbladder together with the trocar tube.

We compared results of operation of 162 patients with acute cholecystitis, who had conversion cholecystectomy with the data of patients of control group, who had traditional cholecystectomy.

83.3% of patients with acute cholecystitis, who had conversion cholecystectomy were hospitalized 72 hours after illness onset. The same regularity was found also in the control group, in which most of patients operated 48-72 hours after illness onset. Depending on the timing of laparoscopic cholecystectomy after illness onset patients were divided into the 4 subgroups. **A** subgroup of patients operated before 24 illness onset, **B** subgroup-operated during 24-48 hours, **C** subgroup-operated during 48-72 hours and **D** subgroup-operated after 72 hours illness onset (Table 2).

**Table 2.** Distribution of patients depending on the time of operation after illness onset.

Subgroups	Control group		Main group		Total	
	Abs.	%	Abs.	%	Abs.	%
A	145	11.3	3	1.9	148	10.2
B	224	17.5	8	4.9	232	16.1
C	385	29.9	16	9.9	401	27.7
D	530	41.3	135	83.3	665	46
Total	1284	100	162	100	1446	100

The laparoscopic cholecystectomy was performed in 227 (17.7%) patients with acute catarrhal cholecystitis, in 925 (72.0%) patients with acute phlegmonous cholecystitis and in 132 (10.3%) patients with acute gangrenous cholecystitis.

In the main group, the proportion of conversion cholecystectomy due to acute phlegmonous cholecystitis was 53.1%, and for acute gangrenous cholecystitis – 45.7%. Thus, the conversion of laparoscopic cholecystectomy was mainly used for acute phlegmonous and

gangrenous cholecystitis. Majority of the conversion of laparoscopic cholecystectomy were in patients operated 72 hours after onset of the disease. If, in general, in 665 (46.0%) patients laparoscopic cholecystectomy was performed later than 72 hours from onset of the disease, 135 (20.3%) patients of them had conversion cholecystectomy.

Bleeding from the cystic artery was observed in 26 patients. In 6 (0.5%) cases bleeding was arrested by re-clipping the cystic artery. Bleeding from the gallbladder bed was

observed in 23 patients. Conversion was required for 3 (0.2%) of them, while in 20 (1.3%) patients bleeding was arrested with the help of fibrin-collagen substance and "DNT" hemostatic gauze. Bleeding from blood vessels of anterior abdominal wall occurred in 2 (0.1%) patients. Stump failure of cystic duct was in 5 (0.3%) patients. Bile leakage from the gallbladder bed occurred in 9 patients. In 6 of them, bile leakage was stopped by coagulation and clipping of additional ducts. In other 3 cases, bile leakage was stopped using laparotomy approach. Damage to the choledochus occurred in 11 patients, in 9 of them immediate conversion to conversion cholecystectomy was performed. With the

accumulation of experience in the subsequent in 2 cases it was possible to drain choledochus endoscopically. Both patients were discharged with recovery after removal of drainage for 6-8 days after surgery.

In 2 cases, conversion was resorted due to damage to the portal vein and in 1 case of damage to the external iliac vein. An error in diathermocoagulation of small bleeding tissues in choledochoduodenal zone was cause of damage to the portal vein. At the moment of manipulation by one of the trocars the external iliac vein was damaged. In all cases, an emergency conversion to traditional cholecystectomy was performed, and vascular sutures were applied (Table 3).

**Table 3.** Distribution of patients depending on the nature of intraoperative complications entailed the use of conversion cholecystectomy.

Complications	Conversion completed		Correction was managed		Total	
	Abs.	%	Abs.	%	Abs.	%
Intraoperative complications	45	3.1	34	2.3	79	5.4
Failure of the cystic duct stump	5	0.3	-	-	5	0.3
Bleeding from blood vessels of anterior abdominal wall	2	0.1	-	-	2	0.1
Bleeding from the cystic artery	20	1.3	6	0.5	26	1.8
Bleeding from the gallbladder bed	3	0.2	20	1.4	23	1.6
Bile leakage from the gallbladder bed	3	0.2	6	0.4	9	0.6
Damage to the portal vein	2	0.1	-	-	2	0.1
Damage to the external iliac vein	1	0.07	-	-	1	0.07
Damage to the choledochus	9	0.6	2	0.1	11	0.7

Getting experience, the number of conversion cholecystectomy decreased from year to year. From 2009 year the share of conversions decreased to 1.5%.

In 25 patients biliary hypertension was found. In 23 cases conversion cholecystectomy was performed, while in 2 patients with severe condition endoscopic cannulation of the

choledochus and external drainage were done. 57 patients had adhesions in the subhepatic space and hepatoduodenal zone. In 21 cases it was possible to separate the gallbladder and elements of the hepatoduodenal ligament by adhesiolysis. Other 36 patients we operated with conversion cholecystectomy (Table 4).

**Table 4.** Distribution of patients depending on the nature of the detected pathology.

The nature of pathology	Conversion completed		Correction was managed		Total	
	Abs.	%	Abs.	%	Abs.	%
The stone of choledoch	23	1.6	2	0.1	25	1.7
Infiltrate in the area of the cystic duct	42	2.9	23	1.6	65	4.5
Adhesions in the area of the hepatoduodenal	36	2.5	21	1.4	57	3.9

ligament						
Vater's papilla cancer	1	0.07	-	-	1	0.07
Sclerosis of gallbladder	11	0.7	8	0.5	19	1.2
Echinococcosis of the liver	2	0.1	-	-	2	0.1
Choledochoduodenal fistula	2	0.1	-	-	2	0.1

Vater's papilla cancer, as well as liver echinococcosis were found during laparoscopic revision in 3 patients.

Sclerotic gallbladder was observed in 19 patients. In 11 cases, due to the impossibility of isolation conversion cholecystectomy was done. In the other 8 cases with technical difficulties laparoscopic cholecystectomy successfully was completed. In 2 patients with choledochoduodenal fistula, external drainage of the common bile duct with suturing of the duodenal wall was performed.

Postoperative complications occurred in 45 (3.1%) patients. In 23 cases it was possible to complete the laparoscopic cholecystectomy with difficulties. Among such cases, bile leakage from the bed of the gallbladder in 6 patients, elimination of perivesical abscess and abscess of the subhepatic space - in 12 patients were done.

Relaparotomy was performed in 10 patients (0.6%) due to: subdiaphragmatic and subhepatic abscesses, choledochoduodenostoma failure, choledochal stricture, failure of the cystic duct stump. In the first case, an abscess of the subhepatic space was sanitized by cannulation and drainage of the purulent cavity. Infiltrate in the bed of the gallbladder occurred in 7 patients. Pneumonia was observed in 6 patients. Mortality in the postoperative period occurred in 3 (0.2%) patients.

After conversion cholecystectomy, the postoperative period was complicated in 23 patients. Among them there were subhepatic hematoma in 1 patient, bile leakage in 8, biloma - in 1 patient; infiltrate in the area of the bed of the gallbladder in 3 patients.

As our practice has shown, the reasons for conversions in most cases were the presence of a wrinkled gallbladder with a pronounced cicatricial adhesive or infiltrative process in the area of the gallbladder neck, which made it difficult to differentiate the elements of the

Calot's triangle. In these cases, an early transition to traditional cholecystectomy is recommended.

The vast majority of complications in the postoperative period occurred in patients in whom the conversion was undertaken in terms of more than 30 minutes (in 56 of 66 patients). As for the nature of the complications with a conversion time of up to 30 minutes, they are easily corrected during treatment (bile leakage from the gallbladder bed, suppuration of postoperative wound, infiltrate in the area of the gallbladder bed).

In the main group, we see a decrease in the conversion rate from 11.2% to 1.5%, intraoperative complications - from 4.8% to 1.5%, postoperative complications - from 3.1% to 1.7%, and there were no lethal outcome.

#### IV. Conclusions.

1. The conversion cholecystectomy is an effective way of tactical and technical prevention of intraoperative complications in patients with acute cholecystitis. The main reason for conversion is errors of preoperative ultrasound examination, as well as technical difficulties for laparoscopic cholecystectomy due to local tissue changes or anatomical features of the elements in the operation area. In this regard, conversion cholecystectomy was performed in 80.2% of patients in absolute indications, and in 19.8% - in relative indications.

2. In 46% of patients, laparoscopic cholecystectomy was performed within 72 hours from the onset of the disease, in 20.3% of which had to recur to conversion cholecystectomy. At the same time, the postoperative period was complicated in 5.3% patients. Moreover, the vast majority of complications in the postoperative period arose in patients in whom the conversion was carried out in terms of less than 30 minutes.

3. The experience of scrupulous, thorough performance of all stages of laparoscopic cholecystectomy, taking into account the

anatomical variants of the extrahepatic biliary tract, gallbladder, vessels in the area of operation, the nature of the pathological process and other factors. Inflammatory periproces and infiltrate in the area of the hepatoduodenal ligament, gangrene of the gallbladder, bleeding from the gallbladder bed are the most important arguments for accepting decisions about using of conversion cholecystectomy.

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