

LAPAROSCOPIC CHOLECYSTECTOMY IN ACUTE GANGRENOUS CHOLECYSTITIS

The clinic, laboratorial, intraoperative, and morphologic findings of 482 patients with acute gangrenous cholecystitis have been studied. There were 162 men (33.6%) and 320 (67.4%) women at the age of 15-91 years, with average 55.3 ± 6.5 years old. 218 patients were operated by laparoscopic method, traditional access was provided in 264 patients. Conversion was performed in 17 from 218 cases (7.8%). Postoperative complications made 8.3% and 13.6% in both groups respectively. Intraoperative complication during laparoscopic cholecystectomy (common bile duct injury) occurred in 1 (0.46%) patient operated at the fifth day since the commencement of disease. Conversions and complications reduction was provided by the offered technical improvements of laparoscopic cholecystectomy such as a change of the points of trocars injection, using the modified instruments for the tissues dissection, gallbladder mobilization and hemostasis.

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Introduction

The increase of cholelithiasis sickness rate (ChL) is followed by increasing of its complicated forms such as acute cholecystitis, choledocholithiasis, cholangitis, stenosing papillitis, biliary pancreatitis; these forms are found in 30-45% of patients (Korolev and Pikovskiy, 1990; Galperin, 1983; Nazirov et al., 2006). Search of methods improving the results of early diagnostics and surgical treatment of acute cholecystitis (ACh) and its complications led to wide usage of endo-visual technologies (Mosyagin et al., 2000; Sheyko et al., 2009; Saurland, 2006).

Acute gangrenous cholecystitis (AGCh) intra-operatively occurs in patients from 2% up to 31% cases (Khadjibaev et al., 2004; Ram et al., 2000; Morfin et al., 1968; Singer and Mckeen, 1994; Croley, 1992; Hunt and Chu, 2000; Merriam et al. 1999). Despite of a high rate of conversions a successful laparocholecystectomy (LChE) always gives a better result (Galperin, 1983; Saurland, 2006; Malton et al., 2006).

Material and methods

In this research we retrospectively examined our experience of laparoscopic cholecystectomy (LChE) in treating patients with AGCh. Since April 2002 up to June 2010 the 8326 patients with clinical diagnosis "Acute cholecystitis" were admitted to our clinic. 5678 (68.2%) of them were performed laparoscopic and conventional operations. The clinic, laboratorial, intraoperative and pathologoanatomic findings were studied and subgroup with AGCh (482; 8,5%) was determined. 218 patients have been operated by laparoscopy and 264 ones have been performed conventional operations.

Totally there were 162 males (33.6%) and 320 females (67.4%) aged from 15 to 91 years, average age was 55.3 ± 6.5 . Misdiagnoses had been made in 36 (7.5%) patients. It should be noted that the greatest difficulties in diagnostics of ACh both at pre-hospital and in-hospital stages have been occurred in patients of middle and old age. Thus, diagnosis of ACh presented certain difficulties in some cases both at pre-hospital stage and in hospitalization moment.

Average duration of disease from the moment of the first symptoms up to visiting and hospitalization to clinic consisted 2.4 ± 0.75 years; 246 (51%) patients had disease duration from 1 to 3 years. Average prolongation of attacks before the admission formed 3.3 and 3.6 days in laparoscopic and conversional groups correspondingly.

Clinical presentations included in itself an acute pain in the right subcostal area (98%), increasing white blood cells count (91%), increasing of body temperature (16.3%) and jaundice (9%). The leading in clinical presentation of disease in all the patients was the pain syndrome, and the attack of acute cholecystitis arose in 165 (34.2%) patients for the first time. In other patients pain attacks typical for ChL were noted in the period from 2 months up to 28 years, and 45% of them were once treated in hospital, 28.3% - twice-thrice and other - more than three times. Thus, 67.9% of patients were early hospitalized with ACh, they have been performed conservative treatment, but further an aggravation was developed again which required more active therapeutic tactics.

Analysis of hepatic function revealed increase of AST levels (20.4%), ALT (22.7%) and total bilirubin (9%) in blood serum. Leucocytosis (more than 10 thou/ml) presented in 441 from 482 cases (91.5%). Fever (body temperature more than 38) was noted in 89 (18.5%) patients. Ultrasonography showed presence of gallstones (88.6%), gallbladder's wall thickening (72.3%) and a presence of paravesical liquid (20.5%). In 301 (62.5%) patients the severity of general habitus was sufficiently aggravated by a presence of concomitant diseases and it has increased a risk of the supposing operative intervention.

Different forms of peritonitis were revealed in 385 (79.9%) from 482 patients with acute gangrenous cholecystitis.

Gangrenous-perforative form was determined in 14 (2.9%) patients. In 356 (73.9%) cases the prevalence of peritonitis had local transsudative, and in 29 (6.0%) cases - diffuse peculiarities. Among them, in 286 patients it was noted serous character of exudate, in 89 patients - serous-bilious, in 10 - purulent, fibrinous exudate.

Laparocholecystectomy was successfully performed in 201 (92.2%) from 218 cases. Conversion was also successfully performed in 17 cases from 218 (7.8%) ones.

Duration of laparoscopic operations varied from 35 up to 300 minutes averaging 75.0 ± 6.1 minutes. Half of all interventions has the duration of 55-65 minutes (quartile amplitude Q25%-Q75%), and median was 60 minutes.

Statistical data manipulation (determination of average arithmetical M; standard error of average arithmetical m; Student's t distribution was measured with the use of Excel program (Microsoft, USA). Reliability criterion was $P < 0.05$.

Results

Laparoscopic cholecystectomy was successfully performed in 201 from 218 AGCh patients. Conversion was made in 17 from 218 (7.8%) cases.

An attempt of laparoscopic dissection of paravesical infiltrate and scar tissues was made in all the patients from the main (LChE) group. Being convinced of unsuccessful endoscopic manipulations in 17 (7.8%) patients we passed on to laparotomy approach.

Modified method of laparoscopic cholecystectomy with the use of three 10 mm trocars has been made in 57 AGCh patients. Introduction points of trocars into abdominal cavity were the following:

1. The 1st trocar for optical system was introduced paraumbilically;
2. The 2nd trocar for using of operating tools was introduced epigastrally;
3. The 3rd trocar was introduced 4 cm lower the right costal margin in a point between median subclavicular and anterior axillary lines. Through this trocar was introduced a 10 mm firm Babcock forceps.

After puncture and evacuation of gallbladder content the last one is caught by Babcock forceps in the area of neck and it is conducted a traction upwards and medial. Then with the use of forceps-dissector there is a subserous separation of the lateral gallbladder wall and Hartman pocket. Gradually moving Babcock forceps on the separated area of Hartman pocket it is performed a preparation of a bladder duct towards from gallbladder wall to a side of fusion with general hepatic duct. Then medial wall of gallbladder is separated. Cystic duct was dissected, clipped and intersected. Cystic artery was also prepared, clipped and intersected. Then gall bladder was subserously separated from neck and extracted out through epigastral puncture. The use of this method allowed to reduce a number of conversions from 7.8 to 3.8%.

The most serious intraoperative complication occurred in 1 (0.46%) patient operated five days later from the beginning of disease: during dissection of paravesical infiltrate the general bile duct was damaged.

Among patients being operated by us, we have noted a suppuration of place where the epigastral trocar was set in 9 (4.1%) patients. It is possibly connected with that exactly this puncture was exposed the extension and suturing aponeurosis and also the infection during extraction of the remote gallbladder. To prevent this complication we recommend to extract gallbladder in container in all the cases. Suppuration of postoperative wound in CChE group was observed in 7.95% patients.

Comparatively (LChE versus CChE) postoperative complications are presented in Table 1. Percentage of postoperative complications in LChE group is lower than in CChE one (8.3% and 13.6% respectively).

TABLE 1. POSTOPERATIVE COMPLICATIONS IN LChE AND CChE GROUPS

Indices	LChE n=218		CChE n=264	
	n	%	n	%
Intraperitoneal bleedings	2	0.9	-	-
Bile effusion through drainage	4	1.9	3	1.14
Bilious peritonitis	1	0.46	1	0.38
Subhepatic abscess	1	0.46	3	1.14
Wound suppuration	9	4.1	21	7.95
Pneumonia	1	0.46	5	1.9
Myocardial infarction	-	-	2	0.76
Postoperative lethality	0	0	1	0.38
Total complications	18	8.3	36	13.6

TABLE 2. RESULTS OF BOTH GROUPS TREATMENT IN COMPARATIVE ASPECT, N=482

Parameter	Laparoscopic cholecystectomy (n=218)	Conventional cholecystectomy (n=264)	P Teste Wilkinson
	Md (±SD)	Md (±SD)	
Average duration of operation	75.0±17.33minutes	85.0±20.00 minutes	<0.0001
Average stay in ICU	14.0±2.03 hours	36.0+4.99 hours	<0.0001
Average hospital stay	14.0+2.03 days	36.0+4.99 days	<0.0001

Only 9.2% patients in LChE group required treatment in ICU, but 82.6% patients in CChE group need to be stayed in ICU and it that averaged, 6 days (P=0.018).

Postoperative hospital stay also sufficiently differed in these two groups. The patients being performed successful LChE were discharged from hospital in average 3.6 days after operation while patients in conventional group required hospital stay 6.5 days (P<0.001 (Table 2).

Discussion

Acute gangrenous cholecystitis (AGCh) as it was mentioned above, presented from 2% up to 31% patients being performed cholecystectomy with preoperative diagnosis "acute cholecystitis" (Khadjibaev et al., 2004; Fahim et al., 2000; Morfin et al., 1968; Singer and Mckeen, 1994; Croley, 1992; Hunt and Chu, 2000; Merriam et al., 1999). According to our data this form of Ach has been revealed in 8.5% patients. AGCh is more often appears as the result of obstruction of cystic duct by concrement (Korollev and Pikovskiy, 1990). Constant obstruction leads to increasing of intracystic pressure, ischemia and epithelial necrosis and development of pathogenic bacterial flora in gallbladder wall (Korollev and Pikovskiy, 1990; Galperin, 1983).

Due to non-specific clinical and laboratorial findings the diagnostics of AGCh remains a dilemma for operating surgeons. AGCh in old-aged patients is diagnosed with difficulty thereof such patients have an erased clinical picture of disease. Degree of morphologic changes in gallbladder does not often correspond to clinical presentations of disease, especially to the intensity of pains in abdomen (Ukhanov et al., 2009). Consequences of late diagnostics of AGCh in patients of middle and old age result to increasing of mortality to 3.7% and postoperative complications achieve 40% (Korollev and Pikovskiy, 1990).

Despite of great technical difficulties and increase the risk of laparoscopic operation in AGCh laparoscopic cholecystectomy (LChE) was successfully made by us in most cases. But most reports present results of LChE in catarrhal and/or phlegmonous forms of acute cholecystitis and gangrenous form presents in a small quantity of patients (Mosyagin et al., 2000; Nazirov et al., 2006).

Such clinical presentations of AGCh as pains in the right subcostal area, fever and leucocytosis do not differ from acute simple cholecystitis. Jaundice that is seldom occur in acute simple cholecystitis was noted in 44 of 485 (9%) patients. Laboratory data including biochemical indexes of hepatic test are non - specific.

USD of abdominal organs is a method of choice. While the presence of concrements in gallbladder, thickening of its wall and paravesical liquid are the most widespread ultrasound data, but these signs also do not differ catarrhal form of ACh from the gangrenous one. The presence of double gallbladder wall and unclear boundaries of it are the most specific for gangrenous form of acute cholecystitis (ACh) (Teefey and Baron, 1991). One of the reliable signs is the wedging stone in gallbladder neck which we have observed in 88% patients with AGCh. Therefore, being based on clinical, laboratorial, instrumental findings the preoperative diagnosis of AGCh was verified only in 56 from 485 (11.5 %) patients.

Technical aspects of LChE in non-complicated calculous cholecystitis are rather well studied and worked out, but in ACh operation has its peculiarities and difficulties. In the process of accumulating our experience we have mastered and proposed to use some modes allowing to avoid "headaches" arising during intervention.

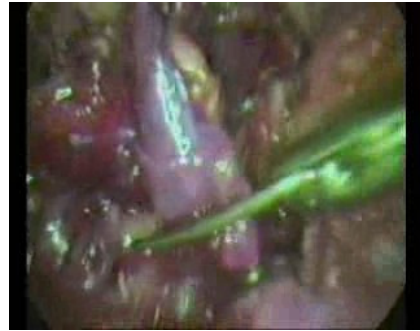
In some cases infiltration, thickening of gallbladder wall achieve such grade that it is getting impossible to hold it even with powerful forceps, attempts to fix organ result to "spreading" and potential perforation of its destructively changed wall. In such situations we recommend to suture widely a wall of fundus area with "II"- shaped suture. Then ligature is gripped with forceps and used for organ traction. In the area of gallbladder neck it is often managed to grip and hold a wall with 10-mm Babcock forceps, but this mode of suturing may be also used in difficult cases.

More often we have observed the necrosis of gallbladder wall in area of Hartman sphincter and sometimes with spreading of necrosis into initial parts of cystic duct. In such cases it is obligatory to separate a healthy area of cystic duct and its further clipping and intersection (Figures 1 and 2).

FIGURE 1. SEPARATION OF NECROTIZING GALLBLADDER NECK AND DUCTUS CYSTICUS



FIGURE 2. CLIPPING OF HEALTHY AREA OF DUCTUS CYSTICUS



Modified method of LChE with the use of three 10 mm trocars has been used by us in 57 AGCh patients. The main advantage of original method is to extend the possibilities of safe tissues dissection. It allowed shortening reliably the quantity of contra-indications to operation and intraoperative complications. We succeeded in reducing percentage of conversions from 7.8% up to 3.8% by using this method.

Taking into account rather low percentage of failures at dissection of cicatricial infiltrative adhesions with the use of endoscopic technology (3.8%) we think that an attempt of LChE may be taken in all the cases. In most cases gangrenous changes were restricted by particular areas of gallbladder. Adequate healthy tissue usually presented in proximal parts of body and neck. It was taken into account for safe separation in Calot's triangle area. If the whole gallbladder was necrotized or there was an evident inflammatory process, dense infiltrate in the given anatomic area that can be badly prepared endoscopically, it should be used a laparotomy to avoid of sufficient increase operation time and accidental injury of the involved organs.

As Ach's complications start to present on the 4th day of disease we have come to conclusion that LChE should be better performed before the presentation of ACh complications - the first 72 hours from the beginning of disease. In later terms it should be differentiate and evaluate not only character of local changes but also own experience as well as technical equipment (Nazirov et al., 2007).

Irrespectively from the character of inflammatory process we resort in all cases to single-stage radical operation. No one case in our observations showed the indications to multi-stage operations. Not being absolute opponents of two-stage method of treatment in destructive cholecystitis we consider that indications to it may be absolutely restricted. Two-stage method of treatment may be practically recommended for inoperable patients.

Conclusion

Acute gangrenous cholecystitis is not contra-indication to LChE. Therapeutic resources of laparoscopic techniques in 96.2% cases allow performing cholecystectomy successfully. Offered technical improvements of LChE containing changes in the points of placing trocars, using modified instruments for dissection of tissues, techniques of mobilization of gallbladder and hemostasis contribute to lowering the quantity of conversions (from 7.8% to 3.8%) and a number of intra - and postoperative complications.

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