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**Main long-term negative results (surgical complications) after biliary tract surgery for cholelithiasis**

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**Summary:** Today, not “complicated” cholecystolithiasis (CCLT) is treated by laparoscopic cholecystectomy (LCHEC) in up to 95-98.7% of cases, choledocholithiasis (CDL) and stenosis of the papilla of Vater (SPV), mainly by endoscopic papillasphincterotomy (EPST), laparoscopic choledocholithotomy (LCDLT) up to 75 - 85%, and sometimes also by laparoscopic choledochoduodenostomy (LCDA), etc. If these operations cannot be performed or they were inadequate, then surgeons are forced to use the open variants of these operations.

**Keywords:** Cholelithiasis (GI), laparoscopic cholecystectomy (LCHEC), endoscopic papillosphincterotomy (EPST), choledocholithotomy (CLT), choledochodenoanastomosis (CDA), papillosphincterotomy (PST), laparoscopic choledocholithotomy (LCDLT), transduodenal papillosphincteroplasty (TDPSP), benign stenosis of the Vater nipple (DSFS), terminal part of the choledochus (TCH), Nipple Vater (FS), obstruction of the terminal part (OTP), common bile duct (CBD, Vater’s papilla stenosis (VPS).

**Relevance of the work.** Everywhere today the main forms of biliary tract disease, such as cholelithiasis (CLT) - calculus cholecystitis (CCLT), obstruction of patency (OP) of the terminal part (TP) of the common bile duct (CBD) and Vater's papilla (VP), due to choledocholithiasis (CDL) and stenosis of the papilla of Vater (SPV) are successfully diagnosed (by clinical laboratory examination, ultrasound, CT, MRI, cholangiography, RPCG, etc.) and is treated mainly by laparoscopic cholecystectomy (LCHEC) in up to 95-98.7% of cases ((1, 8, 9), choledocholithiasis (CDL) and SPV, mainly, by (through) endoscopic or interoperative papillosphincterotomy (EPST or IOPST), laparoscopic choledocholithotomy (LCDLT) up to 75 - 87% and recently, for the same indication, a number of surgeons ( have begun to widely use laparoscopic choledochoduodenostomy (LCDA), etc. Recently, a number of surgeons have begun to widely use laparoscopic choledochoduodenostomy (LCDA) for the same indication [2,3,7,16,21]

If the above mentioned operations (endoscopic, laparoscopic, etc.) can’t be performed or they were inadequate, then surgeons are forced to use opening methods of these operations, such as opening (O) variants of CHEC (OCHEC), choledocholithotomy (OCDLT), choledochoduodenostomy (OCDA), papillosphincterotomy (OPST), papillosphincteroplasty (OPSP), etc.

But the long-term results of some of them (especially CHEC, CDLT, EPST and CDA, regardless of whether they were performed open or laparoscopically) are not yet fully positive [4,5,12,14,16] (encouraging)-- are not always positive yet (not yet fully comforting), due to the development of recurrent or residual CDL, SPV, even allegedly carried out (it should be especially emphasized) for UC CCLT. Without even mentioning such a high percentage of the so-called controversial concept as “postcholecystectomy syndrome” (PCHECS), occurring in up to 51.3% or more cases [11,15,20,22]. Which force patients to continue treatment after surgery, even sometimes they undergo re-operation, mainly for recurrent (repeated) or remaining (residual) CDL

and SPV up to 10 - 15% [20,22]. This means that there are still some problems in the diagnosis and treatment of this pathology.

**Purpose of the study.** To improve the quality of treatment of patients operated on for CLT. by identifying some of the reasons for unsatisfactory results of surgical treatment requiring repeated operations.

**Research objectives.** To find out some of the reasons for the unsatisfactory results of existing methods of surgical treatment of CLT, requiring repeated operations.

**Materials and research methods.** We and our staff have performed more than 14,000 LHEK (after 1994) and 5,084 OHEK (mostly before 1995), regarding NO HTsLT, 97 - OCDLT and 36 LHDLT, 461 - OHDA, 38 OPST, 974-OPSP and 337 open double internal drainage (ODID) of the biliary tract (GBT), i.e., OPSP + OHDA were performed for CDL and SPS (see Table 1).

After them, 1688 patients returned again due to their condition not improving after surgery. Of these, 1603 patients were after CHEC, 46 after CDLT, 39 after CDA. More than half of whom (858 patients) required a comprehensive examination (Clinical and laboratory examination, ultrasound, gastroduodenoscopy, contrast X-ray examination of the gastrointestinal tract, RPCG, MRI cholangiography, etc.) for PCHECS.

At the same time, in 162 patients after CHEC, CDL and SPV were detected, and they were re-operated and underwent EPST (128 cases) with sanitation (removal of stones) of the bile ducts. In 34 patients who failed to adequately perform EPST (with repeated attempts to remove, more often than not, large multiple, fissured - strangulated stones from the bile ducts), opening surgery was performed (OPST or OPSP and CDA), especially in more advanced - severity cases (with 3 degrees of pathology) disease (see Table 1), which occurs more often in our regions. Due to the late presentation appeal - receipt of patients for CCLT. The remaining patients continue conservative treatment for chronic pancreatitis, cholangitis, hepatitis, gastroduodenitis, etc.

Table 1  
Basic methods of treatment of CLT

	During 1972-1994 y.	After 1994y
OCHEC	5 084	102
LCHEC -	-	14,098
OCHDLT	97	8
LCHDLT	=	36
OHDA	430	46
OPST	38	-
OPSP	946	28
DVD	228	119
Total	6 3 2 3	14 4 3 7

After them, 2088 patients returned again due to their condition not improving after surgery. Of these, 1822 patients were after CHEC (из них 522 после и 1300 после...), 66 after CDLT, 239 after CDA. More than half of whom (1358 patients) required a comprehensive examination (Clinical and laboratory examination, ultrasound, gastroduodenoscopy, contrast X-ray examination of the gastrointestinal tract, RPCG, MRI cholangiography, etc.) for PCHECS.

At the same time, in 664 patients after CHEC, 76 больных после ХДА и 72 после

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CDLT were detected, CDL and SPV and they were re-operated and underwent EPST (418 cases) with sanitation (removal of stones) of the bile ducts. In 96 patients who failed to adequately perform EPST (with repeated attempts to remove, more often than not, large multiple, fissured - strangulated stones from the bile ducts), opening surgery was performed (OPST or OPSP and CDA), especially in more advanced - severity cases (with 3 degrees of pathology) disease (see Table 1), which occurs more often in our regions. Due to the late presentation appeal - receipt of patients for CCLT. The remaining patients continue conservative treatment including for chronic pancreatitis, cholangitis, hepatitis, gastroduodenitis, etc. obstruction of patency (OP) of the terminal part of the common bile duct (TCH) and Vater's papilla (PS) due to choledocholithiasis (CHL) and Vater's stenosis

**Table 2.**

The main signs of OP TP CBD and VP due to CDL and VPS in cholangiography (ERCP, MRCP, intraoperative cholangiogram etc.), cholangioscopy, choledochoscopy, balloon cholangiopapillography and probing.

Investigations	Degrees of the OTP CBD and the VP		
	I	II	III
Intraoperative/on table cholangiogram, choledochoscopy, balloon cholangiopapillography			
Narrowing of the TP CBD and the VP(in mm)	> 2-1	>1	< 1
Flow of the radiocontrast agent through the VP	Mildly decreased	Mod erate to severely decreased	Sev erely decreased or no flow
Dilatation of the CBD (in mm)	< 15	15-19	>20
Probe	4 mm probe is not passing but 3 mm probe is passing with some effort.	3 mm probe is not passing	-
Choledochoscopy	Luminal narrowing of the TP CBD and the VP due to inflammatory-fibrotic deformity, polyps, lack of "motor play" of the terminal CBD and the sphincter of the VP. Choledochoscope does not pass through the VP.		

**The discussion of the results.** As is known, CHEC (LCHEC or OCHEC) is indicated

only for UC CCLT, i.e. without obvious (noticeable, clear) signs of CDL and SPV (i.e., in the absence of signs of obstructive jaundice, visible (noticeable) dilatation of the diameter of CBD, stones in it, etc.). CDLT and EPST for CDL with - or without SPV, and CDA or DVD of BT in advanced (with 2 and especially 3 degrees) cases (see table 1) of pathology CDL and SPV(6, 10,11, 17, 19 и др.

Thanks to these operations, CLT (CCLT, CDL, SPV, etc.) is supposedly (evidently) completely eliminated. If so, then what is such a common reason for the development of CDL and SPV, including after LCHEC performed for UC CCLT, not to mention other unknown causes of PCHECS...!?

At the same time, after adequate OPSP and DVD of BT, despite their use in more advanced - complicated forms of CLT, as well as after unsuccessful performing or inadequate EPST or OCDT, OCDA, reports on the frequency of recurrent or residual CDL and SPV in periodicals much less often (and, in our practice, were not observed at all). Moreover, their long-term results turned out to be much better than even after LCHEC performed for UC CCLT. The results were even worse after CDLT with bougienage of SPV and CDA.

All this suggests that during LCHEC (for UC CCLT) , CDLT and CDA performed (carried out), for CDL and SPV, do not there remain undiagnosed CDLT and SPV remain (after LHEC, CDLT and CDA) and inadequate correction of the pathology as a result of EPST, CDLT and CDA....!?

It should be emphasized that today the diagnosis of CCLT and CDL, and (also) their treatment by LCHEC, LCDLT and EPST are generally accepted, without any serious disagreement. Therefore, more often than not, the true residual nature of CDL after LCHEC, it seems to us that CDL should not be so great (at least, it is unlikely), and as for SPV, supposedly its main cause is considered to be CCLT CDL, it also seems to be radically eliminated by LCHECS. If so, then where do recurrent or residual CDL and SPV come from...!?

If during CLT (CCLT and CDL) diagnostic errors do not occur in 2-3%, and in the diagnosis of SPV there are almost no such clear established data, i.e., the frequency of SPV during CLT ranges from 1-5% to 30 – 45% or more.

As is known, most authors believe that SPV as a complication of CLT - CCLT and CDL. They are eliminated by LCHEC (CCLT), and CDL by CDLT and EPST...! And after PSP and DVD of BT there is practically no relapse and there is no residual CDL and SPV.

Therefore, it seems to us that the main problem in this pathology, all such often lies not adequately eliminated bile stasis, but precisely at the level of VP, leading to repeated bile stasis. not only served as the cause of relapse of the pathology, and even at the beginning of CLT. Although many believe that the main causes of CLT are, first of all, dyscholia, inflammation, and then stagnation of bile. There is no doubt about it.

But, with dyscholia and inflammation, the sudden appearance of significantly large stones (more than 1.5 - 2 - 3 mm), often delayed and growing in size and increasing in number in the gallbladder and especially in the bile ducts, is difficult to imagine, given the data below.

Since, naturally, gallstones initially appear in the form of “microlites” - in the form of “biliary sludge” or stones of small size (up to 1 – 1.5 – 2 mm) and they should migrate freely along the bile flow from the gallbladder to common bile duct, further and especially through the VP into the duodenum, if there are no obstacles in the VP area leading to bile stasis (in the bile ducts).

Since, with an intact biliary system, the diameter of the narrowest parts of the bile ducts, which are the cystic duct and VP, is always larger than these microliths - small stones, which on average are 2 - 4 mm and 3 - 6 mm, respectively. For example, with intact bile ducts (on a corpse), 3-4 mm probes are often difficult to pass through the cystic duct into the common bile duct, but they pass through the VP almost without any difficulty. And when identifying stones in the bile ducts, it's the other way around.

It should be noted here that if there are stones in the gallbladder smaller than the diameter of the cystic duct, such stones are almost always found in the hepaticocholedochus (especially, during transillumination), very often especially in the ampulla of the VP during choledochoscopy.

Stones migrated from the gallbladder through a narrow (2-4 mm in diameter) and relatively long (15 – 30 – 60 ... mm) duct (often tortuous) should pass freely - migrate through a relatively wide (3- 6 mm in diameter) - and a short (from 4 – 25 mm) channel of the VP, moreover, the bile outflow from the VP into the duodenum is much faster than through the cystic duct. Moreover, after LCHEC, i.e. after elimination (as it is considered), the main thing is the main formation of stones, including their removal from the bile ducts, by LCDLT and EPST, we can say that CLT is almost completely eliminated. Then what is the cause of recurrent or residual CDL and SPV...!?

According to the leading Ukrainian hepatologist Professor N.B. Gubergritsa, after CHEC (supposedly done for “uncomplicated” calculous cholecystitis), at least 55% of patients are not completely cured of the disease, and in her monograph published in 2007 (“Chronic abdominal-biliary pain” M., 2007. 420 p.), PCHES was noted in up to 87% of cases).

Based on this, it can be assumed that at the beginning of the pathology (as a trigger for the disease (cholelithiasis), it seems to us that it often lies in the VP, leading to bile stasis in the bile ducts, primarily in the gallbladder, taking into account its large volume - as a keeper - of the reservoir bile.

During inadequate activation of digestion, i.e. disorderly eating (in a flash, at the wrong time, without desire - without appetite, stressful situations, physical inactivity, etc.) and as a result of insufficient work of the sphincter apparatus of the VP (dysfunction, spasms, papillitis, etc.) it seems to us that bile is mostly emptied from the extravascular bile ducts, while not having time to completely empty the gallbladder. This leads to thickening of the bile and the formation of microliths - and then stones with their retention, of course, at the beginning of the gallbladder. The constant migration of stones through the cystic duct, especially through an altered VP, aggravates the change in VP (this is a universally recognized mechanism for the development of this pathology...!) with their subsequent accumulation in the common bile duct...!

This means that timely removal of the gallbladder seems to break this vicious circle in most cases, significantly preventing and stopping the further development of the pathology - continued stone formation and its complications, but it turns out that this is not always the case - and not always effective (see top...!) .

As is known, diagnoses of CDL and especially SPV are often based on the degree of expansion of the diameter of the hepaticocholedochus and the presence of jaundice (at admission or in history, more often during an attack of biliary colic). As for jaundice, it can be absent in CDL and SPV up to 50% (. ....). It seems to us that the degree of expansion of the hepaticocholedochus also requires some clarification.

As is known, with intact bile ducts, the diameter of the hepaticocholedochus does not exceed 4–8 mm, and during LCHEC, the diameter of the hepaticocholedochus in almost more than half of the cases is 8–10 mm, and often up to 11–12 mm. Surgery usually completes the LCHEC operation in such cases, If a stone is not clearly identified in the hepaticocholedochus and SPS.

If for a given patient the initial diameter of the hepaticocholedochus was 4-6 mm, then during LCHEC the diameter of the hepaticocholedochus was detected to be 8 - 12 mm, which occurs in more than half of the cases, then it turns out to be dilated almost 2 - 3 times. As for choledocholithiasis (which is also considered one of the main signs of SPV), it is often detected even with a non-dilated common bile duct in up to 10 - 15% of cases.

This means that not the absence of jaundice, the expansion of the hepaticocholedochus (8 – 10 – 12 mm considered normal in many publications) and stones in the common bile duct does not exclude the diagnosis of SPV. What is evidenced by the presence of a fairly high percentage of recurrent or residual CDL and SPV...!?, even after LCHEC performed for uncomplicated CCLT.

This means that primary operations on the biliary tract are performed on time (especially during LCHEC, CDLT and CDA) or are not diagnosed (given the residual - recurrent nature of the pathology) or are not adequately corrected during the procedure. This means it is necessary to develop more advanced diagnostic methods and treatment of CLT complicated by CDL and especially SPV.

**Summary:** Today, not “complicated” cholecystolithiasis (CCLT) is treated by laparoscopic cholecystectomy (LCHEC) in up to 95-98.7% of cases, choledocholithiasis (CDL) and stenosis of the papilla of Vater (SPV), mainly by endoscopic papillasphincterotomy (EPST), laparoscopic choledocholithotomy (LCDLT) up to 75 - 85%, and sometimes also by laparoscopic choledochoduodenostomy (LCDA), etc. If these operations cannot be performed or they were inadequate, then surgeons are forced to use the open of variants of these operations.

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