

7-1-2018

THE ANALYSIS OF SURGICAL TREATMENT OF POST-TRAUMATIC SCAR STRICTURES OF MAGISTERIAL BILE DUCTS AND BILIODIGESTIVE ANASTOMOSES

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Recommended Citation

Akbarov, M.M. (2018) "THE ANALYSIS OF SURGICAL TREATMENT OF POST-TRAUMATIC SCAR STRICTURES OF MAGISTERIAL BILE DUCTS AND BILIODIGESTIVE ANASTOMOSES," *Central Asian Journal of Medicine*: Vol. 2018 : Iss. 2 , Article 13.

Available at: <https://uzjournals.edu.uz/tma/vol2018/iss2/13>

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UDC: 616.367-003.92-089.86-89

Title of the article in the Uzbek language:

МАГИСТРАЛ ЎТ ЙЎЛЛАРИ (МУЙ) ВА
БИЛИОДИГЕСТИВ АНАСТАМОЗЛАРДА (БДА)
ТРАВМАДАН КЕЙИНГИ ЧАНДИҚЛИ
СТРИКТУРАЛАРНИ ХИРУРГИК ДАВО
НАТИЖАЛАРИНИНГ ТАҲЛИЛИ

Title of the article in Russian language:

АНАЛИЗ РЕЗУЛЬТАТОВ ХИРУРГИЧЕСКОГО
ЛЕЧЕНИЯ ПОСТТРАВМАТИЧЕСКИХ
РУБЦОВЫХ СТРИКТУР МАГИСТРАЛЬНЫХ
ЖЕЛЧНЫХ ПРОТОКОВ И
БИЛИОДИГЕСТИВНЫХ АНАСТОМОЗОВ

THE ANALYSIS OF SURGICAL TREATMENT OF POST-TRAUMATIC SCAR
STRICTURES OF MAGISTERIAL BILE DUCTS AND BILIODIGESTIVE
ANASTOMOSES

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Калит сўзлар: марказий ўт йўллар,
билиодегестив ўт йўллар,
рентгенобиллиар амалиёт,
трансжигар каркас дренажлаш,
гепатикохоледох,
гепатикоюналанастомоз, тери-
жигар орқали холангография,
эндоскопик ретроград
панкреотохолонгиография.

АННОТАЦИЯ

Мақсад: 153 нафар МУЙ операциядан кейинги чандиқли стриктураси ва олдин БДА ўтказилган беморларнинг бевосита ва узоқ муддатларидаги натижаларини баҳолаш. **Материал ва усуллар:** текширув асоси бўлиб 2000 йилдан 2015 йилгача Академик В.Вахидов номидги Республика Хирургия илмий текшириши марказида магистрал ўт йўлларини травмадан кейинги стриктураси (134 нафар касал – 87,6 %), шунингдек, БДА нинг чандиқли стенози (19 нафар касал – 12,4 %) бўйича операция қилинган беморлар ётади. **Натижа:** 129 (84,3 %) ҳолатда реконструктив оператив амалиёт бажарилган, шулардан: 125 та ГепЕА, 4 та ГепДА қилинган. ББА қайта тиклаш операцияси 13 та касалда (8,5 %) ва рентгенэндобиллиар амалиёт (РЕБА) 11 (7,2 %) нафар касалда ўтказилган. **Хулоса:** марказий ўт йўллари чандиқли стриктурасида танлов операцияси Ру бўйича ГепЕА ҳисобланади. Стриктура сатҳи, ҳосил қилинган анастомоз диаметри ва ТЖКД ишлатилиши ГепЕА нинг узоқ кутиладиган

натижалари муваффақияти ҳисобланади. ТЖКД сиз ГенЕА даволаш натижаларини яхшилайти, бироқ бу усулни ўт йулларининг юқори сатҳдаги стриктураларида қўллаб бўлмайти.

Информация о статье

Принят: январь 2018 г.

Опубликовано: июль 2018 г.

Ключевые слова: магистральный желчный проток, билиодигестивных анастомоз, рентгенэндобилиарные вмешательства, транспеченочная каркасная дренирования, гепатикохоледох, гепатикодуоденоанастомоз, гепатикоюноанастомоз, чрескожная чреспеченочная холангиография, эндоскопическая ретроградная панкреатохолангиография.

Article info

Adopted: January 2018

Published: July 2018

Key words: magisterial bile duct, biliodigestive anastomosis, X-ray endobiliary interference, transhepatic carcass drainage, hepaticocholedoch, hepatocoduodenoanastomosis, hepatocojunoanastomosis, percutaneous transhepatic biliary drainage, endoscopic retrograde cholangiopancreatography.

АННОТАЦИЯ

Цель исследования. Оценить результаты непосредственных и отдаленных наблюдений 153 больных с послеоперационными рубцовыми стриктурами МЖП и ранее наложенными БДА. **Материалы и методы.** В основу исследования включены результаты лечения 153 пациентов оперированных в Республиканском специализированном Центре хирургии им. академика В. Вахидова с посттравматическими рубцовыми стриктурами магистральных желчных протоков (МЖП) (134 больных - 87,6%), а также с рубцовыми стенозами БДА (19 больных - 12,4%), сформированных ранее в связи с травмой МЖП в сроки с 2000 по 2015 год. **Результаты.** Реконструктивные оперативные вмешательства были выполнены в 129 (84,3%) наблюдениях: ГенЕА – 125, ГенДА – 4. Восстановительные операции – ББА выполнен у 13 (8,5%) и рентгенэндобилиарные вмешательства (РЭБВ) у 11 (7,2%) больных. **Выводы.** Операцией выбора при рубцовых стриктурах МЖП является ГенЕА по Ру. Основными условиями, влияющими на отдаленные результаты ГенЕА, являются уровень стриктуры, диаметр сформированного анастомоза и использование ТПКД. ГенЕА без ТПКД улучшает результаты лечения, однако от этой методики приходится отказываться у значительной части больных с высокими стриктурами желчных протоков.

ABSTRACT

Objective. To estimate the results of direct and remote observations of 153 patients with post-operative scar strictures of MBD and early imposed BDA. **Materials and Methods:** The treatment results of 153 patients operated in Republican Specialized Center of surgery named after academician V. Vachidov with post-traumatic scar strictures of magisterial bile ducts (MBD) (134 patients – 87.6%), and with scar stenosis of BDA (19 patients – 12.4%), early formed because of trauma of MBD in the period from 2000 to 2015 were included. **Results:** Reconstructive operative interventions were performed in 129 (84.3%) patients: HepJA – 125, HepDA – 4. Recovery operations – BBA were done 13 (8.5%) and X-ray endobiliary intervention (XREBI) in 11 (7.2%) patients. **Conclusions:** Choice of operation in scar strictures of MBD is HepJA on Roux. The main conditions, influence on long-term results of HepJA, are stricture level, diameter of formed anastomosis and using of THCD. HepJA without THCD improves results of treatment, but this technique is not used in significant part of patients with high strictures of bile ducts.

In most cases, the hepatocojejunoanastomosis (HepJA) on Roux was performed to 125 (81.7%) patients, of them in 34 patients it was done without transhepatic carcass drainage. BBA was performed in 13, HepDA – in 4, XREBI – in 11 patients. In early terms of observation, there were post-operative complications – 33.4%, lethality – 9.15%. Good and satisfactory results in separate terms after HepJA were in 85.4%. The factors contributed to the developing of BDA restrictions were high level of strictures («-1», «-2»), relatively the small diameter of anastomosis ($\leq 15\text{MM}$), using of THCD. In the results, after repeated intervention the satisfactory results of treatment were received in 91.8% patients traced in separate terms of observations.

In spite of constant developing techniques of cholecystectomy, the frequency of bile ducts damages does not decrease. The authors, studying the problem of reconstructive surgery of extrahepatic bile ducts, note that in comparison with cholecystectomy from traditional access the involving of laparoscopic cholecystectomy has been followed the increased rate of bile ducts damages in 2-4 times and in percentage it composes 0.1-3% [4, 9, 7, 10,12].

In trauma of bile ducts, the treatment is too difficult and requires long-term treatment, expensive therapeutic and diagnostic manipulations which lead to serious invalidation of patients. Lethality composes 8-17%; complications during operations appear in 47%, developing of post-traumatic strictures of bile ducts in 35-55% [1, 3, 4, 5, 7, 8, 10, 11].

Outcomes of iatrogenic damage of bile ducts can seriously influence on the patient health, and only timely and competently performed surgical intervention can prevent the developing of severe complications such as peritonitis, external biliary fistulas, scar strictures of hepatic duct and as their results the mechanical jaundice, cholangitis, liver abscess and biliary cirrhosis [2, 3, 4, 6, 9, 10, 11, 12] .

In spite of certain successes gained in reconstructive biliary surgery, unsatisfactory results are noted even in most experienced surgeons' works on the average in 10-33% of observations. Such patients need in repeated reconstructive operations and they are true called as “biliary cripples” [1, 5, 12].

At present, the themes for discussion are the choice of optimal method of biliary tree reconstruction, indications to transhepatic carcass drainage of anastomosis and operations without using carcass drainages, and risk factors of stenosis development of biliodigestive anastomoses (BDA).

The age of patients varied from 21 to 77 years old. The average age composed 48.12 ± 1.4 years. Women were 111 (72.5%), men - 42 (27.5 %).

Among 137 (89.5%) patients, the reason of MBD stricture developing was iatrogenic trauma of hepaticocholedocha (HCH) in the process of cholecystectomy. Of them, it was in 53 during laparoscopic cholecystectomy, in 63 during traditional or «open» cholecystectomy, in 21 patients during minilaparotomic cholecystectomy.

In 7 patients the damage of MBD happened during performing the resection of stomach because of duodenum ulcer disease, in 9 during operations because of liver echinococcosis and its complications.

In the time of admission 56 (36.6%) patients had one operation in history, 97 patients (63.4%) were admitted having 2-4 operations in history, which were performed early because of MBD damage.

Diagnostic algorithm based on accounting of clinical symptoms and applying of complex of modern diagnostic investigation methods, which began from ultra sound investigation (USI). PTCHG was the most informative – 47 (88.6%) from 53, then fistulocholangiography – 31 (67.4%) from 46, ERCHP – 14 (19.7%) from 71.

The main clinical symptoms of strictures were cholangitis – 102 (66.7%), jaundice – 129 (84.3%). External biliary fistula was in 57 (37.2%) patients, at the same time it was full in 14 patients.

The most important factor, defining the surgical tactics, was the type of stricture. The distribution of patients schematically by the level of stricture (on classification of E.I. Galperin 2002) was presented in Table 1.

Table 1.

The level of scar stricture of bile duct.

Stricture type	All	%
«+2 type»	10	6.5
«+1 type»	19	12.4
«0 type»	45	29.4
«-1 type»	58	37.9
«-2 type»	21	13.7
All	153	100

Among observed patients, the primary level of HCH damage could be revealed in 146 (95.4%) patients. In 7 (4.6%) patients, who were admitted from other hospitals the level of stricture was revealed only during operation, as there was not necessary information in medical documentation.

The next results of treatment were marked on the number and character of complications developed in post-operative period, and the number of fatal outcomes. Long-term results were marked on the data of inpatient and outpatient examination, and by questionnaire as well.

Results and discussion.

Reconstructive operative interventions were performed in 129 (84.3%) patients: HepJA – 125, HepDA – 4. Recovery operations – BBA were done 13 (8.5%) and x-ray endobiliary intervention (XREBI) in 11 (7.2%) patients (Table 2).

Table 2.

The methods of surgical correction of post-traumatic MBD strictures depending on its type.

Operation		Type of stricture					In all
		+2	+1	0	-1	-2	
HepJ A	With THCD			15	49	21	85
	without THCD	1	2	22	7		32

HepDA Dissociation, HepDA application	with THCD			2	2		4
	witho ut THCD	1					1
HepJA Dissociation, HepJA application	with THCD			2			2
	witho utTH CD	1					1
HepDA		1	3				4
BBA		2	11				13
XRE BI	HCH stenting	1	3				4
	Endoscopic diathermochase r of HepDA	3		3			6
	Antegrade bougie of HepJA			1			1
All		10	19	45	58	21	153

Depending on the clinical and intraoperative signs, reconstruction of bile ducts was performed with one-stage or two-stage operative interventions. In the cases of already formed strictures of the bile duct walls, as a rule, were compressed and suitable for formation of sealed BDA. In intensive jaundice, cholemic endotoxemia and high risk of decompensation of liver insufficiency the BDA formation was itself the high developing risk of post-operative complications up to fatal outcome. In such situations in 56 (36.6%) patients it was performed two-stage treatment: the first stage was the formation of cholangiostoma. After stabilization of patient condition it was done reconstructive operation in second stage.

In the performing HepJA it was used the main formation principles of high precision BDA:

- Allocation of hepatic ducts proximal to stricture over scar tissue;
- cutting of left hepatic duct by the Hepp-Couinaud technique;
- Removal of jejunum segment at the rate of 80–90 cm by Ru;
- Precision formation of anastomosis by single-row nodal suture with outlets.

Analysis of HepJA results showed that in most cases it was possible to make wide anastomosis in strictures, which do not cover upper arch of confluence. Thus, in stricture «0, -1» in most cases it was possible to form anastomosis wider than 20 mm, due to allocation of left hepatic duct in confluence of it with right duct under the portal plate, and this operation is called as Hepp–Couinaud.

It gave a possibility to allocate the ducts out scar tissues and impose anastomosis width up to 2-3 cm at the expense of left hepatic duct.

In the patient group with «-2» type, to form a single anastomosis with jejunum it was made the site on the account of parallel stapling of share ducts remains by their medial walls, dissecting the partition between them (Cattell method). After formation of neoconfluence, it was additionally dissected both share ducts that significantly increase the diameter of future anastomosis.

The level of stricture was higher the more often it was used transhepatic drainage of BDA zone. Thus, in «+2» group, and «+1» group it was not necessary to apply the transhepatic drainage. In «0» and «-1» groups it was needed only in 19 (46.3%) and 51 (87.9%) observations correspondingly. In patients group with stricture type «-2» it was necessary to use transhepatic drainage of BDA zone in all observations (Table 3).

Table 3.

The necessity of using of transhepatic carcass drainage from stricture type.

Stricture type	Transhepatic drainage		All
	Without THD	THD	
" +2 "	3	-	3

"+1"	2	-	2
"0"	22	19	41
"-1"	7	51	58
"-2"	-	21	21
All	34	91	125

Transhepatic drainage of BDA zone was applied on Seypol- Kurian (47), Praderi-Smith (13) and Galperin (31).

Thus, the analysis of made interventions showed that the most favorable capabilities for the performing of radical operation were in «+2;+1;0;-1;» strictures.

For other 28 (18.3%) patients it was performed follow operations:

- in 4 (2.6%) the hepatocoduodenoanastomosis (HepDA) was imposed;
- in 13 (8.5%) BBA was imposed;
- in 4 (2.6%) it was performed endoscopic stenting of bile duct;

- 7 (4.6%) were admitted with the picture of recurrent cholangitis and stenosis of BDA after impose of HepDA (6 patients) and HepJA (1 patient), and it was necessary repeated sessions of XREBI.

Among 153 operated patients the different complications in early post-operative period were noted in 48 (31.4%), of them in 14 (9.15%) it was with fatal outcome. Complications in near post-operative period were presented in Table 4.

Table 4.

Complications in early post-operative period in patients with scar strictures of hepatic ducts and BDA.

Complication	Number of patients	%	Of them died	%
Bankruptcy of BDA	8	5.2		
Hemobiology	6	3.9		

Intraabdominal bleeding	3	1.9		
Small intestinal fistula	3	1.9		
Acute pancreatic necrosis	1	0.65	1	0.65
Suppuration of a post-operative wound	8	5.2		
Hepatic renal failure	4	2,6		
Cardiovascular failure	3	1,9	3	1.9
Multiple organ failure	12	7,8	10	6.5
All	48	31,4	14	9.15

Bankruptcy of BDA has been noted in 8 (5.2%) patients. It is remarkable that bankruptcy of BDA has developed in 3 patients with stricture type «0», in 2 with stricture type «-1», and in 3 with stricture type which has been classified as «-2». Analysis of own data showed that bankruptcy of bioliodigestive anastomosis developed on average in 4th -5th day after operation (from 2nd to 12th day). In all structure of these complications (in 6 from 8 observations) the bankruptcy of BDA was partial and presented itself the external bile duct by control drainage, which stopped independently on 14th -19th day. In whole bankruptcy of BDA in 2 cases it was needed the relaparotomy with external drainage of bile ducts.

Hemobiology developed in 3 patients after performed reconstructive operation. In these patients it was done relaparotomy, as conservative methods of hemostasis were ineffective or effect from their using was short-term, and bleeding relapses had severe character. In all 3 observations it was needed to resort to dissociation of anastomosis, stitching of bleeding area. In 3 (1.9%) observations, when Hemobiology was the result of percutaneously-transhepatic manipulations it was successfully used the conservative tactics.

Intraabdominal bleeding took place in 3 (1.9%) patients. During relaparotomy in all observations the real source of bleeding could not be noted: it took place the diffuse bleeding from soft tissues, from the area of divided seams.

In 3 (1.9%) cases after impose of HepJA on the 7th-9th day after operation it was opened the small intestinal fistula through the post-operative wound. In 1 case

the fistula disappeared independently. In 2 cases it finished with fatal outcome on the base of multiple organ failure.

Suppuration of a post-operative wound was revealed in 8 (5.2%) patients, at the same time the aggravating factors, causing purulent inflammation, were large number of performed early operative interventions on abdominal cavity organs, scar deformation of soft tissues of anterior abdominal wall, and traumatism of operative intervention.

Hepatic renal and multiple organ failure were noted in 4 (2.6%) and 12 (7.8%) patients correspondingly: all of them were early repeatedly operated about main disease, they had long-term and intensive jaundice and histologically revealed biliary cirrhosis in history. In 6 from 16 observations of this complication indicated conditions were extracted conservatively, in 10 the multiple organ failure led to fatal outcome. In 3 cases fatal outcome was on first day after operation because of acute cardiovascular failure.

In remote period, it was possible to observe 122 from 139 patients, which composed 87.8%. At the same time in «+2» group 9 (6.5%) patients were tracked, in «+1» group - 15 (10.8%), «0» - 34 (24.5%), «-1» - 46 (33.1%), «-2» - 18 (12.9%). Average time of observation composed 5.34 ± 0.5 years (Table 5).

Table 5.

Long-term results of treatment and repeated surgical interventions.

Type of operation		Number of patient	Relapses of strictures of HCH or BDA	Repeated intervention and number of patients
HepJA	with THCD	66	11	5-XREBI, 3- HepJA
	without THCD	24	1	1- XREBI
HepDA	with	3		

Dissociation, HepJA application	THCD			
	without THCD	1	1	
HepJADissoci ation, HepJA application	with THCD	2	1	
	without THCD	-		
HepDA		4	4	1- XREBI, 3- HepJA
BBA		11	11	11- HepJA
XRE BI	HCH stenting	4	-	-
	Endoscopic diathermochaser of HepDA	6	6	5- XREBI, 1- HepJA
	Antegrade bougie of HepJA	1	1	1- XREBI
All		122	36	

On experience of BBA, in spite of apparent simplicity of formation and physiology the scarring happened during 1–2 years after operation. In our observations after recovery operations with restriction of HCH 11 patients were admitted in time from 1 year to 5 years. Because of the presence of stricture relapse, for all patients the HepJA was applied on Ru (4 to THCD and 7 – without skeleton drainage).

After application of HepDA in all patients in long-term period, it was observed cholangitis and stenosis of anastomosis: of them for 6 patients it was performed the endoscopic balloon dilatation and diathermochaser, and for 4 patients it was done reconstructive operation of HepDA dissociation and HepJA application on Ru to THCD.

We made the analysis of long-term results of hepatico-jejunum anastomosis. Of 125 patients with HepJA on Ru in long-term post-operative period, it was possible to observe 96 (76.8%) patients. In 82 (85.4%) observations received result allowed to show the absence of stricture signs, in 14 (14.6%) observations long-term results were recognized as unsatisfactory. The retrospective analysis established relapse of stricture happened especially during the first two years from the moment of reconstructive operation. Thus, relapse was noted during 1 year in 5 patients, in time from 2 to 3 years it was in 9 patients.

In retrospective comparison of received long-term results with data of operation protocols, the factors contributed to the developing of BDA restructure were established in 14 patients:

- High level of stricture («-1», «-2») in 9;
- Relatively small diameter of anastomosis (≤ 15 mm) in 7;
- using of transhepatic carcass drainage in 12 patients.

Dependence of development of unsatisfactory HepJA results on indicated factors is confirmed by data presented in tables 6, 7, 8.

Table 6.

Influence of stricture type on long-term results.

Result	Level of stricture				All
	«+1»	«0»	«-1»	«-2»	
Good	1	26	40	15	82
Unsatisfactory	1	4	6	3	14

Table 7.

Influence of BDA diameter on long-term results.

Result	Diameter of anastomosis			All
	≤ 15 mm	16-25 mm	≥ 25 mm	
Good	13	22	47	82
Unsatisfactory	7	5	2	14

Table 8.

Influence of using of skeleton drainage on quality of long-term results.

Result	Without THCD				THCD				All
	«+1»	«0»	«-1»	«-2»	«+1»	«0»	«-1»	«-2»	
Good	1	16	7	-	-	10	33	15	82
Unsatisfactory	1	1	-	-	-	3	6	3	14

In 14 patients due to stricture relapse of HepJA, in 6 it has been performed the antegrade bougie of anastomosis zone, in 3 it has been repeatedly applied HepJA and 5 patients periodically receive conservative therapy. In 12 of 14 patients, the total fixed result was satisfactory, and unsatisfactory result was fixed in 2 patients.

Thus, in the treatment of MBD strictures it was received good results in 86 (70.5%) patients from 122 observed in long-term period. Relapse appeared in 29.5% patients. Repeated operation allowed gaining satisfactory results in 72.2% from this category of patients. Ultimately, good and satisfactory results composed 91.8%, the rate of unsatisfactory results was 8.2%.

Conclusions:

Choice of operation in scar strictures of MBD is HepJA on Roux. The main conditions, influence on long-term results of HepJA, are stricture level, diameter of formed anastomosis and using of THCD.

HepJA without THCD improves results of treatment, but this technique is not used in significant part of patients with high strictures of bile ducts.

Strictures type «-1» and strictures dissociate system of confluence of share ducts type «-2» are the most difficult for surgical correction and take leading place in the development of complications, which allow to include the patients with this stricture type to patients group with potential risk of relapse developing.

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