

The Estimated Results of Surgical Treatment of benign Strictures of Bile Ducts

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Abstract: Surgical treatment addressed to patients with biliary lesions and benign biliary strictures is a current problem for discussion which lead to complex approach of interdisciplinary research and medical anthropology. The study's objective was to systematize the experience of treating benign biliary strictures, analyzing in complex through the prism of effectiveness and efficacy of treatment outcomes. There are presented the remote results of 203 patients who underwent biliodigestive reconstruction during the 1989-2015 years. The patients from the study were monitored during 2-5 years depending on local anatomical peculiarities at the moment of the reconstructive intervention, as well on remote clinical-evolutive peculiarities, using the score proposed by Terblanche.

The reconstructive surgical treatment of benign biliary strictures, classified according to Bismuth, was performed and adapted depending on the level of stricture, with preference of biliodigestive derivations on jejunal loop a la Roux. Reconstructive treatment included: *choledochojejunostomy* - in 86 (42.4%) cases with type I and II strictures; *hepaticojejunostomy* - to 102 (50.2%) patients with strictures of type III and in 15 (7.4%) cases of type IV biliary strictures, *bihepaticojejunostomy* was performed. There were noted the following remote outcomes: very good (Terblanche I) in 123 (60,6%) cases, good (Terblanche II) in 39 (19,2%) cases, relatively satisfactory (Terblanche III) - 18 (8,9%) cases and unsatisfactory (Terblanche IV) in 23 (11,3%) cases. In reconstructive surgery of postoperative biliary strictures, the principle of definitive intervention which solves the qualitative restore of the biliodigestive flow is of priority.

Keywords: Interdisciplinary research, Benign biliary strictures, Reconstructive treatment, Long-term results.

INTRODUCTION

Benign biliary strictures are a serious complication which require repeated surgery. The biliary lesion as an etiological link of biliary strictures is mainly caused by interventions addressed to calculus cholecystitis, especially through classic or laparoscopic cholecystectomy. Strictures evolve clinically with episodes of cholangitis, jaundice, biliary cirrhosis, liver failure followed by death.

In general, damage occurs during mobilization of the duodenum to create gastroduodenoanastomosis or duodenal stump closure. Benign strictures of biliary ducts have a frequency of 0.1-0.8% following gastric resection. Biliary lesions rate was reported to be significantly higher following laparoscopy than classical cholecystectomy. With the spread of laparoscopic cholecystectomy, the incidence of common bile duct lesion has increased from 0.1-0.2% to 0.4-0.7%, compared with open cholecystectomy times [1]. As causes of increased incidence of common bile duct damage were incriminated, including, the level of stricture and the degree of dilatation and duration of follow-up [2, 3, 4].

After bile duct lesions, there is an immediate local inflammatory response, which is followed by fibrosis and narrowing of the of the bile duct's lumen. These changes eventually progress to secondary biliary cirrhosis and portal hypertension [5].

The pathogenesis of this disease is multifactorial but dominates either the direct lesion of cholangiocytes of the bile ducts, or as a result of mechanical or thermal damage of arterioles from peribiliary system plexus, which subsequently leads to the formation of biliary stricture [6].

Several studies show that 10-35% of cases of bile duct surgery are accompanied by late postoperative complications. Stenosis of the biliodigestive anastomoses occurred in 8.3% -30.0% of the cases. It is the most severe of the possible distant complications. The most common distant complication after HJA is angiocholitis, being a primary sign of developing problems with anastomosis functionality, initially only functional, then scar, irreversible. The primary reason for the occurrence of postoperative cholangitis, often associated with transient jaundice, is the development of HJA stenosis.

Among the etiological factors underlying the occurrence of HJA stricture very recently after the reconstructive surgery, there may be the following:

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intraoperative deficiencies, inappropriate surgical technique, inadequate suture materials, tension at the anastomosis partners, excessive tissue electrocautery, and the development of infection in all tissues involved in the operative act. These moments still require a thorough scientific reassessment and present a series of questions without suggestive responses.

All together these justified the need to study both the etiology and treatment - optimal surgical approach to benign biliary strictures, highlighting the most important clinical-evolutive factors, based on our experience in relation with remote outcomes of 203 patients who were divided according to Bismuth's classification.

MATERIALS AND METHODS

The bidirectional, cohort study was performed at clinical base of Chair of Surgery nr. 2 of Nicolae Testemițanu SMPHU during 1989-2015 years. The fundamental ethical research principles and of the Helsinki Declaration have been respected in this research. The patients gave informed consent for enrollment in the study. The research sample included 203 patients with benign biliary strictures of common bile duct. Validity of the sample was estimated according to the classical mathematical-statistical calculation formula. Patients with strictures occurring due to gallstones, megacholedochus, sclerosing cholangitis, choledochal cyst, chronic pancreatitis or stenosis of duodenal papilla, were excluded from the research sample.

Anthropometric, socio-demographic parameters, comorbidities, clinical signs and complications were recorded. The sample was analyzed integrally, after which the parameters were compared on lots: lot A was represented by patients with Terblanche gr. I and II, and lot B - patients with III and IV Terblanche scores.

The degree of biliary obstruction was classified according to Bismuth's classification:

- type I: low stricture of common hepatic duct (CHD) with CHD stump length > 2 cm;
- type II: proximal stricture CHD, CHD stump length < 2 cm;
- type III: hilar stricture without residual CHD, but liver's ductal confluence is preserved;

- type IV: hilar stricture involving the confluence and loss of communication between the right and left hepatic ducts;
- type V: engaging aberrant sector of right hepatic duct alone or with stricture CHD.

The degree of dilatation of the common bile duct was classified as follows: A - width above the stricture < 1.5 cm; B - width is between 1.5 - 2.0 cm; and C - width is > 2.0 cm.

For category data, the exact Fisher test was applied. The statistical software SPSS version 20 was used.

RESULTS

The mean age of the 203 patients was 49.15 ± 0.94 years, in the range: 21-78 years old, of which 37 (18.2%) were men and 166 (81.8%) - women.

Depending on the presented symptoms and the clinical manifestations of patients with postoperative biliary strictures the following clinical picture is found at the time of admission for reconstructive intervention: presence of biliary colic in 103 ($50.7 \pm 4.93\%$) cases; jaundice in 157 ($77.3 \pm 3.34\%$) cases; cutaneous pruritus in 104 ($51.2 \pm 7.36\%$) cases; hepatomegaly in 32 ($15.8 \pm 6.45\%$) cases; fatigue in 140 ($69.0 \pm 3.91\%$) cases; presence of external biliary fistula in 137 ($67.5 \pm 4.01\%$) cases. Stated symptomatic was directly correlated with the presence of chronic biliary-hepatic suffering, motivated by supported biliary injury and followed by reparative operations or drainage of the biliary tree. The intensity of clinical signs was explained by the degree of drainage of the biliary tree, the amount of bile that got in the digestive tract, the presence of local septic complications, or angiocholitis, the transient or persistent mechanical jaundice, the degree of hepatic failure.

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Direct etiologic cause of postoperative biliary strictures in 91 (44.8%) cases was the lesion of the MBD during a traditional cholecystectomy. There was noted a high frequency of acute cholecystitis or situations with major intraoperative fibrosis with deformation of the report of the gallbladder and biliary-vascular complex.

In 107 (52.7%) cases the lesion was secondary to laparoscopic cholecystectomy, more often were spotted situations of scleroatrophic cholecystitis, anatomical abnormalities, bleeding during surgery. Gastric resection for complicated callous ulcers with penetration caused iatrogenic injury just in 5 (2.5%) cases.

An important point to mention is that time from the lesion to its finding was 7.29 ± 0.49 days, which increased the gravity of patients at the stage of drainage of biliary tree and obviously had a major impact on biliary stricture formation.

An important criterion in increasing complexity of strictures furtherly developed was that 99 (48.8 \pm 5.02%) of patients had two or more drainage operations or plastic MBD at the time of lesion. Any repeated trauma obviously increases the local inflammatory process, grade of fibrous tissue and develops a difficult biliary stump due to the excessive fibroplastic process and changed local anatomy. In the remaining 104 (51.2 \pm 4.90%) of cases there is only one intervention, thanks to the presence of partial lesions with retention preservation of MBD path.

Timely detection of these patients prevented septic complications and limitation of re-operation just in order to restore MBD on the Kehr or Robson drainage. The presence of small lesions, partial clipping often makes it technically easier to resolve the biliary drainage through minimally invasive endoscopic methods often associated with percutaneous echo-guidance. Endoscopic stenting was performed at 15 (7.39%)

patients, which excluded the need for open surgical interventions. As a result, it provides natural bile flow into the duodenum and satisfactory physiological preparation and qualitative precondition for reconstructive interventions.

Direct bilirubin values usually on biliary lesion stage were major, an average of 109.54 ± 6.96 $\mu\text{mol/l}$, varying in the range of 6.21 to 621.0 $\mu\text{mol/l}$. It confirms both the high level of cholestasis and the severity of lesion. Long evolution from the time of injury until MBD decompression was directly correlated with bilirubin levels.

All techniques for draining MBD either classic or the minimally invasive, aim at stopping the mechanical jaundice and ensuring effective decompression of the biliary tree. Thus, at the stage of reconstructive intervention we found the general bilirubin 17.21 ± 1.11 $\mu\text{mol/l}$, with a range from 6.4 to 217.8 $\mu\text{mol/l}$.

Preoperative visualization of the biliary tree was obtained by cholangio-fistulography in 29 (14.29%) cases, by ERCP in 157 (77.34%) cases and by CPTH in 19 (9.36%) cases. The performed imaging examination allowed a systematization of the MBD stricture level, MBD stump length and bile duct dilation above the stricture (Table 1).

Surgical Moments

Dilatation of bile duct above the stricture had great importance to the formation of biliodigestive anastomosis. Biliodigestive derivations are essential to rebuilding the biliary tree and restoring properly the biliodigestive flow.

The intraoperative investigation of bile duct allowed us to conduct an examination of the immediate determinants that play a role in the formation of a functional and integral HJA. One of them is the size of the bile trunk. We researched the length of the stump (in mm) and grouped them according to the biliary

Table 1: Level of Stricture of Main Bile Duct According to Bismuth Classification

Bismuth Classification:	N (%)	MBD Stump Length, mm	
		$M_a \pm m$	Extremity
type I	6(3.0%)	44.3 \pm 1.1	40,0 – 47,0
type II	92(45.3%)	24.7 \pm 0.3	17,0 – 30,0
type III	90(44.3%)	7.6 \pm 0.2	4.0 – 10.0
type IV	15(7.4%)	-2.7 \pm 0.3	-5.0 – -1.0

stricture level in Bismuth's classification. Bismuth type I was recorded in 6 (3%) cases, size - 44.33 ± 1.15 mm. In this group, we recorded a proximal stump of a maximum of 47 mm. So virtually all CBP in the supra-duodenal sector was integral, an important fact for surgical tactics. Type II strictures were recorded in 92 (45.3%) of cases, the mean bile size was 24.68 ± 0.49 mm. The maximum was 30 mm, and the minimum was 17 mm. There were detected 90 (44.3%) strictures of type III, where the average size of the stump was 7.60 ± 0.33 mm with a DS of 1.62. The maximum index was 10 mm and the minimum of 4 mm. Fourteen (7.4%) cases were entered in the type IV strictures group. These were the most difficult cases. The size of the stump for them was calculated from the junction of the liver channels, averaging 2.73 ± 0.25 mm with a DS of 1.62. The negative is the reversed distance from the junction, showing a maximum of -1.00 mm and the minimum when we had a shortage of junction material over -5 mm in length.

The gallbladder size was an objective criterion in attesting the complexity of biliary reconstruction. The fact that high biliary strictures require special and complex techniques for the intrahepatic channels exteriorization is a motivation for an objective analysis of the size of the bile duct and a further decision for the optimal technique of HJA formation.

Another important moment, appreciated intraoperatively, was the diameter of the bile duct. A functional anastomosis needs to be wide to provide adequate bile flow by volume. Often, we have clinical situations with complete external drainage of the biliary tree at the first stage of treatment. This usually does not ensure a major dilatation of proximal bile duct pathways, facilitating the difficulty of forming HJA. The analysis of the intraoperative protocols in our group revealed that for type I strictures the average bile diameter was 19.67 ± 0.76 mm with a variation in the extremities from 18.0 to 23.0 mm. This moment has allowed the formation of a wide and functional anastomosis in all cases, based on a long stomach that allowed a good adjustment to the intestinal partner. For type II strictures, we rated bore diameter as 18.11 ± 0.15 mm with a variation of 11.0 to 20.00 mm. In all of these cases we had sufficient dimensions for HJA training, with a medium technical comfort of stomacher training. In the case of dimensions less than 15 mm, we proceeded to the plastic modeling of the stump with longitudinal incisions on the anterior to increase the diameter at anastomosis line level. These technical

moments in correlation with a sufficient length of stump allowed the drilling of an optimal HJA in a functional plane. In case of type III strictures, we encountered a small stump both in length and in diameter, an average of 10.5 ± 0.13 mm with a variation of the extremes from 4 mm to 15 mm. The small diameter in our case was compensated by the preparation of the left hepatic channels, and in some cases even by the formation of an incision on the anterior wall to increase the diameter at the formation of the anastomosis mouth. In diameters smaller than 10 mm, we believe optimal is an incision in boomerang on both channels while preserving the integrity of the liver junction. This technical maneuver allows optimal HJA formation by size and functionality. The worst clinical situation was for type IV strictures. In these cases, we recorded a separate diameter for each hepatic duct of 5.2 ± 0.17 mm with a variation of the extremities from 4.00 to 6.00 mm. The difficulty of forming BiHJA was increased by the lack of bile and lack of reserve in technical handling. We have solved situations through special suture anastomoses under surgical optics control with carcass drainage for a long time.

Any reconstruction of biliary channel, in our experience, fulfilled the following requirements:

- excision of fibrous tissue from proximal biliary channel;
- formation of a wide anastomosis;
- presence of an intact mucous membrane without any inflammatory processes at 360° of the anastomosis line;
- good vascularization on suture line;
- lack of tension on the anastomosis line.

Currently achieving biliary-digestive derivations using Roux loop has become a recognized standard in surgery of biliary strictures. But notable advances were recorded in terms of forming the hepaticojejunostomosis, which was directly related to technological development of processing the biliary stump and suture material. In current practice, anastomosis is performed with ordinary sutures (PDS or Vicril 4/0-5/0) which are applied with 2-3 mm step through all layers. On posterior lip the nodes are applied facing the lumen, and on the anterior - the outside. Suture line is reinforced with sero-serous sutures up to 5 in number, only when needed.

For strictures type I and II according to Bismuth, an end-to-side choledocojejunostomy using hepatic duct and Roux loop is already a recognized norm. In our study sample it was carried out in 86 (42.4%) cases. In this situation, usually we have a pretty "long" stump, which adjusts well to the intestinal mucosa.

In case of high strictures, the biliary stump in Bismuth type III strictures is small, that's why hepaticojejunostomy was faced with the necessity to continue the incision longitudinally on the left channel, after preparing it from the hepatic hilum. In our experience, we had special cases, with intrahepatic anatomical positioning situations without adequate exteriorization in hilum which did not assure us an anastomosis mouth of proper dimensions. In some cases, we resorted to mobilizing the right hepatic duct and extending the incision longitudinally. Just this way we could ensure a broad and functional anastomosis. We accepted as suture material PDS or Vicril 5/0-6/0. Usually these high derivations require mandatory drainage of anastomosis mouth. The drainage was performed according to the Veolker procedure, separately for each biliary channel for 2-3 months. Hepaticojejunostomy was carried out in 102 (50.2%) cases, there were long incisions on both channels liver in 47 (23.2%) of them.

For strictures of type IV, when liver channels junction is completely destroyed, leaving two separate channels in the wound would bring up technical difficulties for reconstructive surgery. Liver channels will be released of parenchyma and fibrous tissue intraoperatively. The essential element that must guide surgery is resection till healthy tissue. They conducted separate anastomoses with each bile duct with Roux loop using 5/0 ordinary resorbable suture in single plan under surgical optical control in 15 (7.4%) cases. We had situations when the right hepatic duct was very short and we had to section and anastomosis separately paramedian right and lateral right channels. Anastomoses were finished with separate drainage of both channels according to Veolker procedure for a period of 6 months. The anastomosed loop required mandatorily serosa-muscle sutures with liver capsule with non-resorbable material, which excluded traction at the anastomosis level, postoperatively.

Early Postoperative Evolution

The postoperative evolution was generally favorable, the length of hospitalization and spectrum of complications are summarized in Table 2.

Postoperative mortality was absent at the stage of reconstructive operations.

Immediate postoperative complications after surgical reconstruction operations were recorded in 69 (34.0%) cases. Most feared postoperative complication was the postoperative abscess, found at 1 (1.4%) patient. The situation was resolved by echo-guided percutaneous drainage.

Transitory bile leak during first 72 hours after surgery was most frequent, evaluated at 24 (34.8%) patients. This event did not require additional interventions, being clarified with the rehabilitation of intestinal passage after surgery.

Wound infection was recorded at 15 (21.7%) patients and was resolved by conservative aseptic dressings.

Alarming postoperative complication was partial anastomosis dehiscence established in 12 (17.4%) cases. These cases were resolved conservatively, due to intraoperative drainage with anastomosis drainage system both posteriorly and anteriorly together with transanastomotic drainage after Veolker.

Postoperative bleeding complications were encountered in version of wound hematoma - 9 (13.0%) cases, resolved by the cutting of infection through widened dressings with anesthetically potentiation.

Postoperative pulmonary complications were recorded in 7(10.1%) cases, mostly pneumonia.

The serious consequences of biliary infection were scored in episodes of cholangitis at 1 (1.4%) patient, solved through targeted antibacterial and infusion therapy.

Postoperative Monitoring

Clinical and functional evaluation of remote outcomes was performed based on the classification proposed by Professor John Terblanche *et al.* (1990), which is used to extensively evaluate the quality of life of patients with biliary reconstructions and presents a reference scale in this domain:

- grade I: no biliary symptoms;
- grade II: transient symptoms, at the moment no symptoms;

Table 2: Surgical Treatment, Spectrum of Registered Early Complications, and Hospitalization Length

Surgical Treatment	n (%), Extremity
Bihepaticojejunostomy	15 (7.4%)
Hepaticojejunostomy	102 (50.2%)
Choledochojejunostomy	86 (42.4%)
Hospitalization duration on reconstructive stage, days	12.0±0.2 (8.0 – 20.0)
Pulling drainage after surgery, days	76.4±2.7 (30.0–180.0)
Time from the surgery till complications arousal, months	29.9±0.5 (2.0 – 68.0)
Length of hospitalization at complications stage after reconstructive surgery, days	13.4±0.5 (9.0 – 20.0)
Early Complications	n (%)
Liver abscess – bile leak	1 (1.4%)
Bile leak on safety drain	24 (34.8%)
Cholangitis	1 (1.4%)
Partial dehiscence of anastomosis	12 (17.4%)
Postoperative wound hematoma	9 (13.0%)
Pneumonia	7 (10.1%)
Postoperative wound suppuration	15 (21.7%)
Clinical Classification by Terblanche	n (%)
grade I	123 (60.6%)
grade II	39 (19.2%)
grade III	18 (8.9%)
grade IV	23 (11.3%)

Note: data are presented as absolute values (relative) or mean ± standard deviation (extreme).

- grade III: clear symptoms requiring medical therapy;
- grade IV: recurrent stricture which needs correction or related death.

Grade I and II results are considered “excellent” and “good”, grade III – “reasonable” and grade IV- “poor” [5].

Clinical data, reconstructive surgical treatment, remote results of the surgical treatment depending on the obtained Terblanche score, are presented in Table 3.

Remote surveillance on average was 29.89±0.5 months, with amplitude range from 2 to 68 months. Excellent or good results were obtained at 134 (66.01%) patients, while 69 (33.9%) remaining patients showed reasonable or weak results.

Patients from group Terblanche I ($n=123$, 60.6%) showed a sustainable recovery and a lack of

complaints from the hepatobiliary system, with a full reinstatement in social activity.

Group Terblanche II ($n=39$, 19.2%) only episodically had clinical transient signs of a chronic liver and biliopathy, without any serious impact. These states were corrected by diet, hepatoprotective therapy, which were received episodically in the hospital.

Group Terblanche III ($n=18$, 8.9%) represented patients who presented complaints at the time of the tests exam and hepatobiliary function disorders. All of them required episodically surgical hospitalization for additional examinations and medical treatment.

Group Terblanche IV ($n=23$, 11.3%) accounted patients with recurrent biliary stricture and essential disturbance of hepatobiliary function on reflux angiocholitis background or of severe cholestatic hepatitis. In all cases when were found strictures of hepaticojejunal-anastomosis, we performed plastic surgery of hepaticojejunal-anastomosis with plastic

Table 3: Comparison of Clinical Data of Patients with Benign Biliary Strictures Depending on Terblanche Classification

Parameters	Lot A, n=162 (79.8%) (Terblanche gr I & II)	Lot B, n= 41 (20.2%) (Terblanche gr III & IV)	p
<i>Symptoms and signs, abs. (%)</i>			
Biliary colic	75 (46.3%)	28 (68,3%)	<0.05
Jaundice	121 (74.7%)	36 (87.8%)	<0.05
Angiocholitis	146 (90.1%)	38 (92.7%)	ns
Cutaneous pruritus	81 (50.0%)	23 (56.1%)	ns
Hepatomegaly	19 (11.7%)	13 (31.7%)	ns
Fistula	109 (67.3%)	28 (68.3%)	ns
Fatigue	112 (69.1%)	28 (68.3%)	ns
<i>Reconstructive surgical treatment, abs. (%)</i>			
Bihepaticojejunostomy	11 (6.8%)	4 (98%)	ns
Hepaticojejunostomy	78 (48.1%)	24 (58.5%)	ns
Choledochojejunostomy	73 (45.1%)	13 (31.7%)	ns
<i>Immediate postoperative complications following the reconstructive stage (n=69), abs. (%)</i>			
Patients with complications, total	38 (23.5%)	31 (75.6%)	<0,001
Liver abscess – bile leak	0 (0%)	1 (3.2%)	NA
Bile leak on safety drain	12 (31.6%)	12 (38.7%)	ns
Cholangitis	0	1 (3.2%)	NA
Partial dehiscence of anastomosis	0	12 (38.7%)	NA
Postoperative wound hematoma	8 (21.1%)	1 (3.2%)	ns
Pneumonia	7 (18.4%)	0	NA
Postoperative wound suppuration	11 (28.9%)	4 (12.9%)	ns
<i>Remote complications following reconstructive stage, (n=42), abs. (%)</i>			
Total number of patients	3 (1.9%)	39 (95.1%)	<0,001
Chronic angiocholitis	0	10 (25.6%)	NA
Cholestatic hepatitis	1 (33.3%)	4 (10.3%)	NA
Hepaticojejunal-anastomosis stricture	1 (33.3%)	21 (53.8%)	ns
Stricture and thread gallstone	1 (33.3%)	3 (7.7%)	ns
Stricture and pseudoaneurysm	0	1 (2.6%)	NA

Note: ns – statistically not significant ($p \geq 0,05$); NA – non-applicable.

elements of Heineke-Mikulicz type. Intervention aimed to liquidate the stricture and anastomotic restoration within the present tissues on anastomosis line. All cases had an intraoperative fibroblastic process on hepaticojejunostomy level while the bile duct was not directly involved, presenting normal tissue. This moment was decisive in omitting the need to restore the anastomosis and achieve only a plasty of anastomosis mouth using 5/0 PDS atraumatic suture in single plane and separate drainage of both liver

channels. Drains were maintained for up to six months, having a housing role in order to stabilize the formation of the anastomosis mouth. The achieved postoperative results were very good.

DISCUSSION

The purpose of reconstructive treatment of postoperative biliary strictures is to ensure long-term biliary-enteral flow through HJA and avoid a

subsequent re-stricture. Hepaticojejunal-anastomosis has become a standard in biliary reconstruction. Most studies dedicated impact of hepaticojejunal-anastomosis on Roux loop present a postoperative success rate from 90 to 98%. There are present remote research evaluations of more than 10 years postoperatively which demonstrate a significant clinical efficacy of the established method with good results from 82% to 98% cases. Most surgeons practicing reconstructive biliary surgery say that these interventions require clinical performance equipment, a multidisciplinary approach, a staged surgical management and not last, an important institutional experience. These things are only possible in Centers of excellence or University clinics, specialized in the field [6].

Hepaticojejunal-anastomosis will allow us to exclude entero-biliary reflux, which is present in hepatico-duodenal and jejunal anastomoses with short arm. Reflux is the cause of chronic inflammatory process in the biliary tree which evolves with the progress of fibrous tissue and as a result we have stricture of anastomosis mouth. There are two directions of solving this problem. The vast majority went about perfecting the art of forming anastomosis with modern suture material and performing a jejunal arm not less than 80-90 cm [2]. The other option is formation of variations of anastomosis mouth with antireflux mechanical effects. There were also tentatives to model artificial valves, cut from intestinal mucosa which protect from any reflux. These types of stomy were usually effective for a short period of time and doomed to long-term progression of fibrous tissue at the anastomosis level. This approach is considered to be passed to history. In present, it is sure that no antireflux mechanism is efficient if it does not have a Roux loop with an arm of at least 80cm. Only a well-prepared arm with adequate vascularity will allow us to avoid bile reflux [4].

Neverminded the achieved results, there is a high lethality (4-19%) and frequent recurrences of hepaticojejunal-anastomosis stricture (3-28%), which proves that the tab remains a topical issue for further research [3, 4, 7].

A reconstructive surgical performance treatment is only possible in surgical centers specialized in hepatobiliary surgery, a key moment to reduction of postoperative complications and avoidance of biliary strictures recurrences. The analysis of remote results demonstrated the clinical effectiveness of

reconstructive interventions in 88.67% of the observations. The ultimate goal of reconstructive treatment of post-operative biliary strictures is to provide long-term biliary-enteral flow through HJA.

The results of the research have shown that the reconstructive interventions, based on the HJA on the Roux loop in the modifications of the Chair of Surgery no. 2, were effective surgical techniques for the treatment of benign biliary strictures. Observance of surgical instructions, preoperative training, and surgical techniques can make HJA in post-operative biliary strictures, a safe intervention. In order to evaluate HJA, the surgeon has a standardized and elaborated score by Professor Terblanche, which allows to highlight the effectiveness of somatic function and quality of life due to the reconstructive surgical gesture.

CONCLUSION

Research results showed that reconstructive interventions of main bile ducts, based on biliojejunal anastomosis on the Roux loop are effective surgical techniques for the treatment of benign biliary strictures. Operative mortality "0" in personal casuistry, presented above. Surgical treatment of postoperative biliary strictures is directly related to the localization level. For strictures of Bismuth type I is optimal an end-to-side choledocojejunostomy with isolated in Y à la Roux loop. For the type II, solution consists of choledocojejunostomy on the isolated in Y à la Roux loop. For situations where we have upwards extension of stricture, hepaticojejunostomy on isolated in Y à la Roux loop seems to be a pertinent solution. For patients with stenosis of type III an end-to-side hepaticojejunostomy on isolated in Y à la Roux with separate transanastomotic protection of left and right hepatic ducts, is preferable. For strictures of type IV is the preferred the application of bihepaticojejunostomy on isolated Roux loop and mandatory transanastomotic drainage of both liver channels.

We consider that stratification of preoperative risk, adequate preoperative preparation and choice of surgical technique for hepaticojejunostomy in case of postoperative biliary strictures – make the intervention safe even for elderly patients.

To assess HJA, surgeon has handily a standardized score developed by Terblanche which illustrates the effectiveness regarding the function and quality of life due to the reconstructive surgical gesture. The surgeon must be able to evaluate the patient in order to allow an

efficient therapeutic adaptation and non-economic of the achieved postoperative outcomes.

Based on the data obtained in our study, the quality of life has been greatly improved by a special recovery program of our clinic, which begins with the preoperative period, by counseling the patient about his postoperative condition and the duration of recovery. Although the principles of this recovery have been developed over several years, they were initially limited and then integrated for biliary tree reconstructive surgery at the level of National Surgical Services.

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