

CASE REPORT

The Role of the Extraperitoneal Drainage in the Corrective Surgery of the Intraoperative-Discovered Accidental Lesions of the Common Bile Duct

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Abstract

Introduction: The field of reconstructive surgery of the accidental main bile duct lesions involves several major categories, which, in turn, enroll some distinct phases due to their evolutionary characteristics. Each of these stages enforces different therapeutic options that are in close connection with the morphological and pathologic appearance of ductal lesions, which differ substantially depending mainly upon the timing of the diagnosis. **Material and method:** We bring into attention a collection of 4 cases with immediately recognized intraoperative lesions of the main biliary pathways that occurred during laparoscopic procedures for biliary lithiasis, since 2001. Although all cases fall into the same category of lesions, the circumstances being different so did the solutions adopted, tailored to the reality of the intraoperative findings, however the common ground was represented by the extraperitoneal drainage. **Conclusions:** Our short suite of clinical case presentation manages to draw attention to some interesting conclusions, such as it is somehow hazardous and not practical to compare clinical results obtained with various surgical techniques, since those are often in close connection with the details and particularities of the case; no single-center clinical experience, even if it is backed up by a large number of cases, can be imposed as a golden standard in resolving these injuries.

Keywords: extraperitoneal drainage, accidental, intraoperative, lesions, reconstructive

Rezumat

Introducere: Domeniul chirurgiei reconstructive a leziunilor accidentale de cale biliară principală are la bază mai multe clase de leziuni, fiecare cu faze distincte de dezvoltare, în funcție de caracteristicile lor evolutive. Fiecare din această etapă presupune opțiuni terapeutice diferite care sunt în strânsă concordanță cu caracteristicile morfologice și patologice ale leziunilor ductale survenite, diferențele provenind în special în funcție de momentul la care au fost diagnosticate. **Material și metodă:** Dorim să aducem în discuție un număr de 4 cazuri de leziuni iatrogene de cale biliară principală recunoscute imediat, în etapa intraoperatorie, în decursul intervențiilor laparoscopice efectuate pentru litiază veziculară, din 2001 și până în prezent. Deși toate cazurile aparțin aceleași clase de leziuni, circumstanțele în care au survenit accidentele fiind diferite și soluțiile corectoare adoptate au fost așadar diferite, dar elementul comun al rezolvării s-a axat pe drenajul extraperitoneal. **Concluzii:** Această scurtă trecere în revistă a cazuisticii de leziuni iatrogene recunoscute imediat atinge anumite concluzii interesante, și anume că este hazardată și nepractică compararea rezultatelor clinice obținute prin procedee chirurgicale diferite, de vreme ce acestea sunt în strânsă relație cu particularitățile cazului; rezultatele publicate doar de un singur centru chirurgical, chiar având la bază un lot semnificativ, nu poate deveni un standard de aur în chirurgia reconstructivă a leziunilor iatrogene de cale biliară principală.

Cuvinte cheie: drenaj extraperitoneal, accidental, intraoperator, leziuni, reconstructie

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INTRODUCTION

Up to date, one of the most well-known and used classification for defining bile duct lesions belongs to Bismuth¹ and was later assumed by laparoscopic surgery as well. In this classification, the author is taking into consideration the remaining intact bile duct length and does not include bile collections that may arise from a bilistasis defect in the cystic duct or the liver bed, nor the lateral solutions of continuity of the main bile duct and right hepatic duct. These kind of iatrogenic injuries were initially reported only after classic cholecystectomy, and this is why, later, with the development and rise of the laparoscopic approach, Strasberg and Soper² modified this classification of accidental injuries including these as well.

In all these years of laparoscopic interventions we came to build our own anatomico-clinical stadialisation that helps a lot choosing the right surgical approach to correct the issue confronted with and could be summarized into two main periods: the intraoperative one and the postoperative one, the latter with a subclassification of early, late and final stages³:

1. **The intraoperative stage** refers to injuries that have been noticed right away and require measures of repair performed into the same operative time;
2. **The postoperative stage:**
 - A. **Early postoperative lesions** (1-30 days postoperatively). Here we can put those cases in which the clinical signs are those of the consequences of the unrecognized injuries missed during the primary surgery. In this category also fall all the cases that reconstructive surgery has failed. It is usually the situation with external biliary fistulas of different etiology and so, the main clinical signs are those of choleperitoneum, or, in much less often, obstructive syndromes, due to accidental total or partial ligation of the extrahepatic bile ducts;
 - B. **Late postoperative lesions** (over 30 days after the surgery). In this category we can put the benign stenosis of the main bile duct with a clinical translation of jaundice, that may or may not be accompanied by external biliary fistulas which in time can lead to a full process of perivisceritis, a nasty situation that can end up with an abscess near the main bile duct embedded in a true sclero-inflammatory pediculosis process.
 - C. **Final stage lesions.** This stage represents the final development of these previous mentioned accidental lesions, whose evolutive inflamma-

tory complications usually occur after two months from the initial moment of surgery. This final or tertiary period is represented by the sclerosing lesions and sometimes by the monstrous anatomical hypertrophic lesions of the biliary pathway, which in many cases are due to the postoperative persistence of the biliary fistulae or to the postoperative biliary stenoses and which have lithiasis or primary and secondary sclerosing cholangitis of the biliary tree as consequences.

Obviously, the most favorable, but also, unfortunately, the rarest situation is the immediate recognition of the lesion, with an incidence cited in the literature of only 5%⁴.

The type of injuries immediately recognized that occur intraoperatively during laparoscopic procedures are these following situations, sequenced by morphological appearance of the lesion:

- Small solutions of continuity or punctures of the main bile duct, with a diameter of 3-5 mm. Only some of them are due to laparoscopic cholecystectomy;
- Total or partial anatomical sections of the main bile duct. These kind of lesions happen especially during a laparoscopic cholecystectomy;
- Accidental main bile duct segmental resections that cover a length between 1.5 cm and up to 3 cm.

MATERIAL AND METHOD

We bring into discussion a number of 4 cases of immediately recognized intraoperative biliary lesions, selected from a larger group of iatrogenic laparoscopic lesions that belong to all 3 categories of defects and gathered across many years of surgical experience in the field of the laparoscopic approach for biliary lithiasis, from 2001 up to present days. In all situations a conversion to open approach was necessary in order to apply the corrective measures.

These cases had the following lesional characteristics:

- 2 cases of partial quasi-total section of the common hepatic duct under the convergence and another
- 2 cases of total anatomical sections of the pedicular choledochus,
- 1 case of anatomical laparoscopic section of the main bile duct in the pedicle sector, due to an abnormality of the retracted hepato-choledochus and embedded in the wall of a sclero-

trophic chronic cholecystitis which disappeared embedded on its left side, then reappeared below and continued towards the hepatic hilum.

The solution adopted for 2 of them was to perform a first step termino-terminal reconstruction, with prosthetic external biliary axial drainage externalized in a transligamentary manner, kept in place for 5 months. The evolution of the cases was generally favorable, with the exception of one that due to a high degree of devascularization of the biliary stump, during the laparoscopic approach, developed a stenosis of the anastomosis tract, as a late postoperative complication, manifested clinically by an obstructive jaundice one year after the intervention. For this case there was a second procedure involved, namely a hepatico-jejunostomy with Roux-*en*-Y loop, prosthetized with an external axial transligamentary biliary drainage. Unfortunately this solution later evolved towards dysfunctionality in less than two years after surgery.

Having this case in mind, when we encountered the second case of laparoscopic bile duct section, at a level just below the confluence of the cystic duct, we decided to adopt a hepatico-jejunal anastomosis, but only after resecting a specimen of the biliary stump in order to have a good tissue with good vascularization. Also, this time again, the main disadvantage of reconstruction was the narrow biliary caliber and thus rendering all attempts of using prosthetics and a protecting assembly of axial drainage impossible. For this reason, after performing the end-to-side hepatico-jejunal anastomosis with an isolated Roux-*en*-Y loop, the idea of performing a second latero-lateral duodeno-jejunal anastomosis seemed like the perfect choice. The reason for this is to allow future visiting via endoscopic means of the biliodigestive derivation. Moreover, externalization of the trans anastomotic drainage is also possible in this situation either in a Witzel manner or in a transnazo-gastric way, through the visiting anastomosis. In case of further complication, such as a stenosis of the hepatico-jejunal anastomosis, this solution of a visitor assembly can be a good failsafe plan having at your disposal the endoscopic recalibration.

As for the case of main bile duct section in the pedicle sector, the fault was discovered only after clipping and sectioning this duct and then we realized it was confused with the cystic duct. Meanwhile, the true cystic that was virtually reduced to a few millimeters in length was situated in a very high position, somewhere at the level of the infundibulum and barely noticeable. In retrospective, we admit that this complex alteration of the operative field called for an intraoperative cholangiography, a procedure for which we had both the

technical means and the qualification, but, with great regret, we did not take into consideration. After the full dissection of the loop embedded and engulfed by the parietal inflammatory process of the hepatic duct, which was detached from the gallbladder wall, we discovered that there is enough material for a termino-terminal anastomosis in the absence of any stress of the stumps, even after removal of clipped fragments. As such we performed a termino-terminal anastomosis using slowly absorbable monofilar threads 4-0 in thickness and the final assembly being prosthetized with an axial trans anastomotic drainage that was externalized in a transligamentary manner. This drainage was maintained for five months and later suppressed with no immediate complications (Figure 1).

However, after a year, during a scheduled routine clinical check, in the absence of any clinical signs of suffering whatsoever, we had a possible sign of a hypothetical bilistasis due to some high value of ALP (Alkaline Phosphatase), situated between 900 mg and 1.000 mg/dl, without any further alteration of the laboratory data. Due to the lack of clinical signs we decided not to investigate further the patient with any kind of tracer-based imagistic procedures, such as percutaneous cholangiography or cholangio-MRI (holangio-Magnetic Resonance Imaging).

Still, after about six months, the patient is readmitted in our clinic, this time with obvious signs of an obstructive jaundice. ERCP (Endoscopic Retrograde

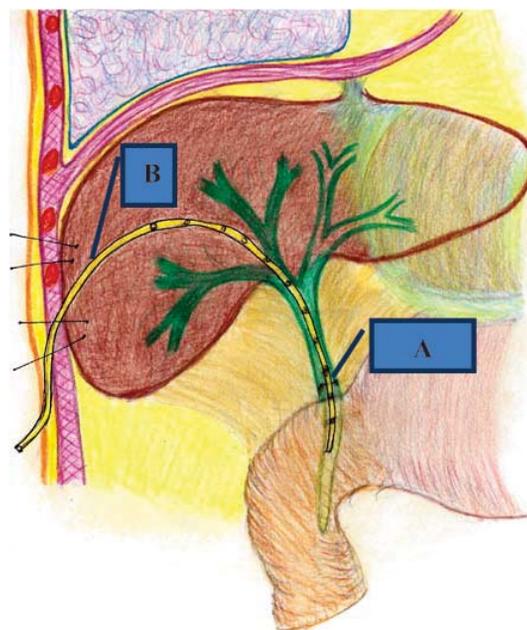


Figure 1. For the reconstruction we chose a bilio-biliary end-to-end suture [A], the final construction being protected by an axial transanastomosis prosthesis and external biliary drainage (transparietohepatic [B]), maintained in place for five months³.

Cholangio-Pancreatography) highlighted a conglomeration of calculi located just above the stenosis area of the termino-terminal anastomosis performed during the reconstructive surgery, in the portion between the hepatic duct and the convergence. Laboratory data revealed an ALP of 1500 mg/dl, and a total bilirubin of 5 mg/dl with the direct component of 4 mg/dl. However AST (Aspartate Aminotransferase), ALT (Alanine Transaminase) and GGT (Gamma-Glutamyl Transpeptidase) did not exceed normal values, but the blood work determined a moderate leukocytosis of 16.000/mm³ WBC (White Blood Cells) (Figure 2, 3).

As a result, surgery is performed, now at about a 1.5 years after the first laparoscopic accident, with biliary desobstruction and restoring the transit through hepatico-jejunostomy on isolated Roux-*en-Y* loop preoperative plan in mind. However, during the intraoperative exploration we found a stone-hard pediculosis at the level of the main bile duct, making very difficult to distinguish the anatomical structures, this being a consequence of the biliary fistula installed at the level of a previous end-to-end anastomosis. Also the duodenum's upper knee was being ascended in the hepatic hilum as a result of the same previous inflammatory and retractile phenomena; the common hepatic duct had a diameter of approximately 1.2 cm. We performed an anterior transverse incision, targeted right on top of the calculus, just above the stenosis area; this maneuver was later accompanied by a flow of lithiasic material and purulent bile colloid evicition. We appli-

ed pressure lavage of intrahepatic bile ducts, followed immediately by even more micro-gallstones and bile purulent discharge. Furthermore we performed an instrumental exploring of the right and left hepatic duct and followed by recalibration of the stenosis area of the main bile duct, located just below the hepaticotomy transverse wound. Thus, biliary transit flow restoration at the level of the main bile duct was possible, surgery completion not excluding at the time the possibility of axial prosthesis for long term recalibration, but with fairly high risk of postoperative restenosis.

And yet, the solution for bile transit restoration came in the form of a latero-lateral hepatico-duodenostomy, prosthethized via a transanastomotic drainage and exteriorized in an axial manner, for the following reasons (Figure 4):

- The advantage of later endoscopic and cholangiography control, both of the biliodigestive anastomosis and of the main bile duct as well, in case of lithiasis relapse;
- The ease of installing an axial transligamentary and of a trans anastomotic prosthesis;
- The two derivation partners had an excellent quality of the wall;
- Perhaps the most important aspect was the tension-free apposition of the duodenum I, already ascended in the hepatic hilum, right to the hepaticotomy wound;
- A wide enough anastomosis opening of over 1 cm.

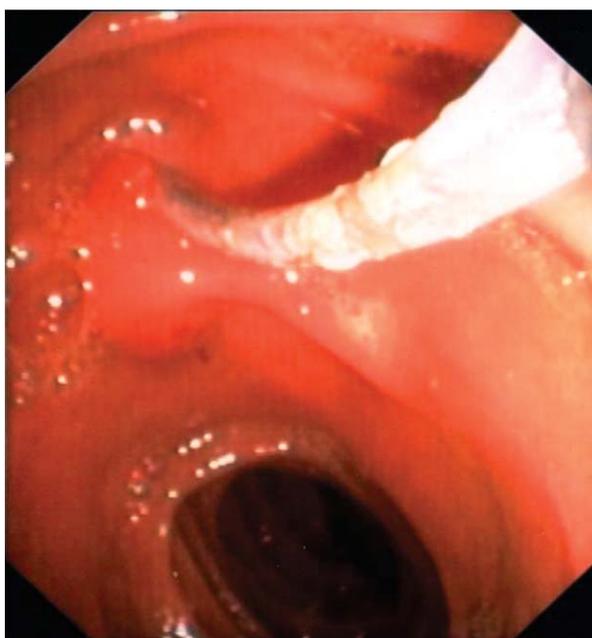


Figure 2. ERCP (endoluminal view) showing the lithiasic material being evacuated after the retraction of the Dormia™ probe³.



Figure 3. ERCP (contrast view) showing an hourglass-shaped calculus grown at the level of the anastomosis, consequently to the stenosing suture, after the endoscopic extraction with the Dormia™ probe of the inferior half³.

The only disadvantage of this installation is, of course, the risk of permanent food pollution of the derivation, a well-known but also quite rare possible cause of dysfunctionality; this could have been overcome by a termino-lateral or lateral-lateral hepatico-jejunostomy.

DISCUSSION

Reconstructive surgery for restoring the biliary-digestive transit, comprises a plurality of techniques which could be systematized into three main groups^{5,6}:

- Reconstructive operations maintaining the integrity of the main bile duct,
- Bypass operations, meaning bilio-digestive anastomoses,
- Substitutive operations, restoring biliary transit by replacing the main biliary conduit with allografts.

From our experience the situations in which the injuries upon the biliary tract can occur are not limited only to classic or laparoscopic cholecystectomy, other possibilities being also to be considered:

- Cholecystectomy for gallstones, especially after laparoscopic technique. A very high risk is considered in all cases of sclero-atrophic cholecystitis, and possible less when it addresses the chronic cholecystitis⁷;
- During surgery of the hepatic hydatid cyst, when the drainage of the remnant cavity is installed in an axial transligamentary manner⁸;

- Bilio-digestive or bilio-biliary fistulas;
- After gastro-duodenal interventions;
- After Kehr type drainage insertion, but this situation only applies to a selected number of cases;
- Jaundice of obstructive nature but neoplastic as well;
- Oddi's papillosphincterotomy during ERCP.

In the case of immediately recognized recognized iatrogenic lesions, the anatomical configuration on which the therapeutic option depends upon is represented primarily by the normal appearance of the biliary stump's wall, which easily allows a tight suture and ensures, with a high percent of success, its endurance. An exception to this situation is the case when the patient underwent a previous an intervention performed in the subhepatic region for an acute inflammatory process that included the liver pedicle.

When the lesion is a pin-hole defect or just a solution of continuity with a gap ranging from 3 to 5 mm, located on the external margin of the common and right hepatic ducts, the defect repair could be simply a suture with a few separate threads of monofilar wire, such as Vicryl™ 3-0 or 5-0, accompanied of course by bile duct prosthesis through an external axial transparietohepatic biliary drainage. These solutions are simple gestures, very effective and usually final, as they tend to be a non-stenosing suture and allow a postoperative evolution free of drawbacks. The drainage should be kept in place for a minimum of two months, but this

Figure 4. A high hepatico-duodenal latero-lateral anastomosis with a tranastomotic prosthesis with the drainage out-putted in axial manner the corresponding postoperative cholangiography showing a fully functional hepatico-duodenal anastomosis, with no leakage and the axial drainage in place³.

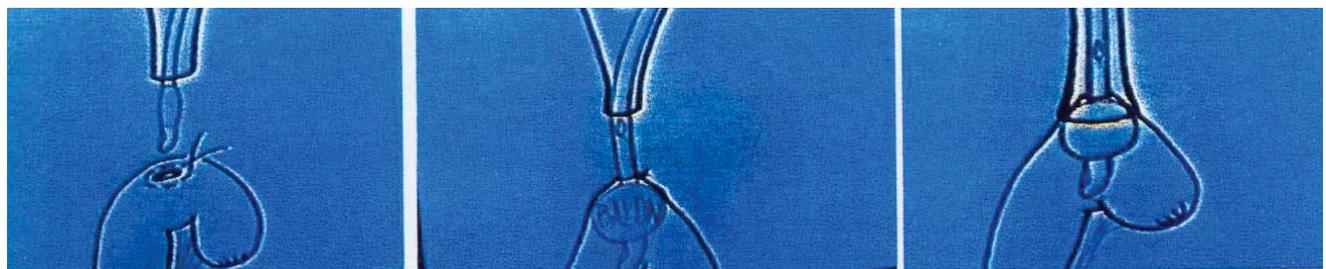
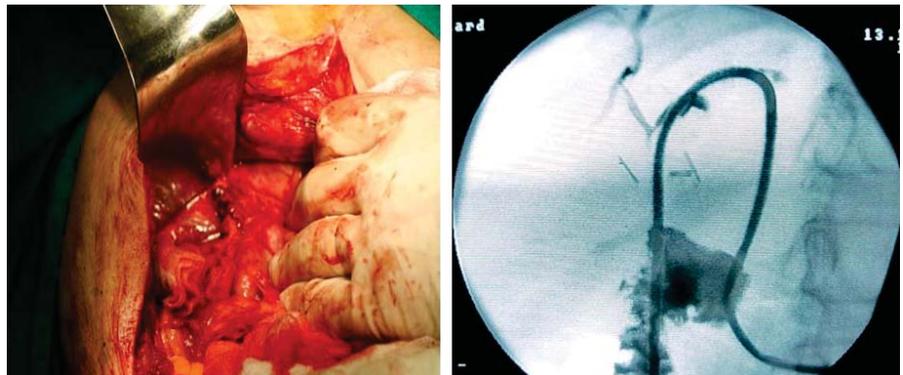


Figure 5. The construction of an hepaticojejunostomy without suture, sequential aspects³.

is decided after some careful evaluation. Such lesions are encountered during laparoscopic cholecystectomy and can be identified, viewed and sutured in this way as well, without the need of conversion to a classic approach. Moreover, the axial prosthesis can also be replaced by a trans cystic drainage, with almost similar effects, if the situation calls for it.

The reconstruction options in the case of an anatomical section at the pedicular level, when the 2 resulting stumps come in close proximity without any kind of tension is somewhat similar. However, in this more complex case, protecting the suture with a transligamentary axial drainage kept in place for a prolonged period of time (more than 5 months) and converting the surgical procedure from laparoscopic to open, are 2 must-have gestures for a successful recovery.

In these cases the challenges of reconstruction attempts by termino-terminal suture in total or partial sections of the main bile duct are the lack of primary biliary axis dilation, (sometimes as narrow as 10 mm or even less) and the full devascularization of the duct due to the excessive laparoscopic dissection with the hook-type monopolar electrode, prior to the accidental lesion. Moreover, due to the above-mentioned narrow caliber, the fitting reconstructive or derivative procedures are often prohibited.

Finally, accidental segmental resections with interruption of the continuity on a greater distance of the main bile duct, such as 1.5 to 3 cm wide, which is an important tissue defect, are definitely difficult to treat because of the high grade of devascularization. This fact forces the surgeon to search above the lesion in a segment of the unaltered hepatic duct that still has a proper vascularization in place, and often we end up at the level of the common hepatic duct or of the convergence itself.

In these cases the major difficulty lies precisely in the distance that separates the two resulting extremities, and as such there is a strong need for a large duodeno-pancreatic detachment necessary for the ascension of the distal biliary stump for a proper end-to-end anastomosis and this is a procedure not easily achievable. As so we end up with a great deal of tension to both ends of the anastomosis that has a high risk of biliary wall devascularisation, which along with traction between the two extremes, is the primary cause of disunity occurring immediately after surgery or of biliary stenosis, on the long term. Therefore the termino-terminal suture is not recommended in these cases and usually not possible.

Apart from the classic hepatico-jejunostomy, in practice we sometimes use a personal procedure of E. Brazuca, implemented for the first time way back in

1994, where hepatico-jejunostomy is performed without sutures or external anchorage, the contention of the two sides being provided by the traction exerted on the inflated balloon of a standard Foley probe, passed through the biliary stump, trans-anastomotically, and through the stoma of the jejunal loop, thus achieving the apposition or contact between the biliary stump's epithelium and the serosa of the ascended isolated loop (Figure 5). In time, due to this tight apposition, this method allows for a scar tissue to be formed, tightness and proper functionality can therefore be achieved. For this method to work, the hepatico-jejunal installation must be allowed a period of 18 days to be fully consolidated as such.

This procedure can be successfully applied to defects as large as 1.5 cm, although we had a case of a much larger gap of 2 cm that we were able to repair through this method. Up to date a large number of cases benefited from this type of surgical repair. So, even in these extreme situations there is still a solution of repair; the best indications for this method are a short biliary stump, undilated and with thin walls that make it prohibited to anastomosis. Good patient evolution in cases submitted to this operation years ago seems to support these claims^{9,10}.

Having said that now we come to realize that actually there are only two solutions a surgeon can go to for a successful bile flow restoration: reconstruction or bypass. For anatomical transection both surgical solutions can be taken into account, while for the resection of a segment of the main bile duct we can only rely on hepatico-jejunal derivation.

Whatever the preferred solution may be, a prosthetic method for a successful outcome must be taken into consideration and actually is required, with the aid of an axial drainage with either transligamentary or transparietohepatic exteriorization. Maintaining such a drainage is to be expect to reach six months.

CONCLUSIONS

This paper's aim is not to become an exhaustive operative textbook for all biliary reconstructive procedure, but to present a collection of interesting cases in which different surgical strategies led to very good results and thus can be taken into consideration for further development.

In the case of lesions discovered immediately, the surgical difficulties rely in the first place on the lack of dilation of the proximal biliary stump and although the biliary wall is normal in thickness and is actually fit for suture, the small inner diameter make an end-to-end suture virtually impossible, as opposed to the early

complications stage, a stage marked mainly by open fistulas in the free peritoneum, when to the lack of dilation of the main bile duct resides in the infiltration, congestion and edema of the hepatic pedicle, and a friable ductal wall is definitely unfit for an apt suture and thus requiring a differentiated therapeutic approach¹¹.

Our full recommendation goes for an isolated Roux-*en-Y* loop hepatico-jejunostomy for all those situations of accidental injuries of the main bile duct when the proximal biliary stump is unfit for a good quality anastomosis; these cases include the following situations: the stump is too short, with less than 1 cm to the convergence, has a thin wall, a size below 1 cm in length. All these conditions can make a suture inadequate as the surgical threads have a good chance of fail¹¹.

For all iatrogenic lesions identified right at the moment of development, the optimal solution is the main bile duct reconstruction under the protection of an axial drainage which shall be removed after a careful evaluation, usually after 5 months. A biliary stump with a caliber that is too small forces the surgeon to choose a bypass method allowing in the same time an axial prosthetization (the Grassi procedure).

The variant of reconstruction by termino-terminal anastomosis offers, in our opinion, the lowest chances of success (although quite possible to succeed, to some extent), for the following reasons:

- Regardless of the length of devascularization, a good blood flow to both trances is required for the viability of the anastomosis, which is unlikely after laparoscopic dissection, especially due to the use of the monopolar hook-type devices;
- Furthermore, in order to obtain two well-irrigated stumps the surgeon must resect the affected ends, thus enlarging even more the gap and therefore creating a higher tension in the final anastomosis;
- Assuming that a supplementary resection of the stumps is not necessary, and no tension on the montage is present, any suture, to a lesser or greater extent, is exuberant, as it relies on the foreign materials of the threads, even if we use monofilar wires; this exuberant reaction goes both extra but especially endoluminally, thus requiring the association of a trans anastomotic prosthesis. This goal can be achieved only with the use of an axial approach and should be kept in place

at least 6 months in order to avoid a long term stenosis development;

- Because of stasis and failure of the Oddi's sphincter to resume full functionality in the immediate postoperative period (24 to 48 hours usually, in less cases up to 72 h), even if the food stimulation is applied, leads to a pressure build-up in the biliary tree and therefore endangers the anastomosis. This is why the endoluminal pressure regime in these cases is much higher than in any other type of biliodigestive derivation;
- The bilio-digestive derivations with a free intestinal loop are not subject to such a pressure regime because the absence of sphincter obstacles and in this case there is a pressure gradient between the biliary end and the intestinal lumen, with a higher pressure reading in the main bile duct and lower one at loop level, this situation leading to a free trans anastomotic flow and assures a leakage-free construction of the anastomosis.

The strategy of ligations applied on the remaining bile ducts with the intent of a controlled postoperative dilation must be avoided, in our opinion, as they can add to the surgical site a parietal necrosis, a dangerous situation with a high risk of fistula reoccurrence.

While most of the surgeons, faced with an intraoperative iatrogenic lesion of the main biliary pathways, will choose the procedure that he knows how to perform at a technical level, we believe that a good operator must know all the technical and tactical solutions available at hand in order to properly choose the best one in accordance with the case's particularities, as there are no standard procedures applicable in all cases and in extreme situations to even improvise to obtain the optimal solution¹².

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References

1. Bismuth H, Lazorthes F. [83rd Congress of the French Surgical Society (Paris, 21-24 September 1981). Second report. Operative injuries of the common biliary duct]. *Journal de chirurgie*. 1981;118(10):601-9.
2. Strasberg SM, Callery MP, Soper NJ. Laparoscopic surgery of the bile ducts. *Gastrointestinal endoscopy clinics of North America*. 1996;6(1):81-105.
3. Ungureanu F. D. BE, Straja D., Badulescu A., Ungurianu L., Pricop M., Dragoescu D., Debretin M., Toba M., Moldovan A. C., Balmes B., Ungureanu D. Tehnici Curente in Chirurgia Clasica si Laparoscopica. 2006;11:362.
4. Schiappa JM. Iatrogenic lesions of the biliary tract. *Acta chirurgica Belgica*. 2008;108(2):171-85.
5. Valentino A. [Reconstructive surgery of the biliary tract]. *Minerva chirurgica*. 1977;32(5):257-78.
6. Cristian Balahura PIC, Gabriel Constantinescu. Modern Management of Benign Bile Duct Strictures. *Modern Medicine*. 2015;22(2):144-50.
7. Sorin Păun IT, Ionuă Negoii, Bogdan Stoica, Mircea Beuran. Technical Challenges of Laparoscopic Cholecystectomy in Patients with Cholestasis. *Modern Medicine*. 2015;22(3):277-81.
8. Ungureanu FD, Ungurianu L, Hasias S, Cucu S, Gadea A, Zaharescu I, et al. [The extraperitoneal transomphalic drainage of the postoperative hydatid cavity through the transposed round ligament detached from the liver]. *Chirurgia*. 2004;99(1):87-92.
9. Bratucu E. [Hepaticojejunostomy]. *Chirurgia*. 2005;100(2):159-62.
10. Bratucu E, Straja D, Cirimbei C, Alecu M, Nechita D. Double sutureless hepaticojejunostomy. *Chirurgia*. 2011;106(3):375-8.
11. Ungureanu F. D. BE, Straja D., Ungurianu L., Mihaela Pricop, Madalina Toba, Moldovan A. C. Leziuni accidentale laparoscopice ale caii biliare principale. Reconstructie sau derivatie? *Revista Chirurgia*. 2009;104(2):1.
12. Belis V. Toward an European Legislation in Administrating Forensic Probation. *Modern Medicine*. 2014;21(1):7-9.