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ORIGINAL ARTICLE

MINIMALLY INVASIVE SURGERY FOR OBSTRUCTIVE JAUNDICE CAUSED BY MALIGNANT TUMORS

E.N.Kolesnikov, S.S.Mezentsev*, A.V.Snezhko, M.N.Chernyak, F.N.Grechkin, T.M.Kecheryukova, O.Yu.Kaimakchi

National Medical Research Centre for Oncology of the Ministry of Health of Russia,
63 14 line str., Rostov-on-Don 344037, Russian Federation

ABSTRACT

Purpose of the study. On the basis of the accumulated experience to optimize approaches to the preoperative preparation, technical aspects of X-ray surgical antegrade minimally invasive endobiliary interventions, rational postoperative management of patients in order to reduce postoperative complications, improving treatment outcomes and quality of life of patients.

Materials and methods. We analyzed 1610 percutaneous transhepatic endobiliary surgeries with separate examination of 1186 X-ray surgical procedures of percutaneous external biliary drainage (PEBD) and 424 cases of antegrade endobiliary stenting (AEBS)

Results. Complications after PEBD were developed in 9 (0.76%) patients: the procedure-related bleeding was noted in 3 (0.25%) cases, and bleeding caused by the progression of hepatic failure, hypocoagulation in 6 (0.5%) cases. 3 patients (0.25%) of this group died. Complications after AEBS were registered in 35 (8.3%) patients: acute postoperative pancreatitis in 24 (5.7%) cases, progression of liver failure, hypocoagulation in 9 (2.1%), tumor-induced duodenal stenosis in 2 (0.47%) cases. One patient (0.24%) of this group died. Reduction in complications after PEBD and AEBS is directly associated with surgery techniques, the use of special tools, and tactics of patient management.

Conclusion. The prevention of complications, treatment outcomes, and the quality of life of patients receiving interventional antegrade endobiliary surgery are inextricably associated with the technical aspects of interventions, the tools and tool materials, necessary correction of endogenous toxicosis, pancreatitis, hepatic failure, and hemostatic system disorders. Constant monitoring of the results of new technologies is necessary to analyze gathered experience for possible correction and optimization of tactical approaches and schemes for more effective treatment of patients with this severe pathology.

Keywords:
oncological interventions, obstructive jaundice, biliary stenting, biliary drainage, hepatoduodenal tumors, pancreatic cancer.

For correspondence:
Stanislav S. Mezentsev – Cand. Sci. (Med.), specialist in X-Ray endovascular diagnostics and treatment National Medical Research Centre for Oncology of the Ministry of Health of Russia, Rostov-on-Don, Russian Federation.
Address: 63 14 line str., Rostov-on-Don 344037, Russian Federation
E-mail: stas@mezentsev.me
ORCID: https://orcid.org/0000-0002-4041-7535
SPIN: 2580-5712, AuthorID: 794786
ResearcherID: AAO-5612-2020

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ОРИГИНАЛЬНАЯ СТАТЬЯ

МИНИИНВАЗИВНЫЕ ХИРУРГИЧЕСКИЕ ОПЕРАЦИИ ПРИ ОБТУРАЦИОННОЙ ЖЕЛТУХЕ, ВЫЗВАННОЙ ЗЛОКАЧЕСТВЕННЫМИ ОПУХОЛЯМИ

Е.Н.Колесников, С.С.Мезенцев*, А.В.Снежко, М.Н.Черняк, Ф.Н.Гречкин, Т.М.Кечерюкова, О.Ю.Каймакчи

ФГБУ «НМИЦ онкологии» Минздрава России,
344037, Российская Федерация, г. Ростов-на-Дону, ул. 14-я линия, д. 63

РЕЗЮМЕ

Цель исследования. На основе накопленного опыта оптимизировать подходы к предоперационной подготовке, техническим аспектам выполнения рентгенохирургических антеградных миниинвазивных эндобилиарных вмешательств, схемам рационального послеоперационного ведения пациентов для снижения послеоперационных осложнений, улучшения результатов лечения и качества жизни пациентов.
Материалы и методы. В статье проведен анализ 1610 чрескожных чреспечёночных эндобилиарных хирургических операций с раздельным исследованием рентгенохирургических наружных чрескожных дренирований желчных протоков печени (РЧДЖП) — 1186 случая и антеградных эндобилиарных стентирований жёлчных путей (АСЖП) — 424 случая.
Результаты. Осложнения при РЧДЖП развились у 9 (0,76%) пациентов: кровотечение, связанное непосредственно с манипуляцией, отмечено в 3 (0,25%) наблюдениях, вызванное прогрессированием печеночной дисфункции, гипокоагуляцией — в 6-и (0,5%) случаях. В этой группе умерло 3 пациента (0,25%). Осложнения при АСЖП отмечены у 35 (8,3%) больных: острый послеоперационный панкреатит — в 24 (5,7%) случаях, прогрессирование печёночной недостаточности, гипокоагуляции в 9 (2,1%), дуоденальный опухолевый стеноз — в 2-х (0,47%) случаях. В этой группе умер 1 больной (0,24%). Снижение количества осложнений при выполнении РЧДЖП и АСПЖ напрямую связано с техникой выполнения операций, применением специального инструментария, тактикой ведения пациентов.
Заключение. Профилактика осложнений, исход лечения и качество жизни пациентов при выполнении интервенционных антеградных эндобилиарных операций неразрывно связаны с техническими аспектами выполнения вмешательств, используемого инструментария и материалов для их изготовления, необходимостью коррекции эндогенного токсикоза, панкреатита, печёночной дисфункции и нарушений системы гемостаза. Необходимым представляется постоянный мониторинг результатов использования новых технологий с целью анализа накопленного опыта для возможной коррекции и оптимизации тактических подходов и схем для более эффективного лечения пациентов с этой тяжёлой патологией.

Ключевые слова:
интервенционные вмешательства в онкологии, обтурационная желтуха, стентирование желчных протоков, дренирование желчных протоков, опухоли гепатодуоденальной зоны, рак поджелудочной железы

Для корреспонденции:
Мезенцев Станислав Станиславович – к.м.н., врач специалист по рентгенэндоваскулярным диагностике и лечению ФГБУ «НМИЦ онкологии» Минздрава России, г. Ростов-на-Дону, Российская Федерация.
Адрес: 344037, Российская Федерация, г. Ростов-на-Дону, ул. 14-я линия, д. 63
E-mail: stas@mezentsev.me
ORCID: https://orcid.org/0000-0002-4041-7535
SPIN: 2580-5712, AuthorID: 794786
ResearcherID: AAO-5612-2020

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RELEVANCE

Today, percutaneous transhepatic endobiliary surgery (PTES) is an important branch of interventional radiology, especially when applied to the treatment of patients with obstructive jaundice (OJ) caused by malignant neoplasms (MN). The combination of minimally invasive surgical interventions makes it possible to solve a large number of emerging medical and diagnostic problems in this severe pathology. Such operations are usually characterized by a low degree of trauma and a small number of complications compared to traditional "open" surgery. In the practice of treatment of malignant tumors complicated by OJ, the commonly used methods of PTES are operations of antegrade cholangiostomy. The variety of clinical situations determines the features of using various technical options for the purpose of solving A wide range of tasks facing the Clinician. Large multi-specialty medical institutions in our country have a rich experience in using minimally invasive percutaneous operations. at present, their implementation in surgical practice is quite well developed, and the methods of PTES have become every day and routine [1–3].

After performing PTES, complications associated with the manipulation itself develop in patients in the range from 2.4 to 32.7%, and their mortality is from 0.4 to 13.8% of patients [4–6]. such significant fluctuations determine the relevance of the search for unified approaches and techniques for performing these interventions. There is no doubt that there is a need for a clearer definition of the indications for performing PTES in various types of cholestasis and localization of the level of bile tree obstruction [7, 8].

Over the past 10 years, the operation of choice for the syndrome of tumor origin is minimally invasive surgical operations of internal and external bile drainage in the FSBI "NMRC of Oncology" of the Ministry of health of the Russian Federation. The most commonly used methods are x-ray surgery for percutaneous external biliary drainage (PEBD) and antegrade endobiliary stenting (AEBS). Sufficient experience has been accumulated in these operations, which requires analysis to optimize and standardize approaches to all aspects of treatment of these patients.

The purpose of the study: based on the accumulated experience, to optimize approaches to preoperative preparation, technical aspects of performing x-ray surgical antegrade minimally invasive endobiliary interventions, and rational postoperative management of patients with obstructive jaundice, caused by malignant tumors to reduce postoperative complications, improve treatment results and quality of life of patients.

MATERIALS AND METHODS

In 2010–2019, 1610 percutaneous transhepatic endobiliary surgeries were performed at the FSBI "NMRC of Oncology" of the Ministry of health of the Russian Federation, of which 1186 patients underwent PEBD and 424 patients underwent AEBS. In the majority of patients (408 cases — 96.3%), AEBS surgery was performed as the second stage of palliative minimally invasive treatment of subhepatic jaundice of tumor etiology after reducing the level of bilirubin in the blood to 40–60 mmol/l, and only in 16 (3.7%) patients such intervention was performed simultaneously.

The number of patients with OJ events of tumor etiology who underwent PEBD surgery was 1,145. In 841 patients (73.5%) of them, according to the survey, a tumor of the periampular region was detected, in 157 (13.7%) cases, MN of the liver and/or proximal bile ducts was detected, in 147 (12.8%) patients, OJ was the result of local or metastatic progression of malignant neoplasms of other localities, in most cases of cancer of the stomach, breast, colon and rectum.

In 919 patients, PEBD surgery was the first stage of surgical treatment, which accounted for 77.5% of all cases. At the second stage, 270 (29.4%) patients underwent gastropancreatoduodenal resections, and 354 (38.6%) patients underwent biliodigestive and/or gastroenteroanastomoses. In patients with advanced tumors, only external drainage was performed in 295 (32%) cases.

Antegrade endobiliary stenting of the biliary tract was performed in patients with malignant neoplasms that were morphologically verified in all cases (from the primary or metastatic focus). In 247 (58.4%) cases, these were mn of the periampular region, in 132 (31.2%) cases — of the liver and proximal bile ducts. Other complicated MN was an indication for AEBS in 45 (10.4%) patients. In 19 cases, AEBS was performed for metastatic bowel cancer, in 11 cases for stomach cancer, in 9 cases for breast cancer, in 2 and 1 cases for kidney and lung cancer, respectively. In 3 patients, mechanical jaundice was a manifestation of metastatic lesions of the lymph nodes of the retroperitoneal space and the hepatoduodenal ligament MN without a primary focus.

RESULTS OF THE STUDY

In all patients who underwent an X-ray external percutaneous drainage of the bile ducts of liver under ultrasound guidance (1186 cases), bile was obtained intraoperatively during puncture of the segmental or lobar bile duct and the drainage system was reliably installed in the bile tree. Complications during the implementation of PEBD developed in 9 (0.76%) patients are introduced in the Table 1. All of them were associated with the bleeding.

The development of bleeding directly related to manipulation was observed in 3 (0.25%) cases: the first patient was found to have a wound to the hepatoduodenal ligament with a portal vein injury and massive intra-abdominal bleeding. The second had an intraparenchymatous hematoma with a rupture of the liver along the puncture channel and blood entering the free abdominal cavity. In these two cases, urgent surgical intervention was required to suture the bleeding site, and after the end of treatment, patients were discharged to prepare for the next stage of treatment at their place of residence. The third patient suffered damage to intercostal vessels with massive intrapleural bleeding. The cause of death of this patient was post-hemorrhagic shock, despite urgent thoracotomy and stopping bleeding on the 2nd day after urgent intervention. The development of bleeding associated with severe coagulopathy (hypocoagulation), due to the progression of hepatic dysfunction, was noted in 6 (0.5%) cases after successful

Table 1. Complications in PEBD

Causes of complications	The nature of the complications	Outcome of hospitalization
bleeding directly related to manipulation: 3 cases (0.25%)	damage to the hepatoduodenal ligament with intra-abdominal bleeding: 1 case	Releases
	development of intraparenchymatous hematoma with its rupture: 1 case	Released
	damaged intercostal vessels with intrapleural bleeding: 1 case	Passed away
bleeding associated with hepatic dysfunction, hypocoagulation: 6 cases (0.5%)	angiodysplasia of the small bowel: 1 case	Passed away
	development of acute erosive and ulcerative bleeding: 3 cases	1 passed away
	the development of hemophilia: 2 cases	Released

Table 2. Complications after AEBS

Complications' character	Hospitalization outcome
Development of acute postoperative reactive pancreatitis: 24 cases (5,7%)	Released
Progression of liver failure, hypocoagulation: 9 cases (2.1%)	1 passed away
Development of duodenal stenosis 3-4 degrees: 2 cases (0.47%)	Released

drainage surgery. The first patient died of profuse small bowel hemorrhage due to congenital vascular angiodysplasia of the small intestine. Three other patients from them developed acute erosive gastrointestinal bleeding, which led to a fatal outcome in one patient against the background of DIC progression. Two more patients were complicated by the development of hemobilia within 2 days after the operation. In these cases, the bleeding was conservatively stopped against the background of hemostatic and hepatotropic therapy.

Complications after performing antegrade endobiliary stenting of the biliary tract were noted in 35 (8.3%) patients, which is comparable to the data of other authors of 8–18% [9–12], presented in table 2.

The most frequent of them was acute postoperative pancreatitis, the development of which was noted in 24 (5.7%) patients. 9 (2.1%) patients were diagnosed with progressive liver failure, accompanied by severe coagulopathy, manifested by significant hypocoagulation. 2 patients (0.47%) were diagnosed with duodenal stenosis of the 3rd degree during hospitalization, which required performing bypass gastroenteroanastomosis. After performing AEBS, 1 patient (0.24%) with generalized pancreatic head cancer, multiple metastatic lesions of retroperitoneal lymph nodes, liver, and bones died. The cause of death was massive gastrointestinal bleeding, the source of which was numerous erosions of the stomach and upper small intestine against the background of pronounced hypocoagulation. In other patients, the phenomena of hypocoagulation were managed to be stopped conservatively. Overall postoperative mortality after PTES was 0.19%.

DISCUSSION

According to the literature, it is mini-invasive PTES in OJ of tumor Genesis that have become one of the most widespread mini-invasive interventions in General clinical practice. Tactical approaches to the use of biliary drainage techniques to eliminate OJ of tumor and non-tumor Genesis are different [13]. To date, antegrade (external or external-internal) and retrograde (internal) drainage of the bile tree in OJ caused by malignant neoplasms have taken the character of routine minimally invasive intervention. Depending on a particular surgical school, specialists performing these operations prefer the first or second method, as well as combined "rendez-vous" methods. The Russian and world literature describes the positive and negative aspects of each of them, and a huge experience has been accumulated for each of them. According to summary statistics, it is not possible to perform endoscopic papillosphincterotomy in 5–12% of patients, complicated cases occur in 6–10%, and the mortality rate is 1–4% [14].

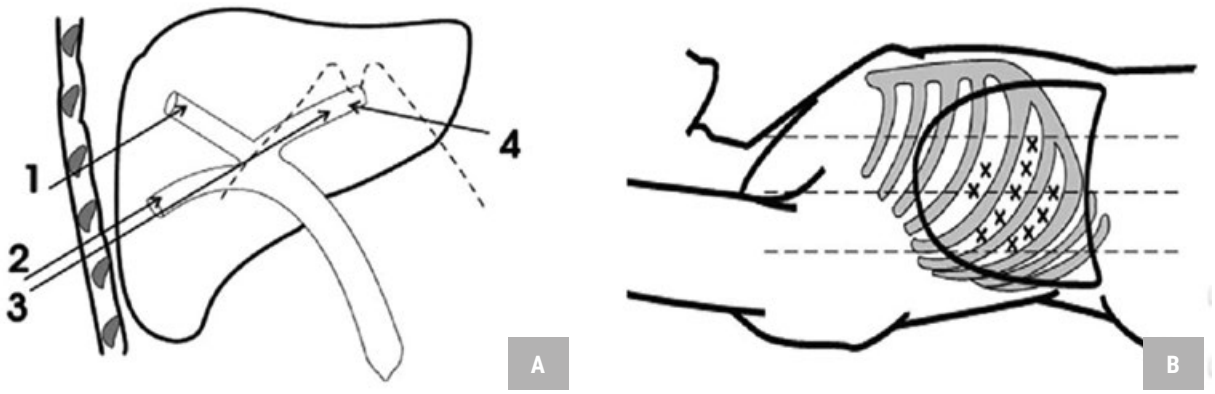

Fig. 1. Variants of surgical access for PEBD used in NMRC Oncology: A – vectors of directions for access to the right 1, 2 and left 3, 4 lobe bile ducts of the liver; B – variants of skin puncture sites depending on the intraoperative ultrasound picture and the height of the costal-diaphragmatic pleural sinus.

The production of antegrade intervention has an undeniably higher percentage of successful results, allows you to leave the tumor block intact, minimize the development of the perioperative inflammatory process (pancreatitis, papillitis), and create prerequisites for a more unhindered and rapid fusion of the anastomosed tissues in the upcoming radical intervention. Today, based on our experience, we can confidently state that the most safe for patients and convenient for surgeons in prognostic terms (before performing radical surgical interventions) method of decompression of the bile tree in OJ of tumor Genesis is precisely antegrade x-ray external percutaneous drainage of the bile ducts of the liver under ultrasound guidance and x-ray control.

Technical aspects of performing PEBD are the most important factor in reducing the number of complications [4, 7, 15]. We associate the fundamental aspect of successful execution of the PEBD with the use of seldinger puncture access along the anterior or mid-axillary line on the right side in the 6, 7 or 8 intercostal spaces. In this case, the vector of the puncture needle runs almost parallel to the course of the right lobar bile duct (Fig. 1)

Often, with such access, the puncture trajectory affects elements of the right costal-diaphragmatic pleural sinus, and various complications may occur, but we have not noted cases of lung injury or bile entering the pleural cavity. Only in one case, hemothorax developed due to damage to the intercostal artery against the background of severe hypocoagulation, which required urgent surgical intervention. In some cases, x-ray examination showed a slightly pronounced pneumothorax, which had no clinical manifestations and was resolved independently within 3–5 days after manipulation.

The second important aspect of the successful completion of PTES is the evolution of the creation of special tools and materials used for their manufacture. In particular, one of the factors that we achieved relatively few complications when performing PEBD is the use of catheters for draining ducts made of structural polyurethane resins (ultratan) instead of plastic materials. In our experience, ultratane drainage systems do not injure the wall of the choledochus, minimize the risk of intraoperative bleeding, dislocation of drainage, bile leaks into the abdominal cavity, have a good hydrophilic coating and x-ray contrast marks for atraumatic and easy installation, are installed in the choledochus or lobar bile duct with virtually no radial ruptures of the liver capsule and the walls of the segmental or lobar bile ducts, are resistant to kinks, well maintain patency, consist of a very smooth and soft material, providing high comfort for the patient, they provide a reliable fixation inside the bile duct and have a large internal lumen. Drainage perforations (side holes) are located on the inner diameter of the fixing ring "pig-tail" of the drainage, which prevents blocking of the holes.

The use of modern consumables has led to the correction of management tactics for patients with biliary tract tumor obstruction. It is considered that if the patient is not shown to perform radical surgery due to the local spread and/or generalization of the cancer process and the predicted life expectancy is less than 3–4 months, biliary stenting should be performed after performing the PEBD. With a longer predicted life expectancy, it is preferable to perform an open (or endoscopic) pallative surgical aid — the formation of a bypass biliodigestive anastomosis (most often a hepaticoenteroanastomosis on a small bowel loop that is turned off by Rue) and the imposition of a gastroenteroanastomosis according to indications [16, 17]. In our opinion, this is justified in cases where plastic tubular stents with side holes are used. During the period of use of such stents, the ratio of patients who underwent AEBS and patients with the formation of these bypass anastomoses was 1 to 1.5 (180 stents, 269 anastomoses).

When using self-extracting Nickel-titanium stents in the subsequent period, we noted a decrease in the number of complications (reduction of cholangitis by 73% ($p \leq 0.01$), pancreatitis by 52% ($p \leq 0.05$), pain syndrome by 68% ($p \leq 0.01$) and, as a result, an improvement in the quality of life of patients, no need for frequent periodic maintenance/replacement of stents (the average stent maintenance interval increased from 1–3 months to 1–1.5 years), as well as due to the lack of access

to the skin (under the skin) of the end face plastic stent tube. The internal diameter of the lumen of such stents reaches 8–10 mm, which makes it possible to adequately and reliably perform bile drainage into the 12-and duodenum (Fig. 2).

Nowadays we do not perform balloon dilation of the stent lumen during its installation and leave a closed safety cholangiostomy after stenting for 3 months. This reduced the incidence of early postoperative pancreatitis and cholangitis by 84% ($p \leq 0.01$). During this time, patients receive special antitumor treatment. If after 3 months during the control study (cholangiography and MRI) there is no deformation of the lumen and funnels of the stent, the safety cholangiostoma is removed on an outpatient basis. At the moment, we perform balloon plastic surgery (dilation) of the tumor block only for extremely dense and extended strictures, in case of severe difficulties in removing the delivery device of the stent-endoprosthesis.

We have experience in monitoring a fairly large number of patients with installed Nickel-titanium stents-endoprostheses for 18–24 months or more without any complications from the stent and manipulations for its maintenance. If stents fail due to tumor growth or lumen obstruction, we perform stent-to-stent restenting. The number of such observations during 2 years was 6 cases. In this regard, we consider the presence of signs of duodenal tumor stenosis or a high risk of its development to be

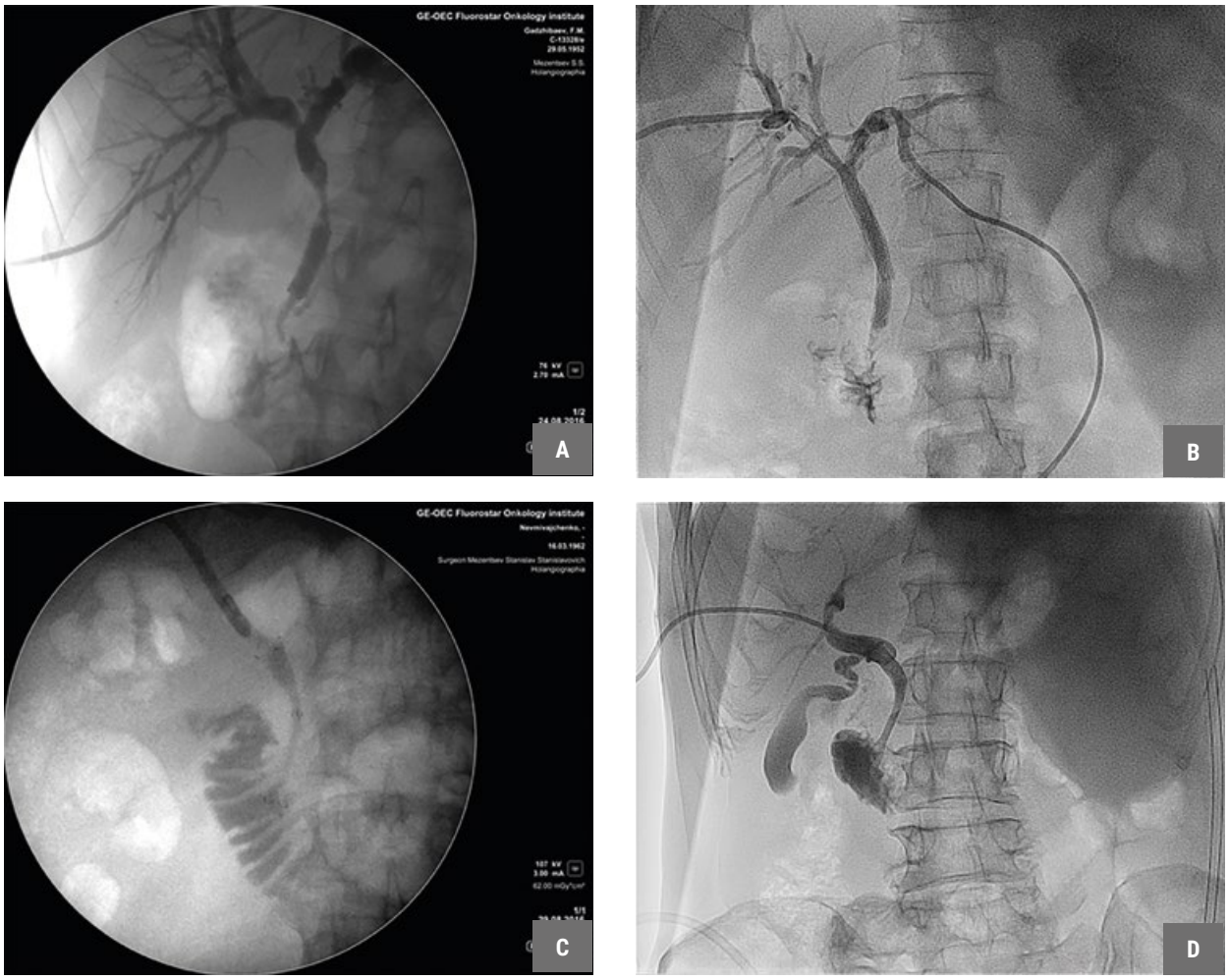

Fig. 2. Cholangiograms of patients after installing self-extracting stents with a proximal block of choledoch (a), a proximal block at the level of confluence of the lobe ducts in a Klatskin tumor – Y-shaped stenting (b) and distal blocks (c, d) of the biliary tract.

an absolute indication for the formation of bypass anastomoses. After the start of using self-extracting stents, the ratio of the number of patients who underwent stenting or bypass anastomosis formation was 3.5 : 1.0 (244 and 69, respectively).

It seems appropriate to differentiate the management tactics of patients with the prospect of performing radical surgery in the future and patients with unresectable forms of MN. Thus, when the lobular ducts of the liver were separated (15 cases of Klatskin's tumor and metastatic lesion of lymph nodes or liver gate parenchyma), we used separate drainage of the lobular bile ducts of the liver. In these cases, the operation was performed simultaneously or at intervals of 3 to 7 days during one hospitalization. We consider it impractical to drain more than two bile ducts when liver segments are separated. According to our experience, in these cases, the probability of complications of drainage operations increases dramatically (three patients had 3 segmental ducts drained; in all cases, we observed bleeding from puncture wounds of the liver capsule, which could be stopped by active conservative therapy), while the clinical effect (elimination of mechanical jaundice) due to the progression of the tumor process is very short-term and does not affect life expectancy and its quality. Radical surgery was performed only in 3 patients of this observation group.

During the analyzed period of time, we performed percutaneous transhepatic drainage of the gallbladder through its bed only in 3 cases (due to insufficient diameter of the ductal system of the liver for conducting the conductor and catheter). This manipulation is technically simpler, but has a number of disadvantages. The main ones are edema of the gallbladder duct in the postoperative period, a high probability of inadequate drainage of the bile tree due to the spread of the tumor to the hepatoduodenal ligament with the “shutdown” of the gallbladder, the inability to perform AEBS if radical surgery is not possible. When performing percutaneous drainage of the gallbladder (including according to our earlier experience), more pronounced pain syndrome is often observed compared to drainage of the ductal system of the liver. This is probably due to the good innervation of the gallbladder bed from the hepatic plexus. In one case, we were able to perform AEBS after cholecystostomy in a clinic from the place of residence. The need to perform an attempt to perform this manipulation was dictated by the severity of the patient's condition, due to large losses of bile, and the inability to perform General anesthesia due to water-electrolyte disorders. It is impossible to perform such interventions in everyday practice due to the narrowness and tortuosity of the specified duct.

Prevention of complications during interventional PTES in patients with OJ, especially caused by MN, is inextricably linked with the need to correct endogenous toxicosis, hepatic dysfunction, and hemostatic disorders [5, 7, 18]. According to our experience, patients with an international normalized ratio in the coagulogram greater than 1.8 and a prothrombin index less than 45% need to undergo preoperative preparation for 5–7 days to correct the phenomena of hypocoagulation. All patients with an initial level of total blood bilirubin over 300 mmol/l during the first day after performing the operation were treated with gravitational plasmapheresis. Some patients needed 2–3 sessions of plasmapheresis to correct hepatic dysfunction at 1–2-day intervals. The plasmapheresis procedure was also performed as planned in all patients who were predicted to perform radical surgery after the elimination of OJ in order to prevent liver failure [19]. This allowed us to normalize homeostasis indicators 2–3 weeks faster than when performing only traditional infusion detoxification therapy, reducing the likelihood of tumor progression by reducing the time before radical intervention. In most cases, patients after performing AEBS experienced reactive pancreatitis, accompanied by hyperamylasemia, which is more pronounced when using self-extracting Nickel-titanium stents. This is due to the pressure of the opening device in the process of “shrinking” (increasing the diameter of the lumen of the installed stent by reducing its length) on the pancreas. The perioperative therapy regimen for all patients with AEBS necessarily included octreotide, as well as proteinase inhibitors (when the level of pancreatic amylase is higher

than 200 u/l). Octreotide was used in a dosage of 0.1–0.3 mg (depending on the severity of pancreatitis) subcutaneously 1–3 times a day. This therapy was performed in the acute period for 3–7 days before the elimination or clinically pronounced reduction of pancreatitis. After performing AEBS, patients received ursodeoxycholic acid 250 mg 1–3 times a day to improve the rheological properties of bile, reduce the phenomena of biliary sludge and reflux of intestinal contents through a stent.

CONCLUSIONS

The use of minimally invasive drainage operations on the biliary tract is currently the most effective and frequent method of treating patients with obstructive jaundice of tumor Genesis. According to our data, when using minimally invasive antegrade percutaneous biliary interventions, there is a relatively low level of complications (0.76% for drainage operations and 8.3% for stenting, which is comparable to the data of other authors) and mortality (the total postoperative mortality for these two methods was 0.19%). This depends both on the experience of specialists (over the past 10 years, FSBI " NMRC of Oncology" has performed more than 1,610 of these techniques), and on the improvement of tools and supplies used in interventional Oncology (the use of catheters for drainage of ducts made of structural polyurethane resins, the use of stents made of Nickel-titanium threads with thermal memory, covered with a silicone membrane). It is necessary to constantly monitor the results of using new technologies in order to analyze the accumulated experience for possible correction and optimization of tactical approaches and schemes for more effective treatment of patients with this severe pathology.

Authors contribution:

Kolesnikov E.N. – research concept and design, scientific editing

Mezentsev S.S. – writing text, processing material, preparing illustrations and tables, collecting, analyzing and interpreting data, making bibliographies, performing surgery, surgery assisting.

Snezhko A.V. – research concept and design, text writing, scientific editing, material processing, technical editing, data analysis and interpretation, article preparation.

Chernyak M.N. – text writing, technical editing, article preparation, operations execution, surgery assistance.

Grechkin F.N. – writing text, processing material, performing surgeries, assisting surgeries.

Kecheryukova T.M. – writing text, processing material, performing surgeries, assisting surgeries.

Kaimakchi O.Yu. – concept and design of the study, scientific editing, preparation of the article.

References

1. Kit OI, Kolesnikov EN, Mezentsev SS, Snezhko AV. Antegrade biliary drainage surgery for obstructive jaundice. Annals of HPB Surgery. 2017;22(2):89–93. (In Russian).
https://doi.org/10.16931/1995-5464.2017289-93

2. Vetshev PS, Musaev GKh, Bruslik SV. Percutaneous minivasive technologies: history, traditions, negative trends and perspectives. Annals of HPB Surgery. 2014;19(1):12–16. (In Russian).

3. Kulezneva YuV, Bruslik SV, Musaev GKh, Izrailov RE, Kirillova MS. Percutaneous modalities of biliary decompression: development and disputable items. Annals of HPB Surgery. 2011;16:(3):35–43. (In Russian).

4. Ivshin VG, Lukichev OD, Makarov YuI, Starchenko GA, Yakunin AYu, Malafeev IV. Comparative characteristics of various methods of percutaneous bile-removing interventions in patients with mechanical jaundice. Annals of HPB Surgery. 2003;8(2):14–18. (In Russian).

5. Karimov SI, Khakimov MS, Adylkhodzhaev AA, Rakhmanov SU, Khasanov VR. Correction of Complications of the Transhepatic Endobiliary Interventions for Obstructive Jaundice Caused by Periampullar Tumors. Annals of HPB Surgery. 2015;20(3):68–74. (In Russian).
https://doi.org/10.16931/1995-5464.2015368-74

6. Tarabukin AV, Mizgirev DV, Epshtein AM, Pozdeev VN, Pozdeev SS, Duberman BL. Biliary Decompression in Malignant Obstructive Jaundice. Annals of HPB Surgery. 2015;20(3):54–58. (In Russian).
https://doi.org/10.16931/1995-5464.2015354-58

7. Dolgushin BI, Nechipai AM, Kukushkin AV, Khachaturov AA. Percutaneous transhepatic puncture cholangiostomy: systematization of representations. Diagnostic and Interventional Radiology. 2012;6(3):31–60.

8. Kasatkin VF, Kit OI, Trifanov DS. Experience in transcutaneous biliary drainage for patients with mechanical jaundice of tumor genesis. Siberian Journal of Oncology. 2008;4:51–54.

9. Gusev AV, Balagurov BA, Borovkov IN, Konkov OI, Martinsh ChT, Pokrovskii EZh, et al. Drainage and endoprosthesis of the bile ducts in case of mechanical jaundice. Bulletin of New Medical Technologies. 2008;15(4):97. (In Russian).

10. Kulezneva YuV, Izrailov RE, Urakova NA. Percutaneous transhepatic stenting of the bile ducts (indications, methods, results). Diagnostic and Interventional Radiology. 2008;2(4):87–93. (In Russian).

11. Lee TH. Technical tips and issues of biliary stenting, focusing on malignant hilar obstruction. Clin Endosc. 2013 May;46(3):260–266.
https://doi.org/10.5946/ce.2013.46.3.260

12. Kalakhanova BKh, Mumladze RB, Chechenin GM, Lebedev SS, Barinov YuV, Gogolashvili DG. Antegrade biliary stenting: the problem of choosing a stent. Annals of Surgery. 2014;5:16–20. (In Russian).

13. Kozlov AV, Tarazov PG, Granov DA, Polikarpov AA, Polysalov VN, Rozengauz EV, et al. Effectiveness of x-ray endobiliary methods of treatment in patients with unresectable liver and bile duct cancer complicated by mechanical jaundice. Annals of HPB Surgery. 2013;4:45–52. (In Russian).

14. Gusev AV, Solov'ev AYu, Lebedev AK, Vakheeva YuM, Efremov AV, Yushinov AA, et al. Immediate and distant results of endoscopic papillosphincterotomy. Modern Problems of Science and Education. 2015;5:323. (In Russian).

15. Aidemirov AN, Shakhnazaryan NG, Vafin AZ, Shakhnazaryan AM. Current approach to mechanical jaundice management. Annals of HPB Surgery. 2015;20(4):62–67. (In Russian). https://doi.org/10.16931/1995-5464.2015462-67

16. Patyutko YuI, Kotelnikov AG. Surgery for cancer of the biliopancreatoduodenal zone. Moscow: Meditsina. 2007, 448 p. (In Russian).

17. Mann CD, Thomasset SC, Johnson NA, Garcea G, Neal CP, Dennison AR, et al. Combined biliary and gastric bypass procedures as effective palliation for unresectable malignant disease. ANZ J Surg. 2009 Jun;79(6):471–475.
https://doi.org/10.1111/j.1445-2197.2008.04798.x

18. Kabanov MYu, Yakovleva DM, Sementsov KV, Gorshenin TL, Rybakov SM, Aksenova TE, et al. Role and Place of Minimally Invasive Interventions in Treatment of Hepatopancreatoduodenal Diseases in Elderly Patients. Annals of HPB Surgery. 2015;20(3):37–46. (In Russian).
https://doi.org/10.16931/1995-5464.2015337-46

19. Gridasov IM, Ushakova ND, Goroshinskaya IA, Nemashkalova LA, Maksimov AYu. The severity and ways of correction of endogenous intoxic index syndrome in patients with obstructive jaundice with cancer of biliopancreatoduodenal area. Journal of Fundamental Research. 2013;9-4:627–631. (In Russian).

Information about author:

Evgenii N. Kolesnikov – Cand. Sci. (Med.), head of the Department of Abdominal Oncology №1 with a group of x-ray endovascular methods of diagnosis and treatment National Medical Research Centre for Oncology of the Ministry of Health of Russia, Rostov-on-Don, Russian Federation. SPIN: 8434-6494, AuthorID: 347457

Stanislav S. Mezentsev* – Cand. Sci. (Med.), specialist in x ray endovascular diagnostics and treatment National Medical Research Centre for Oncology of the Ministry of Health of Russia, Rostov-on-Don, Russian Federation. ORCID: https://orcid.org/0000-0002-4041-7535, SPIN: 2580-5712, AuthorID: 794786, ResearcherID: AAO-5612-2020

Aleksandr V. Snezhko – Dr. Sci. (Med.), Associate Professor, surgeon National Medical Research Centre for Oncology of the Ministry of Health of Russia, Rostov-on-Don, Russian Federation. SPIN: 2913-3744, AuthorID: 439135

Maksim N. Chernyak – specialist in x ray endovascular diagnostics and treatment National Medical Research Centre for Oncology of the Ministry of Health of Russia, Rostov-on-Don, Russian Federation. SPIN: 7418-7320, AuthorID: 917426

Fedor N. Grechkin – Cand. Sci. (Med.), surgeon National Medical Research Centre for Oncology of the Ministry of Health of Russia, Rostov-on-Don, Russian Federation. SPIN: 4144-5304, AuthorID: 734515

Takhmina M. Kecheryukova – specialist in x ray endovascular diagnostics and treatment National Medical Research Centre for Oncology of the Ministry of Health of Russia, Rostov-on-Don, Russian Federation.

Oleg Yu. Kaimakchi – Dr. Sci. (Med.), Associate Professor of Oncology National Medical Research Centre for Oncology of the Ministry of Health of Russia, Rostov-on-Don, Russian Federation. AuthorID: 335064