Original internal derivation catheter endoprosthesis in patients with inoperable infiltration of distal choledochus and biliary-enteric fistula

Aim: The aim of this study was to present the original idea of intervention radiology procedure treating irreversible cholestasis with intrahepatic pneumobilia due to choledocho-enteric fistula in inoperable carcinoma of pancreatic head, in the only possible way. Material and methods: We treated 3 patients with choledocho-enteric fistula using originally designed biliary catheter endoprosthesis of 14-16 Fr, made of the distal end of drainage catheter, which enabled bile derivation with simultaneous treatment of fistulous channel. In pre- and postprocedural evaluation we used ultrasonography and computed tomography. Results: In 2 of 3 cases we treated the fistula successfully while preserving bile derivation. The average survival time was 7,3 months (5-10). Conclusion: The use of this therapeutic procedure is reserved for the terminal phase of malignant disease. It is a palliative procedure and implies previous experience in the use of all possible types of percutaneous biliary drainage.

Keywords: cholestasis, biliary-enteric fistula, endoprosthesis

INTRODUCTION

Reversible cholestasis due to infiltration of distal choledochus is a common indication for percutaneous biliary drainage. These patients are in poor state, with relatively short life expectancy. Due to numerous complications (infection, dislocation, incompetency), percutaneous transhepatic biliary drainage (PTBD) represents initial method in intervention radiology algorithm, which is, when possible, followed by some type of external-internal derivaton or insertion of internal endoprosthesis (catheter or metal). In the choice of type of internal derivation, competency of the distal choledochus and papilla Vateri is of the utmost significance. If this condition is met, which is almost always the case in cholangiocarcinoma, covered metal biliary stents Allium will be adequate. However, in cases where distal choledochus is infiltrated, proximally inserted metal endoprosthesis causes wide communication between duodenal and biliary tract, followed by fast development of pneumobilia and infection. In these cases, the simplest and longlasting solution is wide extended PTBD with several perforations at the distal end, placed in D2 segment of duodenum. If we insisted on the endoprosthesis, the biggest problem would be in the case of complete infiltration of distal choledochus with the presence of choledocho-enteric fistula. Practically, there are two main points to be solved: to enable treatment of fistula and to ensure bile derivation that does not cause pneumobilia and infection.

The aim of this paper is to present an atypical technique and originally designed biliary catheter endoprosthesis as a possible therapeutic solution for these patients, which supports the context of basic clinical identity of intervention radiology: every situation has a possible solution.

MATERIALS AND METHODS

We treated 3 patients with irreversible cholestasis due to pancreatic head carcinoma and simultaneous choledocho-enteric fistula, using originally designed catheter endoprosthesis. In 2 cases there was a single fistula between mid-choledochus and duodenum and in 1 case there were two fistulae, bridging choledochus, D2 and duodenal bulbus. All the cases were inoperable.
Preprocedural evaluation consisted of ultrasonography, CT and laboratory examinations, showing poor clinical state, hyperbilirubinemia, enteric dysfunction and discrete dilatation of intrahepatic bile ducts.

Percutaneous transhepatic cholangiography (PTH) was the first procedure that enabled visualization of pathology (Figure 1). Since there was no significant dilatation of intrahepatic ducts due to biliary-enteric fistula, we left the diagnostic needle in bile duct in case we needed to re-represent biliary tract for repeated punctions or extravasation. We defined the direction for wide-needle punction, so that the end of the needle was adjacent to the junction of left and right hepatic duct, in order to ensure the easiest possible way for the hydrophilic metal guide to be placed. After the placement of metal guide into the duodenum and dilatation of 8 Fr, we placed the drainage catheter up to D2 segment (Figure 2). Using X-rays and 3D CT reconstructions, we measured the position and the distance between the end of catheter, end of fistula and the part of PTBD that was placed intrahepatically in bile ducts. According to acquired data, after temporary extraction, we made 3-4 perforations on the same catheter using surgical scalpel. Thus, the distal perforations were positioned in duodenum and newly made were in intrahepatic bile ducts proximal to the end of fistula (Figure 3). This catheter could not close the end of fistula, so it served as a test to check the position of the perforations before designing final endoprosthesis.

About 7 days later, after injection of contrast agent, we removed the drainage catheter and made endoprosthesis according to his model, using “pigtail” catheter of 14-16 Fr (Figure 4). Endoprosthesis was placed over the metal guide using elastic plastic dilator with conic tip, following the standard procedure 6,7,8 (Figure 5). Since we didn’t know the precise location of papilla, before placing the endoprosthesis we put the thread in the proximal end, thus enabling reposition in case of distal overforce (Figure 4).

RESULTS

Antibiotics and symptomatic therapy were given 10 days after the intervention, and continued afterwards for variable time until infection was managed. Postpro-
CEDERAL evaluation was performed using X-rays, ultrasonography and CT, for defining the position of endoprosthesis, presence of pneumobilia and intrahepatic dilatation (Figure 6, 7). In all cases pneumobilia was managed 10 days after the intervention. Permanent closure of fistulous channel was done in 2 of 3 patients. In case where the endoprosthesis failed to close fistula, it was due to tumor necrosis associated with infection. There was no record of dislocation or cramping of endoprosthesis. In 2 cases overall condition of patients improved. Life duration after the intervention was 5, 7 and 10 months.

**DISCUSSION**

Patients with choledocho-enteric fistula and simultaneous complete and irreversible distal obstruction due to expansile lesion of pancreatic head are extremely hard to treat using percutaneous procedures. The presence of infection and inevitable pneumobilia are fatal. This is especially true for cases where fistulous communication exists on the field of longlasting infection or tissue necrosis. PTBD does not solve the problem of latter unfavourable evolution of fistula. Commonly used endoprostheses (covered metal and plastic) can not be used because the recanalization of the infiltration in the region of pancreatic head, as well as the position of its end in D2 segment, additionally cause pneumobilia. One should bare in mind the width of endoprosthesis so that ends of fistula after the placement stay covered. Catheters of at least 12-16Fr, made of rigid plastic, should be used. Any degradation of catheter construction, contraction, cutting of its distal end, as well as making perforations, make it susceptible to consistency loss and latter technical difficulties at placement. Furthermore, due to bile leak through fistula, there is no intrahepatic bile duct dilatation, so diagnostic visualization is difficult. Internal derivation systems in irreversible cholestasis have some advantages over PTBD because complications such as cholangitis, dislocations and blocking drainage system almost never occur. Before the planning of placing the endoprosthesis we used, it was necessary to leave the drainage system of 8 Fr during 7 days, in order to establish functional percutaneous-hepatic tract for the final insertion of endoprosthesis. In case of secondary obstruction and postprocedural intrahepatic dilatation with hyperbilirubinemia, the extraction of endoprosthesis would be a simple procedure (endoscopically). Compared to other biliary prostheses, the model we used is less expensive because it is made of simple pigtail catheter used for nephrostomy.

The simple alternative to our method is so-called extended PTBD, where perforations are made on catheter proximally to the end of fistula (Figure 8). But, this method implies percutaneous catheter of greater width, which is highly susceptible to development of infec-
tion. Additionally, bile leaks externally, so the quality of life is degraded. The example of our 3 patients shows that using possibilities of percutaneous approach can solve any therapeutic problem without the use of commercially available systems for biliary drainage.

SUMMARY

Cilj ovog rada je prikaz originalnog intervencit rodiološkog tretmana ireverzibine holestaze sa intrahepatičnom pneumobilijom zbog holedoho-enterične fistule u bolesnika sa inoperabilnim karcinomom pankraska.

Materijal i metode: Tretirano je 3 pacijenta sa holedoho-enteričnom fistulom i ireverzibilnom opstrukcijom originalno dizajniranom kateterskom endoprotesom (14-16 Fr) napravljenom od distalnog kraja drenažnog katetera, sa arteficijelno napravljenim otvorima prosimalno od mesta fistule. Pre i post proceduralna evaluacija radjena je ultrazvukom i kompjuterizovanim tomografijom.

Rezultati: U 2 od 3 slučaja primenjenom tehnikom uspešno je sanirana fistula sa očuvanom derivacijom kroz endoprotezu. Prosèeno vreme preživljavanja bilo je 7,3 meseca.

Zaključek: Na do sada primenjivane i publikovane načine saniranja djelomične holestaze je bilo oštećenje bilarnog obdobja. Moguće lako saniranje brojnih slučajeva holestaze, s obzirom na do sada korisne tehnike saniranja, s korisnim rezultatima.

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