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BILIARY DRAINAGE

Nikola Y. Kolev[1], Valentin L. Ignatov[1], Anton Y. Tonev[1], Aleksandar K. Zlatarov[1], Elitsa P. Encheva[2], Tanya N. Kirilova[1], Vasil M. Bojkov[3], Krasimir D. Ivanov[1]

1) Department of General and Operative Surgery,

2) Department of Nuclear Medicine, Metabolic Therapy and Radiotherapy, Department of Surgical Diseases,

University Hospital "St. Marina" Varna, Medical University of Varna, Bulgaria.

ABSTRACT

In patients with obstructive jaundice, when the endoscopic approach fails to achieve biliary drainage, percutaneous cannulation and combined endoscopic/ percutaneous endoprosthesis insertion can be performed simultaneously or in stages. This study compared these two approaches.Endoscopic retrograde biliary drainage (ERBD) and percutaneous transhepatic biliary drainage (PTBD) are the two main non-surgical treatment options for obstructive jaundice in patients with HCC. ERBD is usually the first-line treatment because of its low hemorrhage risk. Mean stent patency time and mean survival range from 1.0 to 15.9 and 2.8 to 12.3 months, respectively. The dominant effect of biliary drainage suggests that successful jaundice therapy could enhance anti-cancer treatment by increasing life expectancy, decreasing mortality, or both. We present an overview of the efficacy of endoscopic and percutaneous drainage for obstructive jaundice in patients with HCC who are not candidates for surgical resection and summarize the current indications and outcomes of reported clinical use.

Key words: obstructive jaundice, Endoscopic retrograde biliary drainage (ERBD), overview, percutaneous drainage.

INTRODUCTION

Controversy exists regarding the preferred technique of PBD, either via endoscopic retrograde biliary drainage (EBD) or using antegrade percutaneous transhepatic biliary drainage(PTBD).[1] PTBD is the preferred method in Japan for relief of obstructive jaundice due to proximalobstruction. In Europe and the USA, EBD is usually performed as primary intervention and is followed by PTBD only when EBD has failed. Internal drainage by EBD, although a less invasive technique, carries increased risk of developing cholangitis due to bacterial contamination from the duodenum and increased risk of procedure related complications such as duodenal perforation and post-EBD, acute pancreatitis [9, 10]. Drainage by means of PTBD is associated with hemobilia, portal vein thrombosis, cancer seeding and potentially more patient discomfort [2]. The three published prospective randomized controlled trials comparing EBD versus PTBD, included patients with unresectable bile duct tumors or carcinoma of the gallbladder and pancreas showing conflicting results. These studies address palliative treatment and although important in the context of biliary drainage no distinction was made between distal and proximalbile duct obstruction. In patients with HCCA with usually involvement of the segmental biliary ducts, drainage of the intrahepatic biliary tree is challenging and mostly requires multiple drainsor stents. However, in patients with a distal bile duct obstruction, usually caused by a tumor in the region of the pancreatic head, drainage is more straightforward and requires a single drainor stent. In the latter category of jaundiced patients in whom partial liver resection is usually notundertaken, PBD remains a controversial issue [3].To date, no studies have been performed regarding the optimal route of drainagein patients with a potentially resectable HCCA. Therefore, the aim of the present study was to compare success rate and complications of EBD and PTBD in patients eligible for resection of asuspected HCCA.

Diagnostic percutaneous transhepatic cholangiography gradually developed into a technique, which allowed prolonged external catheter drainage of malignant strictures in the biliary system [4]. Further developments included percutaneous placement of multiple side-hole catheters into the duodenum, there by establishing internal bile drainage [5]. Early series showed a considerable number of infectious complications (approximately 40%), but further refinements produced better results [6]. The technique we currently routinely use involves the use of ultrasound guidance, a thin Chiba needle and a 0.014-inch guide-wire to gain access to the biliary system.A sheath is then placed over an 0.35-inch guide-wire and strictures are negotiated using standard 5-French angiographic catheters and hydrophylic guide-wires. For permanent stenting self-expandable metallic stents are used.Metal self-expandable stents have become the standard in PTBD and are preferred over plastic endoprosthesis. Metal stents have higher patency rates than plastic stents and

incase of recurrent obstruction a new stent can easily be placed in the blocked metal stent, without having to remove the old one (as opposed to plastic stents) [7]. In addition to this, Lammer et al. found metal stents to be associated with shorter hospital stay and lower cost than plastic stents. A new development is the use of covered stents, which aim at reducing the incidence of recurrent jaundice by preventing tumour ingrowth into the stent. Although tumour ingrowth is probably prevented to some extent by the covering of these stents, it is unclear whether clogging is also prevented [8]. Potential drawbacks of such stents are the increased chance of stent migration,occlusion of side-branches, when stenting hilar lesions, and occlusion of the cystic duct, potentially leading to cholecystitis. Another concern is the potential lack of cost-effectiveness

of the use of such stents. Currently, there is not enough evidence to support the routine use of covered stents in malignant bile duct obstruction, although in selected cases these may be useful.At least as important as advances in PTBD technique are the improvements, which are made in pre-procedure planning by imaging with ultrasound, computed tomography(CT) and magnetic resonance cholangio-pancreatography(MRCP). Particularly when performing drainage and stenting of hilar obstruction, treatment planning on the basis of imaging is crucial [9]. PTBD should never beperformed without a proper non-invasive evaluation of the biliary tree.When discussing technique and results of PTBD, distalbile duct obstruction and proximal obstruction should beseperately addressed.

Percutaneous biliary drainage

The technique we currently routinely use involves the use of ultrasound guidance, a thin Chiba needle and a 0.014-inch guide-wire to gain access to the biliary system.A sheath is then placed over an 0.35-inch guide-wire and strictures are negotiated using standard 5-French angiographic catheters and hydrophylic guide-wires. For permanent stenting self-expandable metallic stents are used.Metal self-expandable stents have become the standard in PTBD and are preferred over plastic endoprosthesis. Metal stents have higher patency rates than plastic stents and in case of recurrent obstruction a new stent can easily be placed in the blocked metal stent, without having to removethe old one (as opposed to plastic stents) [10 - 12]. In addition to this, Lammer et al. [10] found metal stents to be associated with shorter hospital stay and lower cost thanplastic stents. A new development is the use of covered stents, which aim at reducing the incidence of recurrent jaundice by preventing tumour ingrowth into the stent.Although tumour ingrowth is probably prevented to some extent by the covering of these stents, it is unclear whether clogging is also prevented [13 - 16]. Potential drawbacks of such stents are the increased chance of stent migration,occlusion of side-branches, when stenting hilar lesions, and occlusion of the cystic duct, potentially leading to cholecystitis. Another concern is the potential lack of costeffectivenessof the use of such stents. Currently, there is not enough evidence to support the routine use of covered stents in malignant bile duct obstruction, although in selected cases these may be useful.At least as important as advances in PTBD technique are the improvements, which are made in pre-procedure planning by imaging with ultrasound, computer tomography (CT) and magnetic resonance cholangio-pancreatography (MRCP). Particularly when performing drainage and stenting of hilar obstruction, treatment planning on the basis of imaging is crucial [17]. PTBD should never be performed without a proper non-invasive evaluation of the biliary tree.

Surgical versus non-surgical biliary drainage

Surgical biliary bypass is often performed when exploratory laparotomy for a tumour of the pancreatic head region shows unresectability of the tumour. Adequate decompression of the biliary tree can be obtained by performing a hepatico-jejunostomy and a gastric bypass is performed simultaneously. This prevents the need for an additional laparotomy later in the course of the disease when gastric outlet obstruction may develop as a result of local tumour progression. However, mortality and morbidity of this "double bypass" procedure remains considerable, withmortality and morbidity rates ranging from 2% to 5%, and17% to 37%, respectively [18 - 20]. Several randomized trials have been performed inpatients with pancreatic head carcinoma comparing surgical with non-surgical drainage, which was in most cases performed endoscopically [21-23]. Surgical treatment was associated with a higher post operative mortality and morbidity and a longer hospital stay than non-surgical drainage (mostly performed endoscopically), but recurrent jaundice, requiring stent exchange and late duodenal obstruction were more often seen in the non surgical drainage group [23, 24]. Similarly, a randomized study comparing per cutaneous biliary drainage with surgical bypass in patients with unresectable pancreatic headcancer demonstrated successful drainage in all patients, but a higher 30-day mortality and procedure related mortality as well as a longer hospital stay in the surgical group. These advantages of percutaneous drainage were partly annihilated by the higher number of read missions for recurrent jaundice and duodenal obstruction, requiring surgery [25]. Raikar et al.[26] showed endoscopic stent placement to be more cost-effective than surgical biliary drainage, although frequent stent exchanges were necessary in then on-surgical group. It is currently accepted by many to consider surgical biliary drainage only in patients with pancreatic headcancer who are in an otherwise good condition and who have a life expectancy of more than 6 months [27]. This means, that surgical drainage is only performed in patients who undergo an exploratory laparotomy and are found to be unresectable .The advent of duodenal stenting in addition to biliary

stenting may obviate the need for surgical treatment of gastric outlet obstruction and this may further expand indications for biliary stenting in the near future. Currently, prospective studies comparing combined biliary and duodenal stenting versus surgery are lacking and the results of such studies should be awaited [28]. A different situation occurs in patients with malignant obstruction at the hilum. Patients with Bismuth type I and II lesions are surgical candidates. Resection of a type III lesion often requires major surgery and only a minority of these patients eventually will undergo resection. Type IV lesion are generally considered to be irresectable. In patients with unresectable hilar cholangiocarcinoma, performing a hepatico-jejunostomy at the hilum is technically difficult and associated with a higher complication rate and mortality rate than non-surgical stenting [29, 30]. In addition to this, gastric outlet obstruction is an uncommon sequelae of hilar cholangio carcinoma and surgery for this complication is therefore only rarely required. Therefore,non-surgical drainage of the biliary system is the preferred treatment option in the vast majority of patients with unresectable hilar malignancy [31].

Percutaneous versus endoscopic biliary drainage

When comparing percutaneous and endoscopic treatment, again distal and proximal bile duct obstruction should be separated. However, in the only two published prospective randomized trials comparing PTBD and endoscopic retrograde cholangiopancreatography (ERCP) for palliation of inoperable malignancy causing bile duct obstruction, this distinction was not made [32, 33]. In the trial by Speer et al.[34] from 1987, ERCP had a significantly higher success rate for relief of jaundice (81% vs 61%, P=0.017) than PTBD and a significantly lower 30-day mortality (15% vs33%, P=0.016). The higher mortality after percutaneous stents was due to haemorrhage and bile leaks. In this trial, only rigid plastic drainage tubes were used for PTBD and it is likely that current PTBD technique with insertion of metallic stents will yield significantly different results. The second trial by Pinol et al.[35] from 2002 compared PTBD with self-expanding metal stents with conventional endoscopic polyethylene endoprostheses, which reflects current practice in most institutions. The technical success rates of both procedures were similar (percutaneous, 75%; endoscopic, 58%; P=0.29), where as therapeutic success was higher in the percutaneous group (71% vs 42%; P=0.03).Major complications were more common in the percutaneous group (61% vs 35%; P=0.09) but did not account for differences in 30-day mortality rates (percutaneous, 36%;endoscopic, 42%; P=0.83). Overall median survival was significantly higher in the percutaneous group than in the endoscopic group (3.7 vs 2.0 months; P=0.02). In the majority of patients (7/11) in whom endoscopic stent placement failed, subsequent percutaneous stent placementwas successful. It was concluded, that PTBD with placement of a self-expanding metal stent is an alternative to placement of an endoscopic polyethylene endoprosthesis. Numerous non-comparative studies assessing PTBD and ERCP for treatment of distal bile duct obstruction sugges that there are no significant differences in technical success rates between percutaneous and endoscopic treatment[36,37,38]. Also, complication rates and mortality are comparable, although the type of complications differs. Pancreatitis is more often seen after ERCP, where as bile leakage is more frequently seen after PTBD. An advantage of ERCP over PTBD is the absence of a percutaneous drainage tube, which may be uncomfortable for the patient and which requires removal after several days in most cases. Furthermore, PTBD may be painful in some patients, but patient preference for either technique has not been studied. It should be noted that success rates and complication rates for both ERCP and PTBD are dependent on the operators skills and experience and this may influence the choice for one of these techniques in different institutions. In most centres, ERCP is used as the primary procedure for palliative stenting of malignant distal bile duct obstruction. Until recently, ERCP was also considered an important diagnostic tool for assessment of patients with malignant distal bile duct obstruction. Its diagnostic role has now been replaced by ultrasound, CT,and MR(CP) almost completely and the only diagnostic value of ERCP lies in its ability to obtain brush cytology of suspected lesions. In spite of the evidence of superior patency of metallic stents, plastic endoprostheses are usually inserted during ERCP only to be replaced by metallic stents when the occlude with short intervals[38,39]. As a result of this, frequent stent exchanges are necessary using this approach and this may counterbalance the short term cost benefit of using plastic stents[40,41].In current practice, PTBD in distal bile duct obstructionis mostly reserved for cases where ERCP fails or is impossible. The most common reasons for this are duodenal stenosis, failure to pass the biliary stricture,failure to cannulate the papilla (e.g. because of its positionin a duodenal diverticulum), altered anatomy after surgery(B2 stomach), or prior creation of a bilio-enteric anastomosis.In most of such cases, PTBD is technically successful and the use of PTBD as a secondary tool after failure of or inability to perform ERCP is widely accepted.In hilar obstruction, the situation is less clear and both PTBD and ERCP are used as a primary drainage modality in different institutions. PTBD has a distinct advantage over ERCP in that with ultrasound guidance one or more appropriate segments for drainage can be chosen and injection of contrast medium in segments that are too small to be drained can be prevented. As stated before, ultrasound guidance during PTBD is extremely useful in such patients. Further more, negotiating hilar strictures and draining the appropriate segments can be very difficult with ERCP and success rates are lower than for distal strictures[42,43]. Whether PTBD or ERCP is used as the primary tool in patients with hilar obstruction depends on specific patient circumstances and the referring physicians preference

as well as on local availability and expertise. As hilar cholangiocarcinoma is a relatively rare tumour and both percutaneous and endoscopic palliation require considerable expertise, it is probably useful to concentrate

CONCLUSION:

The technical success of the procedure depends on the experience of the Interventional Radiologist performing the drainage. It can be as high as nearly 100%. Clinical efficacy is usually lower but still over 90%. When endoscopic drainage alone fails, a combined percutaneous/endoscopic procedure should only be performed if it can be carried out simultaneously.

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Corresponding author:
Anton Y. Tonev
University Hospital "St. Marina", Medical University of Varna,,
1, Hristo Smirnenski Blvr., Varna, Bulgaria.
E-mail: teraton@abv.bg;