Review of Percutaneous Biliary Drainage in Malignant Biliary Obstruction and Accompanying Bilomas

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Abstract

In this review, we have discussed efficacy of percutaneous biliary drainage not only in cases with malignant biliary obstructive jaundice, but accompanying bilomas as well. Percutaneous biliary drainage is mostly successful. Direct bilirubin levels can be decreased significantly as in our previous series, which has a success of 89.5% of malignant biliary drainages and all associated bilomas. Percutaneous biliary drainage is an effective interventional radiological method in palliation therapy of malignant biliary obstruction and associated bilomas.

Key Words: Bile ducts, Percutaneous, drainage, Biliary, malignant, Biloma

Introduction

Surgical treatment as bilioenteric anastomosis in malignant biliary obstruction has caused in a rate of 15-60% mortalities. Further, it was found as inoperable tumors in 90% of malignant bile duct obstruction. So, an alternative method to surgery has been sought. [1-3] In 1974, Molnar and Stockum was the first to perform percutaneous biliary drainage (PBD) via transhepatic way in decompressing obstructed bile ducts by placing a catheter. [1-3] After, this method has attained wide-spread use, its indications have been clarified, and the rates of mortality and morbidity have decreased. [4,5]

Indications of palliative biliary drainage via transhepatic catheter or endoprothesis are those; high risk for operation in biliary obstruction, nonresectable tumor on ultrasonography (US), computed tomography (CT), and angiography, liver or distant organ metastasis, centrally located cholangiocarcinoma invading common and proximal intrahepatic bile ducts, and technique difficulty in operative bilioenteric anastomosis. [1,2] Furthermore, PBD can be used for associated pathologies, especially in bilomas, of malignant bile duct obstruction. [1-11]

Techniques of percutaneous treatment

Attending pain, emesis, vomiting, itching, weakness, and weight loss can be observed in some, whereas jaundice is observed in almost all patients. Also, bile duct dilatation on US is found in almost all patients, excluding this, frequent findings on US were enlarged gall-bladder, liver mass, pancreatic mass, dilatation of pancreatic duct, and lymphadenopathy.

All procedures were performed by a staff radiologist and a radiology resident. Informed consent was obtained before drainage. All interventional procedures are performed under fluoroscopy guidance. Hemogram, coagulation parameters, and liver function tests are routinely studied before drainage. The patient is placed in supine, skin sterilization with povidone-iodine two times and local anesthesia is performed on 10.th or 11.th intercostals at the right midaxillary line. Percutaneous transhepatic cholangiography is realized with a 22 Gauge (G) Chiba needle. The Chiba needle is advanced under fluoroscopic guidance and directed medially and superiorly. After inner stylet has been removed, needle hub is connected to an injector with half-diluted non-ionic contrast medium. Contrast medium has been injected while needle is withdrawn slowly. After visualization of bile ducts and performing a small incision on skin, an 18 G Chiba needle is inserted appropriate bile duct. Amplatz guide-wire 0.035 inch is advanced via this needle following bile flow out of needle cannula. We attempt to pass narrow bile duct or obstruction level by torque maneuvers via guide-wire, dilator, and catheter combinations. An internal-external biliary drainage 7-10 F catheter is placed as the most proximal hole in bile duct if the obstruction is passed by guide-wire and catheter combinations. If not, an external biliary drainage catheter is put into proper intrahepatic bile duct (Illustration 1). Second attempt is applied after 48-72 hours (Illustrations 2 and 3). If biloma is found with malignant biliary obstruction, a catheter is placed for biloma drainage (Illustration 4).

Antibiotic is administered in all patients on day of drainage. Vital signs are followed after the procedure.
and catheter is irrigated with 5-10 ml serum physiologic per 12 hours. Only internal drainage is provided by closing proximal end of catheter in case of internal-external drainage.

Our experience in the series of percutaneous biliary and biloma drainage [12]

Performed 76 drainage procedures are such as following: once external in 52 patients (40.7%), once internal-external in 15 (19.7%), both once internal-external and external in 3 (3.9%), twice internal-external and once external in 2 (2.6%), twice external in 2 (2.6%), both once internal-external and cholecystostomy in one (1.3%), and twice external and once cholecystostomy in one (1.3%). Biliary stent has been placed in 5 patients (6.6%). Stomach adenocarcinoma has been found in one patient performed an external drainage. Internal fistula and biloma were seen with choledoc stenosis in this patient. We have observed that the fistula is closed in 2 weeks of the biliary drainage. In one patient with internal-external and external catheter, we have placed total 3 catheters, 2 internal-external catheters into right bile ducts and one external catheter into left bile ducts. T-tube has been put into choledoc for high level stenosis in that patient. The patient has been referred to radiology department for increasing mechanic icterus. We have detected intra-hepatic bile duct dilatation and intra-hepatic biloma at portal hilus. Interventional procedures are those; percutaneous transhepatic cholangiography, external catheter into the right anterior bile duct, pig-tail drainage catheter into the biloma, external catheter into the left bile duct, internal-external catheter into the right posterior bile duct, withdrawal of the T-tube, withdrawal of the catheter upon regression of the biloma and exchange of the external catheter in the right anterior bile duct with an internal-external catheter. So, we have placed 2 internal-external catheters into the right bile ducts and an external catheter into the left hepatic ducts. Besides, we have taken a biopsy to confirm malignity from the hypodense area next to the confluence of the both hepatic ducts with20 GWest-Cott needle under CT guidance. The external catheter in the left hepatic ductus has been dislocated at the last control examination on the 9.th month, but the patient could not recatheterized since he expired just after this. Bilomas has been detected in 3 patients in addition to their malignant biliary obstructions. Among them, the first patient has been managed with drainage of his intrahepatic biloma, the second with drainages of intra- and extra-hepatic bilomas, and the third in 2 weeks with drainage for extrahepatic biloma. The last patient had stomach adenocarcinoma with choledoc invasion and iatrogenic biloma in the gall-bladder bed.

Acute cholecystitis has been seen a patient in clinically critical condition. Percutaneous cholecystostomy has succeeded in the patient. Self-expandable metallic stents have been placed in 5 patients. In one with pancreas adenocarcinoma, we have inserted an internal-external catheter followed by placing a stent of 10/40 mm, and he was alive despite liver metastasis on the 13.th month. We have put into choledoc a 10/100 mm stent through a 10/60 mm stent in another patient with cholangiocarcinoma, but this patient expired on the third month. The third patient had pancreas adenocarcinoma placed a 10/60 stent. The remaining patients had metastases from stomach in one and colon in the other.

Success has been evaluated by means of follow-up of direct bilirubins and clinical improvement. Wilcoxon signed-ranks test has been applied for direct bilirubin levels before and after biliary drainage. All the statistics was performed by a mathematician (Özge Aribas).

Patients have been followed between 2 days and 4 years with a mean of 83 days. Mean direct bilirubin level was 7.1±5.5 mg/dl (range, 0.2-20.0) after the procedure whereas this was 14.2±7.4 mg/dl (range, 3.0-36.0) before drainage. Direct bilirubin levels have decreased significantly in the patients (p < 0.001).

Among 5 exitus, one was seen on the day of the drainage, this was accepted as a major complication. The others were due to progression of the malignity during follow-up on the 5.th, 20.th, 26.th, and 37.th days, respectively. The rate of 30-day mortality was 5.3% (4/76). Minimal ascites was detected in 6 patients; this did not impede the procedure. Nevertheless, catheter was withdrawn in another patient on the 5.th day for oozing of ascites. Other minor complications were catheter dislocation in 2 (one not recatheterized for exitus on the 5.th day), hemobilia in 6, catheter obstruction in one (catheter exchange was performed on the 10.th day). Complication was encountered with a rate of 22.4% (17/76). Of minor complications, pain was detected in 12 patients with a rate of 15.8%. Pain was managed with analgesics within 12-24 hours.

Failure has been seen in total 8 patients (10.5%), in 2 patients as procedure and in 6 as direct bilirubin levels, while success has been gained in 68 patients (89.5%). Also, drainage procedures have been successful in
total 3 patients with bilomas.

Apart from treating malignant biliary obstruction, it is important to decompress bile ducts with PBD and to treat cholangitis frequently seen in bile duct obstruction in benign strictures and preoperatively obstructive jaundice, as well. Serum bilirubin levels greater than 10 mg/dl have been associated with increased operative mortality. [6-8] PBD catheters have usually been preferred for aim of palliation in inoperable malignant biliary obstructions. In liver hilus or more proximal bile level, endoscopic biliary interventions are ineffective, whereas PBD is efficiently applied. Indeed, PBD catheters are easily exchanged and placed in proximal of complicated lesions at liver hilum. [1]

The most important disadvantages in external drainage are bile leakage around catheter, infection, physical and psychological irritation due to catheter, and causing to chronic fluid-electrolyte imbalance. Besides, internal drainage has higher cost and more frequent obstruction, and is not possible unless passing distal choledoc. [2] Level of obstruction, whether passing to more distal choledoc or not, and cost-effective condition determinate drainage type. Consequently, we conformed this in choosing external or internal-external or internal drainage types in the series. Cholangitis is more frequently encountered in internal drainage. So, we chose internal drainage with intervals in internal-external drainage via closing external drainage in case cholangitis should be encountered in internal drainage.

Our success in PBD was 89.5% which was complied with other series in the literature. [1-9] Complications are cholangitis, catheter dislocation, bile leakage, catheter obstruction, hemobilia, electrolyte imbalance, biliopleural fistula, pneumothorax, perforation in extrahepatic bile duct, hypotension, and sepsis. Their rates vary between 4.76% and 69.0% in the series. [4,7,8] Complications were seen in 22.4% rate, among which there were hemobilia in 7.9% and catheter dislocation in 2.6%. The latter was, to our knowledge, found in 4.1% in the literature. [8] We accordingly encountered with 30-day mortality in 5.3%, and mortality rate varies from 4.5% to 30.0 in the literature. [4,6,9]

It is known that death is caused from biliary obstruction due to tumor rather than tumor itself if not treated. PBD does not prevent tumor progression but it extends survive. Aim is to correct jaundice in the least time and the safest way. It displays that PBD is needed because of significantly decreasing in serum direct bilirubin levels after PBD, recovering of symptoms and signs, recuperating of cholangitis, and especially treating accompanying biloma.

Biloma is a loculated collection of bile located outside of the biliary tree, and it can be caused by traumatic, iatrogenic or spontaneous rupture of the biliary tree. [10] It is extremely unusual for intrahepatic bile rupture to result in biloma formation in the presence of cholangiocarcinoma. [11] We have found such an extremely rare patient, and treated with PBD and biloma drainage. Bilomas and infected bilomas can be managed via percutaneous treatment. [10] We have treated bilomas associated to malignant obstructive jaundice percutaneously.

Conclusion

In conclusion, percutaneous biliary drainage is a safe and effective interventional radiological procedure not only in palliation of inoperable malignant biliary obstruction in accordance to the literature, but in accompanying bilomas to this condition, as well.

References

Illustrations

Illustration 1

Figure 1: Right external biliary drainage catheter and minimal sub capsular leakage is seen.

Illustration 2

Figure 2: Right internal-external biliary drainage catheter passes to the duodenum.
Illustration 3

Figure 3: Right internal-external biliary drainage catheter passes to the duodenum, as well.

Illustration 4

Figure 4: Drainage catheter in the right external biliary (E), T-tube (T), and catheter in the biloma (B) and contrast medium in the choledoc and duodenum are demonstrated.
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