International Journal of Current Advanced Research
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 8; Issue 05 (F); May 2019; Page No. 18900-18903
DOI: http://dx.doi.org/10.24327/ijcar.2019.18903.3626

Research Article

BILIARY STENTS IN MANAGEMENT OF MALIGNANT OBSTRUCTIVE JAUNDICE: OUR EXPERIENCE IN A TERTIARY CARE HOSPITAL

Debashis Dakshit and Preetam Debasish Panda

Department of Radiodiagnosis, Medical College and Hospital ,Kolkata

A R T I C L E I N F O

Article History:
Received 13th February, 2019
Received in revised form 11th March, 2019
Accepted 8th April, 2019
Published online 28th May, 2019

Key words:

Biliary obstruction, Biliary malignancy, Biliary drainage, Cholecystostomy, Biliary interventions, Percutaneous transhepatic biliary drainage(PTBD),Self expanding mettalic stents(SEMS),Percutaneous transhepatic biliary stenting (PTBS)

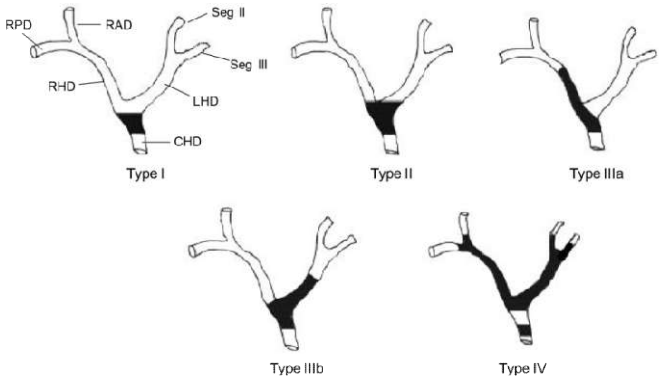
A B S T R A C T

Obstruction in the biliary tract is a common cause of jaundice and often requires image guided interventions as a part of pre-operative or palliative treatment. Numerous procedures including surgical,endoscopy guided and fluroscopy-US guided have been developed. Percutaneous transhepatic biliary drainage(PTBD) with or without deployment of self expanding metallic stents(SEMS) come handy in patients when surgical intervention is not feasible . Malignancy a common cause of biliary obstruction is often detected at a stage when surgical/endoscopic approach have a little role to play ,and only percutaneous approach might prove beneficial which is a palliative treatment. Percutaneous transhepatic biliary drainage(PTBD) with or without deployment of self expanding mettalic stents(SEMS) is a well-established procedure used in patients with malignant obstruction of intra- and extrahepatic bile ducts. PTBD lowers the levels of bilirubin, prevents cholangitis, thereby providing remarkable symptomatic relief and clinical improvement, improving the general condition, quality of life and increasing survival rate drastically. It also improves liver function prior to surgery or neoadjuvant chemotherapy.As endoscopy guided stenting of biliary tract is not carried out at our hospital,all the procedures were carried out using transhepatic approach using fluroscopy and ultrasound. The indications, techniques, advantages and complications of PTBD with SEMS are presented in this review.

INTRODUCTION

Numerous conditions may lead to biliary obstruction including cholangiocarcinoma, gall bladder and pancreatic malignancies, metastatic lymphadenopathy , hepatic and advanced gastric and duodenal malignancies are a few causes. Often the tumors are unresectable at diagnosis and only palliative treatment is offered to improve the quality of life and prolong survival of a patient[1,2]. The role of PTBD in these patients is to decompress the obstructed biliary tree, thereby developing a communication between the biliary tree and the bowel allowing physiological bile flow with SEMS would be added advantage. It may also have positive influence on survival as these patients are more likely to receive chemo- or radiotherapy .Decompressing the obstructed biliary tree decreases pain & jaundice and lowers occurrence of cholangitis by relieving the obstruction.

Corresponding author:* **Preetam Debasish Panda
Department of Radiodiagnosis, Medical College and Hospital,Kolkata



Classification of bile duct obstruction

Biliary obstruction is classified into “low” and “high.” Low bile duct obstruction occurs below the usual insertion of the cystic duct. High bile duct obstruction occurs proximal to the cystic duct insertion and may be classified as suggested by Bismuth and Corlette[3] :

Type I : obstruction below the confluence;
Type II :obstruction confined to confluence;
Type IIIa : obstruction with an extension into right hepatic duct;
Type IIIb: obstruction with an extension into left hepatic duct;

Type IV: multicentric tumors or tumors that involve the secondary confluence on the right or/and left side.

The Treatment Options in Biliary Obstruction caused by Malignancy

Surgery: Candidates for curative surgery are those with Bismuth type I and II lesions while type III lesion often requires a major resection. Type IV lesion are generally considered to be unresectable[4-8]. Prognosis of latter patients is guarded. Survival period ranges from only a few weeks to six months.There have been cases where patients have survived for even several years . Reported median survival is 3–10 months.

Endoscopic stenting: High obstructions, bilateral or multiple strictures, as well as previous upper gastrointestinal tract surgery may render endoscopic stent placement difficult or impossible. It is a method of choice in patients presenting with low biliary obstruction[13,14] .

Percutaneous transhepatic biliary drainage (PTBD) an effective preoperative & palliative procedure in the surgically unfit but often renders the patient vulnerable to infection .Other drawbacks being catheter flushing and dressing on daily basis which could potentially lead to catheter dislodgment. Bile leakage, infection, and pain at the catheter entry site may also occur .

Percutaneous transhepatic biliary stenting (PTBS) procedure used in patients with malignant biliary obstruction for decompression of intra- and extrahepatic bile ducts . ***PTBS recanalizes the*** communication between the biliary tree and the bowel allowing physiological bile flow thereby improves liver function, and has a positive impact on quality of life . It may also have positive influence on survival as these patients are more likely to receive chemo- or radiotherapy.

Indications for PTBS

PTBS is indicated in patients with surgically unresectable tumors, poor general condition of the patient , and in patients with recurrent malignant biliary obstruction[13,14]. In hilar obstruction, both PTBS andendoscopic stenting *may be* used as primary drainage modalities. If endoscopic stentingin distal bile duct obstruction fails or is technically not feasible PTBS is the procedure of choice.

Contraindications for PTBS

Absolute contraindications of percutaneous bile duct stenting are clinically significant coagulopathy and massive ascites , relative contraindications being obesity and uncooperative patients.

Complications of PTBS

Immediate morbidity following PTBS (bleeding, septicemia, and bile leakage) is rare (1–5%). *Major complications*arise in patients with coagulopathies, cholangitis, stones, malignant obstruction and results in prolonged hospitalization, permanent adverse sequelae, or death. *Minor complications* require nominal therapy or a short hospital stay for observation. Rates of minor and major complications are in the range of 8– 23% and 2–20%, respectively. Major and minor complications have been discussed in the table below from previous studies[5,13,14,15,16]. The recommended overall procedure threshold for all major complications of percutaneous transhepatic biliary stenting is 10%.. Most complications can be treated conservatively, mortality is less than 3% .

Table Complications of percutaneous transhepatic biliary stenting

Type of complication	Rate of complication in other studies			Rate of Complication in our study
	N=154 (20)	N=130 (17)	N=76 (3)	N=36
Major	–	11% (14/130)	14.5% (11/76)	-
Hemobilia	6.4% (10/154)	3% (4/130)	2.6% (2/76)	-
Cholangitis	18% (28/154)	–	–	1
Cholecystitis	–	–	1.3% (1/76)	1
Pancreatitis	–	–	5.2% (4/76)	1
Abscess	–	3.8% (5/130)	1.3% (1/76)	-
Sepsis	–	–	2.6% (2/76)	-
Massive hemorrhage	5.8% (9/154)	–	–	-
Pneumothorax	–	0.7% (1/130)	1.3% (1/76)	-
Bile duct rupture	–	2.3% (3/130)	–	-
Stent migration	0.6% (1/154)	–	–	-
Stent dislocation	2.1% (3/154)	–	–	-
Stent obstruction	18% (28/154)	–	–	
Minor		9% (12/130)	8% (6/76)	-
Mild hemorrhage	5.8% (9/154)	–	3.9% (3/76)	4
Biliary-venous fistula	2.1% (3/154)	–	2.6% (2/76)	-
Subcapsular biloma	2.4% (3/154)	–	1.3% (1/76)	-
fever				2
Other data 30-day mortality	9% (14/154)	11% (14/130)	13% (10/76)	-
Reintervention rate	15% (23/154)	–	–	-
Procedure-related mortality	–	–	2.7% (2/76)	-

Procedure

Coagulation tests were verified before the procedure, as coagulopathy is a contraindication to the procedure. Prophylactic intravenous antibiotics were administered 12 h before the procedure. The procedure was carried by radiologists and anesthesiologists.

The biliary ducts were carefully examined to locate and classify the obstruction. The procedures were performed with sonographic and fluoroscopic guidance, with the patient under local anesthesia. Sedation was useful in hepatic encephalopathy patients. A right intercostal and/or left epigastric approach was chosen depending on location of obstuction. A percutaneous transhepatic bile duct puncture was performed under ultrasound guidance and seldinger technique, using a 21-G Chiba needle. A guide wire was then passed into the biliary duct through the needle.A nick was made in the skin along the needle.The needle was then removed with the guide wire in situ and a cannula sheath was introduced .The guide wire was then removed and contrast agent (diluted iohexol) was injected into the biliary duct.Under fluroscopic guidance a guide wire was introduced passing through the common bile duct to the duodenum. The cannula sheath was then removed and stent insertion was then performed over a guide wire. Self-expandable metallic (stainless steel or nitinol) uncovered stents were used in all cases. After successful stent depolyment , a 10-Fr external drainage Malecot catheter was optionally placed proximally to the stent for drainage and flushing. The catheter was clamped the following morning for 4-24 hours and removed when clinical findings confirmed adequate drainage. A 10-Fr external bile drainage Malecot catheter was positioned in all cases when transhepatic stent placement was not technically feasible.

Success and complication rates were recorded. Technical success was defined as a successful deployment of a stentre-canalizing thecommunication between the biliary tree and the bowel allowing physiological bile flow. Clinical success was

defined as a decrease in serum bilirubin level not less than 10–15% relative to baseline within next 2–3 days after stent insertion[18].

RESULTS

Thirty six patients (27 women, 9 men; age range, 30–82 years) with inoperable malignant biliary obstruction were selected for percutaneous transhepatic placement of metallic stents in the period from *January 2017 to December 2018*.The etiology of biliary obstruction was cholangiocarcinoma (n=12), gallbladder carcinoma (n=3), pancreatic carcinoma (n=15), recurrent gastric cancer invading the hepatoduodenal ligament (n=6). The diagnoses were based on imaging studies supported histopathologically if technically feasible.

The biliary stents were placed in a one-step procedure in 5 patients. In the remaining 7 patients, an external PTBD with 8-Fr Malecot catheter was placed, whereas the lesion was stented 3–10 days later. Successful deployment of the stent at the appropriate position was achieved in 10 out of the 12 patients (83% technical success rate). Percutaneous transhepatic insertion of metallic stents was performed either via the right (n=4) or via the left liver lobe (n=6). Single stent placement was adequate to pass the stricture in 9 patients (90%) (8 patients with type I and 1 patient with type II stricture according to Bismuth-Corlette classification). Radiological data and main stages of the stent placement are depicted in Fig. The technical failure in both cases was due to hilar cholangiocarcinoma with multiple intrahepatic strictures and nonidentifiable passage to the extrahepatic biliary tract. Clinical success with a mean 12% decrease in serum bilirubin level within 48–72 hours after PTBS .

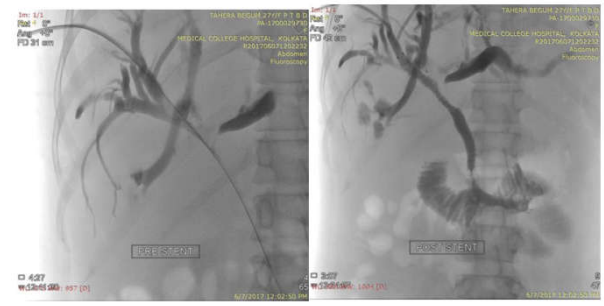
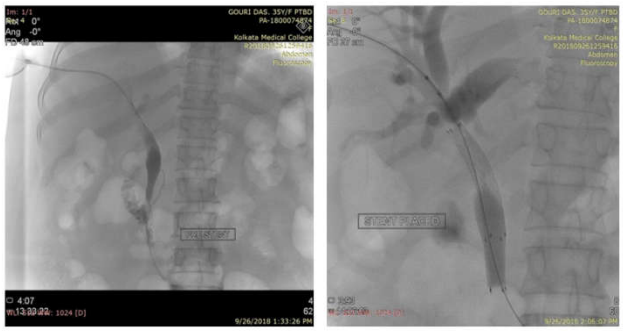


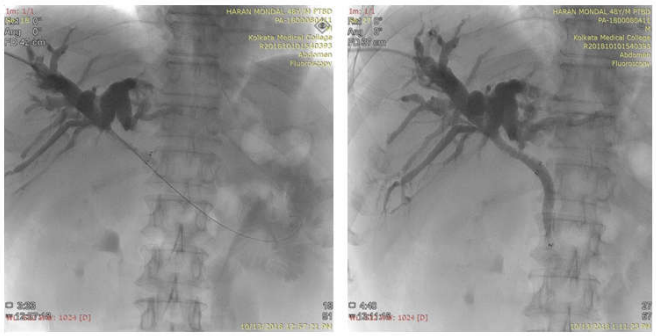
Fig. 1 a) Fig. 1b)

Fig 1a shows fluroscopic image of an obstructed biliary tree, Bismuth and Corlette type III A with guide wire in situ ,fig.1b shows the deployed stents decompressing the biliary tree.



2a) 2b)

Fig 2a shows fluroscopic image of an obstructed biliary tree, Bismuth and Corlette type I with guide wire in situ ,fig.2b shows the deployed stents decompressing the biliary tree.



3a) 3b)

Fig 3a shows fluroscopic image of an obstructed biliary tree, Bismuth and Corlette type II with guide wire in situ ,fig.3b shows the deployed stents decompressing the biliary tree.

4a) 4b)

Fig 4a shows fluroscopic image of an obstructed biliary tree, Bismuth and Corlette type IV with guide wire in situ ,fig.4b shows the deployed stents decompressing the biliary tree.

DISCUSSION

PTBS is preferred in Asia(Japan) while endoscopic stent placement in Europe. PTBS have a distinct advantage over endoscopic stenting , as one or more appropriate segments for drainage can be chosen.Success rates and complication rates for any interventional procedure depends on the operator to some extent.PTBS is an established palliative modality to relieve malignant biliary obstruction. Majority of groups have reported a 95–100% technical success rate in dilated bile ducts and 75% in nondilated bile ducts, with satisfactory biliary decompression and symptom relief in 88–96% of cases[5]. An interesting point of interest is that ,drainage of as little as 30% of the functional parenchyma may be adequate in patients with noncirrhotic liver and in those who have not received chemotherapy[17] ,hence partial liver drainage may appear as effective as a complete liver drainage. The design of mettalic stents allows them to pass freely through a small tract thereby reducing complications associated with procedure. Once deployed ,they expand to their maximum size of their lumen, which might reduce the re-occlusion rates, as the patency of a stent should be directly related to the stent diameter. Lumen of mettalic stents are greater than plastic stents by 20-30 times. The open wire mesh allows drainage of biliary side-branches and plays an important role in the management of hilar obstructions. The variety of different combinations allows treatment of complicated strictures and effective drainage of several isolated hepatic ducts, which should reduce the risk of cholangitis and septicemia. The small surface area of the wire mesh reduces chances of bacterial growth and encrustation.Metallic stents are superior to plastic stents, with longer patency rates, better symptom-free survival time, and improved quality of life for the patients, as well as lower

complication rates at a lower cost. The obstruction rates for uncovered stents in previous studies varied from 5% to 100% during a 1- to 19-month period following stent placement [13,17.] Multiple stent placements in both liver lobes as and when reqiured can be achieved via percutaneous approaches.The lumen of metallic stents can be evaluated with ultrasonography and computed tomography which is an added advantage.

The most common causes of occlusion of an uncovered metallic stent are sludge formation, proximal and distal tumor overgrowth, tumor ingrowth, and stone formation [11]. 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. The symptom-free period for these patients ranges from 2 weeks to 13 months (median of 10 weeks), and majority of the patients die from malignant disease before occurrence of stent dysfunction.

The results might improve with a better preoperative patient selection and increasing experience of interventional radiologists and surgeons. However, as endoscopy guided biliary stenting is not carried out at our hospital ,we have no other option but to proceed all the cases fluroscopy and ultra sound guided.The overall procedure-related morbidity rate was in the range reported by the others, and only one patient in our series developed a major complication that needed specific therapeutic interventions and resulted in prolonged hospitalization. Our initial experience with PTBS seems promising in palliative treatment of patients with primary or recurrent nonresectable malignant biliary obstruction.

CONCLUSION

PTBS is an effective procedure ,though only palliative .Percutaneous stenting of the biliary tree is a safe and effective minimally invasive procedure. Percutaneous transhepatic biliary stenting provides equally adequate palliation in patients with proximal and distal bile duct obstruction.PTBS not only improves the condition of the patient clinically ,but also improves the general condition and quality of life of the patient.

References

1. Brasiūnienė B, Juozaitytė E, Barauskas G. Impact of different treatment methods on survival in advanced pancreatic cancer. Medicina (Kaunas) 2005;41:382-5.
2. Yoshida H, Mamada Y, Taniai N, Mizuguchi Y, Shimizu T, Yokomuro S, *et al*. One-step palliative treatment method for obstructive jaundice caused by unresectable malignancies by percutaneous transhepatic insertion of an expandable metallic stent. World J Gastroenterol 2006;12:2423-6.
3. Bismuth H, Corlette MB. Intrahepatic cholangioenteric anastomosis in carcinoma of the hilus of the liver. Surg Gynecol Obstet 1975;140:170-8.
4. van Delden OM, Lameris JS. Percutaneous drainage and stenting for palliation of malignant bile duct obstruction. Eur Radiol 2008;18:448-56
5. Brountzos EN, Ptochis N, Panagiotou I, Malagari K, Tzavara C, Kelekis D. A survival analysis of patients with malignant biliary strictures treated by percutaneous metallic stenting.
6. Prat F, Chapat O, Ducot B, Ponchon T, Fritsch J, Choury AD, *et al*. Predictive factors for survival of patients with inoperable malignant distal biliary strictures: a practical management guideline. Gut 1998;42:76-80.
7. Lau W, Leung K, Leung TW, Liew CT, Chan MS, Yu SC etal. A logical approach to hepatocellular carcinoma presenting with jaundice. Ann Surg 1997;225:281-5.
8. Molnar W, Stockum AE. Relief of obstructive jaundicethrough percutaneous transhepatic catheter – a new therapeutic method. Am J Roentgenol Radium Ther Nucl Med 1974;122: 356-67
9. Bezzi M, Zolovkins A, Cantisani V,Salvatori FM, Rossi M, Fanelli F, *et al*. New ePTFE/FEP-coveredstent in the palliative treatment of malignant biliary obstruction. *J Vasc Interv Radiol.* 2002 Jun;13(6):581-589.
10. Schoder M, Rossi P, Uflacker R,Bezzi M, Stadler A, Funovics MA, *et al*. Malignant biliaryobstruction: treatment with ePTFE-FEP-covered endoprostheses initialtechnical and clinical experiences in a multicenter trial. *Radiology.* 2002 Oct;225(1):35-42.
11. Hausegger KA, Thurnher S, Bodendorfer G, Zollikofer CL, Uggowitzer M, Kugler C, *et al*. (1998) Treatment of malignant biliary obstruction with polyurethane-covered Wallstents. *AJR Am J Roentgenol.* Feb;170(2):403-408.
12. Miyayama S, Matsui O, Akakura Y,Yamamoto T, Nishida H, Yoneda K, *et al*. Efficacy of coveredmetallic stents in the treatment ofunresectable malignant biliary obstruction. *Cardiovasc Intervent Radiol.* 2004 Jul-Aug;27(4): 349–354.
13. Indar AA, Lobo DN, Gilliam AD, Gregson R, Davidson I,Whittaker S, *et al*. Percutaneous biliary metal wall stenting in malignant obstructive jaundice. Eur J Gastroenterol Hepatol 2003;15:915-9.
14. Burke DR, Lewis CA, Cardella JF, Citron SJ, Drooz AT,Haskal ZJ, *et al*. Quality improvement guidelines for percutaneous transhepatic cholangiography and biliary drainage. J Vasc Interv Radiol 2003;14: S243-6.
15. Inal M, Akgul E, Aksungur E, Demiryurek H, Yagmur O.Percutaneous self-expandable uncovered metallic stents in malignant biliary obstruction. Complications, follow-up and reintervention in 154 patients. Acta Radiol 2003;44:139-146.
16. Isayama H, Komatsu Y, Tsujino T, Sasahira N, Hirano K,Toda N, *et al*. A prospective randomised study of "covered" versus "uncovered" diamond stents for the management of distal malignant biliary obstruction. Gut 2004;53:729-34.
17. Adam A. Metallic biliary endoprostheses. Cardiovasc Intervent Radiol 1994;17:127-32.

****