

# INTERNAL-EXTERNAL VS EXTERNAL PERCUTANEOUS TRANSHEPATIC BILIARY DRAINAGE IN MANAGEMENT OF MALIGNANT INOPERABLE BILIARY OBSTRUCTION - A RETROSPECTIVE STUDY

Lopamudra Ghosh, Partha Pratim Samui, Debashis Dakshit

Department of Radio-diagnosis, Medical College Kolkata, India.

PJR January - March 2015; 25(1): 13-17

## ABSTRACT

**BACKGROUND:** Cases diagnosed with malignant biliary obstruction are often advanced and inoperable at the time of presentation and therefore carry a very poor prognosis. Less is known about the role of percutaneous transhepatic biliary drainage (PTBD) in management of this patient population. In available literature there is inadequate data regarding comparative analysis of internal-external drainage (IED) and external drainage (ED). **PURPOSE:** To portray efficacy of PTBD in management of malignant biliary obstruction and compare between ED alone and combined IED regarding outcome. **METHODS:** Twenty cases of biliary drainage (12 cases of ED and 8 cases of IED) done at our institution were retrospectively reviewed and reassessed over a period of 6 months between February 2014 and July 2014 by clinical and biochemical evaluation on day 7, 14 and 28 after procedure. **RESULTS:** Maximum number of patients (9;45%) were in their 6th decade. Out of 20 patients 14 were female (70%), 6 were male (30%). According to etiology gall bladder carcinoma which was diagnosed in 6 cases (30%) was commonest of all. There were 1 failed attempt (5%), 3 catheter expulsions (15%) following ED and 1 procedure related biliary sepsis (5%) after IED. On follow up serum biochemical markers came down to desired level (2mg/dl) approximately within a week in case of IED and two weeks after ED. Clinical improvement was also remarkably better in IED group. Chemotherapy was initiated in 5 patients (25%) following IED and 3 patients (15%) after ED after 1 week. **CONCLUSION:** IED is much better than ED alone in terms of more rapid clinical and biochemical improvement, catheter positional stability, easy access to future stenting and early initiation of chemotherapy.

**Keywords:** biliary obstruction, external drainage, gall bladder carcinoma, internal-external drainage

## Introduction

Malignant biliary obstruction commonly results from various causes such as gall bladder carcinoma, cholangiocarcinoma, pancreatic carcinoma, periampullary carcinoma, metastatic diseases etc. Cases at the time of presentation are often advanced and inoperable. Most of these cases carry a very poor prognosis and leads to limited life expectancy of patients.<sup>1</sup> In this group with obstructive jaundice treat-

ment by PTBD can alter overall management, provide safe and effective method of palliation and improve their quality of life.<sup>2,3</sup> Percutaneous transhepatic biliary drainage (PTBD) is a therapeutic procedure that consists of sterile puncture of a peripherally located biliary radicle under image guidance followed by placement of a catheter or stent for internal or external drainage of bile.<sup>4</sup> When catheter tip is kept proximal to the obstruction in order to drain bile outside body of the patient into a bag, it is called ED

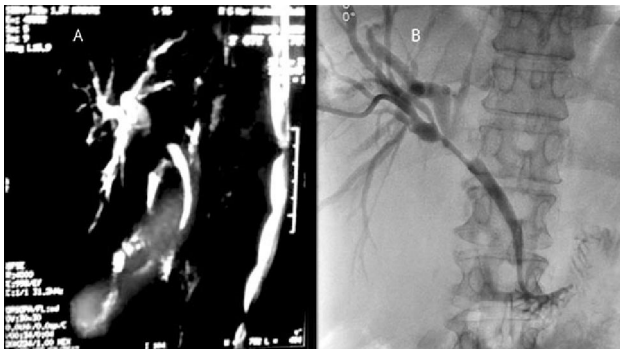
**Correspondence :** Dr. Lopamudra Ghosh  
Department of Radio-diagnosis,  
Medical College Kolkata, 88, College Street,  
Kolkata 700073, India.  
Tel.no:91-9432669135  
Email: drsamilo@rediffmail.com

Submitted 13 April 2015, Accepted 27 April 2015

(Fig. 1). On the other hand during IED obstruction is crossed followed by deployment of PTBD catheter into duodenum across ampulla to drain bile both internally into gut and externally into bag (Fig. 2). Advent of PTBD being a minimally invasive procedure has revolutionized management of patients with inoperable biliary malignancy by decompressing the biliary system.



**Figure 1:** A. Preprocedural MRCP showing dilated biliary radicles (white arrow) and common bile duct (curved arrow) in a case of periampullary carcinoma B. External drainage done by deploying Pigtail catheter (black arrow) proximal to obstruction



**Figure 2:** A. Preprocedural MRCP showing hilar obstruction (white arrow) by gallbladder carcinoma infiltration B. Internal-external drainage was performed by deploying PTBD catheter. Catheter tip (black arrow) noted in duodenum

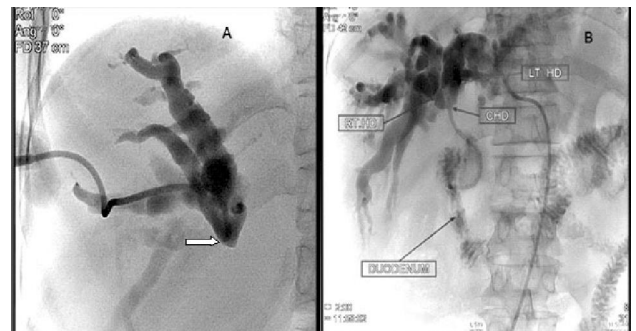
The purpose of this study was to portray efficacy of PTBD in management of malignant biliary obstruction and compare between ED alone and combined IED regarding outcome.

## Materials and Methods

This retrospective descriptive study was performed at our institution over a period of 6 months between February 2014 and July 2014 and included 20 patients with histopathological diagnosis of malignant

biliary obstruction. The diagnosis was made by clinical examination and imaging by ultrasound (USG), contrast enhance computerized tomography (CECT), MRI and MRCP. A retrospective chart review was performed using multidisciplinary case notes of these patients who were referred for PTBD. Patients with malignant inoperable biliary obstruction (mostly proximal), preoperative distal biliary obstruction (in case of grossly deranged LFT or biliary sepsis) or failed ERCP were included in this study. Patients having distal operable biliary obstruction, bleeding diathesis, massive ascites, contrast hypersensitivity were excluded. In case of preprocedural evidence of biliary sepsis we did not perform IED as attempt to cross the ampulla could cause peritumoral inflammation or pancreatitis.<sup>5</sup> So, in this group we preferred performing ED alone.

Biliary drainage was done using Philips Allura Xper FD 20 DSA machine and Philips clear hue 550 USG machine. Firstly USG guided puncture of dilated biliary radical was done by Chiba needle (18-21 G). Then contrast was injected under fluoroscopy guidance for anatomic delineation of the intrahepatic biliary radicles and localize the level of obstruction.<sup>6</sup> In case of external drainage metallic guide wire was introduced followed by serial dilatation of the tract via fascial dilator. Finally pigtail (8 F/10F) catheter was deployed over the wire (Fig. 3). While performing internal-external drainage the crux of our technique was to cross the obstruction by terumo (033) wire to reach duodenum followed by introduction of 5F BMC catheter over the wire upto duodenum. Then terumo wire was exchanged by a stiff wire and BMC catheter was removed. Finally PTBD catheter was deployed over the stiff wire (Fig. 3). We practice prophylactic

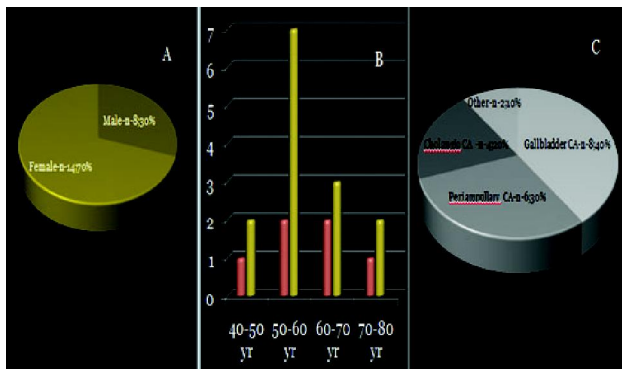


**Figure 3:** A. External biliary drainage done in case of hilar obstruction (white arrow) B. Internal-external biliary drainage done in a similar case with hilar obstruction. Catheter tip noted in duodenum (black arrow)

intravenous antibiotic (ceftriaxone 1 gm) immediately before puncture.<sup>1</sup>

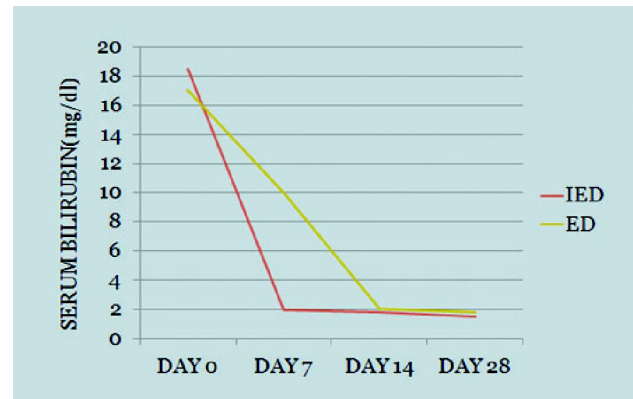
## Results

Twenty patients included in the study were in the age group ranging from 40 to 70 years (median-55 years). Maximum number of patients (n-9;45%) were in their 6th decade. Out of 20 patients 14 were female (70%), 6 were male (30%). Most common malignancy in this study was gall bladder carcinoma (n-8;40%), followed by periampullary carcinoma (n-6;30%), cholangiocarcinoma (n-4;20%), metastatic diseases (n-2;10%) (Fig. 4). Twelve patients (60%) underwent ED and rest 8 (40%) were subjected to IED. There were 1 failed attempt (5%) and 3 catheter expulsions (15%) following ED. There was no catheter dislodgement following IED. Procedure related biliary sepsis resulted in 1 case (5%) after combined drainage.



**Figure 4:** A-Gender distribution of cases  
B-Age distribution of cases  
C-Overall distribution of cases according to etiology

Follow up was done by clinical evaluation and estimation of serum bilirubin and serum alkaline phosphatase on day 7, 14 and 28. Mean serum bilirubin decreased from 18.5 mg/dl to 2 mg/dl (89% reduction) measured 1 week after IED. Mean serum bilirubin dropped from 17 mg/dl to 10 mg/dl (41% reduction) measured after same period following ED. Thus desired level (usually < 2 mg/dL) of serum bilirubin was achieved within 1 week in case of IED.<sup>5</sup> It took almost 2 weeks for serum bilirubin to come down to same level after ED (Fig. 5). There was similar trend of fall of serum alkaline phosphatase in this two methods. There was significant clinical improvement



**Figure 5:** There is more rapid fall of serum bilirubin following IED than ED alone. Serum bilirubin comes down to approximately 2 mg/dl within a week following IED.

in the form of relief from pruritus and symptoms (altered sensorium) due to hepatic encephalopathy in combined approach rather than ED alone. IED facilitated an early initiation of chemotherapy with rapid correction of jaundice as most chemotherapy protocol requires a serum bilirubin level of 2 mg/dl. Chemotherapy was successfully initiated in 5 patients (25%) following IED and 3 patients (15%) after ED after 1 week.

As obstruction was already crossed during internal-external drainage scope for further stenting was easier. We used self-expanding nitinol metallic stent in 3 cases of IED (Fig. 6). We prefer using metal stents because they have high patency rate, shorter hospital stay and overall less cost than plastic stents.<sup>7,8,9,10</sup>



**Figure 6:** A. Pre-stenting image in case of hilar obstruction (white arrow) by gall bladder carcinoma shows contrast opacified biliary system. B. Self expandable metallic stent (black arrow) placed after bypassing hilar obstruction.

Despite of so many advantages there were few drawbacks. IED was bit costlier, required fluoroscopy

guidance and technical efficiency. On the other hand ED was relatively cheap and was a simple technique which could be done only under USG guidance. (Tab. 1) shows effect analysis of IED vs ED. Biliary infection which is a dreadful perioperative complication in patients with malignant obstructive jaundice was observed in 1 case following IED.<sup>11</sup> This was resolved on treatment with antibiotic.

	IED	ED
Serum bilirubin reduction after 1 week	89%	41%
Early relief from pruritus, altered sensorium	yes	no
Stenting	3 (15%)	nil
Chemotherapy after 1 week	5 (25%)	3 (15%)
Catheter expulsion	nil	3 (15%)
Biliary sepsis (postprocedure)	1 (5%)	nil

**Table 1:** Effect analysis; IED vs ED

## Discussion

PTBD has been practiced over 40 years with various technical modifications and improvements.<sup>12</sup> Technical success of this procedure is reported as more than 90% and clinical success as more than 75% in literature.<sup>13</sup> The result of our study revealed that there was strong female predilection of malignant biliary obstruction. Gallbladder carcinoma was the commonest etiology followed by periampullary carcinoma. Patients with gallbladder cancer were probably better palliated by PTBD because of their poor survival.<sup>14</sup> In case of high hepatobiliary obstruction transhepatic biliary decompression remains the only resort because it is inaccessible to endoscopy guided biliary interventions.<sup>15,16,17</sup> IED was superior to ED in terms of more rapid clinical and biochemical improvement. There was even catheter positional stability, easy access to further stenting and early initiation of chemotherapy in case of internal-external group. IED was little costlier, required high yield technical facilities when compared to ED. But there was certainly overall better post procedural outcome of IED in palliation of malignant biliary obstructions.

## Conclusion

PTBD is a safe, cost-effective and minimally invasive palliative technique that offers a lasting solution or

at least temporary relief in patients with advanced irresectable malignant biliary obstruction and improve their quality of life.

IED is superior to ED in terms of more rapid clinical and biochemical improvement, catheter positional stability, easy access to further stenting and early initiation of chemotherapy.

## References

1. Cherian George, Oliver Richard Byass, James Edmund Ian Cast, Interventional radiology in the management of malignant biliary obstruction, *World J Gastrointest Oncol.* 2010 15; **2(3)**: 146-50.
2. Kevin O. Clarke, MD, and Lawrence D. Wagman, MD, FACS, A Safe and Effective Method of Palliation, *J Support Oncol* 2006; **4**: 336-7.
3. Abraham NS, Barkun JS, Barkun AN. Palliation of malignant biliary obstruction: a prospective trial examining impact on quality of life. *Gastrointest Endosc* 2002; **56**: 835-41.
4. Quality Improvement Guidelines for Percutaneous Transhepatic Cholangiography, Biliary Drainage, and Percutaneous Cholecystostomy Wael E. A. Saad, MD, Michael J. Wallace, MD, Joan C. Wojak, MD, Sanjoy Kundu, MD, and John F. Cardella, MD, *J Vasc Interv Radiol* 2010; **21**: 789-95.
5. Anne M. Covey, MD, and Karen T. Brown, MD, Palliative Percutaneous Drainage in Malignant Biliary Obstruction, *J Support Oncol* 2006; **4**: 269-72
6. Kaude JV, Weidenmier CH, Agee OF. Decompression of bile ducts with the percutaneous transhepatic technic. *Radiology* 1969; **93**: 69-71.
7. Stoker J, Lameris JS, van Blankenstein M. Percutaneous metallic self-expandable endoprostheses in malignant hilar biliary obstruction. *Gastrointest Endosc* 1993; **39**: 43-9.

8. Hausegger KA, Thurnher S, Bodendörfer G, Zollikofer CL, Uggowitz M, Kugler C, Lammer J, AJR Am J Roentgenol. Treatment of malignant biliary obstruction with polyurethane-covered Wallstents 1998; **170(2)**: 403-8
9. Pinol V, Castells A, Bordas JM, et al. Percutaneous self-expanding metal stents versus endoscopic polyethylene endoprosthesis for treating malignant biliary obstruction: randomized clinical trial. Radiology 2002; **225(1)**: 27-34.
10. Kaassis M, Boyer J, Dumas R, et al. Plastic or metal stents for malignant stricture of the common bile duct? Results of a randomized prospective study. Gastrointest Endoscop 2003; **57(2)**: 178-82.
11. Chuan Xu<sup>1</sup>, Peng-Hua Lv<sup>1</sup>, Xin-En Huang<sup>2\*</sup>, Ling Sun<sup>1</sup>, Shu-Xiang Wang<sup>1</sup>, FuAn Wang, Internal-External Percutaneous Transhepatic Biliary Drainage for Patients with Malignant Obstructive, Asian Pac J Cancer Prev, **15(21)**: 9391-4.
12. Arner O, Hagberg S, Seldinger SI. Percutaneous transhepatic cholangiography: puncture of dilated and non dilated bile ducts under roentgen television control. Surgery 1962; **52**: 561-5.
13. van Delden OM, Laméris JS, Percutaneous drainage and stenting for palliation of malignant bile duct obstruction, JS, Eur Radiol. 2008 Mar; **18(3)**: 448-56.
14. Jarnagin WR, Burke E, Powers C, Fong Y, Blumgart LH. Intrahepatic biliary enteric bypass provides effective palliation in selected patients with malignant obstruction at the hepatic duct confluence. Am J Surg 1998; **175**: 453-60.
15. Molnar W, Stockum AE. Relief of obstructive jaundice through percutaneous transhepatic catheter--a new therapeutic method. Am J Roentgenol Radium Ther Nucl Med. 1974 Oct; **122(2)**: 356-67.
16. Smith, R. Hepaticojejunostomy with transhepatic intubation. Brit. J. Surg. 1964; **57**: 186-94.
17. Warren, K. W., McDonald, W. M. Facts and fiction regarding strictures of extrahepatic bile ducts. Ann. Surg. 1964; **159**: 996-1010.