



# Role of Interventional Radiology in the Management of Obstructive Jaundice: Achieving Drainage and Stenting

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## Abstract

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**BACKGROUND:** Obstructive jaundice due to the central malignant cause is really challenging for gastroenterologists and usually results in failed drainage of obstructing system, the percutaneous transhepatic biliary drainage (PTBD) usually results in a dramatic pathway opening.

**AIM:** The study aimed to evaluate the role of interventional radiology (IR) in achieving drainage of obstructing system and subsequent reduction of serum bilirubin and its role in stenting the obstructing lesion.

**METHODS:** A prospective study included 40 patients who complained of obstructive jaundice referred to IR unit in specialties surgical hospital from gastroenterology hospital after failed endoscopic drainage and stenting during the period from September 2020 to November 2021.

**RESULTS:** Of 40 patients in study population, 26 are male and 14 females, their median age was 65 years, cholangiocarcinoma is leading cause of biliary obstruction, the technical success of PTBD was 100% and clinical success achieved by lowering of total serum bilirubin by 60% within 2 weeks seen in 75% of the patients, no significant major complications seen after procedure, and only 5% of the patients developed leaking bile along the drain tract.

**CONCLUSIONS:** PTBD and transhepatic biliary stenting are amazing technique in acute and chronic management of patients with obstructive jaundice, achieve dramatic lowering of serum bilirubin, fighting biliary sepsis and long-term palliation of advanced biliary, pancreatic, and ampullary malignancy.

## Introduction

Obstructive jaundice had wide range causes, for simplicity its divided into malignant and benign causes, regarding the malignant causes were mainly cholangiocarcinoma, metastasis, pancreatic, or ampullary carcinoma [1].

The most of the malignant cases are advanced at time of examination and poor in prognosis, and the main aim of treatment was palliation whether of the pain, pruritus, or cholangitis, the palliation was achieved either by surgical or minimally invasive procedures, the latter includes the percutaneous transhepatic biliary drainage (PTBD) and endoscopic drainage endoscopic retrograde cholangiopancreatography (ERCP), PTBD is mainly for the proximal biliary lesion in the porta hepatis while the ERCP for distal lesion [2], [3].

ERCP is sometimes not feasible especially with abnormal anatomy due to prior gastric surgery, pancreatic surgery such as whipple surgery or in case of difficult cannulation, her the PTBD is a problem solving procedure, usually well tolerated by most of patients with minor complications [4]. PTBD usually results in decreasing the total bilirubin, and hence facilitates chemotherapy

initiation, and also achieves symptoms improvements mainly the pruritus, cholangitis, and quality of life [5].

The main contraindication to the percutaneous procedure is uncorrectable coagulopathy, this can be corrected by fresh frozen plasma and Vitamin K supplement, other relative contraindications include ascites which can be drained preoperatively and liver lesions in the pathway of percutaneous route, the PTBD cannot be performed in patients with segmental biliary obstruction or the dilated biliary tree in atrophied lobe [6].

## Patients and Methods

This is a prospective study that comprised 40 patients complaining of obstructive jaundice and referred to the interventional radiology (IR) unit in specialties surgical hospital/medical city complex in Baghdad during the period from September 2020 to November 2021. Their age ranged from 55 to 75 years.

All patients were subjected to ultrasound examination by the specialized IR doctor and then prepared for undergoing the PTBD which was

performed angiography device GE (China). Patients were lying supine on the operative couch after putting off their clothes, sterilization of the whole abdomen and lower chest using povidone iodine, sterile cupping of the convex ultrasonic probe was done and localization of entry site was planned either in the right mid axillary line below the ninth rib for the right lobe drainage or in sub-xiphoid region for the left lobe drainage.

Local anesthesia using 10 ml lidocaine 2% along the pathway tract down to hepatic capsule, then the chiba needle 22Gauge was introduced down to peripheral part of segment V duct in the right lobe or segment III of the left lobe, one within the bile duct, back flow of bile seen at needle hub, then diluted 50:50 iohexol 350: saline was injected under fluoroscopic guide to delineate the biliary tree, after that a hydrophilic wire was introduced, the needle removed, progressive dilation of the tract was done using 6–8 French dilators after that biliary catheter was introduced and wire negotiation through the obstructed duct was done until reaching the duodenum, then contrast was injected to confirm position, the hydrophilic wire was changed for Amplatz stiff wire and then biliary drainage catheter was deployed achieving internal-external biliary drain, the drain was secured to skin using nylon suture and the drained attached to urine bag.

In case of massive dilation of the biliary tree when achieving duodenal passage was not possible external drainage was done, in other hand, few patients (two) required two drain as they have Bismuth Type 3 A cholangiocarcinoma.

Biliary stenting was done in five patients, three of them having Klatskin tumor and two of them require Y-shaped bi-ductal stents. Post-procedure rest, intravenous fluid, and antibiotic were given and the patients discharged on 5 days antibiotic cover and encouragement of oral fluid intake. Weekly, serum bilirubin test was requested and those showing decreasing bilirubin were prepared for biliary stenting.

### Statistical analysis

All patients' data entered using computerized statistical software; Statistical Package for the Social Sciences version 20 was used. Descriptive statistics presented as (mean  $\pm$  standard deviation) and frequencies as percentages. Multiple contingency tables conducted and appropriate statistical tests were performed, Chi-square was used for categorical variables, and Fisher's exact test was used when more than 20% of the expected variable was  $<5$ .

## Results

The study consists of 40 patients, 26 males and 14 females, their age is in range between 55 and

75 years with median age is 65 years, the majority of the patients are in 7th decade, the details regarding the patients age and gender are shown in Table 1.

**Table 1: Demographic distribution of study sample**

Parameters	n (%)
Gender	
Males	26 (65)
Females	14 (35)
Total	40
Age (years)	
<60	2 (5)
61–70	30 (75)
>71	8 (10)
Total	40

Regarding the causes of the obstruction in the presented patients sample, the hilar cholangiocarcinoma is the major cause seen in 70% of the cases, then pancreatic carcinoma which represents 25% cases the remaining 5% include ampullary and metastatic disease either from local invasion of gall bladder carcinoma or lymph nodes met from gastric carcinoma. The total serum bilirubin (TSB) in the study sample is represented in Table 2, the majority of the patients had TSB between 10 and 20 mg/dl and represent 65% of the cases, 22% of the cases their TSB is above 20 mg/dl.

**Table 2: Total serum bilirubin level in study population**

TSB range in mg/dl	n (%)
<10	5 (12.5)
11–20	26 (65)
>20	9 (22.5)
Total	40

TSB: Total serum bilirubin

The technical success of PTBD insertion and stenting was 100%, external-internal drainage was performed in 39 patients, and one patient underwent only external drainage due to markedly dilated common bile duct due because of pancreatic cancer; from the study sample, only five patients had self-expandable stent placed; details about drainage and stenting are shown in Table 3, no significant major post-procedure complications seen, apart from mild peri-drain bile leak was seen in two patients (5%).

**Table 3: Percutaneous biliary procedure type**

Procedure	n (%)
External internal drainage	39 (97.5)
External drainage	1 (2.5)
Stenting	5 (12.5)

The clinical success was assessed by measuring the TSB level in those patients who underwent PTBD by weekly follow-up, 75% showing reduction of TSB for more than 60% during the 2–4 weeks follow-up, and only 5% of them showing no decrease in TSB with significant  $p = 0.004$

## Discussion

Obstructive jaundice is a distressing clinical problem especially when was due to malignant

process [7], the management with either surgical which is usually curative in early stages [8], endoscopic when the patients have proper anatomy, and biliary ducts properly drained [9]. PTBD remains the proper drainage procedure for failed or impossible endoscopic procedure or the patient had high level obstruction with common hepatic duct or hilar lesion [10]. PTBD is performed by specialist IR doctor, who has a proper knowledge of biliary anatomy, guessing the complications when occur and able to manage them instantly especially significant hemobilia, biliary leakage, and pneumothorax [11]. Regarding the demographic distribution of study sample regarding the patients age and gender, both are in line with most of study performed, the explanation of this may be due to primary causative agent of obstruction [12]. The success rate of PTBD and stenting in our study was nearly in agree with most visited articles done by Bapaye *et al.* [10]. The clinical success represented by improving pruritus and decreasing TSB was in agree with study performed by Born *et al.* [13] and Migita *et al.* [14].

## Conclusions

PTBD and biliary stenting were considered a life-saving procedure in relieving the obstructive jaundice and associated complications and symptoms, achieving good palliation for advanced malignant biliary obstruction with minor complications especially when performed by professional IR and the patients are properly selected and prepared for the procedure.

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