

# Percutaneous Trans-hepatic Biliary Drainage In Kurdistan Center For Gastroenterology And Hepatology

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## Abstract

### Background and Objectives

Percutaneous trans-hepatic biliary drainage (PTBD) is an invasive, effective therapeutic method of relieving benign or malignant biliary obstruction and life saving if the patient is septic. Moreover, PTBD is indicated in most of the conditions, when failed ERCP and/or ERCP not feasible. Our objective is to investigate the impact and effectiveness of PTBD in the management of obstructive jaundice

### Patients and Methods

A Prospective clinical study extended from February 2013- October 2013 and included 32 patients whom referred for PTBD to KCGH in Sulaimania city. All patients were meet inclusion criteria for PTBD. After the procedure all of them had follow up.

### Results

Thirty two patients(19 female and 13 male) ,with mean age 62.25 years were included, with the etiology of the obstructive jaundice being cholangiocarcinoma, pancreatic mass; porta hepatis lymph node, gallbladder carcinoma, and peri ampullary tumor were (44%, 31%, 9.5%, 9.5% and 6%) respectively. Metallic stent, external - internal catheter and dilatation were inserted in 65.5%, 31.5% and 3% respectively. Intra procedurally 90.6% had pain and post procedurally had pain, bleeding and cholangitis (64.5%, 3.2% and 3.2%) respectively. There was a significant difference between the pre, and post procedures of (ALT, AST, ALP, TSB, and Direct Bilirubin ), with P value 0.001, 0.003, 0.001, 0.001, and 0.001 respectively.

### Conclusions

PTBD is effective, and relatively safe, with the desirable outcome in the management of obstructive jaundice when other lines of treatment are not effective or possible

### Key terms

Obstructive jaundice, cholangiocarcinoma.

### Introduction

In obstructive jaundice conjugated bilirubin will increase, this is due to failure of normal amount of bile to reach the duodenum, either through a specific failure of canalicular secretion or mechanical obstruction to the bile flow at any level<sup>(1)</sup>. The serum shows increases in conjugated bilirubin, biliary alkaline phosphatase,  $\gamma$  - glutamyl transpeptidase ( $\gamma$  - GGT) and conjugated bile acids<sup>(2)</sup>. Common conditions in which the conjugated bilirubin will be elevated are the problem inside bile ducts such as calculi, and parasites, or inside wall causing stricture such as cholangiocarcinoma, sclerosing cholangitis, and bile duct cysts or outside duct wall

such as tumor in porta hepatis (lymph node or metastasis), tumor in pancreas, and acute or chronic pancreatitis<sup>(2,3)</sup>.

Mullar and Burkhardt introduced cholangiography in Germany in 1921. Then, the procedure of cholangiography gradually expanded, during the 1970s, percutaneous biliary drainage (PBD) for obstructive jaundice and percutaneous treatment of stone diseases was introduced<sup>(4)</sup>.

Percutaneous transhepatic cholangiography (PTC) involves transhepatic insertion of a needle into a bile duct, followed by injection of contrast material to opac-

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ity the bile ducts<sup>(3,4)</sup>. It has close to 100 percent sensitivity and specificity for identifying site of biliary tract obstruction, being more accurate when other less invasive methods of imaging the biliary tree have proved unsuccessful<sup>(5)</sup>. It reliably demonstrates the level of abnormalities and can help diagnose their etiologies, is a safe and effective technique and is purely diagnostic procedure<sup>(5,6)</sup>.

PTBD is an invasive and effective therapeutic method of relieving benign or malignant biliary obstruction and may be life saving if the patient had developed sepsis<sup>(6)</sup>. This include drainage of infected bile in the setting of cholangitis, extraction of biliary tract stones, dilation of benign biliary strictures, or placement of a stent across a malignant stricture<sup>(7)</sup>. Moreover, PTBD is indicated in most of the conditions, when failed ERCP and/or ERCP not feasible<sup>(8)</sup>. Regarding the history of PTC in Iraq, the first procedure of PTC in Iraq was done by Professor Mohammed Hassan Al-Eshaiker<sup>(9)</sup>. In KCGH, the procedure started initially as diagnostic procedure probably approximately 10 times by Dr Shahla Barzanji (personal communication), followed later by diagnosis and treatment trial by current team. Currently in the whole of Iraq, Particularly in Kurdistan region the outcome and effectiveness of PTC in the management of obstructive jaundice is not clear.

The aim of this study is as audit on the relations between base line characteristics of the patient, outcome and effectiveness of the PTC, and PTBD as a therapeutic procedure for patients who have obstructive jaundice when other modalities of treatment are inaccessible.

## Patients and Methods

A prospective clinical consecutive case series study, it carried out at KCGH in Sulaimania city, which serves as a tertiary referral center for Kurdistan and other parts of Iraq, the work design has been approved by ethical committee at KCGH, the study extended from February, 2013 to October, 2013 and 32 (19 female, 13 male) patients were studied. Patients were interviewed before the procedure to obtain informed consent and document the demographic and clinical data. Most patients (if not all) were already admitted and managed conservatively. In addition to that following investigations (such as liver function test, US, CT, MRCP, ERCP and EUS were rechecked, and reviewed precisely. Furthermore, all patients had undertaken full complete blood count (CBC), renal function test, PT and INR. Inclusion and exclusion criteria were as follow<sup>(10)</sup>. Inclusion criteria: Patient has obstructive jaundice and or cholangitis, imaging revealed dilated bile ducts, unfit for surgery, and unfit/failure or inadequate drainage by ERCP. Situation

after surgery (like biliary enteric anastomosis stenosis), Platelet count more than 80000 and INR shouldn't be more than 1.6. Exclusion Criteria: Incorrectable coagulopathy and or thrombocytopenia and Moderate-huge ascites<sup>(10)</sup>.

Methods of procedure (10-12): All patients were evaluated by Ultrasound (US) to identify the ultimate site for the entrance. The patient laid on the angiography table, the abdomen undressed, intravenous access done, One gram (1gm) intravenous injection (IV) of Cefotaxime had been given and patient were monitoring by anesthetist including pulse oximetry and periodic blood pressure monitoring. The skin of abdomen cleansed with iodine pavidone, after the exact point of entrance marked. Sterile draping done, the point of entrance injected with 10-15cc of 2% lidocaine local anesthesia, down to the liver capsule. For the left lobe, the epigastric area was the point of entrance, for the right lobe anterior IVth, Vth lower intercostal spaces used. All the procedure was done under standard sterile condition. At the entrance point a small incision 3-4mm done. A standard nefset puncture set used (including 22 Gauge, puncture needle with stylet, floppy tip steel guide wire 0.025, the 3 sheath dilator, a J tip Teflon coated 0.035 guide wire). The needle passed through the incision, then subcutaneous tissue and the liver to enter one of the segmental dilated intrahepatic bile duct under US guide (Philips incisor 3.5 MHz curvilinear probe), then the stylet removed and bile noted coming out from the needle, then a cholangiogram done by diluted 50% iohexol 350, the anatomy of biliary tree, site, level and degree of the obstruction noted, the 0.025 guide wire advanced through the needle to the main bile duct as close as possible to the obstruction.

Then the needle removed, but the guide wire in place, the dilators advanced over the guide wire until reaching the bile duct, then the internal sheaths and the guide wire removed, leaving the large 6fr external sheath in place, the 0.035 guide wire advanced through the sheath to the point of obstruction, then the sheath removed. A standard angiography sheath 7fr advanced over the guide wire to the bile duct and secured in place, then the guide wire removed, a long (0.035 or 0.025fr) hydrophilic straight tip guide wire advanced through the sheath with an angled tip (6fr) catheter (biliary manipulation catheter) all under direct continuous fluoroscopy. The stricture traversed by the guide wire, and the guide wire advanced to proximal small bowel, this proved by injecting contrast through a dual Chanel (6 or 8) French plastic dilator, then the stricture dilated by 6 and 8 French plastic dilators. Contrast cholangiogram done, the site and length of the stricture studied and

measured, communication between right and left duct, cystic duct and extension of the stricture noted. Appropriate metallic stent chosen regarding length (6-10) cm, the diameter was (8-10) mm, covered, uncovered or partially covered accordingly. The stent advanced over the guide wire to the planned position (distal end beyond the stricture and proximal end before the stricture and inside the biliary tree, and not the liver parenchyma, then the stent deployed in place, an cholangiogram done, the patency of the stent noted, if a severe waist noted a balloon (4-6 mm x4-6cm) used for dilatation of the waist<sup>(10-12)</sup>. Finally, the guide wire removed, the incision sutured by single stitch. The patient moved to the recovery ward under close monitoring for at least two hours, then referred to medical ward for at least 12 hours and treated accordingly including fluid and analgesia. Then patients had periodic follow up.

Data entry and tabulation of data conducted in computer by Microsoft office excel 2010, and then statistical analysis was performed using statistical package for social sciences (SPSS, 20.0). For the associations or differences to be significant the P-value should be < 0.05<sup>(13)</sup>.

**Results**

Thirty two patients (19 female and 13 male) were studied, the age range of the patients were (10-86) years, and the mean age was (60.25) years with mean duration of chief complain (3.67) months. In addition, according to the ethnicity, Kurdish, Arabic, and Turkman, each

constitute (53%), (44%) and (3%) respectively. Regarding the etiology of the obstructive jaundice as shown in table(1), cholangiocarcinoma, pancreatic mass, porta hepatis lymph node, gallbladder carcinoma, and peri ampullary tumor were (44%, 31%, 9.5%, 9.5% and 6%) respectively, where malignant obstruction is a dominant cause and need stenting.

**Table (1): Etiology of obstructive jaundice in studied patients.**

Variables	Numbers (32)	Percentages (100%)
<b>Cholangiocarcinoma</b>	14	44
<b>Pancreatic mass (Carcinoma)</b>	10	31
<b>Gallbladder Carcinoma</b>	3	9.5
<b>Porta hepatis Lymph node</b>	3	9.5
<b>Peri ampullary tumor</b>	2	6

Regarding patient characteristics in form of previous ERCP attempt (either unsuccessful or some time successful but inadequate drainage), past hepatobiliary surgery, drug history of his/her malignant condition, or for any other chronic diseases, and chronic medical conditions are shown in table<sup>(2)</sup>.

**Table (2): Patient characteristics.**

Variables	Numbers	Percentages
<b>Past surgical history of hepatobiliary surgery</b>	10	31
<b>Past drug history</b>	14	44
<b>Previous ERCP attempt</b>	23	72
<b>Past medical history of chronic diseases</b>	9	28.1
<b>Hypertension - Diabetes mellitus</b>	9	28.1

Percutaneous transhepatic cholangiogram done for all patients and in 62.5% were accessed via left hepatic duct, while in 37.5% accessed through right hepatic duct. According to specific interventional procedure 21 (65.5%) of our patients, metallic stent were inserted, 10 patients (31.5%) external - internal catheter were installed only 1 patient (3%) had dilatation as shown in (Fig. 1).

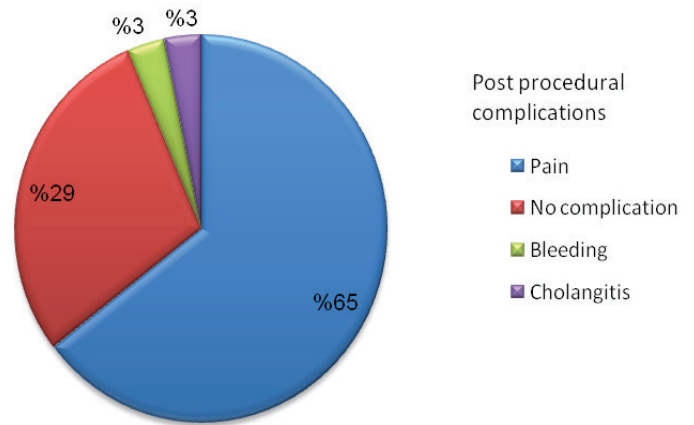
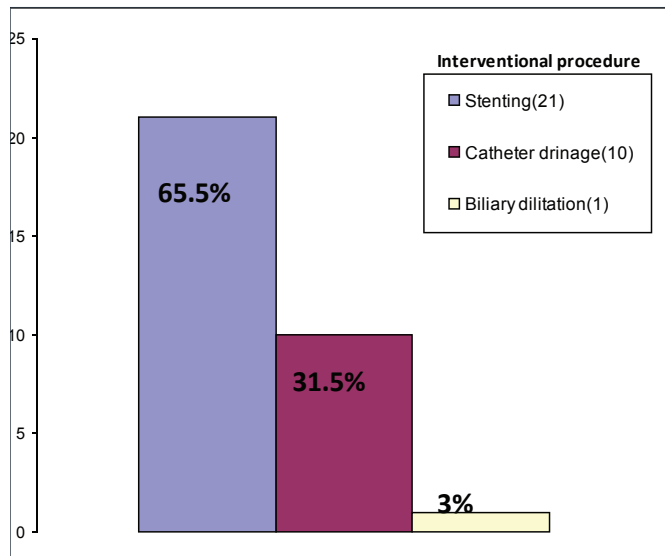


Figure (1): The interventional procedures performed. Percutaneous transhepatic biliary drainage complications intraprocedurally 90.6% of patients had mild pain. Post procedure complication shown in figure (2).

Figure (2): The post-procedural complications  
To identify the effectiveness of the PTBD or post PTBD biochemical markers had been employed as shown in the table (3) which was effective in 97%, but the bilirubin and alkaline phosphatase rate are most important parameter to confirm the clinical outcome. The mean and standard deviation of alkaline phosphatase, (960.5±799.62), total serum bilirubin (20.38±8.47), and direct bilirubin (15.06±5.55) pre operation are very high, but post operation the rate of the those parameters are clinically, and biostatic ally are decrease, in which mean, and slandered diviasion with P value of alkaline phosphatase, total serum bilirubin, and direct bilirubin are (384.87±226.76, P<0.001, 8.1±6.4, P0.001, 5.9±4.4, P0.001) respectively.

Type of investigation	Pre-operative Mean ± Std. Deviation	Post-operative Mean ± Std. Deviation	P-values
ALT	119.64±105.78	55.72±69.73	0.001
AST	125.18±111.75	52.55±48.46	0.003
ALP	960.5±799.62	384.87±226.76	0.001
PT	14.700±1.92	14.1±1.0	0.942
INR	1.27±0.18	1.29±0.12	0.592
TSB	20.38±8.47	8.1±6.4	0.001
Direct B	15.06±5.55	5.9±4.4	0.001
Albumin	2.95±0.54	2.88±0.43	0.637

## Discussion

In this prospective study the efficacy of PTBD in palliating biliary obstruction evaluated, to demonstrate its efficacy in our locality to solve the problem unresectable tumor in which ERCP was not feasible and acceptable. The traditional teaching was to try PTBD for proximal biliary obstruction and ERCP for distal biliary obstruction but due to our special circumstances lack of interventional radiology we resort to do ERCP if it's feasible/ approachable, if not then we need PTBD or probably in future EUS guided draining<sup>(14)</sup>. Patients in this study had some similarity in the baseline demographic characteristics in terms of age and their gender rate, and this was due to having a variety of hepatobiliary disorder. In this study rate of female slightly higher than male<sup>(12)</sup>.

In general, most of the patients in this study were presented with malignant obstructive jaundice which were; cholangiocarcinoma with high percentage as compared with other types (44%), while, pancreatic mass (31%), porta hepatis lymph node (9.5%), gallbladder carcinoma (9.5%) are same percentage, and peri ampullary tumor are decreasing in frequency (6%). In a study done by Bapaye et al.(2013), the commonest aetiology of biliary obstruction was pancreatic head cancer followed by ampullary carcinoma, gastric cancer, and hilar cholangiocarcinoma<sup>(15)</sup>. Our results demonstrated that the PTBD is effective procedure to treat malignant obstructive jaundice as the clinical and biochemical marker show significant improvement that P Value of alkaline phosphatase, total serum bilirubin, and direct bilirubin are less than (P 0.001), similar results reported by (Mashiko et al 1996 :Liu et la 2009: Parlidar et al.2011)<sup>(16-18)</sup>.

Most of our patient have a good clinical outcome; after 1-3 months follow up they have good clinical status with improving performance state with decreasing intrahepatic biliary tree dilatation with pneumobilia. In this study most of complications was a minor, not major or fatal, as compared with a studies done by Liu et al.(2009) and Saad et al.(2010) intraprocedurally mortality was 3.9 and 2.5 respectively<sup>(17,19)</sup>. Fortunately, none of our case was died during procedure and post procedure as a result of complications. Most of patients (93.5%) experienced with mild to moderate pain during the procedure which didn't make us to discontinue the procedure. Whereas, in a study done by Liu et al., 2009, only 7.1% had sever epigastric pain<sup>(17)</sup>. It usually occur

because it is an invasive procedure. Bleeding occurred in 3.2% of patients post operatively. Further complications that has been reported; 3.2% of them had cholangitis. While in a study done by Teixeira et al., in 2013, high rates of cholangitis (66.2%) were reported<sup>(20)</sup>. whereas no complications were seen in 29% of the patients, post procedurally. Patients who undergo percutaneous biliary drainage typically are ill and may have significant liver pathology. As such, a certain number of complications can be expected. The Society of Interventional Radiology addressed this issue in 1997, suggesting complication thresholds of 5% for sepsis, hemorrhage, and localized infection, and a threshold of 3% for mortality<sup>(21)</sup>.

Regarding percutaneous transhepatic biliary stenting,(65.5%) of our patients, metallic stent were inserted, compared with a study done by Bapaye et al.(2013) 46% biliary stenting done ,of this amongst those who received stents, SEMS were placed in eight (67%) and plastic stents in four (33%) patients(15,22).This could be explained by more technical demand and expertise for metallic stents to be deployed successfully.

## Conclusions

PTBD is effective, and relatively safe, with the desirable outcome in the management of obstructive jaundice in our context.

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## REFERENCES

- 1- Ellas, E., (2011) Jaundice and Cholestasis. Dooley, J.S., Lok, A. S.F., Burrough, A.K., and Heathcote, E.J. Editors. In Sherlock's Disease of the Liver and Biliary System. 12th Eds. Oxford: Blackwell Publishing Ltd; 2011. P.234-56
- 2- Teixeira, M. C., Mak, M. P., Marques, D. F., Capareli, F., Carnevale, F. C., Moreira, A. M., et al. Percutaneous Transhepatic Biliary Drainage in Patients with Advanced Solid Malignancies: Prognostic Factors and Clinical Outcomes. *J Gastrointest Cancer* 2013; 44:98-403.
- 3- Keshava, S.N., and Mammen, S. Percutaneous Placement of Biliary plastic Stent. *Indian J Radiol Imaging* 2011; 21: 231-33.
- 4- Hunter, D.W. Percutaneous Biliary Intervention. In:

- Kandarpa, K. and Machan, L., (2011). Handbook of Interventional Radiologic procedures. Philadelphia: Lippincott Williams & Wilkins.
- 5- Freeny, P.C., and Ball, T.J. Endoscopic Retrograde Cholangiopancreatography (ERCP) and Percutaneous Transhepatic Cholangiography (PTC) in the Evaluation of Suspected Pancreatic Carcinoma: A diagnostic limitations and Contemporary Roles. *Cancer* 1981; S6: 1666-78.
- 6- Saad, W. E., Wallace, M. J., Wojak, J. C., Kundu, S., & Cardella, J. F. Quality improvement guidelines for percutaneous transhepatic cholangiography, biliary drainage, and percutaneous cholecystostomy. *J Vasc Interv Radiol* 2010; 21: 789-95.
- 7- Parasher, G., and Lee, J. G. The Role of ERCP in the Pancreatico-Biliary Malignancy. In: Cotton, P.B., Leung, J. Editors. *Advanced Digestive Endoscopy: ERCP*. 1st Ed. Oxford: Blackwell Publishing; 2005. P.120-41
- 8- Gwon DI, Ko GY, Sung KB, Yoon HK, Kim KA, Kim YJ, et al. Clinical outcomes after percutaneous biliary interventions in patients with malignant biliary obstruction caused by metastatic gastric cancer. *Acta Radiologica* 2012; 53: 422-29.
- 9- Mohammed Al-Eshaiker, Samia Saffar and Suha Rassam. Percutaneous transhepatic cholangiography. *J. Fac. Med. Baghdad* 1981; Vol.23, No.1.
- 10- David W. Hunter. Percutaneous Biliary Interventions in: Krishna K., Lindsay M. editors., *Handbook of Interventional Radiologic Procedures*. 4th Eds. Wolters Kluwer, Lippincott Williams and Wilkins; 2011. P.577-589.
- 11- Masaya Miyazaki, Kei Shibuya, Hiroyuki Tokue and Yoshito Tsushima. Percutaneous transhepatic biliary drainage assisted by real-time virtual sonography: a retrospective study. *BMC Gastroenterology* 2013; 13:127.
- 12- Fang Y, Gurusamy KS, Wang Q, Davidson BR, Lin H, Xie X, et al. Meta-analysis of randomized clinical trials on safety and efficacy of biliary drainage before surgery for obstructive jaundice. *Br J Surg*. Nov 2013; 100(12):1589-96.
- 13- Stigler S. Fisher and the 5% level. *Chance* 2008; 21: 12.
- 14- Saluja SS, Gulati M, Garg PK, Pal H, Pal S, Sahni P, Chattopadhyay TK. Endoscopic or percutaneous biliary drainage for gallbladder cancer: a randomized trial and quality of life assessment. *Clin Gastroenterol Hepatol* 2008; 6:944-950.
- 15- Bapaye A., Nachiket Dubale and Advay Aher . Comparison of endosonography-guided vs. percutaneous biliary stenting when papilla is inaccessible for ERCP. *United European Gastroenterology Journal* 2013; 1(4) 285-293.
- 16- Masahiko Iwasaki, Junji Furuse, Masahiro Yoshino, Masaru Konishi, Noriaki Kawano, Taira Kinoshita et al. Percutaneous Transhepatic Biliary Drainage for the Treatment of Obstructive Jaundice Caused by Metastases from Nonbiliary and Nonpancreatic Cancers. *Jpn J Clin Oncol* 1996; 26: 465-468.
- 17- Liu, F., Zhang, C. Q., Wang, G. C., Liu, F. L., Xu, H. W., Xu, L., et al. Percutaneous Biliary Stent Placement in Palliation of Malignant Bile Duct Obstruction. *Gastroentero Research* 2009; 2: 289-94.
- 18- Parıldar Zuhaf, Celal Çınar, Burcu Barutçuoğlu, Güneş Başol, Mustafa Parıldar. Effects of percutaneous transhepatic biliary drainage on renal function in patients with obstructive jaundice. *Diagn Interv Radiol* 2011; 17:74-79.
- 19- Saad E. Wael, Michael J. Wallace, Joan C. Wojak, Sanjoy Kundu, and John F. Cardella. Quality Improvement Guidelines for Percutaneous Transhepatic Cholangiography, Biliary Drainage, and Percutaneous Cholecystostomy. *J Vasc Interv Radiol* 2010; 21:789-795.
- 20- Teixeira, M. C., Mak, M. P., Marques, D. F., Capareli, F., Carnevale, F. C., Moreira, A. M., et al. Percutaneous Transhepatic Biliary Drainage in Patients with Advanced Solid Malignancies: Prognostic Factors and Clinical Outcomes. *J Gastrointest Cancer* 2013; 44:98-403.
- 21- George E. Lynskey, Filip Banovac, and Thomas Chang. Vascular Complications Associated with Percutaneous Biliary Drainage: A Report of Three Cases. *Seminars In Interventional Radiology*/Volume 24, Number 3 2007.
- 22- Inal, M., Akgül, E., Aksungur, E., & Seydaolu, G. Percutaneous placement of biliary metallic stents in patients with malignant hilar obstruction: unilobar versus bilobar drainage. *J Vasc Interv Radiol* 2003; 14: 1409-16.