

**ORIGINAL RESEARCH**

# Improvement in Bilirubin Levels Following Percutaneous Transhepatic Biliary Drainage Using Central Line: A Case Series of 50 Patients

<sup>1</sup>Rijul Marwah, <sup>2</sup>Arvind Ghanghoria, <sup>3</sup>Naveen Gupta, <sup>4</sup>Ajay Choudhary, <sup>5</sup>Kritika Wadhwa, <sup>6</sup>Rahul Patel, <sup>7</sup>Oshin Chhipa, <sup>8</sup>Arnab Show

<sup>1,4,5,6,7,8</sup>PG Resident, <sup>3</sup>Assistant Professor, Department of Surgery, MGMMC & MY Hospital Indore, Madhya Pradesh, India

<sup>2</sup>Professor and Dean, Department of General Surgery, Neemuch Medical College, Neemuch, Madhya Pradesh, India

**Corresponding Author**

Rijul Marwah

PG Resident, Department of Surgery, MGMMC & MY Hospital Indore, Madhya Pradesh, India

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**ABSTRACT**

**Background:** Percutaneous Transhepatic Biliary Drainage (PTBD) is a crucial intervention for managing obstructive jaundice. This case series examines the effectiveness of PTBD using a central line in improving bilirubin levels in 50 patients. **Materials & Methods:** This retrospective case series included 50 patients who underwent PTBD with a central line. A central line was inserted into the biliary system to facilitate drainage. Bilirubin levels were measured before the procedure and at follow-up intervals (1 week, 2 weeks, 1 month). Improvements were analyzed. **Results:** Mean total bilirubin levels at Baseline, Post-procedural 1 week, Post-procedural 2 weeks and Post-procedural 1 month was 12.9 mg/dL, 8.1 mg/dL, 7.2 mg/dL and 5.3 mg/dL respectively. Significant results were obtained while comparing bilirubin levels at different time intervals. Complications were seen in 9 patients (18 percent). Out of these 9 patients, minor complications were seen in 7 patients while major complications were seen in 2 patients. **Conclusion:** PTBD using a central line is an effective method for reducing bilirubin levels in patients with obstructive jaundice.

**Key words:** Bilirubin, Percutaneous, Transhepatic

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**INTRODUCTION**

Biliary obstruction commonly refers to blockage of the bile duct system leading to impaired bile flow from the liver into the intestinal tract. Bile is a substance that contains bile salts, bilirubin, and cholesterol and is continuously synthesized in the liver hepatocytes. Bile is then transported via the bile ducts into the second portion of the duodenum to assist with the metabolism of fats.<sup>1,2</sup>

Jaundice manifests as a yellowish pigmentation of the skin and sclera, which is caused by interrupted or impaired excretion of bilirubin and biliverdin. Obstructive jaundice (OJ), i.e., obstructed bile outflow, can be either intrahepatic or extrahepatic. Intrahepatic OJ can be subdivided into non-obstructive intrahepatic cholestasis and obstructive intrahepatic obstructive cholestasis. Non-obstructive intrahepatic cholestasis may result from viral hepatitis, drug-related cholestasis (e.g., caused by chlorpromazine, methandrostenolone, and birth

control pills), primary biliary cirrhosis, or intrahepatic cholestasis during pregnancy. In contrast, obstructive intrahepatic cholestasis occurs due to intrahepatic sediment-like stones, cancerous emboli, or parasitic infections (e.g., *Toxoplasma gondii* infection).<sup>3, 4</sup> PTBD is safe treatment for biliary decompression. It is usually done to control acute hepatobiliary sepsis or as a palliation for malignant jaundice. In most instances, PTBD is a temporary procedure prior to definitive intervention. However, PTBD can be left life-long in patients with predicted short life expectancy or prohibitive operative risk.<sup>5-7</sup> Hence; the present case series examined the effectiveness of PTBD using a central line in improving bilirubin levels in 50 patients.

**MATERIALS & METHODS**

The present study was conducted for examining the efficacy of PTBD in managing obstructive jaundice in 50 patients. Inclusion criteria for the present study

included patients which diagnosed with obstructive jaundice who underwent PTBD using a central line. Exclusion criteria were patients with incomplete data or those who underwent alternative procedures. PTBD was performed under ultrasound and fluoroscopic guidance. A central line was inserted into the biliary system to facilitate drainage. Bilirubin levels were measured before the procedure and at follow-up intervals (1 week, 2 weeks, 1 month). Data included patient demographics, baseline bilirubin levels, post-procedure bilirubin levels, complications, and clinical outcomes. Paired t-tests were used to compare pre- and post-procedure bilirubin levels, with significance set at  $p < 0.05$ .

**RESULTS**

Mean age of the patients was 53.9 years. 60 percent of the patients were males. Mean total bilirubin levels at

Baseline, Post- procedural 1 week, Post- procedural 2 weeks and Post- procedural 1 month was 12.9 mg/dL, 8.1 mg/dL, 7.2 mg/dL and 5.3 mg/dL respectively. Significant results were obtained while comparing bilirubin levels at different time intervals. The serum total bilirubin decreased by at least 20% in 31 patients (62%). Of these 31 patients, the mean decrease in bilirubin levels was 58%. Seven (14%) demonstrated normalization of bilirubin levels to less than 1.5 mg/dL. Complications were seen in 9 patients (18 percent). Out of these 9 patients, minor complications were seen in 7 patients while major complications were seen in 2 patients. Minor complications included prolonged abdominal pain, dehydration and catheter obstruction while major complications included cholangitis and infection. The majority of patients showed clinical improvement, with resolution of jaundice and improvement in liver function tests.

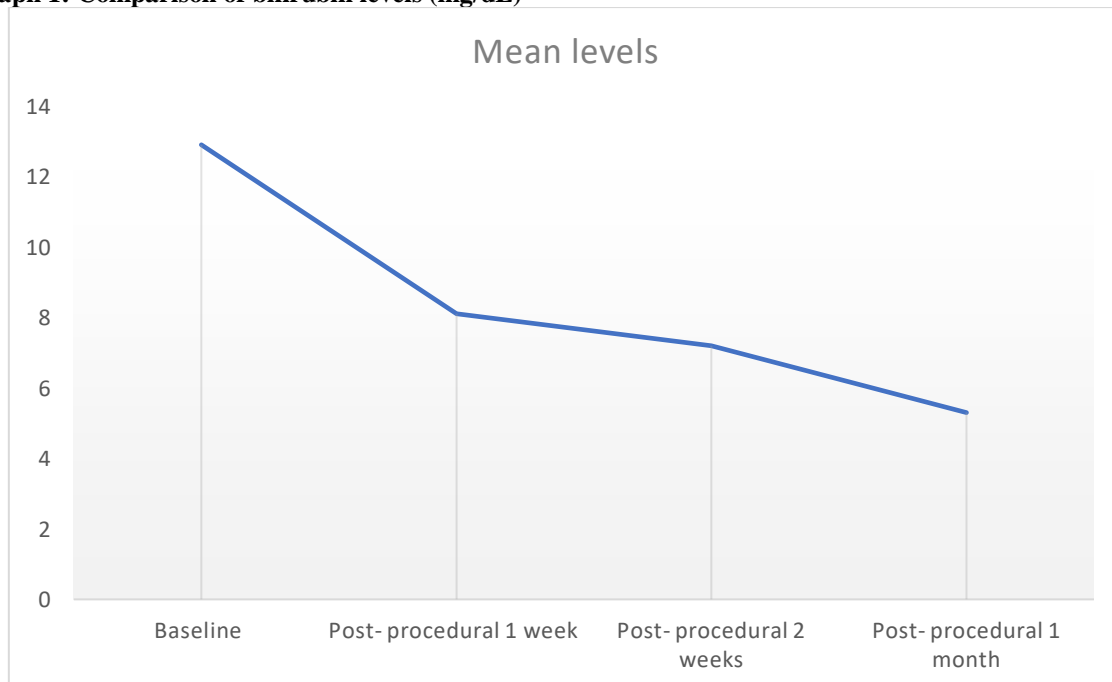
**Table 1: Demographic data**

Variable	Number	Percentage
Gender	Males	30
	Females	20
Age group (years)	Less than 50	17
	More than 50	33
	Mean age (years)	53.9
Obstruction level	Hilar	15
	Non-hilar	35

**Table 2: Comparison of bilirubin levels (mg/dL)**

Time interval	Mean levels	SD	p-value
Baseline	12.9	5.8	0.001 (Significant)
Post- procedural 1 week	8.1	4.9	
Post- procedural 2 weeks	7.2	4.1	
Post- procedural 1 month	5.3	3.8	

**Graph 1: Comparison of bilirubin levels (mg/dL)**



## DISCUSSION

Obstructive Jaundice is a common surgical problem that occurs when there is an obstruction to the passage of conjugated bilirubin from liver cells to intestine. It is among the most challenging conditions managed by general surgeons and contributes significantly to high morbidity and mortality. As patients with obstructive jaundice have high morbidity and mortality, early diagnosis of the cause of obstruction is very important especially in malignant cases, as resection is only possible at that stage. Jaundice due to biliary obstruction may be caused by a heterogeneous group of diseases that include both benign and malignant conditions. The common etiologies of obstructive jaundice have been reported to vary from one centre to another and from one individual to another. Obstructive jaundice is not a definitive diagnosis and early investigation to elucidate the precise etiology is of great importance because pathological changes (e.g. secondary biliary cirrhosis) can occur if obstruction is unrelieved.<sup>7-10</sup>

Over the years, palliative care has evolved with the introduction of newer methods and improvisation of existing techniques. Recent palliative measures not only prolong longevity but also improve the quality of life, hence increasing the acceptance to such procedures. Methods of biliary drainage include: Surgical bypass and Minimally invasive procedures- Endoscopic retrograde cholangiopancreatography (ERCP) & PTBD. Both ERCP and PTBD are well-established and effective means of biliary drainage for palliation in unresectable cases. ERCP is usually performed in cases of distal CBD block (beyond hilum) and PTBD is preferred in proximal biliary obstruction.<sup>11, 12</sup> Hence; the present case series examined the effectiveness of PTBD using a central line in improving bilirubin levels in 50 patients.

Mean age of the patients was 53.9 years. 60 percent of the patients were males. Mean total bilirubin levels at Baseline, Post-procedural 1 week, Post-procedural 2 weeks and Post-procedural 1 month was 12.9 mg/dL, 8.1 mg/dL, 7.2 mg/dL and 5.3 mg/dL respectively. Significant results were obtained while comparing bilirubin levels at different time intervals. The serum total bilirubin decreased by at least 20% in 31 patients (62%). Of these 31 patients, the mean decrease in bilirubin levels was 58%. Seven (14%) demonstrated normalization of bilirubin levels to less than 1.5 mg/dL. Li S et al, in a similar study, investigated the efficacy of percutaneous transhepatic biliary drainage (PTBD) combined with iodine-125 (125I) stranded seeds for the treatment of malignant bile duct obstruction (MBO). A retrospective study was performed on 58 consecutive MBO patients. Twenty patients underwent PTBD combined with 125I stranded seeds (group A). Thirty-eight patients underwent percutaneous trans-hepatic biliary drainage (group B). Total bilirubin, direct bilirubin, and indirect bilirubin levels were compared preoperatively, 1-week, 1-month, and 3-months post-operatively.

Carbohydrate antigen 19-9 (CA19-9), cancer antigen 125 (CA125), and carcino-embryonic antigen (CEA) levels were compared at preoperative and 3-month post-operative stages. The time free from biliary obstruction and survival times were compared. The differences in total bilirubin, direct bilirubin, and indirect bilirubin levels between the two groups were not significant preoperatively, and 1-week post-operatively. However, 1-month and 3-months post-operatively group A was lower than group B. Differences in CA19-9, CA125, and CEA levels between the two groups were not significant preoperatively and 3-months post-operatively. PTBD combined with 125I stranded seeds seem to reduce bilirubin levels and prevents biliary obstruction, promoting survival.<sup>13</sup>

In the present study, complications were seen in 9 patients (18 percent). Out of these 9 patients, minor complications were seen in 7 patients while major complications were seen in 2 patients. Minor complications included prolonged abdominal pain, dehydration and catheter obstruction while major complications included cholangitis and infection. The majority of patients showed clinical improvement, with resolution of jaundice and improvement in liver function tests. Hsu YC et al, elucidated whether different Couinaud hepatic segments as PTBD entry site are associated with high PTBD success and low complications. With higher hepatic segment of PTBD entry site (segment 2/3, 5/6, and 7/8), the trend of PTBD success rate and bilirubin reduction decreased. Furthermore, PTBD entry at segment 7/8 (42.6%) had highest complication rate than segment 5/6 (6.4%) and 2/3 (9.4%). Univariate and multivariate logistic regression analyses showed that PTBD entry segment was an independent factor associated with PTBD success, bilirubin reduction, and complications. Compared to segment 7/8, segment 2/3 and 5/6 had higher odds of PTBD success and bilirubin reduction and associated with lower risk of complications. No independent risk factor for PTBD success and bilirubin reduction were identified in intrahepatic tumors. Moreover, for extrahepatic tumors, PTBD entry at segment 2/3 and segment 5/6 was more likely achieve PTBD success, bilirubin reduction and low complications. Good clinical outcomes were observed for PTBD entry at segments 5/6 and 2/3.<sup>14</sup> Nikolić I et al assessed the clinical Benefit of Percutaneous Transhepatic Biliary Drainage for Malignant Biliary Tract Obstruction. The normalization of the bilirubin level was seen in 23.0% (12/52), but only 15.4% (8/52) received chemotherapy. The median survival time after PTBD was 9 weeks. In patients with ABD that received chemotherapy, the median survival time was 64 weeks, with 30-day mortality of 27.7%, and 6.4% of death within 7 days. The best outcome was in patients with good performance status (ECOG 0-1), low bilirubin (<120 µmol/L) and LDH (<300 µmol/L) levels and elevated leukocytes at the time of the

procedures. PTBD is considered in ABD patients who are candidates for chemotherapy.<sup>15</sup>

## CONCLUSION

PTBD using a central line is an effective and safe method for reducing bilirubin levels in patients with obstructive jaundice, providing significant clinical benefits.

## REFERENCES

- Hundt M, Basit H, John S. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Sep 26, 2022. Physiology, Bile Secretion.
- Pavlidis ET, Pavlidis TE. Pathophysiological consequences of obstructive jaundice and perioperative management. *Hepatobiliary Pancreat Dis Int.* 2018 Feb;17(1):17-21.
- Chen HL, Wu SH, Hsu SH, Liou BY, Chen HL, Chang MH. Jaundice revisited: recent advances in the diagnosis and treatment of inherited cholestatic liver diseases. *J Biomed Sci.* 2018;25:75.
- Rodrigues Santos L, Silva Cruz M, VeigaFerraz R, Ferraz Moreira V, Castro A. Jaundice as a Rare Manifestation of Epstein-Barr Virus Primary Infection. *Cureus.* 2021;13:e15609
- Abolurin OO, Senbanjo IO, Adekoya AO, Ajibola ED. Congenital cytomegalovirus infection as an important cause of infantile cholestatic jaundice: a case report. *Pan Afr Med J.* 2020;36:106.
- Kwan KEL, Shelat VG, Tan CH. Recurrent pyogenic cholangitis: a review of imaging findings and clinical management. *AbdomRadiol (NY)* 2017;42:46–56.
- Strode MA, Bandera BC, Deveaux P, Rice RD. Migrated biliary stent complicated by small bowel obstruction. *Am Surg.* 2013;79:E253–E254.
- Ahmad I, Jan AU, Ahmad R. Obstructive Jaundice. *J Postgrad Med Inst.* 2001;15:194–8.
- Briggs CD, Peterson M. Investigation and management of obstructive jaundice. *Surgery.* 2007;25:74–80.
- Sharma MP, Ahuja V. Aetiological spectrum of Obstructive Jaundice and the diagnostic ability of ultrasonography: A clinician's perspective. *Trop Gastroenterol.* 1999;20:167–9.
- Roche SP, Kobos R. Jaundice in the adult patient. *American Family Physician.* 2004;69:299–304. Ring EJ, Kerlan RK., Jr Interventional biliary radiology. *AJR Am J Roentgenol.* 1984;142:31–4.
- Silviera ML, Seamon MJ, Porshinsky B, Prosciak MP, Doraiswamy VA, Wang CF, et al. Complications related to endoscopic retrograde cholangiopancreatography: A comprehensive clinical review. *J Gastrointest Liver Dis.* 2009;18:73–82.
- Li S, Li B, Li L, Yang X, Xu F, Wang W. The efficacy of the combination of percutaneous transhepatic biliary drainage and 125I stranded seeds for malignant bile duct obstruction treatment. *J Contemp Brachytherapy.* 2020;12(3):225-232. doi:10.5114/jcb.2020.96862
- Hsu YC, Lee HY, Chang CM, Lin CY, Liu YS, Huang HS. Clinical outcomes of percutaneous transhepatic biliary drainage at different Couinaud's hepatic entry segments for treating obstructive jaundice. *Front Surg.* 2023;10:1039106. Published 2023 Jan 24. doi:10.3389/fsurg.2023.1039106
- Nikolić I, Radić J, Petreš A, et al. The Clinical Benefit of Percutaneous Transhepatic Biliary Drainage for Malignant Biliary Tract Obstruction. *Cancers (Basel).* 2022;14(19):4673. Published 2022 Sep 26. doi:10.3390/cancers14194673