

## Original Research Article

# Complications of left and right sided percutaneous transhepatic biliary drainage

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## ABSTRACT

**Background:** Percutaneous Transhepatic Biliary Drainage (PTBD) is performed either via right or left-ductal approach, on the basis of status of primary confluence, secondary confluence and atrophy of liver parenchyma. Our study compares the complications of two approaches in malignant obstruction. The objectives of this study was to assess and compare complications of PTBD.

**Methods:** This study was a prospective hospital based study performed for a period of 2 years from 2016 to 2018. PTBD was performed either via right in 16 patients or left-ductal approach in 15 patients, on the basis of status of primary biliary confluence and atrophy of liver parenchyma.

**Results:** Both minor and major complications were more common in right-sided approach as compared to left-sided approach with most common major and minor complication being cholangitis (16.12%) and fever (12.9%) respectively.

**Conclusions:** PTBD is an excellent palliative procedure to drain the bile ducts in malignant obstruction. Although complications of PTBD are more common in right sided approach but results are statistically insignificant.

**Keywords:** Percutaneous transhepatic biliary drainage

## INTRODUCTION

Biliary tree obstruction and consequent jaundice occur in 70-90% of these patients and have important consequences mainly for the patient's quality of life, morbidity, and overall mortality.<sup>1-5</sup> About 20% of the subclinical jaundice is due to malignant bile duct obstruction. Malignancies leading to obstructive jaundice present too late to perform surgery with a curative intent. Despite technological advances, only 20% of periampullary tumors are found to be resectable at the time of presentation.<sup>6-8</sup> Percutaneous transhepatic biliary drainage (PTBD) is an effective palliative procedure for

malignant biliary obstruction.<sup>9,10</sup> Patients with hilar neoplasm (Klatskin tumor) may be better managed by a percutaneous approach. PTBD was performed either via right (subcostal or intercostal) or left-ductal (sub-xiphoid) approach, on the basis of status of primary confluence, secondary confluence and atrophy of liver parenchyma.

Percutaneous transhepatic biliary drainage (PTBD) is a procedure to drain the bile ducts in the presence of a blockage or damage that prevents normal bile drainage. It has been shown that even if only 30% of the liver parenchyma is drained, it provides adequate palliation to relieve jaundice and associated pruritus.<sup>11,12</sup> Present study

is related to assessment comparison of complications of right and left sided percutaneous transhepatic biliary drainage (PTBD). The objectives of this study was to assess and compare complications of PTBD.

#### *Advantages of right-sided drainage*

- Favourable anatomy for subsequent intervention
- Larger drainage catchment
- Less radiation exposure to operator during placement and subsequent PTBD changes.

#### *Disadvantages of right-sided drainage*

- More painful for patient
- More chances of accidental slippage due to constant motion of the drainage catheter in the intercostal space during respiration.<sup>13</sup>

#### *Advantages of left-sided drainage*

- Less painful (avoids intercostal nerves)
- Less morbidity (avoids blood vessels)
- Preferred in ascites (due to relatively less pericatheter leak of ascites).<sup>13</sup>
- More easily accessed and less likely for drain to fall out (better patient care).

#### *Disadvantages of Left-Sided Drainage*

- Difficult or impossible in cases of atrophic or a high-riding left hepatic lobe
- More likely to access a central duct instead of a preferred peripheral approach
- More radiation exposure to performer's hand.

## **METHODS**

This was a prospective hospital-based study. It was conducted in the Department of Radiodiagnosis and Imaging in collaboration with the Department of Surgical and Medical Gastroenterology of SKIMS.

Study period was two years from 2016 to 2018. 31 elective patients who were referred to our department for PTBD were included in this study.

PTBD was performed either via right (subcostal or intercostal) in 16 patients or left-ductal (sub-xiphoid) approach in 15 patients, on the basis of status of primary biliary confluence and atrophy of liver parenchyma.

#### *Inclusion criteria*

- Patients with confirmed diagnosis of malignant obstructive jaundice who were surgically unresectable
- Unresectable malignant tumour, biliary stricture in whom ERCP has failed.

#### *Exclusion criteria*

- Patients with severe coagulopathy
- Patients with severe ascites
- Patients with severe allergy to contrast material
- Refusal to participate in the study.

#### *Planning of intervention*

#### *Imaging*

Prior to the initiation of procedure, three-dimensional cross-sectional imaging, i.e. computed tomography or magnetic resonance imaging) ± magnetic resonance cholangiopancreatography (MRCP) of patients were reviewed to help identify dilated ducts and/or the level of obstruction for consideration of a target.

#### *Laboratory analyses*

Evaluation of the patient's coagulogram, liver and kidney function was needed. Most patients need contrast administration for cholangiogram which can derange renal function. Patient Preparation for this study Prophylactic antibiotics were started before the procedure along with conscious sedation with midazolam and fentanyl. Informed consent was taken from each patient. Monitoring of vital signs (blood pressure, pulse and oxygenation status) was done during and after the procedure. The procedure was performed in the department using ultrasound and fluoroscopic guidance under all aseptic precautions.

#### *Analysis*

Proper follow up was available in each patient. Complications related to procedure were divided into minor and major.

- Minor Complications: Pain, fever and pericatheter leak
- Major Complications: Cholangitis, blockage of catheter, displacement of catheter and hemobilia. Both minor and major complications were compared in both groups.

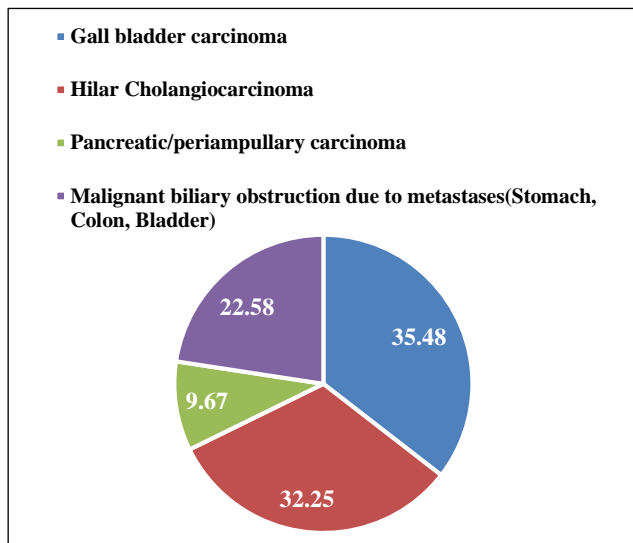
#### *Statistical analysis*

The Chi-square test was used for comparison of complications of left and right sided PTBD. The level of statistical significance was set at  $p \leq 0.05$ .

## **RESULTS**

The most common cause of malignant obstruction in this study was carcinoma gall bladder followed by hilar cholangiocarcinoma. In left-lobe approach, minor complications occurred in 3 patients with fever in 2 patients and pain in 1 patient. In right-lobe approach, minor complications occurred in 7 patients with fever in

2 patients, pericatheter leak in 3 patients and pain in 2 patients.



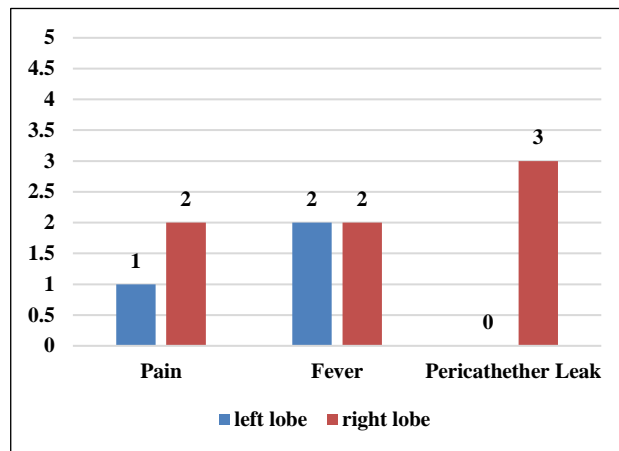
**Figure 1: Etiology of malignant biliary obstruction.**

In two patients with pericatheter leak, we upsized the catheter from 8.3F to 10F. One patient with catheter had relief after drainage of ascites. Patients with pain responded well to analgesics. Patients with fever responded well to broad spectrum antibiotics. The minor complications were not statistically significant in both the groups ( $p > 0.05$ ).

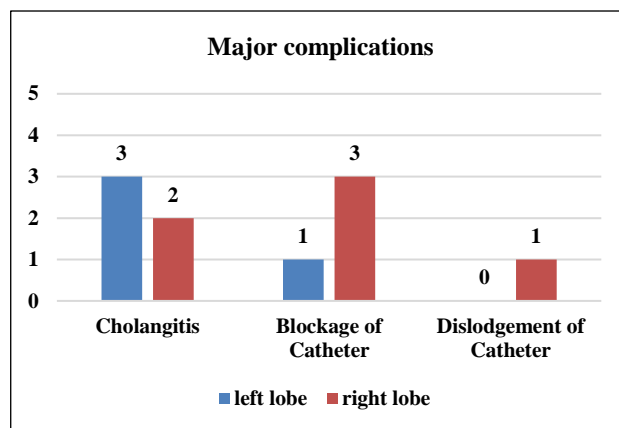
In left-lobe approach, major complications occurred in 4 patients with cholangitis in 3 patients and blockage of catheter in 1 patient. In right-lobe approach, major complications occurred in 6 patients with cholangitis in 2 patients, blockage of catheter in 3 patients and dislodgement of catheter in 1 patient. There was no procedure related death. Three patients with cholangitis (two in left-sided group and one in right-sided group) responded well to conservative treatment while two patients (one each from left and right-sided group) had to undergo bilateral drainage. Two patients with blockage of catheter responded to saline flushes and in two other patients, catheter had to be replaced by new Ring biliary catheter. One patient with dislodgement of catheter underwent re-intervention for placement of ring biliary catheter. The major complications were also not statistically significant in both the groups ( $p > 0.05$ ).

In left-lobe approach, major complications occurred in 4 patients with cholangitis in 3 patients and blockage of catheter in 1 patient. In right-lobe approach, major complications occurred in 6 patients with cholangitis in 2 patients, blockage of catheter in 3 patients and dislodgement of catheter in 1 patient. There was no procedure related death. Three patients with cholangitis (two in left-sided group and one in right-sided group) responded well to conservative treatment while two patients (one each from left and right-sided group) had to undergo bilateral drainage. Two patients with blockage of catheter responded to saline flushes and in two other

patients, catheter had to be replaced by new Ring biliary catheter. One patient with dislodgement of catheter underwent re-intervention for placement of ring biliary catheter. The major complications were also not statistically significant in both the groups ( $p > 0.05$ ).



**Figure 2: Incidence of minor complications in left and right sided PTBD.**



**Figure 3: Incidence of major complications in left and right sided PTBD.**



**Figure 4: Flourosopic image in patient with right sided external PTBD catheter pericatheter leakage.**

## DISCUSSION

Pain is more common in right sided approach because of irritation of periosteum and neurovascular bundle of the adjacent rib as intercostal approach is commonly used. Higher rate of pericatheter leak in right sided group is attributed to fact that ascitic fluid is dependant while as left sided approach is anti- dependent. Also hilar tumors tend to involve secondary divisions on right side earlier as compared to left side leading to occlusion of proximal side holes. In the study reported by Shivanand Gamanagatti et al, rate of minor complications was 14.3% patients. Higher rate of minor complications in our study is attributed to the fact that we are less experienced and have started performing PTBD just three years back. Cholangitis was the most common complication in our study.<sup>14</sup> Cholangitis was seen in every patient with blockage of catheter. This can be attributed to the fact that blockage of catheter leads to stasis of bile which favours colonisation of bacteria. Blockage of catheter in our study was both due to inadequate saline flushes and due to tumour ingrowth. This can be attributed to the fact that Involvement of right sided secondary ducts due to tumor in growth is more common due to shorter length of RHD. Dislodgement of catheter was seen only on right side due to continuous motion of catheter during respiration in the intercostal space. In a study conducted by Bajjal et al, major complication rate was (28%) in whom (5%) died.<sup>15</sup> Higher rate of complications in our study is attributed to the fact that we are less experienced and have started performing PTBD just three years back.

## CONCLUSION

According to these data, both minor and major complications are more common in right sided approach as compared to left sided approach. However, the results were statistically insignificant.

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*Ethical approval: The study was approved by the Institutional Ethics Committee*

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