

# ENBD is the most suitable as preoperative biliary drainage for hilar cholangiocarcinoma

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## Introduction

Preoperative biliary drainage is essential for patients requiring an extended hepatectomy or for those with segmental cholangitis, because it has been shown to reduce mortality and morbidity in patients with hilar cholangiocarcinoma. Biliary drainage can be achieved either externally (percutaneous transhepatic biliary drainage [PTBD] and endoscopic nasobiliary drainage [ENBD]), or internally (endoscopic biliary stenting [EBS]). However, it is unclear which is the most suitable as preoperative biliary drainage for hilar cholangiocarcinoma.

## Patients and methods

**Study 1:** The medical records of 445 consecutive patients with hilar and distal cholangiocarcinoma who underwent resection following PTBD between 1977 and 2007 were retrospectively reviewed, with special attention to PTBD catheter tract recurrence.

**Study 2:** The medical records of 164 consecutive patients with suspected hilar cholangiocarcinoma who underwent unilateral ENBD between 2007 and 2010 were retrospectively reviewed, with special attention to success and efficacy of this procedure. Of the study patients, 128 (78.0%) had Bismuth type III or IV tumors.

**Study 3:** The medical records of 438 consecutive patients with hilar cholangiocarcinoma who underwent resection between 2001 and 2011 were retrospectively reviewed, with special attention to the method of preoperative biliary drainage and survival. Before 2005, we primarily chose to utilize PTBD. After 2005, however, we gradually changed our strategy towards biliary drainage. Currently, ENBD is routinely utilized; PTBD is used only when endoscopic drainage is not feasible.

## Results

**Study 1:** PTBD catheter tract recurrence was detected in 23 (5.2%) patients. On multivariable analysis, duration of PTBD ( $\geq 60$  days), multiple PTBD catheters, and macroscopic papillary tumor type were identified as independent risk factors. Of these, 19 patients underwent surgical resection of tract recurrence. Survival for the 23 patients with tract recurrence was somewhat poorer compared to the 422 patients without tract recurrence.

(median survival: 22.8 vs. 27.3 months,  $P=0.095$ ). Even after surgical resection of tract recurrence, survival was poor.

**Study 2:** The ENBD procedure was successful in 153 (93.3%) of the 164 patients. Of these 164 patients, 65 had serum total bilirubin (TB) levels of 2.0mg/dL or more before the drainage. The first unilateral ENBD was successfully performed in 60 of the 65 patients, and the TB level decreased to less than 2.0 mg/dL after ENBD in 50 of these 60 patients (83.3%). Post-ENBD cholangitis occurred in 47 (28.8%) of the 163 patients, and a previous endoscopic sphincterotomy (EST) was found to be a significant risk factor for post-ENBD cholangitis ( $P < 0.01$ ; 95% CI, 1.30-5.46). Post-ENBD pancreatitis occurred in 33 (20.1%) of the 164 patients (26 grade 1 patients, 4 grade 2 patients, and 3 grade 3 patients). The significant risk factors included undergoing pancreatography ( $P < 0.001$ ; 95% CI, 2.44-31.1) and the absence of previous EBS or ENBD ( $P < 0.001$ ; 95% CI, 3.03-29.2).

**Study 3:** Of the 483 patients, 387 (80.1%) underwent preoperative biliary drainage and the remaining 51 did not. Drainage method was PTBD in 240 patients, ENBD in 127, EBS in 8, and PTBD with ENBD in 12. The use of PTBD decreased gradually: 95.7% (=135/141) in 2001-2005; 76.7% (=56/73) in 2006-2007; 52.3% (=45/86) in 2008-2009; and 18.3% (16/87) in 2010-2011. The survival for patients who underwent resection after PTBD was 41.5% at 3-year and 31.8% at 5-year. This was significantly worse compared to patients with ENBD (67.1% at 3-year and 51.4% at 5-year) or those without biliary drainage (65.1% at 3-year and 54.8 % at 5-year).

## Conclusions

PTBD catheter tract recurrence is not “unusual”. The prognosis for patients with this complication is generally poor, even after resection. Unilateral ENBD of the future remnant lobe(s) exhibited a high success rate, even in patients with B-C type III to IV tumors. The survival for resected patients with PTBD was significantly worse. Taking these findings into consideration, ENBD is an effective and suitable preoperative drainage method for hilar cholangiocarcinoma.