

## Surgical Palliative Drainage in Un-resectable Malignant Biliary Obstruction

Sanei B<sup>1</sup>, Kolahdouzan M<sup>2</sup>, Sheikhabaei S<sup>3,5</sup>, Janbazi L<sup>4</sup>, Shahabi S<sup>5</sup> and Rezaei MA<sup>5\*</sup>

<sup>1</sup>Department of hepatobiliary and pancreatic surgery, Isfahan University of Medical Sciences, Isfahan, Iran

<sup>2</sup>Department of Thoracic Surgery, Isfahan University of Medical Sciences, Isfahan, Iran

<sup>3</sup>Acquired Immunodeficiency Research Center, Isfahan University of Medical Sciences, Isfahan, Iran

<sup>4</sup>Department of Physical Medicine and Rehabilitation, Iran University of Medical Sciences, Tehran, Iran

<sup>5</sup>Department of General Surgery, Isfahan University of Medical Sciences, Isfahan, Iran

### Abstract

**Introduction:** Tumor resection is the curative therapy in the patients with malignant obstruction and in non-operable patients non-surgical palliative therapy, is recommended. These methods may not be successful in some cases because of the various reasons, so the surgical intervention is needed to eliminate biliary obstruction. The aim of this study is to introduce and evaluate a new method for drainage in the patients with un-resectable malignant obstruction in biliary system.

**Method:** This study included 21 patients with un-resectable tumor of biliary tract causing obstruction. After exploring the abdomen, segment II and III of liver will be dissected and then a part of segment III will be removed. In all of cases feeding tube will be put in the duct. Two to three biliary ducts will be specified; thus, feeding tube at least number 5 will be inserted inside the duct and guided through the liver so that it reaches the large ducts inside. A Roux arch will be created afterwards, and will be anastomosed to the liver capsule in parachute procedure. After operation patients will be monitored for the outbreak of cholangitis, anastomosis leakage, pruritus and the decrease of bilirubin level.

**Results:** The new method of surgery in patients with malignant obstruction of the biliary tract was exclusively palliative in all 21 cases. The 30-day mortality in the study group was 14.3% (n=3/21). Pruritus was comparatively cured in the patients (85.7%), and prevalence of cholangitis was decreased after the intervention (19% to 14.3%). Anastomosis was leaked in just one patient.

**Conclusion:** In patients with malignant obstruction in biliary tract in hilum of liver which non-surgical procedures were not successful, so hepatojejunostomy might be more effective.

**Keywords:** ERCP; Biliary obstruction; PTBD; Cholangiocarcinoma; Unresectable

### Introduction

Most patients with malignant obstruction of the biliary tract due to cholangiocarcinoma, gallbladder carcinoma and recurrent gastric cancer are not potentially amenable to surgical curative therapy. Malignant obstructive jaundice is associated with poor survival and morbidities affecting patients' quality of life [1,2]. Therefore palliative therapy is required to provide relief from jaundice and pain in the remaining life time [3,4]. Non-surgical procedures used to eliminate obstruction due to the place of tumor and type of the disease are ERCP and stenting, percutaneous transhepatic biliary drainage, external and internal stenting which may be unsuccessful [5,6].

Common available Surgical palliations performed to provide adequate biliary drainage are segment III cholangiojejunostomy, transtumoral drainage and palliative local resection of tumor [7-11]. Studies revealed that patients receiving surgical treatment have a longer survival and better quality of life compared to the patients underwent nonsurgical palliative therapies [12,13]. Despite main advantages of surgical bypass, high early postoperative morbidity and mortality and complications due to external biliary drainage such as fluid and electrolyte imbalance, loss of bile, dislocation and obstruction of external catheter have to be considered [14,15]. Among surgical techniques, segment III is more favorable, but requires high degree of expertise [16]. In the current study we introduce a simple surgical procedure and investigate its feasibility and efficacy in alleviation of obstructive jaundice.

### Patients and Method

#### Patients

During a period of 24 months from 2012 till 2014, 21 cases with severe mechanical cholestasis due to cholangiocarcinoma, gall bladder cancer and recurrent gastric cancer, underwent our new method of palliative surgery. Our study including patients with sufficient volume of segment II and III without metastatic lesion, who had failed ERCP in their history, not eager to do Percutaneous Transhepatic biliary Drainage and had more than three months life expectancy. Before surgery written informed consent was obtained from all patients. Procedures were performed by the same experienced hepatobiliary surgeon.

#### Surgical method

After exploring the abdomen, left coronary and left triangular

\*Corresponding author: Rezaei MA, Resident of General Surgery, Isfahan University of Medical Sciences, Isfahan, Iran, Tel: +989127786268; Fax: +983136684510; E-mail: [rezaei.mohammadtaghi@gmail.com](mailto:rezaei.mohammadtaghi@gmail.com)

Received April 25, 2016; Accepted June 29, 2016; Published August 05, 2016

**Citation:** Sanei B, Kolahdouzan M, Sheikhabaei S, Janbazi L, Shahabi S, et al. (2016) Surgical Palliative Drainage in Un-resectable Malignant Biliary Obstruction. J Vasc Med Surg 4: 281. doi: [10.4172/2329-6925.1000281](https://doi.org/10.4172/2329-6925.1000281)

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ligaments are divided to mobilize left hemiliver. Surgeon's assistant holds and firmly compresses segment III between the hands to control bleeding. In this step, a small region with surface diameter of 2-3 centimeters and a depth of 1.5-2 centimeters is removed by cautery. Sites of bleeding and bile leakage could be visualized. In cases that bleeding is from portal triad in order to avoid closing duct, the surgeon locates a feeding tube size 5 or bigger inside the duct according to the size of the duct, and then bleeding from hepatic artery and portal vein is controlled with prolene 6/0. After completely stopping the bleeding and according to the amount, which has been removed usually the cut surface of 2 or 3 small biliary ducts can be identified (Figure 1). If there are less than 2 small ducts more liver tissue will be excised. Thus, considering the diameter of the ducts, feeding tubes at least number 5 with side holes are tentatively inserted inside, and guided through the liver to reach the large ducts. A Roux-en-Y loop of the beginning of jejunum is fashioned afterwards. A single layer anastomosis is accomplished, suturing all layers of jejunum to the liver capsule using PDS 6/0 (Figure 2). Then tubes are fixed to the gut by PDS/5-0 and the outermost layer is anastomosed to the liver capsule separately (Figure 3).

### Outcomes and statistical analysis

After the operation patients were monitored for the outbreak of cholangitis, anastomosis leakage and pruritus. Bilirubin was checked in three periods of time, at first, 4<sup>th</sup> and 6<sup>th</sup> weeks after operation. The results are presented as mean ± SD. For statistical analysis chi-square test and paired-T test were used. P-value less than 0.05 was considered statistically significant (Table 1).

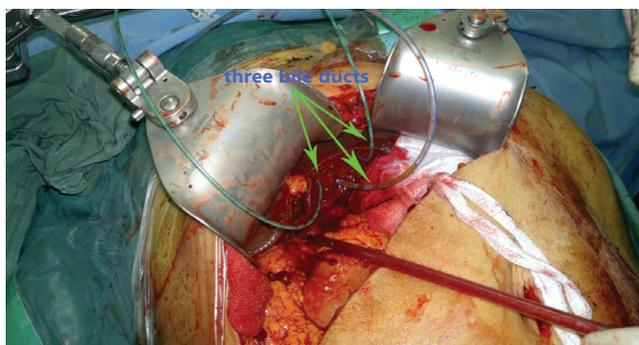


Figure 1: Three bile ducts appear after resection of some part of liver tissue in segment III.

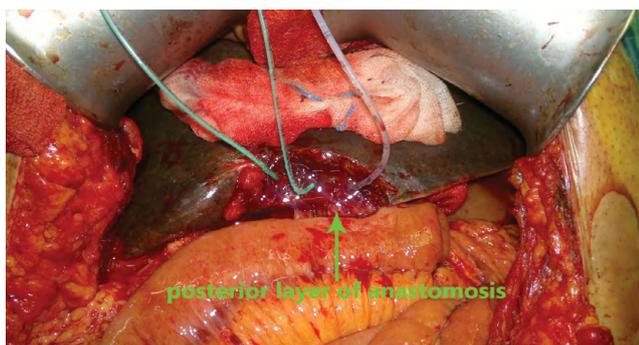


Figure 2: Posterior layer of hepatojejunostomy.



Figure 3: Anterior layer of hepatojejunostomy.

Age (Mean ± SD)	64.6 ± 8
Gender (M/F)	14-Jul
Cause of obstructive jaundice	
Cholangiocarcinoma	14 (66.6%)
Gall bladder cancer	5 (23.8%)
Recurrent gastric cancer	2 (9.5%)
Cause of un-resectability	
Right lobe metastasis	5 (23.8%)
Local invasion	16 (76.2%)

Table 1: Patients' baseline characteristics.

### Results

Biliary decompression was successfully achieved by the new technique in all included subjects including 14 males and 7 females. The mean age of patients was 64.6 ± 8 (range 50 to 81 years). All the patients had severe mechanical cholestasis due to cholangiocarcinoma (n=14, 66.6%), gall bladder cancer (n=5, 23.8%) and recurrent gastric cancer (n=2, 9.5%). None of the patients had experienced former surgeries in order to decompress cholestasis. Five out of 21 studied patients were not eligible to undergo curative surgeries because of right lobe metastasis and 16 cases due to local invasion in 8 patients (38.1%), no communication between right and left hepatic duct existed. Mean Bilirubin level prior to surgery was 22.4 ± 4.1. Pain and fever due to cholangitis was observed in 4 patients.

The mean time of operation was 233 ± 32 min. Bilirubin level was measured before the surgery and the 1<sup>st</sup>, 4<sup>th</sup> and 6<sup>th</sup> weeks after. Our analysis showed that mean bilirubin level decreased significantly during 6 weeks (p<0.001) and 17 patients (94.4%) had bilirubin below 5 in 6th week. Eighteen patients (85.7%) suffered from pruritus before the operation meanwhile 3 patients complained of itching after the c. The main complication, cholangitis was seen in 3 patients (14.3%) who had tumoral invasion to the right and left hepatic duct with no communication between. Myocardial infarct happened in 2 patients in early postoperative days. In 1 patient sepsis was developed and caused the patient admitted in ICU. Bile leakage occurred just in one patient (4.8%). The 30-day mortality rate was 14.3% (3/21). Fifteen patients were alive after 3 months from procedure and only 10 patients survived more than 8 months. There was no significant relation between the cause of mechanical cholestasis and post-operative cholangitis. In addition, prevalence of cholangitis was not significantly higher in metastatic patients (P=0.612) [16-20].

## Discussion

The prognosis of patients suffering from malignant hilar tumor is usually poor. Unfortunately there is limited choice of receiving curative therapy in these patients as they present with surgically un-resectable and invasive tumors at the time of diagnosis. These tumors are usually slow growing and patients die from cholangitis and hepatic failure before distant metastasis [1,2]. Alternative cancer therapies such as chemotherapy and radiotherapy are not effective, because patients with high bilirubin level could not benefit from chemotherapy and radiotherapy doesn't help lengthening survival and improving symptoms [1-3]. Thus, the patients with advanced un-resectable tumors should undergo palliative therapy like biliary duct decompression in order to relieve pruritus and cholestasis. Treatment of obstructive jaundice leads to dramatic improvement in quality of life of the affected patients [21-29].

Interventional procedures reported as first-line treatment for biliary system obstruction in patients with primary un-resectable hilar tumors. The non-surgical methods like Endoscopic Retrograde Cholangiopancreatography (ERCP) and percutaneous transhepatic biliary drainage (PTBD) could be effective in patients with biliary system obstruction. Despite lower initial morbidity and mortality related with Endoscopic treatment, more frequent late biliary complications (e.g. clotting of the stent) are observed in this procedure and surgical palliation like hepaticojejunostomy seems to have better long-term results than endoscopic stenting. So for patients with life expectancy of greater than 6 months, it is recommended to perform surgical biliary bypass. It has been shown that surgical palliation increases patients' quality of life in greater extension as compared to palliative biliary stenting [23-25]. In addition, high frequency of recurrence and cholangitis in non-surgical palliation requiring further interventions [1].

It seems that adequate drainage is provided by this technique, as jaundice and pruritus were relieved in most of our studied patients. Clinically symptoms' palliation is resulted from at least one half of liver drainage. Superiority of this technique is that the site of bile ducts identified in parenchymal splitting is far from location of hilar tumors, therefore; possibility of being invaded by tumor is rare and it is confirmed with low rate of symptom recurrence in our study. The only cases who were still annoyed with pruritus postoperatively were the ones with occlusion of the draining duct of segment (cholangiocarcinoma). In these patients, sufficient drainage of bile was not achieved in order to improve pruritus (Table 2).

Some procedures have been introduced for decompression of biliary tree to date. The principle of our new method was first described by Longmire and Sanford in 1948 which exposes the dilated ducts by parenchymal resection and placement of two or more internal stents. It has been modified afterwards by Soupault and Couinaud which was based on extra-hepatic dissection of segment III bile duct through the round ligament [1].

Previous studies indicated that surgical palliative procedures had significant lower 30-day mortality in contrast with non-surgical palliative procedure [30-32]. Greater survival after surgical decompression is compared to that of endoscopic stenting or percutaneous trans-hepatic biliary drainage. The method used in this study showed that the mortality rate was 14.28% (3 patients out of 21) which was in accordance with the previous studies including 11.6% reported in Aurangzeb, 9% reported in Schlitt et al. study and 21% reported in Yeung et al. study [33,34]. Biliary leakage was reported as

<b>Pruritus (N)</b>	
Before surgery	18 (85.7%)
After surgery	3 (14.3%)
<b>Cholangitis (N)</b>	
Before surgery	4 (19.0%)
After surgery	3 (14.3%)
<b>Bilirubin level (Mean ± SD)</b>	
Before surgery	22.4 ± 4.1
1 <sup>st</sup> week after surgery	14.7 ± 4.1
4 <sup>th</sup> week after surgery	6.7 ± 2.3
6 <sup>th</sup> week after surgery	3.7 ± 1.2
<b>30-day postoperative complications</b>	
MI	2 (9.6%)
Bile leakage	1 (4.8%)
Sepsis	1 (4.8%)
Death within 30 days postoperative	3 (14.3%)

**Table 2:** Pre and post-operation sign and symptoms, complications and survival related to surgery.

one of the most common complications in patients underwent segment III intrahepatic cholangiojejunostomy, which affects 23% of patients and impact on patients' survival adversely [35].

The bilirubin level was fortunately decreased progressively in the first, 4<sup>th</sup> and 6<sup>th</sup> postoperative weeks. The previous study revealed that the elevated bilirubin significantly affects the morbidity and mortality after biliary tract surgery [36,37]. One of the important outcomes, which palliative surgery aimed, is cholangitis. In this method, the rate of cholangitis incidence was 16.7% vs. 19% reported in the study done by Guthrie et al. in surgically drained cases [38]. It seems there is not much different in the rate of cholangitis occurrence in different surgical methods.

Consequently, this method is acceptable and even that it may be easier technique. It can be used in patients with un-resectable obstruction of the extrahepatic bile duct and those whom experienced failed non-invasive methods. More prospective studies require comparing this technique with other surgical techniques.

## Conclusion

It seems to be very difficult to eliminate the obstruction due to un-resectable mass in the hilum of liver. Our study introduced a new technically simple method, which does not require expertise as much as previous surgical palliative therapies and also had same mortality rate and probably fewer complications. It could be considered as an alternative way in patients who failed biliary drainage procedures.

## Acknowledgements

We would like to thank staff of general surgery department in Alzahra hospital, Isfahan University of Medical Science, for support and allowing us to work on this subject.

## Conflict of Interest

The authors declare that there is no conflict of interest in authorship or contribution of this article.

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