RESEARCH ARTICLE

Analysis of Different Ways of Drainage for Obstructive Jaundice Caused by Hilar Cholangiocarcinoma

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Abstract

Objective: To evaluate the prognosis of different ways of drainage for patients with obstructive jaundice caused by hilar cholangiocarcinoma. Materials and Methods: During the period of January 2006- March 2012, percutaneous transhepatic catheter drainage (PTCD)/ percutaneous transhepatic biliary stenting (PTBS) were performed for 89 patients. According to percutaneous transhepatic cholangiography (PTC), external drainage was selected if the region of obstruction could not be passed by guide wire or a metallic stent was inserted if it could. External drainage was the first choice if infection was diagnosed before the procedure, and a metallic stent was inserted in one week after the infection was under control. Selection by new infections, the degree of bilirubin decrease, the change of ALT, the time of recurrence of obstruction, and the survival time of patients as the parameters was conducted to evaluate the methods of different interventional treatments regarding prognosis of patients with hilar obstruction caused by hilar cholangiocarcinoma. Results: PTCD was conducted in 6 patients and PTBS in 7 ($p<0.05$). Reduction of bilirubin levels and ALT levels was obvious after the procedures ($p<0.05$). The average survival time with PTCD was 161 days and with PTBS was 243 days ($p<0.05$). Conclusions: With both drainage procedures for obstructive jaundice caused by hilar cholangiocarcinoma improvement in liver function was obvious. PTBS was found to be better than PTCD for prolonging the patient survival.

Keywords: Cholangiocarcinoma - hilar obstruction - jaundice - stent - the external drainage - biliary infection

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Introduction

Obstructive jaundice is a cumbersome complication in patients with advanced solid malignancies. Percutaneous Transhepatic Catheter Drainage (PTCD)/Percutaneous Transhepatic Biliary Stengting (PTBS) offers a safe and effective method in providing palliative treatment for patients with biliary obstruction, which can relieve symptoms and restore serum biochemistry to normal (Burke et al., 2003; Ho et al., 2013; Xu et al., 2014). This optimizes the clinical condition of the patients for surgical resection or for receiving palliative chemotherapy or radiotherapy, bringing about an improvement in their quality of life (Yu et al., 2010). External drainage and stent implantation are the methods to solve the patients with obstructive jaundice for a long time, but whether there are some difference between the treatment methods in the drainage of bile, postprocedure complications and survival time. This retrospective analysis was conducted in order to evaluate the prognosis of different ways of drainage for patients with obstructive jaundice caused by hilar cholangiocarcinoma.

Materials and Methods

We retrospectively analysis 89 patients (man 53; woman 36; mean age 63±14) with obstructive jaundice caused by hilar cholangiocarcinoma in January 2006-March 2012. External drainage group was defined: according to percutaneous transhepatic cholangiography (PTC), external drainage was selected if the regions of obstruction could not be passed by guild wire after PTC. Stenting group was defined: according to PTC, metallic stent was inserted if the regions of obstruction could be passed by guild wire, external drainage was first choice if infection was diagnosed before the procedure, the metallic stent was inserted in two weeks after the infection was controlled. 64 patients are external drainage group and 25 patients are stenting group. The patients' characteristics are summarized in Table 1. All patients provided written, informed consent for the procedure, and our institutional review board approved the retrospective review of the patients' medical and imaging records.

Percutaneous transhepatic catheter drainage (PTCD)/ percutaneous transhepatic biliary stengting (PTBS) were

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performed in the Interventional diagnosis and treatment center, with the patient under local anesthesia by two interventional radiologist, using continuous fluoroscopy. Intravenous prophylactic antibiotic was given before all procedures using a second-generation cephalosporin. Biliary puncture were carried out using a 21G Chiba needle through the ninth or tenth intercostal space at the right hemiclavicular line level for the right-lobe bile duct access or by the left anterior subxiphoideal access for left-lobe bile ducts. After bile duct contrastation, a coaxial system (NPAS-100; Cook, Bjaeverskov, Denmark) was introduced and a 0.035-inch angled-tip hydrophilic guidewire (Glidewire; Terumo, Tokyo, Japan) was used to cross the stenotic/obstructive area. During the procedure, if the guide wire could pass through the occlusion and into the duodenum, we prefer to use stent (according to patient's will and economy). External drainage was the first choice if the patient has infection before procudure, stent placement was chosen until infection under control in two weeks. When the occlusion was not crossed, external drainage biliary catheter was placed.

We defined reobstructive time for patients is from procedure to appear obstructive jaundice again or laboratory examination TBIL>70mmol/L and DBIL/TIBL>0.5. We are collecting TBIL and ALT values one day before preprocedure and one week after procedure. Overall survival is defined as the time from the transhepatic biliary drainage to death for any cause. Overall survival was estimated by Kaplan-Meier. Prognostic factors were evaluated by t test and x^2 or Fisher's exact test, and considered as statistically significant if the P value was under 0.05. All statistical analyses were done using stata10.0.

Table 1. patient's characteristics before procedure

	number	External group	Stenting group	*P*
Gender				
male	53	38	15	0.96
female	36	26	10	
Age (years)				
≥65	36	27	9	0.59
<65	53	37	16	
Infection before drainage				
yes	28	26	2	0.003
no	61	38	23	
New Infection after drainage				
yes	13	6	7	0.025
no	76	58	18	
Reobstructive time (days)				
≥30	26	23	3	0.026
<30	63	41	22	
Obstructive type (Bismuth)				
I	19	13	6	0.927
II	22	17	5	
IIIa	16	11	5	
IIIb	12	8	4	
IV	20	13	7	
Resection				
Before drainage				
	25	17	8	0.449
After drainage	14	12	2	
No resection	50	35	15	
TBIL decline degree				
≥25%	62	44	18	0.764
<25%	27	20	7	
ALB				
≥30g/L	59	45	14	0.199
<30g/L	40	19	11	

Table 2. Effect Evaluation

	External group	Stenting group	*P*
TBIL changes (umol/L)			
	-70.12+118.88	-82.51+106.93	0.325
ALT changes (U/L)			
	-56.96+98.71	-96.02+131.51	0.065
Reobstructive time (days)			
	104.6+87.77	121.6+90.63	0.209
Survival time (days)			
	161.46+123.12	243.5+184.32	0.008

*TBIL, ALT levels changes is postprocedure minus the preprocedure values

Results

The procedures were all successful in 89 patients, no major complications occured during procedure. There were 28 patients with infection before procedure, 23 of them were under control after drainage. There were 6 patients with new infections in external drainage group (6/64, 9.4%), and 7 patients in stenting group (7/25, 28 %). Patients with biliary infection and blood bacteriology culture, according to culture results, we use sensitive bacteria antibiotic therapy. 5 patients with infection in external drainage group were under control, 1 patient dead because of weak physique, infection uncontrol, and kidney failure. Patients with infection in stenting group were all under control.

In the external drainage group, the mean TBIL from 297.74 umol/L before procedure fell to 227.62 umol/L after procedure, and in the stenting group the mean TBIL before procedure from 264.86 umol/L fell to 192.34 umol/L after procedure (Table 3), both of them have statistically significance, while compare the two groups in terms of decline bilirubin numerical (Table 2), there is no statistical significance. ALT levels, which reflect the liver function recovery, decline from 146.30 U/L in the external group before procedure to 89.33U/L after procedure. In the stenting group ALT levels decline from 161.31U/L in the external group before procedure to 65.29U/L after procedure (Table 3), both of them have statistical significance, but compare the two groups in terms of decline ALT numerical, there is no statistical significance (Table 2).

Table 3. TBIL And ALT Changes

	TBIL (umol/L)		*P*	ALT (U/L)		*P*
	Before procedure	After procedure		Before procedure	After procedure	
External group	297.74+143.19	227.62+147.91	0.0000	146.30+135.26	89.33+90.75	0.0001
Stenting group	264.86+142.01	192.34+102.34	0.0004	161.31+143.39	65.29+35.35	0.0006

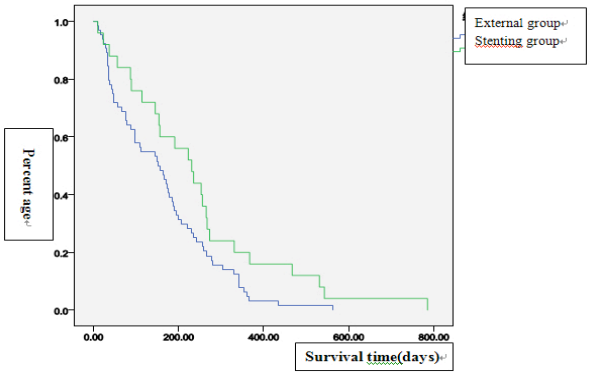

Figure 1. Cumulative Survival Time in Patients with External Drainage Group and Stenting Group. Date were obtained with the Kaplan Meier method

In the external drainage group, the average reobstructive time is 104 days, and the stenting group is 121 days (p>0.05), there is no obvious difference between them. In the stenting group, Median survival time is 231 days, while the external drainage group is 153 days (p<0.05). The 3, 6, 9 month survival rates of external drainage group and stenting group are 63%, 39%, 27% and 63%, 61%, 47%, respectively (Figure 1).

Discussion

Obstructive jaundice is a cumbersome complication in patients with advanced solid malignancies. PTCD/ PTBS is a method of biliary tree decompression, applied as palliative treatment in patients with inoperable malignant biliary obstruction, which could not only significantly reduce bilirubin level, improve the patients life quality and prolong survival time, but also provide the possibillity for subsequent treatment (Hatzidakis et al., 2001; Iruarrizaga et al., 2011). In clinical, patients with obstructive jaundice caused by hilar cholangiocarcinoma are common, most of them have lost the chance of operation (Butthongkomvong et al., 2013; Chong et al., 2013; Duangsong et al., 2013; Huang et al., 2013; Hussain et al., 2013; Kamsa-ard et al., 2013; Manwong et al., 2013; Prachayakul et al., 2013; Sriraksa et al., 2013; Srikoon et al., 2013; Sriputtha et al., 2013; Subrungruanga et al., 2013; Thunyaharn et al., 2013; Woradet et al., 2013). Obstructive jaundice caused by hilar cholangiocarcinoma not only affects the patient's liver function, but also influence the patient's survival time.

Infection is one of the most common complication in patients with obstructive jaundice, which could lead to death perioperation (He et al., 2002; Dambraukas et al., 2003). In previous report, the incidence of infection after stenting is 6.5% - 22% (Shin et al., 2013). Our study shows that new infection rate is 9.4% in external group, 28% in stenting group. Infection rate in stenting group is higher than external drainage group, which may be related to guild wire take gut bacteria into the biliary tract in the course of stent implantation. And after stent implantation, the chance of bacteria retrograde into the biliary tract is also increasing. In our study, patients in external drainage, we not recanalization of obstruction position, so dramatically reduce biliary infection compared with stenting group.

High bilirubin level for patients with obstructive jaundice not only damage the liver cells and reduce the liver synthetic ability, but also inhibit the cardiovascular system and lead to renal insufficiency, which could cause serious respiratory failure (Shin et al., 2013). The TBIL and ALT which reflect the liver function recovery decreasing a lot in both groups have statistical significance, which indicate that both groups could lowering bilirubin, promoting liver function recovery. In our study, the mean TBIL from 297.74 umol/L before procedure fell to 227.62 umol/L after procedure in the external drainage group, and in the stenting group the mean DBIL from 264.86 umol/L fell to 192.34 umol/L after procedure. In our study, there is no obvious difference of falling bilirubin levels between external group and stenting group, which shows that the role of declining TBIL in both groups are consistent. But the value of TBIL decline is more obvious in the external group. So, if patients with high bilirubin levels or to reduce the bilirubin levels preoperative as soon as possible, external drainage is a better choice. ALT levels decline from 146.30 U/L in the external group before procedure to 89.33U/L after procedure. In stenting group ALT levels decline from 161.31U/L before drainage to 65.29U/L after procedure. Some research show that the decline degree of ALT after stent implantation is more obvious than external drainage in a short time, and liver function recovery is better after stent implantation (Qian et al., 2006). Our research is conforming to this. There are also animal experiments confirm that after external drainage, some growth factors which promoting liver cell regeneration in bile are losing, and stent implantation could protect the ability of liver cell regeneration (Todoroki et al., 2000).

Born P confirms that the patency time in stenting group is higher than external drainage group (Born et al., 1998). Our research conform that the mean obstructive time is 121 days in stenting group, longer than 104 days in external drainage group. Although there is no obvious difference of obstructive time statistical analysis, when considering economic factors, external drainage is a better choice in patients with obstructive jaundice, and stent implantation has obvious advantages in improving patients' quality of life, reducing the patients' mental pressure. The median survival time of our study in stenting group was obviously longer than external drainage group, and stenting group 3, 6, 9 month survival rate was also significantly higher than the external drainage group (Figure 1). Combining our study with related some literatures show that stent implantation in patients with preoperative infection is less and the loss of bile decreased gastrointestinal digestion and absorption ability in external drainage, and inhibition of gastrointestinal tract bacteria, which also reduces the patient resistance ability (E.A.et al., 2013). But internal drainage after Stenting implantation is essential to save the biliary physiological function. Stenting drainage for the recovery of liver function is also relatively obvious, and the patient's psychological burden is far smaller than external drainage (DA et al., 2010; Simmons et al., 2006). Therefore, the long-term prognosis of stenting group is relatively better than external drainage group.

The different ways of drainage for the obstructive jaundice caused by hilar cholangiocarcinoma in reducing

the patient's bilirubin level, improving liver function are obvious. PTBS is better than PTCD in prolonging the patient survival time. But our study patients' survival time began to receive drainage, we did not consider the factors before interventional therapy and surgical resection after drainage affect survival time, this is the deficiency of our study. Comparing to other research, obstructive position and albumin levels had no statistical significance, which may related to other centers treatment methods differences, and needs to be studied further.

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