

Figure S1 Survival curves for OS and RFS in all HCC patients with BDTT. The OS of 217 patients before PSM (A); the RFS of 217 patients before PSM (B); the OS of 90 patients after PSM (C); the RFS of 90 patients after PSM (D). OS, overall survival; RFS, recurrence-free survival; HCC, hepatocellular carcinoma; BDTT, bile duct tumor thrombus, PSM, propensity scoring match.

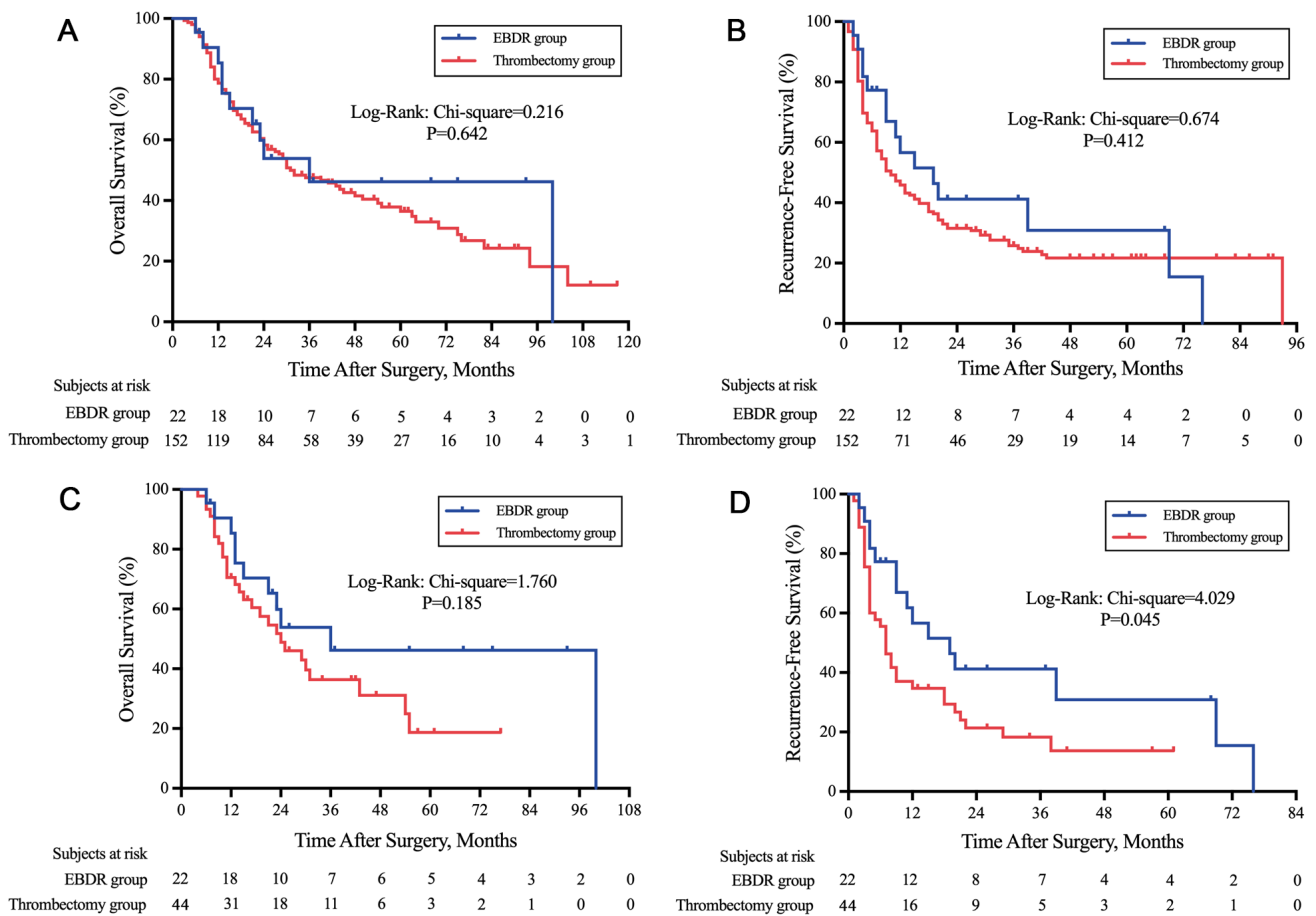


Figure S2 Kaplan-Meier survival curves for OS and RFS in the subgroup of HCC patients with BDTT but without PVTT. OS of HCC patients in the EBDR and thrombectomy groups (22 patients *vs.* 152 patients) before PSM (A) (P=0.642); RFS of HCC patients in the EBDR and thrombectomy groups (22 *vs.* 152 patients) before PSM (B) (P=0.412); OS of HCC patients in the EBDR and thrombectomy groups (22 patients *vs.* 44 patients) after PSM (C) (P=0.185); RFS of HCC patients in the EBDR and thrombectomy groups (22 *vs.* 44 patients) after PSM (D) (P=0.045). OS, overall survival; RFS, recurrence-free survival; HCC, hepatocellular carcinoma; BDTT, bile duct tumor thrombus; PVTT, portal vein tumor thrombus; EBDR, extrahepatic bile duct resection.

Table S1 Demographic and preoperative data of patients with HCC and BDTT before PSM

Variables	All (217)	EBDR group (30)	Thrombectomy group (187)	P
Age (years) [†]	52.0 (46.0-60.0)	54.5 (46.0-60.0)	52.0 (45.0-60.0)	0.661
Gender				0.108
Male	184 (84.8%)	22 (73.3%)	162 (86.6%)	
Female	33 (15.2%)	8 (26.7%)	25 (13.4%)	
HBsAg				0.993
Positive	159 (73.3%)	22 (73.3%)	137 (73.3%)	
Negative	58 (26.7%)	8 (26.7%)	50 (26.7%)	
Child-Pugh class				0.005*
A	123 (56.7%)	10 (33.3%)	113 (60.4%)	
B	94 (43.3%)	20 (66.7%)	74 (39.6%)	
Biliary decompression				0.078
Performed	40 (18.4%)	9 (31.0%)	31 (16.6%)	
Not performed	177 (81.6%)	21 (70.0%)	156 (83.4%)	
AFP (ng/mL)				0.136
≤400	107 (49.3%)	11 (36.7%)	96 (51.3%)	
>400	110 (50.7%)	19 (63.3%)	91 (48.7%)	
ALB (g/L) [†]	39.2 (36.0-42.0)	37.2 (34.4-40.6)	39.5 (36.1-42.4)	0.007*
TBil (mg/dL) [†]	2.7 (1.0-9.1)	7.2 (3.1-13.0)	2.2 (0.9-8.6)	0.011*
ALT (U/L) [†]	77.0 (43.0-134.5)	82.0 (53.7-123.8)	77.0 (41.0-214.0)	0.588
GGT (IU/L) [†]	341.0 (194.5-616.0)	365.5 (192.5-505.1)	331.0 (195.0-619.0)	0.811
PT (s) [†]	12.2 (11.3-13.0)	12.8 (12.2-13.5)	12.0 (11.3-12.9)	0.005*

HCC: hepatocellular carcinoma; BDTT: bile duct tumor thrombus; EBDR: extrahepatic bile duct resection; HBsAg: hepatitis B surface antigen; AFP: α -fetoprotein; ALB: albumin; TBil: total bilirubin; ALT: alanine aminotransferase; GGT: γ -glutamyltransferase; PT: prothrombin time. [†]Mann-Whitney *U* test; others: chi-square test. *P values with statistical significance.

Table S2 Operative and pathologic data of patients with HCC and BDTT before PSM

Variables	All (217)	EBDR group (30)	Thrombectomy group (187)	P
Extent of hepatectomy				0.465
Major	139 (64.1%)	21 (70.0%)	118 (63.1%)	
Minor	78 (35.9%)	9 (30.0%)	69 (36.9%)	
Type of hepatectomy				0.947
Anatomic	129 (59.4%)	18 (60.0%)	111 (59.4%)	
Non-anatomic	88 (40.6%)	12 (40.0%)	76 (40.6%)	
Intraoperative blood loss (mL) [†]	400.0 (200.0-725.0)	400.0 (275.0-850.0)	350.0 (200.0-600.0)	0.197
Pathologic liver cirrhosis				0.529
Presence	120 (55.3%)	15 (50.0%)	105 (56.1%)	
Absence	97 (44.7%)	15 (50.0%)	82 (43.9%)	
Tumor diameter (cm) [†]	5.2 (3.8-7.6)	4.8 (2.5-6.0)	6.0 (4.0-8.0)	0.002*
Number of tumor				0.203
Solitary	145 (66.8%)	17 (56.7%)	128 (68.4%)	
Multiple	72 (33.2%)	13 (43.3%)	59 (31.6%)	
Microscopic margin involvement				0.180
Positive	30 (13.8%)	7 (23.3%)	23 (12.3%)	
Negative	187 (86.2%)	23 (76.7%)	164 (87.7%)	
Tumor capsule				0.032*
Absence	156 (71.9%)	27 (90.0%)	129 (69.0%)	
Incomplete	34 (15.7%)	2 (6.7%)	32 (17.1%)	
Complete	27 (12.4%)	1 (3.3%)	26 (13.9%)	
Tumor differentiation				0.033*
Well/moderate	78 (35.9%)	16 (53.3%)	62 (33.2%)	
Poor/undifferentiated	139 (64.1%)	14 (46.7%)	125 (66.8%)	
Tumor TNM stage				0.067
I/II	134 (61.8%)	14 (46.7%)	120 (64.2%)	
III/IV	83 (38.2%)	16 (53.3%)	67 (35.8%)	
Grade of BDTT				0.022*
B3	50 (23.0%)	2 (6.7%)	48 (25.7%)	
B4	167 (77.0%)	28 (93.3%)	139 (74.3%)	
Concurrent PVTT				0.311
Presence	43 (19.8%)	8 (26.7%)	35 (18.7%)	
Absence	174 (80.2%)	22 (73.3%)	152 (81.3%)	

HCC: hepatocellular carcinoma; BDTT: bile duct tumor thrombus; EBDR: extrahepatic bile duct resection; TNM: tumor-node-metastasis; PVTT: portal vein tumor thrombus. [†]Mann-Whitney *U* test; others: chi-square test. *P values with statistical significance.

Table S3 Recurrence patterns in 161 patients who experienced recurrence before PSM

Variables	EBDR group (n=19)	Thrombectomy group (n=142)	Total (n=161)
Time to recurrence			
<1 year	11 (57.9%)	104 (73.2%)	115 (71.4%)
≥1 year	8 (42.1%)	38 (26.8%)	46 (28.6%)
Location of recurrence			
Intrahepatic recurrence	14 (73.6%)	82 (57.7%)	96 (59.7%)
Extrahepatic metastasis	1 (5.3%)	10 (7.1%)	11 (6.8%)
Bile duct recurrence only	1 (5.3%)	13 (9.2%)	14 (8.7%)
Intrahepatic and extrahepatic recurrence	1 (5.3%)	9 (6.3%)	10 (6.2%)
Intrahepatic and bile duct recurrence	2 (10.5%)	25 (17.6%)	27 (16.8%)
Extrahepatic and bile duct recurrence	0 (0%)	1 (0.7%)	1 (0.6%)
Synchronous intrahepatic, extrahepatic and bile duct recurrence	0 (0%)	2 (1.4%)	2 (1.2%)

EBDR: extrahepatic bile duct resection.