

Supplementary Table 1 Baseline characteristics of five patients with intraductal papillary neoplasm of the bile duct (IPNB) treated with percutaneous transhepatic cholangioscopy-assisted biliary polypectomy (PTCS-BP)

Case No.	Sex/age (years)	Previous interventional procedure	Clinical Presentations (weeks)	Therapy for IPNB with IHS before PTCS-BP	CFT	GGT (IU/L)	ALP (IU/L)	TBil (mmol/L)	CA19-9 (U/L)	CEA (ng/ml)
1	M/76	Cholecystectomy with bilioenteric anastomosis	Repeated cholangitis (4) with jaundice (1)	PTCS-LL	NML	307	267	308	425.3	NML
2	F/62	Right anterior lobectomy of the liver for IPNB 35 months ago. PTCS-assisted PDT 11 months ago due to recurrence	Repeated cholangitis (8)	Stone removal	NML	1049	659	44.5	NML	NML
3	M/53	Cholecystectomy with choledochotomy	Repeated cholangitis (3)	PTCS-LL	NML	464	498	NML	NML	NML
4	F/48	Pancreaticoduodenectomy for IPNB 8 years ago. Percutaneous SEMS 1 month ago due to recurrence	Repeated cholangitis (3) and jaundice (1)	N/A	NML	1452	913	147.4	246.4	7.4
5	F/62	Cholecystectomy 20 years ago	Intermittent cholangitis (50)	PTCS-LL	NML	428	565	46.2	NML	NML

IHS, intrahepatic stones; CFT, coagulation function test; GGT,  $\gamma$ -glutamyl transferase (50 IU/L as the upper normal limit); ALP, alkaline phosphatase (112 IU/L as the upper normal limit); TBil, total bilirubin (17.1 mmol/L as the upper normal limit); CA19-9, carbohydrate antigen (37 U/L as the upper normal limit); CEA, carcinoembryonic antigen (5 ng/ml as the upper normal limit); PTCS, percutaneous transhepatic cholangioscopy; LL, laser lithotripsy; PDT, photodynamic therapy; N/A, non-applicable; NML, normal; SEMS, self-expandable metal stent.

Supplementary Table 2 Efficacy of percutaneous transhepatic cholangioscopy-assisted biliary polypectomy (PTCS-BP) for intraductal papillary neoplasm of the bile duct (IPNB).

Case No.	Date of PTCS-BP	Type	Ductal mucus	PTCS-BP (sessions)	Primary outcome Technical success	Major secondary outcomes			
						Therapeutic success		Clinical success	
					accomplish PTCS-BP of IPNB	Barely no or no residual tumor	cholangitis cholestasis	episodes/	Catheter status (months)**
1	Sep. 2010	Cast-like	Excessive	PTCS-BP (5)	Accomplished	Barely no residual tumor	2/Improvement	7 Fr catheter (8) 7 months later	
2	Apr. 2013	Cast-like	Excessive	PTCS-BP (2)	Accomplished	Barely no residual tumor	2/Improvement	7 Fr catheter (5) 3 months later	
3	Sep. 2013	Polypoid	No	PTCS-BP (1)	Accomplished	No any residual tumor#	1*/Improvement*	Catheter-free (31) 6 months later	
4	Apr. 2014	Cast-like	Excessive	PTCS-BP (1)	Accomplished	Barely no residual tumor	2/Improvement	Catheter-free (25) 3 months later	
5	Dec. 2019	Cast-like	Excessive	PTCS-BP (2)	Accomplished	With residual tumor	3/Improvement	PTCS catheter (34)	

#, curative resection

\*, The outcome was related to removed hepatolithiasis rather than PTCS-BP.

\*\* , The drainage duration with the exchanged catheter or catheter-free duration in parentheses.

Supplementary Table 3 Safety and outcomes of percutaneous transhepatic cholangioscopy-assisted biliary polypectomy (PTCS-BP)

Patients No.	Adverse events during preparation for PTCS-BP		Adverse events during PTCS-BP	Survival status (survival time, months)/ Cause of death
	PTBD	Sinus tract dilation		
1	Bacteremia (1)	No	Cholangitis (1)	Died (15)/Liver failure
2	Cholangitis (3)	Cholangitis (2)	Cholangitis (1)	Died (8)/Cholangitis*/renal failure
3	No	No	No	Alive (37)
4	Cholangitis (1)	No	No	Died (28)/ cholangitis
5	No	Bacteremia (1)	No	Alive (34)

The number inside parentheses represents the event incidence unless otherwise specified.

All developed adverse events of bacteremia and cholangitis in Table 4 were temporary.

\*, caused by malignant hilar bile duct stricture rather than by thick mucus