

Supplementary Table 1 Comparison of patient characteristics between the age-adjusted Charlson comorbidity index groups in the validation cohort

Patient demographics	Total (n = 81)	ACCI = 0-1 (n = 40)	ACCI = 2-3 (n = 31)	ACCI ≥ 4 (n = 10)	P value
Sex, Female/Male	36/45 (44.4/55.6)	18/22 (45.0/55.0)	14/17 (45.2/54.8)	4/6 (40.0/60.0)	0.955
Age (years), ≤ 70/> 70	71/10 (87.7/12.3)	40/0 (100.0/0)	31/0 (100.0/0)	0/10 (0/100.0)	< 0.001
CCI, Low/High	35/46 (43.2/56.8)	21/19 (52.5/47.5)	12/19 (38.7/61.3)	2/8 (20.0/80.0)	0.145
Diabetes, No/Yes	75/6 (92.6/7.4)	37/3 (92.5/7.5)	31/0 (100.0/0)	7/3 (70.0/30.0)	0.007
Cirrhosis, No/Yes	73/8 (90.1/9.9)	36/4 (90.0/10.0)	29/2 (93.5/6.5)	8/2 (80.0/20.0)	0.458
ALT (U/L), ≤ 40/> 40	15/66 (18.5/81.5)	9/31 (22.5/77.5)	4/27 (12.9/87.1)	2/8 (20.0/80.0)	0.582
AST (U/L), ≤ 40/> 40	22/59 (27.2/72.8)	13/27 (32.5/67.5)	7/24 (22.6/77.4)	2/8 (20.0/80.0)	0.559
PLT (×10 ⁹ /L), ≥ 100/< 100	3/78 (3.7/96.3)	3/37 (7.5/92.5)	0/31 (0/100.0)	0/10 (0/100.0)	0.203
ALB (g/L), ≥ 35/< 35	46/35 (56.8/43.2)	21/19 (52.5/47.5)	20/11 (64.5/35.5)	5/5 (50.0/50.0)	0.537
TB (mg/dL), ≤ 1/> 1	16/65 (19.8/80.2)	8/32 (20.0/80.0)	6/25 (19.4/80.6)	2/8 (20.0/80.0)	0.997
INR, ≤ 1.25/> 1.25	70/11 (86.4/13.6)	36/4 (90.0/10.0)	25/6 (80.6/19.4)	9/1 (90.0/10.0)	0.490
CA19-9 (U/L), ≤ 150/> 150	32/49 (39.5/60.5)	16/24 (40.0/60.0)	13/18 (41.9/58.1)	3/7 (30.0/70.0)	0.795
Preoperative PTCD, No/Yes	54/27 (66.7/33.3)	28/12 (70.0/30.0)	20/11 (64.5/35.5)	6/4 (60.0/40.0)	0.793
Maximum tumor size (cm), < 3/3-5/> 5	31/43/7 (38.3/53.1/8.6)	16/19/5 (40.0/47.5/12.5)	12/18/1 (38.7/58.1/3.2)	3/6/1 (30.0/60.0/10.0)	0.655

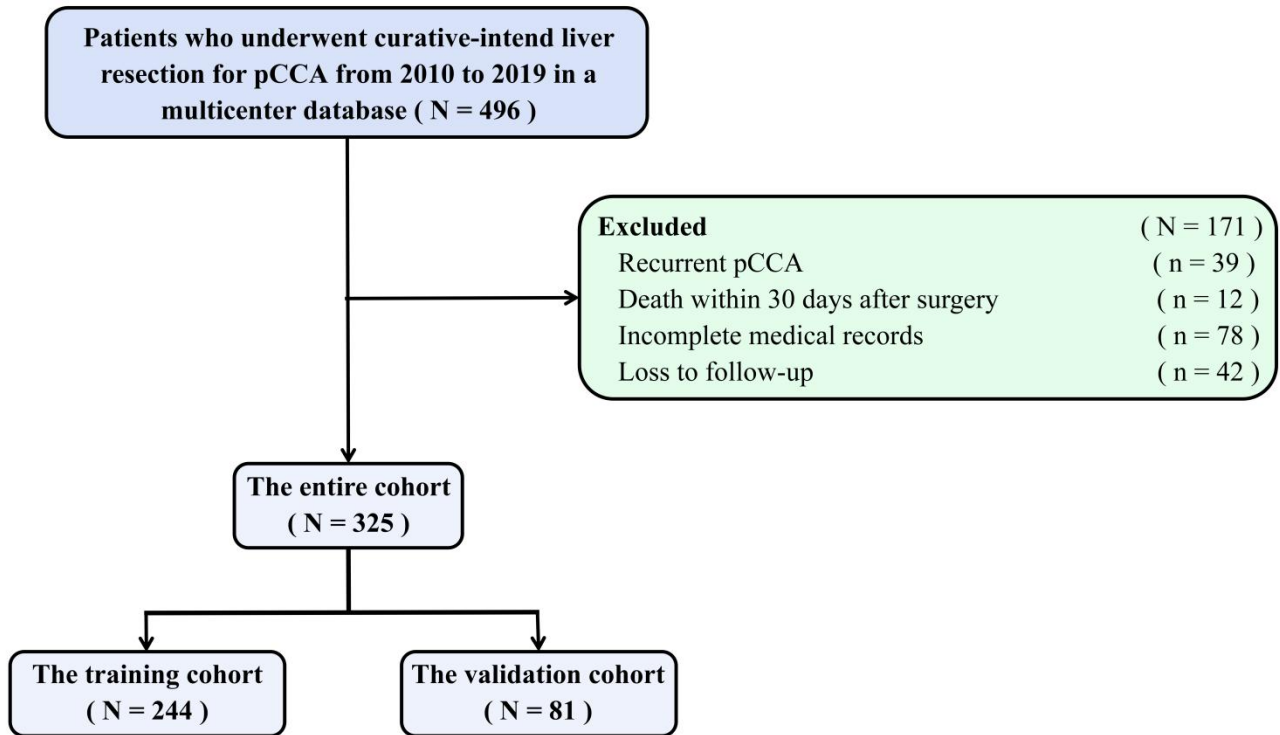
Macrovascular invasion, No/Yes	63/18 (77.8/22.2)	33/7 (82.5/17.5)	24/7 (77.4/22.6)	6/4 (60.0/40.0)	0.309
Microvascular invasion, No/Yes	72/9 (88.9/11.1)	35/5 (87.5/12.5)	27/4 (87.1/12.9)	10/0 (100.0/0)	0.489
Perineural infiltration, No/Yes	62/19 (76.5/23.5)	32/8 (80.0/20.0)	23/8 (74.2/25.8)	7/3 (70.0/30.0)	0.741
Tumor differentiation, well/(moderate/poor)	63/18 (77.8/22.2)	31/9 (77.5/22.5)	23/8 (74.2/25.8)	9/1 (90.0/10.0)	0.578
Extent of resection, Minor/Major	25/56 (30.9/69.1)	13/27 (32.5/67.5)	10/21 (32.3/67.7)	2/8 (20.0/80.0)	0.729
8th AJCC staging system, I-II/III/IV	44/33/4 (54.3/40.7/4.9)	25/13/2 (62.5/32.5/5.0)	18/11/2 (58.1/35.5/6.5)	1/9/0 (10.0/90.0/0)	0.020
Bismuth classification, I-II/III/IV	18/17/46 (22.2/21.0/56.8)	10/8/22 (25.0/20.0/55.0)	6/6/19 (19.4/19.4/61.3)	2/3/5 (20.0/30.0/50.0)	0.919
Lymphoid metastasis, No (ELN > 4)/No (ELN ≤ 4)/Yes	26/30/25 (32.1/37.0/30.9)	14/15/11 (35.0/37.5/27.5)	11/12/8 (35.5/38.7/25.8)	1/3/6 (10.0/30.0/60.0)	0.282
Intraoperative blood loss (mL), ≤ 500/> 500	31/50 (38.3/61.7)	13/27 (32.5/67.5)	14/17 (45.2/54.8)	4/6 (40.0/60.0)	0.549
Perioperative blood transfusion, No/Yes	30/51 (38.3/61.7)	15/25 (37.5/62.5)	9/22 (29.0/71.0)	6/4 (60.0/40.0)	0.210
Period of follow-up, months ¹	26.3 ± 20.0	33.4 ± 22.7	18.4 ± 11.4	22.1 ± 16.9	0.810

Recurrence during follow-up	59 (73.8)	27 (67.5)	22 (71.0)	10 (100.0)	0.001
Death during follow-up	51 (63.0)	22 (55.0)	20 (64.5)	9 (90.0)	0.024
OS, months ²	26.0 (17.3-34.7)	34.0 (22.4-45.6)	21.0 (10.2-31.8)	8.7 (0-29.0)	0.018
1-year OS rate, %	80.1	84.8	83.9	50.0	
3-year OS rate, %	34.7	47.7	8.4	30.0	
5-year OS rate, %	25.2	39.4	3.1	0	

¹Values are the mean \pm standard deviation.

²Values are the median and 95% confidence interval.

ACCI: Age-adjusted Charlson comorbidity index; AJCC: American Joint Committee on Cancer; ALT: Alanine aminotransferase; ASA: American Society of Anesthesiologists; AST: Aspartate transaminase; CA19-9: Carbohydrate antigen 19-9; CCI: Charlson comorbidity index; INR: International normalized ratio; PLT: Platelet count.



Supplementary Figure 1 Flow chart of patient inclusion. pCCA: Perihilarcholeangiocarcinoma.