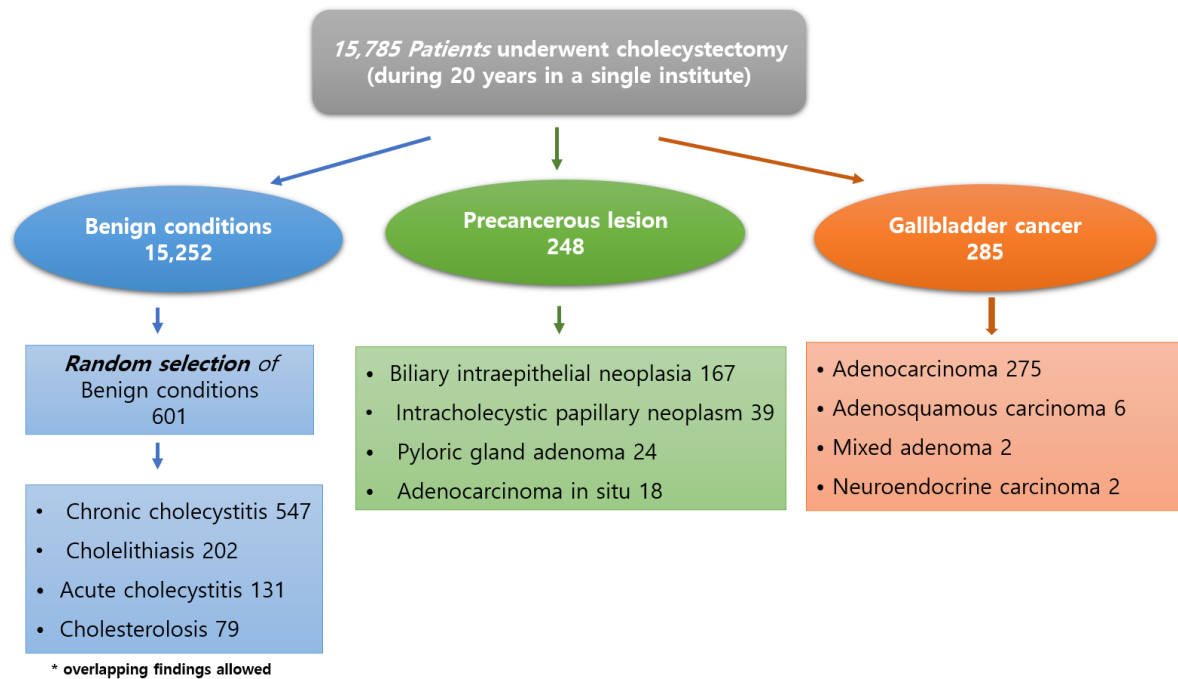




Supplementary Figure 1 Flow chart of enrolled patients underwent cholecystectomy.

Supplementary Table 1 Temporal distribution of pathologic diagnoses in cholecystectomy cases (2004–2023)

Pathologic diagnosis	Total (%)	Years				<i>p</i>
		2004 – 2008	2009 – 2013	2014 – 2018	2019 – 2023	
		n (%)	n (%)	n (%)	n (%)	
Benign conditions	15,252 (96.62)	1,993 (96.23)	3,532 (96.11)	4,472 (96.88)	5,255 (96.90)	0.002
Precancerous lesion	248 (1.57)	40 (1.93)	80 (2.18)	69 (1.49)	59 (1.09)	
Gallbladder cancer	285 (1.81)	38 (1.83)	63 (1.71)	75 (1.62)	109 (2.01)	
Total	15,785	2,071 (13.12)	3,675 (23.28)	4,616 (29.24)	5,423 (34.36)	

Supplementary Table 2 Clinicopathologic characteristics of patients with gallbladder cancer (n=285)

Clinical factors	mean or n (%)
Age (years)	69.10
Sex ratio (M/F)	1.08
Cancer type	
Adenocarcinoma, NOS	275 (96.5)
Adenosquamous carcinoma	6 (2.1)
Mixed adeno- and neuroendocrine carcinoma	4 (1.4)
Stage	
I	83 (29.1)
II	104 (36.5)
III	79 (27.7)
IV	19 (6.7)
Surgical Procedure	
(Extended) Radical cholecystectomy	41 (14.4)
Simple cholecystectomy + Re-operation	124 (43.5)
Simple cholecystectomy	120 (42.1)
Surgical resection	
R0	273 (95.8)
R1	12 (4.2)
Tumor Size (mean, cm)	2.58
Cholecystectomy indication	
GB mass	138 (48.4)
GB polyp	39 (13.7)
Cholecystitis	88 (30.9)
Others	20 (7)
Gallstone (presence)	83 (29.12)
Cholangitis (presence)	71 (24.91)

M/F, male/female; NOS, not otherwise specified

Supplementary Table 3 Clinical features of gallbladder cancer according to stage

Clinical factors	TNM stage		<i>p</i>
	Stage I & II	Stage III & IV	
	(n=184)	(n=101)	
Sex ratio (M/F)	1.15	1.04	0.236
Age (years)	68.93	69.42	0.341
BMI (kg/m ²)	25.30	23.59	0.077
AST (IU/L)	31.70	36.0	0.124
ALT (U/L)	32.65	35.76	0.290
ALP (U/L)	91.72	105.68	0.027
γ-GT (IU/L)	88.98	151.30	0.023
Total Cholesterol (mg/dL)	168.20	158.28	0.040
Triglyceride (mg/dL)	131.93	109.11	0.024
BUN (mg/dL)	15.27	14.53	0.187
Creatinine (mg/dL)	0.90	0.80	0.137
Total Protein (g/dL)	6.83	6.79	0.340
Albumin (g/dL)	3.94	3.84	0.057
Amylase (U/L)	50.41	58.98	0.173
HTN (n, %)	103 (55.1%)	40 (40.8%)	0.022
DM (n, %)	43 (23.0%)	21 (21.4%)	0.763
Gallstone (n, %)	56 (29.9%)	27 (27.6%)	0.672
Cholangitis (n, %)	42 (22.5%)	29 (29.6%)	0.186

(n=285)

Abbreviations: M/F, male/female; BMI, body mass index; AST, aspartate aminotransferase; ALT, alanine transaminase; ALP, alkaline phosphatase; γ-GT, gamma-glutamyl transferase; BUN, blood urea nitrogen; HTN, hypertension; DM, diabetes mellitus

Supplementary Table 4 Multivariate analysis of overall survival in patients with GBCs (n=285)

Metabolic factors	Hazard ratio	95% confidence interval	p-value
Total Cholesterol (>161 VS. ≤161)	1.344	0.941-1.921	0.104
Triglyceride (>108 VS. ≤108)	1.208	0.851-1.716	0.290
Albumin (>3.9 VS. 3.9)	1.430	0.974-2.099	0.068
Age (≤70 VS. >70)	1.598	1.110-2.302	0.012
Stage (I+II VS. III+IV)	3.224	2.287-4.544	<0.001

Supplementary Table 5 Multivariate analysis of overall survival in patients with

Histologic factors	Hazard ratio	95% confidence interval	p-value
Tumor budding (Absence VS. Presence)	1.292	0.783-2.131	0.317
Poor cohesive components (Absence VS. Presence)	1.026	0.638-1.649	0.916
Undifferentiated components (Absence VS. Presence)	1.504	0.472-4.793	0.490
Age (≤70 VS. >70)	1.919	1.357-2.716	<0.001
Stage (I+II VS. III+IV)	2.866	1.999-4.110	<0.001

GBCs (n=285)