

Table S1 The distributions of variables with missing data and the multiple imputation data

Variables		Number (%) with missing data	Complete case	Multiple imputation
Biochemistry	AST (U/L)	1 (0.9)	146.00 [69.00, 272.00]	146.00 [67.00-272.00]
	ALT (U/L)	1 (0.9)	133.00 [66.00, 263.00]	133.00 [64.00-263.00]
	ALP (U/L)	1 (0.9)	224.00 [143.00, 356.00]	224.00 [143.00-368.00]
	Bilirubin (mg/dL)	2 (1.9)	5.25 [2.90, 8.00]	5.30 [2.90-8.00]
	Albumin (g/dl)	32 (30.2)	2.82 (0.57)	2.84 (0.83)
	Lactate (mmol/L)	23 (21.7)	2.10 [1.35, 3.55]	2.10 [1.20-3.70]
Organ failure	Respiratory dysfunction, n (%)	62 (58.5)	38 (86.4)	370 (69.81)
	Number of organ failures	62 (58.5)	4.00 [2.00, 4.00]	3.00 [2.00-4.00]
Severity scores	SOFA	65 (61.3)	14.00 [12.00, 17.00]	13.48 [10.86-15.95]

Notes: data presented are mean \pm SD, median (Q1–Q3), or N (%).

Abbreviations: ALT, alanine aminotransferase; AST, aspartate aminotransferase; ALP, alkaline phosphatase; SOFA, Sequential Organ Failure Assessment.

Table S2 Multivariable linear regression models evaluating the association between timing of biliary drainage and length of stay in-hospital and ICU based on original data

Variables	In-hospital LOS						ICU LOS					
	Crude (N=106)		Model 1 (N=106)		Model 2 (N=104)		Crude (N=106)		Model 1 (N=106)		Model 2 (N=104)	
	β (95%CI)	P value	β (95%CI)	P value	β (95%CI)	P value	β (95%CI)	P value	β (95%CI)	P value	β (95%CI)	P value
Timing of biliary drainage (days)	1.84 (1.45, 2.22)	<0.0001***	1.40 (1.02, 1.78)	<0.0001***	1.41 (1.02, 1.80)	<0.0001***	0.43 (0.22, 0.65)	0.0002***	0.44 (0.21, 0.68)	0.0004***	0.45 (0.19, 0.71)	0.0010**
Timing of biliary drainage (hours)												
<24	Ref		Ref		Ref		Ref		Ref		Ref	
	18.45						2.99		2.95		3.07	
≥ 24	(12.43, 24.46)	<0.0001***	(5.51, 17.47)	0.0003***	(3.73, 16.90)	0.0028**	(-0.06, 6.03)	0.0571	(-0.41, 6.31)	0.0889	(-0.83, 6.96)	0.1263
Timing of biliary drainage (hours)												
<48	Ref		Ref		Ref		Ref		Ref		Ref	
	25.58		20.00		21.23						6.24	
≥ 48	(19.05, 32.11)	<0.0001***	(13.18, 26.81)	<0.0001***	(14.11, 28.34)	<0.0001***	(0.90, 7.95)	0.0156*	(1.23, 9.36)	0.0122*	(1.65, 10.84)	0.0092**

Notes: data presented are β s and 95% CIs. Adjust I model adjusts for age, sex, ECI, cardiovascular dysfunction, neurological dysfunction and bile duct stone as etiology. Adjust

II model adjusts for adjust I +bilirubin, ALP, renal dysfunction, hepatic dysfunction, hematological dysfunction, percutaneous drainage and combination of anti-microbial agents.

Abbreviations: ECI (vanWalRaven), Elixhauser comorbidity index; ALP, alkaline phosphatase. *P < 0.05, ** P < 0.01 and ***P < 0.001

Table S3 Multivariable logistic regression models evaluating the association between timing of biliary drainage and mortality based on original data

Variables	In-hospital mortality					
	Crude (N=106)		Model 1 (N=106)		Model 2 (N=106)	
	OR (95%CI)	P value	OR (95%CI)	P value	OR (95%CI)	P value
Timing of biliary drainage (days)	1.03 (0.95, 1.10)	0.4849	1.00 (0.91, 1.10)	0.9990	0.99 (0.89, 1.11)	0.9202

Variables	30-day mortality					
	Crude (N=106)		Model 1 (N=106)		Model 2 (N=106)	
	OR (95%CI)	P value	OR (95%CI)	P value	OR (95%CI)	P value
Timing of biliary drainage (days)	1.01 (0.93, 1.09)	0.8111	1.01 (0.91, 1.13)	0.7797	1.03 (0.91, 1.18)	0.6211

Notes: data presented are ORs and 95% CIs. Adjust I model adjusts for age, sex, ECI, cardiovascular dysfunction, percutaneous drainage and bicarbonate; Adjust II model adjusts for adjust I + renal dysfunction, hepatic dysfunction, hematological dysfunction, neurological dysfunction, percutaneous drainage, bile duct stone as etiology and combination of anti-microbial agents. *P < 0.05, ** P < 0.01 and ***P < 0.001

Abbreviations: ECI (vanWalRaven), Elixhauser comorbidity index.

Figure S1 The heatmap of missing data distribution in each study variables and outcomes
Dark represents missing data; The levels of the redness represent standardized variable value.

Figure S2 A linear relationship between biliary drainage timing and mortality (a.in-hospital mortality;
b.30-day mortality) via the smoothing spline, adjusted for age, sex, bicarbonate, bacteremia, and ECI.
The red line indicates the estimated mortality rate, and the blue lines represent 95% confidence interval.

Figure S3 a. Subgroup analyses of the association between timing of biliary drainage and in-hospital mortality. Each stratification adjusted for all the factors (age, sex, bacteremia, cardiovascular dysfunction, Percutaneous drainage and ECI) except the stratification factor itself.

b. Subgroup analyses of the association between timing of biliary drainage and 30-day mortality. Each stratification adjusted for all the factors (age, sex, bacteremia, cardiovascular dysfunction, Percutaneous drainage and ECI) except the stratification factor itself.







