

Supplementary material

Supplement Table 1 Univariable cox regression analysis of factors affecting overall mortality and graft failure

Characteristic	Over	Mortali		Gra	Failure	
	all	ty	p	ft	95% CI	p
	HR	95% CI		HR	95% CI	p
COVID period	1.93	1.34, 2.78	<0.001	1.75	1.26, 2.43	<0.001
Recipient						
Age	1.03	1.00, 1.05	0.075	1.02	0.99, 1.04	0.15
Male	1.35	0.87, 2.10	0.18	1.57	1.02, 2.41	0.038
Race						
White	ref	—		ref	—	
African American	0.82	0.40, 1.70	0.60	0.80	0.40, 1.58	0.52
Hispanic	1.34	0.92, 1.96	0.13	1.45	1.03, 2.05	0.034
Asian	0.39	0.16, 0.96	0.04	0.40	0.18, 0.92	0.031
Others	0.91	0.29, 2.87	0.87	0.79	0.25, 2.51	0.70
BMI	1.02	0.98, 1.05	0.32	1.02	0.99, 1.05	0.21
Underlying etiology,						
HCV	ref	—		ref	—	
HBV	0.64	0.26, 1.61	0.35	0.67	0.29, 1.55	0.35
ALD	1.08	0.68, 1.73	0.74	1.11	0.72, 1.72	0.63
NASH	1.58	1.02, 2.45	0.041	1.63	1.09, 2.45	0.017
Others	0.99	0.60, 1.65	0.98	1.06	0.67, 1.69	0.80
Blood Type,						
A	ref	—		ref	—	
AB	0.85	0.31, 2.35	0.75	0.89	0.36, 2.21	0.80
B	1.10	0.64, 1.89	0.74	1.12	0.68, 1.83	0.65
O	1.12	0.77, 1.62	0.56	1.11	0.78, 1.54	0.60

Diabetes		1.02,	0.03	1.5	1.14,	0.00
	1.43	2.00	6	5	2.11	5
HCV positive status		0.65,		0.8	0.61,	
	0.92	1.30	0.62	5	1.17	0.31
Previous abdominal surgery		0.74,		0.9	0.68,	
	1.03	1.44	0.86	3	1.27	0.66
Portal vein thrombosis,		0.67,		1.0	0.67,	
	1.07	1.71	0.77	3	1.59	0.89
Hemodialysis at transplant		0.86,		2.4	1.01,	0.04
	2.33	6.29	0.10	5	5.98	8
TIPSS		0.72,		1.4	0.79,	
	1.43	2.80	0.30	5	2.68	0.23
MELD score		1.00,	0.02	1.0	1.01,	0.01
	1.04	1.07	4	4	1.07	5
MELD exception		0.35,		1.2	0.41,	
	1.11	3.50	0.86	9	4.06	0.66
Mechanical ventilation		0.00,		5.6	0.79,	0.08
	0.00	Inf	0.99	3	40.3	5
AFP		0.99,		1.0	0.99,	
	1.00	1.00	0.27	0	1.00	0.36
Waiting days		1.00,		1.0	1.00,	
	1.00	1.00	0.79	0	1.00	0.52
Donor						
Age		1.00,	0.02	1.0	1.00,	0.01
	1.01	1.02	3	1	1.02	5
Male		0.83,		1.1	0.84,	
	1.18	1.69	0.35	6	1.61	0.37
Race						
White		ref		ref		
African American		0.75,		1.0	0.70,	
	1.14	1.73	0.55	4	1.55	0.84
Hispanic		0.52,		0.9	0.56,	
	0.87	1.47	0.61	0	1.44	0.66
Asian		0.15,		0.5	0.12,	
	0.61	2.48	0.49	0	2.01	0.33
Others		0.32,		1.1	0.41,	
	1.00	3.17	0.99	2	3.03	0.83
BMI		1.00,	0.03	1.0	1.00,	0.03
	1.02	1.05	5	2	1.04	1
Blood Type,						
A		ref	—	ref	—	
AB		0.05,		0.5	0.13,	
	0.33	2.37	0.27	4	2.21	0.39

	B		0.66,		1.1	0.68,	
		1.12	1.91	0.68	1	1.80	0.68
	O		0.83,		1.1	0.81,	
		1.21	1.75	0.32	4	1.60	0.46
HCV NAT positive			0.45,		0.7	0.38,	
		0.93	1.89	0.83	7	1.58	0.48
HCV antibody positive			0.57,		0.8	0.52,	
		0.97	1.66	0.91	6	1.45	0.58
Donor causes of death:							
anoxia		ref	—		ref	—	
			0.77,		1.0	0.73,	
CVA		1.12	1.63	0.56	4	1.48	0.82
			0.38,		0.7	0.45,	
Head Trauma		0.63	1.04	0.07	0	1.08	0.11
			0.00,		0.0	0.00,	
CNS tumor		0.00	Inf	0.99	0	Inf	0.99
			0.87,		1.5	0.72,	
Others		1.91	4.19	0.11	8	3.43	0.25
			0.30,		0.8	0.48,	
DCD		0.58	1.10	0.10	1	1.35	0.42
Organ Share	Local	ref	—		ref	—	
			0.69,		1.0	0.75,	
Regional		1.03	1.54	0.87	8	1.55	0.69
			0.94,	0.08	1.5	0.94,	
National		1.56	2.61	8	1	2.42	0.09
			1.00,		1.0	1.00,	
Distance from donor hospital		1.00	1.00	0.57	0	1.00	0.44
			0.94,		1.0	0.99,	
Cold ischemia time		1.01	1.09	0.75	6	1.13	0.10
			0.71,		1.1	0.82,	
Donor risk index		1.08	1.64	0.71	9	1.74	0.36
Pathological Characteristic							
			0.96,		1.0	0.95,	
Number of tumors		1.07	1.19	0.24	5	1.16	0.33
			0.94,		1.2	0.87,	
Tumor more than 3		1.40	2.09	0.10	7	1.86	0.21
			1.23,	0.00	1.5	1.09,	0.01
Outside UCSF Criteria		1.74	2.47	2	1	2.08	4
			1.00,	0.05	1.2	0.91,	
Outside Milan Criteria		1.40	1.96	2	4	1.69	0.18
			1.00,	0.06	1.0	0.98,	
Tumor max size		1.08	1.18	1	6	1.15	0.12
Worst tumor histology							

Complete tumor necrosis	ref			ref		
		0.93,		1.6	1.08,	
Moderate differentiated	1.45	2.26	0.10	4	2.50	0.02
		1.79,	<0.0	3.0	1.66,	<0.0
Poorly differentiated	3.29	6.04	01	2	5.50	01
		0.72,		1.5	0.93,	0.08
Well differentiated	1.27	2.25	0.41	7	2.64	9
		1.30,	0.00	1.7	1.15,	0.00
Vascular invasion	1.95	2.93	1	0	2.50	7
		1.26,	0.01	2.8	1.04,	0.04
Lymph node invasion	3.41	9.22	6	2	7.60	1
		1.11,	0.03	2.4	0.92,	0.07
Extra hepatic spread	3.01	8.13	0	9	6.71	2
		1.31,	0.00	2.1	1.35,	0.00
Intrahepatic metastasis	2.18	3.63	3	5	3.44	1
		1.37,	<0.0	1.6	1.19,	0.00
High risk features	1.91	2.68	01	2	2.22	2

HR: hazard ratio, CI: confidence interval, MELD: model for end-stage liver disease, BMI: body mass index, HCV: hepatitis C virus, HBV: hepatitis B virus, ALD: alcoholic liver disease, NASH: non-alcoholic steatohepatitis, TIPSS: transjugular intrahepatic portosystemic shunt, AFP: alpha-fetoprotein

Supplement Table 2 Multivariable cox regression analysis of factors affecting graft failure

Characteristic	HR	95% CI	p
COVID period	1.66	1.19, 2.32	0.003
Recipient male	1.47	0.96, 2.26	0.077
Recipient diabetes	1.61	1.18, 2.20	0.003
MELD score	1.04	1.01, 1.07	0.019
Donor age	1.01	1.00, 1.02	0.020
Intrahepatic metastasis	1.97	1.22, 3.17	0.006
Lymph node invasion	2.30	0.84, 6.25	0.10
Worst tumor histology			
Complete Tumor Necrosis	ref		
Moderate differentiated	1.40	0.91, 2.14	0.12
Poorly differentiated	2.37	1.28, 4.39	0.006
Well differentiated	1.32	0.78, 2.23	0.30

HR: hazard ratio, CI: confidence interval, MELD: model for end-stage liver disease