

**SUPPLEMENTAL TABLE S1.** Risk factors for recurrence and graft failure: Univariate analysis

Characteristics	Recurrence (16/40)		Graft failure (30/45)	
	rec./total (%)	P-value*	failure/total (%)	P-value*
Age at diagnosis of PSC				
Under 18 years old	6/13 (46%)	0.165	11/14 (79%)	0.052
18 years old -	10/27 (37%)		19/31 (61%)	
Age at diagnosis of PSC				
Under 20 years old	7/14(50%)	0.076	14/17 (82%)	0.020
20 years old -	9/26 (35%)		16/28 (57%)	
Age at diagnosis of PSC				
Under 30 years old	12/25(48%)	0.031	24/29 (83%)	0.005
30 years old -	4/15 (27%)		6/16 (38%)	
Age at diagnosis of PSC				
Under 18 years old	6/13 (46%)	0.381	11/14 (79%)	0.145
18-40 years old	6/18 (33%)		15/21 (71%)	
41 years old -	4/9 (44%)		4/10 (40%)	
Age at liver transplantation				
Under 18 years old	3/6(50%)	0.241	5/6 (83%)	0.148
18 years old -	13/34 (38%)		25/39 (64%)	
Age at liver transplantation				
Under 30 years old	8/18 (44%)	0.189	16/20 (80%)	0.037
30 years old -	9/25 (36%)		14/25 (56%)	
Age at liver transplantation				
Under 40 years old	12/26 (46%)	0.153	24/30 (80%)	0.084
40 years old -	4/14 (29%)		6/15 (40%)	
Age at liver transplantation				
Under 18 years old	3/6 (50%)	0.262	5/6 (83%)	0.128
18-40 years old	9/20 (45%)		19/24 (79%)	
41 years old -	4/14 (29%)		6/15 (40%)	
Sex				
Female	11/25 (44%)	0.474	17/27 (63%)	0.887
Male	5/15 (33%)		13/18 (72%)	
MELD score				
-19	6/16 (38%)	0.717	12/19 (63%)	0.798
20-	9/23 (39%)		17/25 (68%)	
Unknown	1		1	
MELD score				
-21	8/21 (38%)	0.560	14/25 (56%)	0.099
22-	7/18 (39%)		15/19 (79%)	
Unknown	1			
New Mayo				
-2	8/13 (62%)	0.106	13/16 (81%)	0.715
2-	8/27 (30%)		17/29 (59%)	

New Mayo				
-3	11/23 (48%)	0.741	20/28 (71%)	0.718
3-	5/17 (29%)		10/17 (59%)	
Type of PSC				
Intrahepatic only	5/11 (45%)	0.722	6/11 (55%)	0.411
Intrahepatic and extrahepatic	11/29 (38%)		24/34 (71%)	
Donor age				
-39 years old	12/27 (44%)	0.384	23/31 (74%)	0.267
40 years old-	4/13 (31%)		7/14 (50%)	
Donor age				
-49 years old	8/18 (44%)	0.555	14/20 (70%)	0.290
50 years old-	8/22 (36%)		16/25 (64%)	
Donor sex				
Female	5/13 (38%)	0.290	14/17 (82%)	0.029
Male	11/27 (41%)		16/28 (57%)	
Gender mismatch				
Match	6/18 (33%)	0.842	15/21 (71%)	0.838
Mismatch	10/22 (45%)		15/24 (63%)	
Donor				
Unrelated	4/10 (40%)	0.828	6/11 (55%)	0.345
Related	12/30 (40%)		24/34 (71%)	
Donor				
Unrelated/related (sibling/uncle)	6/18 (33%)	0.329	11/20 (55%)	0.089
Related (parent/son)	10/22 (45%)		19/25 (76%)	
HLA-A matched number				
0	1/4 (25%)	0.523	1/4 (25%)	0.273
1	8/23 (35%)		19/27 (70%)	
2	6/12 (50%)		9/13 (69%)	
Unknown	1		1	
HLA-B matched number				
0	1/7 (14%)	0.500	3/8 (38%)	0.687
1	11/26 (42%)		21/30 (70%)	
2	3/6 (50%)		5/6 (83%)	
Unknown	1		1	
HLA-DR matched number				
0	2/6 (33%)	0.072	3/6 (50%)	0.659
1	9/28 (32%)		22/33 (67%)	
2	4/5 (80%)		4/5 (80%)	
Unknown	1		1	
HLA-DR15 (recipient)				
without	9/21 (73%)	0.674	14/24 (58%)	0.140
with	6/18 (33%)		15/20 (75%)	
Unknown	1		1	
HLA-DR15 (donor)				
without	6/22 (27%)	0.014	14/25 (56%)	0.154
with	9/17 (53%)		15/19 (79%)	
Unknown	1		1	

HLA-DR15 (both)				
without	10/28 (36%)	0.028	18/32 (56%)	0.032
with	5/11 (45%)		11/12 (92%)	
Unknown	1		1	
HLA-DR15(either donor or recipient)				
without	5/15 (33%)	0.245	10/17 (59%)	0.288
with	10/24 (42%)		19/27 (70%)	
Unknown	1		1	
Graft type				
Left lobe	6/13 (46%)	0.365	10/14 (71%)	0.688
Right lobe	8/22 (36%)		17/25 (68%)	
Right lateral	0/1 (0%)		1/2 (50%)	
Whole	2/4 (50%)		2/4 (50%)	
Biliary reconstruction				
Choledocho-choledochostomy	3/5 (60%)	0.603	5/6 (83%)	0.913
Choledocho-jejunostomy	13/35 (37%)		25/39 (64%)	
Number of biliary anastomoses				
1	12/29 (41%)	0.831	20/31 (65%)	0.641
2 or more	4/11 (36%)		10/14 (71%)	
Unknown				
IBD before LT				
Without	8/22 (36%)	0.391	15/24 (63%)	0.578
With	8/18 (44%)		15/21 (71%)	
Active IBD at LT				
Without	14/34 (41%)	0.651	26/39 (67%)	0.663
With	2/6 (33%)		4/6 (67%)	
Active IBD after LT				
Without	6/29 (21%)	0.006	19/32 (59%)	0.911
With	10/11 (91%)		11/13 (85%)	
Development of IBD after LT				
Without	14/37 (38%)	0.920	26/40 (65%)	0.808
With	2/3 (67%)		4/5 (80%)	
IBD anytime				
Without	6/19 (32%)	0.368	11/19 (58%)	0.696
With	10/21 (48%)		19/26 (73%)	
Immunosuppressants at initiation phase				
CNI & steroid	11/22 (50%)	0.339	20/25 (80%)	0.165
CNI & antimetabolites	0/7 (0%)		3/7 (43%)	
CNI & steroid & antimetabolites	5/11 (45%)		7/13 (54%)	
Corticosteroid at initiation phase				
Without	0/7 (0%)	0.243	3/7 (43%)	0.368
With	16/33 (48%)		27/38 (71%)	
Antimetabolites at initiation phase				
Without	11/22 (50%)	0.223	20/25 (80%)	0.220
With	5/18 (28%)		10/20 (50%)	

Immunosuppressants at 1 year after LT				
CNI	2/3 (67%)	0.386	2/3 (67%)	0.319
CNI & steroid	4/6 (67%)		5/7 (71%)	
CNI & antimetabolites	4/10 (40%)		4/10 (40%)	
CNI & steroid & antimetabolites	5/10 (50%)		6/12 (50%)	
Graft loss in 1 year	11		13	
Corticosteroid at 1 year after LT				
Without	6/13 (46%)	0.616	6/13 (46%)	0.570
With	9/16 (56%)		11/19 (58%)	
Graft loss in 1 year	11		13	
Antimetabolites at 1 year after LT				
Without	6/9 (67%)	0.276	7/10 (70%)	0.399
With	9/20 (45%)		10/22 (45%)	
Graft loss in 1 year	11		13	
Acute rejection within 3 months				
Without	9/19 (47%)	0.349	14/21 (67%)	0.863
With	7/21 (33%)		16/24 (67%)	
Acute rejection within 6 months				
Without	8/17 (47%)	0.202	13/19 (68%)	0.657
With	8/23 (35%)		17/26 (65%)	
Corticosteroid pulse for ACR within 3 months				
No	9/20 (45%)	0.357	14/21 (67%)	0.909
Once or more	7/20 (35%)		16/24 (67%)	
CMV antigenemia within 3 months				
Negative	8/25 (32%)	0.019	17/27 (63%)	0.188
Positive	8/15 (53%)		13/18 (72%)	
CMV disease within 3 months				
Without	11/32 (34%)	0.064	23/36 (64%)	0.766
With	5/8 (63%)		7/9 (78%)	
Biliary anastomotic complications within 1 year				
Without	10/33 (30%)	0.145	24/37 (65%)	0.577
With	6/7 (86%)		6/8 (75%)	
Bacteremia within 1 year				
Without	11/24 (46%)	0.605	13/25 (52%)	0.014
With	3/13 (23%)		14/17 (82%)	
Unknown	3		3	

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PSC, primary sclerosing cholangitis; rec., recurrence; MELD, Model for End-Stage Liver Disease; HLA, human leukocyte antigen; LT, liver transplantation; IBD, inflammatory bowel disease; CMV, cytomegalovirus; ACR, acute cellular rejection, CNI, calcineurin inhibitors.