Supplementary Digital Content

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Supplementary Table 1 *Inclusion and Exclusion Criteria for the Redo Liver Transplantation Benchmark Cohort*

Low-risk criteria (Benchmark)	High-risk criteria (Non-benchmark)
Recipient age ≥18 years	Recipient on mechanical ventilation
Recipient with MELD score ≤25	Recipient listed as high urgency
DBD liver graft	Redo-LT within 30 days after primary LT
Absence of any high-risk criteria listed in the next column	Redo-LT for PNF or early HAT
	DCD liver graft
	Portal vein thrombosis in recipient

Lab MELD, laboratory Model of end-stage liver disease score; DBD, donation after brain death; Redo-LT; Redo Liver Transplantation; LT, liver transplantation; PNF, primary non-function (defined as graft failure resulting in death or third transplantation within 7 days of redo-LT excluding other causes of graft failure such as vascular thrombosis, rejection, or recurrent disease); HAT, hepatic artery thrombosis (early occurs within the first 30 days after primary LT); DCD, donation after circulatory death.

Supplementary Table 2 *Characteristics of Patients According to Pre-operative Risk Stratification*

	Benchmark cases n = 373	**Non-benchmark cases n = 729**
Recipient parameters		
Age, years	50 (39-59)	53 (40-60)
Male gender	222 (60)	429 (59)
Weight, kg	68 (59-77)	74 (62-85)
Height, m	1.70 (1.63-1.78)	1.72 (1.64-1.78)
BMI, kg/m^2	23 (21-26)	25 (22-29)
Indication for primary LT:		
- PSC	100 (27)	96 (13)
- PBC	18 (5)	16 (2)
- ASH-related cirrhosis	53 (14)	173 (24)
- NASH-related cirrhosis	10 (3)	59 (8)
- CCC	1 (0.3)	8 (1)
- HCC	61 (16)	176 (24)
- HCV	70 (19)	152 (21)
- HBV	21 (6)	58 (8)
- Acute liver failure	26 (7)	63 (9)
- Cryptogenic cirrhosis	12 (3)	23 (3)
- Autoimmune hepatitis	26 (7)	61 (8)
- Other	77 (21)	146 (20)
Primary LT graft:		
- DBD	250 (74)	490 (71)
- DCD	54 (16)	125 (18)
- Living donor	27 (8)	54 (8)
- Other	7 (2)	21 (3)
- Unknown	35 (3)	39 (4)
Time between primary LT and redo-LT, days	1874 (376-3968)	28 (5-1285)
Time on the waiting list for redo-LT, days	112 (35-249)	5 (2-45)
Indication for redo-LT:		
- PNF	0 (0)	143 (20)
- Early HAT	0 (0)	186 (26)
- Late HAT	72 (19)	62 (9)
- PVT	0 (0)	51 (7)
- Other vascular complication	34 (9)	56 (8)
- Rejection	68 (18)	106 (15)
- Biliary complication	156 (42)	19 (3)
- Recurrence	121 (32)	99 (14)
- Other	55 (15)	142 (20)

Preoperative parameters		
labMELD, score	17 (11-22)	30 (22-36)
Listed as high-urgency priority	0 (0)	400 (55)
On mechanical ventilation	0 (0)	246 (34)
On dialysis	7 (2)	223 (31)
Donor age, years	49 (37-61)	48 (31-60)
Redo-LT graft:		
- DBD	373 (100)	655 (91)
- DCD	0 (0)	64 (9)
- Other	0 (0)	1 (0.1)
Cold ischemia time, minutes	451 (363-548)	420 (342-508)

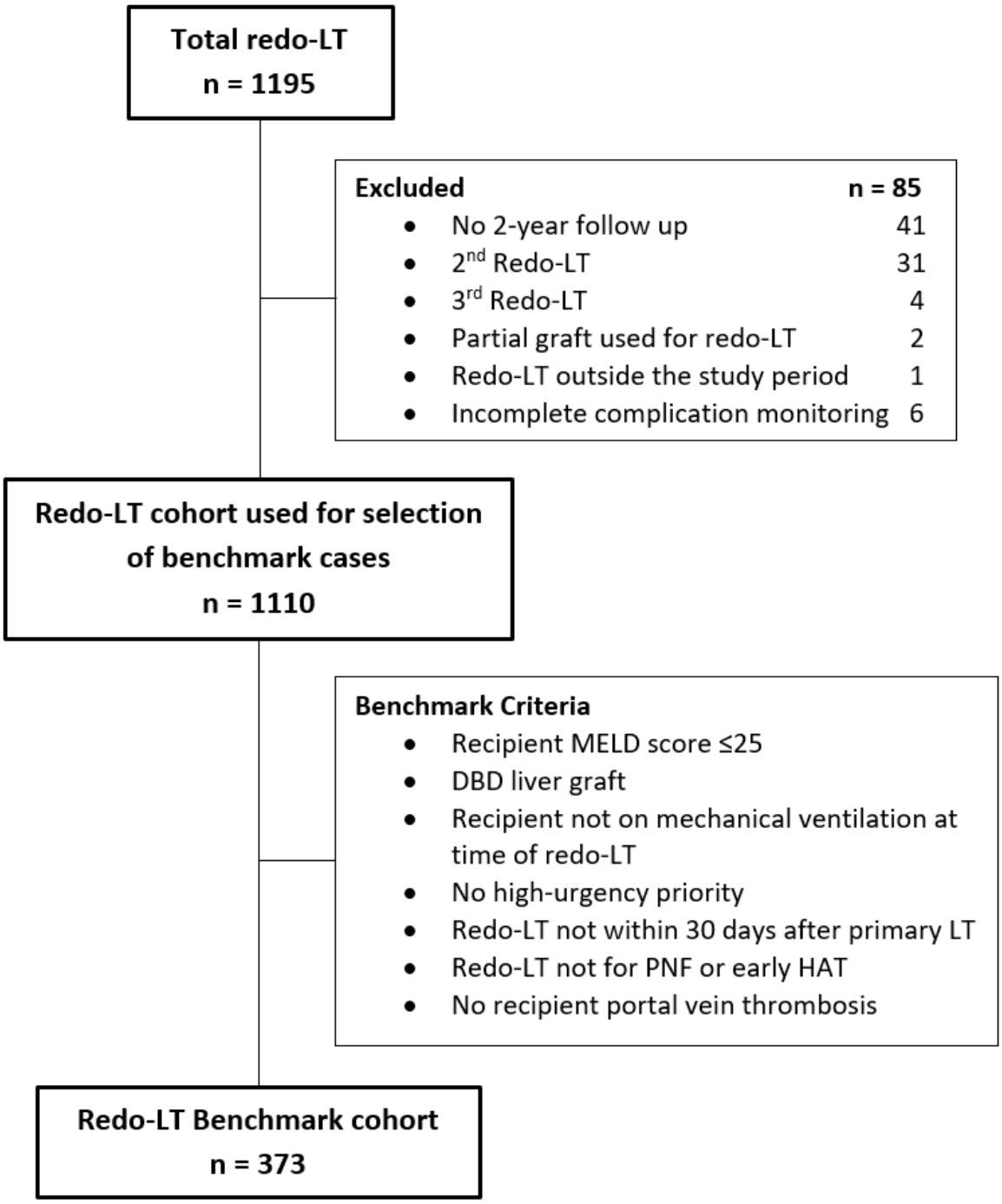
BMI, body mass index; LT, liver transplantation; PSC, primary sclerosing cholangitis; PBC, primary biliary cholangitis; ASH, alcoholic steatohepatitis; NASH, non-alcoholic steatohepatitis; CCC, cholangiocarcinoma; HCC, hepatocellular carcinoma; HCV, hepatitis C virus; HBV, hepatitis B virus; DBD, donation after brain death; DCD, donation after circulatory death; redo-LT, redo liver transplantation; PNF, primary non function; HAT, hepatic artery thrombosis; PVT, portal vein thrombosis; labMELD score, laboratory model of end stage liver disease score.
Data shown as median and IQR or number and proportion (%).

Supplementary Table 3 *Outcomes After Redo Liver Transplantation in Higher-Risk Groups compared With the Benchmark Group*

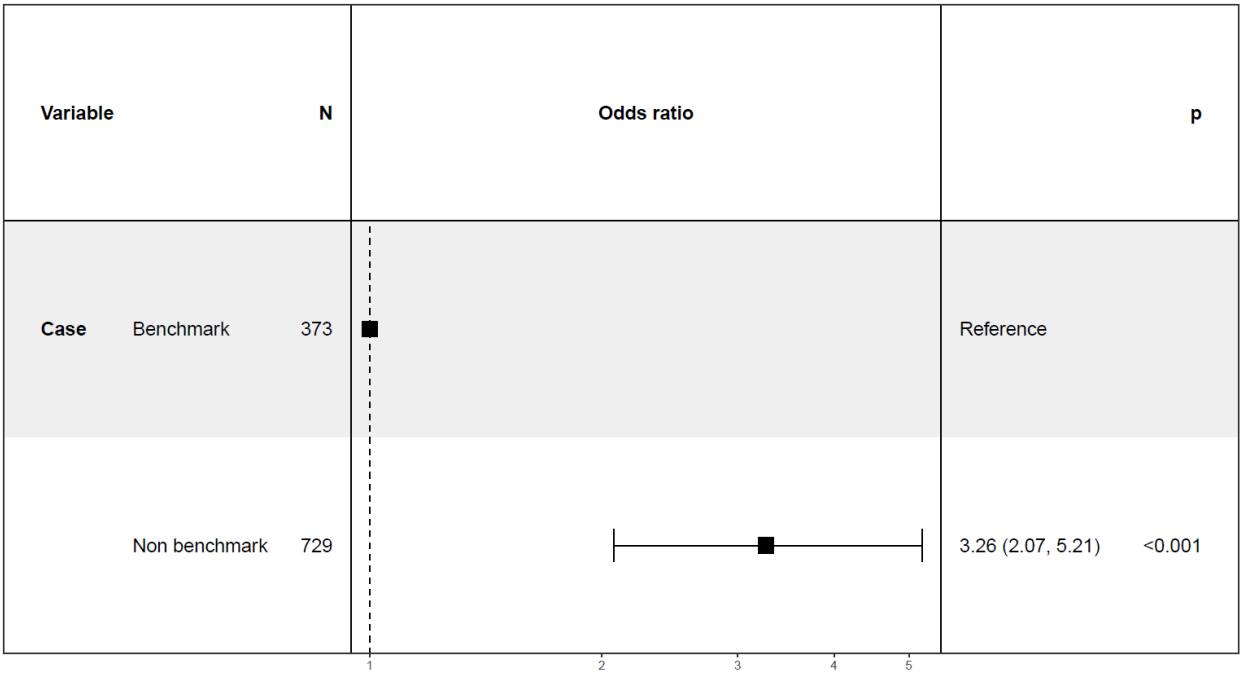
	Recipient with PVT n=51	Redo-LT for early HAT n=186	Benchmark Cohort n=373
Postoperative course			
Intensive care unit stay, days	8 (3-16)	7 (4-16)	4 (2-8)
Hospital stay, days	23 (17-35)	22 (13-38)	18 (13-28)
Newly need of dialysis	12 (24)	27 (15)	53 (14)
Morbidity and Mortality at 1 year			
CCI®	65 (44-99)	57(34-86)	45 (21-74)
≥Grade 2 complication	50 (98)	172 (92)	323 (87)
≥Grade 3a complication	43 (84)	129 (69)	229 (61)
Mortality	12 (24)	32 (17)	37 (10)
Key complications at 1 year			
Primary non-function	3 (5.9)	3 (1.6)	9 (2.4)
Intra-abdominal bleeding	9 (18)	25 (14)	52 (14)
Arterial complication	4 (8)	14 (8)	32 (9)
Hepatic artery thrombosis	1 (2.0)	9 (4.8)	12 (3.2)
Biliary complication	10 (20)	25 (13)	61 (16)
Anastomotic stricture	4 (7.8)	17 (9.1)	37 (9.9)
Non anastomotic stricture	3 (5.9)	2 (1.1)	12 (3.2)
Biliary leakage	4 (7.8)	14 (7.5)	23 (6.2)
Graft loss	13 (26)	37 (20)	47 (13)
Redo redo liver transplantation	2 (3.9)	10 (5.4)	21 (5.6)

PVT, portal vein thrombosis; HAT, hepatic artery thrombosis; CCI, comprehensive complication index.
Data shown as median and IQR or number and proportion (%).

Supplementary Figure 1. Selection of the redo liver transplantation benchmark cohort. Initially, cases with too short follow-up or incomplete data collection, second or even third redo-LT, redo-LT with the use of partial liver grafts, and cases in which redo-LT occurred outside the study period were excluded. Based on available literature, low-risk cases were defined and 373 redo-LT benchmark cases were identified. Redo-LT, redo liver transplantation; MELD, model for end-stage liver disease; DBD, donation after brain death; PNF, primary non-function; HAT, hepatic artery thrombosis.



Supplementary Figure 2. Odds ratio for the development of complications. Benchmark cases with a pre-defined low-risk profile had significantly lower odds ratio for the development of any postoperative complications at 1-year postoperatively compared to non-benchmark cases, as shown by generalized linear models analysis.



Supplementary Figure 3. Correlation between transplant center volume and number of performed redo liver transplantations. There is a significant correlation between the transplant center volume and redo liver transplantation caseload.