



Figure S1 One-year survival analysis of LW_{med} vs. HW_{med} patients in relation to the median ΔPMI ($-0.5\%/month$). LW_{med} , median LW; LW, low wasting; ΔPMI , change in PMI; PMI, psoas muscle index; HW_{med} , median HW; HW, high wasting.

Table S1 Demographics and post-LT outcomes, comparing patients classified as HW_{med} or LW_{med} according to their ΔPMI in relation to the median ΔPMI of the entire study population

Variables	Wasting group		P value
	HW_{med} (n=30)	LW_{med} (n=31)	
Age at Txp (years)	63 [61, 65]	64 [62, 67]	0.21
Sex (female)	8 (26.7)	8 (25.8)	0.93
MELD at Txp	22 [18, 28]	21 [17, 22]	0.09
Waitlist days	28.5 [13, 107]	67 [24, 120]	0.23
Etiology liver disease			0.27
NASH	13 (43.3)	11 (35.5)	
Alcoholic	4 (13.3)	10 (32.3)	
Idiopathic	10 (33.3)	9 (29.0)	
Hepatitis C	3 (10.0)	0	
Malignancy	0	1 (3.2)	
HCC on explant pathology	14 (46.7)	12 (38.7)	0.53
BMI at transplant (kg/m^2)	27.9 [24.1, 33.7]	29.6 [26.2, 32.9]	0.39
ΔPMI (% change PMI/month)	-1.06 [$-2, -0.9$]	0.4 [$-0.17, 1.5$]	$<0.001^*$
Months between CT scans	9.4 [4.9, 12.7]	7.5 [4.6, 9.3]	0.11
Serum albumin at transplant (g/dL)	2.7 [2.4, 3.4]	3.1 [2.6, 3.5]	0.16
Serum protein at transplant (g/dL)	5.9 [4.5, 6.7]	6.4 [5.5, 6.9]	0.18
Outcomes			
Peak serum ALT (U/L)	434 [251, 774]	472 [203, 916]	0.89
Peak serum AST (U/L)	710 [364, 1,142]	735 [312, 1,453]	0.89
Early allograft dysfunction	4/29 (13.8)	7 (22.6)	0.35
Primary nonfunction	0	0	>0.99
Acute kidney injury	11/26 (42.3)	15/29 (51.7)	0.49
1-year graft survival	26 (86.7)	29 (93.5)	0.38
1-year patient survival	26 (86.7)	29 (93.5)	0.38

Data are presented as median [range], n (%), or n/total (%). *, $P < 0.05$. LT, liver transplantation; HW_{med} , median HW; HW, high wasting; LW_{med} , median LW; LW, low wasting; ΔPMI , change in PMI; PMI, psoas muscle index; Txp, transplant; MELD, Model for End-Stage Liver Disease; LT, liver transplantation; GFR, glomerular filtration rate; NASH, non-alcoholic steatohepatitis; HCC, hepatocellular carcinoma; BMI, body mass index; CT, computed tomography; ALT, alanine aminotransferase; AST, aspartate aminotransferase.

Table S2 ANOVA significance table of metabolites including HW_{med} and LW_{med} groups

Metabolite	HW _{med} vs. LKD		LW _{med} vs. LKD	
	Log ₂ FC	P value	Log ₂ FC	P value
2-Aminobutyrate	-0.08583	0.16	-0.14327	0.29
2-Hydroxybutyrate	0.18400	0.87	0.59453	0.26
2-Hydroxyisovalerate	1.41328	0.001 [†]	1.35103	<0.001 [†]
2-Oxoglutarate	0.44423	0.01 [†]	0.25498	0.003 [†]
2-Oxoisocaproate	0.54301	0.17	0.66723	0.03 [†]
3-Hydroxybutyrate	-0.57792	0.29	-0.24569	0.25
3-Hydroxyisobutyrate	0.82219	0.02 [†]	1.20653	<0.001 [†]
3-Methyl-2-oxovalerate	0.52828	0.02 [†]	0.50138	0.04 [†]
Acetate	0.69420	0.02 [†]	0.54796	0.01 [†]
Acetoacetate	-0.94268	0.03 [†]	-0.70462	0.01 [†]
Acetone	0.58795	0.60	0.35358	0.55
Alanine	0.16052	0.12	0.20276	0.35
Asparagine	0.54287	0.048 [†]	0.71342	0.003 [†]
Betaine	1.25356	<0.001 [†]	1.78900	<0.001 [†]
Choline	0.50160	0.01 [†]	0.28258	0.02 [†]
Citrate	1.15965	<0.001 [†]	1.24111	<0.001 [†]
Creatine	-0.64525	0.06	-0.66588	0.004 [†]
Dimethylglycine	0.86633	0.02 [†]	0.94094	0.006 [†]
Ethanol	0.68160	0.01 [†]	0.69832	0.003 [†]
Formate	0.95960	0.01 [†]	2.93918	0.001 [†]
Glucose	0.39286	0.77	0.49770	0.02 [†]
Glutamate	0.42558	0.04 [†]	0.26095	0.09
Glutamine	0.13688	0.37	0.39974	0.02 [†]
Glycerol	-0.06985	0.76	-0.06663	0.72
Glycine	0.02175	0.43	0.17937	0.19
Histidine	0.21843	0.41	0.32919	0.05
Isoleucine	-0.56864	0.04 [†]	-0.49516	0.01 [†]
Isopropanol	1.46864	0.19	2.21191	0.06
Lactate	0.60113	0.05	0.51320	0.02 [†]
Leucine	-0.51721	0.07	-0.49532	0.02 [†]
Lysine	-0.03874	0.91	0.27159	0.52
Methionine	1.02136	0.002 [†]	2.78326	<0.001 [†]
Methylmalonate	0.60012	0.02 [†]	0.59419	0.02 [†]
Ornithine	0.29852	0.06	0.67896	0.002 [†]
Phenylalanine	1.00285	<0.001 [†]	1.23190	<0.001 [†]
Proline	0.81803	0.001 [†]	1.03504	<0.001 [†]
Pyruvate	0.00142	0.12	-0.61535	0.008 [†]
Sarcosine	1.92200	0.06	3.49225	0.001 [†]
Serine	0.11089	0.84	0.18630	0.25
Succinate	0.05477	0.01 [†]	0.03215	0.003 [†]
Taurine	-1.00277	0.007 [†]	-1.10937	0.001 [†]
Threonine	0.06014	0.81	0.21948	0.55
Tryptophan	2.45400	0.001 [†]	2.64456	<0.001 [†]
Tyrosine	1.26006	<0.001 [†]	1.54912	<0.001 [†]
Valine	-0.53640	0.01 [†]	-0.51643	0.007 [†]

The group ANOVA column lists the overall P value from the ANOVA for each metabolite and the subsequent columns are the P values from each of the inter-group comparisons computing using a Tukey post-hoc test. [†], entries are those with an uncorrected P value of <0.05. ANOVA, analysis of variance; HW_{med}, median HW; HW, high wasting; LW_{med}, median LW; LW, low wasting; LKD, living-related kidney donor; FC, fold change.

Table S3 ANOVA significance table of lipoprotein analysis

ID	Name	Analyte category	Analyte description	Size range (nm)	Units	HW vs. LKD		LW vs. LKD	
						Log ₂ FC	P value	Log ₂ FC	P value
TRLP	TRLP	TRLP concentrations	Total TRLP	24–240	nmol/L	-0.76912	0.42	-0.31428	0.76
VL-TRLP	Very large TRLP			90–240	nmol/L	-3.28129	<0.001 [†]	-1.31550	0.005 [†]
L-TRLP	Large TRLP			50–89	nmol/L	-2.90277	0.13	-2.18677	0.61
M-TRLP	Medium TRLP		TRLP subclasses	37–49	nmol/L	-1.50081	0.16	-1.08842	0.36
S-TRLP	Small TRLP			30–36	nmol/L	-1.81298	0.11	-1.15669	0.32
VS-TRLP	Very small TRLP			24–29	nmol/L	-0.21029	0.86	0.18887	0.89
cLDLP	cLDLP	cLDLP concentrations	Total cLDLP	19–23	nmol/L	-0.35131	0.13	-0.40908	0.15
L-cLDLP	Large cLDLP			21.5–23	nmol/L	0.31649	0.83	0.34808	0.79
M-cLDLP	Medium cLDLP		cLDLP subclasses	20.5–21.4	nmol/L	-0.74009	0.41	-0.96377	0.37
S-cLDLP	Small cLDLP			19–20.4	nmol/L	-0.56139	0.29	-0.56737	0.80
cHDLP	cHDLP	cHDLP concentrations	Total cHDLP	7.4–13	μmol/L	-1.51015	<0.001 [†]	-1.31092	<0.001 [†]
L-cHDLP	Large cHDLP			9.6–13	μmol/L	1.06930	0.86	1.13955	0.79
M-cHDLP	Medium cHDLP		cHDLP subclasses	8.1–9.5	μmol/L	-3.75428	0.01 [†]	-3.01527	0.047 [†]
S-cHDLP	Small cHDLP			7.4–8.0	μmol/L	-1.61156	<0.001 [†]	-1.42655	<0.001 [†]
H7P	High-density lipoprotein 7		cHDLP subspecies	12.0	μmol/L	3.10317	0.49	3.18811	0.24
H6P	High-density lipoprotein 6			10.8	μmol/L	0.51195	0.58	0.30117	0.57
H5P	High-density lipoprotein 5			10.3	μmol/L	-2.28838	0.22	-0.76553	0.89
H4P	High-density lipoprotein 4			9.5	μmol/L	-3.14378	0.004 [†]	-2.44629	0.051
H3P	High-density lipoprotein 3			8.7	μmol/L	-4.19841	<0.001 [†]	-3.40255	0.016 [†]
H2P	High-density lipoprotein 2			7.8	μmol/L	-1.70170	0.09 [†]	-1.53871	0.46
H1P	High-density lipoprotein 1			7.4	μmol/L	-1.13028	0.03 [†]	-0.83340	0.53
NTG	TG	Derived triglyceride concentrations	Total triglycerides		mg/dL	-1.35720	<0.001 [†]	-1.00439	0.008 [†]
NTC	TC		Total cholesterol		mg/dL	-0.42201	0.14	-0.34676	0.21
NTRLTG	TRLTG		Total triglyceride rich lipoprotein		mg/dL	-1.50613	0.26	-1.00848	0.62
NTRLC	TRLC	Derived cholesterol concentrations	Total cholesterol		mg/dL	-0.93615	0.38	-0.48933	0.73
NLDLC	LDLC		LDL cholesterol		mg/dL	-0.29850	0.25	-0.33788	0.29
NHDLC	HDLC		HDL cholesterol		mg/dL	-0.42855	0.08	-0.29290	0.41
ApoB	ApoB	Derived apolipoprotein concentrations	ApoB		mg/dL	-0.43650	0.12	-0.41416	0.15
ApoA1	ApoA-1		ApoA-1		mg/dL	-1.16133	<0.001 [†]	-1.00673	0.002 [†]

The group ANOVA column lists the overall P value from the ANOVA for each metabolite and the subsequent columns are the P values from each of the inter-group comparisons computing using a Tukey post-hoc test. [†], entries are those with an uncorrected P value of <0.05. ANOVA, analysis of variance; HW, high wasting; LKD, living-related kidney donor; LW, low wasting; FC, fold change; TRLP, triglyceride-rich lipoprotein particle; cLDLP, calibrated LDL particle; LDL, low-density lipoprotein; cHDLP, calibrated HDL particle; HDL, high-density lipoprotein; Apo, apolipoprotein.

Table S4 ANOVA significance table of metabolites comparing between VHW, HW, and LW groups

Metabolite	Group ANOVA, P value	Inter-group comparisons, P value					
		HW-LKD	HW-LW	HW-VHW	LKD-LW	LKD-VHW	LW-VHW
Tyrosine	<0.001 [†]	0.015 [†]	0.80	0.91	<0.001 [†]	0.15	0.43
Taurine	<0.001 [†]	0.002 [†]	0.98	0.67	<0.001 [†]	0.12	0.74
Citrate	0.001 [†]	0.005 [†]	0.99	0.74	<0.001 [†]	0.15	0.74
Tryptophan	0.001 [†]	0.05	0.76	0.89	<0.001 [†]	0.02 [†]	0.99
Phenylalanine	0.001 [†]	0.02 [†]	0.95	0.75	<0.001 [†]	0.32	0.40
Proline	0.002 [†]	0.045 [†]	0.83	0.96	<0.001 [†]	0.22	0.60
Betaine	0.003 [†]	0.23	0.38	0.99	<0.001 [†]	0.38	0.44
Valine	0.008 [†]	0.44	0.76	0.19	<0.001 [†]	0.008 [†]	0.47
b-hydroxyisobutyrate	0.013 [†]	0.26	0.66	0.97	0.007 [†]	0.60	0.48
a-hydroxyisovalerate	0.028 [†]	0.03 [†]	0.72	0.36	0.084	0.78	0.76
Sarcosine	0.028 [†]	0.95	0.15	0.99	0.03 [†]	0.87	0.44
Ornithine	0.033 [†]	0.87	0.23	0.98	0.03 [†]	0.71	0.61
Aspartate	0.048 [†]	0.19	0.98	0.86	0.04 [†]	0.74	0.62
Glutamine	0.051	0.61	0.82	0.55	0.10	0.99	0.12
Leucine	0.06	0.50	0.93	0.59	0.11	0.06	0.78
Methionine	0.10	0.98	0.35	0.99	0.15	0.99	0.42
Dimethylglycine	0.11	0.96	0.68	0.30	0.32	0.13	0.71
b-methyl-alpha-oxo- oxo- valerate	0.15	0.86	0.90	0.46	0.36	0.14	0.69
Isoleucine	0.19	0.48	0.99	0.90	0.26	0.21	0.91
Acetate	0.20	0.17	0.83	0.94	0.36	0.56	0.99
Histidine	0.20	0.43	1.00	0.63	0.27	0.99	0.53
Serine	0.21	0.52	0.95	0.27	0.68	0.91	0.36
Choline	0.25	0.74	0.99	0.68	0.77	0.19	0.45
Glucine	0.25	0.40	0.99	0.75	0.29	0.97	0.73
Glycerine	0.25	0.41	0.74	0.27	0.84	0.96	0.61
Acetoacetate	0.33	0.28	0.85	0.79	0.54	0.90	0.98
aOIC	0.34	0.90	0.86	0.84	0.36	0.47	0.99
Methylmalonate	0.36	0.46	0.99	0.99	0.35	0.64	0.99
Formate	0.41	0.99	0.64	1.00	0.48	0.99	0.73
a-oxogluterate	0.42	0.99	0.96	0.42	0.97	0.44	0.54
Lactate	0.43	0.41	0.95	0.97	0.53	0.78	0.99
a-hydroxybutyrate	0.51	0.92	0.98	0.84	0.66	0.99	0.59
Creatine	0.54	0.56	0.97	0.83	0.67	0.98	0.93
Glycine	0.57	0.97	0.96	0.88	0.75	0.98	0.61
Glutamate	0.64	0.74	0.97	0.99	0.86	0.65	0.91
Lysine	0.67	0.99	0.86	0.99	0.82	0.99	0.74
Actin	0.68	0.95	0.99	0.88	0.93	0.61	0.81
Threonine	0.78	0.99	0.90	1.00	0.79	0.99	0.94
Alanine	0.80	0.86	0.99	0.97	0.81	0.99	0.97
b-hydroxybutyrate	0.80	0.76	0.88	0.95	0.97	0.98	0.99
Pyruvate	0.83	0.99	0.86	0.99	0.89	0.99	0.97
a-aminobutyrate	0.90	0.99	0.96	0.91	0.98	0.94	0.98
Succinate	0.93	0.97	0.98	0.91	0.99	0.99	0.97

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