



Hangi Hastalara Karaciğer Nakli Yapmayalım?

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ANKARA

Nakil Avantajı?

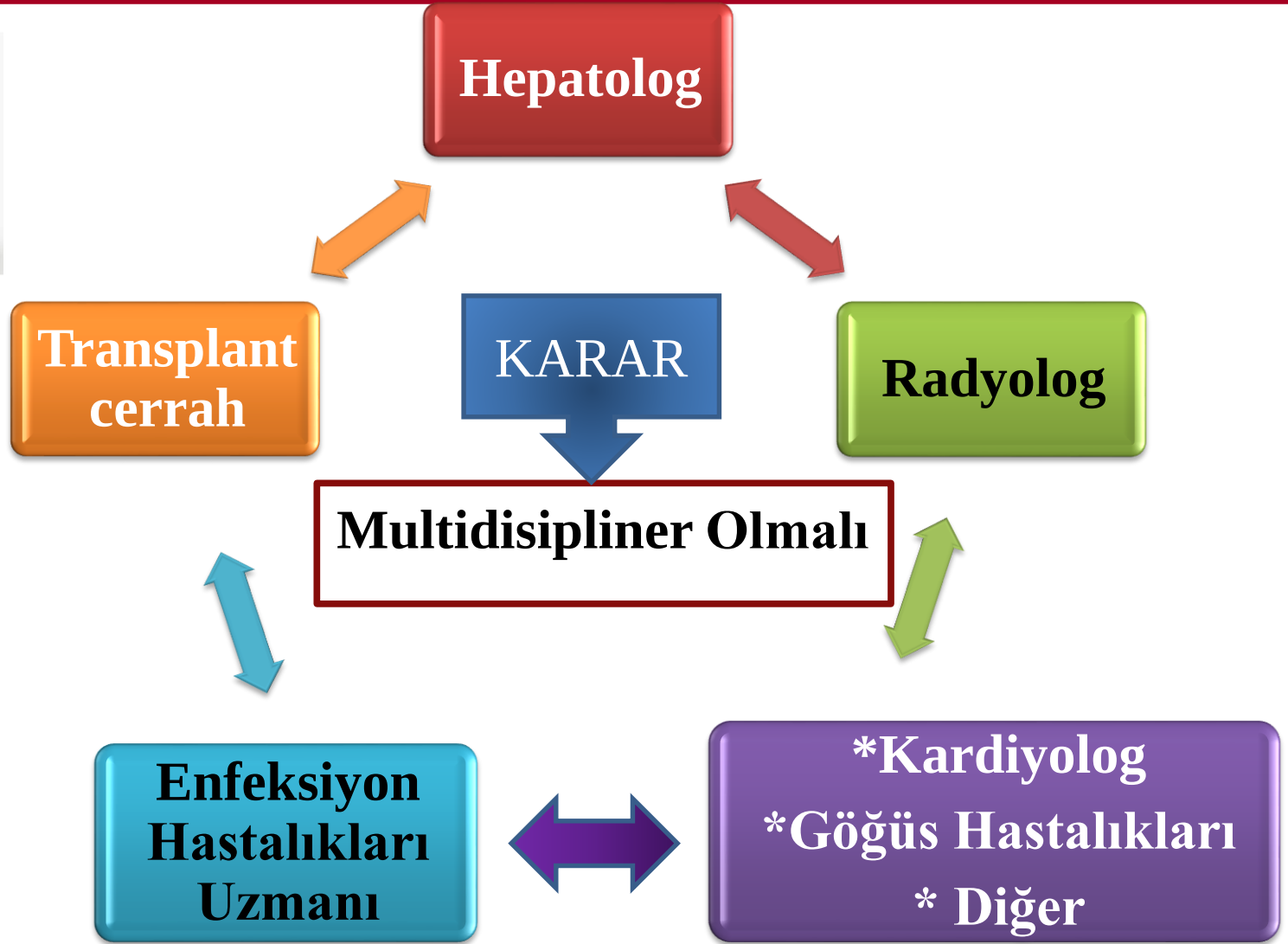


- *Bekleme listesinde mortalite riski ↓
- *Nakil sonrası 1 yıllık yaşam süresi ↑

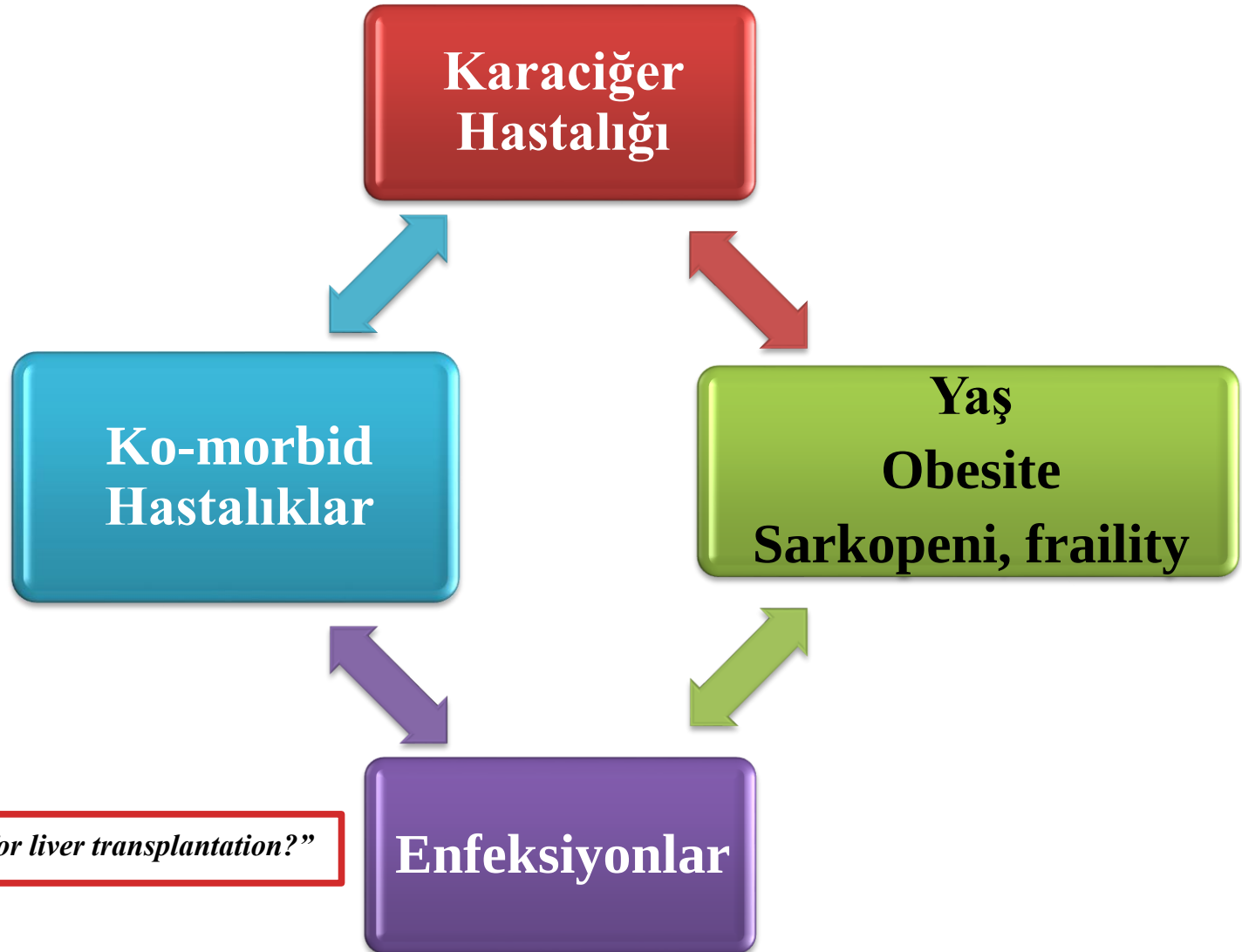
- Data from the European Registry (1998–2012)

Primary indication of LT	Number of patients	Size within group, %	5-year survival, %	10-year survival, %
Chronic liver diseases	66,808		74	64
Alcoholic cirrhosis		27.6	74	60
HCV-related cirrhosis		18.9	65	53
HBV-related cirrhosis		7.2	75	69
HDV-related cirrhosis		2.3	89	85
PBC		7.5	80	72
Malignant tumours	15,197		60	47
HCC		86.5	63	49
CCA		2.8	31	23
Metastases		3.9	49	31
Acute liver diseases	7,585		64	59
Metabolic diseases	5,699		79	71
Benign tumours	1,317		83	76

Kimlere Nakil Yapmayalım?



Kimlere Nakil Yapmayalım?



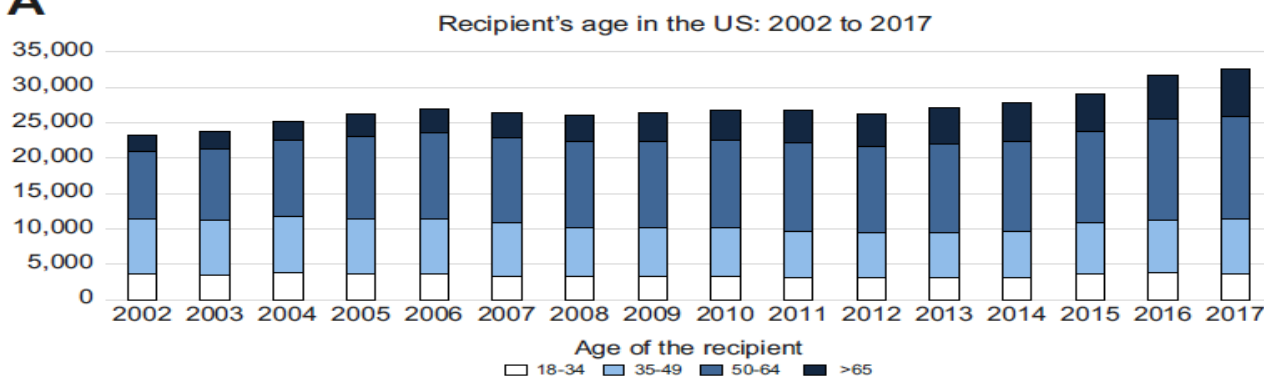
“When is sick too sick for liver transplantation?”

Age and liver transplantation

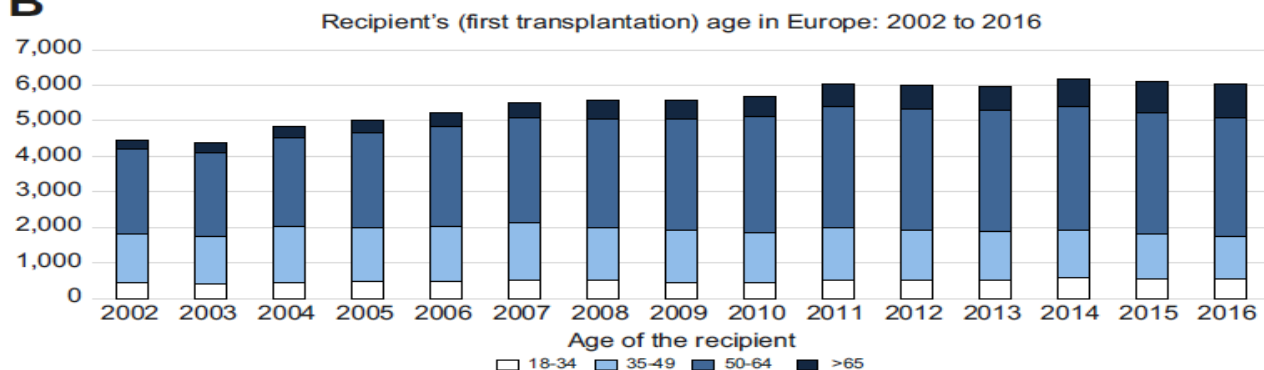


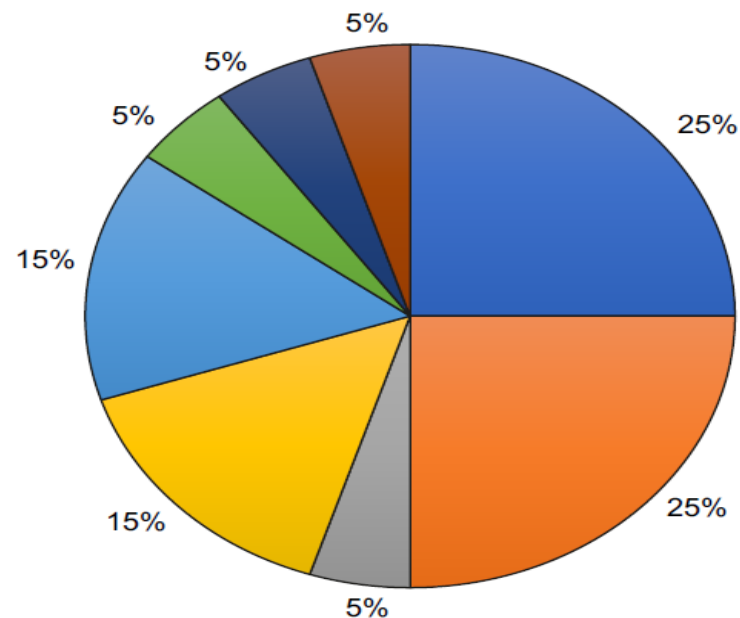
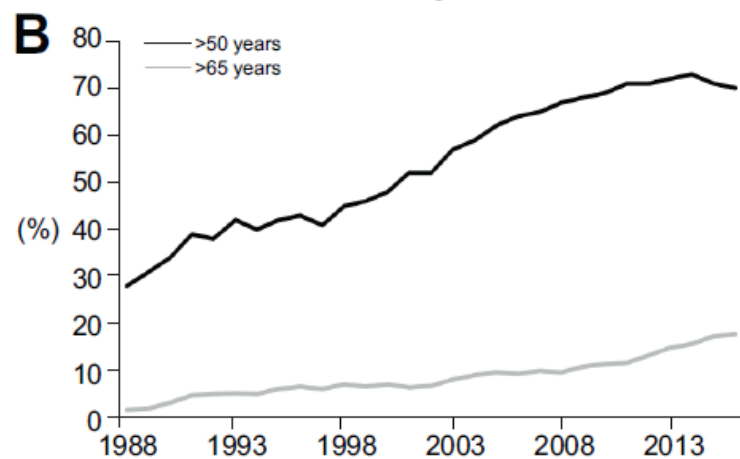
JOURNAL
OF HEPATOLOGY

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- | | |
|-----------------------------|---------------------------|
| ■ Cardiovascular events | ■ Recurrent liver disease |
| ■ <i>De novo</i> malignancy | ■ Rejection (all) |
| ■ Recurrent malignancy | ■ Metabolic bone disease |
| ■ Advanced CKD | ■ Miscellaneous |

Table 1. Post-transplant survival according to different recipients age categories.

Author	Year	Region	Age cut-off values (yr)	Patients	Follow-up (yr)	Post-transplant survival
Rudich S & Busuttil R. ¹³⁸	1999	US	≥70	30	6	57%
			<70	30		73%
Collins BH, <i>et al.</i> ⁵	2000	US	≥60	91	5	52%
			<60	387		75%*
Garcia CE, <i>et al.</i> ²⁶	2001	Europe	≥60	174	5	69%
			<60	707		76%
Cross TJ, <i>et al.</i> ²³	2007	Europe	≥65	77	1	82%
			60–64	137		86%
			18–59	202		83%
			≥65	72		52%
Bilbao I, <i>et al.</i> ³	2008	Europe	<65	313	5	75%*
			≥70	627		58%
Aloia TA, <i>et al.</i> ²⁸	2010	US	<70	7,325	5	68%*
			≥70	480		55%
Schwartz JJ, <i>et al.</i> ²⁴	2012	US	<70	22,296	5	73%*
			≥60	223		89%
Sonny A, <i>et al.</i> ²⁹	2015	US	<60	515	5	90%
			≥70	581		62%
Su F, <i>et al.</i> ¹⁰	2016	US	65–69	1,738	5	68%
			60–64	2,663		72%
			50–59	6,801		73%*

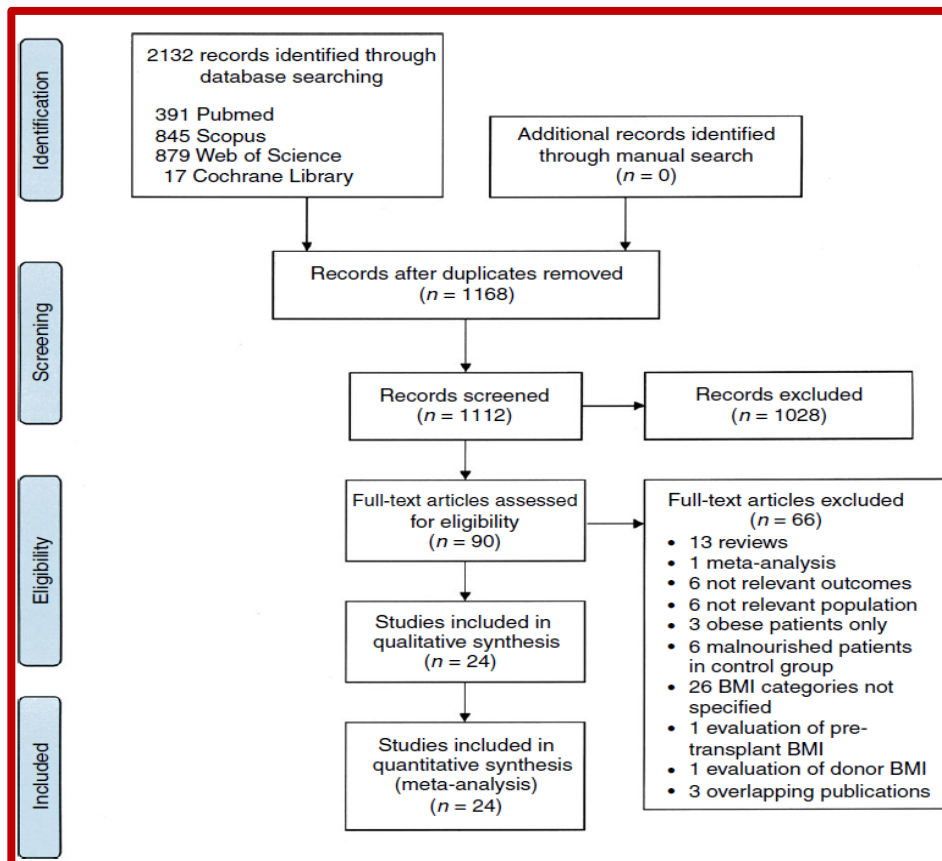
* $p < 0.05$ between groups.

Advanced/advancing age	Over age 65 years	- Increased odds of wait-list mortality for candidates ≥65 years (compared to <65 years): OR 1.35 (95%CI, 1.29–1.41)¹ - Decreased odds of liver transplant for age ≥65 years (compared to <65 years): OR 0.91 (95%CI, 0.88–0.95)¹ - Increased adjusted hazard of graft loss for recipients age 65–69 years (compared to 50–54 years): HR 1.43 (95% 1.32–1.54) and for recipients age ≥70 years: HR 1.72 (95% 1.53–1.93)²
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Obesite



Systematic review with meta-analysis: post-operative complications and mortality risk in liver transplant candidates with obesity

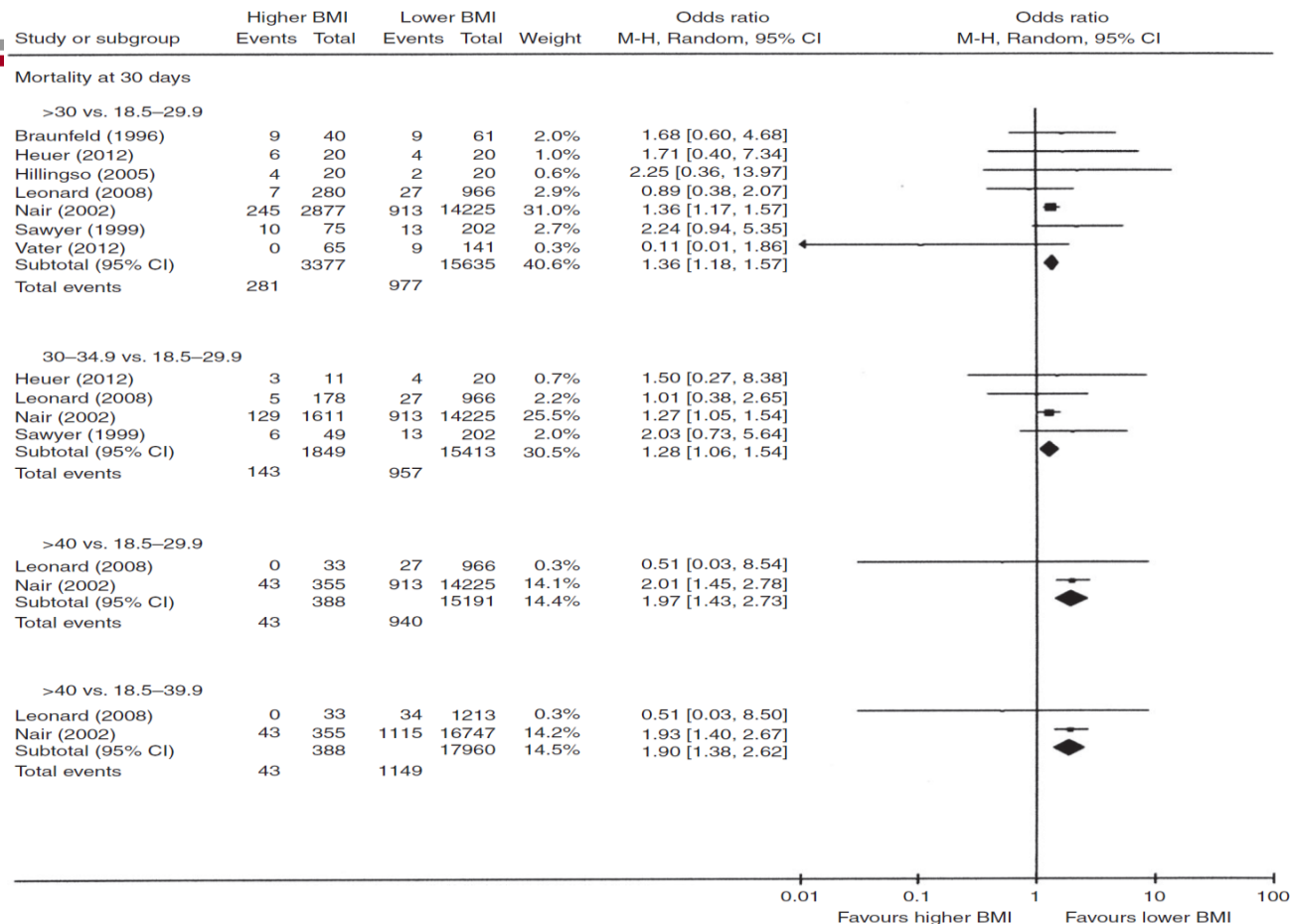




BMI	k	N	OR [95% CI]	Q	I ²	χ ² (P value)	Egger (P value)
30-day mortality							
≥30 vs 18.5-29.9	7	19012	1.36*** [1.18, 1.57]	5.82	11	.46	.83
30-34.9 vs 18.5-29.9	4	17262	1.28** [1.06, 1.54]	1.06	0	.77	.48
35-39.9 vs 18.5-29.9	2	16171	1.26 [0.99, 1.61]	0.07	0	.99	<.001
≥40 vs 18.5-29.9	2	15579	1.97*** [1.43, 2.73]	0.90	0	.91	<.001
≥40 vs 18.5-39.9	2	18348	1.90*** [1.38, 2.62]	0.85	0	.35	<.001
1-year mortality							
≥30 vs 18.5-29.9	21	62142	1.10 [0.95, 1.27]	30.48	48.7	1	.30
30-34.9 vs 18.5-29.9	12	53359	0.98 [0.82, 1.17]	13.70	50	.05	.82
35-39.9 vs 18.5-29.9	9	45857	1.17 [0.94, 1.46]	5.12	49.7	1	.25
≥40 vs 18.5-29.9	7	42320	1.38* [1.00, 1.92]	9.83	59.4	.06	.40
≥40 vs 18.5-39.9	8	128035	1.34** [1.10, 1.62]	6.34	53.9	.07	.63
2-year mortality							
≥30 vs 18.5-29.9	12	21241	1.19 [0.96, 1.47]	20	48.2	.06	.25
30-34.9 vs 18.5-29.9	6	18588	1.02 [0.92, 1.14]	3.50	0	.64	.78
35-39.9 vs 18.5-29.9	5	17268	1.19 [0.97, 1.46]	4.45	37.4	1	.03
≥40 vs 18.5-29.9	5	16573	1.48*** [1.20, 1.82]	5.28	0	1	.79
≥40 vs 18.5-39.9	6	89601	1.46*** [1.32, 1.61]	2.82	0	.77	.52
3-year mortality							
≥30 vs 18.5-29.9	10	41787	1.60* [1.07, 2.40]	10.48	89.6	<.001	.03
30-34.9 vs 18.5-29.9	7	35967	1.07 [0.86, 1.32]	5.39	52.3	.11	.25
35-39.9 vs 18.5-29.9	5	29344	1.31 [0.55, 3.12]	3.79	93	1	<.001
≥40 vs 18.5-29.9	4	26563	1.47 [0.81, 2.64]	4.49	76.3	.04	<.001
≥40 vs 18.5-39.9	5	109430	1.26 [0.92, 1.72]	2.06	84.6	1	.72
5-year mortality							
≥30 vs 18.5-29.9	10	60301	1.16* [1.01, 1.33]	10	76.1	<.001	.12
30-34.9 vs 18.5-29.9	9	52947	1.02 [0.91, 1.15]	9.06	52.5	1	.61
35-39.9 vs 18.5-29.9	7	45515	1.17 [0.96, 1.42]	4.20	67.3	.02	.37
≥40 vs 18.5-29.9	6	42144	1.48* [1.03, 2.14]	16.18	82.8	<.001	.14
≥40 vs 18.5-39.9	7	127778	1.34** [1.08, 1.67]	11.30	78.7	.001	.21
Post-operative complications							
≥30 vs 18.5-29.9	13	4545	1.60** [1.21, 2.11]	17.35	37.7	1	.01
30-34.9 vs 18.5-29.9	7	3001	1.56* [1.10, 2.21]	6.99	31.3	.29	.26
35-39.9 vs 18.5-29.9	4	1250	2.82 [0.89, 8.96]	6.66	70.4	.08	.23
≥40 vs 18.5-29.9	3	994	3.03 [0.32, 29.03]	6.92	84.9	.04	.02
≥40 vs 18.5-39.9	3	1636	2.72 [0.73, 10.23]	5.48	79.4	.09	.02
Cardiopulmonary complications							
≥30 vs 18.5-29.9	5	808	2.62** [1.35, 5.09]	5.67	47.4	1	.69
Hospital length of stay							
≥30 vs 18.5-29.9	6	1220	1.83 [-0.21, 3.86]	200	98	<.001	.46
ICU length of stay							
≥30 vs 18.5-29.9	4	703	2.16 [-1.44, 5.77]	64.4	95	<.001	.68

* P<.05, ** P<.01, *** P<.001

Postoperatif Mortalite



Our analysis suggests that class III obesity poses a significantly increased mortality risk after liver transplantation and that, together with those in the other two classes of obesity, these patients are exposed to a higher risk of post-operative complications.

International Liver Transplantation Consensus Statement on End-stage Liver Disease Due to Nonalcoholic Steatohepatitis and Liver Transplantation



6—IS THERE ANY CIRCUMSTANCE WHERE OBESITY SHOULD CONTRAINDICATE LIVER TRANSPLANTATION?

Recommendations

Class I-III obesity alone does not constitute a contraindication for liver transplantation. However, in the presence of medical comorbidities, particularly concurrent diabetes, rigorous patient selection is strongly recommended. (Quality of evidence: Moderate; Strength of recommendation: Strong).

- * AASLD ve American Society of Transplantation, morbid obese ($[BMI] \geq 40 \text{ kg/m}^2$) nispi kontrendike
- * European guidelines, $BMI > 35$ adaylar multidisipliner değerlendirilmeli

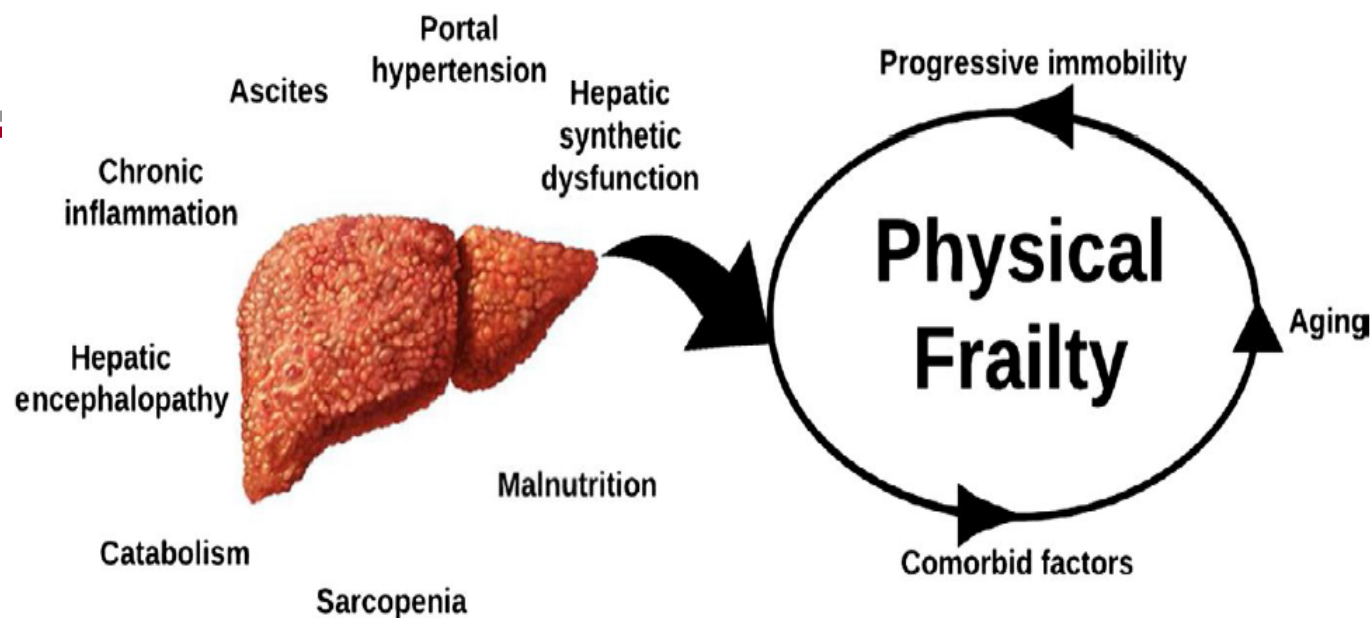


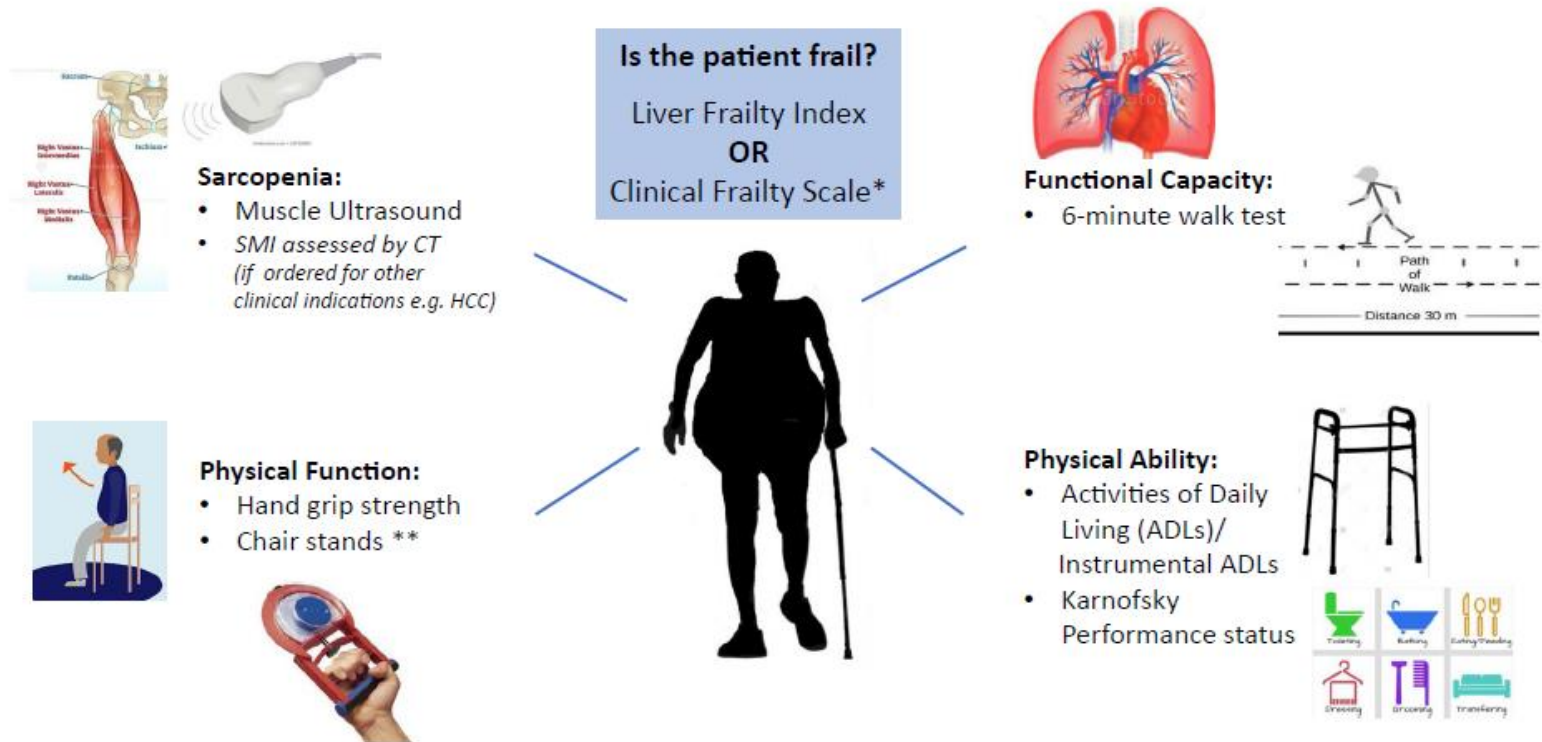
TABLE 2 Properties of the tools evaluating "frailty" that have been evaluated in patients with cirrhosis^a

		Subjective ←-----→						Objective				
		CFS	KPS	ADL/IADL	Braden scale	FFP	SPPB	LFI	Grip strength	Gait speed	6MWT	CPET
Subjectivity	Requires clinician judgment	✓	✓	×	✓	×	×	×	×	×	×	×
	Can be biased by patient reporting	✓	✓	✓	✓	✓	×	×	×	×	×	×
Predictive validity	For pretransplant outcomes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	For posttransplant outcomes	–	✓	–	–	–	–	–	–	–	–	✓
Test characteristics	Reliability (internal consistency and repeatability)	✓	–	–	–	–	–	–	✓	✓	–	–
	Responsiveness to change over time	×	×	×	×	×	✓	✓	✓	✓	–	–
Clinical feasibility	Estimated time taken (minutes)	<1	<1	<2	<5	<10	<5	<5	<1	<2	<10	<60
	Need for specialized equipment	×	×	×	×	×	×	✓	✓	×	×	✓✓
	Need for highly trained personnel	×	×	×	×	×	×	×	×	×	×	✓✓

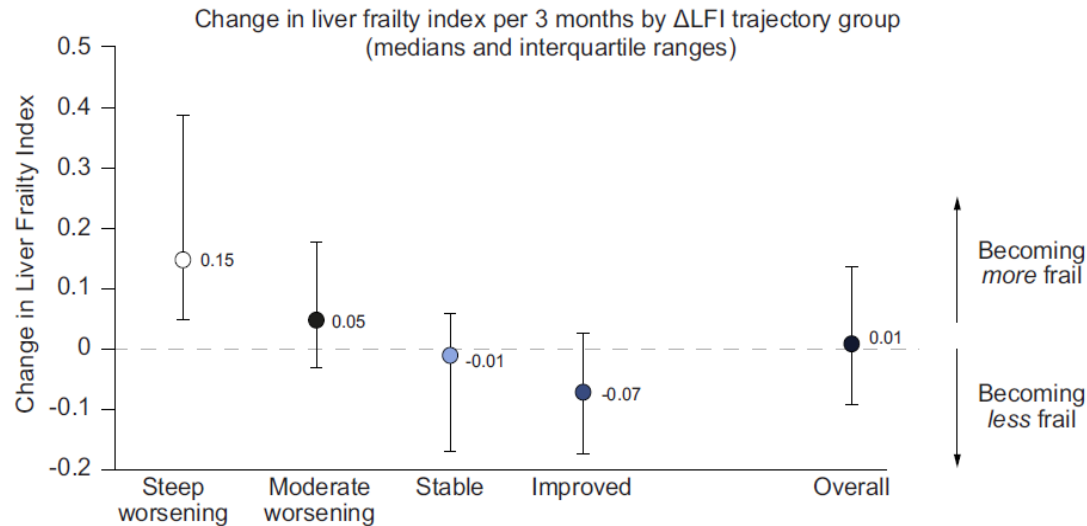
Abbreviations: 6MWT, 6-minute walk test; ADL, Activities of Daily Living; CFS, Clinical Frailty Scale; CPET, cardiopulmonary exercise testing; IADL, Instrumental Activities of Daily Living; FFP, Fried Frailty Phenotype; KPS, Karnofsky Performance Status; LFI, Liver Frailty Index; SPPB, Short Physical Performance Battery.

Note: Double check mark indicates that these tests really need specialized technicians and equipment more so than the other tests that have only one check mark.

^aNo data available; ✓ yes; × no.



Changes in frailty are associated with waitlist mortality ‡ in patients with cirrhosis



n=1,093

NASH, DM ve dializ olan hastalarda
LFI ↑

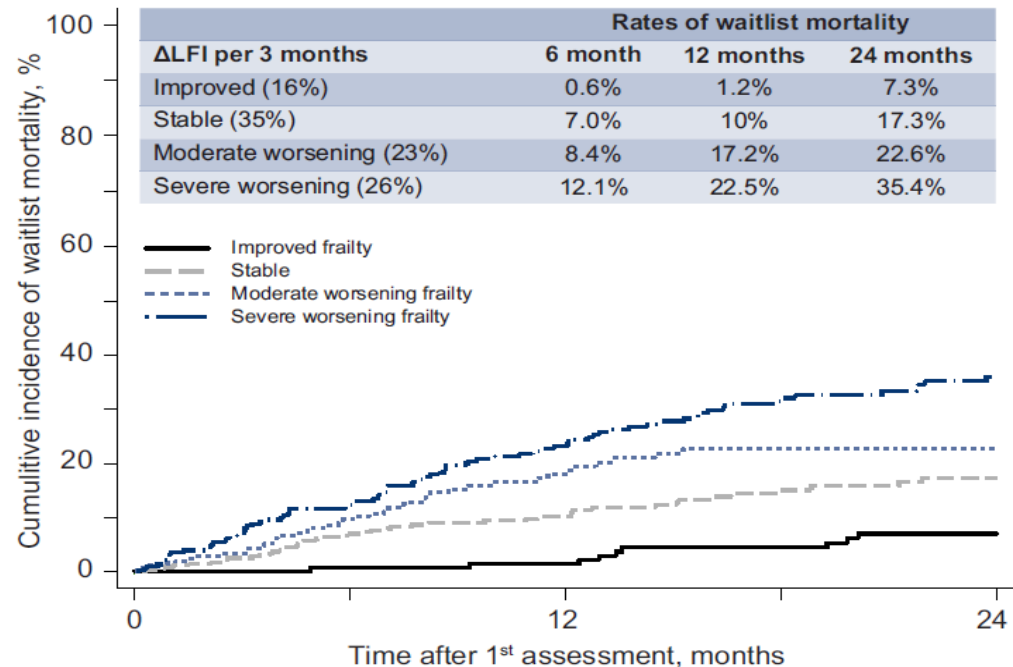


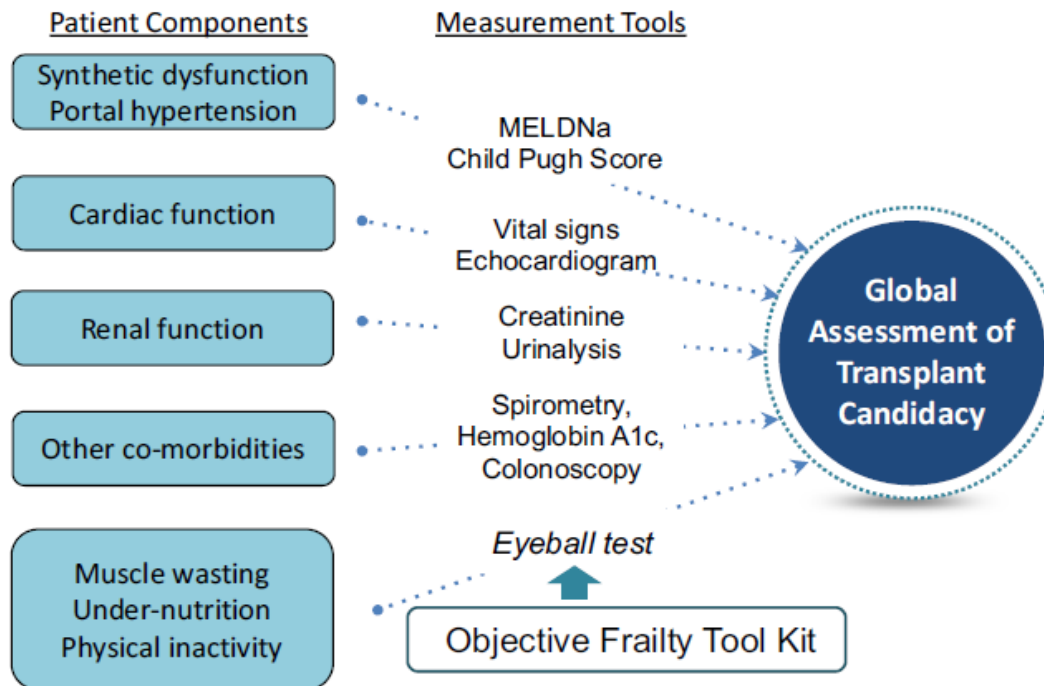
Table 2. Univariable and stepwise additive multivariable models to assess associations between co-variables and waitlist mortality using competing risks models.

	Subhazard ratios (95% CI); <i>p</i> value		
	Univariable analysis	Stepwise multivariable analyses*	
ΔLFI, per 0.1 unit worsening every 3 months	3.91 (2.80–5.46); <0.001	1.85 (1.22–2.82); 0.004	2.04 (1.35–3.09); 0.001
Baseline LFI, per each 0.1 unit worsening	1.07 (1.06–1.09); <0.001	1.08 (1.06–1.11); <0.001	1.07 (1.05–1.10); <0.001
MELD-Na, per each 5 unit increase	1.26 (1.12–1.42); <0.001		1.11 (0.98–1.27); 0.11

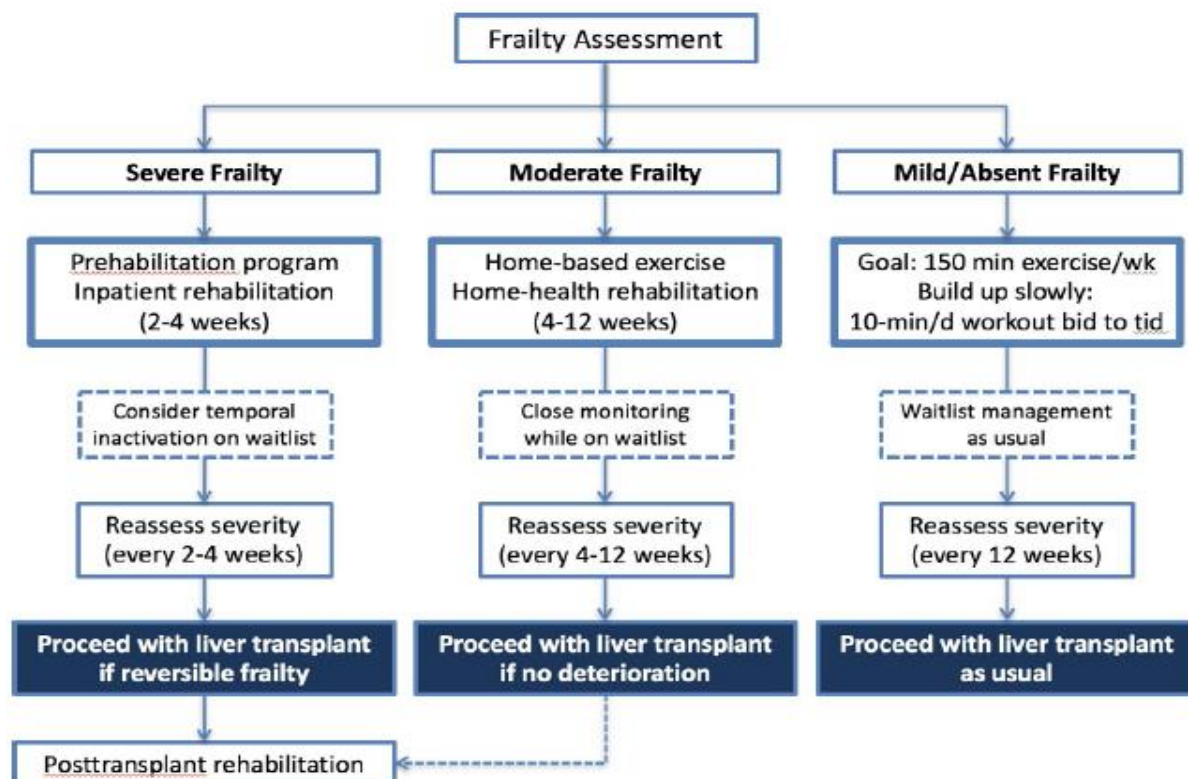
*Adjusted for the variables that were associated with a *p* <0.05: age, albumin, and height. Other variables that were evaluated for inclusion in the final models but were not associated with waitlist mortality with a *p* <0.05 were hypertension, diabetes, ascites, and hepatic encephalopathy. Deceased donor liver transplantation was the competing risk. ΔLFI, change in LFI; LFI, liver frailty index.

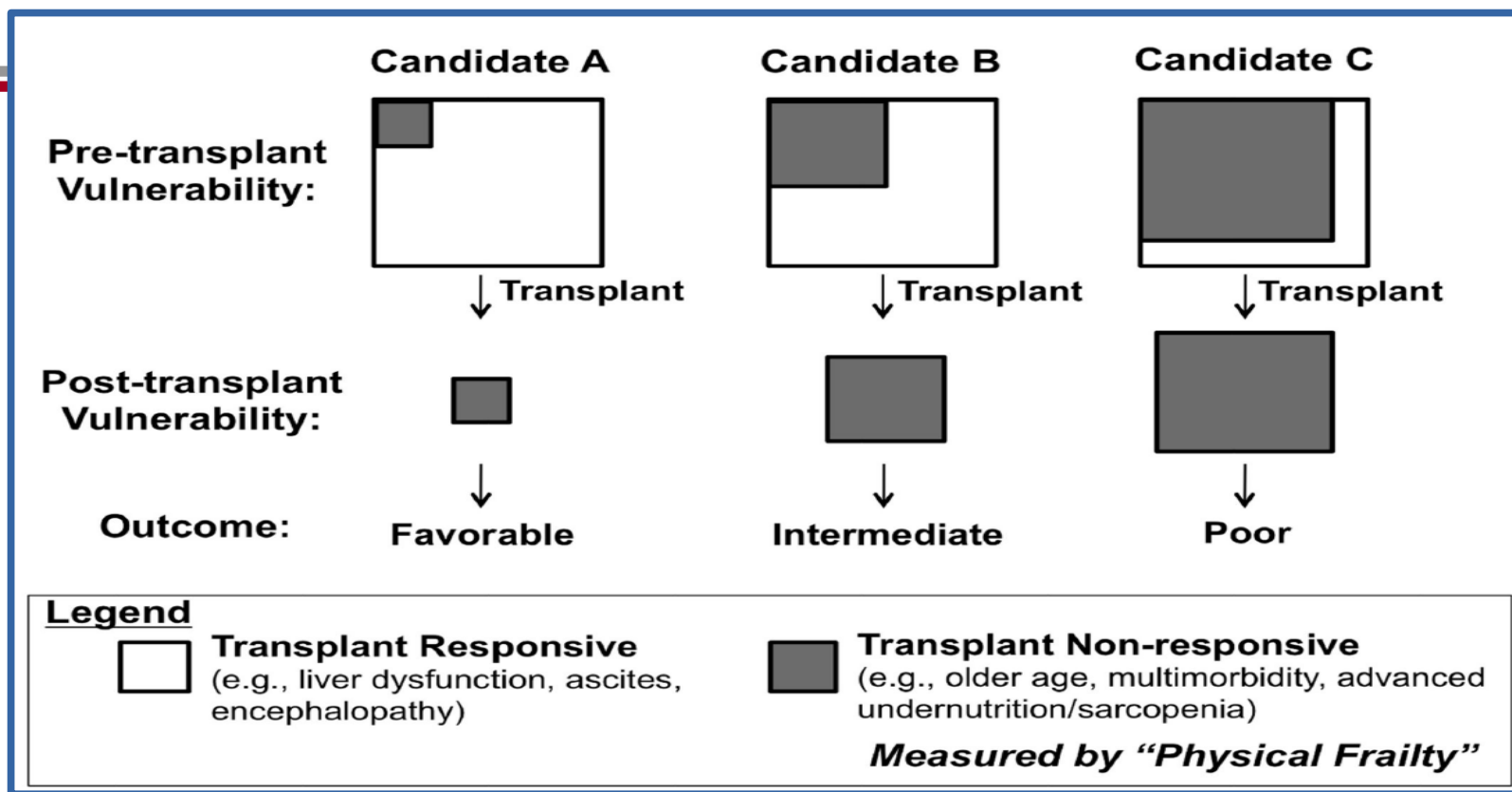
Bekleme listesinde *frailty* progrese olan hastaların %20'si kaybediliyor veya ciddi hastalık nedeniyle liste dışı kalıyor

Frailty in liver transplantation: An expert opinion statement from the American Society of Transplantation Liver and Intestinal Community of Practice



	Stages of frailty		
	Severe	Moderate	Mild/Absent
ADL ^{14,31}	Difficulty with ≥ 2 ADLs	Difficulty with 1 ADL	No difficulty with ADLs
Clinical Frailty Scale ¹⁶	≥ 7	6	1-5
Fried Frailty Phenotype ⁶	≥ 3	1-2	0
Karnofsky Performance Status Scale ^{11,15}	0-40	50-70	≥ 80
Liver Frailty Index ⁷	≥ 4.5	3.2-4.4	< 3.2
6-minute walk test ⁹	< 250 m	< 350 -250 m	> 350 m





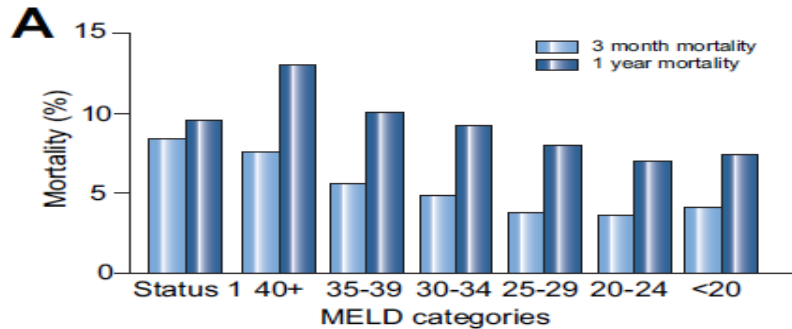
Nakil sonrası 3 aylık mortalite bekleme listesindeki mortaliteyi aşıyorsa nakil yapılması önerilmez.....



Table 3. Scores predicting waiting list mortality.

Score	Author, year	Prediction	c-statistic	Variables
CTP	Child, Turcotte, 1964 Pugh, 1973	Mortality rates 1–10 years, perioperative mortality	n/a	Bilirubin, albumin, quick, hepatic encephalopathy, ascites
MELD	Wiesner, 2001	Three-month mortality	0.78–0.87	Bilirubin, creatinine, INR
Delta MELD	Merion, 2003	Three-month mortality	0.85	Bilirubin, creatinine, INR change within 30 days
Re-weighted MELD	Sharma, 2008	Three-month mortality	0.70	Bilirubin, creatinine, INR
MELDNa	Kim, 2008	Three-month mortality	0.87	Bilirubin, creatinine, INR, sodium (bound between 125–140 mmol/L)
UKELD	Barber, 2008	One-year mortality	0.76	MELD, bilirubin, creatinine, INR, sodium
MELDNa + frailty index	Lai, 2017	Three-month mortality	0.82	MELDNa, frailty index

CTP, Child-Turcotte-Pugh; MELD, model of end-stage liver disease; INR, International normalized ratio; model of end-stage liver disease; UKELD, United Kingdom model for end-stage liver disease.



MELD skor >40

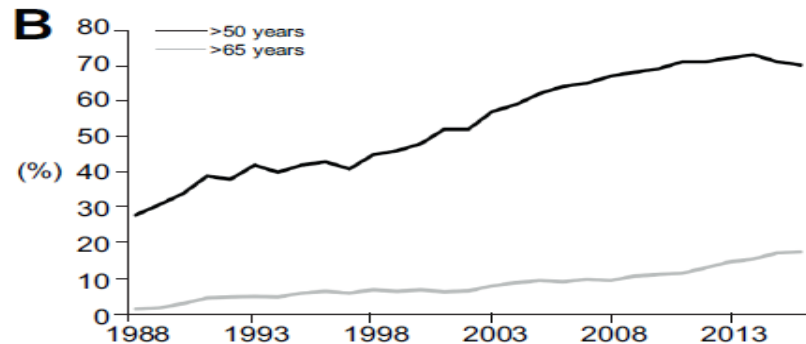


Table 2. Specific definitions of post-transplant futile outcome in LT.

Author, yr	Patient population	Definition of futility
Rana, 2008/2013	Adult recipients	Post-transplant mortality >waiting list mortality
Lao, 2010	Paediatric re-transplant recipients	One-year mortality
Petrowsky, 2014	Adult recipients with MELD ≥ 40	90-day or in-hospital mortality
Panchal, 2015	Adult recipients with MELD ≥ 40	90-day mortality
Asrani, 2015	Adult recipients	>50% mortality at five years

MELD, model of end-stage liver disease.



- Nakil sonrası mortalite bekleme listesindeki mortaliteden yüksekse
- > 40 MELD, 90 günlük mortalite veya erken dönemde hastane içinde mortalite yüksekse
- 5 yıllık mortalite > %50

Potentially inappropriate liver transplantation in the era of the “sickest first” policy – A search for the upper limits

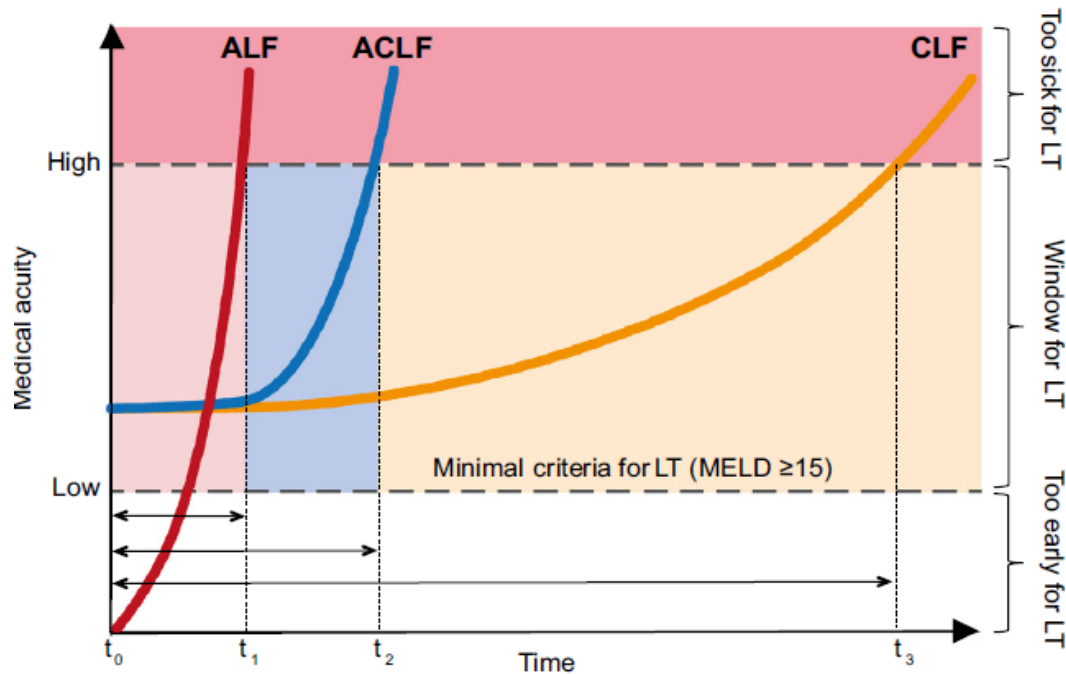
Tx için çok hasta veya çok iyi



Table 1. General definitions of futility.

Futility category	Definition	Possible scenarios in medicine	Possible scenarios in LT
Physiological futility	Treatment which fails to trigger an improved physiological response	Cardiac arrest or brain death on ventilator	LT in patients too sick to survive the operation LT performed too early in patients PNF after LT
Imminent-demise futility	Death can be anticipated in the very near future despite the intervention	“Bridges to nowhere” (e.g. ECMO) Chronic dependency on ICU care Dying before discharge after CPR	Failure of life support treatment in pre-transplant patients requiring delisting and withdraw of care LT in a recipient who will not be able to leave ICU or hospital alive
Lethal-condition futility	Death can be anticipated in the not too distant future (months, years) due to terminal illness despite the intervention	End-stage metastatic cancer	LT in patients with HCC/CCC above accepted criteria who have a post-transplant tumor recurrence
Qualitative futility	No acceptable quality of life can be achieved with the intervention	Terminal dementia Persistent coma	Severe failure to thrive after LT LT in patients with acute liver failure and irreversible brain injury resulting in post-transplant persistent vegetative state

LT, liver transplantation; PNF, primary nonfunction; ECMO, extracorporeal membrane oxygenation; ICU, intensive care unit; CPR, cardiopulmonary resuscitation; HCC, hepatocellular carcinoma; CCC, cholangiocarcinoma.



**Karaciğer nakli
bu hastaya fayda
sağlar mı?**

Fig. 5. Principle courses of three types of liver failure (ALF, ACLF, and CLF) plotted as function of medical acuity over time. Patients with MELD scores <15 are widely accepted not to qualify for LT, as the operative risk exceeds their predicted mortality on the waiting list. Conversely, patients with a high medical acuity might already be too sick to benefit from LT. The major course-determining factor in this setting is time. The rapid onset of sequential organ failure as it occurs in ALF and ACLF leads to a short window of opportunity for LT (t_0 - t_1 and t_0 - t_2). ACLF, acute-on-chronic liver failure; ALF, acute liver failure; CLF, chronic liver failure; LT, liver transplantation; MELD, model for end-stage liver disease.

KO-MORBİD HASTALIKLAR

Kronik Karaciğer Hastalığında Çoklu Sistem Etkilenir

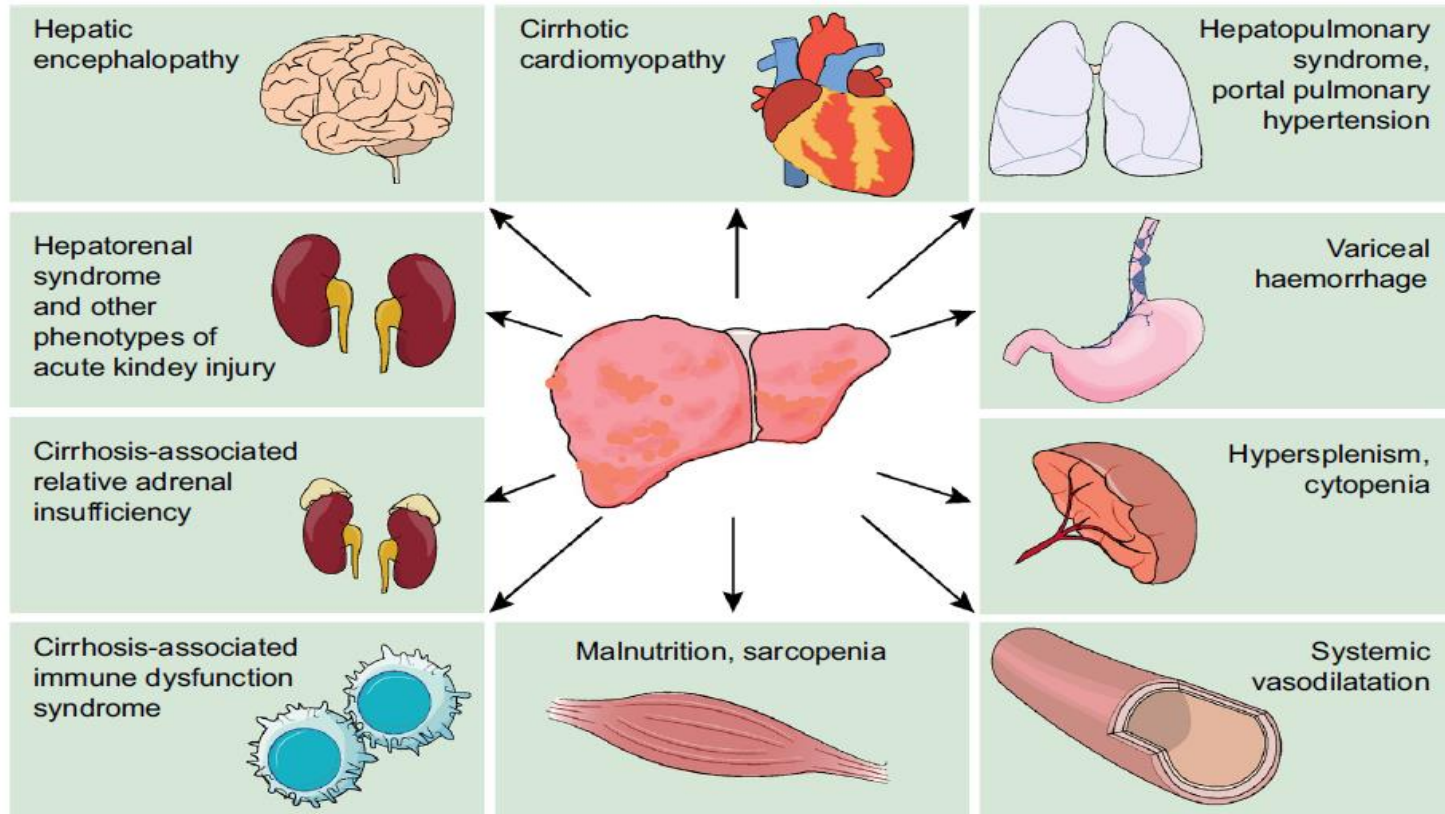


Fig. 3. Liver cirrhosis needs to be considered a systemic disease leading to dysregulation of various organ systems. The presence of one or more organ failure markedly increases the risk of mortality without LT.

Table 5. Proposed absolute and relative pre-transplant conditions when potentially inappropriate LT has to be considered.

Absolute	Relative
Multiorgan failure with 4 or more organ systems failing (liver, kidney, lungs, circulation, brain)	Increased ventilation support ($\text{FiO}_2 \geq 0.5$)
Brain oedema plus herniation or absence of cerebral circulation	Intestinal ischaemia
Circulatory failure requiring 2 vasopressors both with limited responsiveness to further dose escalation	Severe frailty secondary to muscle wasting and malnutrition
Pulmonary hypertension with: - mPAP >50 mmHg, - mPAP 35–50 mmHg with elevated PVR - >250 dyn/s/cm⁵, or - high PVR >400 dyn/s/cm⁵	Aggregated severe chronic comorbidities
Severe respiratory failure requiring maximal ventilation support ($\text{FiO}_2 \geq 0.8$, high PEEP) or on ECMO	
Ongoing infections with following features: septic bacteraemia/fungaemia, septic shock, active spontaneous bacterial/fungal peritonitis, tissue invasive fungal infection	
Ongoing severe/necrotising pancreatitis	
Aggregation of several relative conditions	

mPAP, mean pulmonary artery pressure; PVR, pulmonary vascular resistance; LT, liver transplantation; ECMO, extracorporeal membrane oxygenation; FiO_2 , fraction of inspired oxygen; PEEP, positive end expiratory pressure.

- **Increased hazard of post-transplant mortality associated with:**
 - BMI >35 kg/m² HR 1.2 (95% CI 1.0–1.4)⁷
 - Cardiovascular disease: HR 1.6 (95% CI 1.2–2.2)⁸
 - Coronary artery disease: HR 2.3 (95% CI 1.3–4.3)⁹
 - Diabetes: HR 1.4 (95% CI 1.0–1.9)⁹
 - COPD: HR 1.7 (95% CI 1.1–6.5)⁹
 - Chronic renal insufficiency: HR 1.6 (95% CI 1.2–2.3)⁹

Transplantasyon sonrası 3 aylık mortaliteyi öngörme

Table 4. Scores predicting post-transplant outcome.

Score	Author, yr	Prediction	c-statistic	Recipient variables	Donor variables
DRI	Feng, 2006	Graft loss (time to graft failure)	n/a	None	Age, cause of death, ethnic origin, DCD, partial/split, height, allocation*, CIT
SOFT	Rana, 2008	Three-month mortality	0.70	Age, gender, height, BMI, diagnosis, number of previous LT, ICU or in-hospital pre-LT, diabetes, ALT, albumin, diabetes, dialysis, UNOS status 1, MELD, life support, encephalopathy, portal vein thrombosis, incidental tumor found at LT, ABO incompatible, ventilator dependent, portal bleeding 48 h pre-LT, variceal bleeding within 2 weeks of registration, ascites pre-LT, SBP pre-LT, PE within 6 months of registration	Age, height, weight, cause of death, creatinine, cocaine use, allocation*, CIT, WIT
D-MELD	Halldorson, 2009	Four-year mortality	n/a	MELD	Donor age
Net-benefit model	Schaubel, 2009	Five-year mean lifetime	n/a	Creatinine, albumin, sodium, age, diagnosis, diabetes, dialysis, hospitalisation status, previous LT, mechanical support, portal vein thrombosis, previous abdominal surgery, hepatitis C	Age, cause of death, DCD, CIT, allocation*
BAR	Dutkowski, 2011	Three-month mortality	0.70	MELD, Re-LT, life support, recipient age, CIT	Donor age, CIT
ET-DRI	Braat, 2012	Three-month to one year mortality	0.62	None	Age, cause of death, GGT (U/L), DCD, partial/split, allocation*, rescue LT, CIT
UCLA score	Petrowsky, 2014	Three-month and/or in-hospital mortality	0.75	MELD score, septic shock, cardiac risk, comorbidities (CCI ≥6)	None
Pedi-SOFT	Rana, 2015	Three-month mortality	0.74	Previous LT, life support, renal insufficiency, weight <6 kg	Cadaveric technical variant allograft
ACLF score	Levesque, 2017	Three-month mortality	0.71	Gender, ESLD or HCC, ongoing infection, age, ACLF	Gender



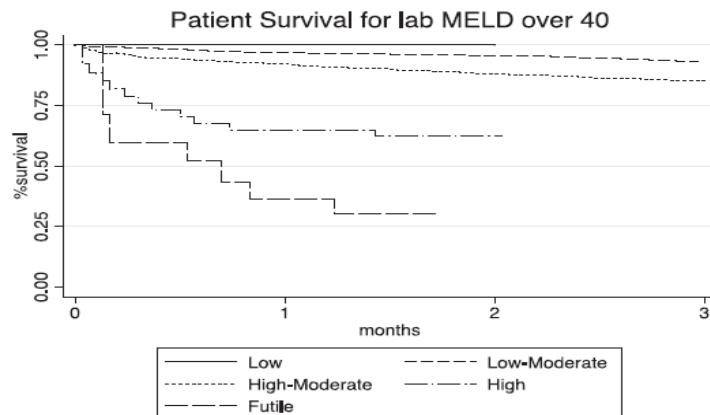
The survival outcomes following liver transplantation (SOFT) score: validation with contemporaneous data and stratification of high-risk cohorts



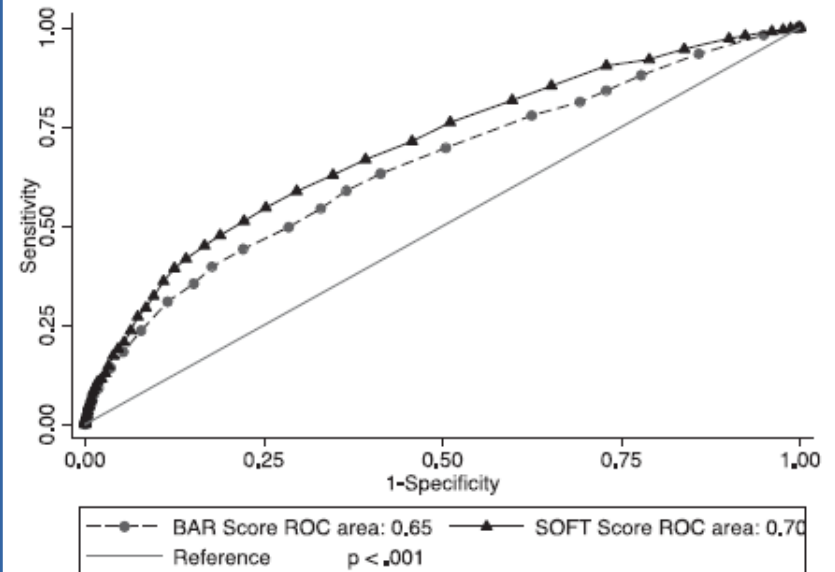
Risk Factor	Points Allotted
Score to predict survival following liver transplantation	
Age > 60	4
BMI > 35	2
One Previous Transplant	9
Two Previous Transplant	14
Previous Abdominal Surgery	2
Albumin < 2.0 g/dL	2
Dialysis Prior to Transplantation	3
Intensive Care Unit Pre-transplant	6
Admitted to Hospital Pre-transplant	3
MELD score > 30	4
Life Support Pre-transplant	9
Encephalopathy	2
Portal Vein Thrombosis	5
Ascites Pre-Transplant	3
Portal Bleed 48 h Pre-Transplant	6
Donor age 10-20 yr	-2
Donor age > 60 yr	3
Donor Cause of Death from Cerebral Vascular Accident	2
Donor Creatinine > 1.5 mg/dL	2
National Allocation	2
Cold Ischemia Time 0-6 h	-3

Patient Survival according to the SOFT score, External Validation C Statistic 0.70 (CI .68-.71)

Risk Category	Survival 3 month
Low Risk (0-5 points)	97%
Low-Moderate Risk (6-15 points)	95%
High-Moderate Risk (16-35 points)	86%
High (36-40 points)	66%
Futile (> 40 points)	50%



Patient Survival according to the SOFT score C Statistic 0.67 (CI .63-.71)



Liver Transplantation in Highest Acuity Recipients

Identifying Factors to Avoid Futility

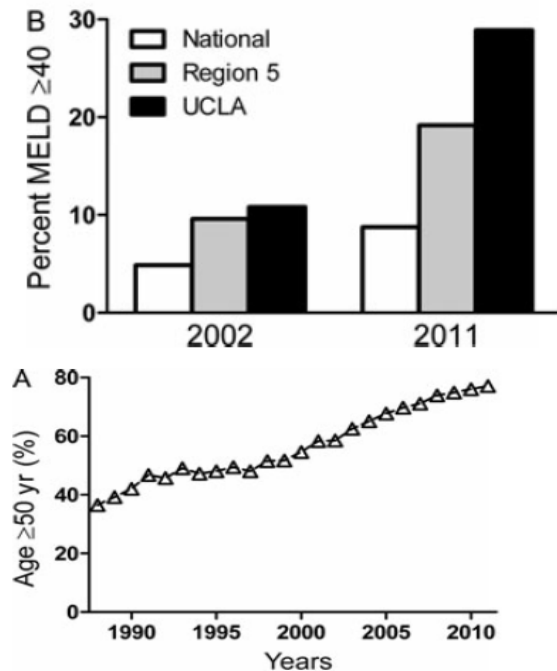


TABLE 4. Independent Risk Factors for Futility and Failure-Free Survival

Risk Factors for Futility*	OR	95% CI	P
MELD (per point)	1.14	0.98–1.32	0.091
Pre-OLT septic shock	2.38	0.96–5.56	0.059
Cardiac risk	3.14	1.25–7.92	0.015
Age-adjusted Charlson Comorbidity Index ≥6	3.95	1.18–13.2	0.026
Risk Factors for Failure-Free Survival†	HR	95%-CI	P
Recipient age (per year)	1.05	1.01–1.10	0.021
Complication grade 4‡	2.23	1.17–4.29	0.015
Hepatitis C	2.82	1.40–5.70	0.004
Metabolic syndrome	3.81	1.76–8.27	0.001

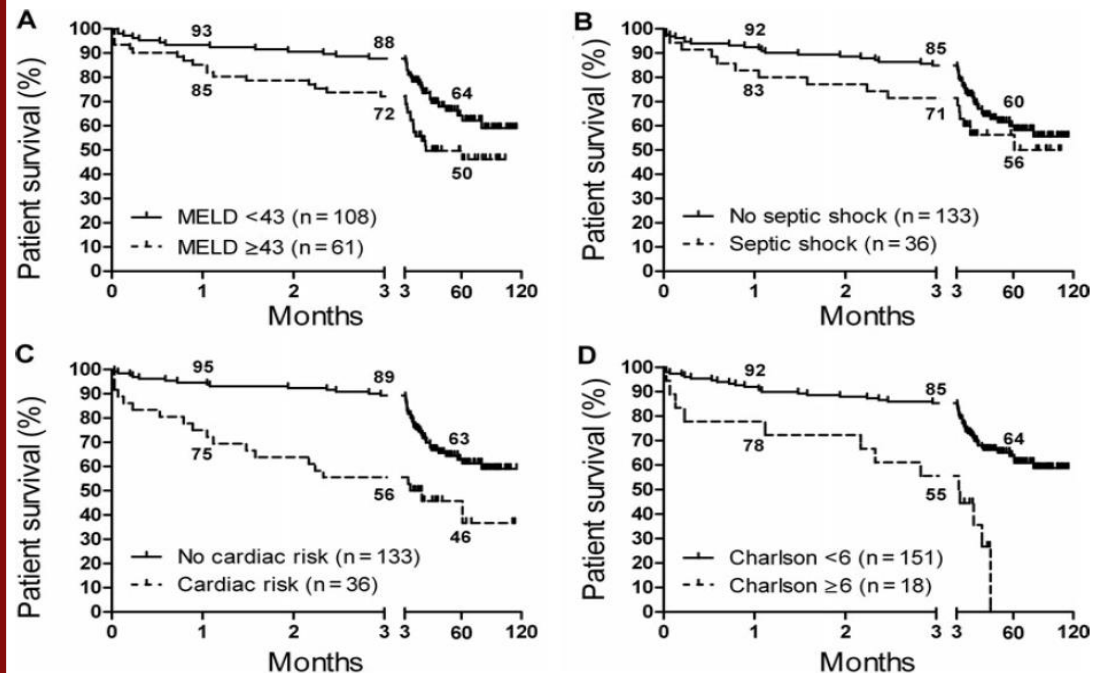
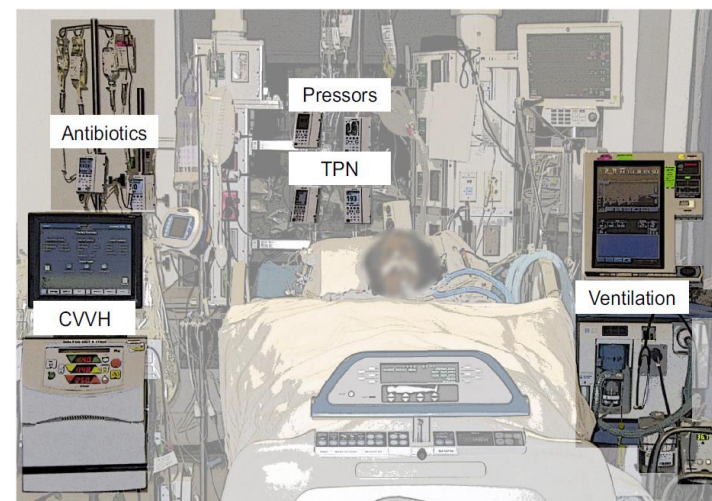
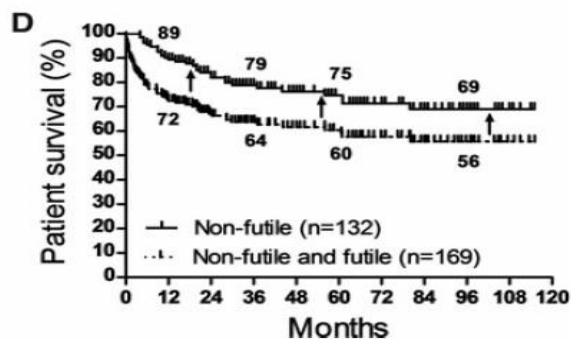
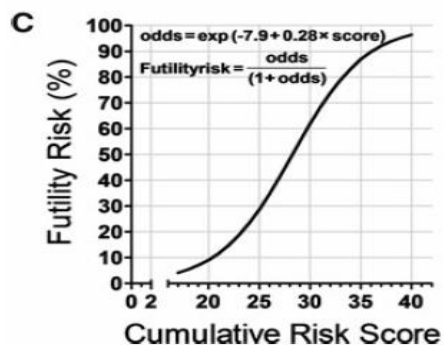
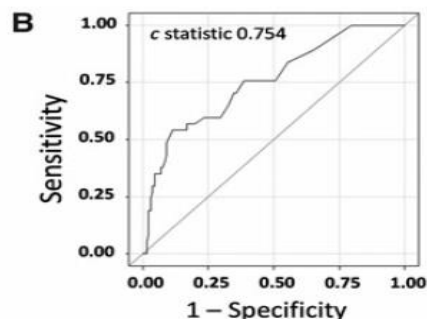
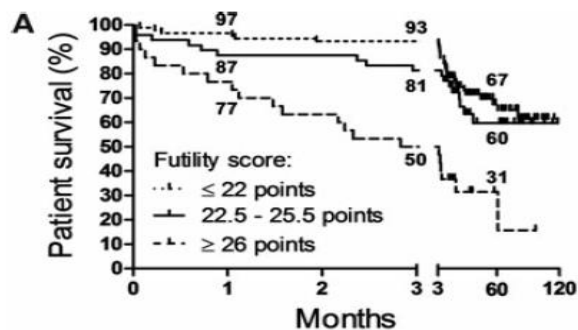


TABLE 5. Cumulative UCLA Futility Risk Score (UCLA-FRS)

Risk Factor	Log OR	Log OR (Ratio to Sepsis)	Points	Points (Ratio to Sepsis)
MELD (per point)	0.129	0.15	0.5	0.17
Pre-OLT septic shock	0.866	1.00	3	1.00
Cardiac risk	1.145	1.32	4	1.33
Age-adjusted Charlson Comorbidity Index ≥ 6	1.373	1.58	5	1.67

Cumulative UCLA Futility Risk Score = $0.5 \times (\text{MELD score}) + 5 \times (1 = \text{Charlson Comorbidity Index} \geq 6; 0 = \text{Charlson Comorbidity Index} < 6) + 4 \times (1 = \text{cardiac risk}; 0 = \text{no cardiac risk}) + 3 \times (1 = \text{septic shock}; 0 = \text{no septic shock})$.



Training and Validation of Deep Neural Networks for the Prediction of 90-Day Post-Liver Transplant Mortality Using UNOS Registry Data



Feature	Points Allotted	
Bar Score		
	Categories	
MELD Score	6-15	0
	16-25	5
	26-35	10
	>35	14
Re-transplantation case		4
Recipient on "Life Support"		3
Recipient age in years	≤40	0
	>40-60	1
	>60	3
Cold ischemia time in hours	0-6	0
	>6-12	1
	>12	2
Donor age in years	≤40	0
	>40	1
Soft Score		
Age >60		4
BMI>35		2
One previous transplant		9
Two previous transplants		14
Previous abdominal surgery		2
Albumin <2.0 g/dl		2
Dialysis prior to transplantation		3
Intensive care unit pre-transplant		6
Admitted to hospital pre-transplant		3
MELD score >30		4
"Life support" pre-transplant		9
Encephalopathy		2
Portal vein thrombosis		5
Ascites pre-transplant		3
Portal bleed 48h pre-transplant*		6
Donor age 10-20 years		-2
Donor age>60 years		3
Donor cause of death from CVA		2
Donor creatinine >1.5 mg/dl		2
National allocation		2
Cold ischemia time (0-6 hours)		-3

>15

>20

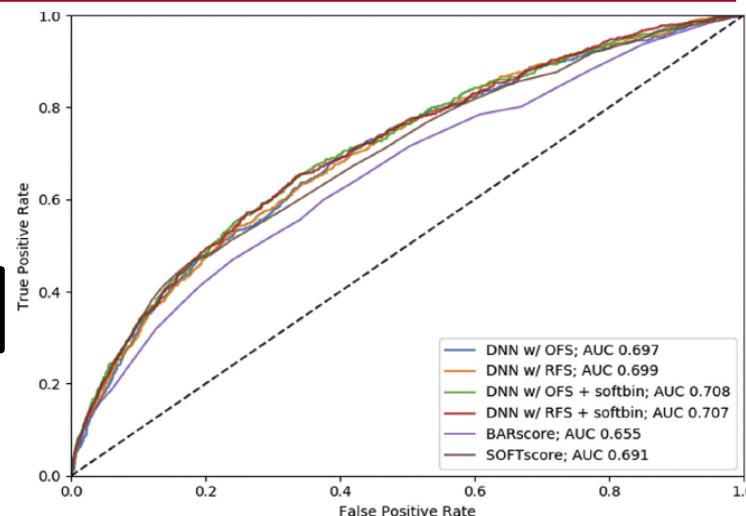


Table 3. Area Under the ROC Curve Results With 95% Confidence Intervals for the Test Set (n = 11,509) and on the Test Set With No Null BAR Scores (n = 11,207).

	AUC (95% CI)	
	n = 11,509	n = 11,207*
BAR score*	0.655 (0.633-0.678)	0.655 (0.633-0.678)
SOFT score	0.691 (0.671-0.714)	0.688 (0.667-0.711)
DNN w/Original 202	0.697 (0.678-0.72)	0.695 (0.675-0.717)
Features Set (OFS)		
DNN w/OFS + softbin	0.708 (0.689-0.73)	0.703 (0.682-0.726)
DNN w/Reduced 140	0.699 (0.681-0.722)	0.698 (0.679-0.72)
Features Set (RFS)		
DNN w/RFS + softbin	0.707 (0.688-0.729)	0.702 (0.68-0.725)

*For the entire test set results, BAR score was calculated on 11,207 test patients.

Table 3
Contraindications to liver transplantation

Absolute Contraindications to Transplant

Severe cardiopulmonary disease
Other outstanding comorbidity
Hepatic malignancy with vascular
invasion or beyond transplantable
criterion
Extrahepatic malignancy
Active infection

Active substance abuse
Poor psychosocial support
Poor compliance



Relative Contraindications to Transplant

Advanced age
Obesity
Psychiatric disease

HIV infection
Surgical challenges: prior extensive intra-
abdominal surgeries, extensive vascular
thrombosis

Malignite öyküsü olan ve karaciğer transplantasyon planlanan hastaya yaklaşım

Proposed malignancy-free delay periods before transplantation.

Time	European guidelines [82]	American guidelines [83]
No delay	Incidental RCC Basal-cell skin cancers	Incidental RCC Basal-cell skin cancers Bladder carcinoma <i>in situ</i>
Less than 2 years	<i>In situ</i> carcinomas Small single focal neoplasms Low-grade bladder cancer Excised SCC Prostate (1-2 years)	
2 years (also includes cancers otherwise not listed)	Lymphoma Thyroid Testicular Symptomatic renal	Invasive bladder Symptomatic renal Testicular Thyroid Prostate Lymphoma
More than 2 years	Malignant melanomas (>2 years) Breast cancer (>3 years) Colorectal cancer (>5 years) Invasive cervical cancer (4-5 years) Invasive bladder (>5 years)	Breast cancer (2-5 years) Malignant melanoma (2-5 years) Colorectal cancer (0-5 years, depends on stage)

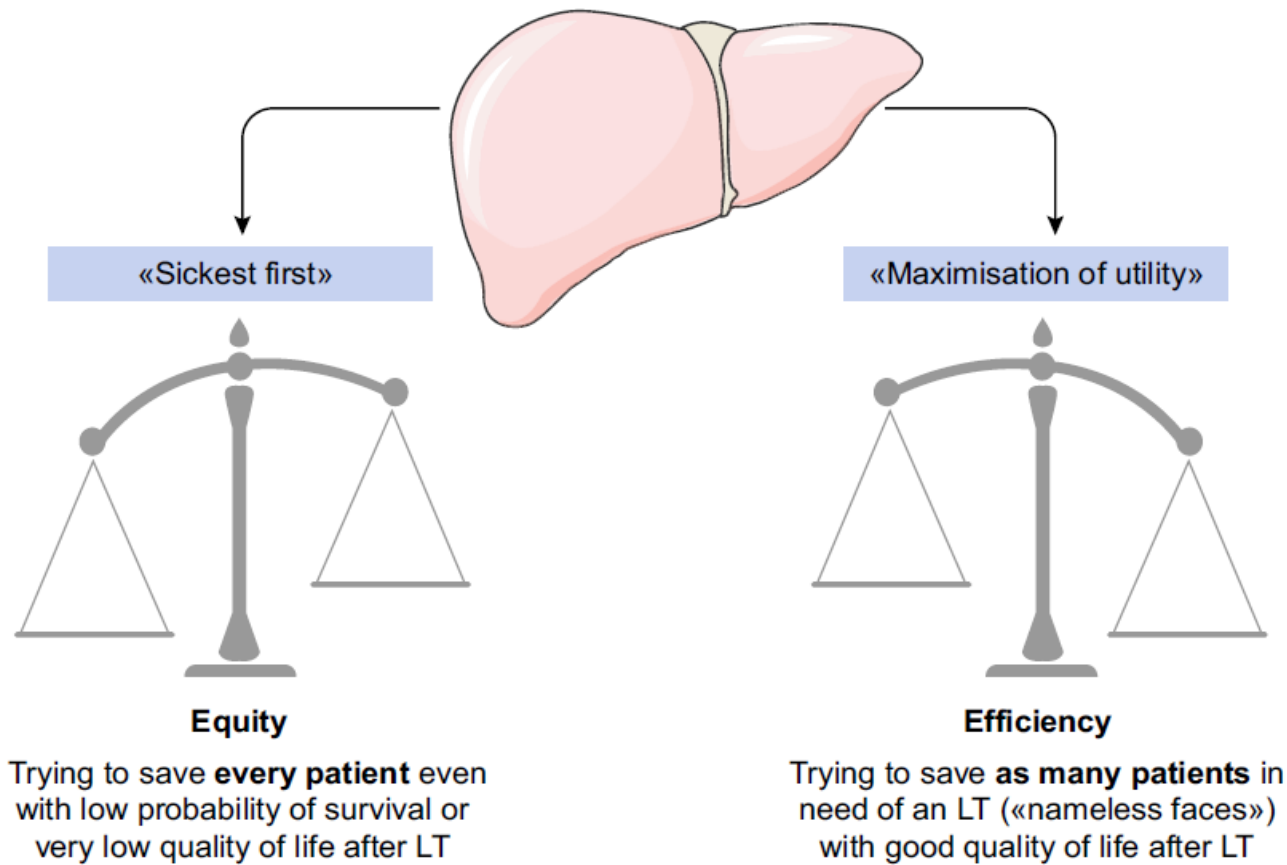
SCC=squamous cell carcinoma; RCC=renal cell carcinoma.

Malignite Öyküsü Olan Hastada Transplantasyon Zamanlaması

Table 2. Guidelines for the minimum time interval between diagnosis and treatment of a cancer and the transplantation

Type	Stage	Guideline					
		AST	CARI	B&D	CST	EBPG	MMOH
Renal cell carcinoma	Small or discovered incidentally	○	○	○			○
	Symptomatic	●	●	●			●
	Large or invasive	●	●	●			●
Bladder cancer	In situ or noninvasive papilloma	○	○	○	○	○	○
	Invasive	●	●	●	●	●	●
Breast cancer	Stage 0–2 (including early stage)	●	●	●	●	●	●
	Stage 3–4 (advanced/invasive)	●	●	●	●	●	●
Colorectal cancer	Duke A or B1	●			●	●	●
	Duke C		●			●	●
	Duke D		●			●	●
	Patients with a history of colorectal cancer	●			●		
Uterine cancer	Cancer of the uterine body	●	●			●	●
	Cervical cancer in situ	●	○	○	●	●	○
	Invasive cervical cancer		●	●		●	●
Prostate cancer	Localized	○					
	Invasive	●	●	●		●	●
Melanoma	In situ	●	●	●	●		●
	Invasive	●	●	●	●	●	●
Nonmelanoma skin cancers	Basal cell carcinoma					●	
	Squamous cell carcinoma						●
Leukemia		●			●		
Lung cancer		●			●		
Lymphoma		●	●	●	●		●
Multiple myeloma			●		●		
Testicular cancer		●	●				●
Thyroid cancer		●	●				●
Wilms tumor		●	●	●			●
Symbol	Recommendation						
○	0 years						
●	Minimum 2 years						
●	2–5 years						
●	Minimum 5 years						
●	Contraindicated						
	No recommendation (or insufficient evidence)						

??



SONUÇ

- Kimlere nakil yapmayalım sorusuna yanıt, kesin kontrendikasyon olanlar dışında kompleks, multidisipliner yaklaşım gerekli
- MELD>40, ciddi sarkopeni, *frailty* olan hastada nakil sonrası mortalite çok yüksek
- Kronolojik yaşdan çok fizyolojik yaş önemli, >65 yaş survi kısa, ko-morbidite (CV risk) ve malinite riski fazla
- BMI >40, post operatif komplikasyon sık, BMI>35 üzeri multidisipliner değerlendirmeli
- Kanser öyküsü olan hastalarda nakil kararı kanser evresi, bekleme süresi ve kanser cinsine göre değerlendirilmeli

Hangi hastada karaciğer nakli yapmamalıyız? ‡

- a. Morbid Obes (BMI>40)
- b. >75 yaş
- c. 2 yıl önce kolon kanseri tanısı almış
- d. Portopulmoner HT tanısı olan ve PAP >50 mmHg
- e. Hepsi