(Transplantasyonda Zor Olgular)

Obez Hastada Transplantasyon

Prof. Dr. Ayhan DİNÇKAN

İstinye Üniversitesi Hastanesi Liv Hospital Bahçeşehir

Organ Nakli Merkezi

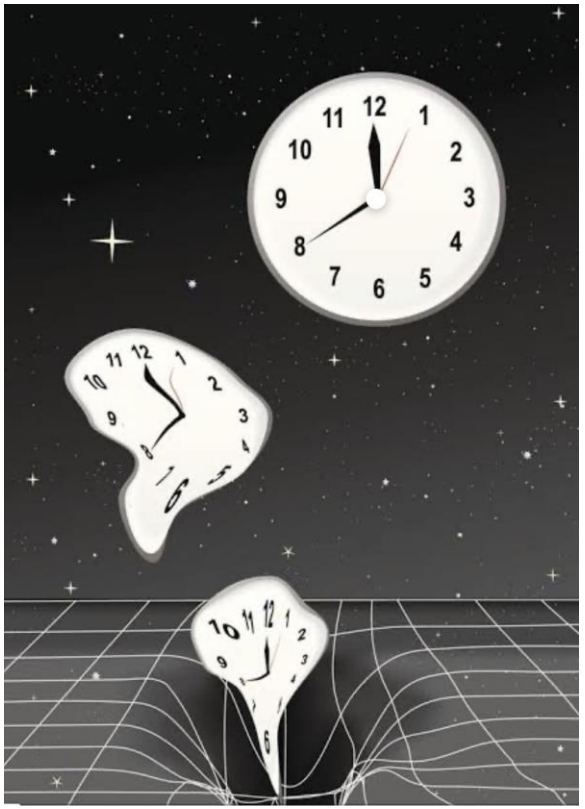
TİGED-2024/Antalya

Ne istiyoruz?

Sağlık

Para

Zaman



Giriş

- **<u>Obezitenin Epidemiyolojisi:</u>**
- **Obezite** bütün dünyada hızla artan, <u>multifaktöriyel etyolojiye sahip</u>, çağımızın epidemisi sayılan ciddi bir halk sağlığı sorunudur.

- ✓ Aşırı ve yanlış beslenme alışkanlıkları
- ✓ Fiziksel aktivite yetersizliği
- ✓ Yaş, cinsiyet, eğitim düzeyi, sosyo-kültürel etmenler
- ✓ Gelir durumu
- ✓ Hormonal ve metabolik etmenler
- ✓ Genetik, psikolojik etmenler
- ✓ Sık aralıklarla çok düşük enerjili diyetler

- Önceleri gelişmiş ülkelerdeki orta ve üst sosyoekonomik düzeye sahip kesimde sık görülürken günümüzde artık gelişmekte olan ülkelerde de **sorun** olmaya başlamıştır.

PubMed®

obesity

Search

Advanced Create alert Create RSS User Guide

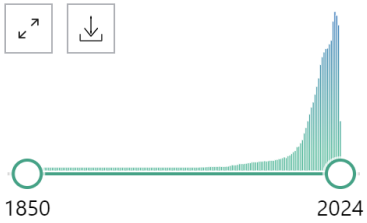
Save Email Send to Sort by: Best match Display options

MY NCBI FILTERS

476,143 results

Page 1 of 47,615

RESULTS BY YEAR



1 **Obesity** and hypertension.

Seravalle G, Grassi G.

Cite

Pharmacol Res. 2017 Aug;122:1-7. doi: 10.1016/j.phrs.2017.05.013. Epub 2017 May 19.

Share

PMID: 28532816 Review.

Obesity and in particular the excessive visceral fat distribution is accompanied by several alterations at hormonal, inflammatory and endothelial level. ...The second part will be focalized on the major target organ damage linked with **obesity** and **obesity**-rela ...

PubMed®

obesity and transplantation

Search

Advanced Create alert Create RSS User Guide

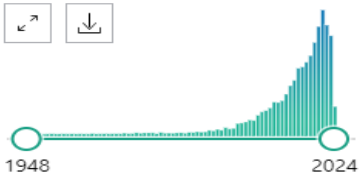
Save Email Send to Sort by: Best match Display options

MY NCBI FILTERS

9,998 results

Page 1 of 1,000

RESULTS BY YEAR



1 **Obesity** and kidney **transplantation**.

Chang JH, Mushailov V, Mohan S.

Cite

Curr Opin Organ Transplant. 2023 Apr 1;28(2):149-155. doi: 10.1097/MOT.0000000000001050. Epub 2023 Jan 31.

Share

PMID: 36752277 Review.

Although the prevalence of **obesity** in the CKD/end-stage kidney disease population is increasing, many **obese** patients are excluded from the benefit of kidney **transplant** based on their BMI alone. For this reason, we sought to review the experience thus far with ...

Obesity Surgery
https://doi.org/10.1007/s11695-019-03925-1

ORIGINAL CONTRIBUTIONS

Bariatric Surgery Is Efficacious and Improves Access to Transplantation for Morbidly Obese Renal Transplant Candidates

Renana Yemini[1,2] &Eviatar Nesher[3,4] &Idan Carmeli[1,2] &Janos Winkler[4,5] &Ruth Rahamimov[4,5] &Eytan Mor[3,4] & Andrei Keidar[1,2,4,6]

- **KBH**; Ktx ile sağkalım, hayat kalitesi ve maliyet
- **Obezite**; global pandemi (popülasyon 1/3)
  - Kalp, böbrek, NASH ve kronik organ yetmezliği
  - Uzun dönem ve tek başarılı tedavi: Bariatrik surgery ***(Hawn ve ark-2011)***
- **KBH-Tx ve obezite**;
  1. Hastaların %60'ı obez (BMI>30 kg/m²)
  2. Tx sonrası kilo artışı >
     - Sağlıklı olma
     - İmmunsupresyon (steroid)
  - Mortalite ve morbidite artışı…

Obes Surg. 2019 Aug;29(8):2373-2380. doi: 10.1007/s11695-019-03925-1.

Obesity and Kidney Transplantation

Titte R. Srinivas, MD, and Herwig-Ulf Meier-Kriesche, MD†*

- USRDS verisi: **51.927** hasta
- KTx sonrası <u>hasta ve graft sağkalımı</u> **U şeklinde** bir fenomen sergiler
  - BMI'lerin her iki ucunda bulunanların sonuçları kötüdür
  - Ancak hasta sağkalımı hala diyaliz ve bekleme listesine göre iyidir.

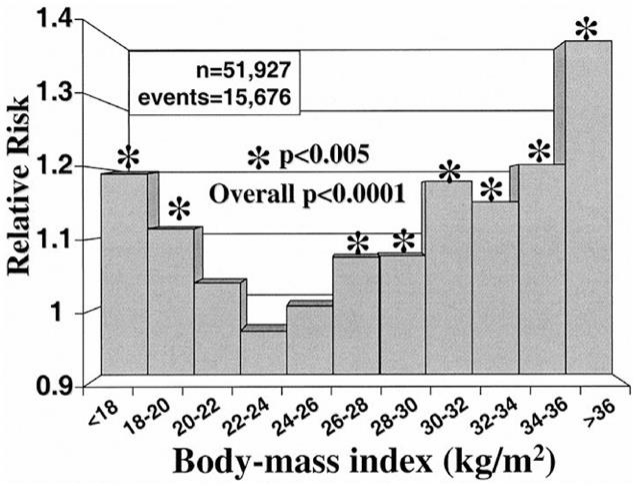


Figure 1. Relative risk for graft loss by BMI.

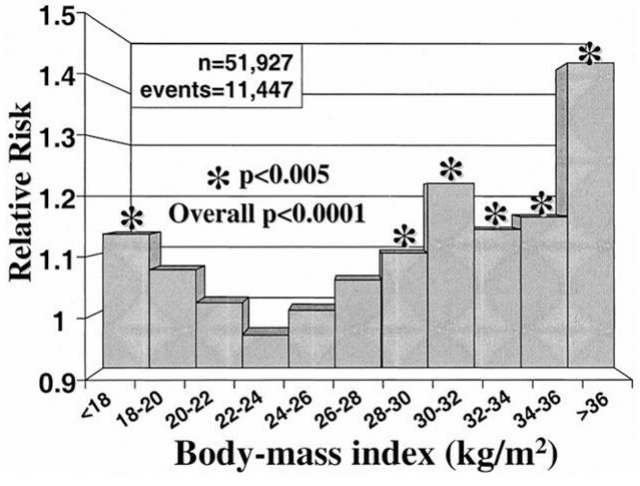


Figure 2. Relative risk for death-censored graft loss by BMI.

✓ *KTx, tüm obezite sınıflarında diyaliz veya bekleme listesindeki hastalarla karşılaştırıldığında hasta sağkalım avantajı sağlar.*

Seminars in Nephrology, Vol 33, No 1, January 2013, pp 34-43

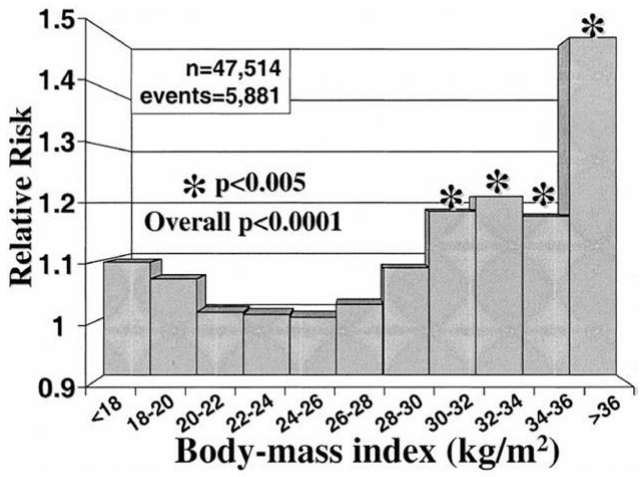


Figure 3. Relative risk for chronic allograft failure by BMI.

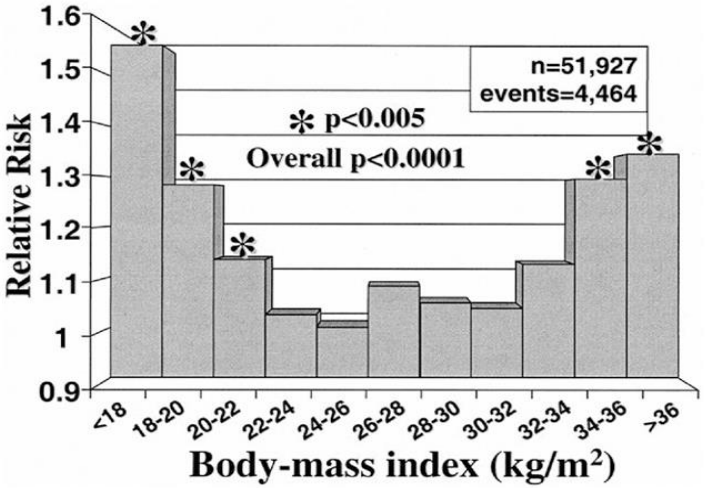


Figure 4. Relative risk for death with functioning graft by BMI.

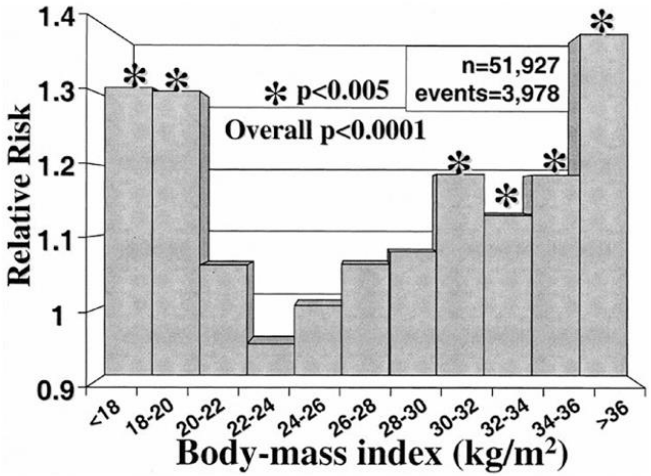


Figure 5. Relative risk for cardiovascular death by BMI.

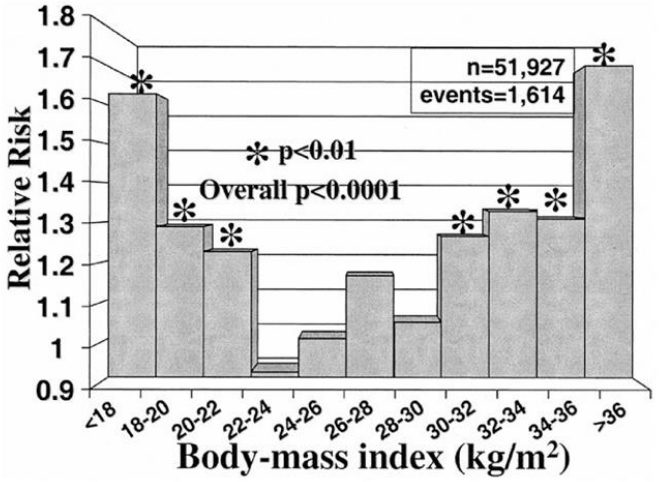


Figure 6. Relative risk for infectious death by BMI.

Nephrol Dial Transplant (2022) 37: i1–i15
https://doi.org/10.1093/ndt/gfab310
Advance Access publication date 12 November 2021

Management of obesity in kidney transplant candidates and recipients: A clinical practice guideline by the DESCARTES Working Group of ERA

Gabriel C. Oniscu[1], Daniel Abramowicz[2], Davide Bolignano[3], Ilaria Gandolfini[4], Rachel Hellemans[5], Umberto Maggiore[6], Ionut Nistor[7], Stephen O'Neill[8], Mehmet Sukru Sever[9], Muguet Koobasi[10] and Evi V. Nagler[11]

[1]Edinburgh Transplant Centre, Royal Infirmary of Edinburgh, Edinburgh, UK, [2]University Hospital Antwerp, Antwerp, Belgium, [3]Department of Medical and Surgical Sciences, Nephrology and Dialysis Unit, Magna Graecia University of Catanzaro, Catanzaro, Italy, [4]Dipartimento di Medicina e Chirurgia, Università di Parma, UO Nefrologia, Azienda Ospedaliera–Universitaria di Parma, Parma, Italy, [5]University Hospital Antwerp, Antwerp, Belgium, [6]Dipartimento di Medicina e Chirurgia, Università di Parma, UO Nefrologia, Azienda Ospedaliera–Universitaria di Parma, Parma, Italy, [7]Methodological Center for Medical Research and Evidence-Based Medicine, University of Medicine and Pharmacy 'Grigore T. Popa', Iași, Romania, [8]Department of Transplant Surgery, Belfast City Hospital, Belfast, UK, [9]Department of Nephrology, Istanbul School of Medicine, Istanbul University, Istanbul, Turkey, [10]Knowledge Centre for Health Ghent, Ghent University Hospital, Ghent, Belgium and [11]Department of Nephrology, Ghent University Hospital, Ghent, Belgium

Correspondence to: Evi V. Nagler; E-mail: evi.nagler@ugent.be

- Sağlık profesyonellerine yönelik **kılavuz**
- 116 makale, sistematik derleme ve metaanaliz
- 5 soruya cevap aranmış

1. SDBH olan hastalarda böbrek nakli için bir risk faktörü olan obeziteyi hangi parametre en iyi yansıtır?

- **Tavsiyeler:** obez ve böbrek nakli için değerlendirilen SDBH'da VKİ ek olarak bel çevresi veya bel/kalça oranının ölçülmesini öneriyoruz (**2C**)

- **Klinik pratik için tavsiye:**
  - Genel popülasyon
    - VKİ
  - SDBH
    - Bel ve bel/kalça oranı
    - Koniklik index
    - PKBH !!

TABLE 1.

Options to evaluate obesity in patients with ESKD[3]

BMI >30 kg/m^2	Class I: 30–34.9 Class II: 35–39.9 Class III: >40
Waist circumference (cm)	Men: >102 cm Female: >88 cm
Waist/hip ratio	Men: >0.9 Female: >0.85
Conicity index	Waist circumference(m)/[0.109 × square root of (weight [kg]/height [m])]

BMI, body mass index; ESKD, end-stage kidney disease.

Diğer klavuzlar

- KDIGO (2020):
  - Böbrek nakli adayları ve bekleme listesi hastaları bir nakil cerrahı tarafından muayene edilmeli (**1B**)
    - Ama nasıl yapılacağı ?

- ERBP (2015) ve BTS (2011):
  - Sadece VKİ değerlendirilir
  - Pretx VKİ>30 kg/m² olanların kilo vermesi önerilir.
    - Ama nasıl ?

Chadban SJ, Ahn C, Axelrod DA *et al.* KDIGO clinical practice guideline on the evaluation and management of candidates for kidney transplantation. *Transplantation* 2020; 104: S11–S103
Abramowicz D, Cochat P, Claas FH *et al.* European Renal Best Practice guideline on kidney donor and recipient evaluation and perioperative care. *Nephrol Dial Transplant* 2015; 30: 1790–1797

2. Obezite hangi düzeyden sonra (VKİ düzeyine göre) böbrek nakli alıcılarında sonuçları etkiler?

- **Tavsiyeler:**
  1. SDBH olup VKİ 30-34 kg/m² olan kişilerin başka türlü uygun görülmeleri halinde böbrek nakli için kabul edilmeli **(2C)**
  2. Daha yüksek VKİ için bir öneride bulunmak için veri yok **(-D)**
  3. Obez olan hastalara böbrek nakli sonrası DGF, yaraya bağlı morbidite, akut rejeksiyon ve DM gibi olası perioperatif komplikasyon riski konusunda danışmanlık verilmeli **(1C)**

- **Klinik pratik için tavsiye:**
  - Böbrek naklini tartışırken VKİ ile birlikte diğer risk faktörlerini de tartın.

Nephrol Dial Transplant (2022) 37: i1–i15
https://doi.org/10.1093/ndt/gfab310
Advance Access publication date 12 November 2021

Perioperatif komplikasyon riskini kabul edilemez hale getiren veya uzun vadeli sonuçları çok kötü yapan obezite derecesinin fikirbirliği YOK

Table 1. Summary of published reports of kidney transplant outcomes in obese recipients

Study	Study year	Country	Design	Patients (*n*)	BMI (kg/m^2) cutoff	Outcomes in obese recipients
Tsapepas *et al.*, 2022	2004–2020	US	Retrospective	2806	≥35	Higher DGF rate; higher incidence of surgical site infection; no difference in graft survival.
Zhang *et al.*, 2022	2016–2019	China	Retrospective	831	>24	Higher incidence of abnormal graft function in early posttransplantation period.
Yemini *et al.*, 2022	2005–2019	Israel	Retrospective	1403	>30	Higher DGF rate; worse 1-year, 5-year, and 10-year graft and patient survival.
Buemi *et al.*, 2022	2010–2018	Belgium	Retrospective	306	≥30	Higher DGF rate; higher incidence of surgical site infection and surgical complications; worse patient survival; no difference in graft survival.
Castelli *et al.*, 2022	2005–2018	France	Time-dependent propensity score matching study	27 037	30–35	Increased 10-year life expectancy in kidney transplantation group versus awaiting-kidney transplantation group.
Dobrzycka *et al.*, 2022	2014–2017	Poland	Retrospective	433	≥30	Higher DGF rate; higher incidence of early surgical complications; worse 1-year death-censored graft survival.
Scheuermann *et al.*, 2022	1993–2017	Germany	Retrospective	578	≥30	Higher DGF rate; higher incidence of surgical site infection and surgical complications; worse death-censored graft survival.
Axelrod *et al.*, 2022	2005–2016	US	Retrospective	193 984	≥30	Higher incidence of posttransplant DM.
Yin *et al.*, 2021	1991–2019	Multinational	Meta-analysis	326 550		BMI with the lowest risk of graft loss: 25.2 kg/m^2; BMI with the lowest risk of patient death: 24.7 kg/m^2.
Foucher *et al.*, 2021	2005–2016	France	Retrospective	4691	>30	Higher incidence of serious bacterial infections and cardiac complications; worse patient survival.
Sureshkumar *et al.*, 2021	2001–2016	US	Retrospective	44 560	>35	Higher DGF rate; worse death-censored graft survival in recipients with BMI >30.
Jarv *et al.*, 2021	After 2000	Estonia	Retrospective	706	≥25	Worse 5-year graft survival; worse 5-year and 10-year patient survival.
Bellini *et al.*, 2017	2014–2016	UK	Prospective	370	30	No difference in DGF rate and graft survival.
Lafranca *et al.*, 2015	2014	Multinational	Meta-analysis	209 000	≥30	Higher DGF rate; higher incidence of surgical site infection and surgical complications; higher incidence of posttransplantation DM; higher incidence of acute rejection; worse graft and patient survival.
Nicoletto *et al.*, 2014	1990–2013	US	Meta-analysis	9296		Higher DGF rate; no difference in graft and patient survival for patients who received kidney transplant after year 2000.
Gill *et al.*, 2013	1995–2007	US	Retrospective	208 498	≥40 and <40	Survival benefit in kidney transplantation group versus nonkidney transplantation group; no survival benefit in Black patients with BMI >40.

DGF. delayed graft function: DM. diabetes mellitus.

Özet:

- ✓ A rejeksiyon
- ✓ DGF
- ✓ Uzamış ameliyat süresi
- ✓ Uzun yatış
- ✓ Yara yeri sorunu
- ✓ Herni
- ✓ Cerrahi kompl.
- ✓ NODAT

- ✓ Kötü graft sağkalımı
- ✓ Mortalite

Chang JH ve ark. Obesity and kidney transplantation. CO transplantation. 28-2 (2023)

Chadban SJ, Ahn C, Axelrod DA *et al.* KDIGO clinical practice guideline on the evaluation and management of candidates for kidney transplantation. *Transplantation* 2020; 104: S11–S103
Abramowicz D, Cochat P, Claas FH *et al.* European Renal Best Practice guideline on kidney donor and recipient evaluation and perioperative care. *Nephrol Dial Transplant* 2015; 30: 1790–1797
Campbell S, Pilmore H, Gracey D *et al.* KHA-CARI guideline: recipient assessment for transplantation. *Nephrology* 2013; 18: 455–462
Dudley C, Harden P. Renal Association clinical practice guideline on the assessment of the potential kidney transplant recipient. *Nephron Clin Pract* 2011; 118 (Suppl 1): c209–c224

Diğer kılavuzlar

- **KDIGO (2020):**
  - Ktx adayları nakilden dışlanmamalı **(2B)**
  - Ama VKİ 40> kg/m² olan adaylarda nakil dikkatli olmalı ve postop dönem için ek danışmanlık verilmeli
- **UK Renal Ass (2011):**
  - VKİ 30>kg/m² teknik zorluk ve artan perioperatif risk
  - VKİ 40>kg/m² Ktx fayda görme oranı düşük **(2B)**
- **ERBP (2015):** hasta sağkalımı tartışmalı
- **KHA-CARI (2013):**
  - Tek başına obezite Ktx engel değil **(1B)**
  - VKİ 40>kg/m² olan tx adayları bireysel değerlendirilmeli **(2C)**

3. Obez olup bunun haricinde böbrek nakline engel olacak sorunu bulunmayanlarda obezite, böbrek nakli HD arasındaki yarar-zarar dengesini etkiler mi?

- **Tavsiyeler:**
  - VKİ 30-39 kg/m² arasında Ktx engel başka bir sorunu yok ise canlı/kadavra tx ideal bir tedavidir **(2C)**
  - VKİ 30-39 kg/m² arasında hastalarda bekleme listesine alınmada veya tx gecikme olmamalı **(2C)**

- **Klinik pratik için Tavsiye:**
  - Tx kararı verilirken VKİ ve diğer risk faktörleri tartışılmalı

Table 1. Summary of published reports of kidney transplant outcomes in obese recipients

Study	Study year	Country	Design	Patients (*n*)	BMI (kg/m²) cutoff	Outcomes in obese recipients
Gill *et al.*, 2013	1995–2007	US	Retrospective	208 498	≥40 and <40	Survival benefit in kidney transplantation group versus nonkidney transplantation group; no survival benefit in Black patients with BMI >40.

Chang JH ve ark. Obesity and kidney transplantation. CO transplantation. 28-2 (2023)

4. SDBH olan transplant adaylarında kilo kaybını hedefleyen müdehalelerin yarar ve zararları nelerdir?

- **Tavsiyeler:**
  1. Ktx adayı obez hastalar kilo vermeleri konusunda cesaretlendirilmeli ve beslenmeleri multidisipliner ekip tarafından düzenlenmeli **(1D)**
  2. VKİ 40> kg/m² olan Ktx adayları bariatrik cerrahi önerilmeli **(2C)**
  3. VKİ 35> kg/m² ve en az bir obezite ilişkili komorbidite olan hastalara bariatrik cerrahi önerilmeli **(2D)**
  4. Ktx adaylarına BC tiplerinden laparoskopik sleeve gastrektomi (LSG) öneriyoruz **(2D)**
- **Klinik pratik için tavsiye:**
  - VKİ 40 ve üzeri LSG
  - VKİ 35-39 arası tip 2 DM, uyku apnesi, NASH ve kalp hastalığından en az biri varsa LSG yapılmalıdır.

Nephrol Dial Transplant (2022) 37: i1–i15
https://doi.org/10.1093/ndt/gfab310
Advance Access publication date 12 November 2021

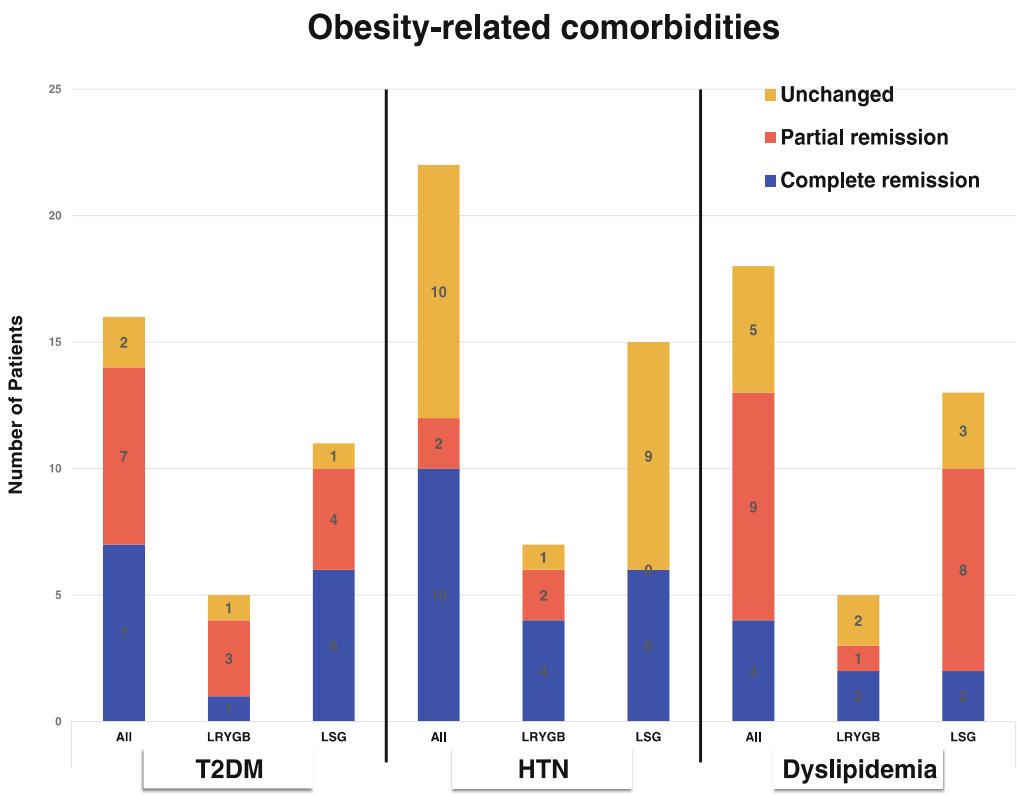
Bariatric Surgery Is Efficacious and Improves Access to Transplantation for Morbidly Obese Renal Transplant Candidates

update

Renana Yemini[1,2] &Eviatar Nesher[3,4] &Idan Carmeli[1,2] &Janos Winkler[4,5] &Ruth Rahamimov[4,5] &Eytan Mor[3,4] & Andrei Keidar[1,2,4,6]

Table 1 Demographic and bariatric characteristics of the study patients

No. patients	24
Mean age at bariatric surgery, y	54 (range 28–68)
Gender	
Male	16
Female	8
Type of surgery	
LSG	17
LRYGB	7
Status	
Preemptive	7
Hemodialysis	16
Peritoneal dialysis	1
Chronic kidney disease etiology	
T2DM	15
Other	9
Focal segmental glomerosclerosis	2
Polycystic kidney disease	3
Hemolytic uremic syndrome	1
Unknown	3
Comorbidities	
T2DM	16
Hypertension	22
Dyslipidemia	18
IHD	5
Follow-up (mean ± SD), months	47 ± 6.5



Obesity Surgery
https://doi.org/10.1007/s11695-019-03925-1

ORIGINAL CONTRIBUTIONS

Böbrek nakli

	Author	Year	Type	Surgery type	No. of patients	Follow-up (months)	Percent of EWL	Improvement of comorbidities	Morbidity	Mortality			Graft survival (%)	Graft function
										<30 days	<90 days	Overall at 1 year		
1	Alexander el al.	2007	Before KT	SG	41|9[a]	>12[b]	68%	++	n.R.	0	0	2 (4.9%) (1 necrosis, 1 cardiac arrest)	n.R.	n.R.
2	Koshy et al.	2008	Before KT	AGB	3|1[a]	15[c]	37%	n.R.	0	0	0	0	100	Good
3	Modanlou et al.	2009	Before KT	GB/other	29|20[a]	17 ± 11[b]	60%	n.R.	0	1	0	1 (3.4%)	n.R.	n.R.
4	Marszalek et al.	2012	Before KT	AGB	1|1[a]	11	30%	n.R.	0	0	0	0	100	DGF
5	Lin et al.	2013	Before KT	SG	6|2[a]	16.6[c]	66%	++	1 (17%)	0	0	0	n.R.	n.R.
6	Kienzl-Wagner et al.	2015	Before KT	SG	1|1[a]	6 21%	n.R.	1 SSI	0	0	0	100	good	
7	Freeman et al.	2015	Before KT	SG	52|6[a]	18.3 ± 12.6[b]	32 ± 18%	++	0	0	0	2 (3.8%) (1 stroke, 1 sepsis)	n.R.	n.R.
8	Jamal et al.	2015	Before KT	18 GB/2 SG	21|2[a]	27.6 ± 22.8[b]	61 ± 35%	n.R.	6 (28.6%) 2 early (anastomotic stricture, leakage), 4 late (stricture, obstruction, ulcer)	0	1 (sepsis)	1 (4.8%) (sepsis)	n.R.	n.R.
9	Kienzl-Wagner et al.	2017	Before KT	SG	8|7[a]	38.4 ± 16.8[b]	62.7%	n.R.	0	0	0	0	100	100
	Total				162|49[a]				7 major (4.3%), 1 minor (0.6%)			1 early (0.6%), 5 late (3.1%)		
9	Marterre et al.	1996	After KT	GB	3	12	>50%	++	n.R.	n.R.	n.R.	n.R.	100	n.R.
10	Modanlou et al.	2009	After KT	GB/other	86	17 ± 11[b]	30.8%	n.R.	1 (1.2%) early (reversible acute rejection)	1	1	2 (2.3%)	93	n.R.
11	Ziemianski et at.	2014	After KT	GB	1	12	87%	++	0	n.R.	n.R.	n.R.	100	Improved
12	Szomstein et al.	2010	After KT	1 SG/4 GB	5	24[c]	50%	n.R.	0	0	0	0	100	No effects
13	Khoraki et al.	2015	After KT	SG	4	36.7[c]	40%	++	1 (25%) early (reoperation due to bleeding)	0	0	0	100	Improved
14	Golomb et al.	2014	After KT	SG	10	14[c]	75%	++	2 (20%), 1 early (transient renal failure), 1 late (1 revision due to sleeve stricture)	0	0	0	100	Improved
15	Alexander et al.	2007	After KT	GB	10	>12	71%	n.R.	n.R.	0	0	1 (10%) late (cardiac arrest)	90	n.R.
	Total				119				3 major (2.5%), 1 minor (0.8%)			1 early (0.8%), 2 late (1.7%)		

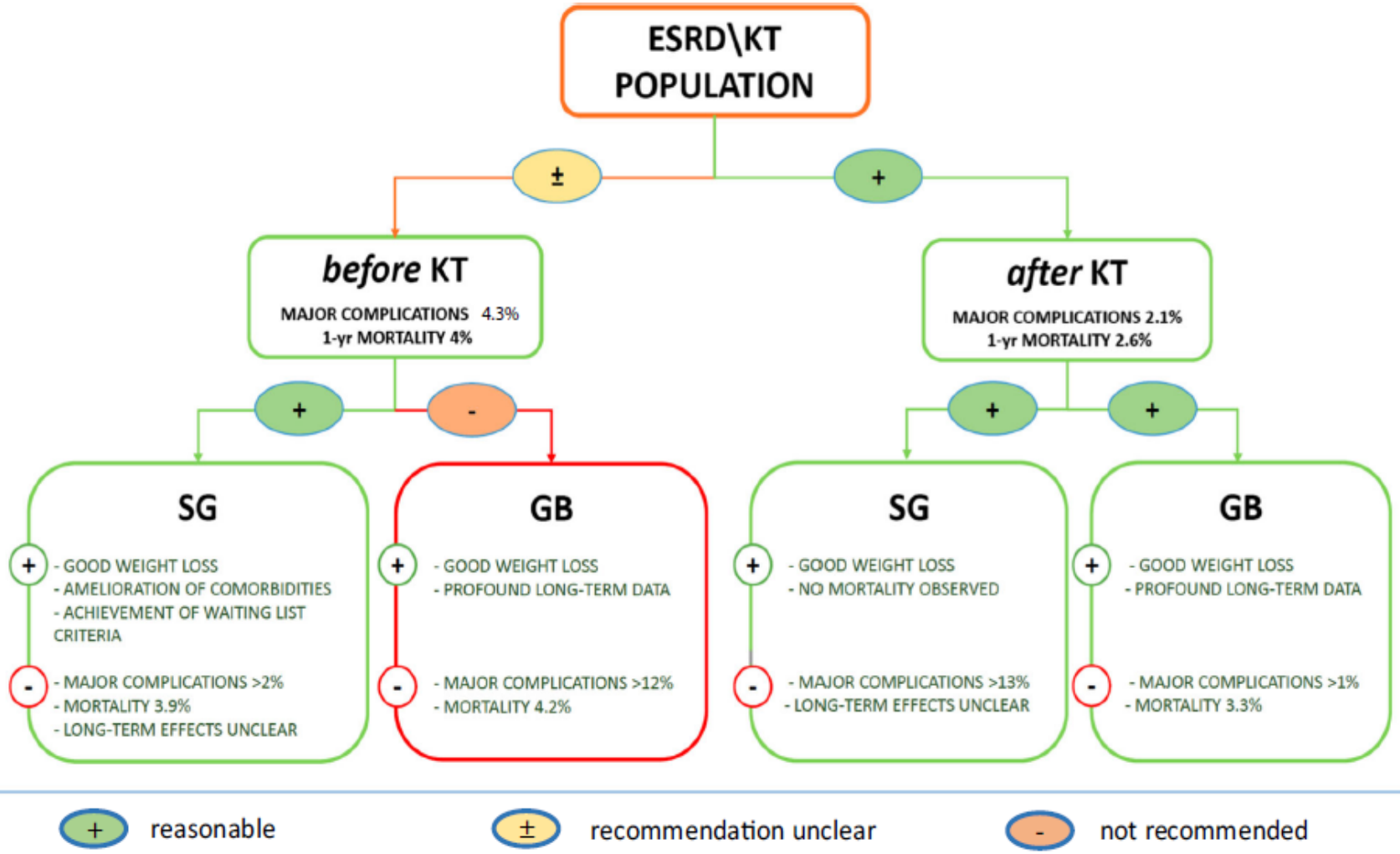
Dziodzio T at all. Obes Surg.2017

OBES SURG (2017) 27:2696–2706
DOI 10.1007/s11695-017-2854-8

REVIEW ARTICLE

The Role of Bariatric Surgery in Abdominal Organ Transplantation—the Next Big Challenge?

Tomasz Dziodzio[1] · Matthias Biebl[1] · Robert Öllinger[1] · Johann Pratschke[1] · Christian Denecke[1]



Obesity and Kidney Transplantation—How to Evaluate, What to Do, and Outcomes

Pierpaolo Di Cocco, MD,[1] Giulia Bencini, MD,[1] Mario Spaggiari, MD,[1] Egor Petrochenkov, MD,[1] Stepan Akshelyan, MD,[1] Alberto Fratti, MD,[1] Jing Chen Zhang,[2] Jorge Almario Alvarez, MD,[1] Ivo Tzvetanov, MD,[1] and Enrico Benedetti, MD[1]

- VKI 30> kg/m²Cerrahi alan inf (CAİ): 4 kat
  - Herni: 3 kat
  - VKI 40>: CAİ %20-40
  - Kötü graft sağkalımı

- Minimal invaziv teknik:
  - **Robot-assisted Ktx (RAKT)**
    - RAKT komplikasyonları azaltmış
    - Graft sağkalımı daha iyi…

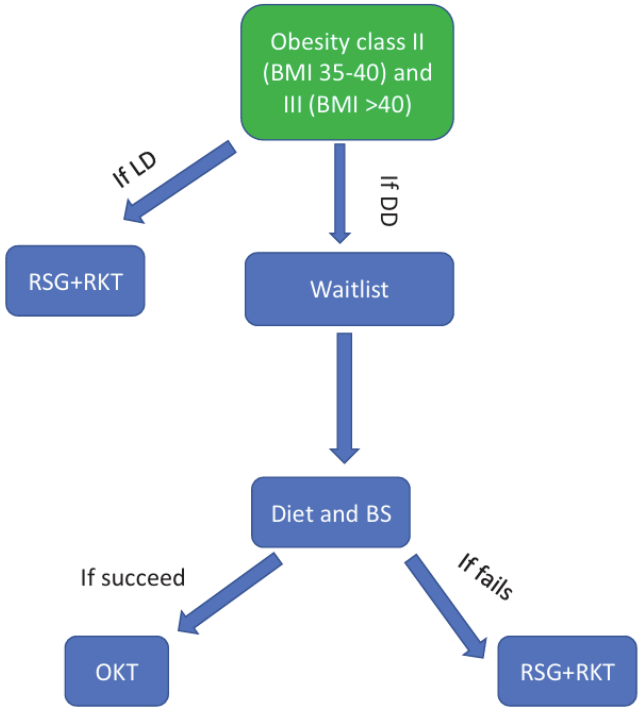
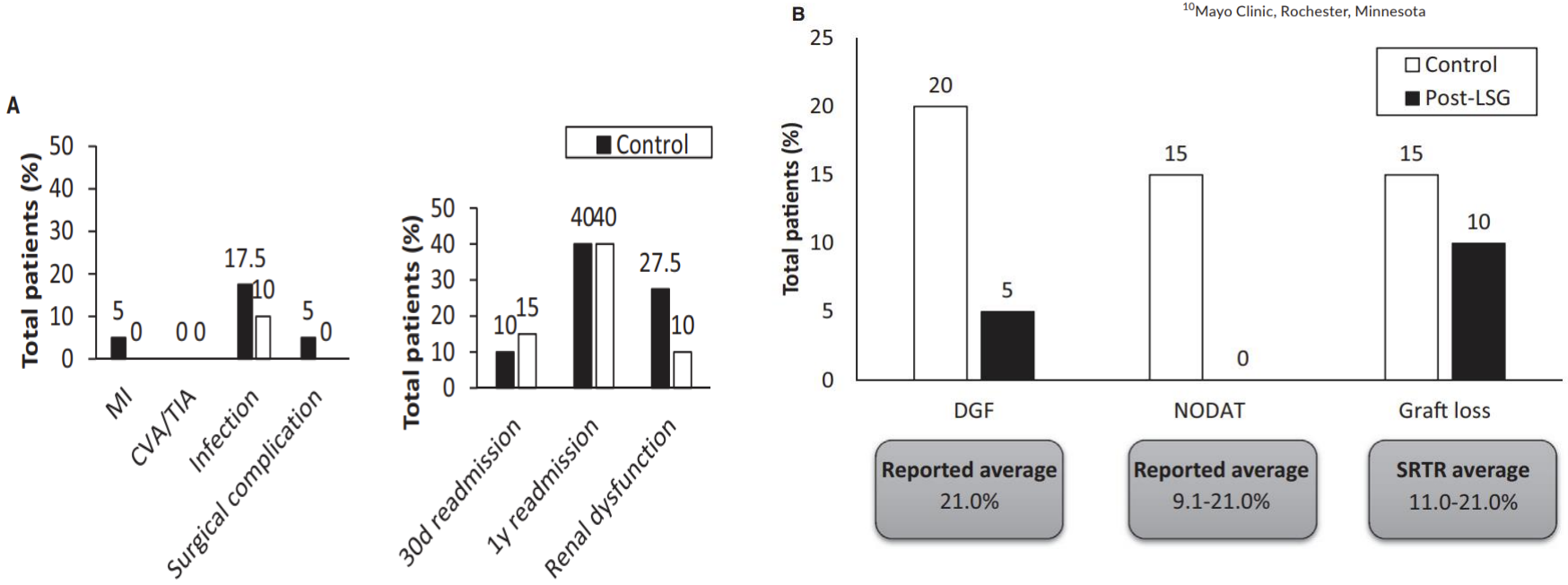


FIGURE 1. University of Illinois at Chicago approach to obese candidates. BMI, body mass index; BS, bariatric surgery; DD, deceased donor; LD, living donor; OKT, open kidney transplant; RKT, robotic kidney transplantation; RSG, robotic sleeve gastrectomy.

Obesity, transplantation, and bariatric surgery: An evolving solution for a growing epidemic

Tayyab S. Diwan[1] | Tiffany C. Lee[1] | Shunji Nagai[2] | Enrico Benedetti[3] | Andrew Posselt[4] | Ginny Bumgardner[5] | Sabrena Noria[5] | Bryan A. Whitson[5] | Lloyd Ratner[6] | David Mason[7] | Jon Friedman[8] | Kenneth J. Woodside[9] | Julie Heimbach[10]

[1]University of Cincinnati, Cincinnati, Ohio
[2]Henry Ford Hospital, Detroit, Michigan
[3]University of Illinois at Chicago, Chicago, Illinois
[4]University of California at San Francisco, San Francisco, California
[5]Ohio State University, Columbus, Ohio
[6]Columbia University Medical Center, New York, New York
[7]Baylor Medical Center, Dallas, Texas
[8]OptumHealth, Cypress, California
[9]University of Michigan, Ann Arbor, Michigan
[10]Mayo Clinic, Rochester, Minnesota



A, **Short-term outcomes** in recipients of kidney transplant after undergoing laparoscopic sleeve gastrectomy (LSG) compared with controls (recipients of kidney transplants with similar BMI who did not undergo LSG). MI, myocardial infarction; CVA, cerebrovascular accident; TIA, transient ischemic attack

B**, Longterm outcomes** in recipients of kidney transplant after undergoing laparoscopic sleeve gastrectomy (LSG) compared with controls (recipients of kidney transplants with similar BMI who did not undergo LSG). Abbrev. DGF: delayed graft function, NODAT: new-onset diabetes after transplant, SRTR: Scientific Registry of Transplant Recipients

Am J Transplant. 2020;20:2143–2155.

5. Böbrek naklinden sonra yapılan bariyatrik cerrahinin fayda ve zararları nelerdir?

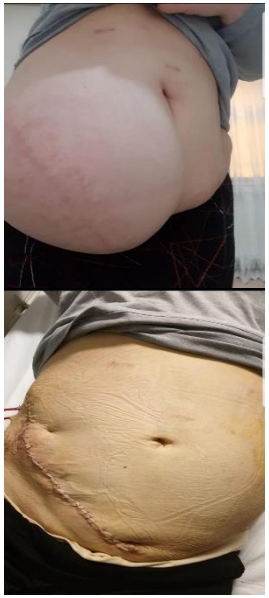
- **Tavsiyeler:**
  1. VKİ 40> kg/m² Ktx'li hastalarda BC düşünülmeli (2C)
  2. VKİ 35> kg/m² olan Ktx'li hastalarda en az bir obezite ilişkili komorbidite varsa bariatrik cerrahi önerilmeli **(2D)**
  3. Ktx hastalarında BC tiplerinden laparoskopik sleeve gastrektomi (LSG) öneriyoruz **(2D)**

- **Klinik pratik için tavsiye:**
  - Bariatrik cerrahi cerrahi dışı uygun yöntemlerle kilo kaybı denenip başarılı olunamadığında düşünülmelidir.
  - Diyet
  - Orlistat (GİS lipaz inhibitörü olup oksalat emilimini arttırır)

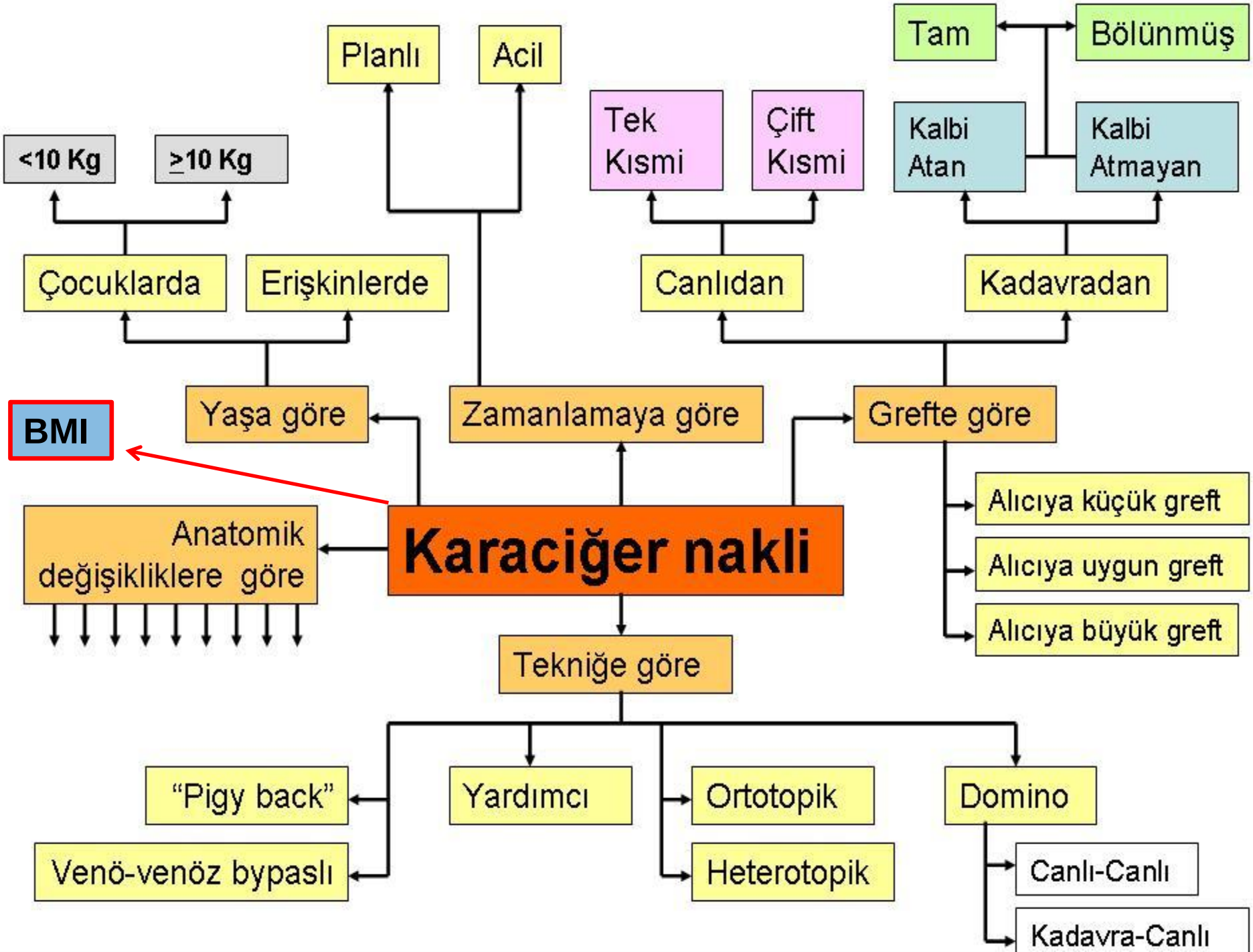
Nephrol Dial Transplant (2022) 37: i1–i15
https://doi.org/10.1093/ndt/gfab310
Advance Access publication date 12 November 2021

Böbrek nakli sonuçlarımız

İstinye Üniversitesi
Liv Bahçeşehir Hastanesi



- **Böbrek nakli:** 1.286 hasta
  - **BMI 35>: 59** (max: 48 kg/m²)
  - BMI 30-35: 161
  - BMI 25-30: 365
  - BMI 20-25: 413
  - BMI <20: 288
- **Sonuç: 59 hasta**
  - Posttx LSG: 3 hasta
  - Takip:
  - Kronik rejeksiyon:7
    - Graft kaybı:2
  - Hasta kaybı: 8
    - İnfeksiyon: 4 (3 covid, 1 sepsis)
    - Kardiak ölüm: 2
    - Diğer: 2


Tam
Bölünmüş
Planlı
Acil
Tek Kısmı
Çift Kısmı
Kalbi Atan
Kalbi Atmayan
<10 Kg
≥10 Kg
Çocuklarda
Erişkinlerde
Canlıdan
Kadavradan
BMI
Yaşa göre
Zamanlamaya göre
Grefte göre
Alıcıya küçük greft
Anatomik değişikliklere göre
Karaciğer nakli
Alıcıya uygun greft
Alıcıya büyük greft
Tekniğe göre
"Pigy back"
Yardımcı
Ortotopik
Domino
Venö-venöz bypaslı
Heterotopik
Canlı-Canlı
Kadavra-Canlı

Vaka

- MA, 54 yaş
- NASH bağlı KC-s
- MELD skoru:21
- EP, asit var
- Eko: iyi
  - EF:% 65
  - PAB: 30mmHg
- BMI: 41.6 kg/m²
  - 5 yıl: LSG
  - 3 ay: LGB

AASLD-2013 Guideline

- Karaciğer nakli (LTx): BMI>40 ise *rölatif kontrendike*
  - Operatif risk yüksek
  - Ltx sonrası 5-10 yıllık sağkalım artarken
    - BMI> hastalarda komorbidite yüksek

- **Pre-tx:** obezite cerrahisi (OC) kontrendike
  - Dekompanse Kc-S
- **Eş zamanlı: ???** (canlı/kadavra)
- **Post-tx**: teknik olarak zor
  - Adezyon ve uzun süreli immunsupresyon

Martin P et all. Hepatology. 2014

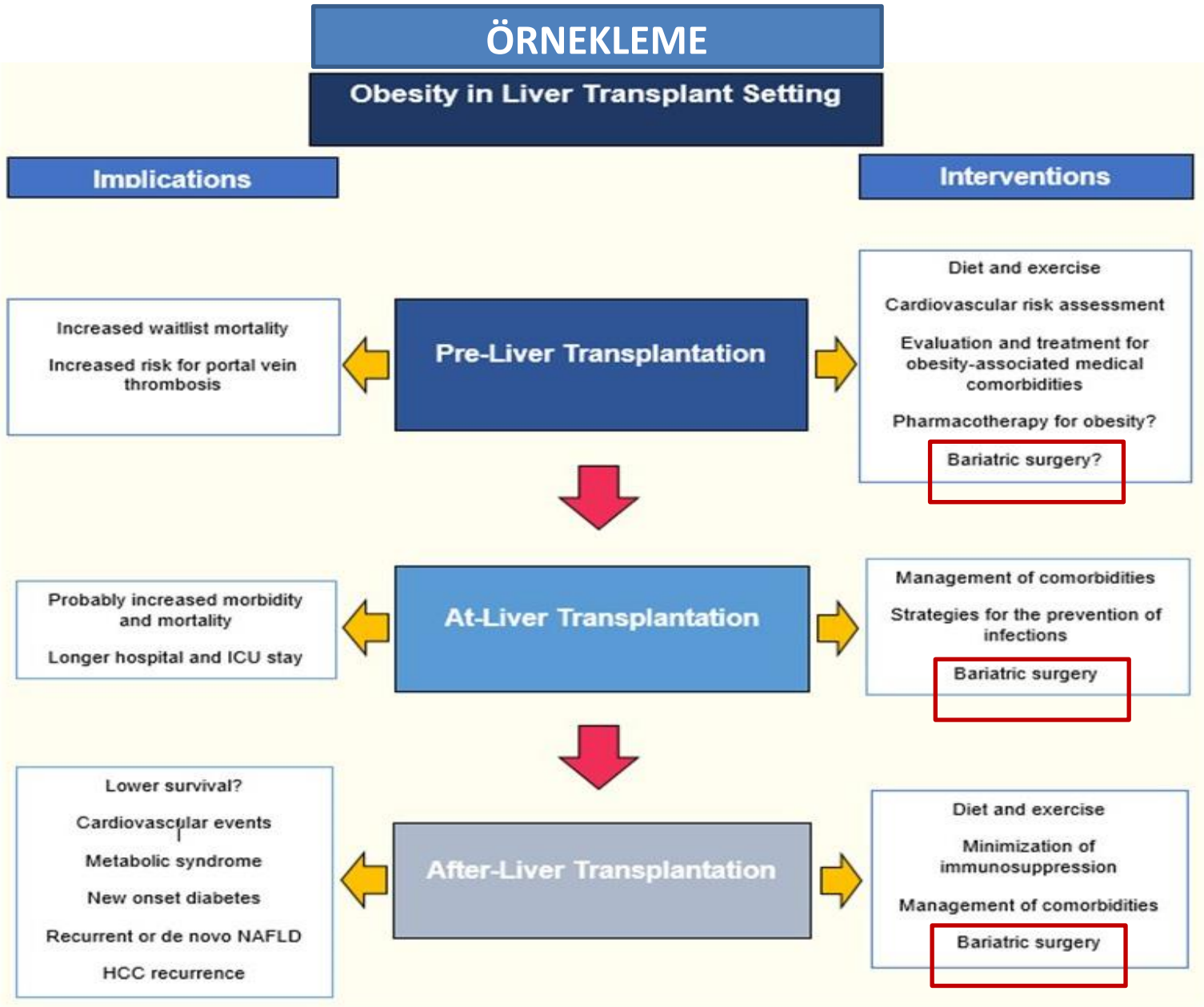
Bariatric Surgery and Liver Transplantation

Duminda Suraweera, MD, Elena G. Saab, Gina Choi, MD, and Sammy Saab, MD, MPH

Table. Liver Disease and Candidacy for Bariatric Surgery

Type of Patient	Bariatric Surgery Candidate
Compensated cirrhotic without portal hypertension	Yes
Compensated cirrhotic with portal hypertension	No
Decompensated cirrhotic	No
Liver transplant recipient (<1 year posttransplant)	No
Liver transplant recipient (≥1 year posttransplant)	Yes

ÖRNEKLEME



Nutrients **2019**, *11*, 2552; doi:10.3390/nu11112552

BC ve LTx zamanlama

Review

Obesity in the Liver Transplant Setting

Carlos Moctezuma-Velazquez, Ernesto Márquez-Guillén and Aldo Torre *

Nutrients **2019**, *11*, 2552; doi:10.3390/nu11112552

Table 1. Timing of bariatric surgery in the liver transplant setting.

	PRE	DURING	POST
PROS	-Potential for improvement of liver function and delisting -Potential for decreasing risk of post-LT complications associated with obesity -Weight loss in order to achieve a certain BMI in centers where obesity is a contraindication for LT	-Single intervention and single recovery phase -Less risk of perioperative complications associated with portal hypertension	-Patient is more stable and without portal hypertension
CONS	-Potential for increased morbidity and mortality in patients with advanced cirrhosis	-Potential increased risk of staple line complications due to high dose steroids -Rapid weight loss may complicate immunosuppression dosing -May worsen intolerance to oral intake in the immediate postoperative period -Increased surgical time -Potential for increased rate of perioperative complications when compared to LT-only procedure -May worsen accelerated loss of bone mass in the first months after LT -May be cumbersome to the patient to learn post-LT care plus post-BS care	-Technically more challenging surgery because of post-LT adhesions -Increased infection risk due to immunosuppression -Steroids can interfere with healing

Based on information from Sharpton [59], García-Sesma [60], Diwan [53]. LT: Liver transplant; BMI: Body mass index; BS: Bariatric surgery.

Karaciğer nakli

	Author	Year	Type	MELD score	Surgery type	No. of patients	Follow-up (months)	Percent of EWL	Improvement of comorbidities	Morbidity	Mortality			Graft survival (%)	Graft function
											<30 days	<90 days	Overall at 1 year		
1	Lin et al.	2013	Before LT	11	SG	20/6[a]	24[b]	66%	++	5 (25%) early (2 SSIs, 1 organ insufficiency, 1 bleeding, 1 leakage)	0	0	3 (15%)	85	Stable
2	Takata et al.	2008	Before LT	n.R.	SG	8	11.4[b]	40%	++	2 (25%) early (cirrhotic patients: 1 bleeding, 1 hepatic encephalopathy)	0	0	0	100	n.R.
3	Marszalek et al.	2015	Before LT	n.R.	GB	1/1[a]	>24	50%	n.R.	1 (100%) early (bleeding, revision, renal failure)	0	0	0	100	Stable
Total						29/7[a]				6 (20.7%) major, 2 minor (6.9%)			3 (10.3%) late		
4	Campsen et al.	2008	With LT	n.R.	AGB	1	6	45%	++	0	n.R.	n.R.	n.R.	100	Stable
5	Heimbach et al.	2013	With LT	32	SG	7	17[b]	33%	n.R.	3 (43%) early (1 leakage + revision, 1 bleeding, 1 rejection)	0	0	0	100	Stable
6	Nesher et al.	2017	With LT	24	SG	3	13	27.9%	++	2 (67%) early (1 biliary leakage + transient acute kidney failure)	0	0	0	100	Stable
Total						11				5 (45.5%) early			0		
7	Duchini et al.	2001	After LT	–	GB	2	27	35.3%	++	1 (50%) mild dumping	0	0	0	100	Improved
8	Lin et al.	2013	After LT	–	SG	9	6[b]	56%	++	3 (33.3%) early revisions (1 hernia, 1 bile leakage, 1 dysphagia)	0	0	0	100	Stable
9	Al-Nowaylati et al.	2013	After LT	–	GB	7	59[b]	41%	++	5 (71.4%) late (1 reversal, 2 SSIs, 2 hernias)	0	0	2 (28.6%) (1 septic shock, 1 esophageal CA)	74	Improved
10	Pajecki et al.	2014	After LT	–	SG	1	5	75%	++	0	0	0	0	100	Stable
11	Tichansky et al.	2015	After LT	–	GB	1	4	21%	++	0	0	0	0	0	n.R.
12	Khoraki et al.	2015	Post-Tx	–	SG	5	18[b]	48%	++	1 (25%) early (bleeding)	0	0	0	100	Stable
Total						25				5 (20%) major, 5 (20%) minor			2 (8%) late		

Dziodzio T at all. Obes Surg.2017

OBES SURG
DOI 10.1007/s11695-017-2634-5

BRIEF COMMUNICATION

Simultaneous Liver Transplantation and Sleeve Gastrectomy: Prohibitive Combination or a Necessity?

Eviatar Nesher[1] · Eytan Mor[1] · Amir Shlomai[2,3] · Michal Naftaly-Cohen[2] · Renana Yemini[4] · Alexander Yussim[1] · Marius Brown[2] · Andrei Keidar[4,5]

Table 1 Demographics and bariatric outcomes

Patient	1	2	3
Sex/age	M/53	M/48	F/32
Liver disease	NASH Cirrhosis	HCV + HCC + NASH cirrhosis	Wilson disease + NASH
MELD	24	23	24
Preoperative weight/BMI	135/42.6	125/46.6	125/46
Last weight/BMI	95/30	88/30.4	94.5/33.9
Total weight loss (%)	29.6	29.6	24.4
DM	Resolved	Resolved	None
HTN	Resolved	Resolved	None
Complications	Biliary anastomosis leak, Transient ARF	None	None
Follow-up (month)	24	12	3

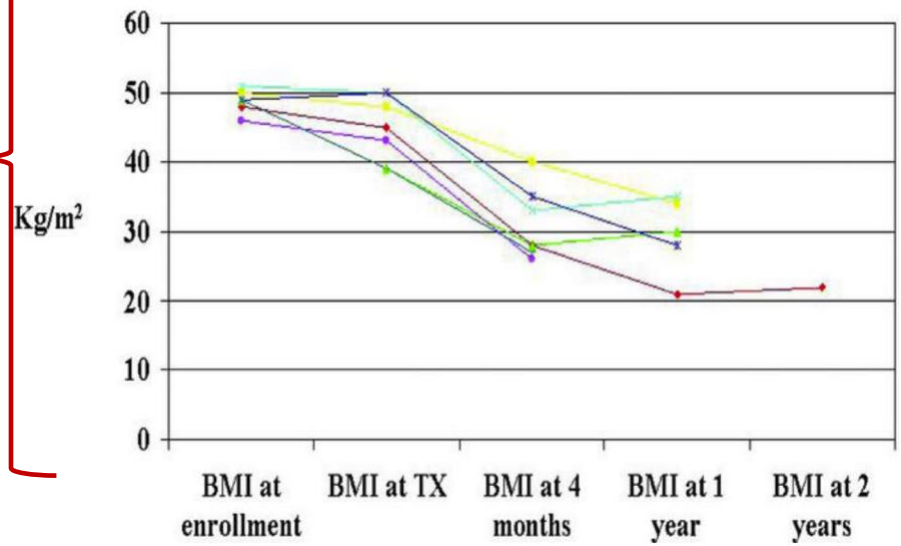
MELD model for end-stage liver disease, *DM* diabetes mellitus, *HTN* hypertension, *NASH* non-alcoholic stetohepatitis, *HCV* hepatitis C virus, *HCC* hepatocellular carcinoma, *ARF* acute renal failure

TABLE 1 Bariatric surgery and liver transplant case series, including those with pretransplant, simultaneous with transplant, and posttransplant bariatric surgery

Author	Time range	Cohort (n)	Bariatric procedure done	Timing of bariatric procedure to transplant	Endpoints and notable findings
Lin et al[55]	2006-2012	SG pre–liver (n = 20) and kidney (n = 6) transplant	SG	Pretransplant	7/20 transplanted, all met weight criteria. 1 staple line leak, 2 patients with transient hepatic decompensation
Safwan et al[121]	2007-2017	Patients currently undergoing LT with remote history of prior bariatric surgery Roux en Y (9) Sleeve gastrectomy (1) Jejunoileal bypass (1)	LRYGB SG Jejunoileal bypass	Pretransplant	30 d re-op rate, biliary complications, patient and graft survival at 1 and 2 y. No comparison group for complications, but similar patient/graft survival to those without bariatric surgery
Takata et al[90]	2004-2007	Patients with cirrhosis (n = 6) who underwent SG	SG	Pretransplant	Complications, excess weight loss, obesity-related comorbidities, transplant candidacy. Excellent weight loss noted, though short follow-up. No major complications but transient hepatic decompensation noted peri-operatively
Heimbach et al[87]	2006-2012	Obese patients undergoing LT who had a combined LT and SG (n = 7) and who had LT with no SG (N = 37)	SG	Simultaneous	Death, graft loss, operative complications were similar in two groups. Post LT metabolic outcomes superior in the combined group
Tariciotti et al[93]	2016	N = 1 obese patient with NAFLD and HCC undergoing combined LT + SG	SG	Simultaneous	Weight loss robust, no significant complications, follow-up only 5 mo, no comparison group
Nesher et al[92]	Not stated	LT and simultaneous SG (n = 3)	SG	Simultaneous	Normal allograft function, robust weight loss at 13 mo. No comparison group
Lin et al[55]	2007-2011	SG post LT (n = 8)	SG	Posttransplant	30-d complications include 3 re-ops. Weight loss robust, allograft function normal, improved metabolic parameters
Osseis et al[96]	2008-2015	SG post LT (N = 6)	SG	Posttransplant	Surgical outcomes, liver and kidney function tests, outcomes of obesity-related complications, excess weight loss
Tsamalaidze et al[122]	2010-2016	SG after LT (n = 12) and SG with no previous transplant (n = 36)	SG	Posttransplant	Case-control noted similar postoperative events, long-term weight loss, comorbidity resolution. Slightly longer hospital stay in those with prior LT
Elli et al[98]	2008-2014	Post solid organ transplant recipients undergoing sleeve gastrectomy and nontransplant patients undergoing sleeveb gastrectomy Kidney transplant (n = 6) Liver transplant (n = 2) Pancreas transplant (n = 2)	SG	Posttransplant	Percentage excess weight loss, perioperative and postoperative complications
Khoraki et al[97]	2008-2014	Post solid organ transplant patients undergoing SG Liver (n = 5) Also heart and kidney patients reported (total 10)	SG	Posttransplant	Robust weight loss, resolution or improvement of obesity-related co morbidities, normal allograft function. Splenectomy required in LT recipient due to bleeding, with subsequent PV thrombosis and need for TIPS

Obesity, transplantation, and bariatric surgery: An evolving solution for a growing epidemic

Tayyab S. Diwan[1] | Tiffany C. Lee[1] | Shunji Nagai[2] | Enrico Benedetti[3] | Andrew Posselt[4] | Ginny Bumgardner[5] | Sabrena Noria[5] | Bryan A. Whitson[5] | Lloyd Ratner[6] | David Mason[7] | Jon Friedman[8] | Kenneth J. Woodside[9] | Julie Heimbach[10]



- Future studies should investigate comparative effectiveness of bariatric surgery timing in the LT population between S-LT and D-LT.

American Journal of Transplantation 2013; 13: 363–368
Wiley Periodicals Inc.

doi: 10.1111/j.1600-6143.2012.04318.x

Combined Liver Transplantation and Gastric Sleeve Resection for Patients With Medically Complicated Obesity and End-Stage Liver Disease

Table 1: Characteristics of 37 patients enrolled in the noninvasive weight loss protocol, compared to those who underwent combined liver transplant plus sleeve gastrectomy. MELD at transplant = mean calculated value at transplant, not including exception scores. BMI at LT is corrected for ascites.

Characteristic	Total n = 37	Total N = 7	p-Value
Gender M:F	16:21	4:3	0.25
diagnosis	NASH = 12 HCV + HCC = 9 HCC + other = 3 CCA = 3 All other = 10	NASH = 4 HCV/NASH = 1 Alpha-1/NASH = 1	
Age at transplant	50 (range 31–67)	48 (range 44–60)	0.01
MELD at transplant	19 (range 8–35)	32 (range 11–40)	<0.001
Postoperative deaths	2/37 (5%)	0	0.27
O.R. Time, mean	4:21 (2:54–7:51)	4:59 (4:16–7:39)	0.59
Mean BMI at presentation	40 (36–46)	49 (46–51)	<0.001
Mean BMI at transplantation	33 (28–40)	48 (39–52)	<0.001
Mean BMI at last follow-up	36 (25–45)	29 (23–35)	0.003
N with BMI > 35 posttransplant	21/35 (60%)	0/7	0.001
Diabetes posttransplant	12/35 (34%)	0/7	0.03
Hemoglobin A1C at 1 year	5.6 (range 4.6–7)	5.6 (4.5–7)	0.26
Iothalmate clearance, mL/min/BSA at 1 year	48.3	55.8	0.29
Number of BP meds, mean at 1 year	1	0	0.05
Ultrasound (+) steatosis	7/35 (20%)	0/7	0.10
Mean follow-up	35 months (range 8–61 months)	17 months (range 8–33 months)	0.001

Diagnoses: NASH = nonalcoholic steatohepatitis; HCV = hepatitis C virus; HCC = hepatocellular carcinoma; CCA = neoadjuvant chemoradiotherapy + hilar cholangiocarcinoma alpha-1 anti-trypsin deficiency; MELD = Model for End-stage Liver Disease; O.R. = operating room; BMI = body mass index

Table 2: Specific patient details for those undergoing combined liver transplantation and sleeve gastrectomy. BMI at LT is corrected for ascites. MELD score is physiologic score and (exception score.)

Patient	LT Date	Diagnosis	MELD at LT	BMI at LT	OR time (h)	LOS (days) Post-LT	BMI at F/U	Complication
57 male	9/09	NASH	26	45	4:12	16	23	Late HAT, excess weight loss
55 female	9/10	HHT	11 (25)	48	4:18	8	34	Steroid-resistant rejection
53 female	10/10	NASH	27	39	4:16	8	30	None
54 female	1/11	NASH	40	51	5:04	8	35	None
48 male	6/11	Alpha-1, NASH	40	52	4:55	13	28	None
60 male	8/11	HCV, NASH	40	51	4:29	133	26	Early graft dysfunction, leak from gastric staple line
44 male	11/11	NASH	40	48	7:39	16	27	None

Diagnoses: NASH = nonalcoholic steatohepatitis; HCV = hepatitis C virus; Alpha-1 = alpha-1 anti-trypsin deficiency

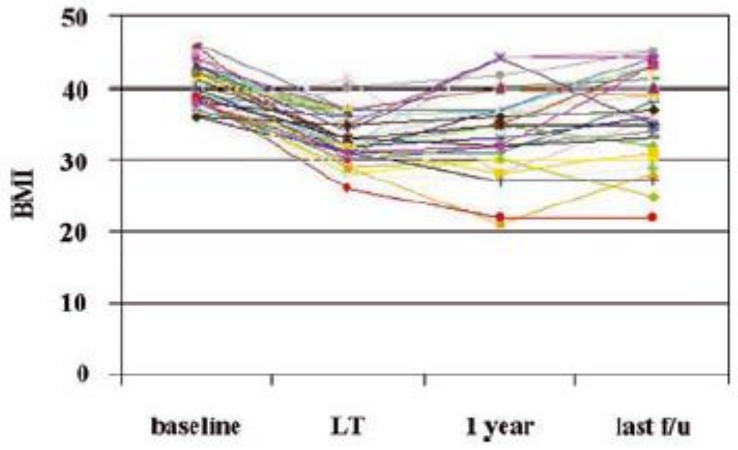


Figure 1: BMI trends for 37 patients managed in the noninvasive pre-LT weight loss program. Mean follow-up is 33 months.

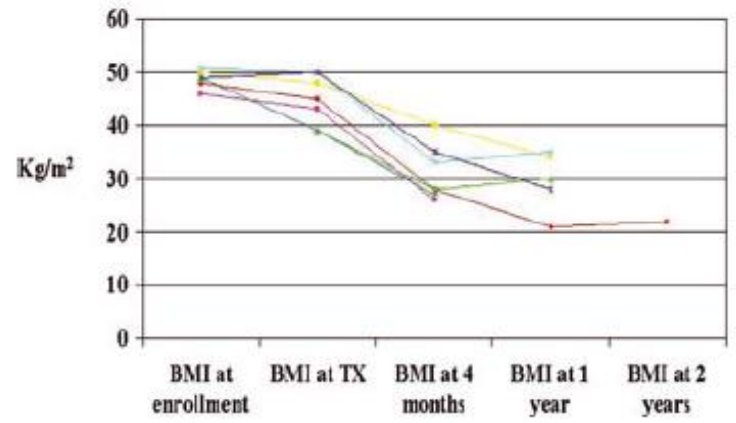


Figure 2: BMI trends for those patients who underwent combined liver transplant plus sleeve gastrectomy (N = 7). Mean follow-up is 17 months.

Delayed Sleeve Gastrectomy Following Liver Transplantation: A 5-Year Experience

Mackenzie C. Morris,[1,2] Andrew D. Jung,[1,2] Young Kim,[1,2] Tiffany C. Lee,[1,2] Tiffany E. Kaiser,[1,2] Jonathan R. Thompson,[1,2] Khurram Bari,[2,3] Shimul A. Shah,[1,2] Robert M. Cohen,[2,3] Daniel P. Schauer,[2,3] Eric P. Smith,[2,3] and Tayyab S. Diwan[1,2]

TABLE 2. Patient Demographics

	Posttransplant LSG (n = 15)
Sex, male	6 (40.0)
Age, years	59 (51-62)
Race	
Caucasian	13 (86.7)
African American	2 (13.3)
OSA	3 (20.0)
HTN	11 (73.3)
DM	8 (53.3)
CAD	0 (0)
CVD	0 (0)
Etiology of liver failure	
NASH	14 (93.3)
Associated etiologies	
AIH	2 (13.3)
PBC	1 (6.7)
EtOH	3 (20.0)
HBV	1 (6.7)
HCV	1 (6.7)
Maintenance IS regimens	
Tacrolimus monotherapy	1 (6.7)
Tacrolimus + MMF	10 (66.7)
Tacrolimus + MMF + prednisone	2 (13.3)
Cyclosporine + MMF	1 (6.7)
Cyclosporine + azathioprine	1 (6.7)

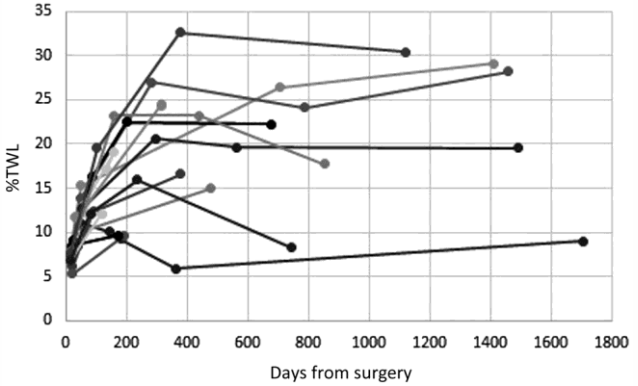


FIG. 1. The %TWL for each individual patient following LSG.

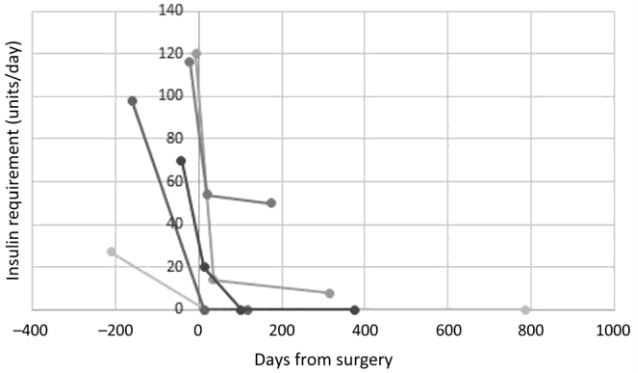


FIG. 2. The daily insulin requirement for patients on insulin therapy preoperatively and in the postoperative period following LSG.

Liver Transplantation 25 1673–1681 2019 AASLD.
Received May 2, 2019; accepted August 2, 2019.

Liver Tx ve Sleeve gastrektomy-LTSG

- Pre-tx başarısız kilo kaybı programları
- Bariatrik team ve transplant team
- Kadavra donör ve *duct to duct safra*
- Önce LT ve sonra OC (40 dk)
- Nasojejunal tüp; enteral beslenme
- Extübasyon sonrası kontrast testi ve oral gıda
- Taburculuk sonrası ilk 3 ay haftalık kontrol

Nesher E at all. Obes Surg.2017

Obezite cerrahisi (OC)

Gastric band (AGB): Ltx ilk kombine edilen

- Kilo kaybı etkisi az
- Yabancı cisim komplikasyonları
- Endoskopi zor (bilier komplikasyonda)

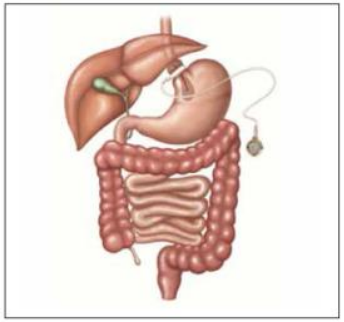


Figure 1. An adjustable gastric band. The arrow shows the direction of food.

Gastrik bypass (GB):

- Teknik olarak kompleks
- Malabsorbsiyon fazla (tac için önemli)

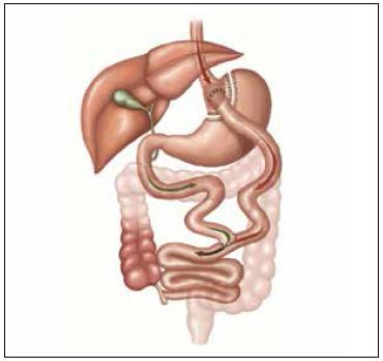


Figure 3. A Roux-en-Y gastric bypass. The red arrows show the direction of food, and the green arrows show the direction of bile.

Sleeve gastrectomy (SG):

- Önerilen

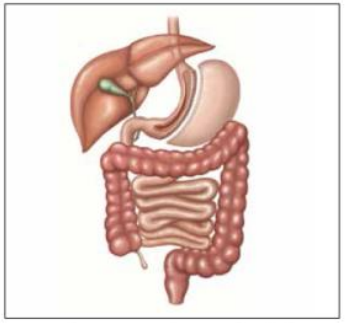


Figure 2. A sleeve gastrectomy. The arrow shows the direction of food.

Nesher E at all. Obes Surg.2017

Obezite cerrahisi (OC)

Table 2. Pros, cons, and weight loss of different bariatric approaches in the liver transplant setting.

	Gastric Bypass	Sleeve Gastrectomy	Banding	Intragastric Balloon
PROS	-The most efficient in terms of weight loss	-Does not cause malabsorption, less risk for malnutrition -Less operative time, reducing anesthesia duration -Technically easier -Does not modify pharmacokinetics of tacrolimus or MMF	-The least invasive, requires minimal dissection -Technically speaking is the easiest of the surgical procedures	-Minimally invasive -Can potentially be used in the decompensated patient -Easiest of all the procedures
CONS	-No easy access to the biliary tract or the remnant stomach which may develop variceal bleeding -Potential to lead to malabsorption and undernutrition -Affects the PKs of immunosuppressants -Use of steroids may increase the risk of marginal ulcers	-Risk of perioperative bleeding if there are gastric varices -Risk of bleeding or leakage from staple line	-Risk of complications related to the band (infection, migration) -The least effective in terms of weight loss	-Contraindicated in patients with large esophageal varices, gastric varices, or severe portal gastropathy

MMF: Mycophenolate mofetil; PKs: Pharmacokinetics.

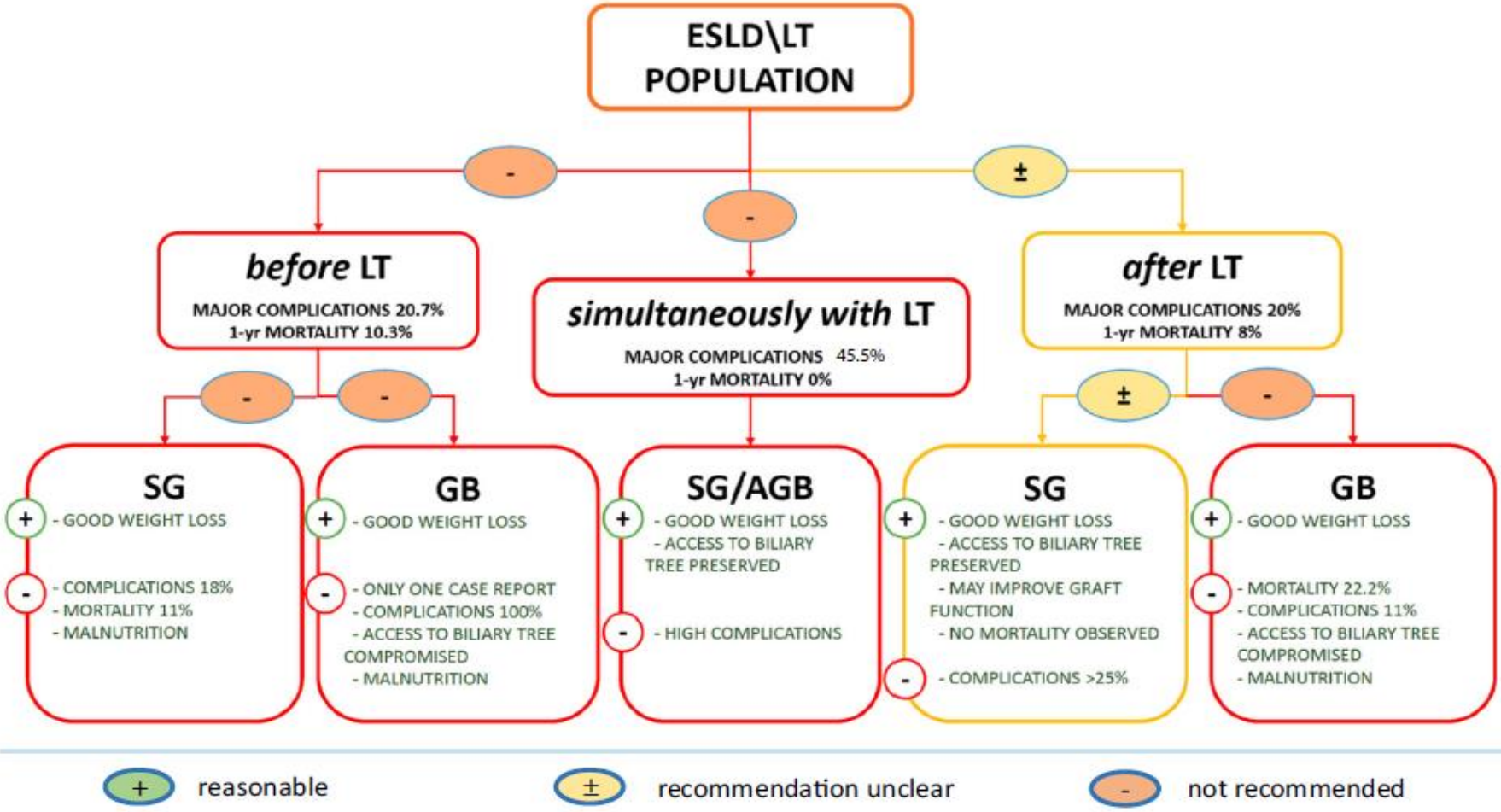
Nutrients **2019**, *11*, 2552; doi:10.3390/nu11112552

OBES SURG (2017) 27:2696–2706
DOI 10.1007/s11695-017-2854-8

REVIEW ARTICLE

The Role of Bariatric Surgery in Abdominal Organ Transplantation—the Next Big Challenge?

Tomasz Dziodzio[1] · Matthias Biebl[1] · Robert Öllinger[1] · Johann Pratschke[1] · Christian Denecke[1]



Karaciğer nakli sonuçlarımız

İstinye Üniversitesi
Liv Bahçeşehir Hastanesi

- **Karaciğer nakli:** 582 hasta
  - BMI 40>: 11 (max: 46.8 kg/m²)
  - BMI 35-39: 31
    - DUAL lob: 2 hasta

- **Sonuç: 42 hasta**
  - Pre ve posttx LSG: hasta yok
  - Takip:
  - Hasta kaybı: 9
    - Periop (ilk 30): 5
    - Takipte: 2
      - İnfeksiyon: 2 (covid)

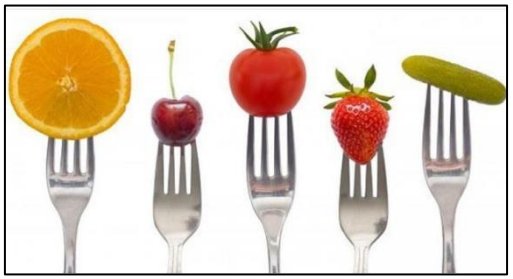
Sonuç

- ✓ Perioperatif komplikasyon riskini kabul edilemez hale getiren veya uzun vadeli sonuçları çok kötü yapan obezite derecesinde fikirbirliği YOK..
- ✓ Obez hastalarda hasta ve graft sağkalımı
  - ✓ Obez olmayanlara göre daha kötü
  - ✓ Tx adayı ve bekleme listesi hastalarına göre daha iyi
- ✓ Bekleme listesi ve böbrek nakli hastalarında
  - ✓ OC; seçilmiş hastalarda etkin ve güvenlidir.
  - ✓ Böbrek nakli sonrası SG ve GB uygulanabilir
  - ✓ SDBH ve bekleme listesi hastalarında SG önerilir
    - ✓Renal fonksiyonları düzeltebilir
    - ✓Kabul edilir mortalite ve morbidite

Sonuç

- **Karaciğer nakli;** obez hastalarda belirli bir mortalite ve morbidite oranı ile uygulanabilir
  - OC; Ltx sonrası güvenli bir cerrahidir.
  - GB; komplikasyon oranı yüksek
  - SG; tercih edilen prosedür olmalı

- İmmunsupresif İlaçlar
  - Tabletlerin kullanımı
  - Antiproliferatif ilaçların yönetimi



- Eşzamanlı OC ve Ltx yükselen trend
- Canlı vericili nakil deneyimi **???**

Teşekkürler

drdinckan@gmail.com