Reconsidering the Impacts of Morbid Obesity on Kidney Transplantation in the Age of Robotic-Assisted Kidney Transplantation

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Robotic-Assisted Kidney Transplant for Obese Recipients

- Most kidney transplant centers in the United States employ a BMI cutoff for kidney transplant recipients
- Consideration to raise BMI limits and expand transplant access for morbidly obese patients through use of robotic-assisted kidney transplant (RAKT)

RAKT can overcome technical limitations in high BMI patients…but:

How does obesity impact kidney transplant outcomes?

What is the best approach to implementing RAKT in obese recipients?

Effects of BMI on Kidney Transplant: UNOS/OPTN Database

OPTN ORGAN PROCUREMENT AND TRANSPLANTATION NETWORK

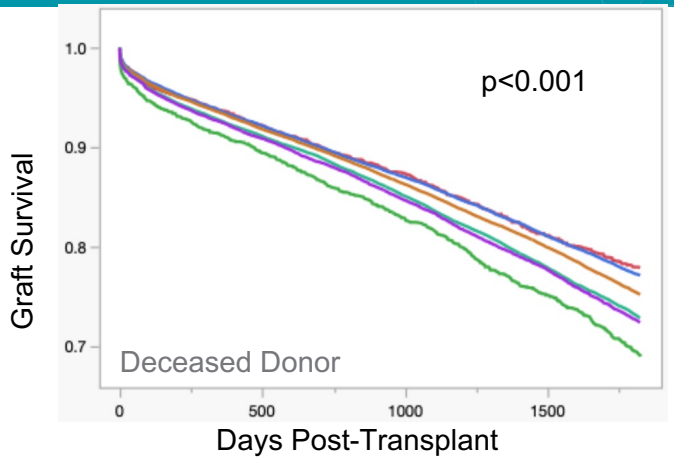
UNOS℠

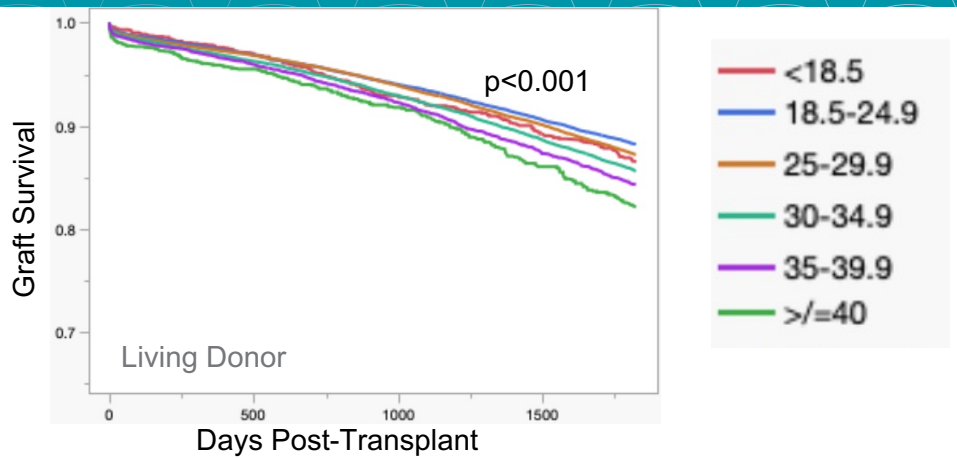
- Retrospective analysis of UNOS/OPTN kidney transplant database (2005-2019)
- Stratified into cohorts by:
  - Deceased donor (n=138,132) vs living donor (n=68,957) kidney transplant
  - BMI (in kg/m^2): <18.5; 18.5-24.9; 25-29.9; 30-34.9; 35-39.9; >40
- Primary endpoint: 5-year graft survival
  - Multivariable model for 5-year graft survival constructed (70% test; 30% validation)
- Secondary endpoints: Incidence of DGF, 6-mo and 12-mo eGFR, rejection

Demographics

Outcome	BMI (in kg/m2)						P value
	<18.5	18.6-24.9	25-29.9	30-34.9	35-39.9	>40	
Age, y (median, IQR)	43 (29-57)	53 (41-63)	57 (47-65)	56 (47-64)	54 (45-62)	51 (42-59)	<0.001
Gender (% male)	34.2	56.6	65.4	61.2	56.1	50.2	<0.001
Race/Ethnicity (%)							
White	34.7	36.8	39.3	41.4	42.1	39.7	<0.001
Black	26.4	29.9	33.1	37.1	42.1	46.7	
Hispanic	16.3	18.6	19	15.8	12	9.6	
Asian	20.9	13.1	6.7	3.3	1.8	1.2	
Other	1.7	1.7	2	2.5	2.1	2.7	
Recipient DM (%)	9.7	24.2	37.6	47.2	48.8	42.5	<0.001

UNOS/OPTN Database: 5-Year Graft Survival

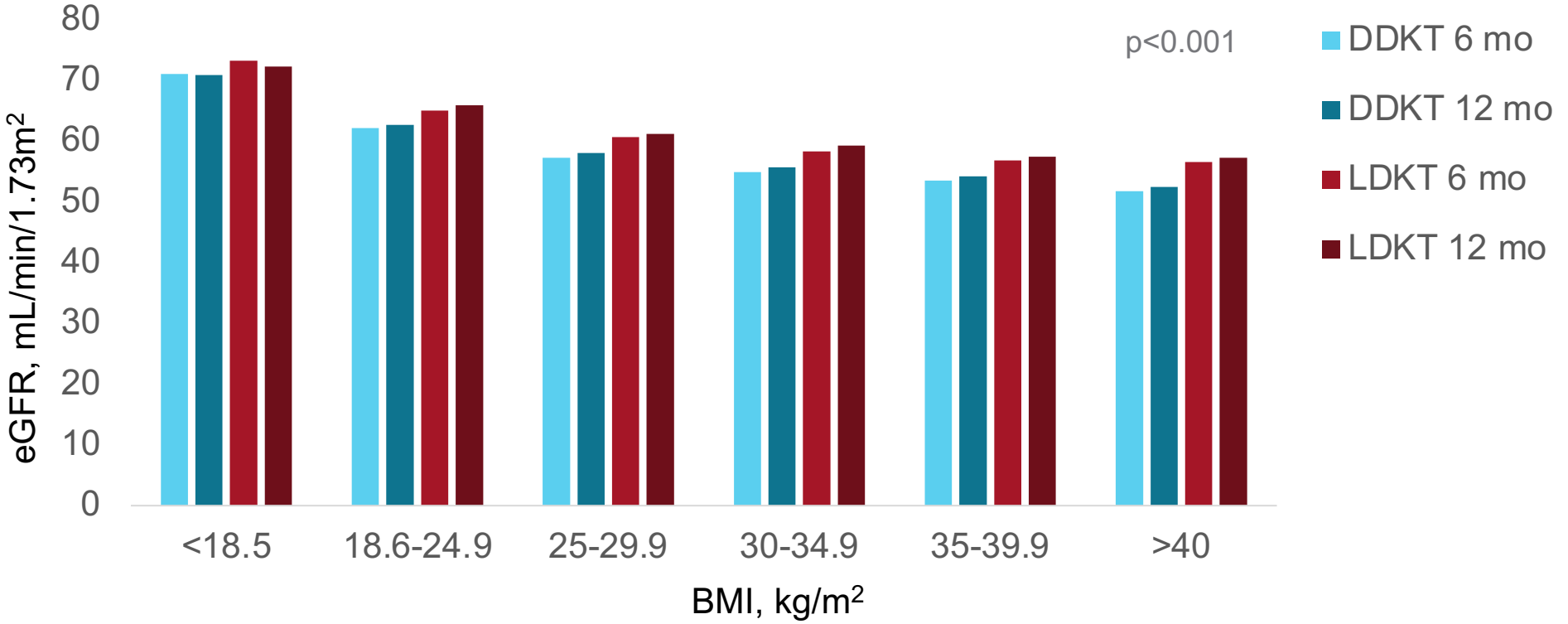




Multivariable 5-yr Graft Loss Hazard Ratio

	BMI (in kg/m2)						P value
	<18.5	18.6-24.9	25-29.9	30-34.9	35-39.9	>40	
Deceased donor	1.145 (1.004-1.305)	Ref	0.981 (0.942-1.022)	1.036 (0.992-1.083)	1.084 (1.025-1.146)	1.289 (1.163-1.429)	**<0.001**
Living donor	1.188. (0.782-1.806)	Ref	1.156 (1.000-1.337)	1.136 (0.969-1.330)	1.091 (0.890-1.338)	**1.431** (1.004-2.039)	0.252

UNOS/OPTN Database:
Estimated Glomerular Filtration Rate (eGFR) – 6mo and 12mo



UNOS/OPTN Database: Secondary Outcomes

	BMI (in kg/m2)						
	<18.5	18.6-24.9	25-29.9	30-34.9	35-39.9	>40	
	Incidence of DGF (%)						p value
Deceased donor	18.7	22.6	26.4	30.03	32.9	37.8	<0.001
Living donor	2.5	2.6	3.1	3.9	4.8	5.7	<0.001
	Length of Stay, days (median, IQR)						
Deceased donor	5 (4-8)	5 (4-7)	5 (4-7)	5 (4-7)	5 (4-7)	5 (4-8)	<0.001
Living donor	4 (3-5)	4 (3-5)	4 (3-5)	4 (3-5)	4 (3-5)	4 (4-6)	<0.001
	Evidence of Acute Rejection (%)						
Deceased donor - 6 months	5.6	6	6.3	7.3	7.6	8.1	<0.001
12 months	8.1	7.6	7.9	8.8	9.1	9.5	<0.001
Living donor - 6 months	4.5	5.6	6.4	7.1	8.4	8.7	<0.001
12 months	6.3	7.2	7.9	8.7	9.8	10.8	<0.001

We Can, But Should We?

- Inferior short- and medium-term outcomes for patients with BMI >35
  - Inferior DDKT 5-year graft survival – DD
  - Decreased eGFR at 1 year – DD and LD
  - Increased delayed graft function, LOS, acute rejection
- Must be considered against the known 20% 1-year mortality on dialysis
- RAKT mitigates technical aspects of kidney transplant
- Should be employed with a peri-transplant weight loss strategy to optimize graft outcomes

We Can, but Should We? Pathways to Kidney Transplantation