



UNIVERSITÀ DEGLI STUDI DI NAPOLI
FEDERICO II



Robotic Kidney Transplant in Candidates with Morbid Obesity

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XXVI IFSO WORLD CONGRESS
OF BARIATRIC & METABOLIC SURGERY

NAPOLI, ITALY | Mostra d'Oltremare
30 AUGUST - 1 SEPTEMBER, 2023

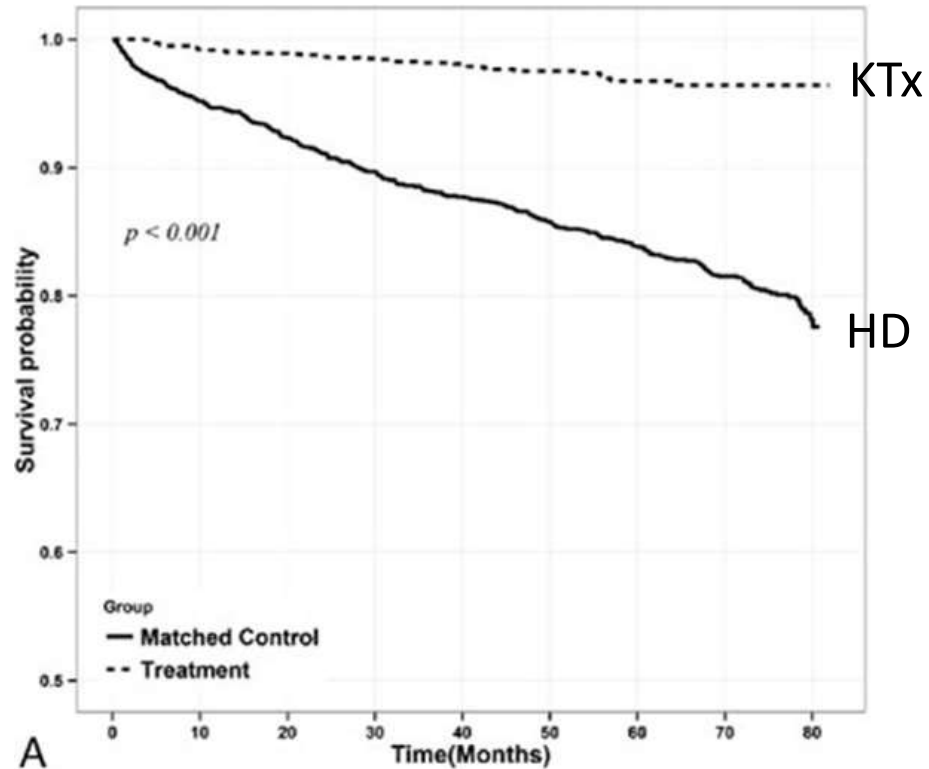




KTx vs HD



PATIENT SURVIVAL



1-year OS >95%

FOCUS ON:

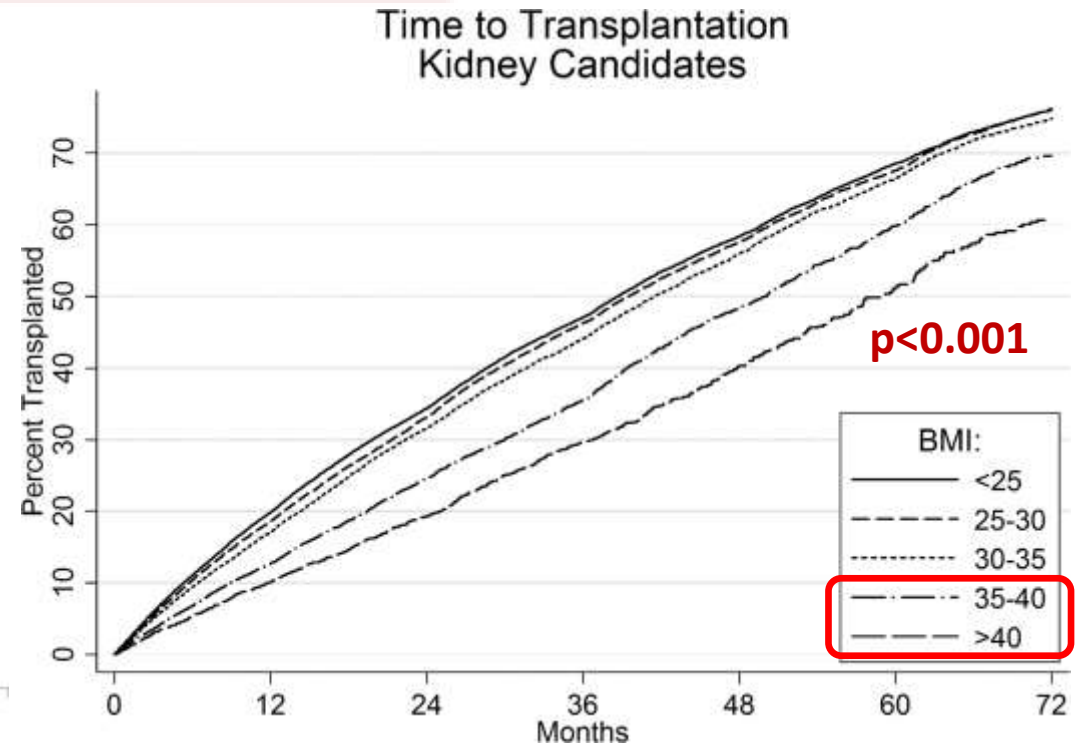
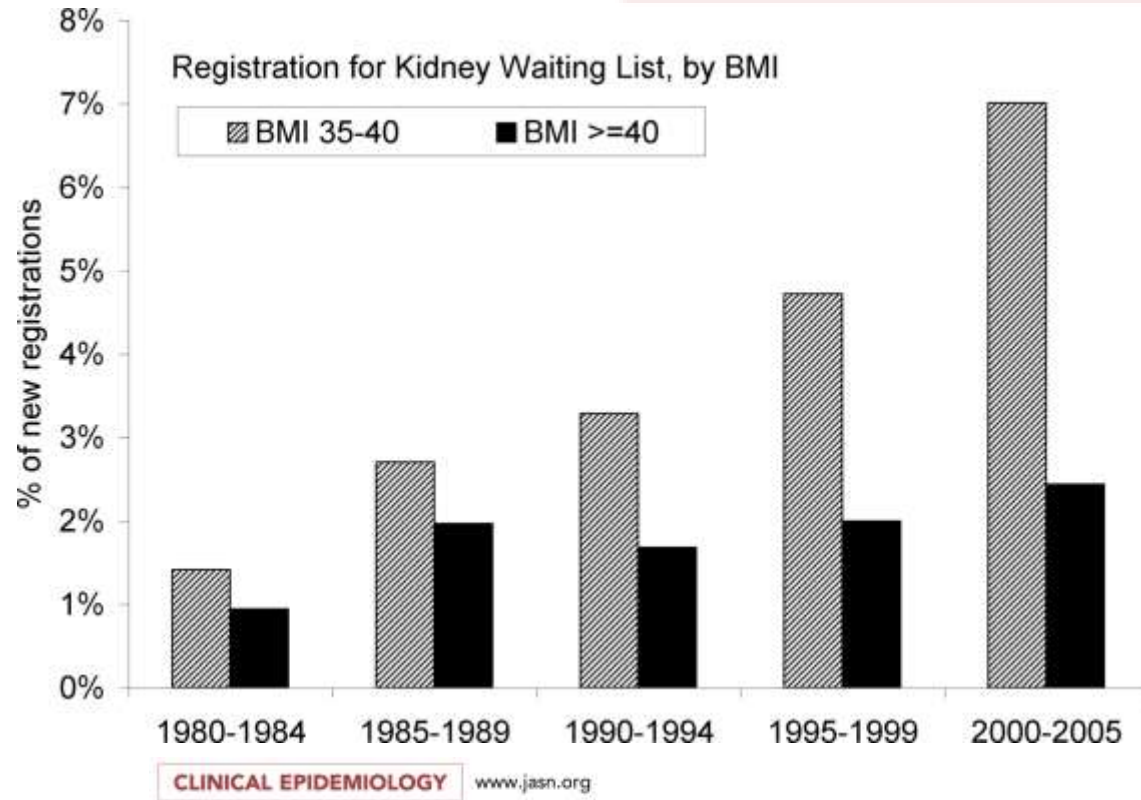
- Long-term outcomes
- Morbidity/QoL
- Increase access



Obesity and KTx



3rd leading cause of suspension from WL



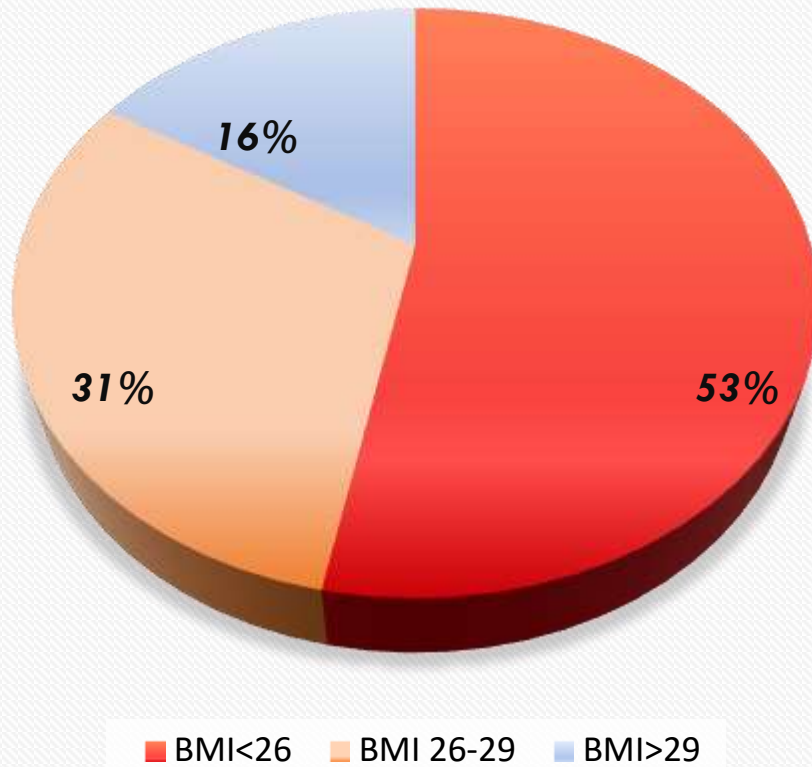
Obesity Impacts Access to Kidney Transplantation

Dorry L. Segev,* Christopher E. Simpkins,* Richard E. Thompson,† Jayme E. Locke,* Daniel S. Warren,* and Robert A. Montgomery*





KTx Candidates



- 147 patients (41 suspended)
- Average Age: 53.3 ± 5.3
- Average BMI: 25.7 ± 4.9
- BMI active pts: 24.7 ± 4.9
- BMI suspended pts: 27.3 ± 4.6

} $p=0.003$

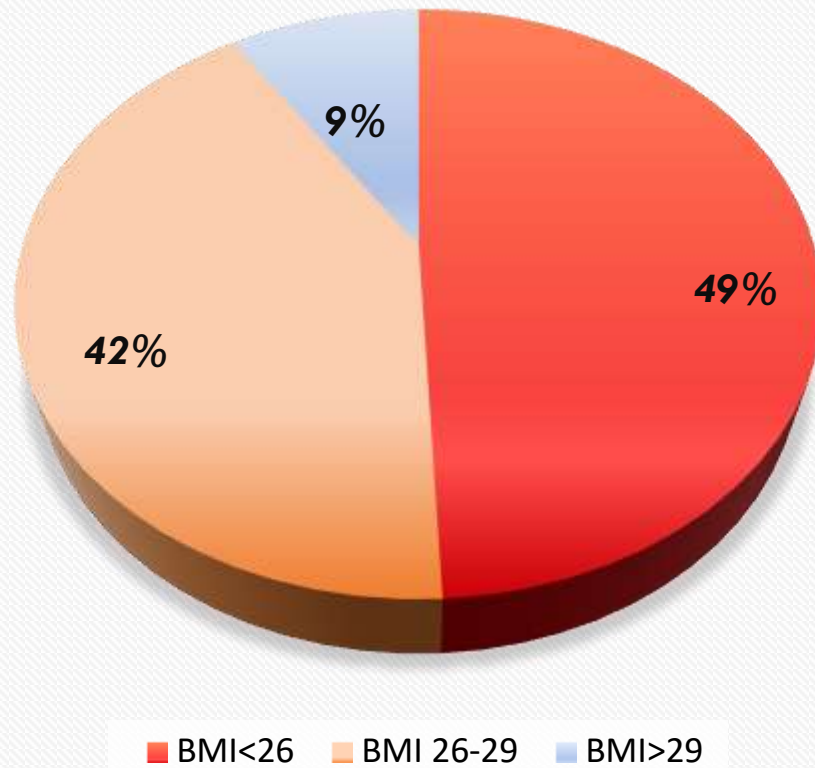


Federico II – KTx Recipients

ROB KTx in BMI>30
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KTx Recipients



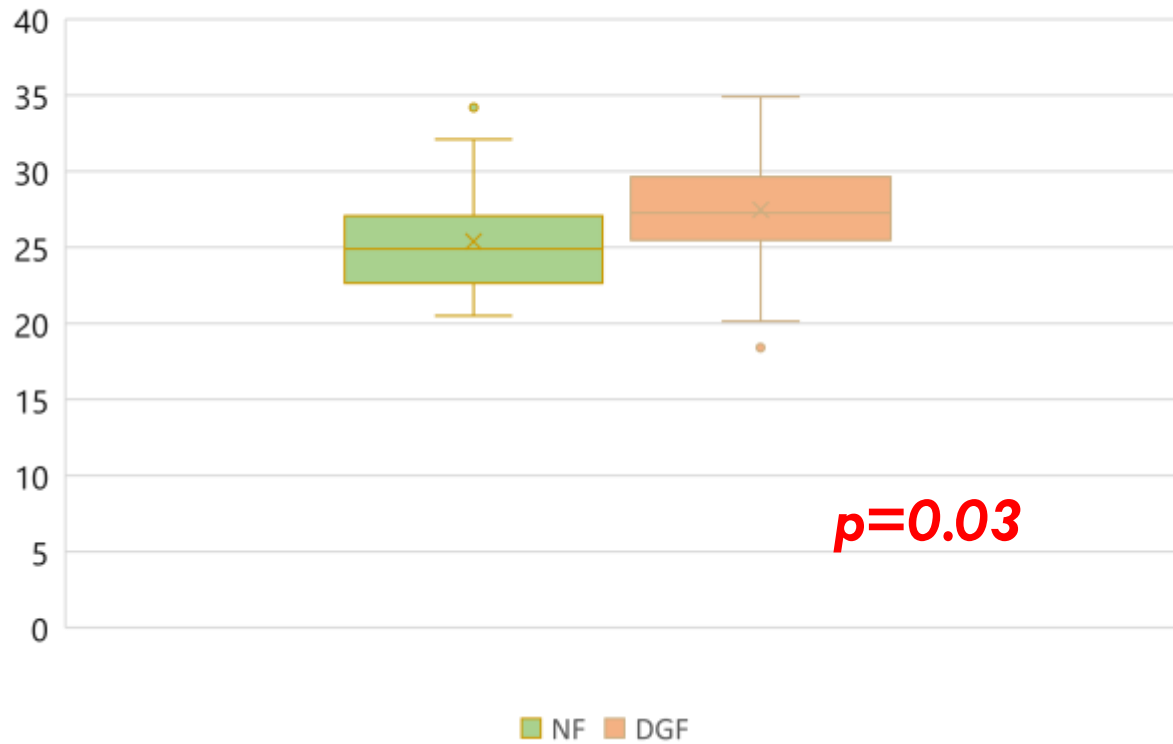
- Recipient age: 46.6 ± 9.2 yrs
- Recipient BMI: 24.8 ± 4.0



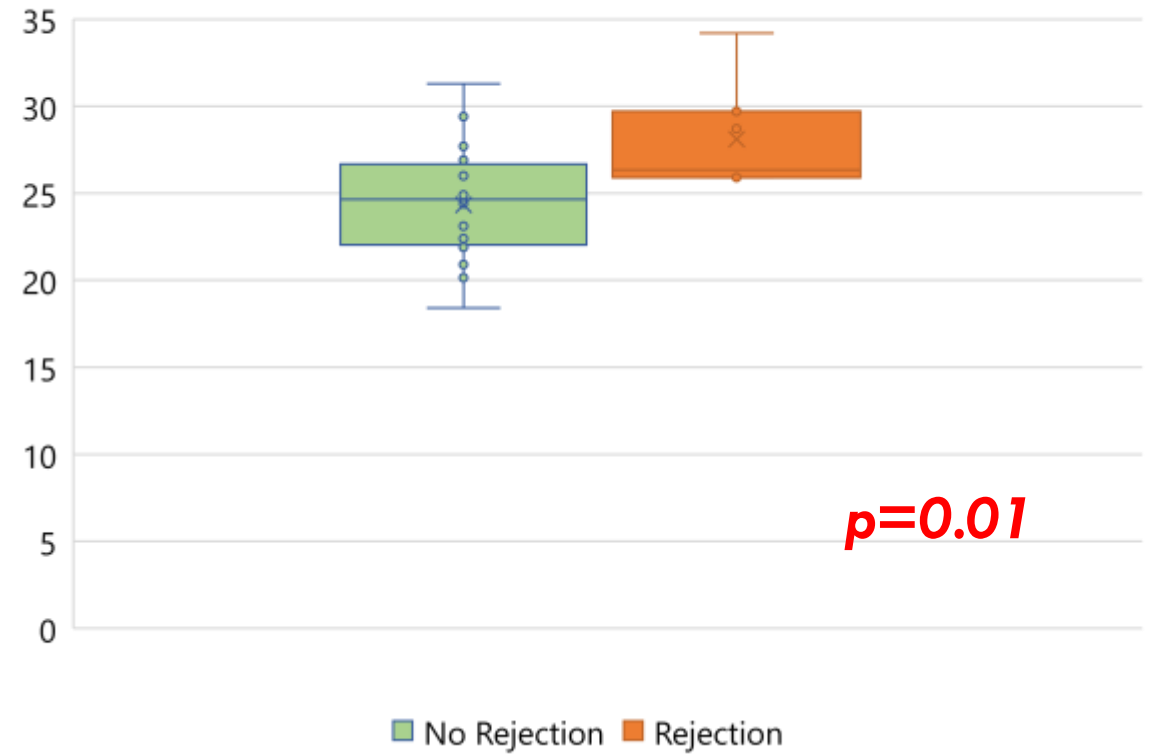
Federico II - Outcomes



BMI and Graft Function



BMI and Rejection





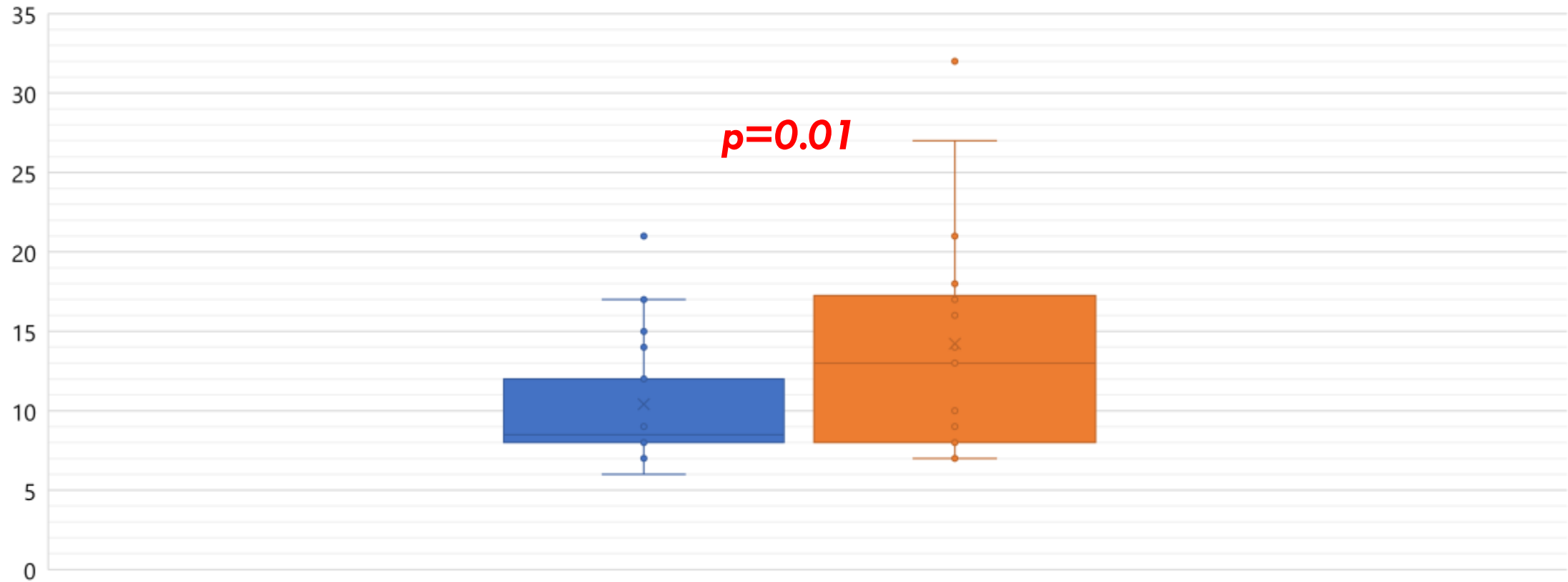
Federico II - Outcomes

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LOS

■ Normal BMI ■ BMI > 25





KTx vs HD in Obese

ROB KTx in BMI>30
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Clinical TRANSPLANTATION
The Journal of Clinical and Translational Research

Kidney transplantation in the morbidly obese: complicated but still better than dialysis

William M. Bennett, Kevin M. McEvoy, Karen R. Henell, Sudha Pidikiti, Viken Douzdjian, Thomas Batiuk

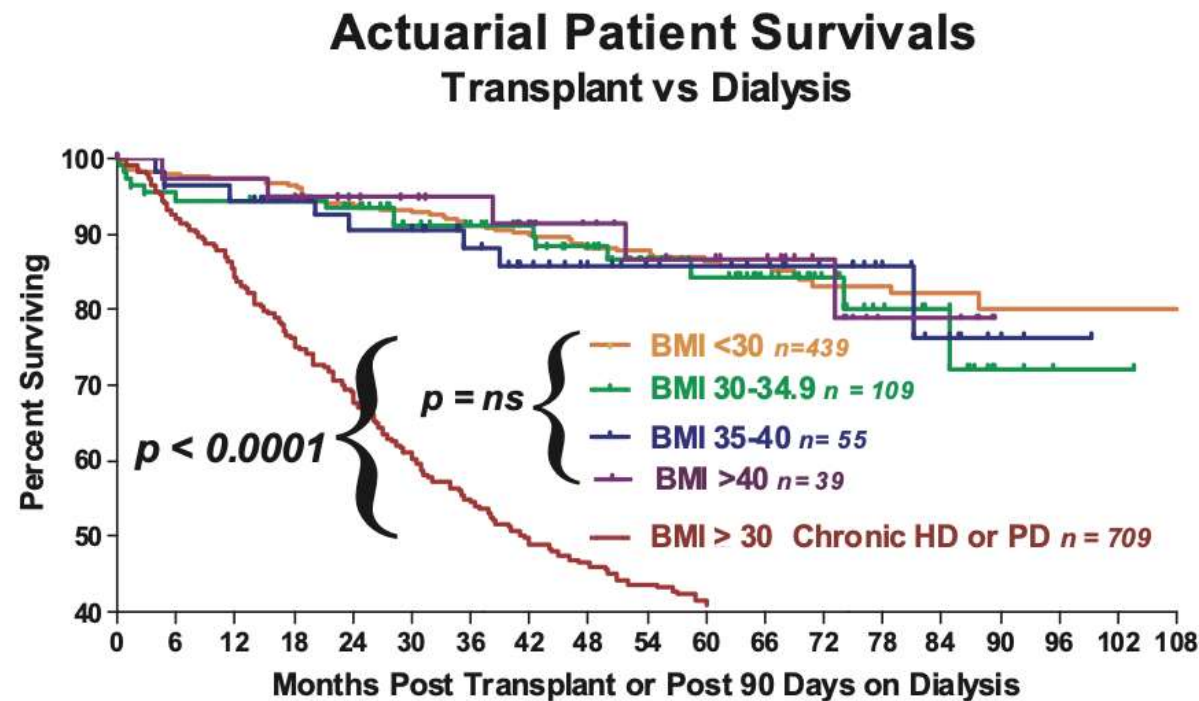


Fig. 1. Actuarial patient survival with transplant (this series) compared to patient survivals on dialysis with BMI > 30.



BMI and Access to KTx

ROB KTx in BMI>30
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Accept people with ESKD and a BMI of 30–34 kg/m² for kidney transplantation if they are otherwise considered suitable; it is suggested to counselling patients living with obesity about the possible increased risk of perioperative complications such as delayed graft function, wound-related morbidity, acute rejection and diabetes after transplantation.



Transplant candidates should **not be excluded** from transplantation **because of obesity**. However, transplantation in **patients with a BMI >40 kg/m²** should be approached with **caution** and patient **counselling** related to the **increased risk of postoperative complications** is recommended.'



BMI >30 kg/m² presented technical difficulties and increased the risk of perioperative complications and individuals with a BMI >40 kg/m² were less likely to benefit from kidney transplants.



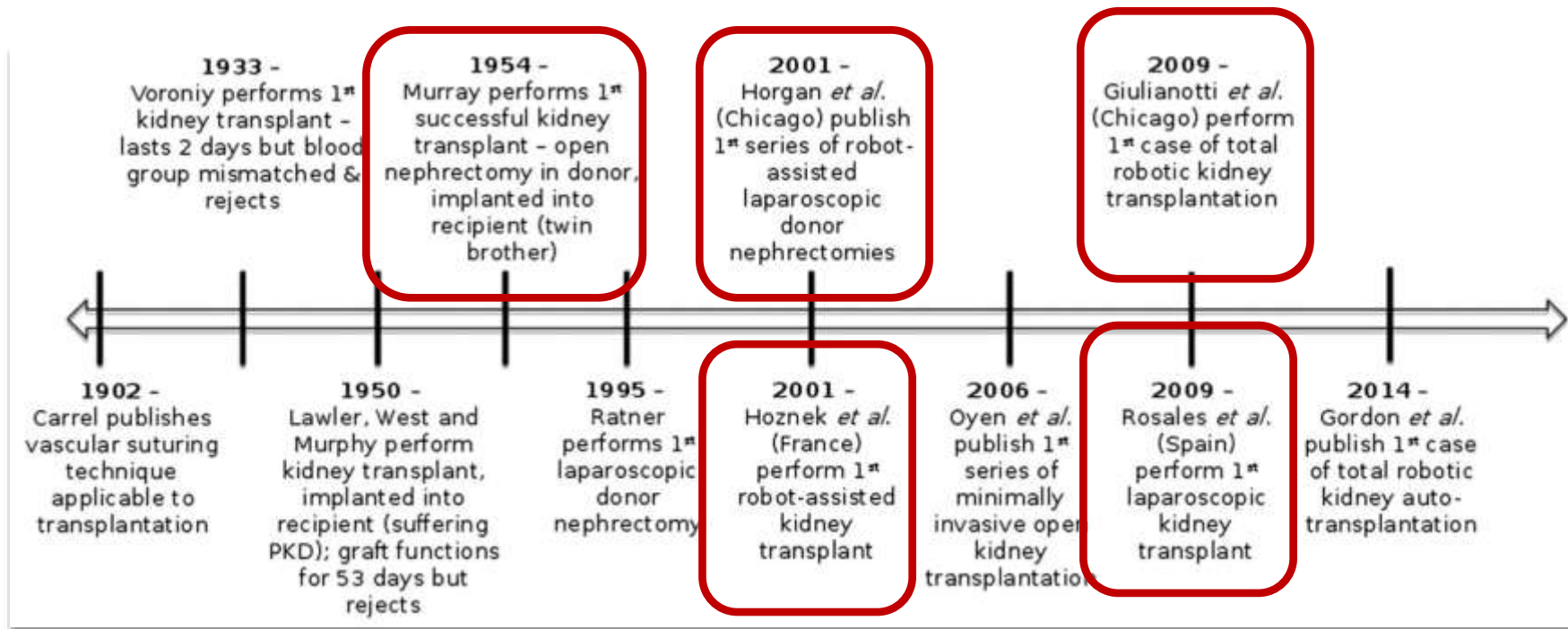
Kidney transplant candidates with a BMI >30 kg/m² should lose weight prior to kidney transplant.



Obesity alone should not preclude a patient from a kidney transplant. In the case of **BMI >40 kg/m², suitability is carefully assessed on an individual basis.** Since graft survival may be mediated by comorbid factors, particularly cardiovascular, it is also recommended that transplant candidates were screened for cardiovascular disease.



KTx milestones



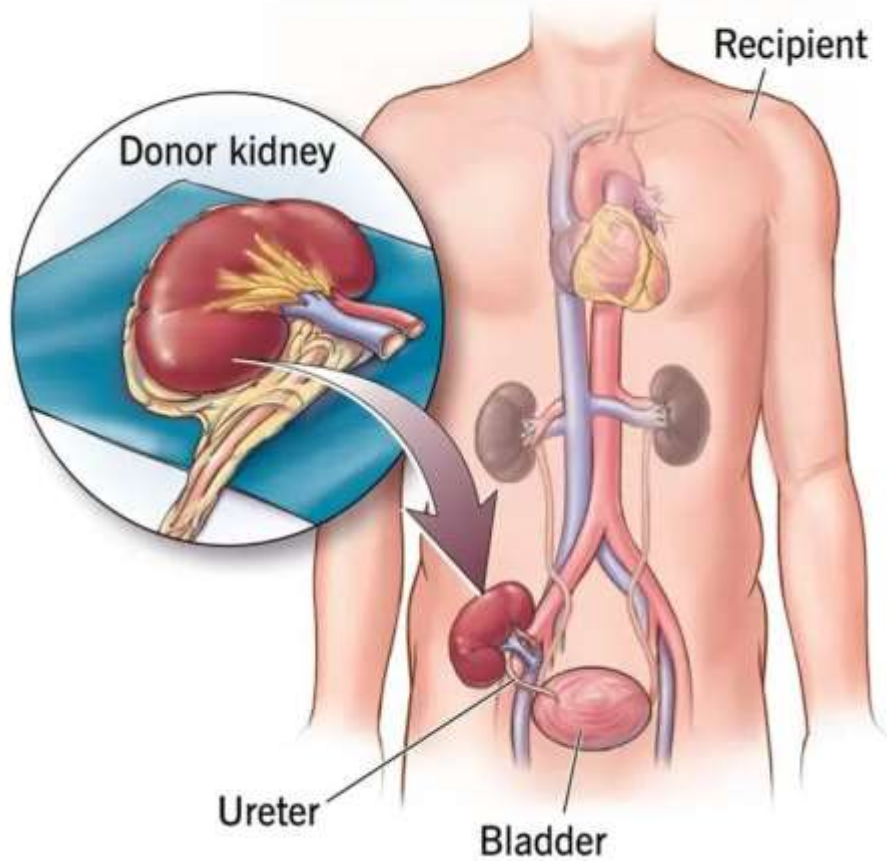


KTx surgery

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Kidney Transplant





RAKTx

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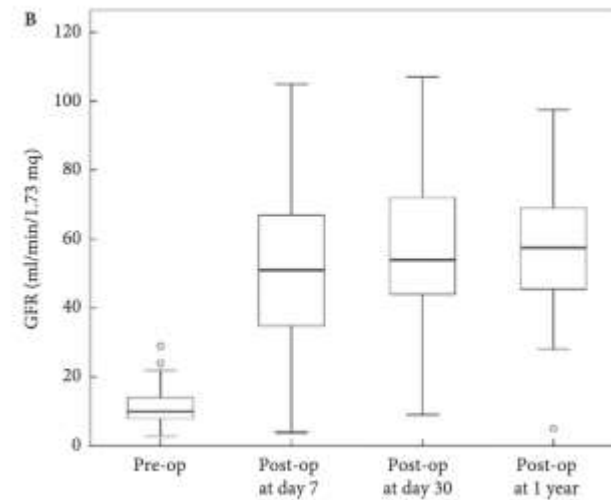
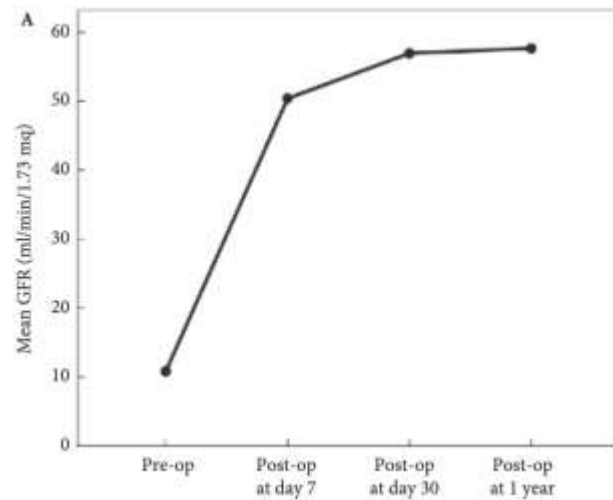


Mobilization of iliac vessels



European experience of robot-assisted kidney transplantation: minimum of 1-year follow-up

Angelo Territo^{*}, Lluís Gausa^{*}, Antonio Alcaraz[†], Mireia Musquera[†], Nicolas Doumerc[‡], Karel Decaestecker[§], Liesbeth Desender[¶], Michael Stockle^{**}, Martin Janssen^{**}, Paolo Fornara^{††}, Nasreldin Mohammed^{††}, Giampaolo Siena^{‡‡}, Sergio Serni^{‡‡}, Selcuk Sahin^{§§}, Volkan Tuğcu^{§§}, Giuseppe Basile^{*} and Alberto Breda^{*}



Findings at 1-year follow-up indicate RAKT from a living donor to be a safe procedure in a properly selected group of recipients. RAKT was associated with a low complication rate and there was maintenance of excellent graft survival and function. This is the first and largest study to report functional results after RAKT from a living donor with a minimum follow-up of 1 year.



RAKTx in Obese Pts

ROB KTx in BMI>30
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NIH Public Access

Author Manuscript

Am J Transplant. Author manuscript; available in PMC 2014 March 01.

Published in final edited form as:

Am J Transplant. 2013 March ; 13(3): 721-728. doi:10.1111/ajt.12078.

Minimally Invasive Robotic Kidney Transplantation for Obese Patients Previously Denied Access to Transplantation

J. Oberholzer, MD¹, P. Giulianotti, MD², K.K. Danielson, PhD^{1,5}, M. Spaggiari, MD¹, L. Bejarano Pineda, MD¹, F. Bianco, MD², I. Tzvetanov, MD¹, S. Ayloo, MD², H. Jeon, MD¹, R. Garcia-Roca, MD¹, J. Thielke, PharmD³, I. Tang, MD⁴, S. Akkina, MD⁴, B. Becker, MD⁴, K. Kinzer, BS¹, A. Patel, MBA¹, and E. Benedetti, MD¹

Robotic Kidney Transplant and Co

Demographics

Age (years), mean (SD)

Gender (male), No. (%)

Race (African American/Hispanic/White), N

Clinical

BMI (kg/m²), mean (SD)

Obese (30≤BMI<35)/Morbidly Obese (BMI

	Robotic Transplant (n=28)	Controls (n=28)	P value
Surgical Outcomes			
Delayed graft function, No. (%)	1 (3.6)	0	0.99
Surgical biopsy [*] , No. (%)	7 (25.0)	0	0.01
Wound complications, No. (%)	1 (3.6)	8 (28.6)	0.02
Wound infections, No. (%)	0	8 (28.6)	0.004
Creatinine at discharge (mg/dl), mean (SD)	2.0 (1.4)	1.4 (0.5)	0.04
Creatinine at 6 months (mg/dl), mean (SD)	1.5 (0.4)	1.6 (0.6)	0.47
Graft survival at 6 months, No. (%)	28 (100)	28 (100)	
Patient survival at 6 months, No. (%)	28 (100)	28 (100)	
Resource Utilization			
Hospital days for transplant, mean (SD)	8.2 (4.5)	8.1 (5.3)	0.98
Total hospital days over 6 months, mean (SD)	14.3 (10.2)	15.8 (17.3)	0.69
Readmission over 6 months, mean (SD)	1.6 (2.0)	1.5 (1.5)	0.82
Reoperation over 6 months, No. (%)	0	1 (3.6)	0.99
Hospital costs for transplant (\$: n=28/25), mean (SD)	75,148	60,552	0.02
Total hospital costs over 6 months (\$), mean (SD)	86,272	66,487	0.04



RAKT_x + SG

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Received: 30 April 2020 | Revised: 25 August 2020 | Accepted: 15 September 2020
DOI: 10.1111/ajt.16322

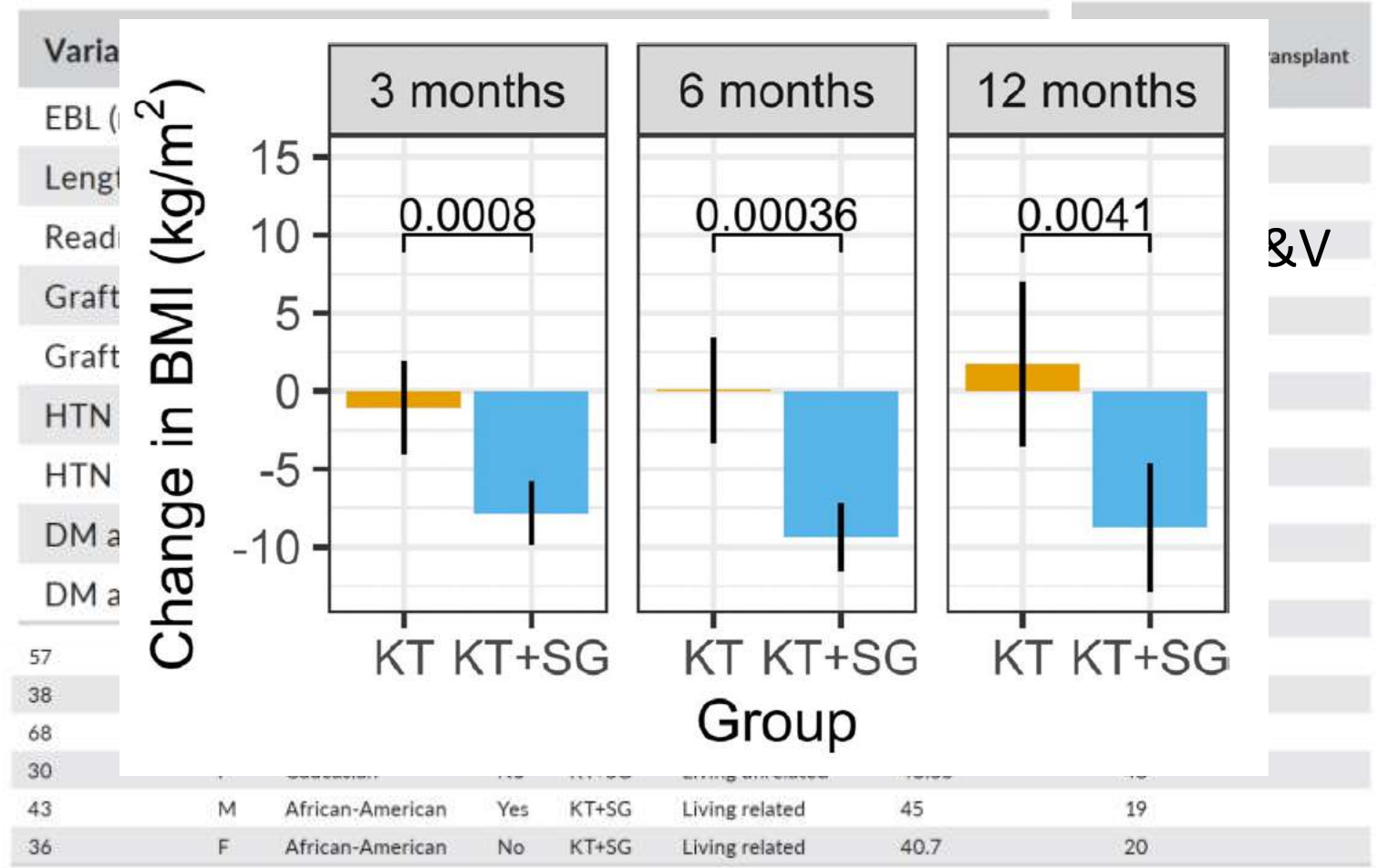
ORIGINAL ARTICLE

AJT

Simultaneous robotic kidney transplantation and bariatric surgery for morbidly obese patients with end-stage renal failure

Mario Spaggiari¹ | Pierpaolo Di Cocco¹ | Kiara Tulla¹ | Kerim B Kaylan² | Mario A Masrur³ | Chandra Hassan³ | Jorge A Alvarez¹ | Enrico Benedetti¹ | Ivo Tzvetanov¹

- BMI>35
- 95% LD





KTx vs HD



Advantages

Intra-operative ease

- Magnification

- Three-dimensional high definition

- Higher degrees of freedom with robotic arms

- Tremor filtration

Improved post-operative recovery

- Reduced post-operative pain and analgesic requirement

- Reduced length of hospital stay

Reduced wound complications (e.g., surgical site infection, incisional hernia)

Improved cosmetic outcome

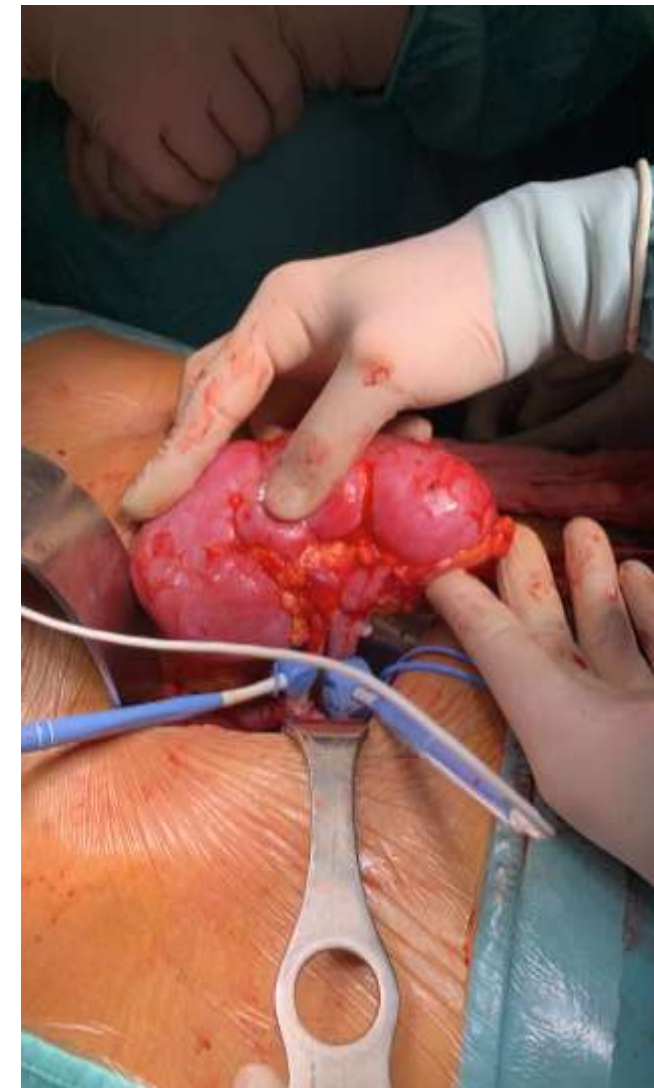
Disadvantages

Long operative times

Longer cold ischaemia, rewarming and total ischaemia times

Difficult post-operative biopsy of transplant kidney

High cost





Obesity

Obesity is highly prevalent across high-income countries and increasingly so across low- and low-middle income countries. In the US, nearly 70% of the adult population is overweight or obese, while 6.7% have class III obesity (BMI ≥ 40).¹⁴⁶ Obesity in the context of metabolic syndrome is a strong risk factor for the development of ESKD. In the Reason for Geographic and Racial Differences in Stroke (REGARDS) study which prospectively evaluated 30,239 black and white adults in the US, the overall incidence of obesity (BMI ≥ 30 kg/m²) was 38%, of whom 66% had metabolic syndrome. In the presence of metabolic syndrome, obesity increased the risk of ESKD two-fold. However, there was no independent association of obesity and ESKD in the absence of metabolic syndrome. Despite the clear association of obesity with peripheral vascular disease, coronary artery disease, and steatohepatitis, obesity is often associated with a lower risk of death among patients receiving maintenance dialysis.^{147,148}

The impact of obesity on kidney transplant outcomes is complex. When compared to remaining on dialysis, obese patients who undergo kidney transplant experience prolonged survival.^{149,150} Among obese patients, Gill *et al.* demonstrated a 48% reduction in mortality after transplantation compared to remaining on dialysis. However, a recent meta-analysis including more than 200,000 recipients comparing outcomes in obese and non-obese recipients, demonstrated that obesity (BMI > 30 kg/m²) conveys an increased risk of death (relative risk [RR] 1.52), delayed graft function (RR 1.52), acute rejection (RR 1.17), wound infection (RR 3.13), dehiscence (RR 4.85), and prolonged hospital stay (2.31 days). Consequently, the Work Group recommends assessment of all candidates for obesity using either BMI or waist-to-hip criteria. Obesity is a relative contraindication to kidney transplantation. Patients found to be obese or particularly those with class II or class III obesity (BMI ≥ 35 kg/m²) should be considered for intervention such as dietary counseling or bariatric surgery. The Work Group did not establish a firm BMI cutoff, but encourages each transplant program to consider their own resources and skills in caring for this population. For example, early experience with robotically assisted transplantation has demonstrated improved outcomes among obese patients.¹⁵¹ Pre-transplant panniculectomy may be use-



EAU Guidelines on Renal Transplantation

A. Breda (Chair), K. Budde, A. Figueiredo, E. Lledó García,
J. Olsburgh (Vice-chair), H. Regele
Guidelines Associates: R. Boissier, V. Hevia,
O. Rodríguez Faba, R.H. Zakri
Guidelines Office: E.J. Smith

3.1.5.2 *Robot-assisted kidney transplant surgery*

Robot-assisted kidney transplant (RAKT) surgery using living donor kidneys has been evaluated in multi-centre prospective non-randomised studies (using IDEAL consortium principles) [126]. Single-centre prospective non-randomised studies are on-going addressing RAKT with use of deceased donor kidneys. Both trans- and extra-peritoneal approaches for RAKT are described. Potential advantages of RAKT may exist (decreased post-operative pain, incision length and lymphocele rate). Potential issues with RAKT are the exclusion of recipients with severe atherosclerosis or third (or further) kidney transplants, a higher than expected rate of DGF and a small number of reported early arterial thromboses despite carefully selected cases [127]. The learning curve for RAKT has been reported to be 35 cases for experienced surgeons in a retrospective multicentre series of 187 patients undergoing RAKT [128]. Complication and DGF rates decreased significantly and plateaued after the first 20 cases. The rate of Clavien-Dindo grade III/IV complications was 14% during the first ten RAKTs, but only 3% after this [128]. The rate of arterial graft thrombosis (1.6%) was comparable with that for open kidney transplant (0.5 - 3.5%) [128]. A ten year single-centre retrospective analysis of 239 obese RAKT patients concluded that RAKT can be safely performed in obese patients with minimal risk of developing a surgical site infection [129]. A graft failure rate of 7.1% was reported during follow-up mostly due to acute rejection. Patient and graft survival was 95% and 93% at three years, respectively [129]. Evidence is too premature to recommend RAKT outside of appropriately mentored prospective studies.



Conclusions - RAKTx



- Evidence and role still limited (no level 1)
- Non-inferior to open KTx in super selected cases
- Safety concerns
 - Abdominal organs damage
 - Graft warming
 - Intraoperative leak/bleeding
 - Inadequate 360° vision of anastomoses
 - Anastomoses not in the final position
- Advantages in obese patients
- Limitations: atherosclerosis, multiple/short vessels, re-transplantation
- Cost-effective?
- Feasibility 24/7 (availability of robotic platform)?
- Association with SG? Timing?
- Bypassing the BMI issue rather than “solving” it?

THANK YOU !



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Rettorato



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