1. GUÍAS Y REVISIONES

1. A Comprehensive Risk Quantification Score for Deceased Donor Kidneys: The Kidney Donor Risk Index. KDIGO 2018

Disponible en: https://kdigo.org/wp.../08/KDIGO-Txp-Candidate-GL-Public-Review-Draft-Oct-22.pdf Último acceso julio 2019.

2. European Renal Best Practice Guideline on kidney donor and recipient evaluation and perioperative care

Abramowicz D, Cochat P, Claas FH et al.
Nephrol Dial Transplant. 2015 Nov;30(11):1790-7.

ABSTRACT
The European Best Practice Guideline group (EBPG) issued guidelines on the evaluation and selection of kidney donor and kidney transplant candidates, as well as post-transplant recipient care, in the year 2000 and 2002. The new European Renal Best Practice board decided in 2009 that these guidelines needed updating. In order to avoid duplication of efforts with kidney disease improving global outcomes, which published in 2009 clinical practice guidelines on the post-transplant care of kidney transplant recipients, we did not address these issues in the present guidelines. The guideline was developed following a rigorous methodological approach: (i) identification of clinical questions, (ii) prioritization of questions, (iii) systematic literature review and critical appraisal of available evidence and (iv) formulation of recommendations and grading according to Grades of Recommendation Assessment, Development, and Evaluation (GRADE). The strength of each recommendation is rated 1 or 2, with 1 being a 'We recommend' statement, and 2 being a 'We suggest' statement. In addition, each statement is assigned an overall grade for the quality of evidence: A (high), B (moderate), C (low) or D (very low). The guideline makes recommendations for the evaluation of the kidney transplant candidate as well as the potential deceased and living donor, the immunological work-up of kidney donors and recipients and perioperative recipient care. All together, the work group issued 112 statements. There were 51 (45%) recommendations graded '1', 18 (16%) were graded '2' and 43 (38%) statements were not graded. There were 0 (0%) recommendations graded '1A', 15 (13%) were '1B', 19 (17%) '1C' and 17 (15%) '1D'. None (0%) were graded '2A', 1 (0.9%) was '2B', 8 (7%) were '2C' and 9 (8%) '2D'. Limitations of the evidence, especially the lack of definitive clinical outcome trials, are discussed and suggestions are provided for future research.

3. Evaluation of Adult Kidney Transplant Candidates. Ajad 2007

Disponible en: https://www.ajkd.org/article/S0272-6386(07)01147-X/fulltext Último acceso julio 2019.

4. Canadian Society of Transplantation consensus guidelines on eligibility for kidney transplantation. CMAJ 2005

Disponible en: http://www.cmaj.ca/content/173/10/S1 Último acceso julio 2019.

2. FRAGILIDAD

5. Individual Frailty Components and Mortality in Kidney Transplant Recipients.

McAdams-DeMarco MA, Ying H, Olorundare I, et al.
Transplantation. 2017 Sep;101(9):2126-2132.

ABSTRACT
BACKGROUND: Frailty increases early hospital readmission and mortality risk among kidney transplantation (KT) recipients. Although frailty represents a high-risk state for this population, the correlates of frailty, the patterns of the 5 frailty components, and the risk associated with these patterns are unclear.
METHODS: Six hundred sixty-three KT recipients were enrolled in a cohort study of frailty in transplantation (12/2008-8/2015). Frailty, activities of daily living (ADL)/instrumental ADL (IADL) disability, Centers for Epidemiologic Studies Depression Scale depression, education, and health-related quality of life (HRQOL) were measured. We used multinomial regression to identify frailty correlates. We identified which patterns of the 5 components were associated with mortality using adjusted Cox proportional hazards models.
RESULTS: Frailty prevalence was 19.5%. Older recipients (adjusted prevalence ratio [PR], 2.22; 95% confidence interval [CI], 1.21-4.07) were more likely to be frail. The only other factors that were independently associated with frailty were IADL disability (PR, 3.22; 95% CI, 1.72-6.06), depressive symptoms (PR, 11.31; 95% CI, 4.02-31.82), less than a high school education (PR, 3.10; 95% CI, 1.30-7.36), and low HRQOL (fair/poor: PR, 3.71; 95% CI, 1.48-9.31). The most common pattern was poor grip strength, low physical activity, and slowed walk speed (19.4%). Only 2 patterns of the 5 components emerged as having an association with post-KT mortality. KT recipients with exhaustion and slowed walking speed (hazards ratio = 2.43; 95% CI, 1.17-5.03) and poor grip strength, exhaustion, and slowed walking speed (hazard ratio, 2.61; 95% CI, 1.14-5.97) were at increased mortality risk.
CONCLUSIONS: Age was the only conventional factor associated with frailty among KT recipients; however, factors rarely measured as part of clinical practice, namely, HRQOL, IADL disability, and depressive symptoms, were significant correlates of frailty. Redefining the frailty phenotype may be needed to improve risk stratification for KT recipients.

6. Changes in Frailty After Kidney Transplantation.

McAdams-DeMarco MA, Isaacs K, Darko L, et al.
J Am Geriatr Soc. 2015 Oct;63(10):2152-7.

ABSTRACT
OBJECTIVES: To understand the natural history of frailty after an aggressive surgical intervention, kidney transplantation (KT).
DESIGN: Prospective cohort study (December 2008-March 2014).
SETTING: Baltimore, Maryland.
PARTICIPANTS: Kidney transplantation recipients (N = 349).
MEASUREMENTS: The Fried frailty score was measured at the time of KT and during routine clinical follow-up. Using a Cox proportional hazards model, factors associated with improvements

in frailty score after KT were identified. Using a longitudinal analysis, predictors of frailty score changes after KT were identified using a multilevel mixed-effects Poisson model.
RESULTS: At KT, 19.8% of recipients were frail; 1 month after KT, 33.3% were frail; at 2 months, 27.7% were frail; and at 3 months, 17.2% were frail. On average, frailty scores had worsened by 1 month (mean change 0.4, P < .001), returned to baseline by 2 months (mean change 0.2, P = .07), and improved by 3 months (mean change -0.3, P = .04) after KT. The only recipient or transplant factor associated with improvement in frailty score after KT was pre-KT frailty (hazard ratio = 2.55, 95% confidence interval (CI) = 1.71-3.82, P < .001). Pre-KT frailty status (relative risk (RR) = 1.49, 95% CI = 1.29-1.72, P < .001), recipient diabetes mellitus (RR = 1.26, 95% CI = 1.08-1.46, P = .003), and delayed graft function (RR = 1.22, 95% CI = 1.04-1.43, P = .02) were independently associated with long-term changes in frailty score.
CONCLUSION: After KT, in adult recipients of all ages, frailty initially worsens but then improves by 3 months. Although KT recipients who were frail at KT had higher frailty scores over the long term, they were most likely to show improvements in their physiological reserve after KT, supporting the transplantation in these individuals and suggesting that pretransplant frailty is not an irreversible state of low physiological reserve.

7. Pre-Kidney Transplant Lower Extremity Impairment and Post-Kidney Transplant Mortality.
Nastasi AJ, McAdams-DeMarco MA, Schrack J, et al.
Am J Transplant. 2018 Jan;18(1):189-196.

ABSTRACT
Prediction models for post-kidney transplantation mortality have had limited success (C-statistics ≤0.70). Adding objective measures of potentially modifiable factors may improve prediction and, consequently, kidney transplant (KT) survival through intervention. The Short Physical Performance Battery (SPPB) is an easily administered objective test of lower extremity function consisting of three parts (balance, walking speed, chair stands), each with scores of 0-4, for a composite score of 0-12, with higher scores indicating better function. SPPB performance and frailty (Fried frailty phenotype) were assessed at admission for KT in a prospective cohort of 719 KT recipients at Johns Hopkins Hospital (8/2009 to 6/2016) and University of Michigan (2/2013 to 12/2016). The independent associations between SPPB impairment (SPPB composite score ≤10) and composite score with post-KT mortality were tested using adjusted competing risks models treating graft failure as a competing risk. The 5-year posttransplantation mortality for impaired recipients was 20.6% compared to 4.5% for unimpaired recipients (p < 0.001). Impaired recipients had a 2.30-fold (adjusted hazard ratio [aHR] 2.30, 95% confidence interval [CI] 1.12-4.74, p = 0.02) increased risk of postkidney transplantation mortality compared to unimpaired recipients. Each one-point decrease in SPPB score was independently associated with a 1.19-fold (95% CI 1.09-1.30, p < 0.001) higher risk of post-KT mortality. SPPB-derived lower extremity function is a potentially highly useful and modifiable objective measure for pre-KT risk prediction.

8. An interdisciplinary approach to the older transplant patient: strategies for improving clinical outcomes.
Schaenman J, Goldwater D, Malinis M.
Curr Opin Organ Transplant. 2019 Jun 18.

ABSTRACT
PURPOSE OF REVIEW: Describe the latest investigations into the role of frailty and assessment of other aging-related issues in the solid organ transplant candidate and recipient. This information is relevant for all involved in the care of transplant patients, but is especially relevant in infectious diseases, given the increased burden of infection seen in older and frailer patients.
RECENT FINDINGS: The Fried Frailty Phenotype (FFP) and Short Performance Physical Battery (SPPB) are well validated tools for measuring frailty in older adults. Recently, these frailty tools have also been used to predict a range of clinical outcomes in adults with endstage organ disease undergoing advanced therapies including mechanical circulatory device (MCSD) or transplantation including death on the waiting list, length of hospital stay, need for readmission, infection, and death. Frailty may also be estimated by chart review and comorbidity assessment. Other aging-related evaluations of interest are cognitive function, sarcopenia, and nutritional status. The strength of association for each tool varies by the type of end organ disease, although there are many findings in common across organ types.
SUMMARY: As trends in the aging of the population continue to impact transplant and MCSD candidates and recipients, it is increasingly important for providers to be cognizant of the methods for assessment of aging-associated dysfunction including frailty and sarcopenia.

9. Frailty has a significant influence on postoperative complications after kidney transplantation-a prospective study on short-term outcomes.
Schopmeyer L, El Moumni M, Nieuwenhuijs-Moeke GJ, et al.
Transpl Int. 2019 Jan;32(1):66-74.

ABSTRACT
Currently, there are no tools to predict postsurgery outcome after kidney transplantation. This study assesses whether frailty influence 30-day postoperative complications after kidney transplantation. One-hundred and fifty kidney transplantations were prospectively included. Frailty was assessed using a frailty indicator, consisting of 15 questions, covering most domains of functioning. Postoperative complications were measured by the Comprehensive Complication Index (CCI). Using a linear regression model, 30-day postoperative complications and frailty correlation were adjusted for confounders, including sex, age, ASA Score, Charlson Comorbidity Index, hypertension, BMI, smoking, dialysis, duration of dialysis, type of transplantation, and retransplantation. The mean frailty score was 2.07(±1.6) and 23 patients were classified as frail (GFI ≥4). The mean CCI-score was 18(±15.6), the mean CCI-score for "frail" patients 30.1(±17.2) compared to 15.5 (±14.2) for "non-frail" patients (N = 116). In a regression analysis, a significant relationship between CCI-score and frailty (β = 13.3; 95% CI 5.7-20.9; P = 0.0007) and transplantation type (β = 4.9; 95% CI: 0.72-9.16; P = 0.02) was found, independent of confounders. In conclusion, frailty and type of transplantation are independent factors associated with an increased risk of postoperative complications.

10. Frailty and early hospital readmission after kidney transplantation.
McAdams-DeMarco MA, Law A, Salter ML, et al.
Am J Transplant. 2013 Aug;13(8):2091-5.

ABSTRACT

Early hospital readmission (EHR) after kidney transplantation (KT) is associated with increased morbidity and higher costs. Registry-based recipient, transplant and center-level predictors of EHR are limited, and novel predictors are needed. We hypothesized that frailty, a measure of physiologic reserve initially described and validated in geriatrics and recently associated with early KT outcomes, might serve as a novel, independent predictor of EHR in KT recipients of all ages. We measured frailty in 383 KT recipients at Johns Hopkins Hospital. EHR was ascertained from medical records as ≥1 hospitalization within 30 days of initial post-KT discharge. Frail KT recipients were much more likely to experience EHR (45.8% vs. 28.0%, p = 0.005), regardless of age. After adjusting for previously described registry-based risk factors, frailty independently predicted 61% higher risk of EHR (adjusted RR = 1.61, 95% CI: 1.18-2.19, p = 0.002). In addition, frailty improved EHR risk prediction by improving the area under the receiver operating characteristic curve (p = 0.01) as well as the net reclassification index (p = 0.04). Identifying frail KT recipients for targeted outpatient monitoring and intervention may reduce EHR rates.

11. Prehabilitation for kidney transplant candidates: Is it time?
Cheng XS, Myers JN, Chertow GM, et al.
Clin Transplant. 2017 Aug;31(8).

ABSTRACT
Many patients become frail with diminished cardiorespiratory fitness while awaiting kidney transplantation. Frailty and poor fitness powerfully predict mortality, transplant graft survival, and healthcare utilization after kidney transplantation. Efforts to intervene with post-transplant physical therapy have been met with limited success, in large part due to high study dropout. We reviewed the literature on chronic kidney disease and exercise to propose a clinical framework for physical therapy interventions to improve fitness, scheduled for before the transplant. This framework may lead to better patient retention and compliance, and thus demonstrate better efficacy in mitigating the effects of frailty and poor fitness after kidney transplantation.

12. Implications of Frailty for Peritransplant Outcomes in Kidney Transplant Recipients.
Cheng XS, Lentine KL, Koraishy FM, et al.
Curr Transplant Rep. 2019 Mar;6(1):16-25

ABSTRACT
PURPOSE OF REVIEW: Research over the past few decades points to the importance of frailty, or the lack of physiologic reserve, in the natural history of chronic diseases and in modifying the impact of potential interventions. End-stage kidney disease (ESKD) and the intervention of kidney transplantation are no exception. We review the recent epidemiologic and cohort-based evidence on the association between frailty and kidney transplant outcomes and provide a framework of questions with which to approach future research endeavors and clinical practice.
RECENT FINDINGS: Frailty in kidney transplant candidates can be measured in numerous ways, including descriptive phenotype, description scores, functional testing, and surrogate measures. Regardless of the metric, the presence of frailty is strongly associated with inferior pre- and posttransplant outcomes compared to the absence of frailty. However, some frail patients with ESKD can benefit from transplant over chronic dialysis. Evidence-based approaches for identifying frail ESKD patients who can benefit from transplant over dialysis, with acceptable posttransplant

outcomes, are lacking. Interventional trials to improve frailty and physical function before transplant (prehabilitation) and after transplant (rehabilitation) are also lacking.
CONCLUSION: Frailty is increasingly recognized as highly relevant to peritransplant outcomes, but more work is needed to: 1) tailor management to the unique needs of frail patients, both pre- and posttransplant; 2) define phenotypes of frail patients who are expected to benefit from transplant over dialysis; and 3) develop interventions to reverse frailty, both pre- and post-transplant.

13. Association of Kidney Transplant Center Volume With 3-Year Clinical Outcomes.
Sonnenberg EM, Cohen JB, Hsu JY, et al.
Am J Kidney Dis. 2019 May 7.

ABSTRACT
RATIONALE & OBJECTIVE: A robust relationship between procedure volume and clinical outcomes has been demonstrated across many surgical fields. This study assessed whether a center volume-outcome relationship exists for contemporary kidney transplantation, specifically for diabetic recipients, older recipients (aged ≥65 years), and recipients of high kidney donor profile index (KDPI ≥ 85) kidneys.
STUDY DESIGN: Retrospective cohort study.
SETTING & PARTICIPANTS: Adult kidney-only transplant recipients who underwent transplantation between 2009 and 2013 (N = 79,581).
EXPOSURES: The primary exposure variable was center volume, categorized into quartiles based on the total kidney transplantation volume. Quartile 1 (Q1) centers performed a mean of fewer than 66 kidney transplantations per year, whereas Q4 centers performed a mean of more than 196 kidney transplantations per year.
OUTCOMES: All-cause graft failure and mortality within 3 years of transplantation.
ANALYTICAL APPROACH: Multivariable Cox frailty models were used to adjust for donor characteristics, recipient characteristics, and cold ischemia time.
RESULTS: Minor differences in rates of 3-year deceased donor all-cause graft failure across quartiles of center volume were observed (14.9% for Q1 vs 16.7% for Q4), including in subgroups (diabetic recipients, 18.4% for Q1 vs 19.7% for Q4; older recipients, 19.4% for Q1 vs 22.5% for Q4; recipients of high KDPI kidneys, 26.5% for Q1 vs 26.5% for Q4). Results were similar for 3-year mortality. After adjustment for donor, recipient, and graft characteristics using Cox regression, center volume was not significantly associated with all-cause graft failure or mortality within 3 years, except that diabetic recipients at Q3 centers had slightly lower mortality (compared with Q1 centers, adjusted HR of 0.85 [95% CI, 0.73-0.99]).
LIMITATIONS: Potential unmeasured confounding from patient comorbid conditions and organ selection.
CONCLUSIONS: These findings provide little evidence that care in higher volume centers is associated with better adjusted outcomes for kidney transplant recipients, even in populations anticipated to be at increased risk for graft failure or death.

14. Frailty and Access to Kidney Transplantation.
Haugen CE, Chu NM, Ying H, et al.
Clin J Am Soc Nephrol. 2019 Apr 5;14(4):576-582.

ABSTRACT

BACKGROUND AND OBJECTIVES: Frailty, a syndrome distinct from comorbidity and disability, is clinically manifested as a decreased resistance to stressors and is present in up to 35% of patient with ESKD. It is associated with falls, hospitalizations, poor cognitive function, and mortality. Also, frailty is associated with poor outcomes after kidney transplant, including delirium and mortality. Frailty is likely also associated with decreased access to kidney transplantation, given its association with poor outcomes on dialysis and post-transplant. Yet, clinicians have difficulty identifying which patients are frail; therefore, we sought to quantify if frail kidney transplant candidates had similar access to kidney transplantation as nonfrail candidates.

DESIGN, SETTING, PARTICIPANTS, & MEASUREMENTS: We studied 7078 kidney transplant candidates (2009-2018) in a three-center prospective cohort study of frailty. Fried frailty (unintentional weight loss, grip strength, walking speed, exhaustion, and activity level) was measured at outpatient kidney transplant evaluation. We estimated time to listing and transplant rate by frailty status using Cox proportional hazards and Poisson regression, adjusting for demographic and health factors.

RESULTS: The mean age was 54 years (SD 13; range, 18-89), 40% were women, 34% were black, and 21% were frail. Frail participants were almost half as likely to be listed for kidney transplantation (hazard ratio, 0.62; 95% confidence interval, 0.56 to 0.69; P<0.001) compared with nonfrail participants, independent of age and other demographic factors. Furthermore, frail candidates were transplanted 32% less frequently than nonfrail candidates (incidence rate ratio, 0.68; 95% confidence interval, 0.58 to 0.81; P<0.001).

CONCLUSIONS: Frailty is associated with lower chance of listing and lower rate of transplant, and is a potentially modifiable risk factor.

15. Dynamic Frailty Before Kidney Transplantation-Time of Measurement Matters.

Chu NM, Deng A, Ying H, et al.

Transplantation. 2019 Feb 4.

ABSTRACT

BACKGROUND: Frail kidney transplant (KT) recipients have higher risk of adverse post-KT outcomes. Yet, there is interest in measuring frailty at KT evaluation and then using this information for post-KT risk stratification. Given long wait times for KT, frailty may improve or worsen between evaluation and KT. Patterns, predictors, and post-KT adverse outcomes associated with these changes are unclear.

METHODS: 569 adult KT candidates were enrolled in a cohort study of frailty (11/2009-09/2017) at evaluation and followed-up at KT. Patterns of frailty transitions were categorized as: 1) binary state change (frail/nonfrail); 2) 3-category state change (frail/intermediate/nonfrail); and 3) raw score change (-5 to 5). Adjusted Cox proportional hazard and logistic regression models were used to test whether patterns of frailty transitions were associated with adverse post-KT outcomes.

RESULTS: Between evaluation and KT, 22.0% became more frail, while 24.4% became less frail. Black race (RRR=1.98, 95%CI:1.07-3.67) was associated with frail-to-nonfrail transition; diabetes (RRR=2.56, 95%CI:1.22-5.39) was associated with remaining stably frail. Candidates who became more frail between 3-category states (HR=2.27, 95%CI:1.11-4.65) or frailty scores (HR=2.36, 95%CI:1.12-4.99) had increased risk of post-KT mortality and had higher odds of length of stay (LOS) ≥2 weeks (3-category: OR=2.02, 95%CI:1.20-3.40; scores: OR=1.92, 95%CI:1.13-3.25).

CONCLUSIONS: Almost half of KT candidates experienced change in frailty between evaluation and KT, and those transitions were associated with mortality and longer LOS. Monitoring changes in frailty from evaluation to admission may improve post-KT risk stratification.

16. Frailty and Changes in Cognitive Function after Kidney Transplantation.
Chu NM, Gross AL, Shaffer AA, et al.
J Am Soc Nephrol. 2019 Feb;30(2):336-345.

ABSTRACT
BACKGROUND: Restoration of kidney function after kidney transplant generally improves cognitive function. It is unclear whether frail recipients, with higher susceptibility to surgical stressors, achieve such post-transplant cognitive improvements or whether they experience subsequent cognitive decline as they age with a functioning graft.
METHODS: In this two-center cohort study, we assessed pretransplant frailty (Fried physical frailty phenotype) and cognitive function (Modified Mini-Mental State Examination) in adult kidney transplant recipients. To investigate potential short- and medium-term effects of frailty on post-transplant cognitive trajectories, we measured cognitive function up to 4 years post-transplant. Using an adjusted mixed effects model with a random slope (time) and intercept (person), we characterized post-transplant cognitive trajectories by pretransplant frailty, accounting for nonlinear trajectories.
RESULTS: Of 665 recipients (mean age 52.0 years) followed for a median of 1.5 years, 15.0% were frail. After adjustment, pretransplant cognitive scores were significantly lower among frail patients compared with nonfrail patients (89.0 versus 90.8 points). By 3 months post-transplant, cognitive performance improved for both frail (slope =0.22 points per week) and nonfrail (slope =0.14 points per week) recipients. Between 1 and 4 years post-transplant, improvements plateaued among nonfrail recipients (slope =0.005 points per week), whereas cognitive function declined among frail recipients (slope =-0.04 points per week). At 4 years post-transplant, cognitive scores were 5.8 points lower for frail recipients compared with nonfrail recipients.
CONCLUSIONS: On average, both frail and nonfrail recipients experience short-term cognitive improvement post-transplant. However, frailty is associated with medium-term cognitive decline post-transplant. Interventions to prevent cognitive decline among frail recipients should be identified.

17. Comorbidity, Frailty, and Waitlist Mortality among Kidney Transplant Candidates of All Ages.
Pérez Fernández M, Martínez Miguel P, Ying H, et al.
Am J Nephrol. 2019;49(2):103-110.

ABSTRACT
BACKGROUND: Kidney transplantation (KT) candidates often present with multiple comorbidities. These patients also have a substantial burden of frailty, which is also associated with increased mortality. However, it is unknown if frailty is merely a surrogate for comorbidity, itself an independent domain of risk, or if frailty and comorbidity have differential effects. Better understanding the interplay between these 2 constructs will improve clinical decision making in KT candidates.

OBJECTIVE: To test whether comorbidity is equally associated with waitlist mortality among frail and nonfrail KT candidates and to test whether measuring both comorbidity burden and frailty improves mortality risk prediction.
METHODS: We studied 2,086 candidates on the KT waitlist (November 2009 - October 2017) in a multicenter cohort study, in whom frailty and comorbidity were measured at evaluation. We quantified the association between Charlson comorbidity index (CCI) adapted for end-stage renal disease and waitlist mortality using an adjusted Cox proportional hazards model and tested whether this association differed between frail and nonfrail candidates.
RESULTS: At evaluation, 18.1% of KT candidates were frail and 51% had a high comorbidity burden (CCI score ≥2). Candidates with a high comorbidity burden were at 1.38-fold (95% CI 1.01-1.89) increased risk of waitlist mortality. However, this association differed by frailty status (p for interaction = 0.01): among nonfrail candidates, a high comorbidity burden was associated with a 1.66-fold (95% CI 1.17-2.35) increased mortality risk; among frail candidates, here was no statistically significant association (HR 0.75, 95% CI 0.44-1.29). Adding this interaction between comorbidity and frailty to a mortality risk estimation model significantly improved prediction, increasing the c-statistic from 0.640 to 0.656 ($p < 0.001$).
CONCLUSIONS: Nonfrail candidates with a high comorbidity burden at KT evaluation have an increased risk of waitlist mortality. Importantly, comorbidity is less of a concern in already high-risk patients who are frail.

18 . Report from the American Society of Transplantation on frailty in solid organ transplantation.

Kobashigawa J, Dadhania D, Bhorade, et al.
Am J Transplant. 2019 Apr;19(4):984-994.

ABSTRACT
A consensus conference on frailty in kidney, liver, heart, and lung transplantation sponsored by the American Society of Transplantation (AST) and endorsed by the American Society of Nephrology (ASN), the American Society of Transplant Surgeons (ASTS), and the Canadian Society of Transplantation (CST) took place on February 11, 2018 in Phoenix, Arizona. Input from the transplant community through scheduled conference calls enabled wide discussion of current concepts in frailty, exploration of best practices for frailty risk assessment of transplant candidates and for management after transplant, and development of ideas for future research. A current understanding of frailty was compiled by each of the solid organ groups and is presented in this paper. Frailty is a common entity in patients with end-stage organ disease who are awaiting organ transplantation, and affects mortality on the waitlist and in the posttransplant period. The optimal methods by which frailty should be measured in each organ group are yet to be determined, but studies are underway. Interventions to reverse frailty vary among organ groups and appear promising. This conference achieved its intent to highlight the importance of frailty in organ transplantation and to plant the seeds for further discussion and research in this field.

19. Association between the "Timed Up and Go Test" at transplant evaluation and outcomes after kidney transplantation.

Michelson AT, Tsapepas DS, Husain SA, et al.
Clin Transplant. 2018 Nov;32(11):e13410.

ABSTRACT
BACKGROUND: Studies have demonstrated the Timed Up and Go Test's (TUGT) ability to forecast postoperative outcomes for several surgical specialties. Evaluations of the TUGT for waitlist and posttransplant outcomes have yet to be examined in kidney transplantation.
OBJECTIVE: To assess the prognostic utility of the TUGT and its associations with waitlist and posttransplant outcomes for kidney transplant candidates.
DESIGN AND METHODS: Single-center, prospective study of 518 patients who performed TUGT during their transplant evaluation between 9/1/2013-11/30/2014. TUGT times were evaluated as a continuous variable or 3-level discrete categorical variable with TUGT times categorized as long (>9 seconds), average (8-9 seconds), or short (5-8 seconds).
RESULTS: Transplanted individuals had shorter TUGT times than those who remained on the waitlist (8.99 vs 9.79 seconds, P < 0.001). Bivariable and multivariable logistic regression showed that after adjusting for age, there was no association between TUGT times and probability of waitlist removal (OR 0.997 [0.814-1.221]), prolonged length of stay posttransplant (OR 1.113 [0.958-1.306] for deceased donor, OR 0.983 [0.757-1.277] for living donor), and 30-day readmissions (OR 0.984 [0.845-1.146] for deceased donor, OR 1.254 [0.976-1.613] for living donor).
CONCLUSIONS: The TUGT was not associated with waitlist removal or prolonged hospitalization for kidney transplant candidates. Alternative assessments of global health, such as functional status or frailty, should be considered for evaluation of potential kidney transplant candidates.

20. Early Hospital Readmission in Older and Younger Kidney Transplant Recipients.
Haugen CE, King EA, Bae S, et al.
Am J Nephrol. 2018;48(4):235-241.

ABSTRACT
BACKGROUND: Up to 31% of kidney transplant (KT) recipients experience early hospital readmission (EHR). We hypothesized that EHR among older KT recipients is higher than younger recipients due to increased comorbidities and higher prevalence of frailty.
METHODS: We identified 22,458 older (age ≥65) and 86,372 younger (18 to < 65) first-time KT recipients (December 1, 1999 - December 31, 2014) using United States Renal Data System data. We estimated the association between patient-level characteristics and EHR (30 days post-KT discharge) with modified Poisson regression among older and younger KT recipients, separately. We estimated the association between graft loss and mortality and EHR using Cox proportional hazards.
RESULTS: EHR was more common in older KT recipients (30.1 vs. 27.6%; p < 0.001). Risk factors for EHR that differed by recipient age included female sex, African American race, diabetes, smoking, dialysis vintage, donor age, and length of stay. Risk of graft loss associated with EHR was greater among older KT recipients (adjusted hazard ratio [aHR] 1.64, 95% CI 1.51-1.77, p < 0.001) than younger KT recipients (aHR 1.43, 95% CI 1.38-1.48, p < 0.001; interaction p < 0.01). However, the risk of mortality associated with EHR was greater among younger recipients (aHR 1.52, 95% CI 1.47-1.57, p < 0.001) than that in older -recipients (aHR 1.40, 95% CI 1.34-1.47, p < 0.001; interaction p < 0.01).
CONCLUSIONS: Older KT recipients are more likely to experience EHR and are at a higher risk of graft loss after EHR than younger recipients. Targeted interventions to prevent EHR and subsequent graft loss in this population should be identified.

21. Depressive symptoms, frailty, and adverse outcomes among kidney transplant recipients.
Konel JM, Warsame F, Ying H, et al.
Clin Transplant. 2018 Oct;32(10):e13391.

ABSTRACT
Depressive symptoms and frailty are each independently associated with morbidity and mortality in kidney transplant (KT) recipients. We hypothesized that having both depressive symptoms and frailty would be synergistic and worse than the independent effect of each. In a multicenter cohort study of 773 KT recipients, we measured the Fried frailty phenotype and the modified 18-question Center for Epidemiologic Studies-Depression Scale (CES-D). Using adjusted Poisson regression and survival analysis, we tested whether depressive symptoms (CES-D score > 14) and frailty were associated with KT length of stay (LOS), death-censored graft failure (DCGF), and mortality.
At KT admission, 10.0% of patients exhibited depressive symptoms, 16.3% were frail, and 3.6% had both. Recipients with depressive symptoms were more likely to be frail (aOR = 3.97, 95% CI: 2.28-6.91, P < 0.001). Recipients with both depressive symptoms and frailty had a 1.88 times (95% CI: 1.70-2.08, P < 0.001) longer LOS, 6.20-fold (95% CI:1.67-22.95, P < 0.01) increased risk of DCGF, and 2.62-fold (95% CI:1.03-6.70, P = 0.04) increased risk of mortality, compared to those who were nonfrail and without depressive symptoms. There was only evidence of synergistic effect of frailty and depressive symptoms on length of stay (P for interaction < 0.001). Interventions aimed at reducing pre-KT depressive symptoms and frailty should be explored for their impact on post-KT outcomes.

22. Frailty and chronic kidney disease: A systematic review.
Chowdhury R, Peel NM, Krosch M, et al.
Arch Gerontol Geriatr. 2017 Jan - Feb;68:135-142.

ABSTRACT
OBJECTIVE: Frailty is associated with increased vulnerability to poor health. There is growing interest in understanding the association between frailty and chronic kidney disease (CKD). This systematic review explored how frailty is measured in patients with CKD and the association between frailty and adverse outcomes across different stages of renal impairment.
STUDY DESIGN: Systematic analysis of peer reviewed articles.
DATA SOURCES: Pubmed, Medline, Web of Science and Cochrane were used to identify the articles.
DATA SYNTHESIS: Articles published before the 17th of September 2016, that measured frailty in patients with CKD was eligible for the systematic review. Two independent researchers assessed the eligibility of the articles. Quality of the articles was assessed using the Epidemiological Appraisal Instrument.
RESULTS: The literature search yielded 540 articles, of which 32 met the study criteria and were included in the review (n=36,076, age range: 50-83 years). Twenty-three (72%) studies used or adapted the Fried phenotype to measure frailty. The prevalence of frailty ranged from 7% in community-dwellers (CKD Stages 1-4) to 73% in a cohort of patients on haemodialysis. The incidence of frailty increased with reduced glomerular filtration rate. Frailty was associated with an increased risk of mortality and hospitalization.

CONCLUSION: Frailty is prevalent in patients with CKD and it is associated with an increased risk of adverse health outcomes. There are differences in the methods used to assess frailty and this hinders comparisons between studies.

23. Incidence, Risk Factors, and Sequelae of Post-kidney Transplant Delirium.
Haugen CE, Mountford A, Warsame F, et al.
J Am Soc Nephrol. 2018 Jun;29(6):1752-1759.

ABSTRACT
BACKGROUND: Frail kidney transplant (KT) recipients may be particularly vulnerable to surgical stressors, resulting in delirium and subsequent adverse outcomes. We sought to identify the incidence, risk factors, and sequelae of post-KT delirium.
METHODS: We studied 125,304 adult KT recipients (1999-2014) to estimate delirium incidence in national registry claims. Additionally, we used a validated chart abstraction algorithm to identify post-KT delirium in 893 adult recipients (2009-2017) from a cohort study of frailty. Delirium sequelae were identified using adjusted logistic regression (length of stay ≥2 weeks and institutional discharge [skilled nursing or rehabilitation facility]) and adjusted Cox regression (death-censored graft loss and mortality).
RESULTS: Only 0.8% of KT recipients had a delirium claim. In the cohort study, delirium incidence increased with age (18-49 years old: 2.0%; 50-64 years old: 4.6%; 65-75 years old: 9.2%; and ≥75 years old: 13.8%) and frailty (9.0% versus 3.9%); 20.0% of frail recipients aged ≥75 years old experienced delirium. Frailty was independently associated with delirium (odds ratio [OR], 2.05; 95% confidence interval [95% CI], 1.02 to 4.13; P=0.04), but premorbid global cognitive function was not. Recipients with delirium had increased risks of ≥2-week length of stay (OR, 5.42; 95% CI, 2.76 to 10.66; P<0.001), institutional discharge (OR, 22.41; 95% CI, 7.85 to 63.98; P<0.001), graft loss (hazard ratio [HR], 2.73; 95% CI, 1.14 to 6.53; P=0.03), and mortality (HR, 3.12; 95% CI, 1.76 to 5.54; P<0.001).
CONCLUSIONS: Post-KT delirium is a strong risk factor for subsequent adverse outcomes, yet it is a clinical entity that is often missed.

24. Frailty, Inflammatory Markers, and Waitlist Mortality Among Patients With End-stage Renal Disease in a Prospective Cohort Study.
McAdams-DeMarco MA, Ying H, Thomas AG, et al.
Transplantation. 2018 Oct;102(10):1740-1746.

ABSTRACT
BACKGROUND: Among community-dwelling older adults, frailty is associated with heightened markers of inflammation and subsequent mortality. Although frailty is common among end-stage renal disease (ESRD) patients, the role of frailty and markers of inflammation in this population remains unclear. We quantified these associations in patients on the kidney transplant waitlist and tested whether frailty and/or markers of inflammation improve waitlist mortality risk prediction.
METHODS: We studied 1975 ESRD patients on the kidney transplant waitlist (November 1, 2009, to February 28, 2017) in a multi-center cohort study of frailty. Serum inflammatory markers (interleukin-6 [IL-6], soluble tumor necrosis factor-α receptor-1 [sTNFR1], and C-reactive protein [CRP]) were analyzed in 605 of these participants; we calculated the inflammatory index score

using IL-6 and sTNFR1. We compared the C-statistic of an established registry-based prediction model for waitlist mortality adding frailty and/or inflammatory markers (1 SD change in log IL-6, sTNFR1, CRP, or inflammatory index).
RESULTS: The registry-based model had moderate predictive ability (c-statistic = 0.655). Frailty was associated with increased mortality (2.19; 95% confidence interval [CI], 1.26-3.79) but did not improve risk prediction (c-statistic = 0.646; P = 0.65). Like frailty, IL-6 (2.13; 95% CI, 1.41-3.22), sTNFR1 (1.70; 95% CI, 1.12-2.59), CRP (1.68; 95% CI, 1.06-2.67), and the inflammatory index (2.09; 95% CI, 1.38-3.16) were associated with increased mortality risk; unlike frailty, adding IL-6 (c-statistic = 0.777; P = 0.02), CRP (c-statistic = 0.728; P = 0.02), or inflammatory index (c-statistic = 0.777; P = 0.02) substantially improved mortality risk prediction.
CONCLUSIONS: Frailty and markers of inflammation were associated with increased waitlist mortality risk, but only markers of inflammation significantly improved ESRD risk prediction. These findings help clarify the accelerated aging physiology of ESRD and highlight easy-to-measure markers of increased waitlist mortality risk.

25. Frailty and Postkidney Transplant Health-Related Quality of Life.
McAdams-DeMarco MA, Olorundare IO, et al.
Transplantation. 2018 Feb;102(2):291-299.

ABSTRACT
BACKGROUND: Health-related quality of life (HRQOL) reflects a patient's disease burden, treatment effectiveness, and health status and is summarized by physical, mental, and kidney disease-specific scales among end-stage renal disease patients. Although on average HRQOL improves postkidney transplant (KT), the degree of change depends on the ability of the patient to withstand the stressor of dialysis versus the ability to tolerate the intense physiologic changes of KT. Frail KT recipients may be extra vulnerable to either of these stressors, thus affecting change in HRQOL after KT.
METHODS: We ascertained frailty, as well as physical, mental, and kidney disease-specific HRQOL in a multicenter prospective cohort of 443 KT recipients (May 2014 to May 2017) using Kidney Disease Quality of Life Instrument Short Form. We quantified the short-term (3 months) rate of post-KT HRQOL change by frailty status using adjusted mixed-effects linear regression models.
RESULTS: Mean HRQOL scores at KT were 43.3 (SD, 9.6) for physical, 52.8 (SD, 8.9) for mental, and 72.6 (SD, 12.8) for kidney disease-specific HRQOL; frail recipients had worse physical (P < 0.001) and kidney disease-specific HRQOL (P = 0.001), but similar mental HRQOL (P = 0.43). Frail recipients experienced significantly greater rates of improvement in physical HRQOL (frail, 1.35 points/month; 95% confidence interval [CI], 0.65-2.05; nonfrail, 0.34 points/month; 95% CI, -0.17-0.85; P = 0.02) and kidney disease-specific HRQOL (frail, 3.75 points/month; 95% CI, 2.89-4.60; nonfrail, 2.41 points/month; 95% CI, 1.78-3.04; P = 0.01), but no difference in mental HRQOL (frail, 0.54 points/month; 95% CI, -0.17-1.25; nonfrail, 0.46 points/month; 95% CI, -0.06-0.98; P = 0.85) post-KT.
CONCLUSIONS: Despite decreased physiologic reserve, frail recipients experience improvement in post-KT physical and kidney disease-specific HRQOL better than nonfrail recipients.

26. Older candidates for kidney transplantation: Who to refer and what to expect?

Concepcion BP, Forbes RC, Schaefer HM.

World J Transplant. 2016 Dec 24;6(4):650-657.

ABSTRACT

The number of older end-stage renal disease patients being referred for kidney transplantation continues to increase. This rise is occurring alongside the continually increasing prevalence of older end-stage renal disease patients. Although older kidney transplant recipients have decreased patient and graft survival compared to younger patients, transplantation in this patient population is pursued due to the survival advantage that it confers over remaining on the deceased donor waiting list. The upper limit of age and the extent of comorbidity and frailty at which transplantation ceases to be advantageous is not known. Transplant physicians are therefore faced with the challenge of determining who among older patients are appropriate candidates for kidney transplantation. This is usually achieved by means of an organ systems-based medical evaluation with particular focus given to cardiovascular health. More recently, global measures of health such as functional status and frailty are increasingly being recognized as potential tools in risk stratifying kidney transplant candidates. For those candidates who are deemed eligible, living donor transplantation should be pursued. This may mean accepting a kidney from an older living donor. In the absence of any living donor, the choice to accept lesser quality kidneys should be made while taking into account the organ shortage and expected waiting times on the deceased donor list. Appropriate counseling of patients should be a cornerstone in the evaluation process and includes a discussion regarding expected outcomes, expected waiting times in the setting of the new Kidney Allocation System, benefits of living donor transplantation and the acceptance of lesser quality kidneys.

27. Kidney transplantation in the older adult.

Knoll GA.

Am J Kidney Dis. 2013 May;61(5):790-7.

ABSTRACT

The end-stage renal disease population is aging. Nearly half of all new patients are older than 65 years and one third are older than 70 years. Assessing the possibility of transplantation for older patients with end-stage renal disease often involves contemplating more complex issues, including cognitive impairment, decreased functional status, and frailty, which makes selecting appropriate candidates more difficult. Older transplant recipients have decreased patient and transplant survival compared with younger recipients. For example, 75% of deceased donor transplant recipients aged 30-49 years are alive after 5 years compared to only 61% for those older than 65 years. Despite poorer outcomes compared with younger recipients, older transplant recipients have a significant improvement in survival compared with similar patients who remain on the wait list, with decreases in mortality of 41%-61% depending on the study. Use of living donors, even older living donors, provides significantly better outcomes for elderly recipients compared with the use of deceased donors. However, in the absence of a living donor, survival is improved significantly by accepting an expanded criteria donor organ rather than waiting for a standard criteria deceased donor. Older transplant recipients experience more infectious complications and less acute rejection, but the risk of transplant loss from rejection is increased compared with younger patients. These immunologic issues, along with the fact that older patients often are

excluded from transplant trials, have made selecting an ideal immunosuppressive regimen challenging. Prospective comparative trials of different agents in the elderly population are warranted to better define the risk-benefit profile. This review discusses transplantation outcomes, including patient and transplant survival, different donor types, quality of life, and immunosuppression for older dialysis patients.

28. Criteria for and Appropriateness of Renal Transplantation in Elderly Patients With End-Stage Renal Disease: A Literature Review and Position Statement on Behalf of the European Renal Association-European Dialysis and Transplant Association Descartes Working Group and European Renal Best Practice.

Segall L, Nistor I, Pascual J, et al.

Transplantation. 2016 Oct;100(10):e55-65.

ABSTRACT

During the last 20 years, waiting lists for renal transplantation (RT) have grown significantly older. However, elderly patients (ie ≥65 years of age) are still more rarely referred or accepted to waiting lists and, if enlisted, have less chances of actually receiving a kidney allograft, than younger counterparts. In this review, we looked at evidence for the benefits and risks of RT in the elderly trying to answer the following questions: Should RT be advocated for elderly patients? What should be the criteria to accept elderly patients on the waiting list for RT? What strategies might be used to increase the rate of RT in waitlisted elderly candidates? For selected elderly patients, RT was shown to be superior to dialysis in terms of patient survival. Virtually all guidelines recommend that patients should not be deemed ineligible for RT based on age alone, although a short life expectancy generally might preclude RT. Concerning the assessment of comorbidities in the elderly, special attention should be paid to cardiac evaluation and screening for malignancy. Comorbidity scores and frailty assessment scales might help the decision making on eligibility. Psychosocial issues should also be evaluated. To overcome the scarcity of organ donors, elderly RT candidates should be encouraged to consider expanded criteria donors and living donors, as alternatives to deceased standard criteria donors. It has been demonstrated that expanded criteria donor RT in patients 60 years or older is associated with higher survival rates than remaining on dialysis, whereas living donor RT is superior to all other options.

29. Clinical issues in renal transplantation in the elderly.

Hod T, Goldfarb-Rumyantzev AS.

Clin Transplant. 2015 Feb;29(2):167-75.

ABSTRACT

Kidney transplantation is the best renal replacement therapy option and is superior to dialysis in elderly end-stage renal disease (ESRD) patients. Furthermore, the outcome of transplantation in the elderly is comparable to younger patients in terms of allograft survival. The exact nature of this phenomenon is not completely clear. As the elderly population continues to grow, it becomes more important to identify specific issues associated with kidney transplantation. In particular, elderly transplant recipients might have a lower chance of acute rejection as their immune systems seem to be less reactive. This might predispose elderly recipients to greater risk of post-transplant infectious complications or malignancies. Furthermore, due to differences in

pharmacokinetics, elderly recipients might require lower doses of immunosuppressive medication. As the main cause of graft failure in the elderly is death with a functioning graft and also considering the scarcity of donor organs, it might make sense to recommend transplanting elderly recipients with extended criteria donor kidneys. This approach would balance shorter patient survival compared to younger recipients. In conclusion, old age should not preclude ESRD patients from kidney transplantation. However, specific differences that have to do with immunosuppression and other aspects of managing elderly transplant recipients should be considered.

30. Mortality in Elderly Waiting-List Patients Versus Age-Matched Kidney Transplant Recipients: Where is the Risk?

Hernández D, Alonso-Titos J, Armas-Padrón AM, et al.

Kidney Blood Press Res. 2018;43(1):256-275.

ABSTRACT

The number of elderly patients on the waiting list (WL) for kidney transplantation (KT) has risen significantly in recent years. Because KT offers a better survival than dialysis therapy, even in the elderly, candidates for KT should be selected carefully, particularly in older waitlisted patients. Identification of risk factors for death in WL patients and prediction of both perioperative risk and long-term post-transplant mortality are crucial for the proper allocation of organs and the clinical management of these patients in order to decrease mortality, both while on the WL and after KT. In this review, we examine the clinical results in studies concerning: a) risk factors for mortality in WL patients and KT recipients; 2) the benefits and risks of performing KT in the elderly, comparing survival between patients on the WL and KT recipients; and 3) clinical tools that should be used to assess the perioperative risk of mortality and predict long-term post-transplant survival. The acknowledgment of these concerns could contribute to better management of high-risk patients and prophylactic interventions to prolong survival in this particular population, provided a higher mortality is assumed.

31. Kidney Transplantation Among the Elderly: Challenges and Opportunities to Improve Outcomes.

Singh P, Ng YH, Unruh M.

Adv Chronic Kidney Dis. 2016 Jan;23(1):44-50.

ABSTRACT

Elderly patients (>65 years old) represent the fastest growing population among the ESRD patients and those awaiting kidney transplantation. There is ample evidence to suggest that kidney transplant in the elderly population offers the best chance of survival and improves health-related quality of life compared to remaining on dialysis. Although all these emerging facts are encouraging, this population brings with them complex medical problems including frailty, cognitive impairment, and multiple comorbidities. These issues can be barriers to transplantation and threaten the well-being of the patients after transplantation. Furthermore, aging results in changes to the immune system and affects the pharmacokinetics of immunosuppressants. All these changes can increase risk of complications such as infections and malignancy. Because death with a functioning graft is a common cause of graft loss, the new kidney allocation system has

been implemented in an attempt to maximize allograft utilization and minimize unrealized graft years. This may result in longer wait-times for the elderly. In this review, we will highlight the barriers to kidney transplant, characterize transplant-related issues in the elderly, and propose alternative strategies under the new allocation system.

32. Frailty and Transplantation.

Exterkate L, Slegtenhorst BR, Kelm M, et al.

Transplantation. 2016 Apr;100(4):727-33.

ABSTRACT

Consequences of aging are gaining clinical relevance. In transplantation, aging and immunosenescence impact treatment and outcomes. The impact of aging, however, will critically depend on distinguishing healthy, chronological aging from biological aging that may result into frailty. Approximately 15% of individuals older than 65 years are frail, and it is expected that this condition will gain more clinical relevance with an expected increase to greater than 20% over the next 5 years. Clearly, frailty impacts various general aspects of health care and organ transplantation in particular including patient selection, waitlist management and treatment after transplantation. In general, frailty has been characterized by a compromised physiological reserve and an augmented vulnerability. In comparison to healthy aging, inflammatory markers and cytokines are increased in frail older adults. Thus, modifications of the immune response, in addition to physical limitations and changes of metabolism, are likely to impact outcomes after transplantation. Here, we provide a risk assessment of frailty at the time of transplant evaluation and review effects on outcomes and recovery after transplantation. Moreover, we summarize our current understanding of the pathophysiology of frailty and consequences on immune responses and metabolism.

33. Renal transplantation in elderly patients. How to select the candidates to the waiting list?

Ponticelli C, Podestà MA, Graziani G.

Transplant Rev (Orlando). 2014 Oct;28(4):188-92.

ABSTRACT

Today, old age does not represent a formal contraindication to kidney transplantation. Rather, there is evidence that in elderly patients renal transplantation offers longer life expectancy and better quality of life in comparison with dialysis. Yet, the results of renal transplantation in recipients older than 65years are inferior to those observed in younger adults, death with functioning graft representing a major cause of failure. Therefore, the selection of aged patients is of paramount importance. Apart from the routine clinical and biological investigations, three aspects have been relatively neglected by the transplant community and may require a careful analysis in elderly candidates to transplantation: the presence and degree of frailty, the presence of comorbidities and the adherence to prescriptions. Although there are rapid and simple tests for assessing the degree of frailty in the elderly, there is no clear cut-off value to decide whether a patient should be accepted or not. With advanced age the prevalence and severity of cardiovascular events and other diseases tend to increase. The use of combined age-comorbidity indices may be helpful to identify patients at high risk of mortality. Another critical point is the poor unintentional adherence to treatment, often caused by forgetfulness and mild cognitive

impairment. These drawbacks may be further enhanced by a high number of pills to take and by changes in the dosage or type of prescriptions. A careful screening of the presence and degree of frailty, comorbidity and poor compliance to treatment is highly recommended before admitting older candidates to the waiting list for transplantation.

34. Frailty and delayed graft function in kidney transplant recipients.

Garonzik-Wang JM, Govindan P, Grinnan JW, et al.

Arch Surg. 2012 Feb;147(2):190-3.

ABSTRACT

The ability to predict outcomes following a kidney transplant is limited by the complex physiologic decline of kidney failure, a latent factor that is difficult to capture using conventional comorbidity assessment. The frailty phenotype is a recently described inflammatory state of increased vulnerability to stressors resulting from decreased physiologic reserve and dysregulation of multiple physiologic systems. We hypothesized that frailty would be associated with delayed graft function, based on putative associations between inflammatory cytokines and graft dysfunction. We prospectively measured frailty in 183 kidney transplant recipients between December 2008 and April 2010. Independent associations between frailty and delayed graft function were analyzed using modified Poisson regression. Preoperative frailty was independently associated with a 1.94-fold increased risk for delayed graft function (95% CI, 1.13-3.36; P = .02). The assessment of frailty may provide further insights into the pathophysiology of allograft dysfunction and may improve our ability to preoperatively risk-stratify kidney transplant recipients.

3. OBESIDAD

35. Obesity in kidney transplantation.

Chan W, Bosch JA, Jones D, et al.
J Ren Nutr. 2014 Jan;24(1):1-12.

ABSTRACT
Kidney transplantation is the preferred modality of renal replacement therapy. Long-term patient and graft survival have only improved marginally over the recent decade, mainly because of the development of cardiovascular disease after transplantation. Obesity is a risk factor for cardiovascular disease and is common before and after transplantation. This article reviews the literature assessing the role of pre- and post-transplant obesity on patient and graft survival, discusses the underlying obesity-related mechanisms leading to inferior kidney transplant outcomes, and explores the role of nutritional intervention on improving long-term outcomes of transplantation. Although the role of pretransplant obesity remains uncertain, post-transplant obesity increases the risk of graft failure and mortality. Nutritional intervention is effective in achieving post-transplant weight loss, but the effect on long-term outcomes has not been established. Future research should focus on conducting nutritional intervention studies aiming to improve long-term outcomes of kidney transplantation.

36. Association Between Weight Loss Before Deceased Donor Kidney Transplantation and Posttransplantation Outcomes.

Harhay MN, Ranganna K, Boyle SM et al.
Am J Kidney Dis. 2019 May 16

ABSTRACT
RATIONALE & OBJECTIVE: There is debate on whether weight loss, a hallmark of frailty, signals higher risk for adverse outcomes among recipients of deceased donor kidney transplantation (DDKT).
STUDY DESIGN: Retrospective cohort study.
SETTING & PARTICIPANTS: Using national Organ Procurement and Transplantation Network data, we included all DDKT recipients in the United States between December 4, 2004, and December 3, 2014, who were adults (aged ≥ 18 years) when listed for DDKT.
EXPOSURES: Relative pre-DDKT weight change as a continuous predictor and categorized as <5% weight change from listing to DDKT, ≥5% to <10% weight loss, ≥10% weight loss, ≥5% to <10% weight gain, and ≥10% weight gain.
OUTCOMES: We examined 3 post-DDKT outcomes: (1) transplant hospitalization length of stay (LOS) in days, (2) all-cause graft failure, and (3) mortality.
ANALYTIC APPROACH: Unadjusted fractional polynomial methods, multivariable log-gamma models, and multivariable Cox proportional hazards models.
RESULTS: Among 94,465 recipients of DDKT, median pre-DDKT weight change was 0 (interquartile range, -3.5 to +3.9) kg. There were nonlinear unadjusted associations between relative pre-DDKT weight loss and longer transplant hospitalization LOS, higher all-cause graft loss, and higher mortality. Compared with recipients with <5% pre-DDKT weight change (n = 49,366; 52%), recipients who lost ≥10% of their listing weight (n = 10,614; 11%) had 0.66 (95% CI, 0.23-1.09) days

longer average transplant hospitalization LOS (P = 0.003), 1.11-fold higher graft loss (adjusted HR [aHR], 1.11; 95% CI, 1.06-1.17; P < 0.001), and 1.18-fold higher mortality (aHR, 1.18; 95% CI, 1.11-1.25; P < 0.001) independent of recipient, donor, and transplant factors. Pre-DDKT dialysis exposure, listing body mass index category, and waiting time modified the association of pre-DDKT weight change with hospital LOS (interaction P < 0.10), but not with all-cause graft loss and mortality.
LIMITATIONS: Unmeasured confounders and inability to identify volitional weight change. Also, the higher significance level set to increase the power of detecting interactions with the fixed sample size may have resulted in increased risk for type 1 error.
CONCLUSIONS: DDKT recipients with ≥10% pre-DDKT weight loss are at increased risk for adverse outcomes and may benefit from augmented support post-DDKT.

37. Hypoalbuminaemia at time of surgery is associated with an increased risk for overall graft loss after kidney transplantation.

Anderson B, Khalil K, Evison F, et al.
Nephrology (Carlton). 2018 Aug 27.

ABSTRACT
AIM: The aim of this retrospective cohort study was to investigate whether pre-operative hypoalbuminaemia (<35 g/L) is associated with adverse outcomes post-kidney transplantation.
METHODS: Our retrospective, single-centre analysis included all patients who received their kidney transplant between 2007 and 2017, with documented admission albumin levels prior to surgery. Survival analyses were undertaken to explore the relationship of pre-transplant hypoalbuminaemia versus other baseline variables upon post-transplant outcomes.
RESULTS: We analysed 1131 kidney allograft recipients transplanted at our centre (2007-2017), with median follow-up 746 days (interquartile range 133-1750 days). Kidney transplant recipients with pre-operative hypoalbuminaemia were more likely older, female, recipients of deceased-donor kidneys and to have longer cold ischaemic times. Recipients with pre-operative hypoalbuminaemia had longer hospital admissions post-operatively but no difference in delayed graft function rates. There was no difference in 1 year creatinine but recipients with hypoalbuminaemia had reduced risk for cellular rejection. We observed significantly worse patient survival (83.2% vs 90.7%, P < 0.001) and overall graft survival (72.5% vs 82.0%, P < 0.001) for recipients with hypoalbuminaemia vs normal albumin levels, respectively, but no difference in death-censored graft survival. In a Cox regression model, adjusted for baseline pre-operative variables, hypoalbuminaemia was independently associated with an increased risk for overall graft loss after kidney transplantation (hazard ratio 1.468, 95% confidence interval 1.087-1.982, P = 0.012).
CONCLUSION: Pre-operative hypoalbuminaemia is an independent risk factor for overall graft loss after kidney transplantation. Further work is warranted to investigate the underlying pathophysiology to determine what supportive measures can be undertaken to attenuate adverse post-transplant outcomes.

38. Obesity and bariatric intervention in patients with chronic renal disease.
Bellini MI, Paoletti F, Herbert PE.
J Int Med Res. 2019 Jun;47(6):2326-2341.

ABSTRACT
Obesity is associated with chronic metabolic conditions that directly and indirectly cause kidney parenchymal damage. A review of the literature was conducted to explore existing evidence of the relationship between obesity and chronic kidney disease as well as the role of bariatric surgery in improving access to kidney transplantation for patients with a high body mass index. The review showed no definitive evidence to support the use of a transplant eligibility cut-off parameter based solely on the body mass index. Moreover, in the pre-transplant scenario, the obesity paradox is associated with better patient survival among obese than non-obese patients, although promising results of bariatric surgery are emerging. However, until more information regarding improvement in outcomes for obese kidney transplant candidates is available, clinicians should focus on screening of the overall frailty condition of transplant candidates to ensure their eligibility and addition to the wait list.

39. Body mass index, waist circumference and mortality in kidney transplant recipients.
Kovesdy CP, Czira ME, Rudas A, et al.
Am J Transplant. 2010 Dec;10(12):2644-51.

ABSTRACT
Higher body mass index (BMI) appears paradoxically associated with better outcomes in patients with chronic kidney disease. Whereas higher BMI reflects both increased visceral and subcutaneous fat and/or muscle mass, a combined assessment of BMI and waist circumference may enable differentiation of visceral adiposity from muscle and/or nonvisceral fat mass. We examined the association of BMI and waist circumference with all-cause mortality in a prospective cohort of 993 kidney transplant recipients. Associations were examined in Cox models with adjustment for demographic and comorbid conditions and for inflammatory markers. Unadjusted death hazard ratios (95%CI) associated with one standard deviation higher BMI and waist circumference were 0.94 (0.78, 1.13), p = 0.5 and 1.20 (1.00, 1.45), p = 0.05, respectively. Higher BMI was associated with lower mortality after adjustment for waist circumference (0.48 [0.34, 0.69], p < 0.001), and higher waist circumference was more strongly associated with higher mortality after adjustment for BMI (2.18 [1.55-3.08], p < 0.001). The associations of waist circumference with mortality remained significant after additional multivariable adjustments. Higher BMI and waist circumference display opposite associations with mortality in kidney transplant recipients. Waist circumference appears to be a better prognostic marker for obesity than BMI.

40. Obesity in Kidney Transplantation: Impact on Transplant Candidates, Recipients, and Donors.
Glicklich D, Mustafa MR.
Cardiol Rev. 2019 Mar/Apr;27(2):63-72.

ABSTRACT

Obesity is now common among children and adults who are kidney transplant candidates and recipients. It is associated with an increased risk of cardiovascular disease and kidney failure. This also pertains to potential living kidney donors with obesity. Obese patients with end-stage renal disease benefit from transplantation as do nonobese patients, but obesity is also associated with more risk. A complicating factor is that obesity is also associated with increased survival on maintenance dialysis in adults, but not in children. The assessment of obesity and body habitus should be individualized. Body mass index is a common but imperfect indicator of obesity. The medical management of obesity in renal failure patients is often unsuccessful. Bariatric surgery, specifically laparoscopic sleeve gastrectomy, can result in significant weight loss with reduced morbidity, but many patients do not agree to undergo this treatment. The best approach to manage obese transplant candidates and recipients is yet unresolved.

41. Robotic kidney transplantation: dream or future?

Bruyère F, Doumerc N.

Curr Opin Urol. 2018 Mar;28(2):139-142.

ABSTRACT

PURPOSE OF REVIEW: Kidney transplantation is the preferred modality for the treatment of patients with end-stage renal disease. Robot-assisted kidney transplantation (RAKT) has been in use since 2002 to reduce morbidity in open kidney transplantation. The aim of this review is to highlight the most relevant publications on this challenging surgical topic.

RECENT FINDINGS: Recent publications suggest that minimally invasive techniques in kidney transplantation, including RAKT, have shown promising results particularly with regard to complications and recovery, reducing postoperative pain and analgesic requirement with a better cosmetic result. Regarding complications, RAKT seems to be a safe surgical alternative to open kidney transplantation.

SUMMARY: When performed by surgeons with robotic and kidney transplantation experience, RAKT is safe and reproducible in selected cases while maintaining excellent graft function. The ideal indication of RAKT seems to be for morbidly obese patients ineligible for open kidney transplantation. Further investigations need to confirm this promising data.

42. A Kidney Graft Survival Calculator that Accounts for Mismatches in Age, Sex, HLA, and Body Size.

Ashby VB, Leichtman AB, Rees MA et al.

Clin J Am Soc Nephrol. 2017 Jul 7;12(7):1148-1160.

ABSTRACT

BACKGROUND AND OBJECTIVES: Outcomes for transplants from living unrelated donors are of particular interest in kidney paired donation (KPD) programs where exchanges can be arranged between incompatible donor-recipient pairs or chains created from nondirected/altruistic donors.

DESIGN, SETTING, PARTICIPANTS, & MEASUREMENTS: Using Scientific Registry of Transplant Recipients data, we analyzed 232,705 recipients of kidney-alone transplants from 1998 to 2012. Graft failure rates were estimated using Cox models for recipients of kidney transplants from living unrelated, living related, and deceased donors. Models were adjusted for year of transplant and

donor and recipient characteristics, with particular attention to mismatches in age, sex, human leukocyte antigens (HLA), body size, and weight.
RESULTS: The dependence of graft failure on increasing donor age was less pronounced for living-donor than for deceased-donor transplants. Male donor-to-male recipient transplants had lower graft failure, particularly better than female to male (5%-13% lower risk). HLA mismatch was important in all donor types. Obesity of both the recipient (8%-18% higher risk) and donor (5%-11% higher risk) was associated with higher graft loss, as were donor-recipient weight ratios of <75%, compared with transplants where both parties were of similar weight (9%-12% higher risk). These models are used to create a calculator of estimated graft survival for living donors.
CONCLUSIONS: This calculator provides useful information to donors, candidates, and physicians of estimated outcomes and potentially in allowing candidates to choose among several living donors. It may also help inform candidates with compatible donors on the advisability of joining a KPD program.

43. Bariatric Surgery in Renal Transplant Patients.
Gheith O, Al-Otaibi T, Halim MA, et al.
Exp Clin Transplant. 2017 Feb;15(Suppl 1):164-169.

ABSTRACT
OBJECTIVES: The idea of transplanting organs is not new, nor is the disease of obesity. Obese transplant recipients have greater risk of early death than their cohorts, which is not due to increased rejection but due to obesity-related complications, including arterial hypertension, diabetes, and delayed graft function. Here, our aim was to evaluate the effects of bariatric surgery versus lifestyle changes on outcomes of moderate to severely obese renal transplant recipients.
MATERIALS AND METHODS: Twenty-two morbidly obese patients with stable graft function who underwent bariatric surgery were compared with 44 obese patients on lifestyle management (control group). Both groups were evaluated regarding graft and patient outcomes.
RESULTS: The studied groups were comparable demographically. In the bariatric study group versus control group, we observed that the mean body mass index was 38.49 ± 9.1 versus 44.24 ± 6 (P = .024) at transplant and 34.34 ± 7.6 versus 44.38 ± 6.7 (P = .002) at 6 months of bariatric surgery. Both groups received a more potent induction immunosuppression, but this was significantly higher in the obese nonbariatric control group (P < .05). There were more patients with slow and delayed graft functions in the same nonbariatric group. The 2 groups were comparable regarding new-onset diabetes after transplant, total patients with diabetes, and graft outcomes (P > .05).
CONCLUSIONS: Bariatric surgeries are feasible, safe pro cedures for selected obese renal transplant recipients.

44. Effect of the Obesity Epidemic on Kidney Transplantation: Obesity Is Independent of Diabetes as a Risk Factor for Adverse Renal Transplant Outcomes.
Kwan JM, Hajjiri Z, Metwally A, et al.
PLoS One. 2016 Nov 16;11(11):e0165712.

ABSTRACT

BACKGROUND: Obesity is a growing epidemic in most developed countries including the United States resulting in an increased number of obese patients with end-stage renal disease. A previous study has shown that obese patients with end-stage renal disease have a survival benefit with transplantation compared with dialysis. However, due to serious comorbidities, many centers place restrictions on the selection of obese patients for transplantation. Further, due to obese patients having an increased risk of diabetes, it is unclear whether obesity can be an independent risk, independent of diabetes for increasing adverse renal transplant outcomes.
METHODS: To investigate the role of obesity in kidney transplantation, we used the Scientific Registry of Transplant Recipients database. After filtering for subjects that had the full set of covariates including age, gender, graft type, ethnicity, diabetes, peripheral vascular disease, dialysis time and time period of transplantation for our analysis, 191,091 subjects were included in the analyses. Using multivariate logistic regression analyses adjusted for covariates we determined whether obesity is an independent risk factor for adverse outcomes such as delayed graft function, acute rejection, urine protein and graft failure. Cox regression modeling was used to determine hazard ratios of graft failure.
RESULTS: Using multivariate model analyses, we found that obese patients have significantly increased risk of adverse transplant outcomes, including delayed graft function, graft failure, urine protein and acute rejection. Cox regression modeling hazard ratios showed that obesity also increased risk of graft failure. Life-table survival curves showed that obesity may be a risk factor independent of diabetes mellitus for a shorter time to graft failure.
CONCLUSIONS: A key observation in our study is that the risks for adverse outcome of obesity are progressive with increasing body mass index. Furthermore, pre-obese overweight recipients compared with normal weight recipients also had increased risks of adverse outcomes related to kidney transplantation.

4. PATOLOGIA SISTÉMICA

45. Cardiac disease evaluation and management among kidney and liver transplantation candidates: a scientific statement from the American Heart Association and the American College of Cardiology Foundation: endorsed by the American Society of Transplant Surgeons, American Society of Transplantation, and National Kidney Foundation.

Lentine KL, Costa SP, Weir MR, et al.
Circulation. 2012 Jul 31;126(5):617-63.

No abstract available

46. Prognostic factors of coronary heart disease in asymptomatic diabetics for inclusion on the kidney transplant waiting list. Screening with coronary angiography.

Pinilla-Echeverri N, Moreno-Reig AL, Romera-Segorbe AM, et al.
Nefrologia. 2012 Jul 17;32(4):502-7.

ABSTRACT
INTRODUCTION AND OBJECTIVES: Coronary artery disease is a major cause of morbidity and mortality in diabetic kidney transplant candidates. The high prevalence of coronary disease in asymptomatic patients creates the need for major coronary artery disease screening. Our goal was to determine the prevalence and prognostic factors associated with coronary disease in this patient group.
METHOD: A retrospective study of a cohort of 36 asymptomatic patients with diabetes mellitus type 1 and 2 and chronic renal failure that were candidates for renal transplantation between January 2007 and October 2011.
RESULTS: We followed a cohort of 36 patients. Significant coronary disease was found in 65% (13) of patients with type 1 diabetes mellitus and 81.3% (13) with type 2 diabetes mellitus. In the multivariate logistic regression analysis, smoking (OR=8.3, P=.048) and glycosylated haemoglobin levels (OR=9.525, P=.006) were significantly associated with coronary artery disease. Factors not significantly associated with coronary artery disease included: age, sex, type of diabetes mellitus, duration of diabetes mellitus (years) and hypertension.
CONCLUSION: Diabetic patients without clinical angina and chronic renal failure who were candidates for inclusion in the kidney transplant waiting list have a high prevalence of significant coronary artery disease. Smoking and glycosylated haemoglobin levels were independently associated with the presence of coronary artery disease.

47. Frequency and clinical predictors of coronary artery disease in chronic renal failure renal transplant candidates.

de Albuquerque Seixas E, Carmello BL, Kojima CA, et al
Ren Fail. 2015 May;37(4):597-600.

ABSTRACT
BACKGROUND/AIMS: Cardiovascular diseases are major causes of mortality in chronic renal failure patients before and after renal transplantation. Among them, coronary disease presents a

particular risk; however, risk predictors have been used to diagnose coronary heart disease. This study evaluated the frequency and importance of clinical predictors of coronary artery disease in chronic renal failure patients undergoing dialysis who were renal transplant candidates, and assessed a previously developed scoring system.
METHODS: Coronary angiographies conducted between March 2008 and April 2013 from 99 candidates for renal transplantation from two transplant centers in São Paulo state were analyzed for associations between significant coronary artery diseases (≥70% stenosis in one or more epicardial coronary arteries or ≥50% in the left main coronary artery) and clinical parameters.
RESULTS: Univariate logistic regression analysis identified diabetes, angina, and/or previous infarction, clinical peripheral arterial disease and dyslipidemia as predictors of coronary artery disease. Multiple logistic regression analysis identified only diabetes and angina and/or previous infarction as independent predictors.
CONCLUSION: The results corroborate previous studies demonstrating the importance of these factors when selecting patients for coronary angiography in clinical pretransplant evaluation.

48. Role of Coronary Angiography in the Assessment of Cardiovascular Risk in Kidney Transplant Candidates.

Mann DM, Fernandez S, Mondal Z, et al.
Am J Cardiol. 2016 Sep 1;118(5):679-83.

ABSTRACT

Cardiovascular disease is the leading cause of death among those with renal insufficiency, those requiring dialysis, and in recipients of kidney transplants reflecting the greatly increased cardiovascular burden that these patients carry. The best method by which to assess cardiovascular risk in such patients is not well established. In the present study, 1,225 patients seeking a kidney transplant, over a 30-month period, underwent cardiovascular evaluation. Two hundred twenty-five patients, who met selected criteria, underwent coronary angiography that revealed significant coronary artery disease (CAD) in 47%. Those found to have significant disease underwent revascularization. Among the patients found to have significant CAD, 74% had undergone a nuclear stress test before angiography and 65% of these stress tests were negative for ischemia. The positive predictive value of a nuclear stress test in this patient population was 0.43 and the negative predictive value was 0.47. During a 30-month period, 28 patients who underwent coronary angiography received an allograft. None of these patients died, experienced a myocardial infarction, or lost their allograft. The annual mortality rate of those who remained on the waiting list was well below the national average. In conclusion, our results indicate that, in renal failure patients, noninvasive testing fails to detect the majority of significant CAD, that selected criteria may identify patients with a high likelihood of CAD, and that revascularization reduces mortality both for those on the waiting list and for those who receive an allograft.

49. Cardiac Risk Assessment in Kidney Transplant Candidates: Clinical Usefulness of Different Guidelines.

Mehdiyev S, Velioglu A, Arikan H, et al.
Transplant Proc. 2019 May;51(4):1058-1063.

ABSTRACT
Although cardiovascular (CV) assessment is recommended to minimize perioperative risk in all potential kidney transplant recipients, the utility and reliability of various assessment methods are not well established. In this study, we investigated the CV evaluations and outcomes of standardized CV assessment protocols (Lisbon and American Society of Transplantation [AST]) in potential kidney transplant recipients. Data were analyzed for 266 end-stage renal disease patients (mean age 45.4 ± 13 years, female-to-male ratio 126:140) accepted for kidney transplantation wait-listing. Patients were classified as low and high cardiac risk according to their first cardiac evaluation. Major cardiovascular events (CVEs) and deaths were recorded. At the end of follow-up (median 639 days), 72 (27.1%) patients underwent kidney transplantation. A total of 49 patients (18.4%) had CVEs and 42 (15.8%) patients died. Being over 45 years of age and having dialysis vintage over 1 year were found to be independent risk factors for CVEs. Forty-eight out of 60 high-risk patients evaluated with noninvasive tests had negative results. Twelve out of these 48 patients had a CVE in due course. Among 10 patients who underwent coronary angiography, 1 had a CVE and 1 died. The sensitivity and specificity of the AST guidelines (area under the curve = 0.647, P = .005, sensitivity 83%, specificity 54%) were higher than Lisbon. In conclusion, the predictive risk factors for CVEs were age over 45 years and dialysis vintage over a year. Our results also suggest that exercise electrocardiography and myocardial perfusion scintigraphy for cardiac evaluation are less sensitive in CVE prediction. We recommend clinicians to use the AST guidelines and to prioritize coronary angiography in pretransplant CV assessment.

50. A call to action: variability in guidelines for cardiac evaluation before renal transplantation.
Friedman SE, Palac RT, Zlotnick DM, et al.
Clin J Am Soc Nephrol. 2011 May;6(5):1185-91.

ABSTRACT
BACKGROUND AND OBJECTIVES: Candidates for renal transplantation are at increased risk for complications related to cardiovascular disease; however, the optimal strategy to reduce this risk is not clear. The aim of this study was to evaluate the variability among existing guidelines for preoperative cardiac evaluation of renal transplant candidates.
DESIGN, SETTING, PARTICIPANTS, & MEASUREMENTS: A consecutive series of renal transplant candidates (n=204) were identified, and four prominent preoperative cardiac evaluation guidelines, pertaining to this population, were retrospectively applied to determine the rate at which each guideline recommended cardiac stress testing.
RESULTS: The rate of pretransplant cardiac stress testing would have ranged from 20 to 100% depending on which guideline was applied. The American Heart Association/American College of Cardiology (ACC/AHA) guideline resulted in the lowest rate of testing (20%). In our population, 178 study subjects underwent stress testing: 17 were found to have ischemia and 10 underwent revascularization. The ACC/AHA approach would have decreased the number of noninvasive tests from 178 to 39; it would have identified only 4 of the 10 patients who underwent revascularization. The three other guidelines (renal transplant-specific guidelines) recommended widespread pretransplant cardiac testing and thus identified nearly all patients who had ischemia on stress testing.
CONCLUSIONS: The ACC/AHA perioperative guideline may be inadequate for identifying renal transplant candidates with coronary disease; however, renal transplant-specific guidelines may

provoke significant overtesting. An intermediate approach based on risk factors specific to the ESRD population may optimize detection of coronary disease and limit testing.

51. Treatment and management options for the hepatitis C virus infected kidney transplant candidate.

Dejman A, Ladino MA, Roth D.

Hemodial Int. 2018 Apr;22 Suppl 1:S36-S44.

ABSTRACT

A substantial body of literature has unequivocally established that prevalent hepatitis C virus infection in chronic kidney disease (CKD), end stage renal disease (ESRD) and kidney transplant recipients is associated with a negative impact on patient survival. As a consequence of remarkable work that explained the details of the hepatitis C virus (HCV) genome, a class of drugs referred to as the direct-acting antiviral (DAA) agents were developed that targeted specific key sites in viral replication. Large clinical trials in the HCV-infected general population followed soon after that demonstrated cure rates exceeding 95%. Treatment paradigms have been further refined and expanded to populations of patients that were initially excluded from the large pivotal trials. This includes the CKD and ESRD patients for whom there are now safe and effective DAAs available as well. In this context, the focus of decision making has shifted from initially demonstrating safety and efficacy to now identifying which patient should receive therapy and at what point in their CKD/ESRD journey. The specific issue of timing of treatment is particularly relevant to the HCV-infected ESRD patient who is being considered for kidney transplantation. The option of treating with DAAs prior to the transplant or alternatively delaying therapy and treating in the posttransplant period will be influenced by several factors, including patient preference, the extent of liver injury, the availability of a living or deceased donor, and more recently the option of transplanting a kidney from HCV-positive donor. The latter has been associated with the advantage of shortened waiting times and expansion of the organ donor pool. The optimal timing and choice of therapy will be the result of a decision that has been individualized for each patient as a consequence of a process of clear communication involving the patient, primary care physician, nephrologist, gastroenterologist (GI)/hepatologist, and local transplant center.

52. Management of patients with hepatitis B in special populations.

Cholongitas E, Tziomalos K, Pipili C.

World J Gastroenterol. 2015 Feb 14;21(6):1738-48.

ABSTRACT

The development of effective nucleos(t)ide analogs (NAs) against hepatitis B virus (HBV) has improved the outcome of patients with chronic hepatitis B (CHB). This review updates issues related to the management of CHB patients included in special populations. Entecavir (ETV) and tenofovir (TDF) represent the currently recommended first-line NAs in patients with HBV decompensated cirrhosis. The combination of HBV immunoglobulin (usually for a finite duration) and NA is considered the standard of care for prophylaxis against HBV recurrence after liver transplantation. TDF is the best choice for hemodialysis patients and in patients with chronic kidney disease with nucleoside resistance. ETV and telbivudine are the preferred options in naïve renal transplant recipients and with low viremia levels, respectively. All hepatitis B surface antigen

(HBsAg)-positive candidates should be treated with NAs before renal transplantation to achieve undetectable HBV DNA at the time of transplantation. Conventional interferon or NAs can also be used in children, on the basis of well-established therapeutic indication. Pregnant women at high risk of perinatal transmission could be treated with lamivudine, telbivudine or TDF in the last trimester of pregnancy. HBsAg-positive patients under immunosuppression should receive NA pre-emptively (regardless of HBV DNA levels) up to 12 mo after its cessation. In HBsAg negative, anti-HBc positive patients under immunosuppression, further studies are needed to form a final conclusion; however, it seems that anti-HBV prophylaxis is justified in such patients with hematological diseases and/or for those receiving rituximab-containing regimens, regardless of their anti-HBs or serum HBV DNA status.

53. Hypercoagulability in Kidney Transplant Recipients.
Parajuli S, Lockridge JB, Langewisch ED, et al.
Transplantation. 2016 Apr;100(4):719-26.

ABSTRACT
Thrombosis remains an important complication after kidney transplantation. Outcomes for graft and deep vein thrombosis are not favorable. The majority of early kidney transplant failure in adults is due to allograft thrombosis. Risk stratification, early diagnosis, and appropriate intervention are critical to the management of thrombotic complications of transplant. In patients with end-stage renal disease, the prevalence of acquired risk factors for thrombosis is significantly high. Because of hereditary and acquired risk factors, renal transplant recipients manifest features of a chronic prothrombotic state. Identification of hereditary thrombotic risk factors before transplantation may be a useful tool for selecting appropriate candidates for thrombosis prophylaxis immediately after transplantation. Short-term anticoagulation may be appropriate for all patients after kidney transplantation.

54. Beneficial effect of kidney transplantation from a deceased donor on severe chronic refractory intradialytic hypotension - a case report.
Ignacak E, Cieniawski D, Bętkowska-Prokop A, et al.
BMC Nephrol. 2017 Jul 20;18(1):248.

ABSTRACT
BACKGROUND: Chronic refractory hypotension (IDH, intradialytic hypotension) is a rare but serious problem encountered in patients on hemodialysis. Patients with chronic hypotension are often disqualified by transplant teams from renal transplantation. This is due to the possibility of an enormous risk of ischemic complications.
CASE PRESENTATION: We describe a 44-year old female patient with severe refractory hypotension (mean BP 60/30 mmHg, the lowest 48/28 mmHg), which appeared after bilateral laparoscopic nephrectomy of the infected kidneys. The kidney transplantation from a deceased donor, with infusion of the two pressor amines (dopamine, dobutamine) was performed without technical complications and the blood pressure measurements were 100-120/70-80 mmHg. The immunosuppression regimen was tacrolimus (TAC) + mycophenolate mophetil (MMF) and steroids (GS). Pressor amines were discontinued on the 18th day after the transplantation. Because of delayed graft

function, 4 hemodialysis treatments were performed. The patient was discharged from the hospital on the 22nd day with good function of the transplanted kidney (the concentration of serum creatinine 117 µmol/l). During one-year follow-up, the patient has been remaining stable with a very good graft function (serum creatinine 84 µmol/l) and normal blood pressure.

55. Accuracy of the preoperative assessment in predicting pulmonary risk after nonthoracic surgery.

McAlister FA, Khan NA, Straus S et al.

Am J Respir Crit Care Med. 2003 Mar 1;167(5):741-4.

ABSTRACT

We examined the accuracy of preoperative assessment in predicting postoperative pulmonary risk in a prospective cohort of 272 consecutive patients referred for evaluation before nonthoracic surgery. Outcomes were assessed by an independent investigator who was blinded to the preoperative data. There were 22 (8%) postoperative pulmonary complications. Statistically significant predictors of pulmonary complications (all p < or = 0.005) were as follows: hypercapnea of 45 mm Hg or more (odds ratio, 61.0), a FVC of less than 1.5 L/minute (odds ratio, 11.1), a maximal laryngeal height of 4 cm or less (odds ratio, 6.9), a forced expiratory time of 9 seconds or more (odds ratio, 5.7), smoking of 40 pack-years or more (odds ratio, 5.7), and a body mass index of 30 or more (odds ratio, 4.1). Multiple regression analyses revealed three preoperative clinical factors that are independently associated with pulmonary complications: an age of 65 years or more (odds ratio, 1.8; p = 0.02), smoking of 40 pack-years or more (odds ratio, 1.9; p = 0.02), and maximum laryngeal height of 4 cm or less (odds ratio, 2.0; p = 0.007). Thus, preoperative factors can identify those patients referred to pulmonologists or internists who are at increased risk for pulmonary complications after nonthoracic surgery.

56. Evaluation and Management of Pulmonary Hypertension in Kidney Transplant Candidates and Recipients: Concepts and Controversies.

Lentine KL, Villines TC, Axelrod D, et al.

Transplantation. 2017 Jan;101(1):166-181.

ABSTRACT

Although cardiac evaluation before kidney transplantation commonly focuses on coronary artery disease, a comprehensive pretransplant cardiac evaluation must consider other prognostically important cardiac conditions including functional and structural heart disease. Pulmonary hypertension (PH) is increasingly recognized among patients with kidney failure and may be driven by left heart failure, high cardiac output from arteriovenous fistula, hypoxic lung diseases, and metabolic derangements associated with renal disease. In this article, we examine several key concepts and controversies relevant to optimizing the assessment and management of PH in kidney transplant candidates and recipients. First, categorizing PH according to underlying pathophysiologies, hemodynamic characteristics, and treatment responses as currently defined by the World Health Organization can be challenging in this population, but should be pursued to direct appropriate management. Second, echocardiographic PH (based on variable definitions) has

been reported in 13% to 50% of selected pretransplant cohorts, but use of more precise diagnostic methods is needed to better define epidemiology and underlying etiologies. Third, although measures of PH have been associated with adverse patient and graft outcomes after kidney transplantation, pilot data suggest that PH may improve with successful transplantation. Fourth, recent advances in PH treatment in the general population focus on World Health Organization group 1 pulmonary arterial hypertension, and the efficacy of management strategies for any PH type in patients with renal failure is largely unproven. Broader prospective data, including attention to the impact of transplantation, are needed to advance understanding of the frequency, causes, and optimal management of PH in kidney transplant candidates and recipients.

57. American Society of Anesthesiologists Classification Versus ARISCAT Risk Index: Predicting Pulmonary Complications Following Renal Transplant.

Kupeli E, Er Dedekarginoglu B, Ulubay G, et al.

Exp Clin Transplant. 2017 Feb;15(Suppl 1):208-213.

ABSTRACT

OBJECTIVES: Patients with chronic renal failure are prone to pulmonary complications. Renal transplant recipients should undergo complete preoperative evaluation to determine risk of postoperative pulmonary complications. The American Society of Anesthesiologists classification and the Assess Respiratory Risk in Surgical Patients in Catalonia risk index correlate well with incidence of postoperative pulmonary complications. Here, we compared their accuracy in predicting pulmonary complications following renal transplant.

MATERIALS AND METHODS: We retrospectively reviewed medical records of renal transplant recipients between years 2004 and 2015. We collected patient data on Assess Respiratory Risk in Surgical Patients in Catalonia risk index, including demographics, smoking history, comorbidities, preoperative pulmonary risk score, laboratory results, surgery information, history of lower respiratory tract infection 1 month pretransplant, urgency of surgery, American Society of Anesthesiologists classification, and pulmonary complications within 1 month posttransplant.

RESULTS: Of 172 patients (123 males; mean age 38.82 y), 22 (12.8%) developed pulmonary complication during the first month posttransplant, including effusion (9 patients), pneumonia (10 patients), respiratory inefficiency (2 patients), and pulmonary embolism (1 patient). Atelectasis was observed in 95.4% of patients with complications. A positive correlation was observed between age and development of complications ($r = 0.171$; $P = .025$). Regarding risk score, 75% of patients at high risk and 19.5% at intermediate risk developed pulmonary complications. Patients with low-risk scores had significantly lower complications than intermediate- and high-risk groups ($P < .001$). A positive correlation was observed between preoperative risk score and complications ($r = 0.34$; $P < .001$). There was no association between the American Society of Anesthesiologists scores and postoperative complications ($P = .7$).

CONCLUSIONS: The American Society of Anesthesiologists classification was found to be a weaker modality to predict pulmonary complications after renal transplant; as it relates to the general health status, than the Assess Respiratory Risk in Surgical Patients in Catalonia risk index.

58. Pretransplant Midodrine Use: A Newly Identified Risk Marker for Complications After Kidney Transplantation.

Alhamad T, Brennan DC, Brifkani Z, et al.

Transplantation. 2016 May;100(5):1086-93

ABSTRACT

BACKGROUND: Midodrine is prescribed to prevent symptomatic hypotension and decrease complications associated with hypotension during dialysis. We hypothesized that midodrine use before kidney transplantation may be a novel marker for posttransplant risk.

METHODS: We analyzed integrated national US transplant registry, pharmacy records, and Medicare claims data for 16 308 kidney transplant recipients transplanted 2006 to 2008, of whom 308 (1.9%) had filled midodrine prescriptions in the year before transplantation. Delayed graft function (DGF), graft failure, and patient death were ascertained from the registry. Posttransplant cardiovascular complications were identified using diagnosis codes on Medicare billing claims. Adjusted associations of pretransplant midodrine use with complications at 3 and 12 months posttransplant were quantified by multivariate Cox or logistic regression, including propensity for midodrine exposure.

RESULTS: At 3 months, patients who used midodrine pretransplant had significantly ($P < 0.05$) higher rates of DGF, 32% versus 19%; hypotension, 14% versus 4%; acute myocardial infarction, 4% versus 2%; cardiac arrest, 2% versus 0.9%, graft failure, 5% versus 2%; and death, 4% versus 1% than nonusers. After multivariate adjustment including recipient and donor factors, as well as for the propensity of midodrine exposure, pretransplant midodrine use was independently associated with risks of DGF (adjusted odds ratio, 1.78; 95% confidence interval [CI], 1.36-2.32), and 3 month death-censored graft failure (adjusted hazard ratio, 2.0; 95% CI, 1.18-3.39), and death (adjusted hazard ratio, 3.49; 95% CI, 1.95-6.24). Patterns were similar at 12 months.

CONCLUSIONS: Although associations may in part reflect underlying conditions, the need for midodrine before kidney transplantation is a risk marker for complications including DGF, graft failure, and death.

59. The evaluation of renal transplantation candidates: clinical practice guidelines.

Kasiske BL, Cangro CB, Hariharan S, et al.

Am J Transplant. 2001;1 Suppl 2:3-95.

No abstract available

5. VIH

60. Increased Mortality and Graft Loss With Kidney Retransplantation Among Human Immunodeficiency Virus (HIV)-Infected Recipients.

Shelton BA, Mehta S, Sawinski D, et al.
Am J Transplant. 2017 Jan;17(1):173-179.

ABSTRACT
Excellent outcomes have been demonstrated in primary human immunodeficiency virus (HIV)-positive (HIV+) kidney transplant recipients, but a subset will lose their graft and seek retransplantation (re-KT). To date, no study has examined outcomes among HIV+ re-KT recipients. We studied risk for death and graft loss among 4149 (22 HIV+ vs. 4127 HIV-negative [HIV-]) adult re-KT recipients reported to the Scientific Registry of Transplant Recipients (SRTR) (2004-2013). Compared to HIV- re-KT recipients, HIV+ re-KT recipients were more commonly African American (63.6% vs. 26.7%, $p < 0.001$), infected with hepatitis C (31.8% vs. 5.0%, $p < 0.001$) and had longer median time on dialysis (4.8 years vs. 2.1 years, $p = 0.02$). There were no significant differences in length of time between the primary and re-KT events by HIV status (1.5 years vs. 1.4 years, $p = 0.52$). HIV+ re-KT recipients experienced a 3.11-fold increased risk of death (adjusted hazard ratio [aHR]: 3.11, 95% confidence interval [CI]: 1.82-5.34, $p < 0.001$) and a 1.96-fold increased risk of graft loss (aHR: 1.96, 95% CI: 1.14-3.36, $p = 0.01$) compared to HIV- re-KT recipients. Re-KT among HIV+ recipients was associated with increased risk for mortality and graft loss. Future research is needed to determine if a survival benefit is achieved with re-KT in this vulnerable population.

61. Solid organ transplantation in the HIV-infected patient: Guidelines from the American Society of Transplantation Infectious Diseases Community of Practice.

Blumberg EA, Rogers CC; American Society of Transplantation Infectious Diseases Community of Practice.
Clin Transplant. 2019 Feb 17:e13499.

ABSTRACT
These updated guidelines from the Infectious Diseases Community of Practice of the American Society of Transplantation review the management of transplantation in HIV-infected individuals. Transplantation has become the standard of care for patients with HIV and end-stage kidney or liver disease. Although less data exist for thoracic organ and pancreas transplantation, it is likely that transplantation is also safe and effective for these recipients as well. Despite what is typically a transient decline in CD4+ T lymphocytes, HIV remains well controlled and infection risks are similar to those of HIV-uninfected transplant recipients. The availability of effective directly active antivirals for the treatment of Hepatitis C is likely to improve outcomes in HIV and HCV co-infected individuals, a population previously noted to have decreased survival. Drug interactions remain an important consideration, and integrase inhibitor-based regimens are preferred due to the absence of interactions with calcineurin and mTOR inhibitors. Additionally, despite the use of more potent immunosuppression, rejection rates exceed those found in HIV-uninfected recipients. Ongoing research evaluating HIV-positive organ donors may provide support for utilizing these donors for HIV-positive patients in need of transplantation.

62. Access to Kidney Transplantation among HIV-Infected Waitlist Candidates.
Locke JE, Mehta S, Sawinski D, et al.
Clin J Am Soc Nephrol. 2017 Mar 7;12(3):467-475

ABSTRACT
BACKGROUND AND OBJECTIVES: Kidney transplantation among HIV-infected patients with ESRD confers a significant survival benefit over remaining on dialysis. Given the high mortality burden associated with dialysis, understanding access to kidney transplantation after waitlisting among HIV+ candidates is warranted.
DESIGN, SETTING, PARTICIPANTS, & MEASUREMENTS: Data from the Scientific Registry of Transplant Recipients were linked to Intercontinental Marketing Statistics pharmacy fills (January 1, 2001 to October 1, 2012) so that we could identify and study 1636 HIV+ (defined as having filled one or more antiretroviral medications unique to HIV treatment) and 72,297 HIV- kidney transplantation candidates.
RESULTS: HIV+ waiting list candidates were more often young (<50 years old: 62.7% versus 37.6%; P<0.001), were more often men (75.2% versus 59.3%; P<0.001), were more often black (73.6% versus 27.9%; P<0.001), had longer time on dialysis (years: 2.5 versus 0.8; P<0.001), were more often coinfected with hepatitis C virus (9.0% versus 3.9%; P<0.001), and were less likely to remain active on the waiting list (37.7% versus 49.4%; P<0.001). Waitlist mortality among HIV+ candidates was similar compared with HIV- candidates (adjusted hazard ratio, 1.03; 95% confidence interval, 0.89 to 1.20; P=0.67). In contrast, likelihood of living donor kidney transplantation was 47% lower (adjusted hazard ratio, 0.53; 95% confidence interval, 0.44 to 0.64; P<0.001), and there was a trend toward lower likelihood of deceased donor kidney transplantation (adjusted hazard ratio, 0.87; 95% confidence interval, 0.74 to 1.01; P=0.07) compared with in HIV- candidates.
CONCLUSIONS: Our findings highlight the need for additional study to better understand disparities in access to kidney transplantation, particularly living donor kidney transplantation, among HIV+ kidney waitlist candidates.

63. Access to the waiting list and to kidney transplantation for people living with HIV: a national registry study.
Tourret J, Guiguet M, Lassalle M, et al.
Am J Transplant. 2019 Jun 17.

ABSTRACT
We compared access to a kidney transplantation (KT) waiting list (WL) and to KT between people living with HIV (PLHIV) and HIV-uninfected controls. Using the REIN (the national Renal Epidemiology and Information Network registry), we included all PLHIV initiating dialysis in France throughout 2006-2010 and HIV-uninfected controls matched for age, sex, year of dialysis initiation, and the existence of a diabetic nephropathy. Patients were prospectively followed until December 2015. We used a competitive risk approach to assess the cumulative incidence of enrollment on WL and of KT, with death as a competing event (sub-distribution hazard ratio adjusted on comorbidities, asdHR). There were 255 PLHIV in the REIN (median age 47 years) of whom 180 (71%) were also found in the French Hospital Database on HIV (FHDH-ANRS CO4) including 126 (70%) known to be on antiretroviral therapy with HIV viral suppression (VS). Five years after dialysis initiation, 65%, and 76%, of treated PLHIV with VS, and of HIV-uninfected controls were enrolled on a WL (asdHR 0.68; 95% CI 0.50-0.91). Access to KT was also less frequent and delayed

for treated PLHIV with VS (asdHR 0.75, 95% CI, 0.52-1.10). PLHIV continue to face difficulties to access KT.

64. Solid Organ Transplantation in HIV-Infected Recipients: History, Progress, and Frontiers.

Werbel WA, Durand CM.

Curr HIV/AIDS Rep. 2019 Jun;16(3):191-203.

ABSTRACT

PURPOSE OF REVIEW: End-stage organ disease prevalence is increasing among HIV-infected (HIV+) individuals. Trial and registry data confirm that solid organ transplantation (SOT) is efficacious in this population. Optimizing access to transplant and decreasing complications represent active frontiers.

RECENT FINDINGS: HIV+ recipients historically experienced 2-4-fold higher rejection. Integrase strand transferase inhibitors (INSTIs) minimize drug interactions and may reduce rejection along with lymphodepleting induction immunosuppression. Hepatitis C virus (HCV) coinfection has been associated with inferior outcomes, yet direct-acting antivirals (DAAs) may mitigate this. Experience in South Africa and the US HIV Organ Policy Equity (HOPE) Act support HIV+ donor to HIV+ recipient (HIV D+/R+) transplantation. SOT is the optimal treatment for end-stage organ disease in HIV+ individuals. Recent advances include use of INSTIs and DAAs in transplant recipients; however, strategies to improve access to transplant are needed. HIV D+/R+ transplantation is under investigation and may improve access and provide insights for HIV cure and pathogenesis research.

65. HIV in the dialysis population: Current issues and future directions.

Boyle SM, Lee DH, Wyatt CM.

Semin Dial. 2017 Sep;30(5):430-437.

ABSTRACT

Antiretroviral therapy has significantly reduced mortality due to HIV infection, but the aging HIV-positive patient population now faces a growing burden of comorbidity. This review describes the changing epidemiology of chronic kidney disease and end-stage renal disease in this population, and highlights recent advances in antiretroviral therapy and kidney transplantation that directly impact the care of patients with HIV infection and end-stage renal disease.

66. Optimal timing of hepatitis C treatment among HIV/HCV coinfected ESRD patients: Pre- vs posttransplant.

Shelton BA, Berdahl G, Sawinski D, et al.

Am J Transplant. 2019 Jun;19(6):1806-1819.

ABSTRACT

Patients with end-stage renal disease (ESRD) who are coinfected with hepatitis C virus (HCV) and human immunodeficiency virus (HIV) have access to effective treatment options for HCV infection. However, they also have access to HCV-infected kidneys, which historically afford shorter times to transplantation. Given the high waitlist mortality and rapid progression of liver fibrosis among

coinfected kidney-only transplant candidates, identification of the optimal treatment strategy is paramount. Two strategies, treatment pre- and posttransplant, were compared using Monte Carlo microsimulation of 1 000 000 candidates. The microsimulation was stratified by liver fibrosis stage at waitlist addition and wait-time over a lifetime time horizon. Treatment posttransplant was consistently cost-saving as compared to treatment pretransplant due to the high cost of dialysis. Among patients with low fibrosis disease (F0-F1), treatment posttransplant also yielded higher life months (LM) and quality-adjusted life months (QALM), except among F1 candidates with wait times ≥ 18 months. For candidates with advanced liver disease (F2-F4), treatment pretransplant afforded more LM and QALM unless wait time was <18 months. Moreover, treatment pretransplant was cost-effective for F2 candidates with wait times >71 months and F3 candidates with wait times >18 months. Thus, optimal timing of HCV treatment differs based on liver disease severity and wait time, favoring pretransplant treatment when cirrhosis development prior to transplant seems likely.

67. Disparity in access to kidney allograft offers among transplant candidates with human immunodeficiency virus.

Cohen JB, Locke JE, Shelton B, et al.

Clin Transplant. 2019 Feb;33(2):e13466.

ABSTRACT

BACKGROUND: Despite a survival benefit from transplantation and acceptable outcomes, patients with human immunodeficiency virus (HIV+) face barriers to kidney transplantation. Little is known about the acceptance or decline of organ offers on their behalf because waitlist registry data do not include HIV serostatus.

METHODS: We performed a retrospective cohort study using match run data from the Organ Procurement and Transplantation Network, including every kidney offer from May 1, 2007, to July 3, 2013. HIV and hepatitis C virus (HCV) serostatus were obtained by merging the match run with clinical data from a large dialysis provider. We used Cox proportional hazards modeling to evaluate differences in time to the first organ offer and to transplantation. A total of 35 646 uninfected, 2213 HCV+, 418 HIV+, and 71 HIV+/HCV+ candidates received organ offers during the study period.

RESULTS: Compared to uninfected candidates, HIV+ candidates had a significantly lower likelihood of receiving a first offer (adjusted hazard ratio [aHR] 0.88, 95% confidence interval [CI] 0.79-0.99) and undergoing transplantation (aHR 0.82, 95% CI: 0.68-0.98) after receiving a first offer; HCV+ candidates had a similar likelihood of receiving a first offer (aHR 0.98, 95% CI: 0.92-1.03) and greater likelihood of transplantation after receiving a first offer (aHR 1.23, 95% CI: 1.12-1.36).

CONCLUSIONS: HIV+ candidates had a significantly longer wait until their first organ offer and to transplantation. Efforts to increase their access to transplantation are needed.

68. First UK case report of kidney transplantation from an HIV-infected deceased donor to two HIV-infected recipients.

Nolan E, Karydis N, Drage M, et al

Clin Kidney J. 2018 Apr;11(2):289-291.

ABSTRACT
Kidney transplantation is now considered the treatment of choice for many human immunodeficiency virus (HIV)-infected patients with end-stage renal disease (ESRD). Graft survival rates using HIV-negative donors and carefully selected HIV-positive ESRD patients are similar to those observed in HIV-uninfected kidney transplant recipients. To address the relative shortfall in donated organs it has been proposed that organs from HIV-infected deceased donors might be allocated to HIV-infected patients on the transplant waiting list. Preliminary experience in South Africa reports promising short-term outcomes in a small number of HIV-infected recipients of kidney transplants from HIV-infected donors. We sought to replicate this experience in the UK by accepting kidney offers from HIV infected deceased donors for patients with HIV-infection on the kidney transplant waiting list. Here we report the UK's first cases of kidney transplantation between HIV-positive donors and recipients.

69. HIV-Positive Kidney Donor Selection for HIV-Positive Transplant Recipients.
Muller E, Barday Z.
J Am Soc Nephrol. 2018 Apr;29(4):1090-1095.

ABSTRACT
The risks associated with transplanting HIV-positive kidneys into HIV-positive recipients have not been well studied. Since 2008, 43 kidneys from 25 HIV-positive deceased donors have been transplanted into patients who are HIV positive in Cape Town, South Africa. Among the donors, 19 (76%) died secondary to trauma. The average age for donors was 34 (interquartile range, 19-52) years old. In some donors, only one kidney was used because of a limited number of suitable recipients on the waiting list. Only two donors had been previously exposed to antiretroviral triple therapy. In 23 of the deceased organ donors, the HIV status was not known before the time of death. Initial concerns about transplanting HIV-positive allografts into HIV-positive recipients in this clinic revolved around the possibility of HIV superinfection. However, all recipients remained virally suppressed several years after the transplant. Only one recipient experienced an increased viral load after the transplant, which was related to a period of noncompliance on her medication. After counseling and improved compliance, the viral load decreased and became suppressed again. Herein, we discuss the findings of this study and review the literature available on this crucial topic.

70. The future of HIV Organ Policy Equity Act is now: the state of HIV positive to HIV+ kidney transplantation in the United States.
Boyarsky BJ, Bowring MG, Shaffer AA, et al.
Curr Opin Organ Transplant. 2019 May 27.

ABSTRACT
PURPOSE OF REVIEW: We report the current state of HIV-to-HIV kidney transplantation in the United States and remaining challenges in implementing this practice nationally.
RECENT FINDINGS: The HIV Organ Policy Equity (HOPE) Act, which was the first step in unlocking the potential of HIV+ organ donors, mandates clinical research on HIV positive to HIV+ transplantation. As of March 2019, there have been 57 HOPE donors, including both true and false-positive HOPE donors resulting in more than 120 transplants.

SUMMARY: The HOPE Act, signed in 2013, reversed the federal ban on the transplantation of organs from HIV D+ into HIV R+ . Ongoing national studies are exploring the safety, feasibility, and efficacy of both kidney and liver transplantation in this population. If successfully and fully implemented, HIV positive to HIV+ transplantation could attenuate the organ shortage for everyone waiting, resulting in a far-reaching public health impact.

6. PATOLOGIA COGNITIVA, DEPENDENCIA

71. Limited health literacy and adverse outcomes among kidney transplant candidates.

Warsame F, Haugen CE, Ying H1, Garonzik-Wang JM, et al.
Am J Transplant. 2019 Feb;19(2):457-465.

ABSTRACT
More than one-third of US adults have limited health literacy, putting them at risk of adverse clinical outcomes. We evaluated the prevalence of limited health literacy among 1578 adult kidney transplant (KT) candidates (May 2014-November 2017) and examined its association with listing for transplant and waitlist mortality in this pilot study. Limited health literacy was assessed at KT evaluation by using a standard cutoff score ≤5 on the Brief Health Literacy Screen (score range 0-12, lower scores indicate worse health literacy). We used logistic regression and adjusted Cox proportional hazards models to identify risk factors for limited health literacy and to quantify its association with listing and waitlist mortality. We found that 8.9% of candidates had limited health literacy; risk factors included less than college education (adjusted odds ratio [aOR] = 2.87, 95% confidence interval [CI]:1.86-4.43), frailty (aOR = 1.85, 95% CI:1.22-2.80), comorbidity (Charlson comorbidity index [1-point increase] aOR = 1.12, 95% CI: 1.04-1.20), and cognitive impairment (aOR = 3.45, 95% CI: 2.20-5.41) after adjusting for age, sex, race, and income. Candidates with limited health literacy had a 30% (adjusted hazard ratio = 0.70, 95% CI: 0.54-0.91) decreased likelihood of listing and a 2.42-fold (95% CI: 1.16- to 5.05-fold) increased risk of waitlist mortality. Limited health literacy may be a salient mechanism in access to KT; programs to aid candidates with limited health literacy may improve outcomes and reduce disparities.

72. Limited health literacy is associated with reduced access to kidney transplantation.

Taylor DM, Bradley JA, Bradley C, et al.
Kidney Int. 2019 May;95(5):1244-1252.

ABSTRACT
Limited health literacy is common in patients with chronic kidney disease (CKD) and has been variably associated with adverse clinical outcomes. The prevalence of limited health literacy is lower in kidney transplant recipients than in individuals starting dialysis, suggesting selection of patients with higher health literacy for transplantation. We investigated the relationship between limited health literacy and clinical outcomes, including access to kidney transplantation, in a prospective UK cohort study of 2,274 incident dialysis patients aged 18-75 years. Limited health literacy was defined by a validated Single Item Literacy Screener (SILS). Multivariable regression was used to test for association with outcomes after adjusting for age, sex, socioeconomic status (educational level and car ownership), ethnicity, first language, primary renal diagnosis, and comorbidity. In fully adjusted analyses, limited health literacy was not associated with mortality, late presentation to nephrology, dialysis modality, haemodialysis vascular access, or pre-emptive kidney transplant listing, but was associated with reduced likelihood of listing for a deceased-donor transplant (hazard ratio [HR] 0.68; 95% confidence interval [CI] 0.51-0.90), receiving a living-donor transplant (HR 0.41; 95% CI 0.19-0.88), or receiving a transplant from any donor type (HR 0.65; 95% CI 0.44-0.96). Limited health literacy is associated with reduced access to kidney transplantation, independent of patient demographics, socioeconomic status, and comorbidity.

Interventions to ameliorate the effects of low health literacy may improve access to kidney transplantation.

73. Association of Citizenship Status With Kidney Transplantation in Medicaid Patients.
Shen JI, Hercz D, Barba LM, et al.
Am J Kidney Dis. 2018 Feb;71(2):182-190.

ABSTRACT
BACKGROUND: Although individuals classified as nonresident aliens, including undocumented immigrants, are entitled to receive emergency dialysis in the United States regardless of their ability to pay, most states do not provide them with subsidized care for maintenance dialysis or kidney transplantation. We explored whether nonresident aliens have similar outcomes to US citizens after receiving kidney transplants covered by Medicaid, a joint federal and state health insurance program.
STUDY DESIGN: Retrospective observational cohort study.
SETTING & PARTICIPANTS: All adult Medicaid patients in the US Renal Data System who received their first kidney transplant from 1990 to 2011.
PREDICTOR: Citizenship status, categorized as US citizen, nonresident alien, or permanent resident.
OUTCOME: All-cause transplant loss.
MEASUREMENTS: HRs and 95% CIs estimated by applying Cox proportional hazards frailty models with transplantation center as a random effect.
RESULTS: Of 10,495 patients, 8,660 (82%) were US citizens, 1,489 (14%) were permanent residents, and 346 (3%) were nonresident aliens, whom we assumed were undocumented immigrants. Nonresident aliens were younger, healthier, receiving dialysis longer, and more likely to have had a living donor. 71% underwent transplantation in California, and 61% underwent transplantation after 2005. Nonresident aliens had a lower unadjusted risk for transplant loss compared with US citizens (HR, 0.48; 95% CI, 0.35-0.65). Results were attenuated but still significant when adjusted for demographics, comorbid conditions, dialysis, and transplant-related factors (HR, 0.67; 95% CI, 0.46-0.94).
LIMITATIONS: Citizenship status was self-reported, possible residual confounding.
CONCLUSIONS: Our study suggests that the select group of insured nonresident aliens who undergo transplantation with Medicaid do just as well as US citizens with Medicaid. Policymakers should consider expanding coverage for kidney transplantation in nonresident aliens, including undocumented immigrants, given the associated high-quality outcomes in these patients.

74. Prevalence and correlates of medication non-adherence among kidney transplant recipients more than 6 months post-transplant: a cross-sectional study.
Weng FL, Chandwani S, Kurtyka KM, et al.
BMC Nephrol. 2013 Dec 1;14:261.

ABSTRACT
BACKGROUND: Among kidney transplant recipients, non-adherence with immunosuppressive medications frequently precedes allograft loss. We sought to determine the prevalence and correlates of medication non-adherence among kidney transplant recipients.

METHODS: We performed a single-center, cross-sectional study of kidney transplant recipients who were at least 6 months post-transplant. We measured self-reported adherence using the Immunosuppressive Therapy Adherence Scale (ITAS, which is scored from 0 to 12, where higher scores indicate increased adherence) and barriers to adherence using the Immunosuppressive Therapy Barriers Scale (ITBS). We also used validated scales to measure perceived stress, health literacy, anxiety, depression, and interpersonal support.
RESULTS: The 252 patients included in the study were 59.9% male, 27.0% Black, and at a median of 2.9 years post-transplant (interquartile range [IQR] 1.4-5.8). On the ITAS, 59.1% scored a perfect 12, 26.6% scored 10-11, and 14.3% scored 0-9. In univariate models, non-adherence (defined as ITAS score ≤9) was significantly associated with increased scores on scales for perceived stress (OR 1.12, 95% CI 1.01-1.25) and depression (OR 1.14, 95% CI 1.02-1.28), and with more self-reported barriers to adherence on the ITBS (OR 1.15, 95% CI 1.08-1.22). After adjusting for sociodemographic factors, stress and depression were not associated with non-adherence. Higher scores on the ITBS (corresponding to more self-described barriers to adherence) were associated with lower scores on the ITAS (P < 0.001). Several individual barriers were associated with non-adherence.
CONCLUSIONS: Among prevalent kidney transplant recipients, a minority is non-adherent. Practical barriers to adherence may serve as promising targets for future interventions.

75. The Stanford Integrated Psychosocial Assessment for Transplantation: A Prospective Study of Medical and Psychosocial Outcomes.
Maldonado JR, Sher Y, Lolak S, et al.
Psychosom Med. 2015 Nov-Dec;77(9):1018-30.

ABSTRACT
BACKGROUND: Psychosocial factors may significantly affect post-transplant outcomes. The Stanford Integrated Psychosocial Assessment for Transplantation (SIPAT) was developed as an assessment tool to enhance the pre-transplant psychosocial evaluation.
METHODS: We identified heart, lung, liver, or kidney transplant recipients assessed with the SIPAT pre-transplantation and transplanted between June 1, 2008, and July 31, 2011, at our institution. We analyzed prospectively accumulated psychosocial and medical outcomes at 1 year of follow-up.
RESULTS: 217 patients were identified and included in the analysis. The primary outcomes of organ failure and mortality occurred in 12 and 21 patients, respectively, and were not significantly associated with the pre-transplant SIPAT scores. On the other hand, SIPAT scores were significantly correlated with the probability of poor medical and psychosocial outcomes (secondary outcomes). In fact, higher SIPAT scores predicted higher rates of rejection episodes (Spearman ρ = 0.15, 95% 95% confidence interval [CI] = 0.02-0.28, p = .023), medical hospitalizations (ρ = 0.29, 95% CI = 0.16-0.41, p < .001), infection rates (p = .020), psychiatric decompensation (p = .005), and support system failure (area under the curve = 0.70, 95% CI = 0.60-0.79, p < .001). The relationship with nonadherence suggested a trend, but no statistical significance was observed (area under the curve = 0.60, 95% CI = 0.50-0.71, p = .058).
CONCLUSIONS: Study outcomes suggest that SIPAT is a promising pre-transplantation assessment tool that helps identify candidate's areas of psychosocial vulnerability and whose scores are associated with both psychosocial and medical outcomes after transplantation.

76. Depression and Anxiety as Risk Factors for Morbidity and Mortality After Organ Transplantation: A Systematic Review and Meta-Analysis.

Dew MA, Rosenberger EM, Myaskovsky L, et al.

Transplantation. 2015 May;100(5):988-1003.

ABSTRACT

BACKGROUND: Depression and anxiety are common mental health problems in transplant populations. There is mixed evidence concerning whether they increase morbidity and mortality risks after transplantation. If such associations exist, additional risk reduction strategies may be needed.

METHODS: Four bibliographic databases were searched from 1981 through September 2014 for studies prospectively examining whether depression or anxiety (determined with diagnostic evaluations or standardized symptom scales) affected risk for posttransplant mortality, graft loss, acute graft rejection, chronic rejection, cancer, infection, and rehospitalization.

RESULTS: Twenty-seven studies (10 heart, total n = 1738; 6 liver, n = 1063; 5 kidney, n = 49515; 4 lung, n = 584; 1 pancreas, n = 80; 1 mixed recipient sample, n = 205) were identified. In each, depression and/or anxiety were typically measured before or early after transplantation. Follow-up for outcomes was a median of 5.8 years (range, 0.50-18.0). Depression increased the relative risk (RR) of mortality by 65% (RR, 1.65; 95% confidence interval [95% CI], 1.34-2.05; 20 studies). Meta-regression indicated that risk was stronger in studies that did (vs did not) control for potential confounders (P = .032). Risk was unaffected by type of transplant or other study characteristics. Depression increased death-censored graft loss risk (RR, 1.65; 95% CI, 1.21-2.26, 3 studies). Depression was not associated with other morbidities (each morbidity was assessed in 1-4 studies). Anxiety did not significantly increase mortality risk (RR, 1.39; 95% CI, 0.85-2.27, 6 studies) or morbidity risks (assessed in single studies).

CONCLUSIONS: Depression increases risk for posttransplant mortality. Few studies considered morbidities; the depression-graft loss association suggests that linkages with morbidities deserve greater attention. Depression screening and treatment may be warranted, although whether these activities would reduce posttransplant mortality requires study.

77. Psychosocial Challenges in Solid Organ Transplantation.

Kuntz K, Weinland SR, Butt Z.

J Clin Psychol Med Settings. 2015 Sep;22(2-3):122-35.

ABSTRACT

Organ transplantation is often a life-saving surgery for individuals with end-stage organ disease. However, for most types of solid organ transplant, the demand for organs outweighs the supply, resulting in the need to institute a waiting list for suitable patients who cannot immediately receive an organ. Individuals who need transplants must undergo an assessment process that includes medical, surgical, and psychosocial evaluations. The transplant psychosocial evaluation considers whether surgical candidates are able and willing to care for the transplanted organ for many years. The evaluation must also consider a number of psychosocial risk factors that can lead to complications, which may cause premature loss of the graft. Some of these risk factors include a history of poor medical adherence, psychopathology (including substance use disorders), poor social support, and cognitive dysfunction. This article briefly summarizes the assessment of each of

these risk factors and how they can be mitigated to ensure the best outcomes for patients and their families.

78. Cognitive Changes in Chronic Kidney Disease and After Transplantation.
Van Sandwijk MS, Ten Berge IJ, Majoie CB, et al.
Transplantation. 2016 Apr;100(4):734-42

ABSTRACT
Cognitive impairment is very common in chronic kidney disease (CKD) and is strongly associated with increased mortality. This review article will discuss the pathophysiology of cognitive impairment in CKD, as well as the effect of dialysis and transplantation on cognitive function. In CKD, uremic toxins, hyperparathyroidism and Klotho deficiency lead to chronic inflammation, endothelial dysfunction and vascular calcifications. This results in an increased burden of cerebrovascular disease in CKD patients, who consistently have more white matter hyperintensities, microbleeds, microinfarctions and cerebral atrophy on magnetic resonance imaging scans. Hemodialysis, although beneficial in terms of uremic toxin clearance, also contributes to cognitive decline by causing rapid fluid and osmotic shifts. Decreasing the dialysate temperature and increasing total dialysis time limits these shifts and helps maintain cognitive function in hemodialysis patients. For many patients, kidney transplantation is the preferred treatment modality, because it reverses the underlying mechanisms causing cognitive impairment in CKD. These positive effects have to be balanced against the possible neurotoxicity of infections and immunosuppressive medications, especially glucocorticosteroids and calcineurin inhibitors. A limited number of studies have addressed the overall effect of transplantation on cognitive function. These have mostly found an improvement after transplantation, but have a limited applicability to daily practice because they have only included relatively young patients.

79. Kidney transplantation complications related to psychiatric or neurological disorders.
Carrasco FR, Moreno A, Ridao N, et al.
Transplant Proc. 2009 Jul-Aug;41(6):2430-2.

ABSTRACT
Defining absolute psychiatric or neurological contraindications among kidney transplantation candidates is controversial, especially taking into account that graft outcomes are similar to other groups of patients. The social support network should be exhaustively evaluated to ensure adherence to immunosuppressive therapy and minimization of complications resulting from the neuropsychiatric disorder. We reviewed transplants (n = 668) in our center between January 2001 and August 2008 searching for patients with a diagnosis of neurological or psychiatric disease before renal transplantation. We also reviewed demographic data, social support networks, patient and graft survivals as well as transplant complications. Twelve patients were transplanted with neurological or psychiatric disorders: seven with cognitive impairment and five with psychiatric diseases. Nine patients had good social support networks. The mean follow-up time was 2.65 +/- 2.42 years. The graft loss rate was 34% (n = 4), including only one attributed to a mental disorder, namely, nonadherence to immunosuppressive therapy. Regarding complications, four were related to the neuropsychiatric disorder: hypoglycemia due to insulin overdose, aspiration pneumonia because of altered pharynx-larynx motility, hyponatremia related to diuretic

abuse, and malnutrition plus dehydration. Patient survival in this period was 91.7%. The one patient died due to multiple organ failure secondary to respiratory sepsis with a functioning graft. In summary, neuropsychiatric disorders should not be considered to be contraindications for kidney transplantation although a social support network is essential and must be carefully evaluated.

80. Mental health disorders and solid-organ transplant recipients.

Corbett C, Armstrong MJ, Parker R, et al.

Transplantation. 2013 Oct 15;96(7):593-600.

ABSTRACT

Depression affects up to 60% of solid-organ recipients and is independently associated with both mortality (hazard ratio for death of ~2) and de novo malignancy after transplantation, although the mechanism is not clear. Both pretransplantation psychosis and depression occurring more than 2 years after transplantation are associated with increased noncompliance and graft loss. It remains to be shown that effective treatment of depression is associated with improved outcomes and quality of life. Immunosuppressive drugs (especially corticosteroids and calcineurin inhibitors) and physiologic challenges can precipitate deterioration in mental health. All potential transplant candidates should be assessed for mental health problems and preexisting medical conditions that can mimic mental health problems, such as uremic, hepatic, or hypoxic encephalopathy, should be identified and treated appropriately. Expert mental health review of those with identified risk factors (such as previous suicide attempts, history of mental illness or noncompliance with medications) is advisable early in the transplant assessment process to mitigate risk and support the patient. Patients with mental health disorders, when adequately controlled and socially supported, have outcomes similar to the general transplant population. Therefore, exclusion from transplantation based on the diagnosis alone is neither ethically nor medically justified. However, it is ethically and clinically justifiable to deny access to transplantation to those who, despite full support, would have a quality of life that is unacceptable to the candidate or are likely to be noncompliant with treatment or follow-up, which would lead to graft loss.

81. Psychosocial aspects of the organ transplant experience: what has been established and what we need for the future.

Engle D.

J Clin Psychol. 2001 Apr;57(4):521-49.

ABSTRACT

This article briefly describes the current status and limitations of the organ transplant process that has now become a routine medical procedure. The article discusses how transplantation is not a cure for end-stage organ disease but an alternative form of treatment with both potential medical and psychosocial problems. Both transplant candidates and recipients encounter psychosocial problems. The article examines how these psychosocial problems affect transplant patients prior to transplant, immediately following surgery, and posttransplant. The psychosocial problems include psychiatric diagnoses, individual and family adjustment and relationship problems, sexual dysfunction, return-to-work (RTW) difficulties, and compliance problems and variables related to noncompliance. The article also reviews the special problems of pediatric and adolescent

transplant recipients. The need for empirically supported interventions is noted in each of the problem areas. The author outlines problems with previous research studies that hamper solid interpretations of the data, and discusses literature suggesting that the psychosocial problems of transplant candidates and recipients are likely to be underreported. The article concludes with recommendations about the need to switch research efforts toward intervention studies in the problem areas already solidly identified by the literature.

82. Solid organ transplantation: are there predictors for posttransplant noncompliance? A literature overview.

Bunzel B, Laederach-Hofmann K.

Transplantation. 2000 Sep 15;70(5):711-6.

ABSTRACT

BACKGROUND: Many studies confirm that noncompliance or poor compliance is one of the great problems in health care as it results in waste of resources and funds.

METHODS: This overview includes literature on heart, liver, and kidney transplants with emphasis on heart transplantation in adult and pediatric transplant patients and addresses the following variables as potential predictors of postoperative compliance problems: demographic variables (age, marital status, gender) psychological variables (anxiety, denial) psychiatric disorders (major depression, anxiety, and personality disorders), poor social support, pretransplant noncompliance, obesity, substance abuse, and health-related variables (distance from transplant center, indication for transplantation, required pretransplant assist device). Relevant studies on these topics that were conducted up to 1999 are included and discussed in this overview. The most important results are presented in tables.

RESULTS: Unfortunately, there has not been any systematic and comprehensive review of the literature on predictors of noncompliance in organ transplant patients so far. With organ transplantation noncompliance impairs both life quality and life span as it is a major risk factor for graft rejection episodes and is responsible for up to 25% of deaths after the initial recovery period. Therefore, it might be assumed that well-informed transplant patients are a highly motivated group whose compliance is just as high. This is not the case. However, even when graft loss means loss of life as in heart or liver transplantation, noncompliance occurs. To best select potential organ recipients, it would be ideal if patients who are very likely to show noncompliant behavior could be identified already before being transplanted.

CONCLUSION: The literature overview shows the necessity of preoperative psychosocial screening regarding predictors for posttransplant noncompliance.

83. Justice and Respect for Autonomy: Jehovah's Witnesses and Kidney Transplant.

Cummins PJ, Nicoli F.

J Clin Ethics. Winter 2018;29(4):305-312.

ABSTRACT

That Jehovah's Witnesses may refuse lifesaving blood transfusions is a morally accepted feature of contemporary medical practice. The principle of respect for autonomy supports this, and there is seldom reason to interfere with this choice because it rarely harms another individual. Advances in surgical technique have made it possible for transplant surgeons to perform bloodless organ

transplant, enabling Jehovah's Witnesses to benefit from this treatment. When the transplant organ is a directed donation from a family member or friend, no ethical dilemma arises. However, when a Jehovah's Witness cannot identify a living donor and wishes to be listed for organ transplant, the transplant team may face an ethical dilemma. On the one hand, it wishes to provide care to the patient that is compatible with her or his preferences. On the other hand, the team may wonder if it is fair to other patients who need an organ and will accept blood transfusion to include the Jehovah's Witness patient on a waiting list for a donated organ. If the Jehovah's Witness patient is listed and receives an organ, then a patient who also needs an organ, and who is willing to accept all care to optimize the success of the transplant, may be denied an organ. To frame the ethical dilemma outlined above we present an anonymized case of a Jehovah's Witness woman in urgent need of a kidney, who was referred to one of the authors' institution's transplant center. We review the evolution of the Jehovah's Witness position on blood transfusion and the medical community's efforts to provide care that accommodates this religious commitment. If Witnesses are to be denied transplant in the name of justice, there must be an ethically sound reason. We identify two rationales in the literature: (1) this allocation is unacceptable because it will cost lives; (2) resources should be allocated to patients who comply with the standard of care. We argue that neither apply to this dilemma. We also emphasize the importance of examining the data on outcomes of transplant with and without transfusion. Our interpretation of the published data on transplant without transfusion is that the outcomes are similar. We conclude that, in the absence of data that resources are risked, it is not ethical to refuse to include a Jehovah's Witness patient on a waiting list for an organ. Finally, we reflect on the heterogeneity in transplant institutes' polices for accepting Jehovah's Witness patients.

84. Cannabis Dependence or Abuse in Kidney Transplantation: Implications for Posttransplant Outcomes.

Alhamad T, Koraishy FM, Lam NN, et al.

Transplantation. 2019 Feb 4.

ABSTRACT

BACKGROUND: Cannabis is categorized as an illicit drug in most US states, but legalization for medical indications is increasing. Policies and guidance regarding cannabis use in transplant patients remain controversial.

METHODS: We examined a database linking national kidney transplant records (n=52,689) with Medicare claims to identify diagnoses of cannabis dependence or abuse (CDOA) and associations (adjusted hazard ratio, 95% LCL aHR95% UCL) with graft, patient and other clinical outcomes.

RESULTS: CDOA was diagnosed in only 0.5% (n=254) and 0.3% (n=163) of kidney transplant recipients in the years before and after transplant, respectively. Patients with pretransplant CDOA were more likely to be aged 19-30 and black race, and less likely to be obese, college-educated, and employed. After multivariate and propensity adjustment, CDOA in the year before transplant was not associated with death or graft failure in the year after transplant, but was associated with posttransplant psychosocial problems such as alcohol abuse, other drug abuse, noncompliance, schizophrenia and depression. Further, CDOA in the first year posttransplant was associated with an approximately 2-fold increased risk of death-censored graft failure (aHR 1.592.293.32), all-cause graft loss (aHR 1.502.092.91), and death (aHR 1.061.793.04) in the subsequent 2 years. Posttransplant CDOA was also associated with cardiovascular, pulmonary, and psychosocial problems, and with events such as accidents and fractures.

CONCLUSIONS: While associations likely, in part, reflect associated conditions or behaviors, clinical diagnosis of CDOA in the year after transplant appears to have prognostic implications for allograft and patient outcomes. Recipients with posttransplant CDOA warrant focused monitoring and support.