Kidney donation

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Outlines

- Introduction
- Inclusion criteria for donor
- Medical history taking
- Laboratory evaluation
- Exclusion criteria

Introduction

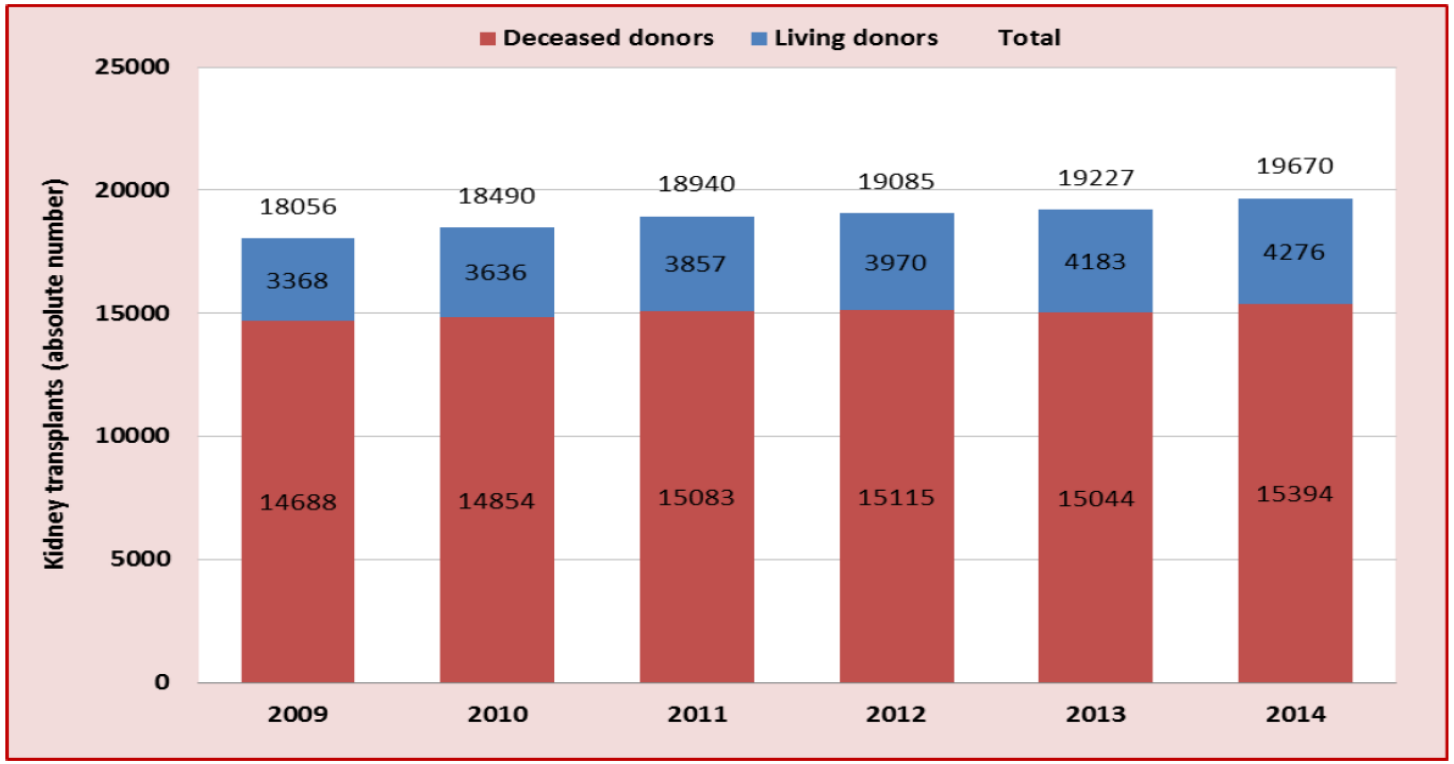
- While a kidney transplantation referral does not imply immediate transplantation, an earlier referral can improve the chances of a patient receiving a preemptive transplantation.
- Renal transplantation should be discussed with all patients with advanced CKD with no absolute contraindications.
- Interested patients without contraindications should be referred to a transplant program when the eGFR is <30 ml/min/1.73 m2*

*Knoll G, Cockfield S, Blydt-Hansen T, Baran D, Kiberd B, Landsberg D, Rush D, Cole E. Canadian Society of Transplantation consensus guidelines on eligibility for kidney transplantation. CMAJ. 2005;173:S1–S25.

Introduction

- Approximately 45% of all kidney transplants in the United States are from living donors.

Absolute number of kidney transplant procedures from living and deceased donors in the European Union in 2009 and 2014



Introduction

- With genetically related donors, the half-life of a transplanted organ may be over 15 years, which means that for many patients the kidney transplant is a treatment for life.
- Organs from non-genetically related donors have as good graft survival as the best matched organs from deceased donors.

Better overall results obtained with kidneys from living organ donors?

- Living donors are usually younger and selected on the basis of their overall good health, with less co-morbidity than that observed in deceased donors.
- Living organ donation can often mean a much shorter ischemic time, with the time from donation to the re-perfusion of the kidney in the recipient being less than from a deceased donor.
- The practice of living kidney donation also makes it easier to perform pre-emptive transplantation

INCLUSION CRITERIA

- **Age greater than or equal to 18 years and mentally capable of making an informed decision**
- Measured eGFR using a 24 hour collection of more than 80-85 ml/min-adjusted for age and gender.
- No overt evidence of coercion or financial compensation for donation

Age

- Upper limit of age: There is no absolute upper age limit for kidney donation.
- Previously, donors candidates >50 years of age were often not considered suitable.
- However, donor candidates age 50 years and older are now commonly accepted if these individuals are in good physical and mental condition and have adequate kidney function.
- Donors older than 60 years are more likely to have persistently eGFR after nephrectomy to <60 mL/min

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Renal function

- A 24-hour urine sample must be collected.

$$Clearane\ of\ Creatinine = U_{cr} \times \frac{V}{P_{Cr}}$$

- Use of Cockroft-Gault, aMDRD and CKD-EPI as complementary tests, given that these formulae are not validated for this specific population.

Renal function

- Higher threshold value of GFR (≥90 mL/min/1.73 m2) should be used for the routine acceptance of a donor candidate.
- In the intermediate range of eGFR (60 to 89 mL/min/1.73 m2), the decision to approve should be individualized based on demographic and health profile in relation to the transplant program's acceptable risk threshold, including projected risk of kidney failure estimated from simultaneous consideration of all baseline factors

Renal function

Prospective donors with eGFR between 80-90 cc/min/1.73m^2 should be evaluated by radioisotope renography (ie, DTPA scan)

Medical history

- A personal history of significant medical conditions, including but not limited to hypertension, past evaluation for CAD, lung disease, heart disease, GI disease, autoimmune disease, neurologic disease, genitourinary disease, hematologic disorders, bleeding or clotting disorders, history of cancer including melanoma, history of infections, and allergies, risk factors for kidney and cardiovascular disease and prior episodes of gout.
- Women should be asked about prior hypertensive disorders of pregnancy (eg, gestational hypertension, preeclampsia, or eclampsia) and future childbearing plans

Medical history

- A kidney-specific personal history including genetic renal diseases; kidney disease, proteinuria, and hematuria; kidney injury; diabetes, including gestational diabetes; nephrolithiasis; and recurrent urinary tract infections.
- Family history including history of coronary artery disease, cancer (including kidney cancer), kidney disease, diabetes, and hypertension

Medical history

- Social history including occupation, employment, and health insurance status; living arrangements; social support; smoking, alcohol, and drug use and abuse; psychiatric illness, depression, and suicide attempts; and increased-risk behaviors.
- Physical exam should include vital signs, examination of all major organ systems, measurement of height and weight, and computation of body mass index (BMI).
- Blood pressure must be measured on at least two occasions or by 24-hour or overnight ambulatory blood pressure monitoring (ABPM).

DONOR OBESITY

- Healthy overweight patients (BMI 25-30 kg/m2) may safely proceed to kidney donation.
- Moderately obese patients (BMI 30-35 kg/m2) should undergo:
  - careful pre-operative evaluation to exclude cardiovascular, respiratory and kidney disease.
  - Counselled carefully about the increased risk of peri-operative complications, based on extrapolation of outcome data from very obese donors
  - Counselled carefully about the long-term risk of kidney disease. They should be advised to lose weight prior to donation and to maintain their ideal weight following donation.
- Data on the safety of kidney donation in the very obese (BMI > 35 kg/m2) are limited and such patients should be discouraged from donating

Blood pressure

- Potential donors with blood pressure <140/90 mmHg are suitable for nephrectomy on the basis of blood pressure.
- Potential donors with ‘high normal’ blood pressure (>130/85 mmHg) should be warned about the greater future risk of developing hypertension and associated cardiovascular events and the need for monitoring (which should be recommended irrespective of nephrectomy).
- **Additional assessment (24 hour blood pressure monitoring) should be considered but is not required.**

Blood pressure

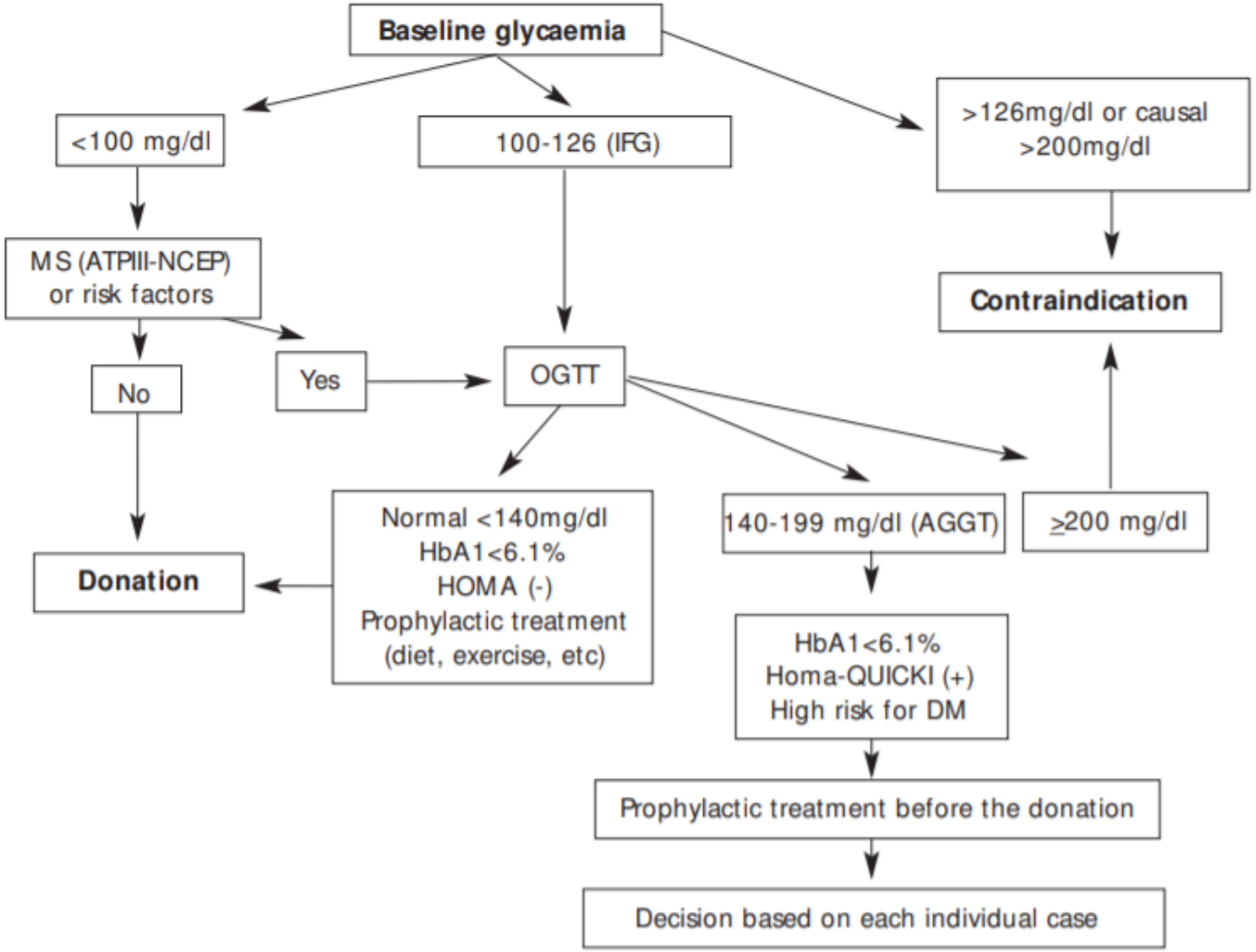
- **Office blood pressure** measurements are sufficient for the assessment of the majority of potential donors.
- Ambulatory blood pressure monitoring should be considered for potential donors who have hypertension (blood pressure greater than 140/90 mmHg or who are taking pharmacological treatment for hypertension) and if this is normal, donor nephrectomy is not precluded.

Blood pressure

- Living kidney donors should be encouraged to minimize the risk of hypertension and its consequences by lifestyle measures including smoking cessation, frequent exercise and, where appropriate, weight loss.
- The presence of mild-moderate hypertension that is controlled with 1-2 antihypertensive agents is not a contraindication to kidney donation providing significant end organ damage has been excluded.

Diabetes mellitus

- All potential living kidney donors must have a fasting plasma glucose level checked.
- A level between 100-126 mg/dL is indicative of an impaired fasting glucose state and an oral glucose tolerance test (OGTT) must be undertaken.


Baseline glycaemia
<100 mg/dl
100-126 (IFG)
>126mg/dl or causal >200mg/dl
MS (ATPIII-NCEP) or risk factors
Contraindication
No
Yes
OGTT
Normal <140mg/dl
HbA1<6.1%
HOMA (-)
Prophylactic treatment (diet, exercise, etc)
140-199 mg/dl (AGGT)
≥200 mg/dl
Donation
HbA1<6.1%
Homa-QUICKI (+)
High risk for DM
Prophylactic treatment before the donation
Decision based on each individual case

Laboratory and imaging tests

- Blood group
- CBC
- PT/PTT/INR
- BUN/Cr
- Na/K
- Ca/P/Alb
- AST/ALT/ ALP
- TG/Tot Chol/HDL/LDL

- Glucose tolerance test or HbA1C
- U/A & microscopy; U/C
- Urinary protein and albumin excretion
- eGFR by isotopic methods or a creatinine clearance calculated from a 24- hour urine collection.

Blood group

- ABO typing is performed on two separate occasions prior to donation.
- As rhesus (Rh) antigens are not expressed on kidney tissue cell surfaces, this antigen system does not play a major role in allograft rejection, and matching for Rh antigens is not relevant in most settings
- Most kidney transplant programs routinely perform HLA typing to support counseling about projected graft survival and to optimize HLA matching in the event that there is more than one donor candidate.

Evaluation of proteinuria

- Measuring protein/creatinine or albumin/creatinine ratios are not recommended as the only evaluation for proteinuria.
- Proteinuria should be measured by 24-hour urine collection. (Adequacy of collection should be confirmed by containing 20–25 mg creatinine/kg body weight for men and 15–20 mg/kg for women)
- Proteinuria > 150 mgr/day would usually be an exclusion of donation.
- The presence of microalbuminuria (urinary albumin excretion of >30 mg/day) should preclude live donation.

Hematuria

- Persistent isolated microscopic hematuria (defined as **>** 3–5 urinary sediment RBC/HPF) should be evaluated as following if urinary tract infection has been ruled out:
- Urine should be evaluated for dysmorphic RBC.
- Urine cytology and complete urologic work up (including spiral CT scan and cystoscopy) should be done if glomerular hematuria has been excluded.
- Unexplained hematuria necessitates evaluation for adenovirus.

- Urinary tract must be sterile for donation. (Negative urine culture is mandatory)
- Asymptomatic bacteruria should be treated before donation.

Could I select a donor form family in ADPKD?

- Evaluation of living-donor candidates with a family history of ADPKD by genotyping (including genotyping of the index case, when available)
- If age <30 years and there is one or more total cysts present (by CT scan or ultrasound)
- If age ≥30 years and there is more than one cyst on imaging

Other disease

- Alport’s disease
  - Potential donors without hematuria and older than 20 years could be accepted for donation.
- Systemic lupus erythematosus (SLE)
- a) Potential donors with family history of SLE must be evaluated for familial SLE by:
    - ANA
    - Complement level
    - Anti ds-DNA antibody
- b) Positive ANA preclude donation.

Could I select a donor with renal stone?

- Recurrent stone formers are excluded from donation.
- Donor candidates with a history of kidney stones or nephrolithiasis (>3 mm) identifed on imaging must have a 24- hour urine stone panel including calcium, oxalate, uric acid, citric acid, creatinine, and sodium.
- Prospective donors with a distant history of a single stone (**>**10 years) without recurrence and without metabolic abnormality would be acceptable.

Renal stone

- Asymptomatic potential donors with history of or current single stone, could be accepted as donor if:
    - The size of stone is less than 1cm.
    - The stone is potentially removable during transplantation.
    - The metabolic evaluation of donor is not significant:
        - No hypercalcuria, hyperuricemia, or metabolic acidosis.
        - No cystinuria or hyperoxaluria.
        - Normal iPTH, Calcium, Phosphorus.
    - No evidence of multiple stones or nephrocalcinosis on spiral CT scan.
    - The stone-containing kidney is selected for donation.

Renal stone

- Stones with high risk of recurrence (Cystine, sturvite, or those due to systemic diseases) preclude donation.
- The younger the donor age (age 25–35), the longer the exposure to the possibility of a recurrence. Donation is not recommended in young candidates.
- Lifelong annual evaluation for new stones in remnant kidney is recommended.
- Evidence of mass, cyst, horseshoe kidney and cortical scarring preclude donation.

Imaging

- Anatomic assessment of kidneys by imaging to assess equality of kidney size and evaluate for masses, cysts, stones, or other structural defects to help determine the kidney best suited for donation.
- All the prospective donors should undergo ultrasonography of kidneys and urinary tract.
- CT angiogram and urogram should be done to evaluate kidneys, kidney vasculature and urinary tract anatomy.

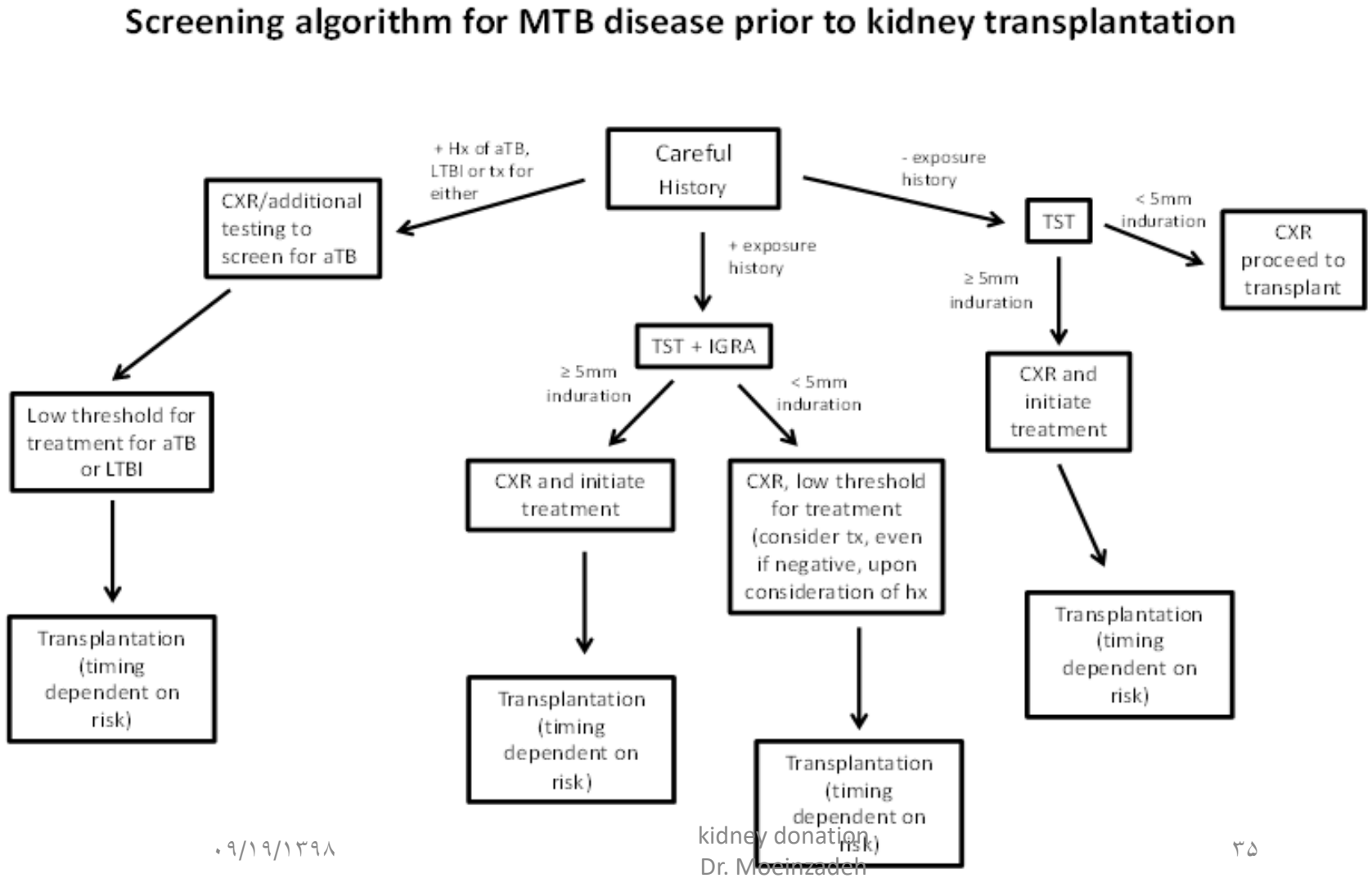
Screening for transmissible infectious diseases

- CMV antibody (IgG, IgM):
  - If CMV IgM is positive, perform either CMV qualitative PCR or repeat anti CMV IgM in 2-4 weeks
- EBV antibody (IgG, IgM):
  - In case of positive anti EBV IgM, repeat anti EBV IgM in 2-4 weeks.
- Anti-HSV Antibodies (Ig M):
  - In case of positive anti HSV IgM, repeat anti HSV IgM in 2-4 weeks:
- HIV antibody as close as possible but within 28 days prior to organ recovery.

Screening for transmissible infectious diseases

- HBsAg testing as close as possible but within 28 days prior to organ recovery.
- Anti-HBc antibody testing as close as possible but within 28 days prior to organ recovery.
- Anti-HCV antibody testing as close as possible but within 28 days prior to organ recovery.
- Syphilis testing: VDRL
- Wright‘s test.

PPD or IGRA for Mycobacterium TB



PPD test

- In case of positive result (PPD>10 mm) and in the absence of active disease, recipient should be treated with isoniazid for 9 to 12 months.

Screening for cancer

- Cervical cancer
- Breast cancer
- Prostate cancer (PSA in men >40 years old)
- Colon cancer
- Lung cancer

Psychosocial evaluation

- Evaluation for any psychosocial issues
- For all candidate, we should consult with psychiatric.

Evaluation of reactive antibody

- Perform HLA- Typing PCR (I & II)

آزمایشگاه تشخیص طبی یکتا
Yekta Medical Diagnostic Laboratory

Molecular Diagnostics

HLA PCR TYPING REPORT

Physician: Dr. Ref // Milad Esfahan	Test code: H-98-08-19	Reception code: 08-2079
National ID code:		Blood group: O+

Name	Rel.	Class I PCR	Class II PCR
[redacted]	Donor [redacted]	A*26-A*33 B*35-B*51	DQB1*03 DRB1*04-DRB1*13 DRB3- DRB4

DNA has been extracted with column based DNA extraction kit. Then HLA class I and class II alleles amplified with sequence specific primer (SSP) method. The number of used primers is as follows:

24 primers mix for identification of HLA-A
48 primers mix for identification of HLA-B
24 primers mix for identification of HLA-C
31 primers mix for identification of HLA-DRB1
13 primers mix for identification of HLA-DQB1

Lab director

Yekta Lab
Molecular Department
and
HLA Typing

آزمایشگاه تشخیص پزشکی یکتا
دکتر سید محمد حسن هاشمی مدنی
نظام علوم آزمایشگاهی ۲۱۵

تلفن: ۶۶۵۶۵۸۶۶ - فکس: ۶۶۵۷۵۷۰۹ - آدرس: خیابان دکتر قریب- خیابان قدر- پلاک ۱۲۴- طبقه اول

Address: Dr. Gharib Street, Ghadr Street, number 124, first floor- Telephone: 66565866 – Fax: 66575709

EXCLUSION CRITERIA

- Absolute Contraindications:

- Type I/Type II Diabetes
- a. Evidence of an Abnormal Glucose Tolerance Test
- HIV positive
- Uncontrollable hypertension or history of hypertension with evidence of end stage organ damage.
- Nephrolithiasis (more than 2 episodes)
- Sickle Cell Anemia and/or trait
- Medically significant liver disease

Relative Contraindications:

- Medically significant organic heart disease
- Active malignancy, or incompletely treated malignancy (excluding non-melanoma skin cancers)
- Evidence of acute symptomatic infection (until resolved)
- High suspicion of donor coercion
- High suspicion of illegal financial exchange between donor and recipient
- Lack of social support
- HbSAg positive
- Renal Cystic Disease (ADPKD, Autosomal Recessive and Medullary Cystic Disease
- Diagnosable psychiatric conditions requiring treatment before donation, including any evidence of suicidality
- Mentally incapable of making an informed decision

Relative Contraindications:

- Hematuria
- Cardiac disease
- Proteinuria greater than 150mg/day
- History of malignancy
- Active substance abuse
- BMI greater than 30
- History of multiple urinary tract infections
- Family history of hereditary renal diseases
- HCV AB Positive with negative PCR Quant

Relative Contraindications:

- Psychiatric disorder
- Preeclampsia or eclampsia
- Probation, unresolved criminal charges or pending criminal investigations
- Incarceration

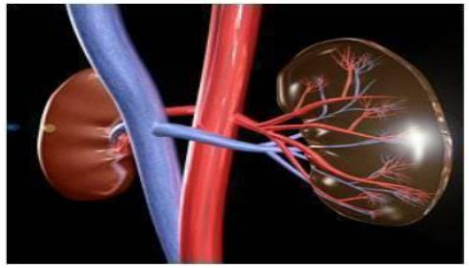
Take home message: Laboratory and imaging tests

- Blood group
- CBC
- PT/PTT/INR
- BUN/Cr
- Na/K
- Ca/P/Alb
- AST/ALT/ ALP
- TG/Tot Chol/HDL/LDL
- Glucose tolerance test or HbA1C
- U/A & microscopy; U/C
- Urinary protein and albumin excretion
- eGFR by isotopic methods or a creatinine clearance calculated from a 24- hour urine collection.

Take home message

- CMV Ab (IgG, IgM)
- EBV Ab (IgG, IgM)
- HSV Ab (IgM)
- HBS Ag
- HBC Ab
- HCV Ab
- HIV Ab
- Wright
- PPD
- VDRL
- Kidney and urinary system ultrasonography
- CT Angiography
- HLA Typing PCR (Class I& II)
- Refer to surgeon

UNITED KINGDOM GUIDELINES
FOR
LIVING DONOR KIDNEY TRANSPLANTATION



Core Curriculum

AJKD

Evaluation of Kidney Donors: Core Curriculum 2018

Deirdre Sawinski and Jayme E. Locke

LABBAFINEJADHOSPITAL

Transplantation Protocol

MUSC Health
MEDICAL UNIVERSITY of SOUTH CAROLINA
• TRANSPLANT CENTER •

Adult Living Kidney Transplant Selection Criteria