

Columbia University Medical  
Center  
Renal Transplant Program

*Infrastructure*  
*Protocols*

# *Infrastructure*

- Physicians
  - Nephrologists
  - Surgeons
  - Pathologists
  - Tissue Typing
  - Consultants
- Nurse Coordinators
  - Living Donor
  - Pre-Transplant
  - Post-Transplant
  - List maintenance
- Administrator
- Social Work
- QA/PI
- “Desensitization Team”

# *Physicians*

- Nephrologists
  - 4 Full-time transplant Nephrologists
  - 4 other Nephrologists participate in the care of transplant patients
- Surgeons
  - 7 transplant surgeons, 5 also participate in Liver transplantation
  - 3 Living Donor surgeons
  - 1 Pediatric surgeon
- Pathologists
  - 4 Renal pathologists
- Tissue Typing
- Consultants
  - Cardiology
  - Urology
  - Infectious Diseases
  - Pulmonary
  - Vascular Surgery
  - Psychiatry

# *Nurse Coordinators*

- Living Donor
  - 2 dedicated coordinators
- Pre-Transplant
  - 5 dedicated coordinators
- Post-Transplant
  - 4 dedicated coordinators
- List maintenance
  - 1 post-transplant coordinator – “Top 40” list

# Protocols

- Living Donor Evaluation
- (Recipient Evaluation)
- Immunosuppressive regimens

# *Living Donor Evaluation (1)*

## Types of living donors

- Living related
- Living Unrelated, but Emotionally related
- “Internet-related” donor
  - Responded to solicitation
- Non-directed donor

## Types of living donor transplants

- Standard living donor transplants
- Paired kidney exchanges (“swaps”)
  - Standard
  - “Altruistic”
- “Never-ending chains”

# *Living Donor Evaluation (2)*

## *Evaluation Team*

*Dedicated separate team, **none** involved with the care of the potential recipient*

- Living Donor Coordinator
- Nephrologist
- Dedicated Social Worker
- Psychiatrist
- Nutrition
- Surgeon

**NYP/COLUMBIA  
KIDNEY TRANSPLANT PROGRAM LIVING DONOR EVALUATION PROTOCOL**

1. Questionnaire/Consent for Evaluation

2. Pretesting: ABO, HLA, BMP, urine analysis

- Calculate BMI
- Calculate eGFR (MDRD)
- Calculate eCrCl (Cockcroft and Gault)

If either calculation is below 80ml/minute, patient to bring in 24 hour urine collection to first evaluation or complete Iothalamate GFR per the nephrologist's recommendation

3. Donor Phone Intake

The Donor must initiate the first contact with the transplant team. At that time, the results of the family study are discussed with the donor and a brief history is taken.

4. First Evaluation

- Meet with a Donor Transplant Coordinator
- A complete physical with a nephrologist
- Meet with a Social Worker
- Meet with a Financial Coordinator
- Blood and urine tests
- Chest x-ray and EKG

5. Second Appointment

- Psychiatric evaluation
- Abdominal and pelvic CT scan angiogram

6. Third Appointment

- Surgical evaluation

7. Discussion of patient at selection meeting by multidisciplinary transplant selection committee.

8. Fourth Appointment

- Pre-op testing to be completed 7-10 days prior to surgery; tests include a final cross match with the recipient, blood work, chest x-ray, and EKG

Additional testing that may be needed:

- Stress echocardiogram for all patients over the age of 50
- GYN consult/ PAP
- Mammogram for women over the age of 40
- Colonoscopy for everyone over the age of 50
- PSA for all men over 50 years old and for all African Americans over age of 40

# *Living Donor Evaluation (3)*

## Exclusions

- Age < 18 years old
- Measured gfr <80 ml/min
- Abnormal glucose metabolism
- Proteinuria, Hematuria
- Hypertension
- BMI > 40
- Active psychiatric disorder/inability to give informed consent
- Coronary artery disease
- Family history of ADPKD, < 30 years old in the absence of genetic testing
- Inappropriately motivated

Medically suitable, willing, but  
immunologically incompatible potential  
living kidney donor

### ***Options***

- Incompatible program
  - ABO incompatible, + cross-match
- Paired kidney exchange
  - Standard
  - “Altruistic

# *Protocols*

- Living Donor Transplant
- Deceased Donor Transplant
- ABO Incompatible
- + Cross match
- Paired Kidney Exchange
- Kidney after non-renal solid organ transplantation
- Kidney re-transplantation following BK nephropathy
  
- “Top 40”

# Standard Renal Transplant Immunosuppression *Columbia University Medical Center*

- Induction:
  - ***Thymoglobulin<sup>R</sup>*** 1-1.5 mg/kg daily x 4-5 days
  - ***Solu-medrol*** 500 mg IV day 0; Solu-medrol 250 mg IV d 1; 125 mg IV day 2; Solu-medrol 75 mg IV day 3.
- Maintenance:
  - *Tacrolimus* (initial target level 10-12 ng/ml)
  - *Mycophenolate sodium* (Myfortic<sup>R</sup>)
- Acute Rejection:
  - Depending on pathology (Steroid pulse, Thymoglobulin<sup>R</sup>, (OKT3), Plasmapheresis-IVIg)

# Standard Renal Transplant Immunosuppression *Columbia University Medical Center*

- Induction: (*Elderly, Reduced LV function, HLA Identical Living Donor*)
  - **Simulect<sup>R</sup>** 20 mg day 0, day 4
  - **Solu-medrol** 500 mg IV day 0; Solu-medrol 250 mg IV d 1; 125 mg IV day 2; Solu-medrol 75 mg IV day 3.
- Maintenance:
  - *Tacrolimus* (initial target level 10-12 ng/ml)
  - *Mycophenolate sodium* (Myfortic<sup>R</sup>)
- Acute Rejection:
  - Depending on pathology (Steroid pulse, Thymoglobulin<sup>R</sup>, (OKT3), Plasmapheresis-IVIg)

# Renal Transplantation

## Immunosuppression for Positive Crossmatch

### Live Donor

- Identification of donor specific antibody, type, “strength”(titer)
- Desensitization using plasmapheresis, IVIg, immunosuppression
- Patients with a live donor with a flow cytometry positive crossmatch with Donor specific antibody, but a negative cytotoxic crossmatch, will receive 2 PP/IVIg treatments pre-transplant and 2 PP/IVIg treatments post-transplant
- Commencement of Plasmapheresis:
  - Tacrolimus 0.05 mg/kg/dose with Q 12hr dosing
  - Myfortic (MPA) 720 mg/dose with Q 12hr dosing for Caucasians, Asians, Hispanics
  - MPA 1080 mg/dose with Q 12hr dosing for African Americans

## Plasmapheresis/IVIg:

One volume exchange replaced with Albumin

IVIg 100mg/Kg after each plasmapheresis treatment

<b>Starting Titer- Cytotoxic Crossmatch</b>	<b>#PP/IVIg Treatments Pre- Transplant</b>
1:1	3
1:2	4
1:4	5
1:8	6
1:16	6
1:32	6
1:64	7
1:128	8
1:256	9
1:512	10

**Patients will receive a minimum of two PP/IVIg treatments *following* transplantation**

**Following Cessation of Plasmapheresis: IVIg (10% sucrose free) 1 gm/kg QD X 2 days (total dose 2 gm/kg) to be administered every other month for 3 doses**

# Renal Transplantation

## Immunosuppression for Positive Crossmatch Live Donor (2)

- **Intra-operative:**

- Solumedrol 500 mg IVPB
- Zenapax (Daclizumab) 2mg/Kg IV
- Rituximab 375 mg/m<sup>2</sup>

- **POD #0:**

- Start Tacrolimus 0.05 mg/kg/dose with Q 12hr dosing when taking po
- Myfortic (MPA) 720 mg/dose with Q 12hr dosing for Caucasians, Asians, Hispanics
- MPA 1080 mg/dose with Q 12hr dosing for African Americans

- **POD #1:**

- Solumedrol 250 mg IVPB
- Tacrolimus target level 15-20
- MPA as above---adjust as tolerated

# Renal Transplantation

## Immunosuppression for Positive Crossmatch

### Live Donor (3)

- POD #2:
  - Solumedrol 125 mg IVPB
  - Tacrolimus target level 15-20
  - MMF as above---adjust as tolerated
- POD #3:
  - Solumedrol 75 mg IVPB
  - Tacrolimus target level 15-20
  - MPA as above---adjust as tolerated
- POD #4:
  - Prednisone 20 mg X 2 weeks
  - Tacrolimus target level 15-20 for 3 months, then 10-15 for months 4-6, then 8-12
  - MPA as above---adjust as tolerated

# Renal Transplantation

## Immunosuppression for Positive Crossmatch

### Live Donor (4)

- **POD #14:**
  - Zenapax (Daclizumab) 1 mg/Kg
  - Prednisone 15 mg QD X 2 weeks IV
- **POD #30 (1 month post-op):**
  - Prednisone 10 mg QD X 2 weeks
  - Zenapax (Daclizumab) 1 mg/Kg IV
- **POD #45 (6 weeks post-op):**
  - Prednisone 5 mg QD X 2 weeks
  - Zenapax (Daclizumab) 1 mg/Kg IV
- **POD #60 (2 months post-op):**
  - Prednisone 2.5 mg QD X 2 weeks then
  - Prednisone 2.5 mg QOD X 2 weeks then D/C at 3 months
  - Zenapax (Daclizumab) 1 mg/Kg IV

# Renal Transplantation

## *Follow-up Protocol for Positive Crossmatch*

### Live Donor Transplantation

- Protocol biopsies, Donor-specific crossmatch
- Weeks 1,2,4
- Months 6, 12, 24
  
- Antibody-mediated rejection
  - Diagnosis (DSA, graft dysfunction, Histology – C4d+)
  - Treatment
    - Plasmapheresis, IVIg
    - Pulse steroids
    - (Thymoglobulin)
    - (Rituximab, High-dose IVIg)
    - Donor-specific antibody monitoring

# Renal Transplantation

## Immunosuppression for *ABO-Incompatible* Live Donor

- Plasmapheresis/IVIg:
- One volume exchange replaced with Albumin
- IVIg 100mg/Kg after each plasmapheresis treatment
- Number of PP/IVIg treatments pre-transplant is based on starting isoagglutinin titer and roughly follows the schedule at right:

<b>Starting Isoagglutinin Titer by Coombs</b>	<b>#PP/IVIg Treatments Pre-Transplant</b>
1:16	3
1:32	4
1:64	5
1:128	6
1:256	7
1:512	8
1:1024	9

# Renal Transplantation

## Immunosuppression for ABO-Incompatible Live Donor

- Commencement of Plasmapheresis:
  - Tacrolimus 0.05 mg/kg/dose with Q 12hr dosing
  - Myfortic<sup>R</sup> (MPA) 720 mg/dose with Q 12hr dosing for Caucasians, Asians, Hispanics
  - Myfortic<sup>R</sup> 1080 mg/dose with Q 12hr dosing for African Americans (“intensified dosing regimen”)
- Intra-operative:
  - Solumedrol 500 mg IVPB
  - Thymoglobulin 1.5 mg/kg (round off to nearest 25mg) (goal for total Thymoglobulin dose 6 mg/Kg)
  - Rituximab 375 mg/m<sup>2</sup>

# Renal Transplantation

## Immunosuppression for ABO-Incompatible Live Donor

- POD #0:
  - Start Tacrolimus 0.05 mg/kg/dose with Q 12hr dosing when taking po
  - Myfortic (MPA) 720 mg/dose with Q 12hr dosing for Caucasians, Asians, Hispanics
  - MPA 1080 gm/dose with Q 12hr dosing for African Americans
- POD #1:
  - Solumedrol 250 mg IVPB
  - Thymoglobulin 1.5 mg/kg (round off to nearest 25mg) – (Thymoglobulin should be administered following plasmapheresis)
  - Tacrolimus target level 15-20
  - MPA as above---adjust as tolerated

# Renal Transplantation

## Immunosuppression for ABO-Incompatible Live Donor

- **POD #2:**

- Solumedrol 125 mg IVPB
- Thymoglobulin 1.5 mg/kg (round off to nearest 25mg) – goal for total Thymoglobulin dose 6 mg/Kg---Thymoglobulin should be administered following plasmapheresis
- Tacrolimus target level 15-20
- MMF as above---adjust as tolerated

- **POD #3:**

- Solumedrol 75 mg IVPB
- Thymoglobulin 1.5 mg/kg (round off to nearest 25mg) -Thymoglobulin should be administered following plasmapheresis
- Tacrolimus target level 15-20
- MPA as above---adjust as tolerated
- CBC with Differential on POD#3 for patients on Thymoglobulin with target percentage of Lymphocytes <5% and the absolute lymphocyte count <100

# Renal Transplantation Follow-up Monitoring for ABO- Incompatible Live Donor

- **POD #4:**
  - No further steroids
  - Tacrolimus target level 15-20 for 1 month, then 10-15 for 2nd month, then 8-12
  - MPA as above---adjust as tolerated

*Protocol biopsy*

*Week 1, 2, 4*

*Month 6, 12, 24*

# Other Protocols

- *Desensitization for Deceased donor transplantation (per Dr. Stan Jordan)*
  - Patient selection – waiting time based
  - IVIG (high dose)
  - Rituximab
- *Kidney Transplantation after other non-renal solid organ transplant (already on long-term immunosuppression)*
  - Simulect induction
  - Sirolimus converted to Mycophenolic acid
  - Resume Sirolimus at 6 weeks
- *Repeat transplant with prior history of BK polyomavirus nephropathy*
  - Simulect induction
  - Tacrolimus, Leflunomide

# Quality Assessment/Improvement

- Monthly meeting for program review
  - **Volumes**
  - **Patient, graft survival**, living donor and deceased donor, adult and pediatric, benchmarked against US national results
  - **Analysis of all graft failures**, regardless of time after transplantation
  - **Analysis of all patient deaths**, regardless of time after transplantation
  - **Review of possible disease transmission from donor kidney**