

# Emory Kidney Transplant (Inpatient) Elective Course

## Rotation Experience

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Ranked as the No. 1 hospital in Georgia and Atlanta, Emory University Hospital is a teaching hospital for Emory University School of Medicine. The Emory Kidney Transplant Program ranks as one of the most prestigious transplant programs in the country which has performed more than 5,000 kidney transplants to date.

As a final-year medical student, I found that the management for post-transplant patients was more complex and challenging than that in general nephrology. Whatever disease they got would be complicated by immunosuppression and their post-transplant status. I like taking challenges; solving puzzles is my favorite, and I prefer seeing the patient as a whole instead of a disease. Thus, I took the advanced elective course at the Emory Transplant Center, which started with the kidney transplantation team.

NOTE: This is a USMLE step 1 score required rotation!

## Before my journey

The following materials were what I prepared prior to my elective:

- *Master the Boards USMLE Step 2 CK*, 5<sup>th</sup> Edition (Part 1 chapter 11 Nephrology)
- *Pocket Companion to Brenner and Rector's The Kidney* (Chapter 39 Donor and Recipient Issues, chapter 40 Clinical Aspects of Renal Transplantation)

I also completed UWorld Q bank (nephrology) with the tutor mode and downloaded the *Brenner and Rector's The Kidney*, 10<sup>th</sup> Edition, (Chapter 71 Transplantation Immunobiology, 72 Clinical Management of the Adult Kidney Transplant Recipient) for reference.

## My daily schedule

We don't have any early morning meetings. The first ward round started at 0900, and the second round began at 1300. However, most people came in around 0700-0730 to see their patients. We saw our primary care patient in the morning, the consulting patient in the afternoon with the surgery team. If there's a biopsy, it would start around 0800-0830.

## The kidney transplant inpatient team

Dr. Pastan was the attending physician in charge of the inpatient unit during my elective. The attending

physicians shift between the outpatient and inpatient departments every two weeks. The transplant fellow was always there. Dr. Abbas was doing her transplant fellowship. Dr. Mudunuru was another fellow doing his transplant elective. There were also several physician assistants and nurse practitioners. No matter who had a question regarding nephrology, Dr. Pastan was always willing to share his knowledge. He not only taught me about kidney transplant but taught the physician in charge of surgery the basic concepts of dialysis. He also kept an open conversation with fellows. Instead of straight putting in orders, he shared his thinking process and opinion upon treatment and clinical decisions. He always spoke with a sense of humor; expressed empathy and compassion to both his patients and other faculties. I spent a lot of time with Dr. Abbas as well. She taught me about the essential concept of kidney transplant, immunosuppression, and assigned me new patients to follow. Though I need not put orders or do notes, I saw patients and presented during the ward rounds.

## Patients and ward rounds

We saw every patient. We had around 25 primary care patients and 15 patients on our consulting list. Most patients were on the 6<sup>th</sup> floor of the Tower, some scattered through the Emory hospital, and still, some were ICU patients with a complex medical history. I met patients with diverse sociocultural background. I saw Caucasian African American, Hispanic, and Asian patients during my elective.

- **Primary care patients**

Whoever got a kidney transplant in the past had to be hospitalized for treatment would be admitted to our team. We saw patients in the emergency department and took care of them until they were discharged. As a result, we had to manage whatever medical conditions they had. For example, we had a patient admitted for bloody stool, and his eventual diagnosis was *Clostridium difficile* colitis. Dr. Pastan once told me that we must be cautious while dealing with infection in our transplant patients. With the immunosuppressants, they were vulnerable to opportunistic infections such as *Pneumocystis jirovecii* pneumonia (PJP), Cryptococcus, *Cytomegalovirus* (CMV) and numerous fungal infections. If the physicians were not aware of the immunosuppressed status of the patients, they might miss an important diagnosis and managed the patient with inappropriate treatment. For example, a PJP pneumonitis could present similar to usual community acquired pneumonia.

- **Consult patients**

We participated in the post-operative care with the surgical team. We saw patients before and after their transplantation. Sometimes we went on ward rounds with the surgical team. Most patients who received their kidney from a living donor did very well. Their new organ started to work right after the transplant, and we could see the creatinine level drop like a miracle. Some patients who received their kidney from a deceased donor would suffer from delay graft function. According to Dr. Pastan, their kidneys “had been on ice for a while, so it takes time for them to wake up.”

## Presenting patients during ward rounds

I briefly presented my patients to Dr. Pastan during ward rounds. I reviewed the vitals, nursing notes, lab data, medications and saw my patients before rounds. Compared to patients in other departments, transplant patients usually have a long complicated story. I had to focus on their current issues instead of digging into details of their unrelated past medical history.

These are what I paid most attention while reviewing the patient's history:

- **The Transplant Record:**
  - The infectious status of the donor and recipient: CMV, EBV, HCV, HIV
  - Living related donor renal transplant (LRRT) or deceased donor renal transplantation (DDRT)
- **Past Medical History:**
  - Whether or not on dialysis before transplant (ESRD or CKD)
  - Cause of renal failure (notice the possibility of recurrence)
  - Underlying infection (HIV, HBV, HCV, et al.)
  - Past surgical history
  - Past major events (stroke, DVT, ACS, et al.)
  - Other chronic conditions (hypertension, diabetes, hyperlipidemia, atrial fibrillation, etc.)
- **Current Medications:**
  - Additional attention to medications that induce or inhibit the P-450 system. Calcineurin inhibitors (CNIs) are metabolized via the liver.

A general present could be roughly separated into four parts:

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**S:** **Basic data:** name, age, gender, POD.

**Patients' complaints:**

- Look for symptoms of rejection (fever, malaise, and graft pain), anemia (dizziness, shortness of breath with ambulation), CNI extrarenal toxicity such as severe tremor.
- Ask about pain, urinary symptoms, passing gas, ambulation, intake, sleep.

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**O:** Vitals, physical examinations, lab data.

**Vitals:** blood pressure, input-output.

**Urine:** amount, color, content, incontinence.

**Focus physical examination:**

- GA: conscious, energy level, mood.
  - HEENT: anemia (pale conjunctiva)
  - Chest and lungs
  - Operative site: wound healing, redness, swelling, discharge.
  - Abdomen: ecchymosis, bowel sounds, renal artery bruit over the graft site.
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- Extremities: signs of DVT (pain, swelling, temperature), pulse, edema, skin turgor.
  - Neuro: tremor, weakness, numbness, spasm, signs of electrolyte imbalance.

**Lab data:**

- Glucose:
  - ✓ Hyperglycemia due to prednisone
- CBC/DC:
  - ✓ Anemia: watch out for bleeding with rapidly decreasing Hb
  - ✓ Leukocytosis: a side effect of prednisone
- Electrolyte imbalance:
  - ✓ Hypophosphatemia:  
common in the early post-transplant period due to residual hyperparathyroidism.  
(Symptom: muscle weakness, target plasma phosphate level: 2.5 to 4 mg/dL)
  - ✓ Hyperkalemia:  
possible due to CNI toxicity (Other medications related to hyperkalemia: ACEIs, ARBs, b-blockers, diuretics, digoxin, NSAIDs)
  - ✓ Metabolic acidosis:  
Mild distal (hyperchloremic) renal tubular acidosis (RTA) is common after transplantation. Bicarbonate replacement is given in severe cases.
  - ✓ Hypomagnesemia:  
Due to CNI. Magnesium supplement only when below 1.5 mg/dL.
- CNI level:
  - ✓ High concentrations: cyclosporine >350 ng/mL or tacrolimus levels >20 ng/mL.
  - ✓ Target concentration of tacrolimus (specific to Emory):  
with Belatacept: 5-8 ng/mL, without Belatacept: 8-12 ng/mL.

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**A:** Current management on active problems.

**Immunosuppression agents:**

- Calcineurin Inhibitors: Cyclosporine, Tacrolimus (Prograf)
- Mycophenolate Mofetil (Cellcept)
- Prednisone
- Sirolimus (Rapamycin)
- Belatacept
- Basiliximab
- Anti-thymocyte globulin (ATG)

**Prophylaxis:**

- Valganciclovir (Valcyte)
- SMX-TMP (Bactrim)

**P:** Medications adjustment, examinations, discharge schedule.

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The fellows and physician assistants and nurse practitioners were always willing to help me to find the information I need on the computer system. They also gave me important information I missed and presented the plan to the attending.

## **Key knowledge**

- Basic renal pathophysiology
- Renal transplant procedure:  
The anatomy of the transplant, pre and post operative care, the difference between LRRT & DDRT, complications such as delayed graft function (DGF), and thrombotic microangiopathy (TMA).
- Immunosuppressive agents in renal transplant:  
Indication, contraindication, side effects, acute calcineurin inhibitor nephrotoxicity.
- Belatacept (Nulojix):  
Developed in Emory! A novel second-generation CTLA-4Ig that binds with a higher affinity to B7-1/2 and prevents effective T-cell activation by blocking the CD28 co-stimulation pathway.
- Indication of renal biopsy
- Renal ultrasound
- Histology and pathology of the kidney
- Infectious complications of renal transplantation:  
Common pathogens: Cytomegalovirus (CMV), EBV, *Listeria monocytogenes*, *Pneumocystis carinii*, *Nocardia* sp, syncytial virus (RSV), influenza, HPV.
- Urinary tract infection
- Pregnancy in the renal transplant recipient
- Post-transplant malignancy:  
Post-transplant lymphoproliferative disorder (PTLD) and other malignancies.

## **Kidney biopsy**

We did kidney biopsies for patients who were suspected of having a rejection. What surprised me the most was when all we had been doing was waiting for the report popping up on our computer, Dr. Pastan always went to the pathology department to see the specimen and discuss the image with the pathologist by himself. With that tiny window filled with glomerulus and convoluted tubules, I realized it was worthy of spending some time on pathology.

## **An unexpected lesson of doctor-patient communication**

A patient with hematuria was scared by the resident on duty because he told her she had cancer. The truth was: she had a suspicious mass and blood clots in her kidney. By the time we admitted this patient, we had not yet confirmed her diagnosis. Her words were a lesson for me: “Once you were informed with cancer,

your life would be no longer the same.” She described how upset she was upon the cruel information, and how did the fear keep haunting her mind.

Everyone participating in patient care matters. Every word, expression, and action causes a consequence. Just like how careful we are while prescribing a medication, deciding on a treatment, or ordering an examination, the communication between patients and the medical team is also an essential part of caring.

## Psychosocial aspect of the transplant patients

About 20 percent of patients with chronic kidney disease are suffering from depression.<sup>1</sup> The prevalence for anxiety and depression in dialysis patients are about 30% to 45% and 20% to 30%, respectively.<sup>2</sup> Mood symptoms not only affect the quality of life but also relate to poor outcome of the transplant. Patients who had symptoms of depression after kidney transplant were more likely to die than patients without depression.<sup>3</sup>

It was hard for me not to notice that many patients on the transplant team were taking more than one psychiatric medication: antidepressant, anti-anxiolytic, antipsychotic, or mood stabilizer. The side effects of immunosuppression, or long-term complication of kidney condition could contribute to mood symptoms. Even so, psychosocial factors also play an important role.

I still remembered one of my primary care patients in Taiwan. She received a kidney from her son who died many years ago. She cried over the news that her graft failed and she had to go back on dialysis. It was understandable how upsetting this news could be. However, on the last day of my rotation, she told me she felt depressed not because of her failed graft, but it made her feel like losing her son again. In addition to the patients with a complication of their transplant, patients who newly received their graft from a related living donor often experience some degree of emotional disturbance. Some worried about the procedure, some felt guilty about their donor, and some just avoided talking about their overall condition.

To my surprise, at Emory, I rarely saw patients undergoing emotional challenges after their transplant. My patient, Ms. Y, received a kidney from her daughter, told me the transplant had a positive effect on her family. She admitted the worries at the beginning for her daughter, but they got even closer through their long journey of transplant. Another patient, Ms. E, told me she felt excited and grateful after the procedure. She declared that her energy level “has never been so good.”

Probably I had too short an elective to investigate the aspect of psychological distress among transplant patients because these topics could be so tough to bring up. Or possibly that was because patients at Emory were from a with better socioeconomic status. With a good support system, they were less likely to suffer from these issues.

1. Bautovich A, Katz I, Smith M, et al. Depression and chronic kidney disease: A review for clinicians. *Aust N Z J Psychiatry*. 2014 Jun;48(6):530-41.
2. Feroze U, Martin D, Kalantar-Zadeh K, et al. Anxiety and depression in maintenance dialysis patients: preliminary data of a cross-sectional study and brief literature review. *J Ren Nutr*. 2012 Jan;22(1):207-10.
3. Zhong S G, Konstadina G. Anxiety and depression in patients with end-stage renal disease: impact and management challenges – a narrative review. *Int J Nephrol Renovasc Dis*. 2018; 11: 93–102.

## In brief

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This is an elective highly specialized in kidney transplant. The inpatient part includes ward rounds, kidney biopsy, and occasional discussion with the pathologists. I learned about the care of pre and post transplant patients, long-term complication management, opportunistic infection, and immunosuppressants. I felt like reading a transplant textbook, 4D version. It is worthwhile taking this rotation for a medical student with a special interest in nephrology transplantation.