

Renal Block

Lecture Seven

Renal Allograft

Important notes & MCQS

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Objectives:

- Recognize the concept of renal allograft.
- Describe the pathology of rejection
- Differentiate between acute and chronic rejection.
- Recognize the principal infections inherent to renal transplantation.
- Recognize acute and chronic drug toxicity.

## Two major things that may kill the patient if the clinician says the opposite:

- Rejection
- Infection

**Why?** Because if we say that its rejection and we give more immunosuppressant and it turns out to be an infection the patient may die

- Most important transplantation that doesn't get rejected is **pregnancy**.
- The most important thing in allografts is **HLA compatibility**.

## Types of rejection:

### ○ Hyperacute:

The patient already has the antibodies circulating, after entering the kidney it becomes hemorrhagic, necrotic and polymorphonuclear cells infiltrate after a few hours and this isn't supposed to happen.

Hyperacute under the microscope (antibody mediated):

- 1- Necrosis
- 2- Hemorrhage
- 3- Polymorph nuclear cells infiltrate

### ○ Acute rejection:

Happens in days or two weeks and is two types **T cell mediated** (cellular mediated) and **antibody mediated**. They differ in treatment.

#### 1. Acute T cell mediated:

- Grade 1 will look like **tubulointerstitial inflammation** and if it got more severe **the wall of the vessels will thicken** and **endothelialitis** and is grade 2.
- If really severe inflammation lymphocytes infiltrate, **thickening endothelialitis** and **fibrinoid necrosis type 3** may be t cells or antibody mediated.
- The T cell mediated has a better prognosis than the antibody mediated

#### 2. Acute Antibody mediated rejection to diagnosis we need 3 criteria:

##### 1- Cellular injury:

- May appear as **dilatation of the peritubular capillaries** and **polymorph or lymphocytes** within them.
- Another type is only **acute tubular injury** and necrosis no inflammation or anything else but is **c4d positive** or lastly blood vessels fibrinoid necrosis and inflammation and infiltration.

##### 2- **C4d positive in immunofluorescence.**

### 3- Circulating antibodies:

We can find Circulating Donor specific antibody in the blood but not as high as in the hyperacute.

#### ○ **Chronic:**

- **Fibrosis and sclerosis of blood vessels.**
- Antibody or t cell mediated
- **All in t cell:**
  - **Borderline changes** will need **clinical investigation** (creatinine).
  - **Grade 1 A or 1 B:** depending on the **tubulointerstitial inflammation** severity between both.
  - **Grade 2: endothelialitis** we see a few lymphocytes beneath the endothelium and thick wall.
  - **Grade 3:** may be **t cell mediated** or **antibody mediated** more severe than the rest
- **Chronic allograft nephropathy:**

Fibrosis, arterial sclerosis, and scarring.

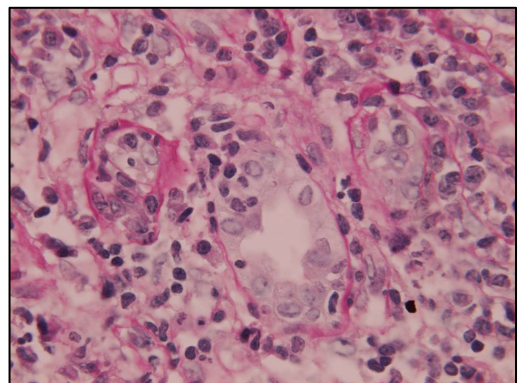
→ May be from rejection, drug toxicity (**cyclosporine**) or other things

→ We see **double contouring** in the glomeruli like membranoproliferative glomerulonephritis but membranoproliferative it is **induced by immune complex** but here it is because the **circulating antibodies** injured the capillary of the glomeruli they went to the **endothelial cell** and then recuperated and came back and made another capillary wall and made

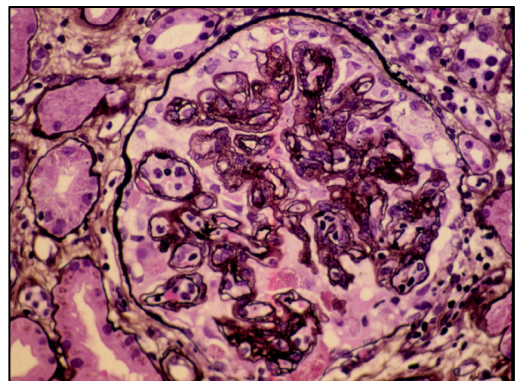
**transplant glomerulopathy.**

- **Transplant glomerulopathy:**

Chronic lesion more than a hundred days and 2 double contouring.



Tubulitis and lymphocytes (the black dots) and rupture of the tubular basement membrane.



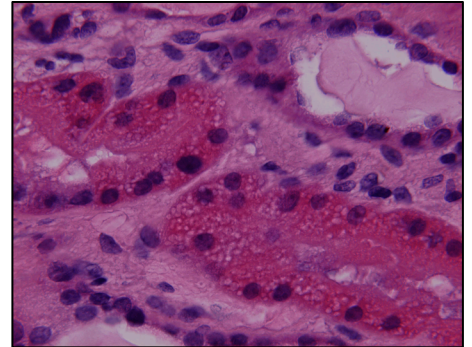
### Chronic Allograft nephropathy:

In capillary we also see **narrowing of the lumen** and **atherosclerosis** like in hypertension to differentiate between them we do **silver stain** and if we see **silver elastic multilayering it is hypertension** if not then it is chronic allograft nephropathy.

### Drug toxicity:

Cyclosporine toxicity:

- Acute we see the **isometric vacuolization** in the tubules.
- If chronic we see **strip fibrosis** or **nodules** in the wall of the blood vessels, hyaline nodules.



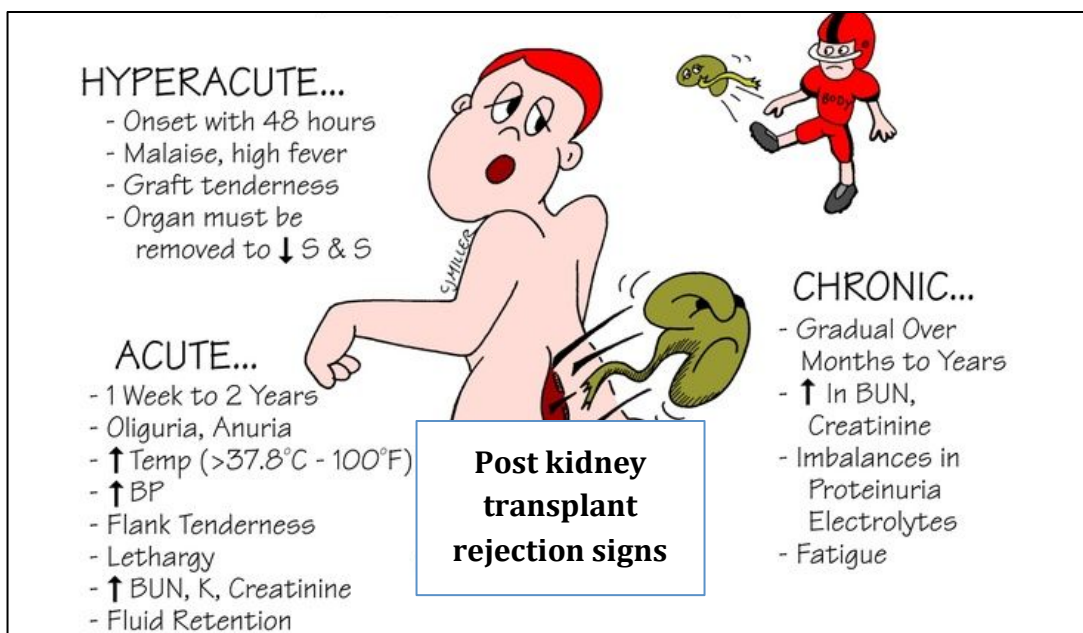
We see vacuolization and isometric due to acute drug toxicity.

### Infections:

#### Most important infection:

- **Polyoma** virus:
  - In chronic transplant because they are taking a lot of **immunosuppressants**.
  - We can see inclusion in the nuclei **ground glass appearance** and gray.
  - It is mainly in the **tubule**.
- **Cytomegalovirus:**
  - It makes the cells big and is in the glomeruli and nuclei (everywhere not specific).

**Note:** Any disease that leads to kidney transplant may return to the new kidney or **even de novo** (a new disease) may happen.



**Post kidney transplant rejection signs**

**HYPERACUTE...**

- Onset with 48 hours
- Malaise, high fever
- Graft tenderness
- Organ must be removed to ↓ S & S

**ACUTE...**

- 1 Week to 2 Years
- Oliguria, Anuria
- ↑ Temp (>37.8°C - 100°F)
- ↑ BP
- Flank Tenderness
- Lethargy
- ↑ BUN, K, Creatinine
- Fluid Retention

**CHRONIC...**

- Gradual Over Months to Years
- ↑ In BUN, Creatinine
- Imbalances in Proteinuria Electrolytes
- Fatigue

The infographic features a cartoon illustration of a man with a kidney being attacked by a green alien-like creature. A superhero character in a red suit is running towards the man, holding a green frog-like creature. The man's back is labeled 'SPRINGER'.

**Now Check Your Understanding:**

- 1. What is the most important transplantation that doesn't get rejected?**
  - A. Pregnancy
  - B. Kidney
  - C. Liver
  - D. Heart
- 2. A patient had recurrent kidney disease after his kidney transplantation. How correct is this scenario?**
  - A. Not correct at all
  - B. Correct
- 3. A patient was given immunosuppressant therapy after kidney transplantation. He died a week after the therapy started. What could have been the cause of his death?**
  - A. Rejection
  - B. Infection
  - C. All of the above
- 4. A patient had an infection after his kidney transplant. Histological picture shows ground glass appearance, what infection could that be?**
  - A. TB
  - B. Polyoma
  - C. Cytomegalovirus
- 5. A patient had an infection after his kidney transplant. Histological picture shows infiltration throughout the glomeruli, tubules and interstitium, what infection could that be?**
  - A. TB
  - B. Polyoma
  - C. Cytomegalovirus
- 6. Which of the following causes antibody mediated endothelial damage?**
  - A. Normal kidneys
  - B. Acute rejection
  - C. Chronic rejection
  - D. Hyperacute rejection

1. A	2. B	3. B	4. B	5. C	6. D
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**7. Vasculitis is associated with?**

- A. Normal kidneys
- B. Acute rejection
- C. Chronic rejection
- D. Hyperacute rejection

**8. A cyanotic kidney is a feature of?**

- A. Normal kidneys
- B. Acute rejection
- C. Chronic rejection
- D. Hyperacute rejection

**9. Which of the following is T-cell mediated?**

- A. Normal kidneys
- B. Acute rejection
- C. A & B
- D. Hyperacute rejection

**10. A patient had a successful renal transplant and in a year he had routine check up that revealed progressively high serum creatinine levels. What could that be an indication of?**

- A. Normal kidneys
- B. Acute rejection
- C. Chronic rejection
- D. Hyperacute rejection

**11. We can see mild arteritis in:**

- A. Grade IA
- B. Grade IB
- C. Grade IIB
- D. Grade III

**12. We can see fibrinoid necrosis in:**

- A. Grade IA
- B. Borderline changes
- C. Grade IIB
- D. Grade III

7. B	8. D	9. B	10. C	11. C	12. D
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**13. Where can we see double contour?**

- A. Chronic allograft nephropathy
- B. Amyloidosis
- C. DDD
- D. RPGN

**14. Where can you see transmural arteritis?**

- A. Grade IA
- B. Grade IB
- C. Grade IIB
- D. Grade III

**15. How can you treat cyclosporine toxicity?**

- A. Gastric lavage
- B. Reduce dose
- C. Alkalization of urine

**16. What can you use in the treatment of grade II?**

- A. Steroids
- B. Cyclosporine
- C. Statins

13. A

14. D

15. B

16. A

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