Glomerular disease

three clinical patterns of disease

1. Focal nephritic. hematuria, mild proteinuria, occasional red cell cast. No edema, hypertension or renal insufficiency. Think mild IgA nephropathy.
2. Diffuse nephritic. heavy proteinuria, edema, hypertension, renal insufficiency. Diffuse glomerulonephritis of nearly every glomerulus
3. Nephrotic syndrome. heavy proteinuria but few red cells.

Nephrotic syndrome

Three defining characteristics of nephrotic syndrome:
1. **Proteinuria** > 3.5 g/24 hours
2. **Edema**
3. **hypoalbuminuria**

Additional characteristics include:
- thrombophilia
- hypercholesterolemia

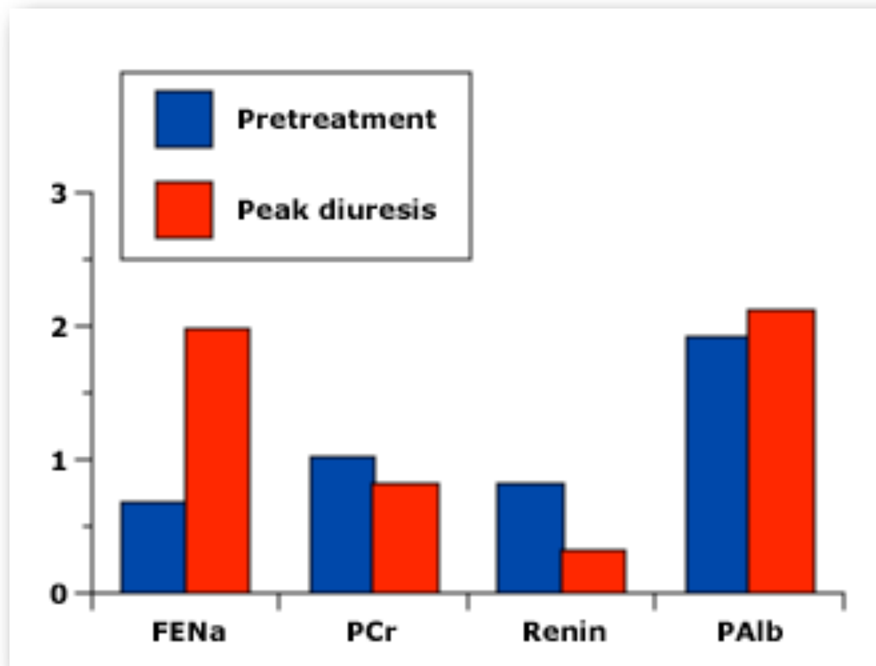
Complications

Secondary Causes	Primary renal disease
Diabetes	Minimal Change Disease
Amyloidosis	Membranous nephropathy
Multiple myeloma	Focal segmental glomerulosclerosis
Systemic Lupus Erythematosis (WHO V)	Membranoproliferative glomerulonephritis
	IgA nephropathy

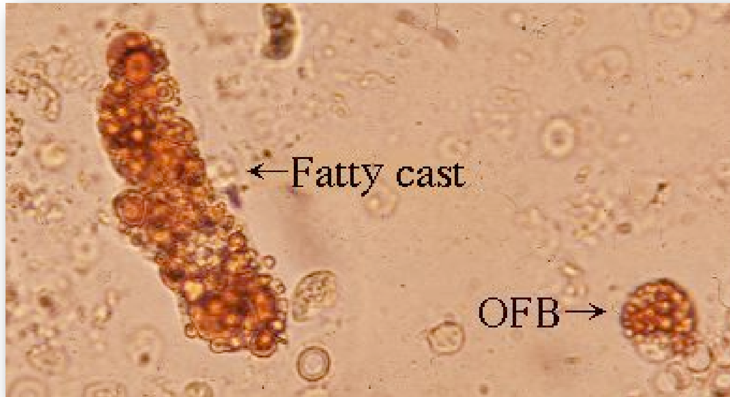
Hypoalbuminuria: liver can synthesize 25g a day so it is strange that 4-10 g of urine loss of albumin results in hypoalbuminemia. Likely a result of proximal tubule albumin metabolism

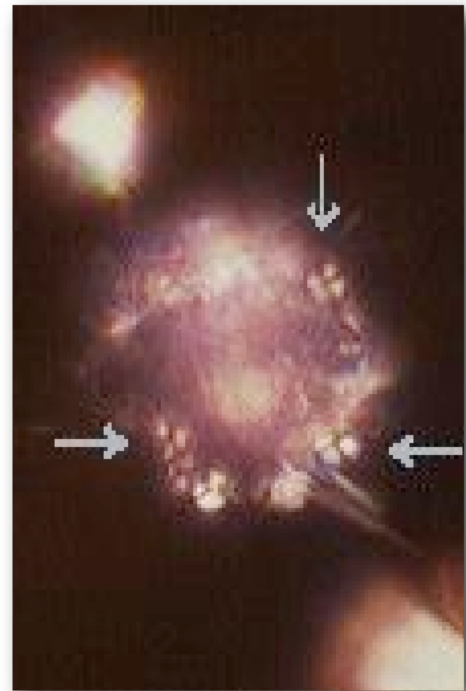
Edema:

underfill theory	overfill theory
albumin infusions result in spontaneous duresis in some patients	In minimal change disease the diuresis induced by steroids occurs before an improvement in albumin
more likely with intact GFR	more likely with GFR < 50
often occurs early with overfill occurring later	More likely with albumin > 2
more common with albumin < 1	
less responsive to diuretics	



Hypercholesterolemia: Decreased oncotic pressure stimulates cholesterol synthesis by the liver. Decreased triglyceride clearance results in hypertriglyceridemia. Increased cholesterol results in lipiduria and the finding of fatty casts and oval fat bodies in the urine.





Thromboembolism is more common with 24-hour protein > 10 grams and in membranous nephropathy. Besides DVT and PE patients can present with cerbral vein thrombosis and renal vein thrombosis (flank pain, gross hematuria, and acute renal failure). Thought to be due to loss of antithrombotic proteins in the urine.

Diagnosis:

Serologic work-up:
- Hep B
- Hep C
- SPEP
- UPEP
- C3
- C4
- ANA
- ASO
- Cryoglobulinemia

Pathologic work-up
- CT-guided kidney biopsy
- U/S-guided kidney biopsy

Treatment:

Specific therapy	Nonspecific therapy
depending on the disease	**Diuretics** loop diuretics, typically less effective than in normal patients
steroids	ACEi / ARB
cyclophosphamide	Statins
mycophenylate mofitil	Coumadin in selected patients
melphalan	