Nephrotic Syndrome Vs Nephritic Syndrome

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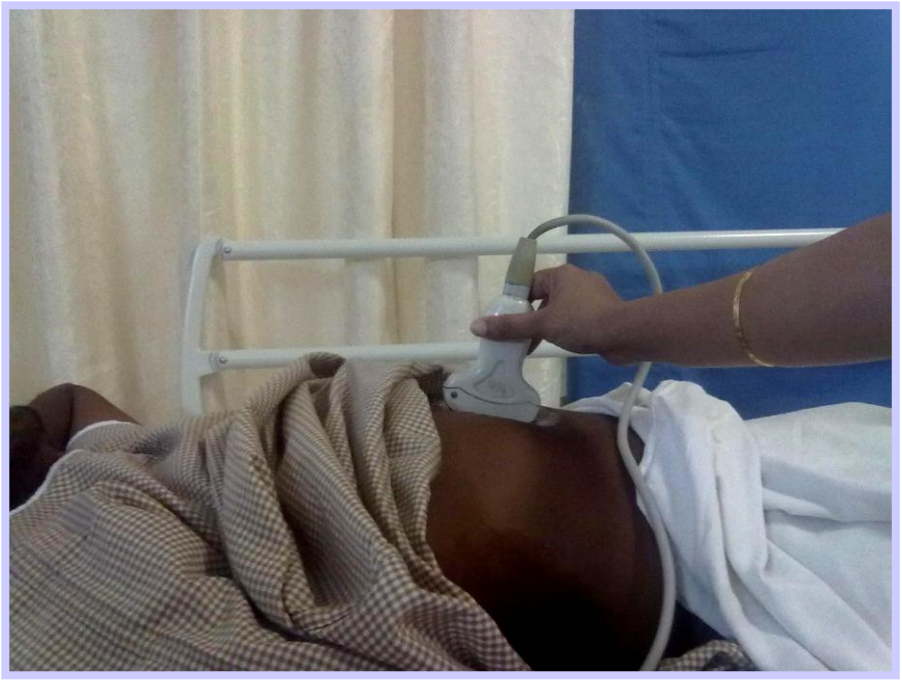
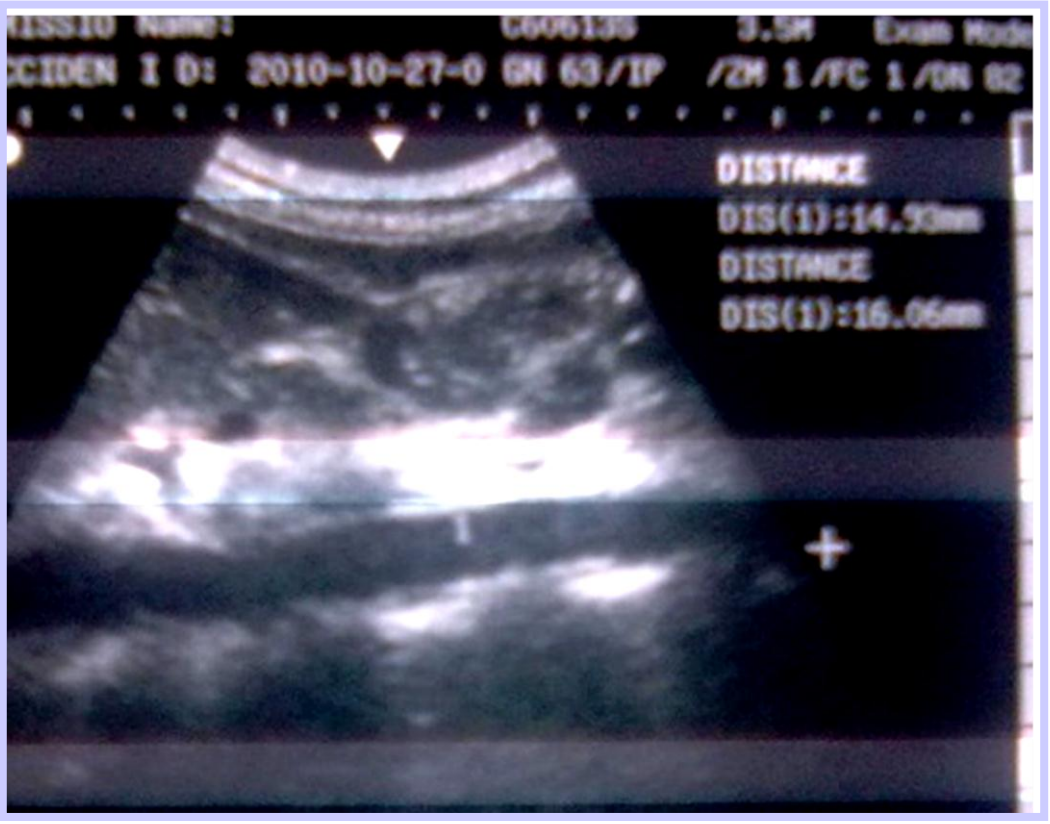
- 24 year old male was brought to ED with polytrauma

Has dark colored urine on catheterisation

IVC diameter measurement





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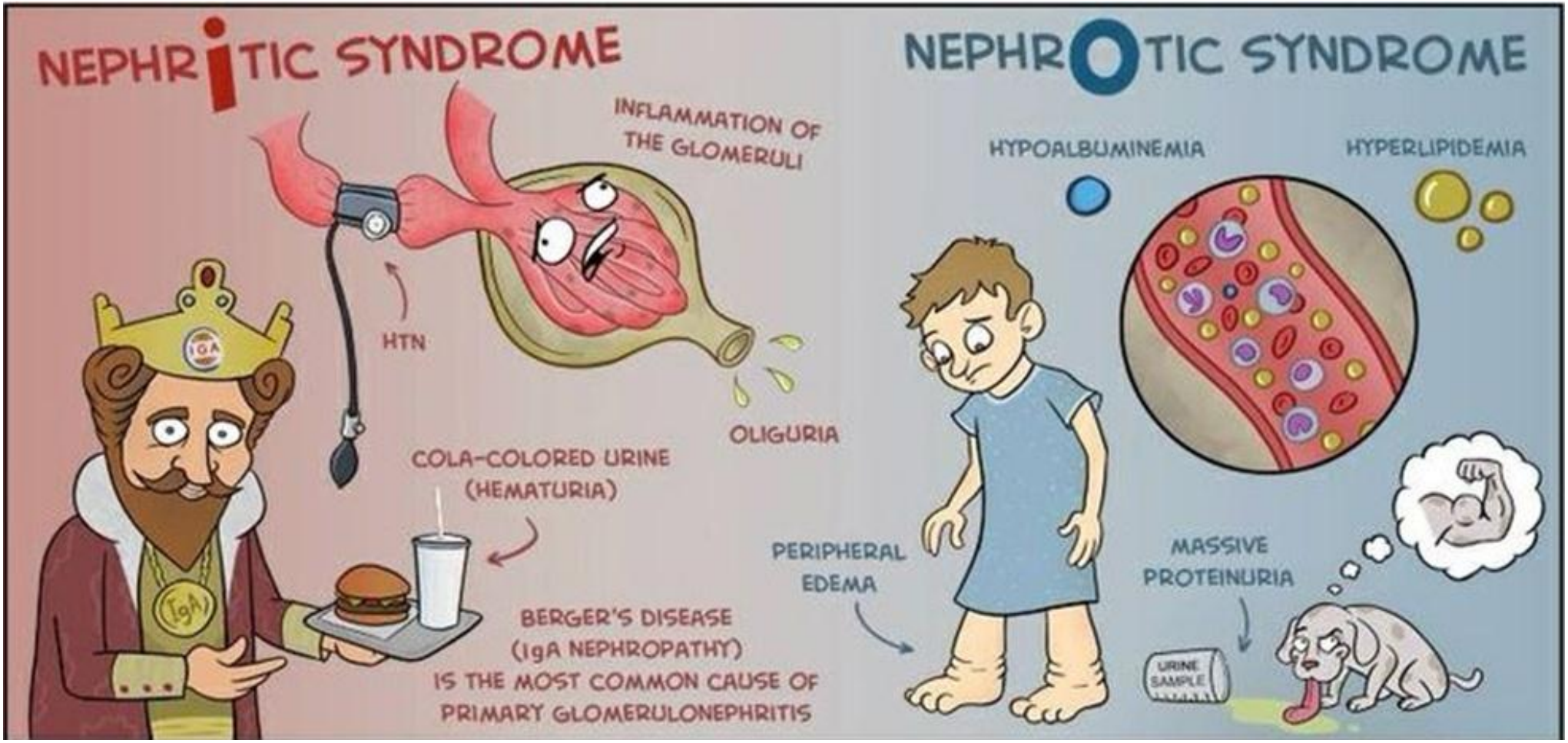
Fluid status assessment

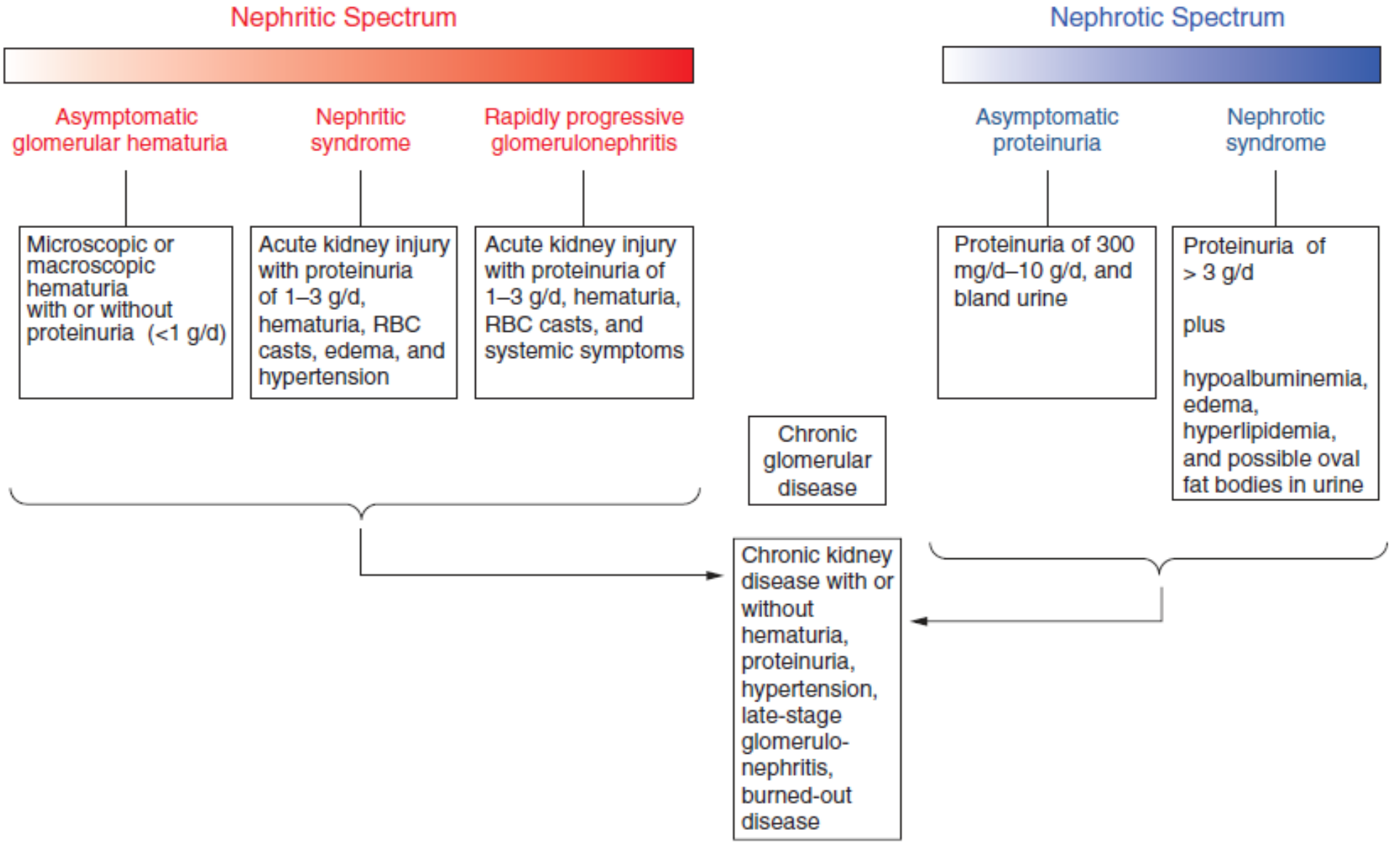
IVC measured	Percent collapse (IVC) during inspiration	CVP (mm Hg)
<1.5 cm	>50%	0-5
1.5-2.5 cm	>50%	5-10
1.5-2.5 cm	<50%	10-15
>2.5 cm	Little phasicity	15-20

- IVC/Ao Index around 1.2 +- 0.17

Objectives

- Understand and define nephrotic and nephritic syndromes.
- Describe the initial investigations and management of nephrotic and nephritic syndromes.
- Describe the complications of nephrotic and nephritic syndromes.


NEPHRITIC SYNDROME
INFLAMMATION OF THE GLOMERULI
HTN
OLIGURIA
COLA-COLORED URINE (HEMATURIA)
BERGER'S DISEASE (IgA NEPHROPATHY) IS THE MOST COMMON CAUSE OF PRIMARY GLOMERULONEPHRITIS
NEPHROTIC SYNDROME
HYPOALBUMINEMIA
HYPERLIPIDEMIA
PERIPHERAL EDEMA
MASSIVE PROTEINURIA
URINE SAMPLE


Nephritic Spectrum
Nephrotic Spectrum
Asymptomatic glomerular hematuria
Nephritic syndrome
Rapidly progressive glomerulonephritis
Asymptomatic proteinuria
Nephrotic syndrome
Microscopic or macroscopic hematuria with or without proteinuria (<1 g/d)
Acute kidney injury with proteinuria of 1–3 g/d, hematuria, RBC casts, edema, and hypertension
Acute kidney injury with proteinuria of 1–3 g/d, hematuria, RBC casts, and systemic symptoms
Proteinuria of 300 mg/d–10 g/d, and bland urine
Proteinuria of > 3 g/d
plus
hypoalbuminemia, edema, hyperlipidemia, and possible oval fat bodies in urine
Chronic glomerular disease
Chronic kidney disease with or without hematuria, proteinuria, hypertension, late-stage glomerulo-nephritis, burned-out disease

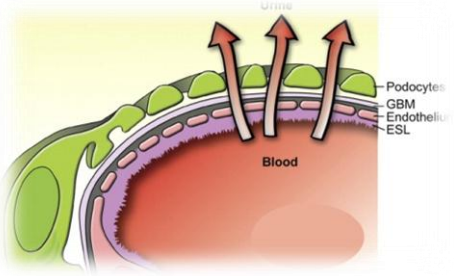
Pathophysiology

NEPHROTIC

- Loss of foot processes

NEPHRITIC

- Proliferative changes and inflammation of the glomeruli

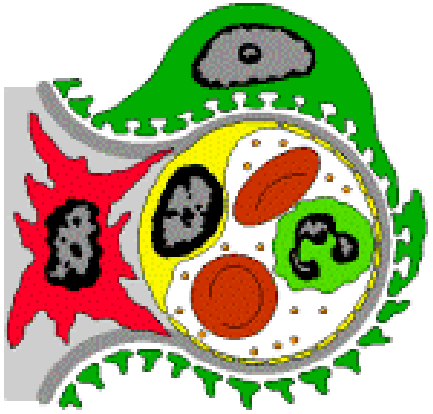


Bottom line- “increased permeability of the glomeruli”

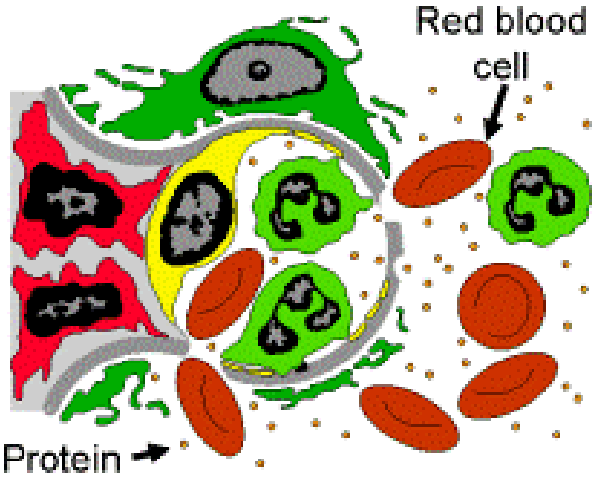
What is nephrotic syndrome?

Increased permeability of the glomerulus leading to loss of proteins into the tubules

Proteinuria and Hematuria

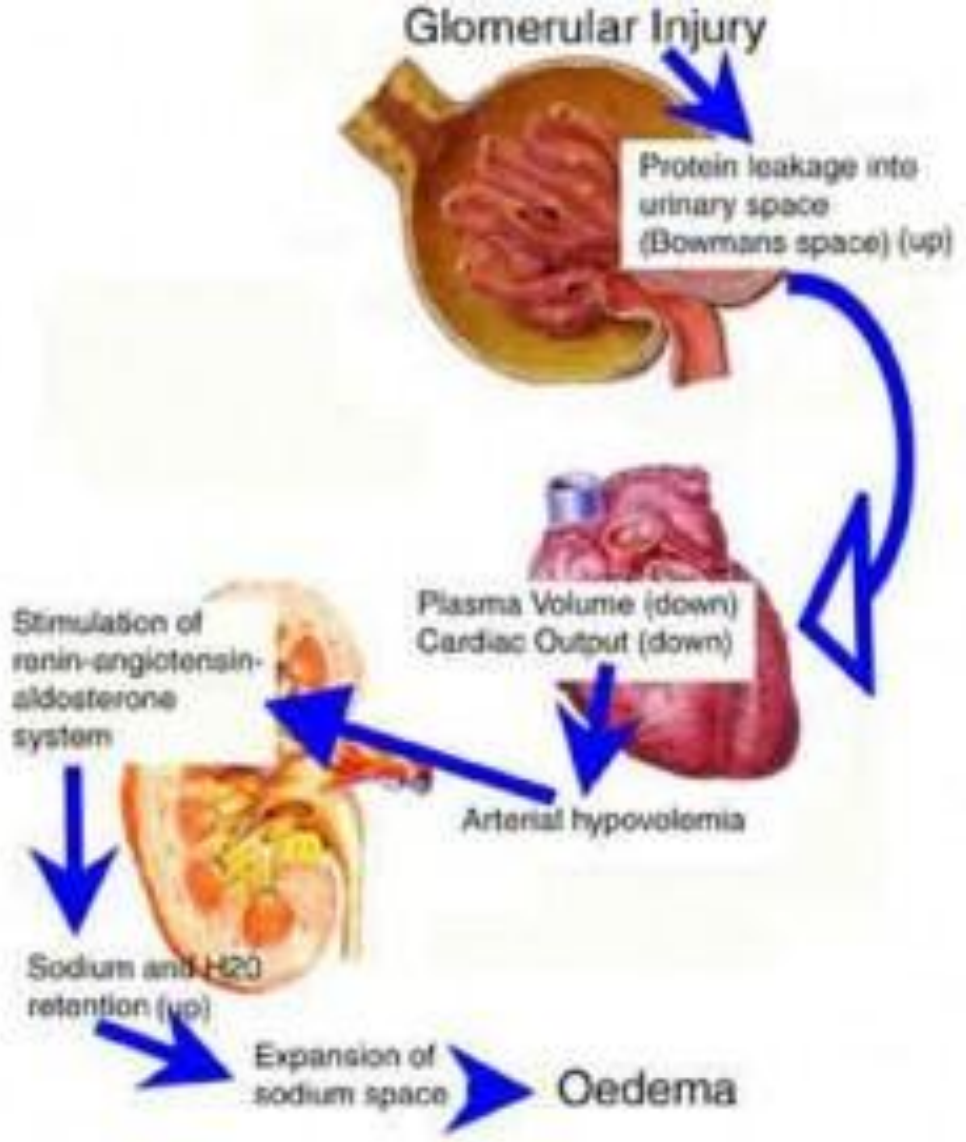


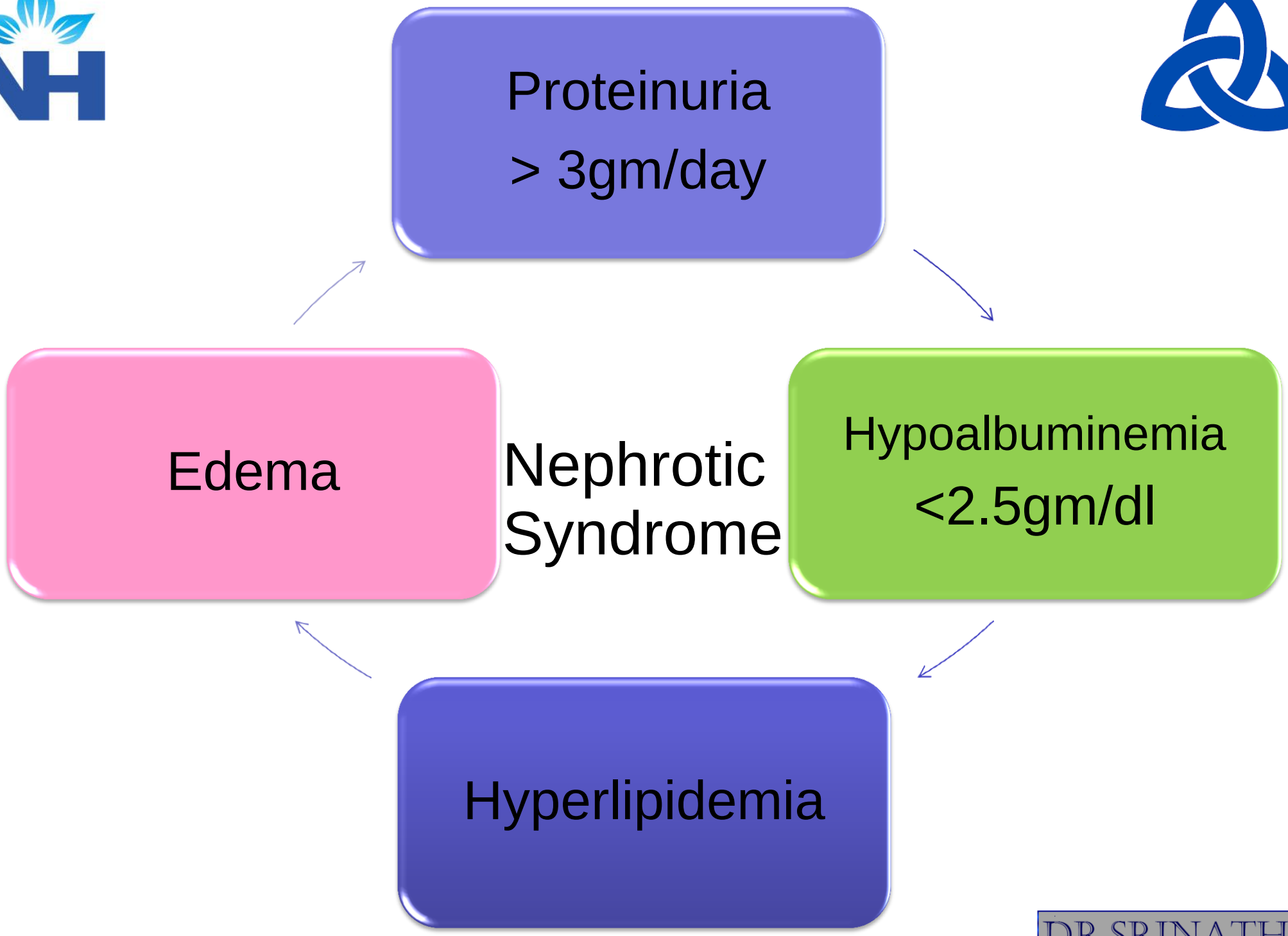
A normal capillary in a glomerulus keeps red blood cells, white blood cells and most proteins in the blood and only lets watery fluid into the urine.



A capillary in a diseased glomerulus lets protein into the urine (proteinuria) and red blood cells into the urine (hematuria).

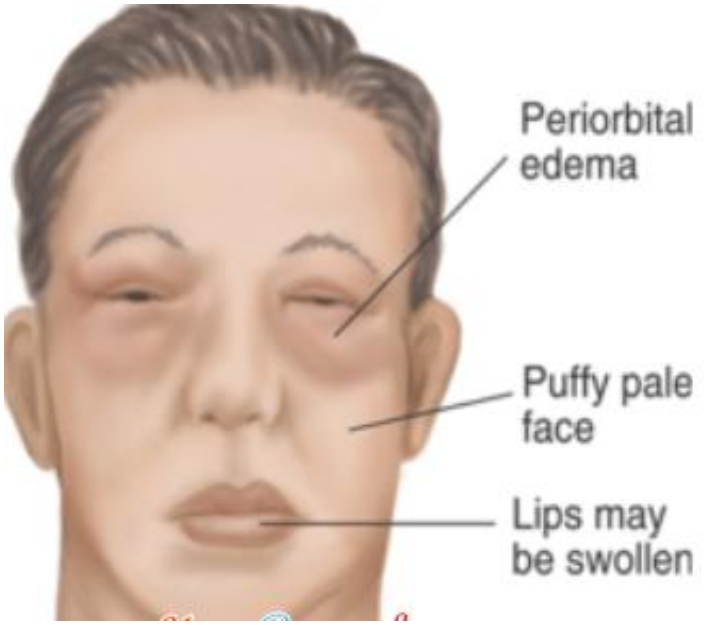
Nephrotic Syndrome




Proteinuria
> 3gm/day
Hypoalbuminemia
<2.5gm/dl
Hyperlipidemia
Edema
Nephrotic
Syndrome

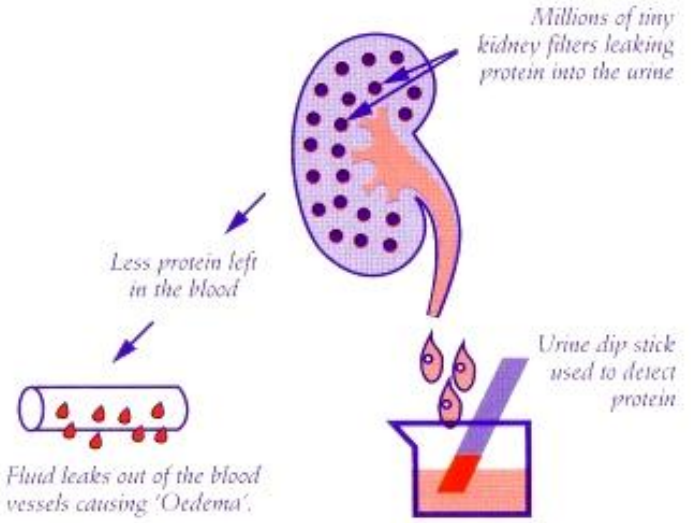
Presentation

- New-onset oedema
  - Initially periorbital or peripheral
  - Later genitals, ascites, anasarca
- Frothy urine
- Generalised symptoms – lethargy, fatigue, reduced appetite



Further possible presentations...

- Oedema
- BP normal/raised
- Leukonychia
- Breathlessness:
  - Pleural effusion, fluid overload, AKI
- DVT/PE/MI
- Eruptive xanthomata/ xanthalosmata



Possible Scenarios ...

- Young, fit 24 year old male complaining of frothy urine.
- 10 year old boy with puffy eyes.
- 74 year old female with multiple co-morbidities and swollen ankles.

Differential Diagnosis for Oedema

- Congestive Cardiac Failure
  - Raised JVP, pulmonary oedema, mild proteinuria
- Liver disease
  - Hypoalbuminaemia, ascites/oedema

- What investigations can you do?

Causes of Nephrotic Syndrome

- Primary glomerulonephritis
  - Minimal change disease (80% paeds cases)
  - Focal segmental glomerulosclerosis (most common cause in adults)
  - Membranous glomerulonephritis

Systemic Causes

- Secondary glomerulonephritis
  - Diabetic nephropathy
  - Sarcoidosis
  - Autoimmune: *SLE, Sjogrens*
  - Infection: *Syphilis, hepatitis B, HIV*
  - Amyloidosis
  - Multiple myeloma
  - Vasculitis
  - Cancer
  - Drugs: *gold, penicillamine, captopril, NSAIDs*

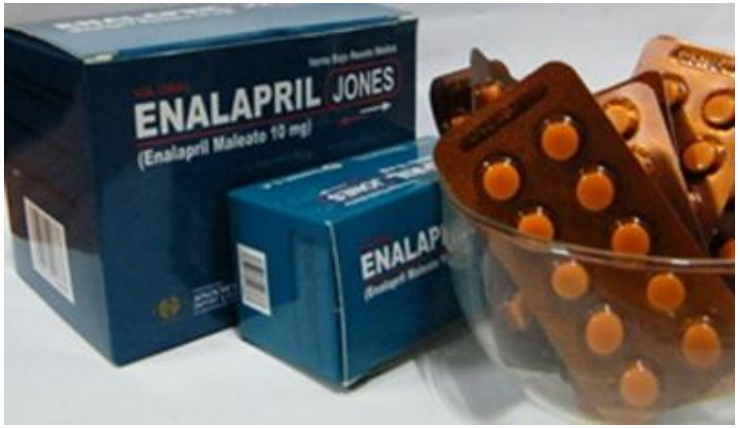
Investigations

- Urine dipstick for protein
- Urine microscopy
- Bloods – the usual ones, plus renal screen
  - Immunoglobulins, electrophoresis (myeloma screen), complement (C3, C4) autoantibodies (ANA, ANCA, anti-dsDNA, anti-GBM)
- Renal ultrasound
- Renal biopsy (all adults)
  - Children generally trial of steroids first

Management

- **Conservative**
  - Monitor U&E, BP, fluid balance, weight
  - Salt and fluid restriction
  - Treat underlying cause

Management



Decrease Glomerular pressure
Contain antifibrotic effects

For controlling edema
Combination drugs more useful

For Hyperlipidemia and Hyper triglyceredemia

Complications

Increased susceptibility to infection

Thromboembolism

Hyperlipidaemia

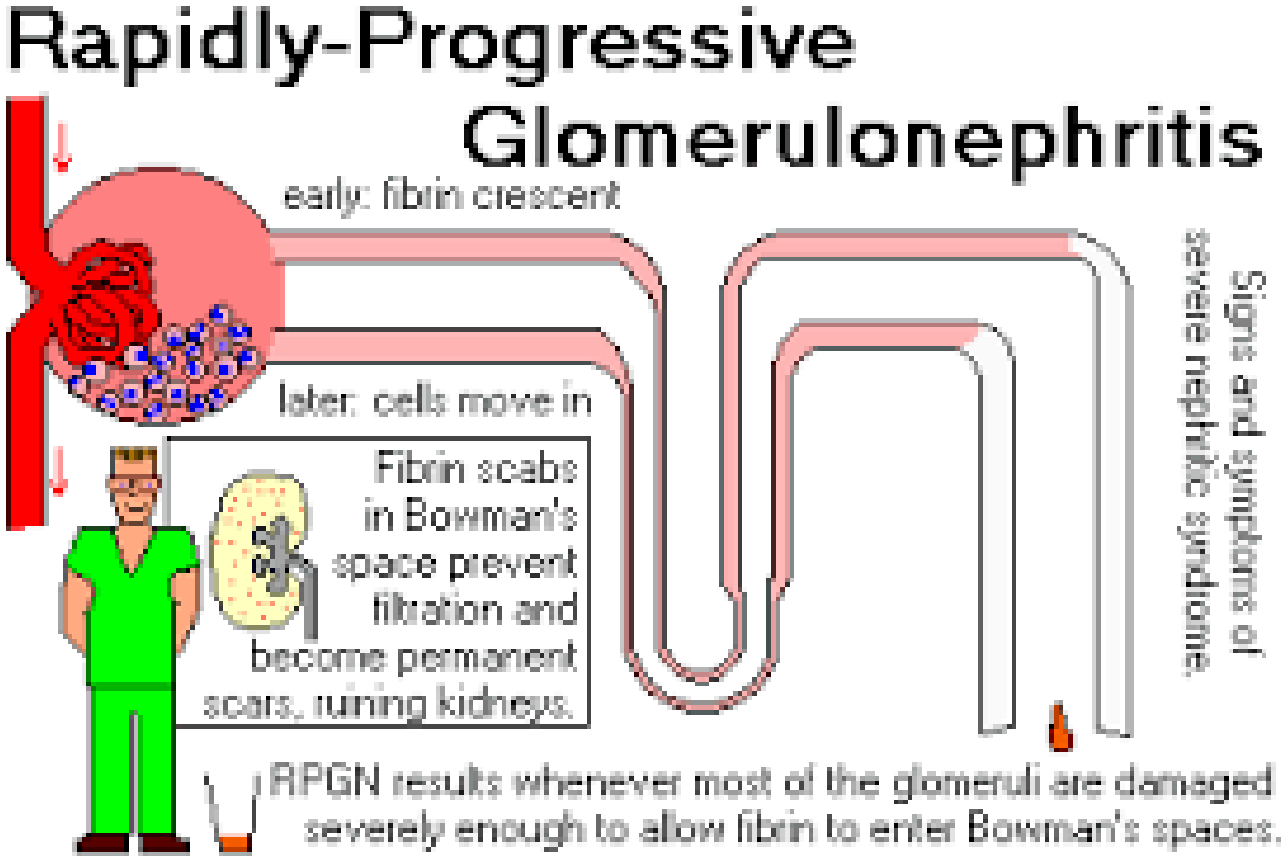
Prognosis

- Varies
- With treatment, generally good prognosis
  - Especially minimal change disease (1% progress to ESRF)
- Without treatment, very poor prognosis
  - Children under 5 or adults older than 30 = worse prognosis

What is nephritic syndrome?

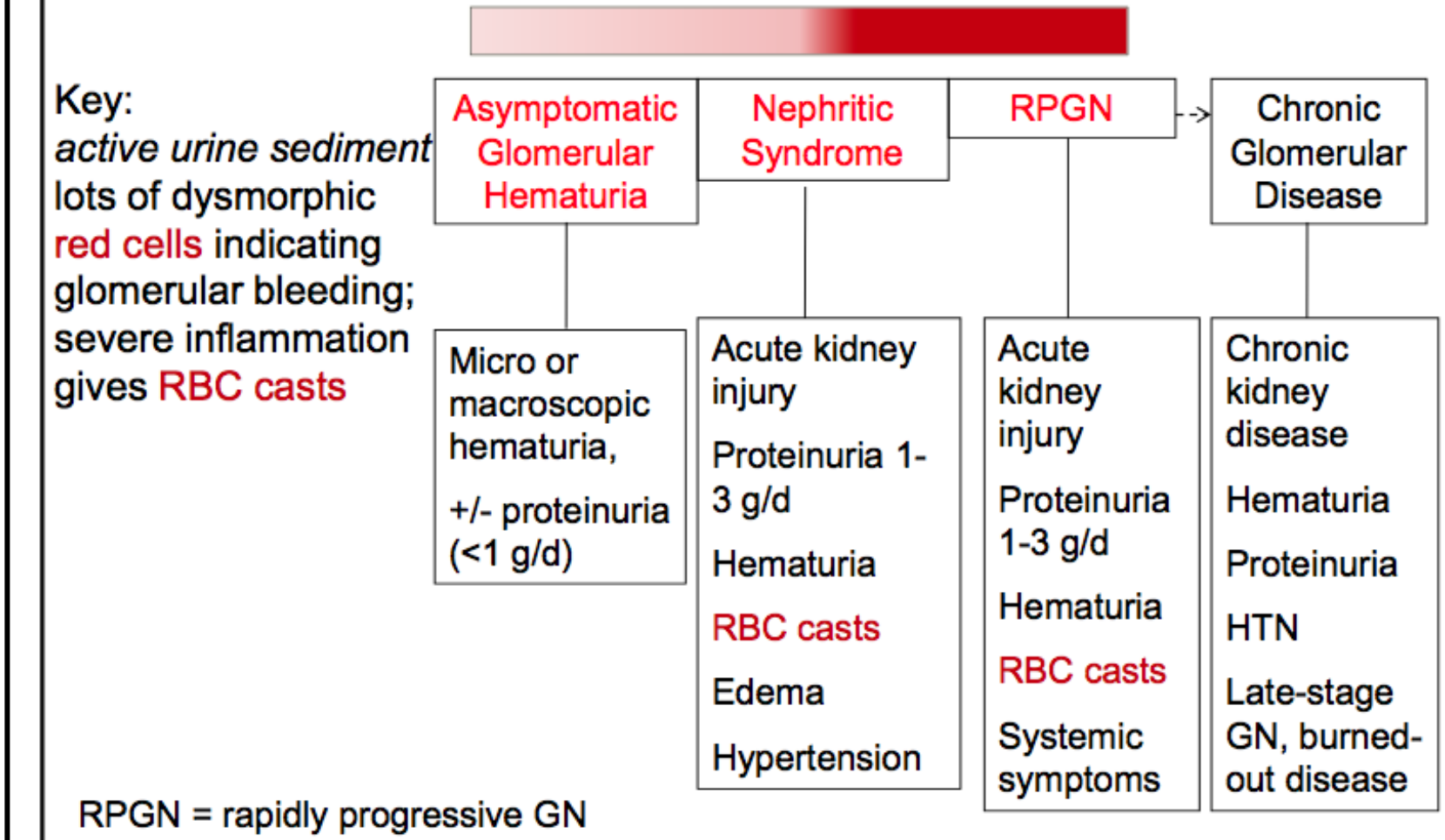
Pathophysiology

- Thin glomerular basement membrane with pores that allow protein and blood into the tubule.

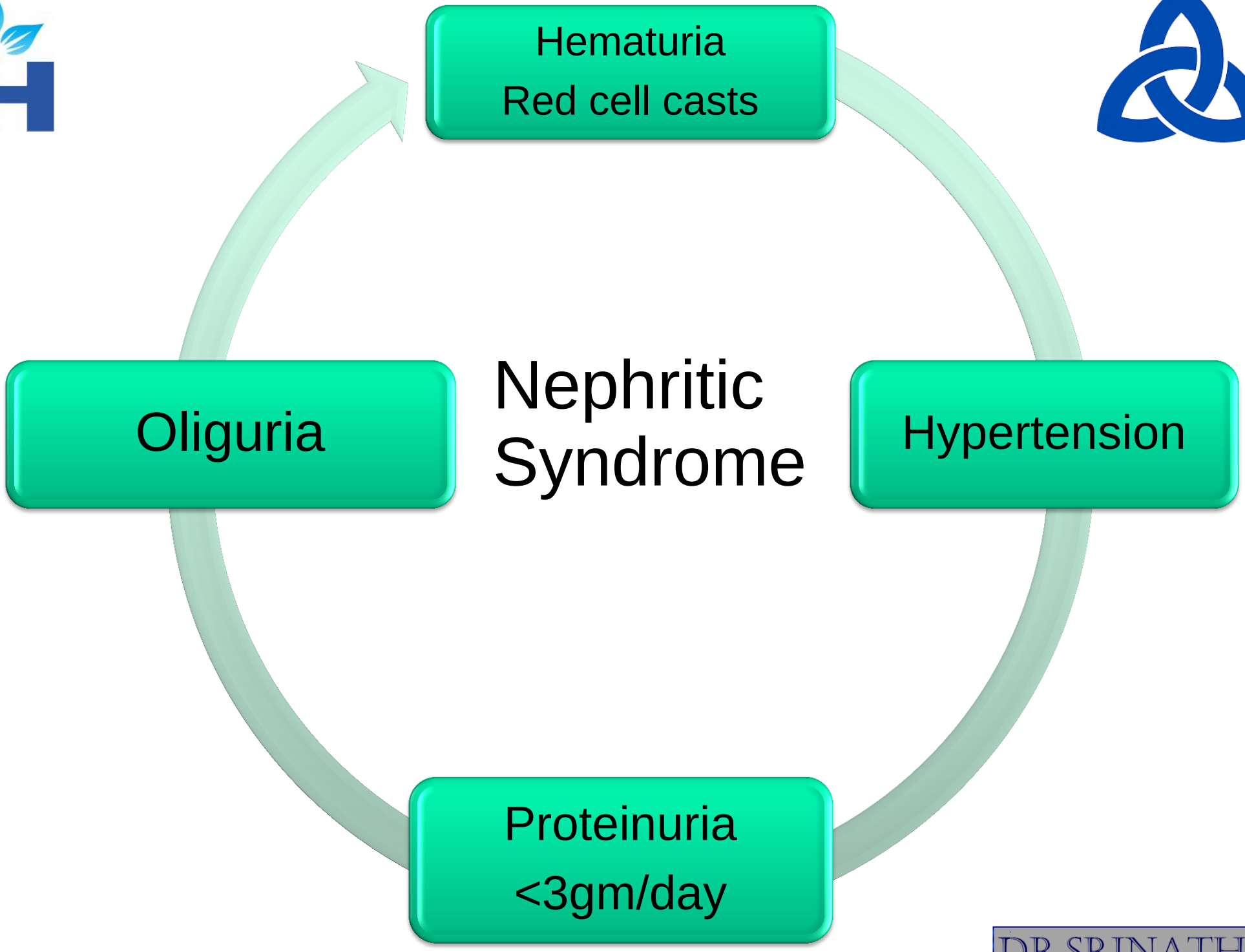


Clinical Syndromes of Glomerular Diseases

Nephritic spectrum

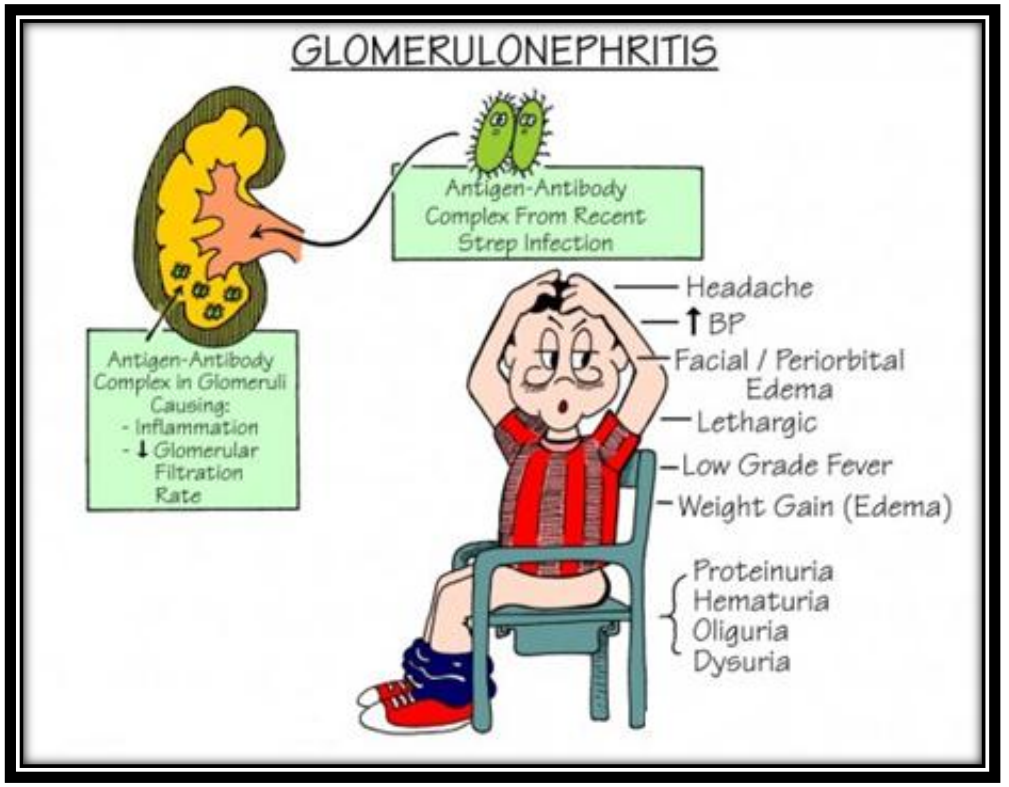


RPGN = rapidly progressive GN


Hematuria
Red cell casts
Hypertension
Proteinuria
<3gm/day
Oliguria
Nephritic Syndrome

Signs and Symptoms

- Haematuria (E.g. cola coloured)
- Proteinuria
- Hypertension
- Oliguria
- Flank pain
- General systemic symptoms
- Post-infectious = 2-3 weeks after strep-throat/URTI



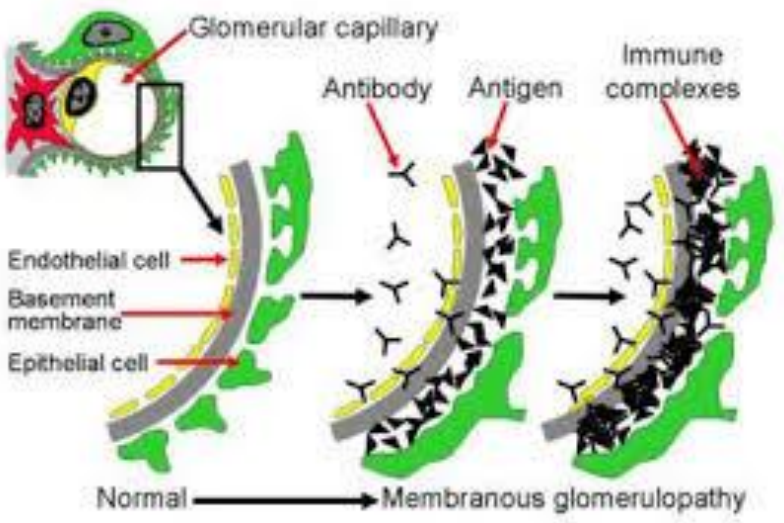
What are your differentials?

- Malignancy (older patients)
- UTI
- Trauma

- What bedside investigation would you like to do?
- You decide to refer to the renal clinic...

Causes

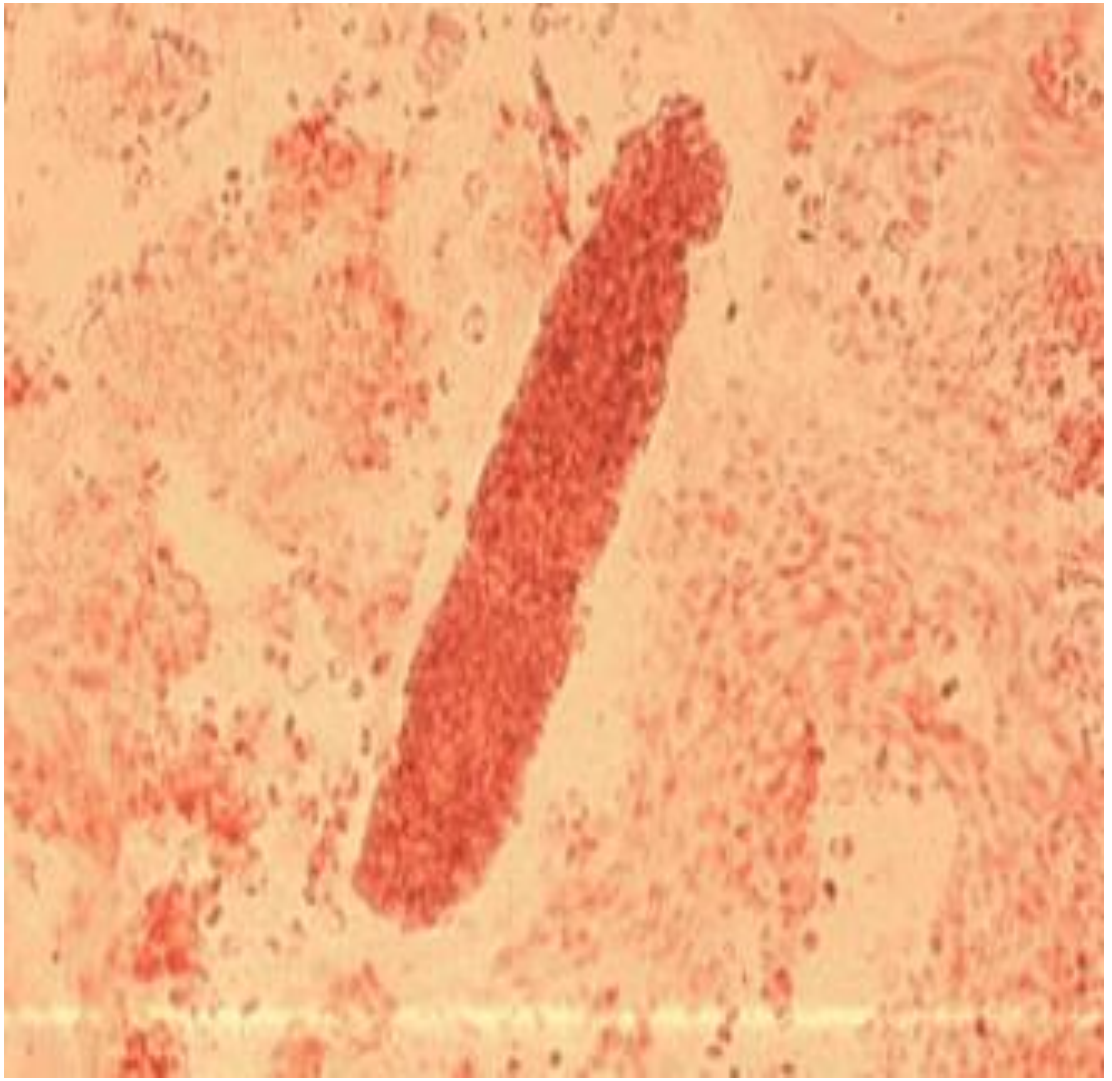
- **Post-infectious glomerulonephritis**
- **Primary**
  - IgA Nephropathy (Berger's disease)
  - Rapidly progressive glomerulonephritis
  - Proliferative glomerulonephritis
- **Secondary glomerulonephritis**
  - Henoch-Schonlein purpura
  - Vasculitis



Investigations

- Urine dipstick and send sample to lab
- Urine microscopy – red cell casts
- Bloods – the usual plus renal screen
  - Immunoglobulins, electrophoresis, complement (C3, C4) autoantibodies (ANA, ANCA, anti-dsDNA, anti-GBM); blood culture; ASOT (anti-streptolysin O titre)
- Renal ultrasound
- Renal biopsy

Red Cell Casts



Management

- **Conservative**
  - Monitor U&E, BP, fluid balance, weight
  - Salt and fluid restriction
  - Treat underlying cause
- **Medical**
  - Diuretics
  - Treat hypertension
  - Corticosteroids/immunosuppression
  - Dialysis
- **Surgical**
  - Renal transplant

Prognosis

- Varies
- Post-infectious usually self-resolving (95% recover renal function)
- Others are a bit more nasty

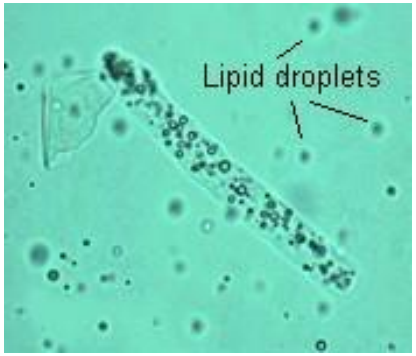
URINANALYSIS

NEPHROTIC

- Negligible RBC's / WBC's
- Absence of cellular casts
- Free lipid droplets
- Lipid laden macrophages

NEPHRITIC

- RBC's abundant
- RBC casts
- Lipid elements usually absent



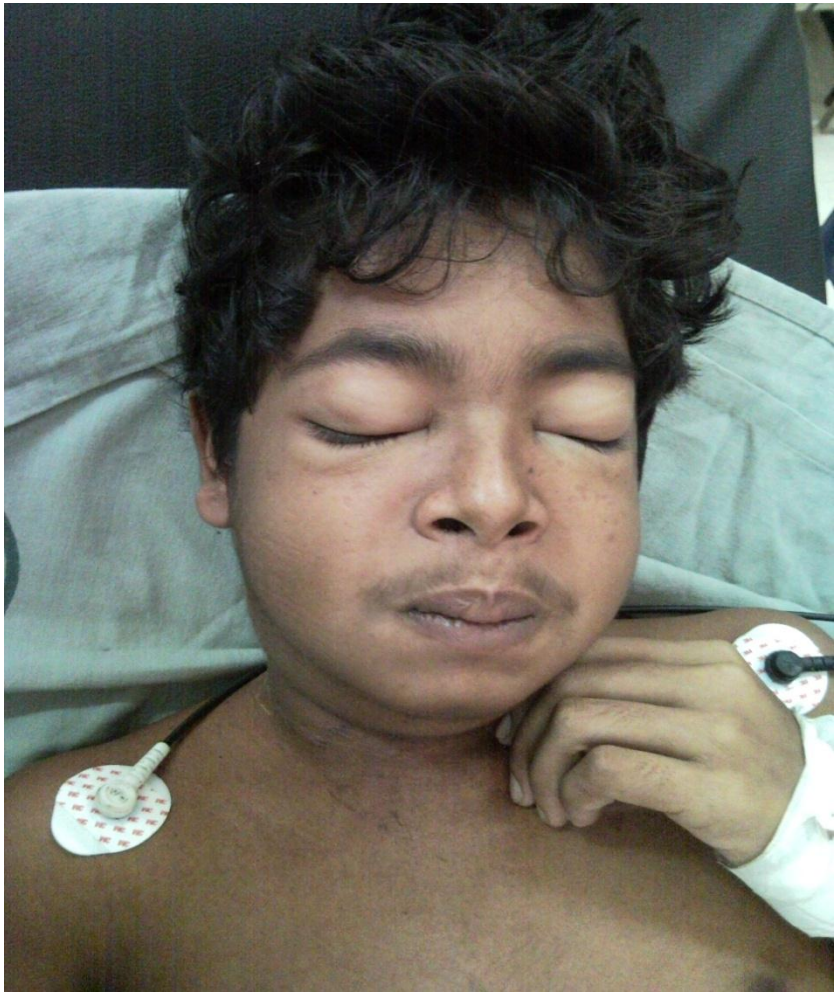
Summary

- Nephrotic syndrome = MASSIVE proteinuria
- Nephritic syndrome = haematuria/red cell casts
- May be a mixed presentation

- New oedema? Dipstick that urine!
- Haematuria? Exclude malignancy!

Which is bad ??

Balakrishnan / 18 / M



- Pt conscious, not oriented
- Airway – Patent
- Breathing – RR – 32/min
  - Depth adequate
  - BL basal creps +
  - Spo2 98% @ RA
- Circulation – HR 136/min

  BP – 130/80mmhg

  IV access obtained with 18 G

HOPI

- Apparently normal 1 ½ months back
- Developed fever – High grade,

  Intermittent, with chills and rigors.
- H/O cough since 1 month
  - Dry cough
  - No postural and diurnal variations
  - No h /o Hemoptysis

- H/O B/L leg swelling since 1 week
- H/O Puffiness of face since 1 day.
- H/O Altered sensorium since 1 day

- No/H/O headache
- NO/H/O projectile vomiting
- No/H/O Diarrhoea
- No/H/O abdominal distension
- No/H/O chest pain or palpitations
- Was treated locally
- Referred to SKS hospital

- Urine examination showed Hematuria and proteinuria
- Renal parameters were elevated
- Urea – 160
- Creatinine – 6.0
- Advised HD

.

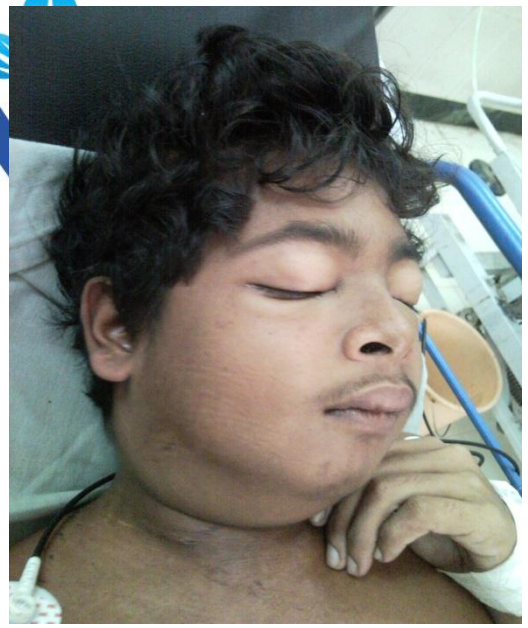
D/D

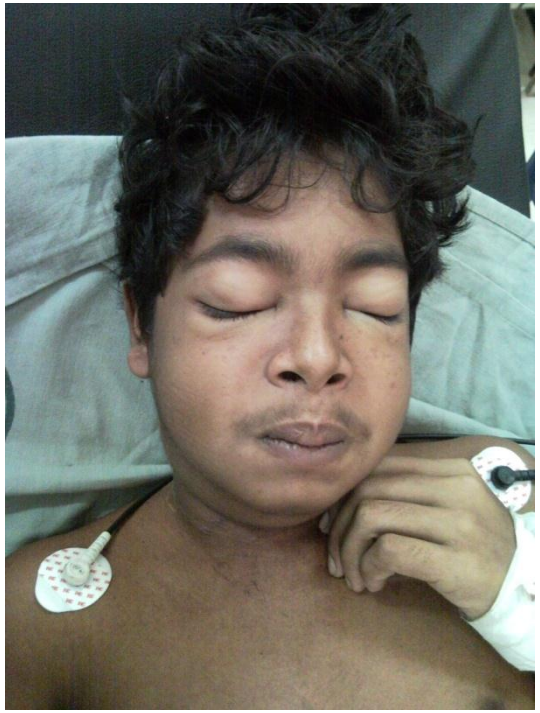
- Nephritic syndrome
- Nephrotic syndrome
- Acute renal failure
- Chronic renal failure
- CCF

- PT – 15.8
- INR – 1.11
- Renal biopsy
  - Sclerosing proliferative glomerulonephritis with **more than 80% cellular cresents** with multifocal tubular atrophy.

Dialysis

- 9 sitting dialysis done
- RFT 185/6.8 reduced 90/5.2





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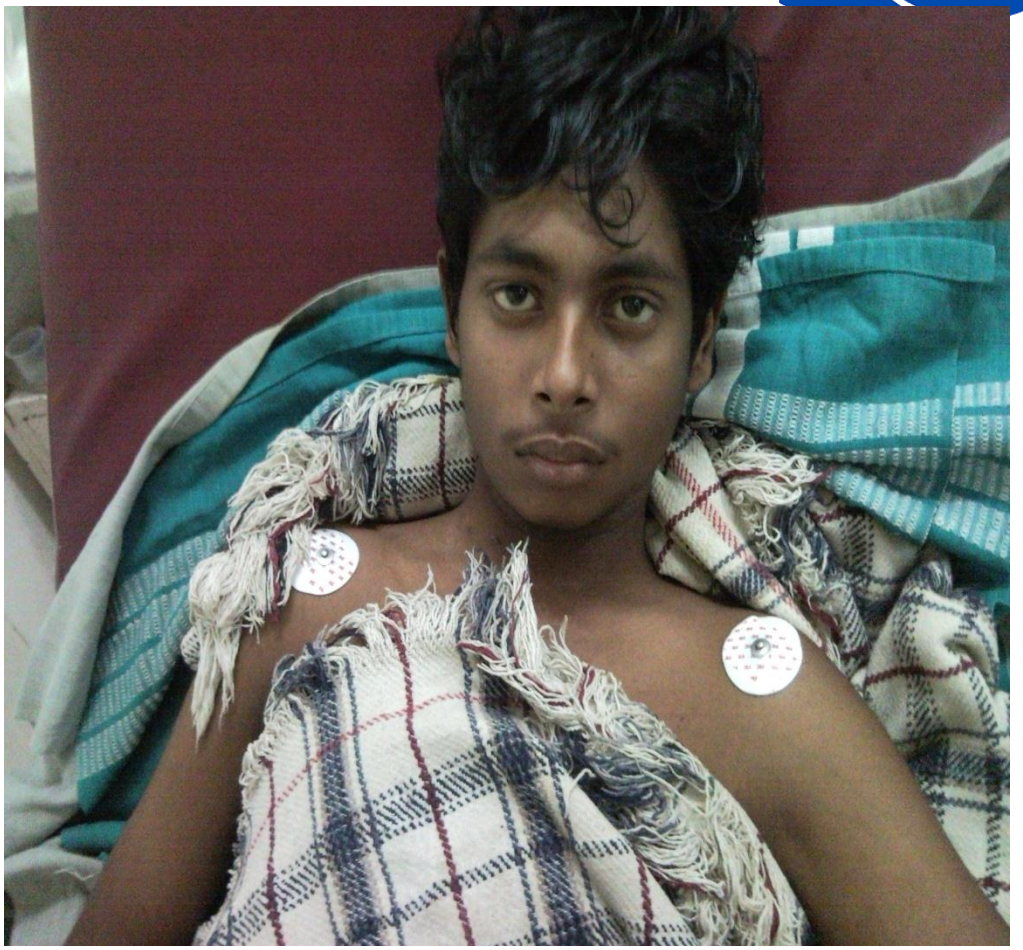

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