

Approach to PROTEINURIA

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Learning objectives

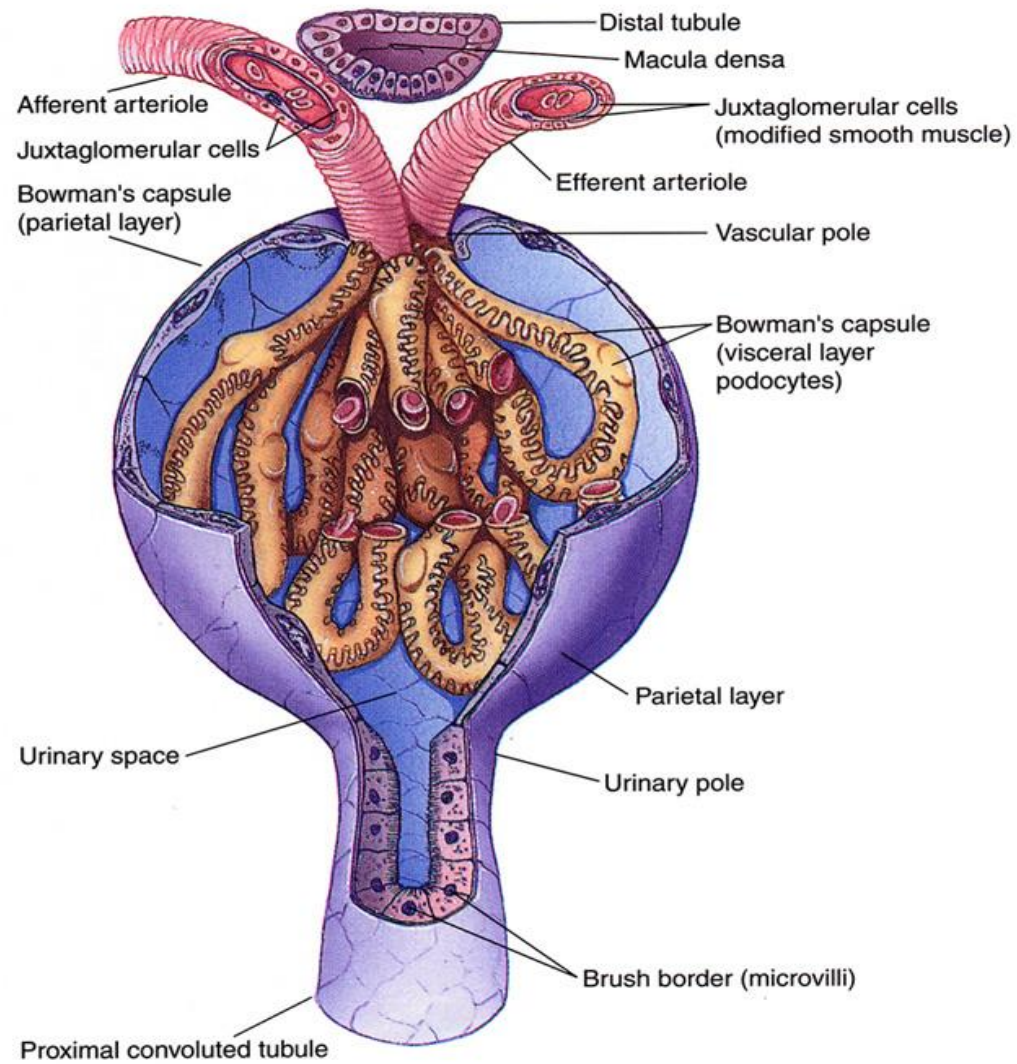
- Define
- Pathophysiology
- Etiology
- Clinical features
- Differentiation from acute nephritis
- Investigations
- Treatment and follow up
- Complications

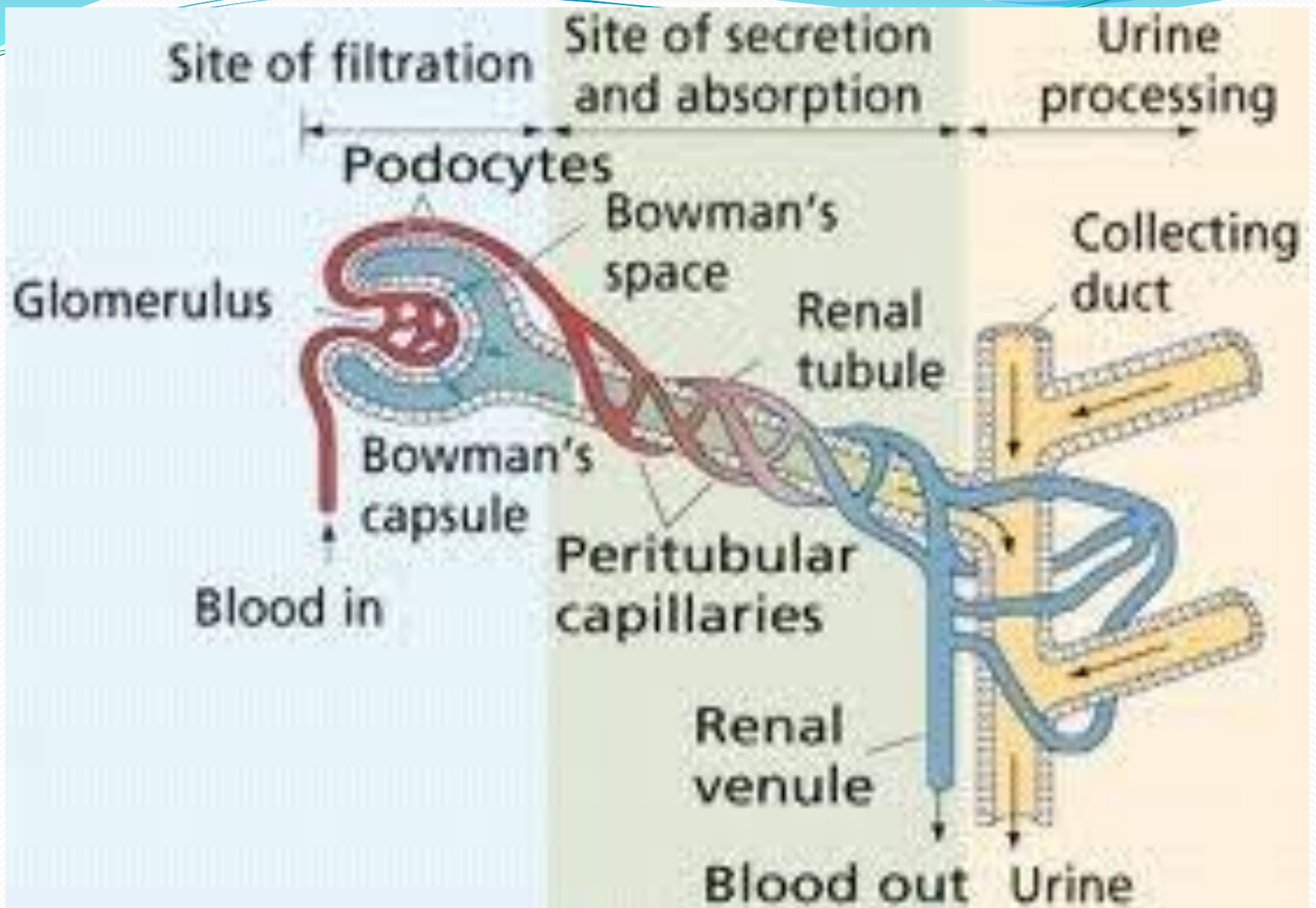
Learning Objectives

- 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.



Draw a nephron!





Glomerulonephritis

- **Glomerulus** – capillary loop with basement membrane which allows passage of specific molecules into the nephron
- **Glomerulonephritis** – inflammation/damage of the glomerular basement membrane resulting in altered function. Relatively uncommon cause of kidney injury.
- Can present as **nephrotic and/or nephritic** syndrome.

What is nephrotic syndrome?

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

PROTINUREA

Negative

Positive : Trace = 10-20 mg %

+ = 30 -100 mg%

++ = 100-300 mg%

+++ = 300-1000mg%

++++ =1000>mg%

10%children excrete 1+ protein at any time

24 hr urine protein

- Normal =150 mg/day or 4mg/m²/hr
- Abnormal >4mg/m²/hr
- Nephrotic >40 mg/m²/hr

Spot Pr:Creat Ratio

- < 0.5 upto 2yr
- < 0.2 above 2 yr
- > 3 NEPHROTIC RANGE

Causes of proteinuria

1. Transient pr.

Fever, exercise, dehydration, cold exposure, CHF, seizure

Orthostatic

2. Glomerular diseases-ISOLATED PROTEINURIA

NS

FSGS

MPGN

MN

Amyloidosis, diabetes, sickle

CAUSES-contd.....

3.GLOMERULAR PROTIEN>HEMATURIA

APSGN

IG A Nephropathy

HSP

Lupus,alport

4.TUBULAR

Cystinosis , wilson,galactosemia,ATN,PCKD

Presentation

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

homework

- Why edema in morning & periorbital

Differential Diagnosis for Oedema

- Congestive Cardiac Failure
 - Raised JVP, pulmonary oedema, mild proteinuria
- Liver disease
 - Hypoalbuminaemia, ascites/oedema
- What investigations can you do?
- You decide to send your patient to the renal clinic...

Further possible presentations...

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

NEPHROTIC SYNDROME

- Proteinuria
 - Hypoproteinemia
 - Edema
 - Hyperlipidemia
-
- Primarily Pediatric disease
 - 2-3/100000 children /year

Etiology & Pathogenesis

- Primary[90%] – MCNS 85%
FSGS 10%
MP 05%
- Genetic-
- Secondary-infections
 - drugs
 - immune/allergic
 - malignancy
 - Glomerular hyperfiltration

Mechanisms-pivotal role of podocytes

- T cell dysfunction – loss of - ve charge glycoprotein
- Plasma factor
- Mutation in podocyte protein - podocin or
alpha actinin 4

homework

- Which molecules are lost in urine

Clinical features

- M:F 2:1
- Age 1-6 yr
- Trigger factor
- Edema eye leg generalized genital
- **NO Hypertension / Hematuria /ARF**

Diagnosis

- Confirm Nephrosis
- Try to find out SECONDARY cause
- Rule out infection

Investigations

- Urine dipstick and send to lab
- Urine microscopy
- Bloods – the usual ones, plus renal screen, to r/o nephritis,
- To find out secondary causes
- To rule out occult infections
- Renal ultrasound ?
- Renal biopsy
 - Children generally trial of steroids first
 - older children-biopsy

Atypical NS-rare

- AGE- less than 1 yr ,more than 8 yr
- Gross hematuria
- Hypertension
- Renal insufficiency
- hypocomplementemia

Management

- Mild /Moderate edema - OPD
- Counseling
- SRD
- Diuretics- NO

Admission

- Symptomatic edema
- Fluid restrict if low Na
- Diuretics – chlorthiazide / frusemide
- IV albumin + frusemide
- Plasmapheresis
- PPA onto protein-A based column

Steroid Treatment

PREDNISOLONE

After -ve MT and PCV vaccine

- 60 mg/m²/day (max 80 mg) 4-6 week
- 40mg/m²/day alt day 4- 6 wk. max 2-3 mo

Terminology

- Responsive
- Resistant- after 8 wk
- Relapse- 3+ & EDEMA
- Dependent-RELAPSE DURING MAINTAINANCE
- Frequent / Infrequent relapser

Monitoring Disease & side effects

- Steroids
- proteinurea

Atypical Nephrotic

- Dependant/resistant/freq. relapser
 - Treat cyclophosphamide 2-3mg/kg/d 8-12wk
 - +alt day pred
 - Wbc wkly
-
- High dose pulse methylpred. 30 mg/kg alt day
 - 6 doses then taper over 18 mo
 - +cycloph.
-
- Cycloserine- 3-6mg/kg
 - Tacrolimus- 0.15mg/kg
 - Mycophenolate
-
- ACE inhibitors

Complications

- Infection-20-30 %
- SBP-
- Thromboembolism-2-5%
- Hyperlipidemia

PROGNOSIS

- MCNS relapse rate decreases as age advances
- Unlikely chronic
- Fertility normal
- Poor prognosis in steroid resistant

CONGENITAL NEPHROTIC SYNDROME-

rarest

- Presents in first 3 mo of life
- Inherited
- High mortality
- Nephrectomy
- RRT
- TRANSPLANTATION