

**#MADEEASY**



**NEPHROTIC  
SYNDROME**





## NEPHROTIC SYNDROME

**Patient:** *Namaste doc, let's continue our discussion about the kidney disorders. We have to discuss about Nephrotic syndromes today. What exactly are these?*

**Doctor:** *Namaste, ah yes, I remember! So, let's get into details of nephrotic syndrome.*

- *It basically occurs due to a damage of the glomerular basement membrane.*
- *You can remember it as nephrotic syndrome as holes are created in the basement membrane.*
- *There is increased permeability especially to proteins which leak out in the urine.*

**Patient:** *But how exactly does this happen that suddenly the basement membrane develops holes?*

**Doctor:** *Let's look at the pathogenesis of nephrotic syndrome*



# Pathogenesis



## **Podocyte damage**

- **Immune mechanisms like immune complexes are responsible for damage of the podocytes.**
- **These podocytes form the basement membrane and the filtration barrier.**
- **Hence, their damage leads to increased permeability.**
- **All nephrotic syndromes show effacement of podocytes.**
- **These are like the bricks that form the basement membrane and if these are damaged, the integrity of the BM is damaged and rats can sneak out all the food items easily.**

## **Proteinuria**

- **Proteins like albumin pass through the basement membrane and are lost in the urine.**
- **There is decreased oncotic pressure**
- **Compensatory increased hepatic synthesis of lipoproteins.**
- **And when the chef sees that all his food items are missing, he cooks more and more food items to make up for the loss.**

**Patient:** What would this look like in terms of symptoms?

**Doctor:** The resulting signs and symptoms would be:





## Clinical Presentation

- **Massive proteinuria (>3.5 grams in 24 hours)**
- **Edema**
- **Hypoalbuminemia**
- **Hyperlipidemia (lipid casts in urine)**
- **Recurrent infection (due to loss of immunoglobulin)**

**Patient:** Alright, so what syndromes can be a part of “nephrotic” syndromes?

**Doctor:** again, these can be primary or due to secondary causes.





## Primary Nephrotic Syndromes

- Minimal change disease
- MCC of nephrotic syndrome in children
- Frothy urine is seen.
- No deposits observed on immunofluorescence.
- Light microscopy: no changes observed
- Since no changes are seen in these techniques, it is called minimal change disease, it occurs in minimal age. **HOWEVER EM shows Effacement which is seen in ALL nephrotic syndrome disorders.**
- Electron microscopy: effacement of podocytes (only change)

**Patient:** So this is seen in kids like PSGN, what about adults?

**Doctor:** nephrotic syndrome has 2 more disorders, one which is most common in adults and the other one which is specifically more common in elderly.





## Focal Segmental Glomerulosclerosis

- **MCC of nephrotic syndrome in adults**
- **Associated with HIV, HTN and sickle cell anemia.**
- **HIV associated nephropathy findings:**

1. **Tubular cystic lesions**
2. **Visceral epithelial cell hypertrophy**
3. **Glomerular damage**
4. **Non-responsive to steroids**
5. **Poor prognosis**

**Tip to remember:** not a good way but easy to remember than other technical mnemonics: HIV is associated with FSGS as if someone has HIV, they are 'F'ed.

- **Shows effacement of podocytes.**



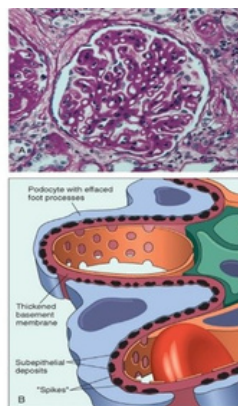


## Membranous Glomerulopathy

- **Elderly**
- **Hepatitis B**
- **SLE**
- **Cancer**
- **MEMBERS** of this group are either too old or too sick to attend the meetings.

### Pathophysiology

- **Autoantibodies against HLA-DQA1 cause damage of the podocyte.**
- **Podocyte effacement --> shows "spike and dome appearance".**
- **Subendothelial deposits**
- **Thick basement membrane**



**Membranous nephropathy.**  
A, Diffuse thickening of the glomerular basement membrane.  
B, Schematic diagram illustrating subepithelial deposits, effacement of foot processes, and the presence of "spikes" of basement membrane material between the immune deposits.





## Secondary causes of Nephrotic Syndrome

- **Systemic lupus erythematosus (SLE)**
- **Diabetes mellitus**
- **Hepatitis B, C**
- **Drugs: NSAIDs**

***Patient:*** Thanks a lot doc for sharing your knowledge with me!

