



Med433 Team
*Problem
Based
Learning*



Third case:

**my body is
swollen !**

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Color Index





Key points from the Scenario:

- Mohammed is a student 10 years old, male
- Presented with one week history of lower limbs swelling and puffiness (swelling) around eyes especially in the morning
- His urine is frothy (foaming) for a few days
- Onset of symptoms was gradual
- No history of relevant medical illnesses in the past
- His father is a hypertensive and diabetic

Examination

vital signs

- Normal (pulse, BP, temperature, respiratory rate)
- Height: 130cm, weight: 56kg (obese)

Abdomen examination :

- Abdomen is soft and distended (swelled) and positive shifting dullness

Lower limb examination:

- Bilateral pitting edema of both lower limbs, especially in the ankle regions

Head and neck examination:

- Revealed puffiness around the eyes.

Investigations:

Biochemical tests:

	Result	Normal ranges
Serum protein level	49 mg/dL	60-80mg/dL
Serum albumin level	24 mg/dL	35-45mg/dL
Serum total cholesterol level	6.7 mmol/L	Less than 5.2mmol/L

Percutaneous renal biopsy:

Immunofluorescence microscopy → staining for trace (little) coarse immunoglobulin G and immunoglobulin M deposits in capillaries wall

Electron microscopy → showed an extensive effacement (disappeared) of epithelial foot process in glomeruli or podocytes

❖ Diagnosis:

Nephrotic syndrome

❖ Management:

Mohammed started on prednisolone. He was started on furosemide diuretic and he was advised to reduce sodium intake to 1000-2000mg/day.

- The objective of this management is to treat the symptoms brought about by the illness:
 - edema:** by **Furosemide** (It is a loop diuretic) and reduce Na intake
 - kidney damage:** by **Prednisolone** (It is a corticosteroids)
 - Hypoalbuminemia:** increase ingestion of protein rich food
 - Hyperlipidemia:** decrease ingestion of cholesterol, or **anti-hyperlipidemia** drugs in severe cases (such as **Statins** and **fibrates**)
 - Proteinuria:** **Angiotensin-converting enzyme (ACE)** inhibitors and **angiotensin II receptor blockers** are administered to reduce proteinuria

❖ **Other test :**

Complete urine analysis / urine culture :

Examination made	Result	Normal value	Clinical significance
Color	Yellow	Amber yellow	Normal
Character	clear	Clear	Normal
PH	6.0 Acidic	4.8-8.0	Normal
Specific gravity	1.020	1.1015-1.025	Normal
Protein	7 g/d	(-)	Proteinuria
Sugar	(-)	(-)	Normal
Red blood cells	(-)	(-)	Normal
Pus cells	(-)	(-)	Normal
Epithelial cells	++	(-)	Contaminated sample
Amorphous phosphate	(-)	(-)	Normal
Bacteria	(-)	(-)	Normal

Complete blood count :

	RESULT	NORMAL RANGE
hemoglobin	130 g/L	MALE: 135 – 175 g/L FEMALE: 120 – 155 g/L
RBC count	5.4	5.05 – 5.5
WBC count	7.5 x 10 ⁹ /L	4.5 – 11 x 10 ⁹ /L
Platelet count	350	140 – 450 x 10 ⁹ /L

Nephrotic Syndrome

Nephrotic syndrome is a nonspecific disorder in which the filtration membranes of kidneys are damaged, causing to leak large amount of protein (**proteinuria** at least **3.5 grams per day** per 1.73m body surface area) from the blood into the urine.

Kidneys affected by nephrotic syndrome have small pores in the podocytes, large enough to permit proteinuria (and sequently **hypoalbuminemia**, because some of the protein albumin has gone from the blood to the urine) but not large enough to allow cells through (hence no hematuria). By contrast, on nephritic syndrome, RBCs pass through the pores, causing hematuria.

Clinical Presentation

it is characterized by proteinuria (**> 3.5g/day**), hypoalbuminemia, hyperlipidemia and generalized edema.

A few other characteristics are:

- **The most common sign is excess fluid in the body.**
- **Hypertension (rarely and common in nephritic syndrome)**
- **Some patients may notice foamy urine, due to a lowering of the surface tension by the severe proteinuria. Active urinary complaints such as hematuria or oliguria are uncommon (seen in nephritic syndrome).**
- **May have features of the underlying cause , such as the rash associated with SLE, or neuropathy associated with diabetes.**
- **Examination should also exclude other causes of gross edema (especially the cardiovascular and hepatic system).**

Classification and causes

A broad classification of nephrotic based on etiology :

1. **Primary**
2. **Secondary**

Histological classification

Nephrotic syndrome is often classified histologically in to:

1. **Minimal Change Disease (MCD)**
2. **Focal Segmental Glomerulosclerosis (FSGS)**
3. **Membranous Nephropathy (MN)**

Primary causes

Primary causes of nephrotic syndrome are usually described by the histology, i.e., minimal change disease (MCD), focal segmental glomerulosclerosis (FSGS) and membranous nephropathy (MN).

They are considered to be "diagnosis of exclusion", i.e., they are diagnosed only after secondary causes have been excluded.

Secondary Causes

Secondary causes of nephrotic syndrome have the same histologic patterns as the primary causes, though they may exhibit some differences suggesting a secondary cause, such as inclusion bodies.

They are usually described by the underlying cause.

Secondary causes by histological pattern:

1. Membranous nephropathy (MN) :

- Hepatitis B
- Sjögren's syndrome
- Systemic lupus erythematosus (SLE)
- Diabetes mellitus
- Sarcoidosis
- Syphilis
- Malignancy (cancer)

2. Focal segmental glomerulosclerosis (FSGC):

- Hypertensive nephrosclerosis
- HIV
- Diabetes mellitus
- Obesity
- Kidney loss

3. Minimal change disease (MCD)

- Drugs (NSAIDs)
- Malignancy, especially Hodgkin's lymphoma

Diagnosis:

Diagnosis is based on blood and urine tests and sometimes on the kidneys biopsy or both.

Edema :

Is an excessive amount of fluid in the interstitial spaces caused by :

1- ↑ Capillary hydrostatic pressure.

(e.g. heart failure, local venous block. etc.)

2- ↓ Blood osmotic pressure due to decrease plasma proteins.

(e.g: a- Nephrotic syndrome. b- Burns. c- Liver disease d- Malnutrition.)

3- ↑ Capillary permeability e.g. in allergic reactions & burns.

4- Blockage of lymph return by, e.g. infection or cancer.

*** In our case the cause of edema is due to decrease blood osmotic pressure because there is loss of proteins from blood to urine.**

Question:

membranous glomerulonephritis is seen in patients with which diseases?

- 1- SLE
- 2- hepatitis B
- 3- syphilis
- 4- malaria infection
- 5- malignancy

what the meaning of (spike and dome)?

spike :basement membrane material

Dome : immune complex deposits

What is the reason of his swelling in the limbs and face?

Low protein blood level (\downarrow colloid pressure) leading to retention of fluid and weight gain

What are the clinical manifestations of nephrotic syndrome?

- 1) Proteinuria (>3.5 gm\day)
- 2) Hypoalbuminemia
- 3) Generalized edema
- 4) Hyperlipidemia

New terms:

- **Puffiness:** refers to the appearance of swelling in the tissues around the eyes
- **Frothy urine:** The excess protein in the urine often causes the urine to become foamy
- **positive shifting dullness:** a sign, discovered on physical examination, for ascites (fluid in the peritoneal cavity)