# Nephrotic Syndrome

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# Disclosures

- Nothing to declare

# Objectives

- Know how to approach a child with edema
- Focused history
- Focused PE
- Focused labs/imaging
- Focused management

# Case presentation

- A 6 year old child was brought to the clinic because of periorbital swelling of one week duration. He was treated by a relative ENT doctor with antihistamines without benefit

On PE

Normal BP

Had pitting pretibial edema

Mild scrotal swelling

# Nephrotic syndrome

- With permission from family

# Approach to edema

- First Question : Is it allergy or kidney problem or else

  Check urinalysis-> Abnormal-> it is not allergy

- Next Question

  Is it Acute Glomerulonephritis OR Nephrotic syndrome

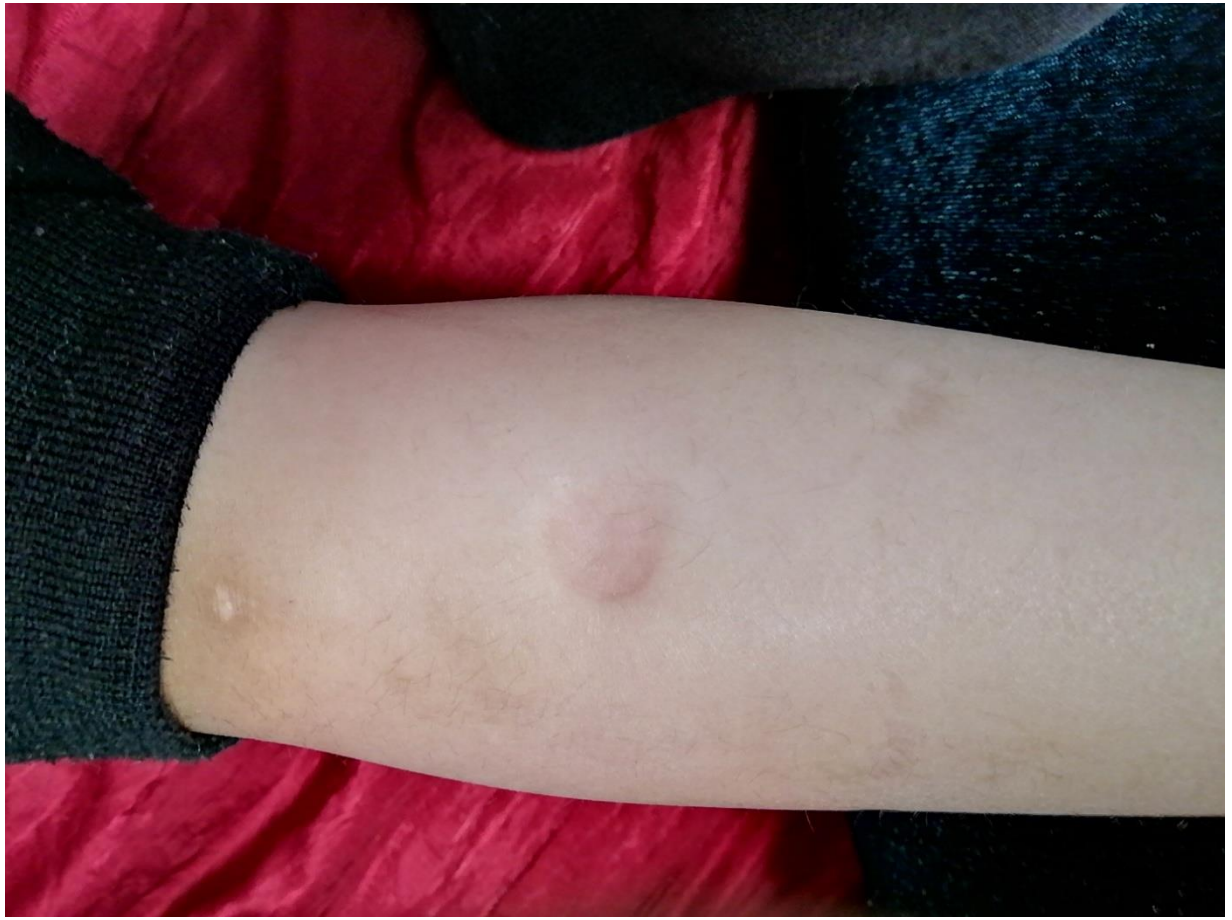
# Physical exam

- **New case**
- Ht percentiles , wt percentiles, BP[high vs Orthostatic hypotension]
- Look for peripheral edema +/- ascites/ scrotal swelling
- Ears-soft with loss of protein
- Nails- horizontal hypoalbuminemic lines with each relapse
- Check for evidence of systemic disease eg rash
- **Known case in relapse**
- Look also for side effect of medication and complications of the disease

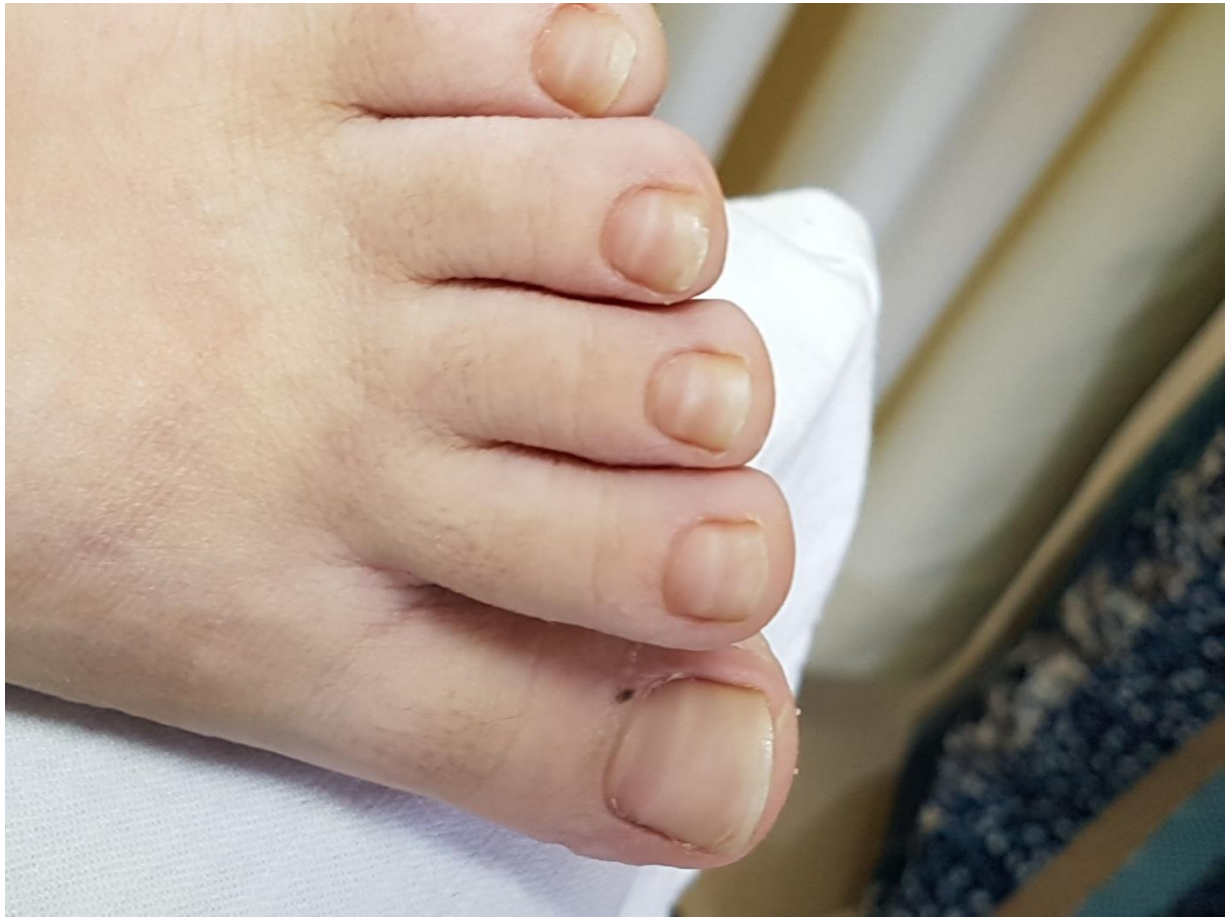
# Clinical detection of  edema

- One finger
- One place
- One minute

# Physical exam- Pitting edema



# Nails :Hypoalbuminemic lines



# Labs

Urinalysis: showed +4 protein; no RBC; no WBC

C3 & ASOT normal

# Nephrotic Syndrome in Childhood

- Edema
- Heavy proteinuria( >50 mg/kgm/day OR > 40 mg/$m^2$/hour)
- Hypoalbuminemia( <2.5 gm%)

- Hyperchlesterolemia

# Nephrotic Syndrome

- **Primary**

- MCNS(>85% of cases)
- FSGS
- Mesangial proliferative
- Membranous

# Nephrotic Syndrome

- **Secondary**

- Infections- Hep B, C, HIV, Malaria
- Miscellan: SLE, Sickle cell disease
- Drug induced: NSAIDS, Penicillamine

# Nephrotic Syndrome

- Most common between 1-12 years is Minimal Change Disease

- Others:
- Focal Segmental Glomerulosclerosis
- Mesangial Proliferative GN
- Membranous nephropathy

# Spot Urine protein/creatinine ratio

- Normal : < 30 mcg alb/mg creatinine
- Normal: < 0.2 in child > 2 years; < 0.5 in child 6 months to 24 months)
- Microalbuminuria : 30-300 mg alb/gm creatinine
- Proteinuria: spot prot/creat ratio 0.2 to 2
- Nephrotic syndrome: spot prot/cr ratio> 2

# Management of NS

- Non pharmacologic: low salt diet. No fluid restriction except if ARF or serum sodium < 125 mEq/L
- Pharmacologic:
- Steroids
- Others:
- Immunomodulators: Levamisole
- Steroid sparing: immunosupressives: Cyclosporin, Tacrolimus, Mycophenolate
- Also vitamin D + calcium

# Non pharmacological:

Fluids: restrict only if serum sodium < 125 or has ARF on top

Protein: Normal daily allowance

Sodium: restrict even when in remission

Fat : restrict fatty food

# Steroids

- Prednisone :
- First episode:  2 mg/kgm/day or 60 mg/$m^2$/day  x 4 weeks the 40 mg/$m^2$/day EOD in a single morning dose x 4 weeks  then stop
- May use iv methylprednisolone instead of oral steroids at the begining

- Steroid Sensitive
- Late Responder
- Steroid Resistant
- Frequent relapse
- Infrequent Relapser
- Steroid Dependent

# Indications for albumin infusion

- Scrotal/labial edema
- Hypovolemia
- Severe anasarca /cellulitis

- Precautions : if volume status is unknown, careful with albumin
- infusion/diuretics

# Indications for renal biopsy

- Atypical presenting features
- Age < 12 months >12 years
- Persistent hypertension or impaired renal function
- Gross Hematuria
- Low C3
- Hepatitis B or C positivity
- Steroid resistance

# Major Complications from disease

- Infection
- Hypovolemia
- Hypercoagulable state

# Safe doctor

- How to be a safe doctor when you assess a child with nephrotic syndrome?

# Infections in NS

- Peritonitis
- Cellulitis
- UTI

# Hypovolemia in NS

- History: risk factors include diarrhea, vomiting, sepsis, injudicious use of diuretics or herbals
- Get generalized abdominal pain

- PE: monitor capillary refil time, peripheral temperature, BP( orthostatic changes) pulse, wt

- Lab: increased Hgb, v low $FE_{Na}$

- Imaging

# Hypercoagulability in NS

- Precipitants( hypovolemia, diuretics )
- Be on the lookout for it

# Complications from steroids

- Growth
- Bone disease
- Posterior subcapsular cataract

- etc

# Immunizations

- For :
- Pneumococcus

- Varicella

- Influenza

# Conclusions

- Cause of edema in a child resides in the history and PE

- In case of periorbital swelling, ask for a urinalysis before diagnosing
- allergy

# Conclusions

- Thank you for listening