Nephrotic syndrome

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Objectives

- Definition
- Classification
- Clinical manifestations
- Complications
- Treatment

Case 1

เด็กชายอายุ 4 ปี บวมที่หนังตาและขา 2 ข้างมา 3 วัน

PE: BP 90/60 mm.Hg
Puffy eyelids
moderate ascites
Pitting edema of both legs

UA: protein 4+, no RBC

Salb 1.8 g/dL, cholesterol 300 mg/dL

Diagnosis?

Case 1

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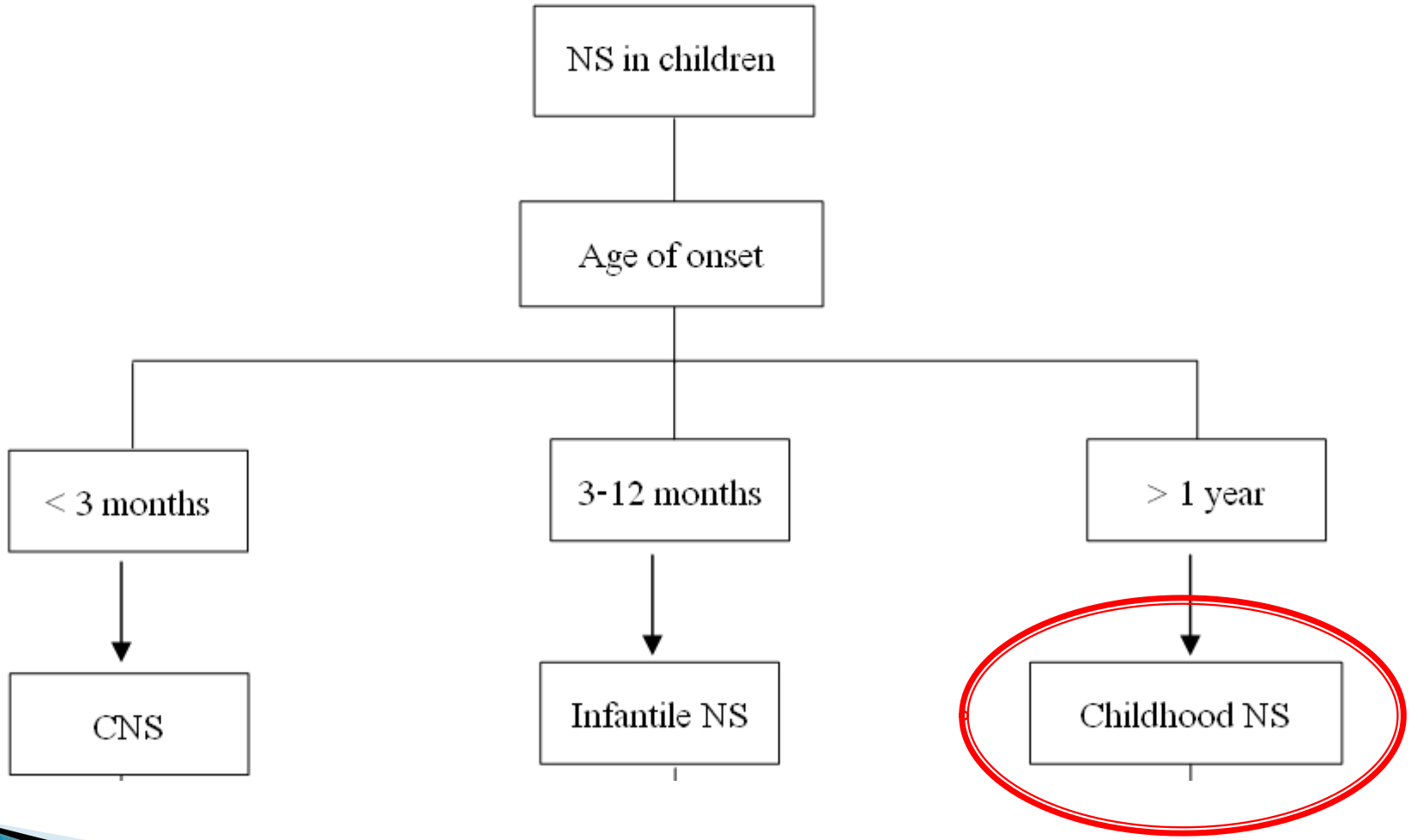
Criteria

- Generalize pitting edema
- Nephrotic range proteinuria***
  (>40 mg/m^2/hr)
- Hypoalbuminemia
- (Hypercholesterolemia)

Diagnosis: Nephrotic syndrome

Classification by age of onset

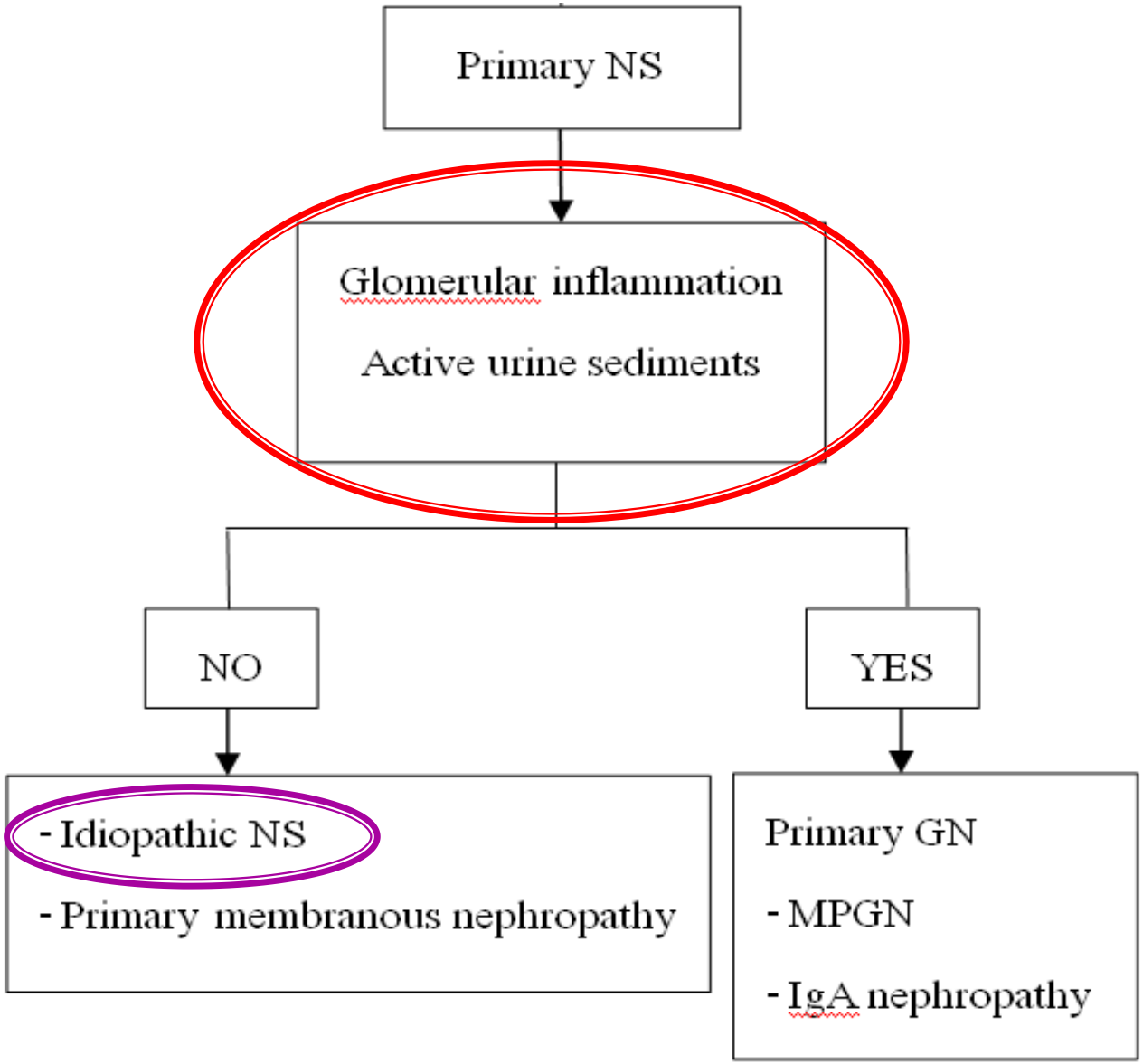


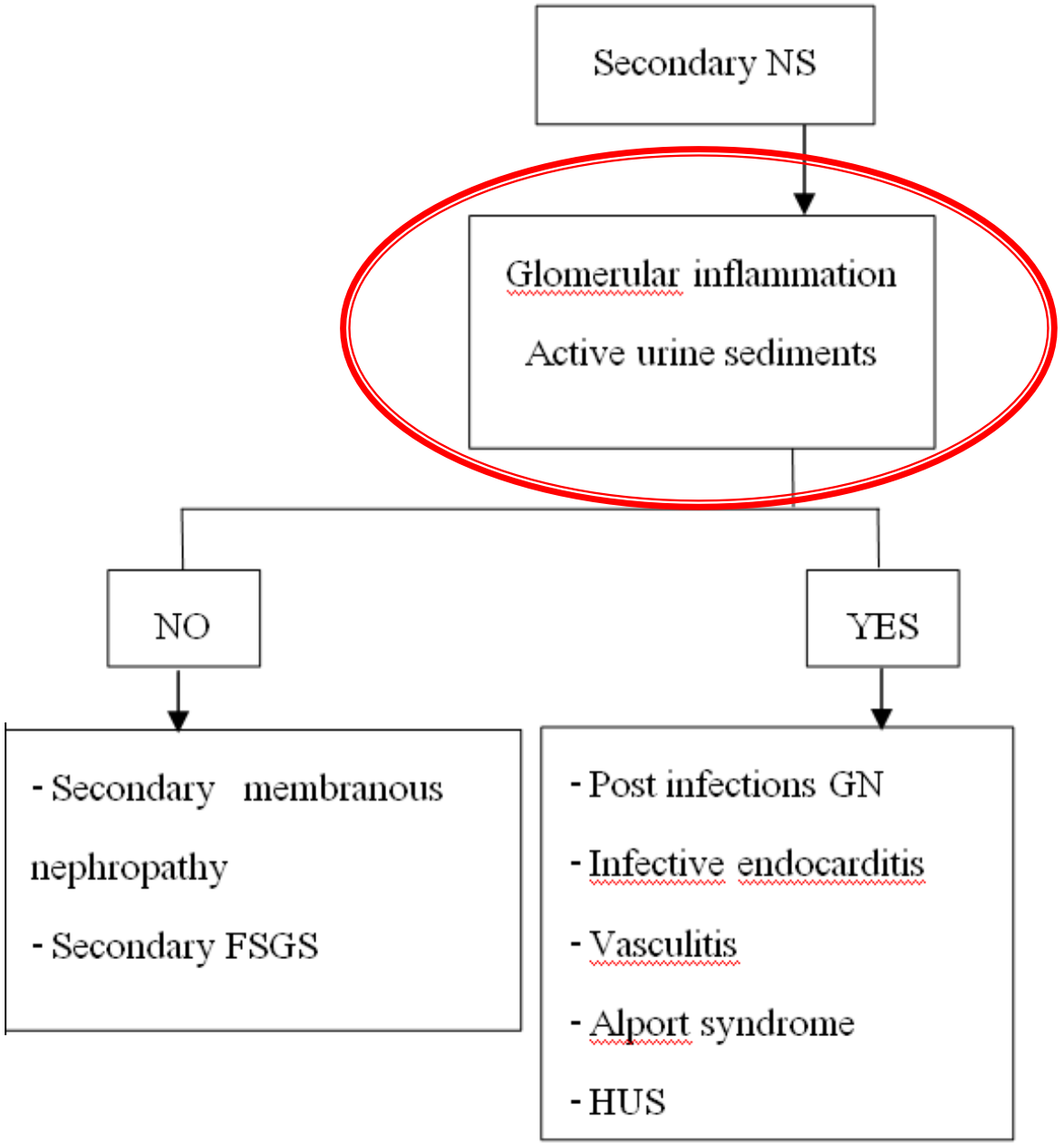
Childhood nephrotic syndrome

- Primary NS
- Secondary NS

Signs and symptoms of systemic disease

Glomerular inflammation
Urine sediments


Primary NS
Glomerular inflammation
Active urine sediments
NO
YES
- Idiopathic NS
- Primary membranous nephropathy
Primary GN
- MPGN
- IgA nephropathy


Secondary NS
Glomerular inflammation
Active urine sediments
NO
YES
- Secondary membranous nephropathy
- Secondary FSGS
- Post infections GN
- Infective endocarditis
- Vasculitis
- Alport syndrome
- HUS

Idiopathic NS: Classification

- Renal pathology
- Steroid responsiveness*

Renal pathology

1. MCNS (MCD)
2. FSGS
3. Diffuse mesangial proliferation (IgM nephropathy)

MCD

- Age of onset: 1-8 years
- No hypertension
- No renal failure
- No hematuria
- Steroid responsive NS
- Normal C_3

Case 1

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Further investigation?

Investigation

- Renal function: BUN, Cr
- Urine protein: UPCR, 24-hr urine
- Serum complement
- SLE work up
- Hepatitis B and C profiles
- Anti-HIV

Investigation

- Parasite
- TB
- Silent infections eg. Dental caries

TREATMENT?

OFFICIAL JOURNAL OF THE INTERNATIONAL SOCIETY OF NEPHROLOGY

SUPPLEMENT TO

kidney INTERNATIONAL

KDIGO 2021 Clinical Practice Guideline for the Management of Glomerular Diseases

VOLUME 100 | ISSUE 4S | OCTOBER 2021
www.kidney-international.org

KDIGO 2021

Cochrane Library

THE COCHRANE COLLABORATION®

Specific treatment: Initial Rx

- Prednisolone 60 mg/m^2/d OD (max 60 mg/d) x 4-6 wks
- 40 mg/m^2/d (max 40 mg/d) AD then tapering of the dose in 2-5 mo
- In the past: total duration : 3 to 6-7 mo

(KDIGO 2021: Total duration: 8-12 wk vs. 16-24 wk in age 1 to<4-6 yr)

Supportive treatment : Diet

- ↑ protein 30-40% (high biological value)
- ↓ salt
- ↓ water in SNa^+ <125 mEg/L
- ↓ saturated fat
- ↓ glucose
- ↑ Calcium/Vit D

Treatment : Hypertension

- ACEI or ARB
- CCB or β-blockers

Indication of albumin infusion

- Anasarca
- Severe genital edema
- Hypotension
- Pre-renal AKI

Human albumin 0.5-1.0 g/kg/d + furosemide 1-2 mg/kg/dose IV drip in 4 hr

Case 2

- เด็กชายอายุ 8 ปี เมื่อ 2 ปีก่อนมีอาการบวมที่หนังตาและขา 2 ข้าง ตรวจพบ urine protein 4+, Salb 1.8 g/dL, cholesterol 300 mg/dL
- ได้รับการวินิจฉัยว่าเป็น nephrotic syndrome
- ให้การรักษาด้วย prednisolone 5 tab BID 4 wk
- จากนั้น urine protein จะกลับมา + หากลดยา prednisolone จึงได้ยา prednisolone 3-6 tab OD มาตลอด 2 ปี
- ล่าสุดได้เพิ่มยา azathioprine 2 เดือนก่อน refer มา
- ระหว่าง refer ผู้ป่วยหกล้มขณะก้าวขึ้นบันได มีแผลถลอกและฟกช้ำที่ขา 2 ข้าง

Case 2

- PE: Cushingoid appearance (moon face, buffalo hump, striae, truncal obesity, proximal M. weakness, hirsutism)

  BP 130/90 mm.Hg

  Pitting edema 1+ of both legs

  Abrasion wounds and ecchymosis at both legs
- UA: protein 3+, no RBC
- BUN 18, Cr 0.9 mg/dL
- Salb 2.4 g/dL, cholesterol 350 mg/dL

Definition of steroid response

- Remission: Uprot <1+ or <4 mg/m^2/hr for ≥ 3 days
- Relapse: Uprot ≥3+ or >40 mg/m^2/hr for ≥ 3 days
  - Infrequent relapser
  - Frequent relapser (≥2/6 mo, ≥4/1 yr)
- Steroid dependence
- Steroid resistance: 4 weeks
- Secondary SRNS

Time to response

- Clinical improvement in 10-15 days

Remission

- 90% in 4 weeks
- <10% in 6-8 weeks (Late responder)
- Small number in 8-12 weeks

Investigation

- Renal function: BUN, Cr
- Urine protein: UPCR, 24-hr urine
- Serum complement
- SLE work up
- Hepatitis B and C profiles
- Anti-HIV

SECONDARY CAUSE

Consider kidney biopsy

Renal biopsy

- Age <1 yr, >12 yr
- Macroscopic hematuria
- Initial hypertension
- Persistent renal insufficiency
- Steroid resistance
- Before calcineurin inhibitors therapy

Treatment of relapse: Infrequent relapser

- Prednisolone 60 mg/m^2/d (max 60mg/d) until 3 days negative proteinuria
- 40 mg/m^2 AD (max 40-60 mg) x 4 wks
- Stop (or slowly decrease dose)

Treatment of relapse: Frequent relapser or dependence

- Prednisolone 60 mg/m^2/d until 3 days negative proteinuria
- Continue the same dose AD then slowly decrease dose to the lowest threshold dose AD (daily dose if AD dose is ineffective)
- Duration at least 3 mo
- Adjust to daily dose of prednisolone 0.5 MKD if URI (5-7 d) or infection occurs
- Add the second drug if steroid toxicity

Alternative treatments

- Alkylating agents: cyclophosphamide, chlorambucil
- Calcineurin inhibitors: cyclosporine, tacrolimus
- Mycophenolate
- (Rituximab)

×Azathioprine

Treatment of steroid resistant NS (SRNS)

- Kidney biopsy
- [Genetic testing (esp. FH+, syndromic features)]
- Add ACEI/ARB if no contraindication
- Add CNI (cyclosporine, tacrolimus)
- Consider MMF if failure to CNI * 6 mo

Complications

Complications

Infection : peritonitis

(most common) from *S.pneumoniae, E.coli, S.bovis, H.influenza,* gram negative bacteria

Complications

Thromboemboli :

- hypercoagulable state
- hypovolemia
- Immobilization
- infection

Complications

- Hypovolemia:

  abdominal pain, low BP, AKI
- Hypocalcemia
- Coronary vessels complication

References

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