Children with Kidney Disease

Dr. Laila Sauduadua
Paediatric Consultant
(Nephrology Interest)

Presentation Outline

- Acute Kidney Injury/ AKI (Definitions)
- Chronic Kidney Disease (Definitions)
- Incidence & Etiology
- CWMH Experience: Etiology (common)
  - Nephrotic Syndrome
  - AGN (PSGN)
  - SLE
- Investigations
- Managements

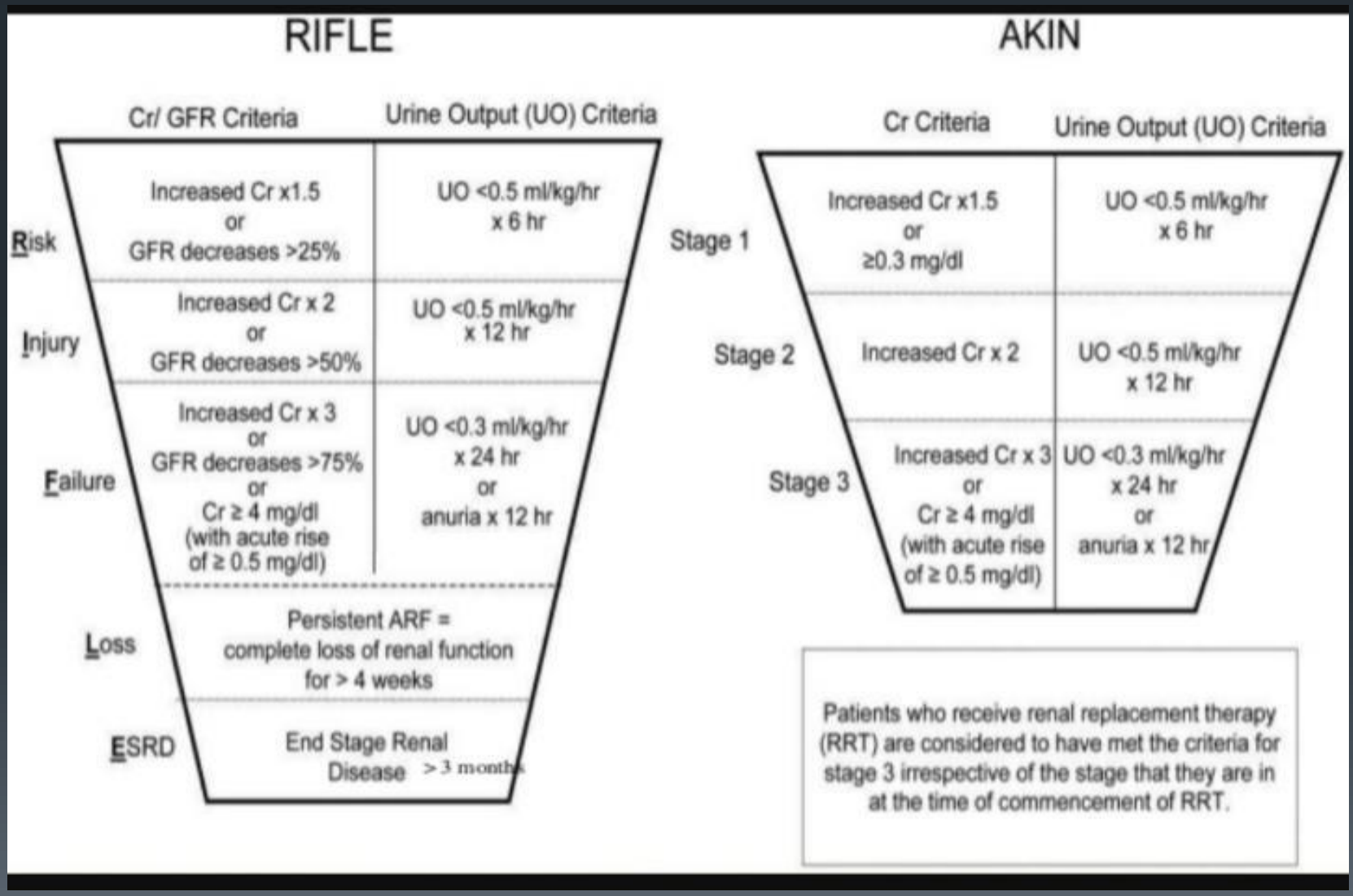
Acute Kidney Injury: Definition

- Rapid deterioration of renal function resulting in retention of nitrogenous wastes and inability to regulate fluid and electrolyte homeostasis

- Defining AKI: -35 definitions in clinical studies (1)
  -Standardized & validated definition: (KDIGO classification) pRIFLE Criteria proposed
  -Later: AKIN started classifying using RIFLE, but not standardized and validated (2)

(1) & (2); utdol

Defining AKI



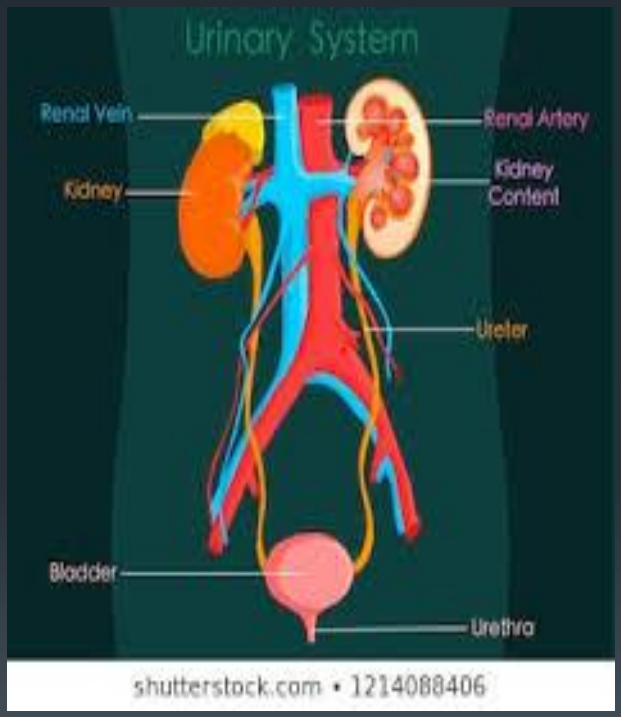
Incidence: AKI

- Precise incidence is unknown
- 40% PICU (Sepsis & multi-organ failure)
- 4-6% General wards
- AGE with Dehydration & Shock (Rotavirus)
- Children with CHD on anti-failures
- AGN (PSGN)/ Nephrotic Syn./ HUS
- Post renal causes are rare

AKI: Etiology

- Pre-renal
- Renal
- Post renal

- Both pre and post renal AKI are potentially reversible in early stages, but if prolonged. Can cause renal parenchymal damage



Chronic Kidney Disease: CKD

- Irreversible loss of renal function, and or reduction of kidney function that generally continues to progress over time (that eventually requires RRT)

- KDIGO 2012 clinical criteria (3): fulfilment of one of the following criteria:

- 1.GFR <60mL/min/1.73m2 x >3 months with implications for health regardless of whether CKD markers are present
- 2. GFR >60mL/min/1,73m2 accompanied with evidence of structural damage

- Staging: KDIGO Staging (Cause of disease, GFR, presence and rate of albumin excretion)

  *Assists in management by risk stratifying for progression and complications of CKD

Grades CKD

- G1 – Normal GFR (≥90 mL/min per 1.73 m^2)
- G2 – GFR between 60 and 89 mL/min per 1.73 m^2
- G3a – GFR between 45 and 59 mL/min per 1.73 m^2
- G3b – GFR between 30 and 44 mL/min per 1.73m^2
- G4 – GFR between 15 and 29 mL/min per 1.73 m^2
- G5 – GFR of <15 mL/min per 1.73 m^2 (kidney failure)

CWMH Experience/ Challengers

- No studies locally on Renal Disease (Strengthen)

- Observation: Same as other Developing countries
  -PICU: Sepsis with multi-organ involvement (Dengue with AKI (PD), appendicitis with Nephrotic Syndrome with AKI (had HD). Sepsis had complications Gastric ulcers with Hemorrhage (youngest that had HD)

  -Wards: Nephrotic Syndrome (PICU Guideline)
  AGN (PSGN)
  SLE
  UTI/ Pyelonephritis
  Surgical cases (obstructive uropathy) – 2019 1st Paeds Renal Transplant

- PICU CPG (Paeds. CSN Launched 2019) & on HOST app (3 Renal Topics)

- Friends of Paeds: -Consult Starship Nephrologist Dr. William Wong &
  -Dr. Amrish (Renal Biopsies & supplies PD & HD)

Nephrotic Syndrome

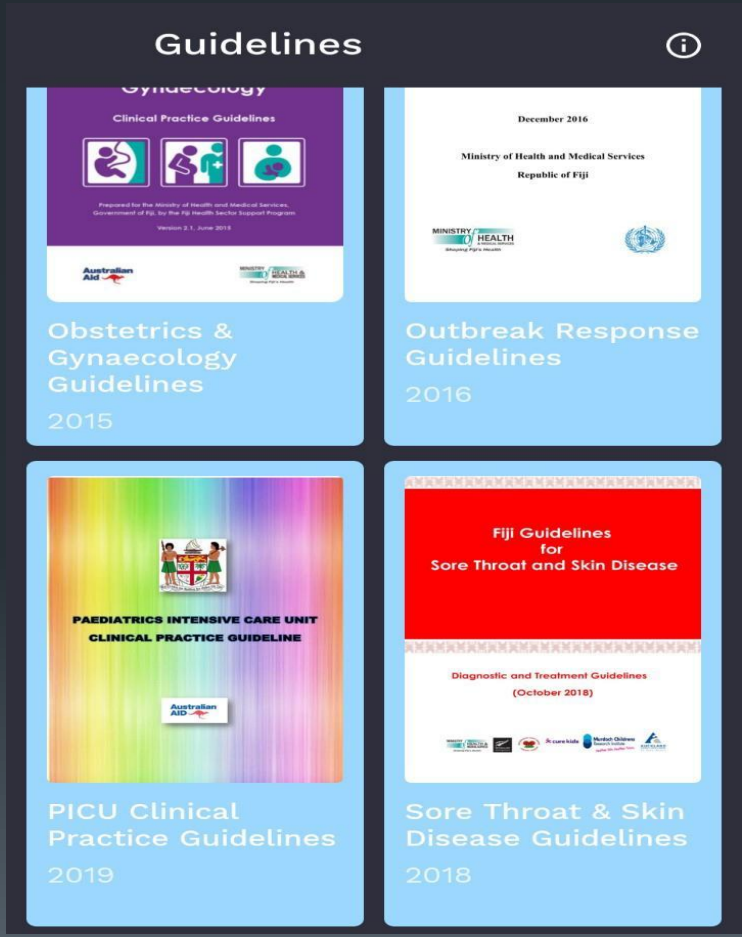
- Pathology:

-significant proteinuria

-hypoalbuminemia

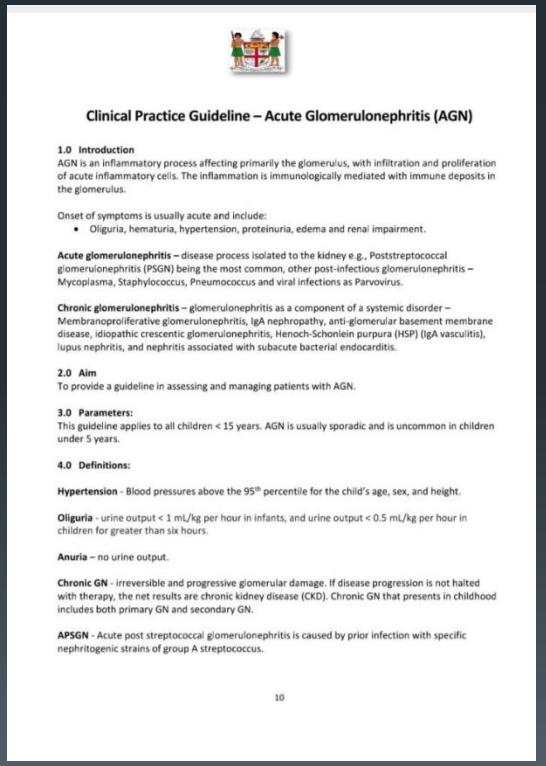
-edema

-high cholesterol



Acute Glomerulonephritis

- PSGN (post streptococcal infections: Commonest)
- Other causes: Bacteria/ Virus etc.
- Pathology: Inflammation (immunologically mediated) primarily affecting the glomerulus



Clinical Practice Guideline – Acute Glomerulonephritis (AGN)

1.0 Introduction
AGN is an inflammatory process affecting primarily the glomerulus, with infiltration and proliferation of acute inflammatory cells. The inflammation is immunologically mediated with immune deposits in the glomerulus.

Onset of symptoms is usually acute and include:
- Oliguria, hematuria, hypertension, proteinuria, edema and renal impairment.

Acute glomerulonephritis – disease process isolated to the kidney e.g., Poststreptococcal glomerulonephritis (PSGN) being the most common, other post-infectious glomerulonephritis – Mycoplasma, Staphylococcus, Pneumococcus and viral infections as Parvovirus.

Chronic glomerulonephritis – glomerulonephritis as a component of a systemic disorder – Membranoproliferative glomerulonephritis, IgA nephropathy, anti-glomerular basement membrane disease, idiopathic crescentic glomerulonephritis, Henoch-Schonlein purpura (HSP) (IgA vasculitis), lupus nephritis, and nephritis associated with subacute bacterial endocarditis.

2.0 Aim
To provide a guideline in assessing and managing patients with AGN.

3.0 Parameters:
This guideline applies to all children < 15 years. AGN is usually sporadic and is uncommon in children under 5 years.

4.0 Definitions:

Hypertension - Blood pressures above the 95th percentile for the child's age, sex, and height.

Oliguria - urine output < 1 mL/kg per hour in infants, and urine output < 0.5 mL/kg per hour in children for greater than six hours.

Anuria – no urine output.

Chronic GN - irreversible and progressive glomerular damage. If disease progression is not halted with therapy, the net results are chronic kidney disease (CKD). Chronic GN that presents in childhood includes both primary GN and secondary GN.

APSGN - Acute post streptococcal glomerulonephritis is caused by prior infection with specific nephritogenic strains of group A streptococcus.

10

Systemic Lupus Erythematosus (SLE)

- A chronic autoimmune inflammatory disease of unknown cause (utdol) and can take up to 10 years to evolve
- 2 criteria to Diagnose: 4/11 (ACR) & 4/17 (SLICC)
- Severe forms disease: Nephritis (Biopsy to stage)
  CNS Lupus
- Treatment: -depends on grade mild, moderate, severe
  -Hydroxychloroquine +/- Steroids
  (Induction & Maintenance phase)

General Investigations

- FBC UECs
- ESR ASOT Serology
- ANA DsDNA C3 C4
- Urine (MCS), Urine Dipstix. 24hr protein, ACR
- Radiology: USS MCU IVP CT scans & MRI
- Drug Levels

Management

- Early identification of AKI to attain normal functions and prevent development of CKD and preserve renal function whilst maintaining growth and development in children
- Infection: Treat promptly
- Diagnosing early and referring (an important component)
- Treatment: Tailored to each disease entity
- Complex cases: Involves MDT approach
  -PD
  -HD

Summary

- Kidney Disease has an impact in children including Developing countries
- AKI & CHD
- CWMH Experience & Challenges
- PICU CPG & some common etiology
- Investigations & Management