



Adult Management of Renal Function Decline

Ronald D. Perrone, MD

Disclosure of Interests

- Otsuka: research support, Consultant
- Sanofi-Genzyme: Consultant
- Novartis: Consultant
- Kadmon: Consultant
- Misubishi-Tanabe: Consultant
- UpToDate: Section Editor, Cystic Kidney Disease
- US Dept. of Defense: research support

KDIGO



Definition of Chronic Kidney Disease

CKD is defined as abnormalities of kidney structure or function, present for >3 months, with implications for health.

CKD is classified based on cause, GFR category, and albuminuria category (CGA).



Prognosis by GFR and Albuminuria

Prognosis of CKD by GFR
and Albuminuria Categories:
KDIGO 2012

				Persistent albuminuria categories Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30-300 mg/g 3-30 mg/mmol	>300 mg/g >30 mg/mmol
GFR categories (mL/min/ 1.73 m ²) Description and range	G1	Normal or high	≥90	Green	Yellow	Orange
	G2	Mildly decreased	60-89	Green	Yellow	Orange
	G3a	Mildly to moderately decreased	45-59	Yellow	Orange	Red
	G3b	Moderately to severely decreased	30-44	Orange	Red	Red
	G4	Severely decreased	15-29	Red	Red	Red
	G5	Kidney failure	<15	Red	Red	Red

Green: low risk (if no other markers of kidney disease, no CKD); Yellow: moderately increased risk;
Orange: high risk; Red, very high risk.

3.1 Prevention of CKD Progression

Treatment is focused on management of blood pressure and proteinuria, (BP goals have changed since KDIGO-CKD 2012)

3.1.5: We suggest that in both diabetic and non-diabetic adults with CKD and with urine albumin excretion of ≥ 30 mg/24 hours (or equivalent*) whose office BP is consistently > 130 mm Hg systolic or > 80 mm Hg diastolic be ***treated with BP-lowering drugs*** to maintain a BP that is consistently ≤ 130 mm Hg systolic and ≤ 80 mm Hg diastolic. (2D)

3.1.7: We recommend that ***an ARB or ACE-I*** be used in both diabetic and non-diabetic adults with CKD and urine albumin excretion > 300 mg/24 hours (or equivalent*). (1B)



3.1.19 Salt Intake

Salt intake

3.1.19: We recommend lowering salt intake to < 90 mmol (< 2 g) per day of sodium (corresponding to 5 g of sodium chloride) in adults, unless contraindicated (see rationale). (1C)

3.1.19.1: We recommend restriction of sodium intake for children with CKD who have hypertension (systolic and/or diastolic blood pressure $> 95^{\text{th}}$ percentile) or prehypertension (systolic and/or diastolic blood pressure $> 90^{\text{th}}$ percentile and $< 95^{\text{th}}$ percentile), following the age-based Recommended Daily Intake. (1C)

3.1.19.2: We recommend supplemental free water and sodium supplements for children with CKD and polyuria to avoid chronic intravascular depletion and to promote optimal growth. (1C)

Treatment of Other Complications

Anemia

Hyperuricemia

CKD Metabolic Bone Disease

Acidosis

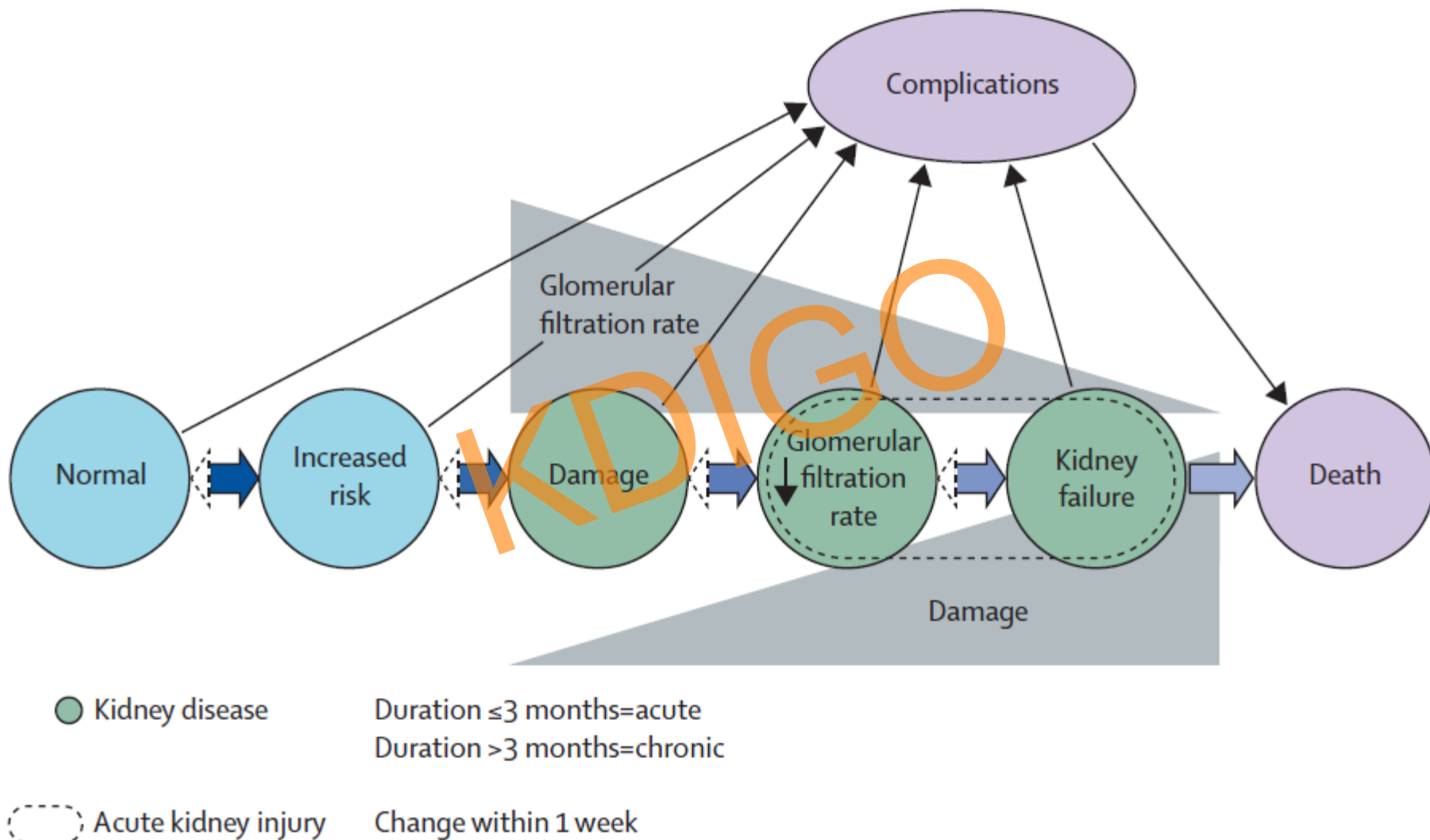
Hyperkalemia

Cardiovascular Disease Prevention

KDIGO



CKD progression



What About Uncommon Diseases?

Frequently not associated with heavy proteinuria in childhood

What does the patient look like in adulthood?

- likely reduced GFR

- likely to have many of the metabolic complications of CKD

- planning for renal replacement therapy will be important



Potential Framework for Consideration

Tubulopathies/channelopathies

Progression of renal injury with development of glomerulosclerosis, irrespective of initial cause

Primary glomerular involvement with albuminuria



Tubulopathies and Channelopathies

Not initially associated with hypertension or albuminuria, although proximal tubulopathy may exhibit albuminuria due to impaired reabsorption rather than glomerular injury

Focus of treatment on managing electrolyte disturbance, polyuria, salt loss, and correcting specific metabolic defect (Cystinosis)

Treatment of hypertension may not require RAAS blockade; RAAS blockade could be harmful

Management of other complications of CKD



Progression of Tubulopathy/ Channelopathy

Development of hypertension and albuminuria, consistent with glomerulosclerosis

Treatment of hypertension and albuminuria with RAAS blockade, adjusted to reflect channel dysfunction and resulting electrolyte abnormalities.

Duration of treatment to correct specific metabolic defect?

Management of other complications of CKD



Glomerular Involvement: Albuminuria

Initial manifestation with albuminuria, development of hypertension, consistent with glomerular involvement

Treatment of hypertension and albuminuria with RAAS blockade

What is the duration of treatment to correct specific metabolic defect?
(Fabry)

Management of other complications of CKD



Literature is Scant

Absence of controlled trials, primarily retrospective or experience based

KDIGO



Transition of Care

Care of adolescent can be challenging

-lack of compliance

-rebellion

This is a difficult time to transition care to adult nephrology, particularly if this involves switching institutions

What is the optimal support system?



What is the Optimal Method for Supporting Patient and Family?

Managing the transition from adolescence to adult care

Managing the transition to ESRD, potential live donor transplantation

KDIGO



Summary

There is a lack of literature regarding the management of rare pediatric kidney diseases in adulthood

Standard clinical practices (RAAS blockade, salt restriction) may not be appropriate

KDIGO

