

KP Hawaii Algorithm for Management of Patients with Chronic Kidney Disease in Primary Care

CHRONIC KIDNEY DISEASE
 Adults with CKD GFR <60mL/min/1.73m² (as estimated by 4-variable MDRD formula) or persistent proteinuria without guideline exclusions (See Box A)

ABBREVIATIONS:
 CKD: Chronic Kidney Disease
 GFR: glomerular filtration rate
 LVH: left ventricular hypertrophy
 UPr/Cr: urinary protein to creatinine ratio

**BOX A
 GUIDELINE EXCLUSIONS**

- Reversible disease (e.g. acute renal failure)
- Terminal illness
- Very advanced age (>85)

Cardiovascular risk
 Manage per CMI guidelines

Diabetes
 Manage per CMI guidelines

Update Labs at least annually
 (lytes, Cr and GFR, microAlb/Cr or UPr/Cr, Hgb)

BLOOD PRESSURE

- Target: <140/90 mmHg in absence of proteinuria
- Use caution in lowering BP when diastolic BP is already <70
- Lowering BP reduces cardiovascular risk, proteinuria and progression of kidney disease.

**BOX B
 REFERRAL GUIDELINES**

- Patient at high risk because of decreased GFR or proteinuria that persists on repeat measurement:
 - High risk for ESRD*
 - Heavy proteinuria (UPr/Cr >4) refractory to intervention by PCP, even with normal GFR
- Unclear diagnosis, especially in young patients.
- Potentially unstable disease, such as lupus nephritis
- Refractory hypertension (failure to achieve goals despite 4-5 drug regimen)
- Clear evidence of rapid progression, with annualized loss of GFR >10mL/min

*Includes:
 1. GFR <20
 2. GFR <40, UPr/Cr ≥ 2

Refer to Nephrology? (See Box B)

Monitor

PROTEINURIA

- BP Target <130/80 if UPr/Cr ratio >0.5
- Target UPr/Cr ratio <1.0
- If UPr/Cr ≥0.3, use ACEI or ARB, unless nondiabetic normotensive with UPr/Cr <1.0.
- When used, ACEIs and ARBs should be titrated up to moderate to high doses (e.g., lisinopril 40 mg bid, losartan 100 mg q day) and may be combined as needed, if significant proteinuria present.
- ACEIs and ARBs should not be combined in the absence of proteinuria.

MICROALBUMINURIA

- For pts with diabetes and CKD with microalbuminuria, the use of an ACEI/ARB delays the appearance of overt proteinuria, but evidence of long-term benefit is limited.

**BOX C
 MEDICATIONS**

AVOID IF GFR <30:

- Biphosphonates (alendronate, risedronate, zoledronic acid)
- Hydrochlorothiazide
- Gadolinium

AVOID IF GFR <60:

- Glyburide
- Meperidine
- Metformin
- Nitrofurantoin
- Phenazopyridine
- Probenecid

USE WITH CAUTION:
 Morphine sulfate, NSAIDs, Spironolactone

ADJUST FOR CKD:
 Allopurinol, Antibiotics (acyclovir, valacyclovir, imipenem), Digoxin, Enoxaparin, Metoclopramide, Phenytoin

Blood pressure

ACEIs or ARBS

- ACEI or ARB can be continued if GFR decline is <30% from baseline or creatinine increase is <30% and serum potassium is ≤5.5 mEq/L.
- When titrating doses, measure electrolytes and Cr/GFR upon initiation or in 2-4 weeks.

Proteinuria (see Box D)

DIURETICS

- Diuretics are reasonable antihypertensive meds in many pts with CKD.
- When titrating doses, measure electrolytes and Cr/GFR upon initiation or in 2-4 weeks.
- Use thiazides when GFR ≥30.
- Use loop diuretics when GFR <30.
- Potassium-sparing diuretics should be used with caution when GFR <30 or with ACEIs or ARBs.

Anemia

Refer to:
 Anemia Management using EPO for Patients with CKD, Hawaii Clinical Practice Guidelines

Meds

See Box C

- Medications to avoid depending on GFR
- Medications to use with caution in CKD
- Medications safe to use but with adjustment for CKD

Diet

- Sodium intake <2.4 g/d
- Avoid high protein intake
- Consider modest protein restriction: (0.8-1.0g/kg/day) in consultation with dietitian
- May require potassium and/or phosphorus restriction
- Consider referral to dietitian, especially with multiple co-morbidities

**BOX D
 ASSESSING PROTEINURIA**

- UPr/Cr approximates a 24 hour urine protein, in grams
- Urine microAlb/Cr is more sensitive for lower level proteinuria. Very roughly, microAlb/Cr divided by 500 gives the 24 hour urine protein in grams
- UPr/Cr levels: <0.3 is normal, while ≥ 3.5 is nephrotic-range