VA/DoD CLINICAL PRACTICE GUIDELINE

Management of Chronic Kidney Disease in Primary Care

KEY ELEMENTS OF THE CKD GUIDELINE

- Diagnostic criteria and identification of early disease.
- Identification of susceptibility factors (adult patients at increased risk for developing CKD).
- Identification of progression factors (adult patients at high risk for worsening kidney damage and subsequent loss of kidney function).
- Prevention of conditions that exacerbate chronic kidney disease.
- Evaluation of patients with kidney disease (estimate of kidney damage).
- Slowing the progression of CKD.
- Management of comorbidities.
- Indication for consultation and referral to a nephrologist.
- Outline of patient education and preparation for kidney replacement therapy.


**Diagnostic criteria and identification of early disease.**

- Systemic illness (e.g., human immunodeficiency virus (HIV), systemic lupus erythematosus, multiple myeloma)
- History of acute kidney injury (AKI) (e.g., acute tubular necrosis, urinary tract obstruction, interstitial nephritis)
- Elderly patients
- Races and ethnicities associated with increased risk (e.g., African Americans, Hispanics, Native Americans)

**Management of comorbidities.**

- **Systemic disorders:** Heart failure, CVD, diabetes, asthma, systemic lupus erythematous, multiple myeloma
- **Drug interventions:** Antihypertensive, anti-diabetic, anti-rheumatic medications
- **Alimentary conditions:** Anemia, osteoporosis, malnutrition
- **End stage renal disease:** Dialysis, transplantation

**Diagnosis of kidney disease.**

- **GFR (mL/min/1.73m2)**
- **Albuminuria**
- **Proteinuria**

**Determination of CKD stage.**

- Stages of CKD: G1 (≥ 90), G2 (60–89), G3 (45–59), G4 (30–44), G5 (≤ 30)

**Indications for nephrology consultation.**

- Presence of risk factors for CKD progression
- Rapid decline in GFR (>5 mL/min/1.73 m2 per year)
- eGFR < 30 mL/min/1.73 m2
- Complications of CKD (e.g., hyperkalemia, hyperphosphatemia)
- Nephrotic range of proteinuria (>3.5 grams/24 hours)
- Rapid loss of kidney function

**Strategies to Slow Progression.**

- Management of comorbidities
- Control of hypertension
- Control of diabetes
- Control of hyperlipidemia
- Avoidance and management of proteinuria
- Avoidance of nephrotoxic drugs
- Management of anemia
- Management of hyperphosphatemia
- Management of hyperparathyroidism
- Management of metabolic acidosis
- Management of fluid retention
- Management of pain

**Treatments for CKD.**

- **Nonpharmacological interventions:** Diet, exercise, smoking cessation
- **Pharmacological interventions:** ACE inhibitors, ARBs, diuretics, beta-blockers, statins, calcium channel blockers, renin-angiotensin-aldosterone system inhibitors, phosphorous binders, erythropoietin stimulating agents, iron supplements, vitamin D analogs, calcium and phosphorus inhibitors

**Diabetes, hypertension, other end organ disease (e.g., CHF), or personal or family history of kidney disease.**

- Systemic illness (e.g., human immunodeficiency virus (HIV), systemic lupus erythematosus, multiple myeloma)
- History of acute kidney injury (AKI) (e.g., acute tubular necrosis, urinary tract obstruction, interstitial nephritis)
- Elderly patients
- Races and ethnicities associated with increased risk (e.g., African Americans, Hispanics, Native Americans)

**Management of comorbidities.**

- Systemic disease progression (e.g., CHF, diabetes, asthma, systemic lupus erythematosus, multiple myeloma)
- Drug interventions (e.g., antihypertensives, anti-diabetics, anti-rheumatics)
- Alimentary conditions (e.g., anemia, osteoporosis, malnutrition)
- End stage renal disease (e.g., dialysis, transplantation)

**Diagnosis of kidney disease.**

- GFR (mL/min/1.73m2)
- Albuminuria
- Proteinuria

**Determination of CKD stage.**

- Stages of CKD: G1 (≥ 90), G2 (60–89), G3 (30–44), G4 (15–29), G5 (≤ 15)

**Indications for nephrology consultation.**

- Presence of risk factors for CKD progression
- Rapid decline in GFR (>5 mL/min/1.73 m2 per year)
- eGFR < 30 mL/min/1.73 m2
- Complications of CKD (e.g., hyperkalemia, hyperphosphatemia)
- Nephrotic range of proteinuria (>3.5 grams/24 hours)
- Rapid loss of kidney function

**Strategies to Slow Progression.**

- Management of comorbidities
- Control of hypertension
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- Management of fluid retention
- Management of pain
### Table 7: Recommended Dosage for ACEIs and ARBs in patients with CDK 1,2

<table>
<thead>
<tr>
<th>Drug</th>
<th>Usual Dose Range</th>
<th>Comments/Cautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benazepril</td>
<td>10-40 mg divided once or twice daily</td>
<td>Start with lower or less frequent doses in patients with CKD (except fosinopril or partial compensation by heparin) or in patients currently being treated with a diuretic.</td>
</tr>
<tr>
<td>Captopril</td>
<td>25-110 mg divided 2-3 times daily (one hour before meals) on an empty stomach</td>
<td>Use with caution in patients with renal artery stenosis. Monitor potassium and renal function (e.g., one- to two-weeks after initiation or dose adjustment).</td>
</tr>
<tr>
<td>Enalapril</td>
<td>5-40 mg divided once or twice daily</td>
<td>Concomitant therapy with potassium-sparing diuretics, potassium supplements, and/or additional RAAS blockers may result in hyperkalemia.</td>
</tr>
<tr>
<td>Fosinopril 10-40 mg once daily</td>
<td>Monitor for the potential risk for fetal morbidity and mortality in patients taking an ACEI during pregnancy. It is recommended that therapy be discontinued as soon as a woman becomes pregnant, alternate therapy should be considered.</td>
<td></td>
</tr>
<tr>
<td>Lisinopril</td>
<td>10-40 mg once daily</td>
<td>Contraindicated in patients with a history of angioedema on an ACEI.</td>
</tr>
<tr>
<td>Moexipril</td>
<td>7.5-30 mg divided once or twice daily (one hour before meals, on an empty stomach)</td>
<td>Use with caution in patients with a history of angioedema on an ACEI due to the potential risk of fetal morbidity and mortality in patients taking an ACEI during pregnancy. It is recommended that therapy be discontinued as soon as a woman becomes pregnant, alternate therapy should be considered.</td>
</tr>
<tr>
<td>Perindopril</td>
<td>4-16 mg divided once or twice daily</td>
<td>Use with caution in patients with renal artery stenosis. Consider lower doses in patients with intravascular volume depletion (e.g., patients currently being treated with a diuretic).</td>
</tr>
<tr>
<td>Quinapril</td>
<td>10-40 mg divided once or twice daily</td>
<td>Contraindicated in patients with a history of angioedema on an ACEI.</td>
</tr>
<tr>
<td>Ramipril</td>
<td>2.5-20 mg divided once or twice daily</td>
<td>Use with caution in patients with intravascular volume depletion (e.g., patients currently being treated with a diuretic).</td>
</tr>
<tr>
<td>Trandolapril</td>
<td>1-4 mg once daily</td>
<td>Use with caution in patients with intravascular volume depletion (e.g., patients currently being treated with a diuretic).</td>
</tr>
</tbody>
</table>

### Table 8: Select Medications Requiring Dose Adjustments or to be Used with Caution in Patients with CKD 1,2,3

<table>
<thead>
<tr>
<th>Drug</th>
<th>Usual Dose Range</th>
<th>Comments/Cautions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angiotensin II Receptor Blockers (ARBs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Azilsartan</td>
<td>80 mg once daily</td>
<td>Consider lower doses in patients with intravascular volume depletion (e.g., patients currently being treated with a diuretic).</td>
</tr>
<tr>
<td>Candesartan</td>
<td>8-32 mg once daily</td>
<td>Use with caution in patients with renal artery stenosis. Monitor potassium and renal function after initiation.</td>
</tr>
<tr>
<td>Eprosartan</td>
<td>400-800 mg divided once or twice daily</td>
<td>Concomitant therapy with potassium-sparing diuretics, potassium supplements, and/or additional RAAS blockers may result in hyperkalemia.</td>
</tr>
<tr>
<td>Irbesartan</td>
<td>150-300 mg once daily</td>
<td>Boxed Warning: due to the potential risk for fetal morbidity and mortality in patients taking an ARB during pregnancy, it is recommended that therapy be discontinued as soon as a woman becomes pregnant, alternate therapy should be considered.</td>
</tr>
<tr>
<td>Losartan</td>
<td>25-100 mg divided once or twice daily</td>
<td>Use with caution in patients with renal artery stenosis. Consider lower doses in patients with intravascular volume depletion (e.g., patients currently being treated with a diuretic).</td>
</tr>
<tr>
<td>Olmesartan</td>
<td>20-40 mg once daily</td>
<td>Use with caution in patients with a history of angioedema on an ACEI.</td>
</tr>
<tr>
<td>Telmisartan</td>
<td>20-80 mg once daily</td>
<td>An ARB may be considered in patients unable to tolerate an ACEI due to cough.</td>
</tr>
<tr>
<td>Valsartan</td>
<td>160-520 mg once daily</td>
<td></td>
</tr>
</tbody>
</table>

*Note this is not a comprehensive list, consult individual product information or alternate sources for further instructions and/or precautions in patients with kidney function impairment.*