A Primary Care Approach to Managing CKD Complications

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No Relationships to Disclose
Disclosure

- **Sandra Taler, MD** has no financial relationships with commercial interest(s).
Learning Objectives

• Identify strategies for the management of complications associated with CKD.
Self Assessment Questions

• 1. Vitamin D3 is the preferred vitamin D form to achieve normal serum vitamin D levels
  o a. True
  o b. False

• 2. In which CKD Stage do most of the complications of Kidney Failure start?
  o Stage A
  o Stage 1
  o Stage 3
  o Stage 5
Steps to CKD Patient Care

1. Does the patient have CKD?
2. Assess GFR, albuminuria
3. Determine etiology
4. Assess for evidence of progression
5. Assess for associated complications
6. Patient education
7. Assess life expectancy and patient wishes for dialysis/transplantation
Complications of Kidney Failure Start in Stage 3 and Progress

- Malnutrition
- Bone Disease (Brittle bones and fractures)
- Fluid overload (Water overload)
- Acid Base Imbalance (Acidic Blood, Electrolyte Abnormalities)
- Anemia/blood loss (Decrease production of red blood cells)
- Hypertension
- Cardiac Disease
- Vascular Disease
Anemia in CKD

• ESA usually not required for nephrogenic anemia until late CKD 4/CKD 5
• Diagnostic workup of anemia is particularly important if severity of anemia is disproportionate to CKD staging
• Appropriate iron supplementation is needed for ESA to be effective
• Initiate iron therapy if TSAT ≤ 30% and ferritin ≤ 500 ng/mL (IV iron for dialysis, oral for non-dialysis CKD)
• Individualize ESA therapy – Start at Hb <10 g/dl, and maintain Hb <11.5 g/dl. Ensure adequate iron stores.
• Avoid transfusion in transplant candidates – if transfuse, use leukocyte filter to reduce HLA sensitization

ESA: Erythropoiesis Stimulating Agent
# CKD-MBD Testing

<table>
<thead>
<tr>
<th>CKD Stage</th>
<th>Calcium, Phosphorus</th>
<th>PTH</th>
<th>25(OH)D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 3</td>
<td>Every 6-12 months</td>
<td>Once – then based on CKD progression</td>
<td>Once – then based on level and treatments*</td>
</tr>
<tr>
<td>Stage 4</td>
<td>Every 3-6 months</td>
<td>Every 6-12 months</td>
<td>*vs. annually</td>
</tr>
<tr>
<td>Stage 5</td>
<td>Every 1-3 months</td>
<td>Every 3-6 months</td>
<td></td>
</tr>
</tbody>
</table>

Use CKD progression, presence or absence of abnormalities, treatment response and side effects to guide testing frequency.

MDB: Metabolic Bone Disease
CKD-MBD

- Treat with D3 as indicated to achieve normal serum levels
- 2000 IU by mouth daily is cheaper and better absorbed than 50,000 IU monthly dose.
- Limit phosphorus in diet, with emphasis on decreasing packaged products - Refer to renal RD
- May need phosphate binders
- DEXA doesn’t predict fracture risk in CKD 3-5
- PTH goals and use of calcitriol not clearly understood in CKD
Lipid Management in CKD: Does Not Delay Progression But May Be of Benefit

- Use statin alone or statin/ezetimibe combination in adults > 50 years with CKD stage 3a-5
- In adults < 50 years with CKD use statin alone if history of CAD, MI, DM, stroke
- Dialysis and transplant patients
  - CONTINUATION but NOT starting statin (or statin/ezetimibe) after dialysis initiation recommended
  - Statin generally recommended in all transplant patients
- Treat according to a “fire and forget” rather than “treat to target” strategy
  - Treat CKD patients with statins or statin/ezetimibe combinations without the need for follow up blood tests.

Lipid Disorders in CKD

A 32% reduction in LDL→17% reduction in primary outcome (nonfatal MI, coronary death, nonhemorrhagic stroke, arterial revascularization)

No reduction in CKD progression, overall or CAD mortality, other individual CAD end-points

Risk Factors for Infection in Patients with CKD

- Advanced age
- High burden of coexisting illnesses (e.g., diabetes)
- Hypoalbuminemia
- Immunosuppressive therapy
- Nephrotic syndrome
- Uremia
- Anemia and malnutrition
- High prevalence of functional disabilities

Vaccination in CKD

• Annual influenza vaccine is recommended for all adults with CKD, unless contraindicated

• Polyvalent pneumococcal vaccine when
  o eGFR < 30 ml/min/1.73m²
  o At high risk of pneumococcal infection (e.g., nephrotic syndrome, diabetes, receiving immunosuppression), unless contraindicated
  o Two vaccines PCV13 then PPSV23 12 months later; both should be offered

• Hepatitis B immunization when GFR < 30 ml/min/1.73 m². Confirm response with appropriate serological testing.

• Use of a live vaccine must consider the patient’s immune status (e.g., immunosuppression).

Malnutrition and CKD

• Malnutrition or protein energy wasting (PEW) is common in CKD and is associated with poor patient outcomes.
• Malnutrition in CKD begins as early as stages 3 and 4. Risk increases with progression of the disease.
• Preventing PEW or malnutrition may require clinical interventions to assess nutritional status, individualize strategies for prevention and treatment, provide patient instruction, and promote patient adherence.
• A specialty-trained registered dietician can help address the nutritional aspects so that protein wasting can be diminished.

Mental Health Counseling

- Psychiatric illnesses like depression are associated with many chronic diseases.
- Depression is linked to early CKD, progressive CKD, kidney failure, hospitalization and increased mortality. 1-4
- Patients with GFR < 60 mL/min/1.73m² should undergo regular assessment for impairment of functioning and well-being. 5

CKD Patient Safety Issues

• **Medication errors**
  - Toxicity (nephrologic or other)
  - Improper dosing
  - Inadequate monitoring

• **Electrolytes**
  - Hyperkalemia
  - Hypoglycemia
  - Hypermagnesemia
  - Hyperphosphatemia

• **Miscellaneous**
  - Multidrug-resistant infections
  - Vessel preservation/dialysis access

Tunneled Jugular Small Bore Central Catheters as Alternative to PICC

ASN Recommendation:
• Don’t place Peripherally Inserted Central Catheters in stage III-IV chronic kidney disease patients without consulting nephrology.
• Venous preservation is critical for stage III-IV chronic kidney disease patients. Excessive venous puncture damages veins, destroying potential AVF sites.

Appendix 1: Algorithm for Selection of Venous Access Sites

- Note on Home IV Infusions: Other than exceptional cases, Home IV Infusions should not be run through HD lines (large lumen, higher infusing risk if not accessible & used properly, flushed with high concentrations of heparin/sodium citrate). Home care RNs will not access HD lines under any circumstances. If the only option for an IV infusion is the HD line, the renal program at the relevant site will assume responsibility, including costs, for all arrangements.

- Patient requires venous access
  - Chronic Kidney Disease (CKD) Stage
    - Stage 4 or 5 (eGFR < 30)
    - Stage 1-3 or 5 (eGFR > 30)
  - Type of access required?
    - Peripheral
    - Central

- Options (in order of preference):
  - Dorsal vein, non-dominant hand
  - Dorsal vein, dominant hand
  - Forearm veins, non-dominant hand
  - Forearm veins, dominant hand

- Contact patient’s attending physician to discuss other potential options
  - If no option, can only be given via another method (see Note 1)

- Anticipated duration:
  - <3 weeks
  - >3 weeks

- Tunneled Cuffed Catheter
  - Permanent catheter
  - Temporary catheter

- Options (in order of preference):
  - Internal jugular (IJ) vein
  - External jugular (EJ) vein
  - Femoral vein
  - Less optimal: subclavian (high incidence of central vein stenosis)

- Last resort: PICC line
  - Options (in order of preference):
    - Brachial vein
    - Basilic vein
    - Cephalic vein
CKD Patient Safety Issues

- **Diagnostic tests**
  - Iodinated contrast media: AKI
  - Gadolinium-based contrast: Nephrogenic Systemic Fibrosis (NSF)
  - Sodium Phosphate bowel preparations: AKI, CKD

- **CVD**
  - Missed diagnosis
  - Improper management

- **Fluid management**
  - Hypotension
  - AKI
  - CHF exacerbation

Common Medications Requiring Dose Reduction in CKD

- Allopurinol
- Gabapentin
  - CKD 4- Max dose 300mg qd
  - CKD 5- Max dose 300mg qod
- Reglan
  - Reduce 50% for eGFR < 40
  - Can cause irreversible EPS with chronic use
- Narcotics
  - Methadone and fentanyl best for ESRD patients
    Lowest risk of toxic metabolites
- Renally cleared beta blockers
  - Atenolol, bisoprolol, nadolol
- Digoxin
- Some Statins
  - Lovastatin, pravastatin, simvastatin, fluvastatin, rosvastatin
- Antimicrobials
  - Antifungals, aminoglycosides, Bactrim, Macrobid
- Enoxaparin
- Methotrexate
- Colchicine
Hyperkalemia

- First try reduction of dietary potassium
- Stop NSAIDs, COX-2 inhibitors
- Stop potassium sparing diuretics
  - spironolactone, eplerenone, amiloride
- Stop or reduce beta blockers
- Avoid salt substitutes that contain potassium
- Stop or reduce ACE inhibitors/ARBS
- New binding agents (Patiromer to be available 1/1/16, ZS-9 under FDA review)
Key Points on Medications in CKD

- CKD patients are at high risk for drug-related adverse events
- Several classes of drugs have renal elimination
- Consider kidney function and current eGFR (not just SCr) when prescribing meds
- Minimize pill burden as much as possible
- Remind CKD patients to avoid NSAIDs
- No Dual RAAS blockade
- Any medication with >30% renal clearance probably needs dose adjustment for CKD
- No bisphosphonates for eGFR <30
- Avoid Gadolinium for eGFR <30
Who Should be Involved in the Patient Safety Approach to CKD?

Patient safety
The Patient (always) and other subspecialists (as needed)
Impact of primary care CKD detection with a patient safety approach

Improved diagnosis creates opportunity for strategic preservation of kidney function

A 60-year-old Caucasian man has CKD 3 attributed to hypertension and type 2 diabetes. He presents with fatigue and a hemoglobin of 9 gm/dL.

How would you address his anemia?

A. Start parenteral iron replacement
B. Start erythropoiesis stimulating agent
C. Order diagnostic evaluation for anemia
D. Reassure him that this is expected with his CKD
Case Question 2

A 65-year-old Hispanic woman with CKD 4 has been told she has osteoporosis. In addition to ensuring adequate daily dietary calcium and vitamin D3 supplementation, what would you recommend for her metabolic bone disease management?

A. Start an oral bisphosphonate

B. Start a parenteral bisphosphonate

C. Change Vitamin D3 to 50,000 units twice a month

D. Continue current treatment with calcium and daily vitamin D
What can primary care providers do?

• Recognize and test at-risk patients
• Educate patients about CKD and treatment
• Manage blood pressure and diabetes
• Address other CVD risk factors
• Monitor eGFR and ACR (encourage labs to report these tests)
What can primary care providers do?

- Evaluate and manage anemia, CKD-MBD, vaccinations, malnutrition, depression and other complications in at-risk patients
- Help patient adjust medications (dosing, contraindications)
- Refer to dietitian for nutritional guidance
- Consider other patient safety issues in CKD (contrast, NSAIDs, hyperkalemia, hypotension, AKI on CKD)
- Consult or team with a nephrologist (co-management)
- Refer patient to nephrology when appropriate
Self Assessment Questions

1. Vitamin D3 is the preferred vitamin D form to achieve normal serum vitamin D levels
   a. *True*
   b. False
   **True Rationale:** Vitamin D3 is less expensive and better absorbed than Vitamin D2

2. Which CKD Stage do most of the complications of Kidney Failure start?
   a. Stage A
   b. Stage 1
   c. *Stage 3*
   d. Stage 5
   **Rationale:** Stage A is not part of CKD staging.
Questions and Answers
Additional Resources

- National Kidney Foundation: Six Step Health Primer
  https://www.kidney.org/atoz/content/sixstepshealthprimer

- KDIGO – Kidney Disease: Improving Global Outcomes
  http://kdigo.org/home/

- www.studyblue.com

- Adriana S. Dusso, Alex J. Brown, Eduardo Slatopolsky. American Journal of Physiology - Renal Physiology Published 1 July 2005 Vol. 289 no. 1, F8-F28
  http://ajprenal.physiology.org/content/289/1/F8