KEY POINTS IN THE TREATMENT OF CHRONIC KIDNEY DISEASE

CHET FOX MD
PROFESSOR OF FAMILY MEDICINE
UNIVERSITY AT BUFFALO
Background

Kidney Failure is a Rapidly Growing Problem

USRDS, 2000
CKD affects 26 million Americans

Prevalence is 11-13%

It consumes 28% of the Medicare Budget

- This was 6.9% in 1993
- Costs for 2013 were $42 Billion dollars

DM+ CKD increases mortality rate 6 fold

CKD disproportionally affects African Americans and Hispanics

http://usrds.org
Who is At Risk for CKD

- Hypertension
- Diabetes
- CAD
- Family History
- CKD
- African American
- Elderly
- Morbid Obesity
Two Screening Tests

- eGFR

- ACR
  - Albumin/Creatinine ratio
# Classification of CKD

<table>
<thead>
<tr>
<th>Kidney Function Stage</th>
<th>GFR (mL/min/1.73m²)</th>
<th>Albuminuria Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Normal (urine ACR mg/mmol)</td>
</tr>
<tr>
<td>1</td>
<td>290</td>
<td>Male: &lt; 2.5, Female: &lt; 3.5</td>
</tr>
<tr>
<td>2</td>
<td>60-89</td>
<td>Not CKD unless haematuria, structural or pathological abnormalities present</td>
</tr>
<tr>
<td>3a</td>
<td>45-59</td>
<td></td>
</tr>
<tr>
<td>3b</td>
<td>30-44</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>15-29</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>&lt;15 or on dialysis</td>
<td></td>
</tr>
</tbody>
</table>

*ACR: Albumin-Creatinine Ratio*
A GFR loss of > 1 mL/min/year beginning at age 25 can result in end-stage renal disease within a normal lifespan.

HTN AND DM ARE THE LEADING CAUSE OF CKD
Two New England Journal publications indicate that cardiovascular survival is directly related to a patient’s kidney function!!

THE KIDNEY COMPASS
“Get Your Bearings on Kidney Disease”

HYPERTENSION

CKD

BONE DISEASE

ANEMIA

DIABETES

PROTEINURIA

SAVE YOUR KIDNEYS AND SAVE YOUR HEART
KEY POINTS IN:

- Diagnosis
- Recognition of Complications
- Medication Safety
- Treatment
- Preparation for Vascular Access
- When to Refer
GD is a 63 year old African American female with poorly controlled HTN, DM, increased lipids, obesity, GERD, gout, and sleep apnea. She has not had an MI (yet) She smokes ½ PPD

Meds include Amlodipine 10 qd, HCTZ 25 qd, Clonidine 0.3 bid, Atorvastatin 10, Metoprolol 100 bid, Insulin glargine 30 at HS, Metformin 1000 po bid, Allopurinol 300 qd, L, Omeparazole 20 qd, and CPAP at 12 cm (Note: she is not on an ACE)
BP is 150/86;
Labs: HbA1C is 10.4; Hb is 9.5, HDL is 35, LDL is 115, triglycerides are 295; Ca is 9.8; Microalbumin/creatinine ratio is 54.5; Creatinine is 1.7: GFR = 39
GD has stage 3 CKD and most of it’s complications.
What should we do for this patient?
Microalbumin/Creatinine >30
GFR < 60
GD has Stage 3B;A2 CKD
This puts her at moderately high risk
She also has all the complications

- Hypertension
- Anemia
- Kidney Disease
- Bone Loss
- Diabetes
- Proteinuria
- Hyperlipidemia
- Heart Symbol
There are meds that are dangerous to her: We stop them or modify dose

GD is taking OTC NSAIDS for her back pain
- We stop this and all NSAIDS and Cox-2

Metformin can cause lactic acidosis. We stop if GFR < 30

We reduce her Allopurinol

We avoid Bisphosphonates
ACE is added to reduce proteinuria and delay CKD progression.
- GFR decreases to 32 but stays there. Creat is 2.1
- K+ is good at 4.0
- We leave her on the ACE
- Her BP goes down to 130/70
- We stop her clonidine as it is no longer need
For Her Diabetes

- She starts a diet and exercise program
  - We encourage patient centered goal setting (Motivational Interviewing)
- We intensify her insulin regimen
- We add Sitagliptin, liraglutide, or glypizide to her insulin regimen
- Her HbA1C drops to 6.8 over 6 months
We increase her statin to Atorvastatin 40 mg qd
We start ASA 81 mg qd
We give her the ACS quit smoking line number
She quits smoking, Her HDL is now 43, LDL 68 and Triglycerides 130
Colonoscopy is normal
MCV is nl at 85
Fe is 50; TIBC is 200 for a saturation of 25%
We start Erythropoieitin 20,000 units q 2 weeks
We start oral iron
√CBC, Fe/TIBC monthly. We hold EPO if Hb > 11.5
Hb rises to 11.5 and she feels much better
Transferrin saturations stay normal at above 20%
We check for bone disease

- We measure $\sqrt{Ca^{++}}$, $PO_4^-$; and PTH and 25 OH Vit D levels.
- $Ca^{++}$ is 9.8 (nl).
- $PO_4^-$ is 3.1 (nl).
- PTH is 60 (nl).
- Vit D is 7 (low).
- We start her on Ergocalciferol 50,000 units once per month or Chlecalciferol 1,000-2,000 units daily.
- We follow these labs yearly and refer if PTH > 100 or $PO_4^-$ rises above 4.5.
We remember “Fistulas first and Catheters Kill”

We tell her to use the back of her hand for blood draws (save the veins)

We refuse to allow any PICC lines to be put in when GFR < 45.

We refer her to nephrology when GFR < 30

If the GFR < 20; we refer for transplant evaluation even before she needs dialysis
Our Patient Does Well

- She does not have a heart attack
- She lost 30 pounds
- Her kidney disease stabilizes
- She feels better and has more energy
- We delay the need for dialysis
- She does not get a hip fracture
- If she does progress, she will be referred early
Most Important Points Evidence Based

- Use GFR, Urine Microalbumin to diagnose CKD
- If GFR < 60 or Microalbumin/creat > 30 start ACE (If cough on ACE, start ARB)
- Avoid NSAIDS
- Refer to Nephrology for GFR < 30
- Refer for Transplant evaluation for GFR < 20
- Promote smoking cessation
- Keep BP < 140/90
- Keep HbA1C < 7.0 (can individualize upward in the elderly)
- Keep LDL < 100
- Avoid PICC lines for GFR < 45
Check Calcium, Phosphorous, PTH, and Vit D yearly
Check Hemoglobin yearly
If iron is normal, start erythropoietin if Hb< 10 or refer to Nephrology
Refer to Nephrology for Phosphorous >4.5 or PTH > 100
Referral Guidelines

- GFR < 30
- Rapidly deteriorating kidney function
- Marked proteinuria
- Difficult-to-control hypertension
- PTH > 100 or Phosphate > 4.5
- GFR < 20; Refer for Transplant evaluation
## Understanding eGFR

<table>
<thead>
<tr>
<th>eGFR</th>
<th>What to do</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;60 and microalbumin&lt; 30</td>
<td>• Yearly surveillance with GFR (for hypertensive patients) and both GFR and microalbumin (for diabetic patients)</td>
</tr>
<tr>
<td>&gt;60 and microalbumin &gt; 30</td>
<td>• ACE or ARB. Avoid NSAIDS</td>
</tr>
<tr>
<td>&gt;45 and  &lt; 60*</td>
<td>• ACE or ARB</td>
</tr>
<tr>
<td></td>
<td>• Discontinue NSAIDS</td>
</tr>
<tr>
<td></td>
<td>• Check hemoglobin</td>
</tr>
<tr>
<td></td>
<td>• Check Calcium, Phosphorous, PTH and Vitamin D yearly</td>
</tr>
<tr>
<td>&gt;30 and &lt; 45</td>
<td>• The above plus</td>
</tr>
<tr>
<td></td>
<td>• ? off Metformin**</td>
</tr>
<tr>
<td></td>
<td>• No PICC lines</td>
</tr>
<tr>
<td></td>
<td>• All blood draws from dominant arm (Save an Arm)</td>
</tr>
<tr>
<td>&lt; 30</td>
<td>• Refer to Nephrologist</td>
</tr>
<tr>
<td></td>
<td>• Stop NSAIDS</td>
</tr>
<tr>
<td>&lt; 20</td>
<td>• Refer for transplant evaluation</td>
</tr>
</tbody>
</table>
* Need 2 consecutive GFR <60 at least 3 months apart to diagnose CKD. If the patient does not have risk factors of hypertension, diabetes, family history or coronary disease, this might be a false positive test.

* Treat hypertension, diabetes, and hyperlipidemia the same way you would treat a diabetic patient.

**Metformin does not cause progression of CKD, but it increases the risk of lactic acidosis.
Questions??
The End!