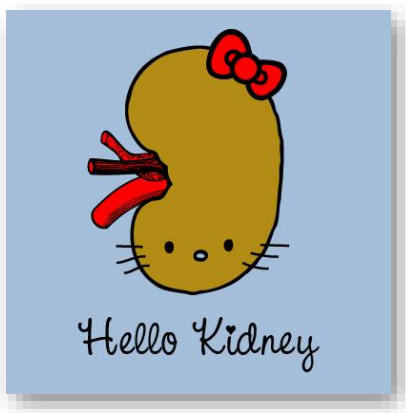


The ABCs of CKD



Kim Zuber, PAC
American Academy of Nephrology PAs
(AANPA)
St Petersburg, FL
Nothing to Disclose



Objectives

- 1) Define risks and staging of CKD using KDIGO guidelines
- 2) Review urinary testing needed to both stage and predict progression of CKD
- 3) Demonstrate proven methods to prevent progression of kidney disease



Kidney Disease Facts

**30 million Americans have CKD
15% of the population
*compared to 13% for diabetes!***

**Every 5 minutes
someone's kidneys fail**

**13 people die every day
waiting for a kidney
transplant & 1 person is
added every 14 min**

**More than 113,000
people are waiting for a
kidney transplant**

**Early detection and
TREATMENT can slow or
prevent CKD progression**



Kidney Disease Facts

30 million Americans have CKD

The cost of CKD
is *\$98 Billion*

Or 20% of the entire Medicare
budget....

are waiting for a kidney
transplant

TREATMENT can slow or
prevent CKD progression



And it is growing.....

- CKD is the fastest growing chronic disease
- The rate of growth is highest in the 20-54 y/o!
- The incidence of CKD grew by 89%
- Death from CKD grew by 98%
- Disability from CKD grew 62%



Analysis of the Global Burden of Disease.....1990-2016, Kidney International 2018

My practice takes good care of CKD!!!

Actually, not so much....

166 Primary Care Docs

11,774 patients with CKD 3 or 4

70% NO urine testing

46% uncontrolled HTN

25% NO ACE or ARB

26% on medications contraindicated in CKD

76% had been tested for anemia!!!!

Primary care management of CKD, J Gen Intern Med. 2011



How do I find CKD?

• Go for the obvious!

- Elderly
- Minority
- Hypertension/CVD
- Diabetes
- Family history
- Female
 - *Although less likely to go to ESRD!*
- On their medical history!

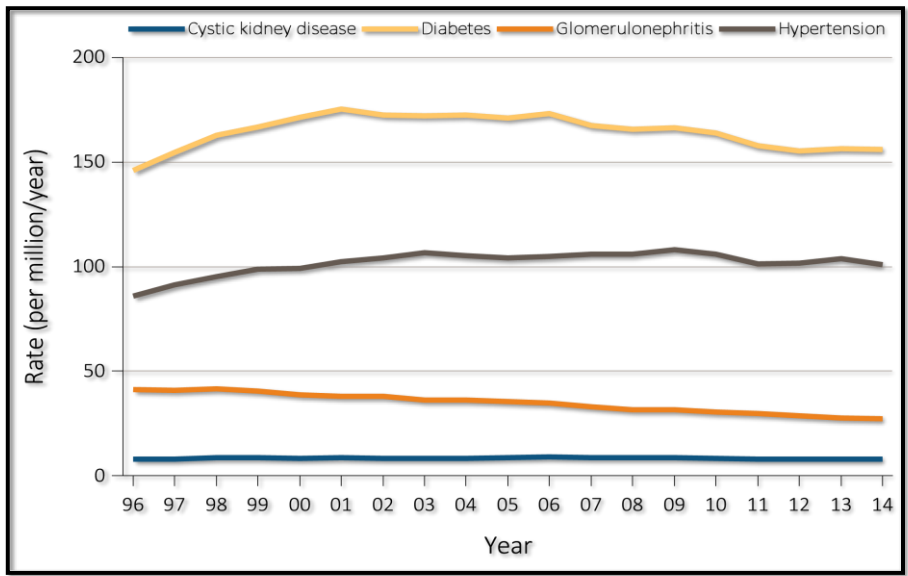
Go for the less obvious!

Previous AKI
 Lupus, sarcoid, amyloid, gout,
 auto-immune...
 Previous donor/Previous transplant
 History of stones
 History of cancer
 History of oophorectomy
 History of gout
 Smoker (any type)
 Soda drinkers
 Moms who drank with pregnancy
 NAFL bingers
 Almost any medical condition



8

Causes of ESRD in the US - 1996-2014

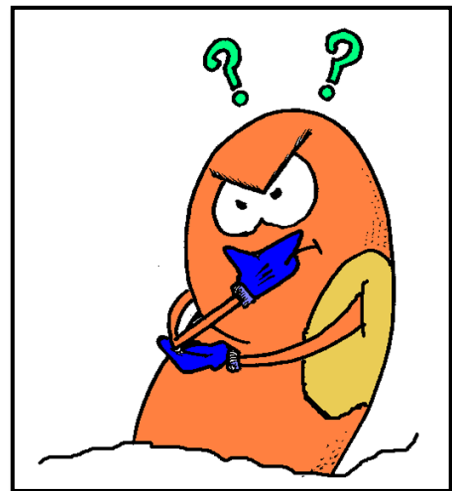


USRDS 2017



8

So we know who
to screen
How do we do It?



Definitions of Kidney Function

- eCrCl using Cockcroft-Gault formula
- eGFR using Modification of Diet in Renal Disease (MDRD) formula
- eGFR using the **CKD-EPI formula**
- eGFR using the Mayo Quadratic formula
- eGFR for children using Schwartz formula
- Cystatin C
- Creatinine Clearance (CrCl)



**All are dependant on assumptions of normal function, weight, race, sex, standard patients and thus are $\pm 30\%$
Thus the **eGFR** since it is an 'estimate'**





Stages of CKD

Composite ranking for relative risks by GFR and albuminuria (KDIGO 2009)				Albuminuria stages, description and range (mg/g)				
				A1		A2	A3	
				Optimal and high-normal		High	Very high and nephrotic	
				<10	10–29	30–299	300–1999	≥2000
GFR stages, description and range (ml/min per 1.73 m ²)	G1	High and optimal	>105					
			90–104					
	G2	Mild	75–89					
			60–74					
	G3a	Mild-moderate	45–59					
	G3b	Moderate-severe	30–44					
	G4	Severe	15–29					
	G5	Kidney failure	<15					

KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of CKD, *Kidney International*, Jan 2013, Vol 3, Issue 1





Sylvester

63 y/o, SCr 1.5mg/dL

UACR 30mg/g

Sylvester tells you he is *Piscataway Indian* which you know from reading Smithsonian is historically black farm hands intermarrying white household workers during the 1600s

Q. What race do you use to calculate GFR?

- A. Indian
- B. African American
- C. Caucasian
- D. Calculate AA and other; average





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63 y/o, SCr 1.5mg/dL

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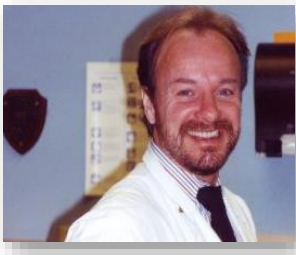
A. Indian

B. African American

C. Caucasian

D. Calculate AA and other; average





Blaine

49 y/o male, AFAB (assigned female at birth)

PMH: Chest reconstruction, metoidioplasty

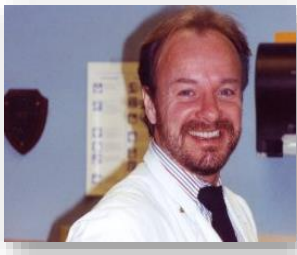
Meds: testosterone IM q2w

Comes into office for annual visit, pre-op for knee scope

Q. What gender do you use to calculate GFR for NSAID dosing?

- A. Male
- B. Female
- C. Calculate both and average
- D. Leave it up to Blaine
- E. Since he is thin, use female





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Blaine

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PMH: Chest reconstruction, metoidioplasty

Meds: testosterone IM q2w

Comes into office for annual visit, pre-op

There are many formulas used to calculate GFR

All are estimates

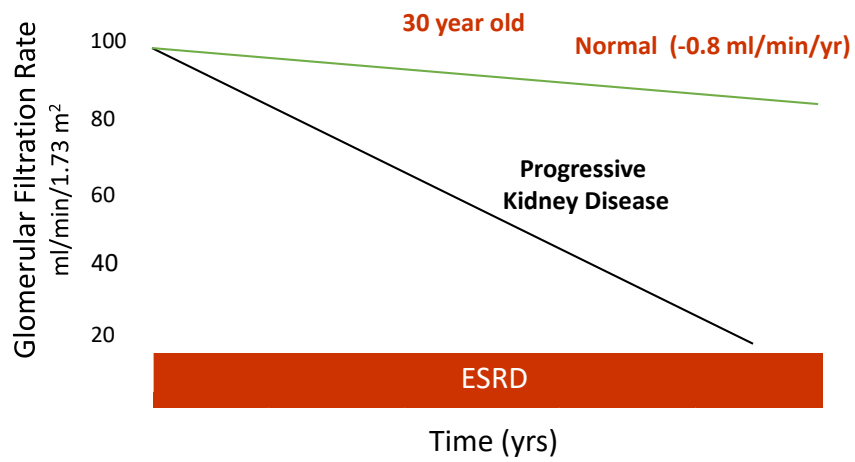
Can be \pm 30% as compared to inulin (research only)

Any GFR calculator is an estimate

- C. Calculate both and average**
- D. Leave it up to Blaine**
- E. Since he is thin, use female**



Normal Progression of Kidney Function





Sadie

She reports she is 85 y/o, female,
has diabetes and she is black

Labs: eGFR 45ml/min

If you lose 1%/yr above the age of 30,
85-30 means 55 years of GFR loss

Or

100 (*average perfect kidney function*)-55 (*years*)

or expected eGFR is **45ml/min**

She is age appropriate....



What is the most critical predictor for progression of kidney disease?

- 1) Systolic Blood Pressure
- 2) A1C Levels
- 3) Urine Albumin to Creatinine
- 4) SCr Levels



What is the most critical predictor for progression of kidney disease?

- 1) Systolic Blood Pressure
- 2) A1C Levels
- 3) Urine Albumin to Creatinine**
- 4) SCr Levels



Albuminuria As Risk Factor

The relationship between magnitude of proteinuria reduction and the risk of ESRD: Results of the AASK study of kidney disease and hypertension
Ach Intern Med **2001**



The Progression of CKD: A 10-year population-based study of the effects of gender and age. KI
2006



Combining GFR and albuminuria to classify CKD improves prediction of ESRD, JASN **2009**

Changes in Albuminuria and the Risk of Major Clinical Outcomes in Diabetes: Results From ADVANCE-ON



Changes in Albuminuria and subsequent risk of incident kidney disease, JASN **2017**

Alberta Kidney Disease Network: Relation between kidney function, proteinuria, and adverse outcomes, JAMA **2010**





Stages of CKD

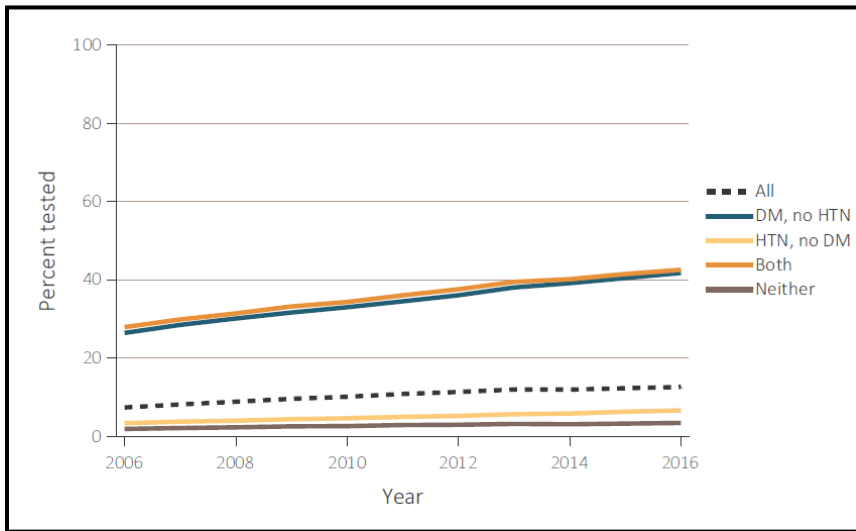
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KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of CKD, *Kidney International*, Jan 2013, Vol 3, Issue 1



23

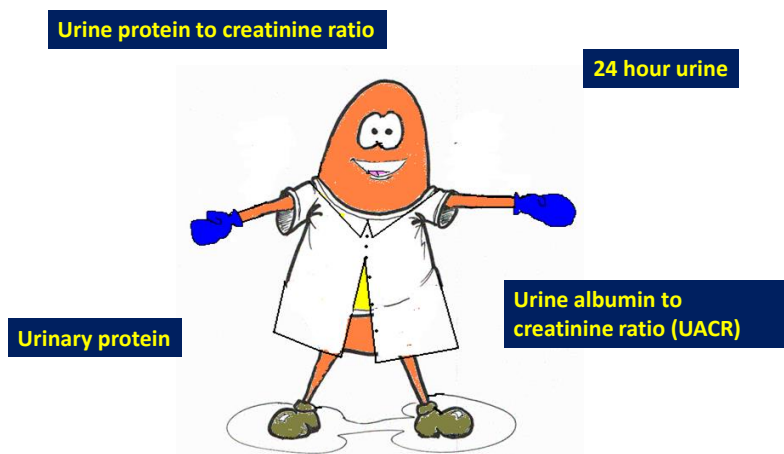
Probability of urine albumin testing in Medicare patients at risk for CKD



USRDS 2019



23



Special Thanks to Scott and White of Temple TX for use of their kidney comic

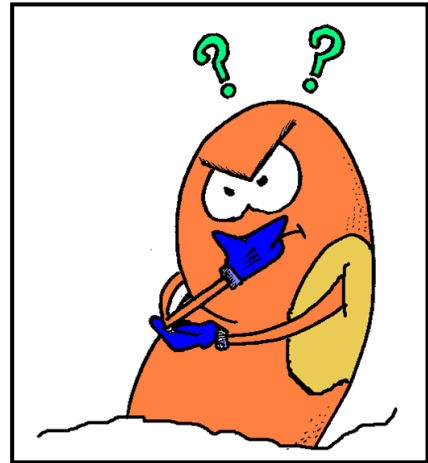


Urine Pearls

- Some labs (Quest, LabCorp) refer to a UACR as ‘microalbuminuria’
- NKF is working with Quest and LabCorp to roll out a ‘Kidney Profile’ that incorporates both the SCr + the UACR
- Be care of **gm/dL** vs **mg/dL**...many an IM resident has gotten in trouble with that
 - 3gm/dl is 3000mg/dl or nephrotic range proteinuria
- **Order a UACR at least 1x/yr to monitor kidney loss**
 - **For all patients with hypertension**
 - **For all patients with diabetes**
 - **For all patients with risk factors (race, AKI, lupus, etc etc)**



So we know who
has CKD
And we tested their
urine
Now...how do we
manage it?



The Big 5

- 1) Hypertension
- 2) Diabetes
- 3) Obesity
- 4) Cardiovascular Disease
- 5) This and That (kind of defies categorization)



Hypertension: The Studies

- SPRINT did not include any diabetics
- ACCORD showed us that tight control caused AKI *BUT this AKI did not cause permanent kidney injury*
- Very few kidney patients need only 1-2 medications
- RAAS blockade is cardio and reno-protective
- As CKD progresses, HTN is harder to control
- As CKD progresses, falls and fractures increase
- Older patients are more fragile



KDIGO BP management Draft Guidelines, 2020

Blood pressure goals in Patients with CKD: A review of the evidence and guidelines, CJASN, 2019

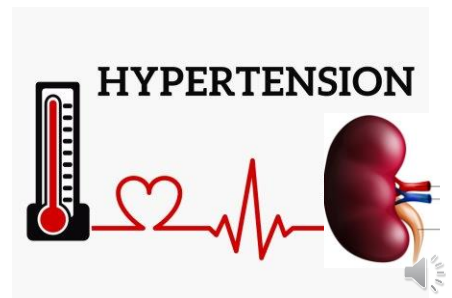
Hypertension

If HTN doesn't cause your CKD, your CKD will cause HTN

So what is the GOAL?

2020 DRAFT KDIGO GUIDELINES:

Target **SBP <120mm** Hg using an automatic office cuff measurement



Effectiveness of Lifestyle Changes

Modification	Example	Approx Reduction
Physical activity	Aerobic (brisk walking?) >30/day, most days	4-9mmHg
DASH eating plan	Low fat diet rich in fruits, vegetables	8-14mmHg
NaCl restriction	Decrease to 2.4gm/day	2-8mm Hg
Moderate ETOH	1 drink/women, 2 drinks/men	2-4mmHg
Weight loss	BMI 18.5-25	5-20mmHg/10kg weight loss
Stress reduction	Practice modality	5mmHg
Quit smoking	Any which way	2-4mmHg after 1 week



NACL Restriction

Stage of Kidney Disease

= NACL clearance

Most effective in

AA populations

Tricks:

Pork holidays

No cooking w/NACL

'B' cooking





First Choice: ACEi/ARB

ACEi OR ARB:

First choice in Diabetes and/or CKD

Even in the AA population

Will decrease albuminuria....

Use it even if there is no albuminuria

It doesn't matter ACEi vs ARB

Only 1 or the other due to:

- inc risk of hyperkalemia
- Hypotension
- AKI/failure
- no decrease in mortality



**One or the other
NOT BOTH!**



When do I stop an ACE/ARB?

- If hyperkalemia cannot be **controlled**

- Diet, education, medication
- What is hyperkalemia?
 - Lab dependent
 - $>5.5\text{mEq/L}$ in CKD 4
 - $>6\text{mEq/L}$ in CKD 5
 - $>$ We'll tell you in CKD 5D!!!

- **Newest data (March 2020):**

Continued use of ACEi/ARB with a $\text{GFR} < 30\text{mm/min}$ protected the heart WITHOUT an increase in ESRD*



* Association Between Renin-Angiotensin System Blockade Discontinuation and All-Cause Mortality Among Persons With Low Estimated Glomerular Filtration Rate, Qiao Y, et al. *JAMA Intern Med.* March 9, 2020



When do I stop an ACE/ARB?

The **STOP-ACEi** trial

Multicenter UK randomized controlled trial of ACEi/ARB withdrawal in advanced kidney disease

Enrollment completed **June 2018**

Trial time line 3 years

Cardiac vs ESRD...

Or

Do the patients have more cardiac events or more GFR loss??

Results to be determined!





Rose

74 y/o routine visit

PMH: PVD, HL, HTN,

Meds: metoprolol, HCTZ, amlodipine, ASA, atorvastatin

PE: 168/98, home 150-160s

Labs: SCr 1.2mg/dL, UACR 30mg/dL, GFR 56mm/min

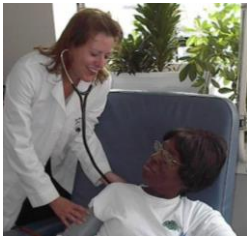
Add lisinopril for BP/UACR control

F/U labs 2 weeks later, SCr 2.2mg/dL with K 5.4mEq/L

What is the cause of the rise in SCr?

- A. Medication induced AIN
- B. Renovascular Disease (RAS)
- C. Rhabdomyolysis from statins
- D. Usual rise from ACE inhibitor
- E. Essential hypertension





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What

A. M

B. Renovascular Disease (RAS)

C. Rhabdomyolysis from statins

D. Usual rise from ACE inhibitor

E. Essential hypertension

**Acceptable rise in SCr
is 20-25%**

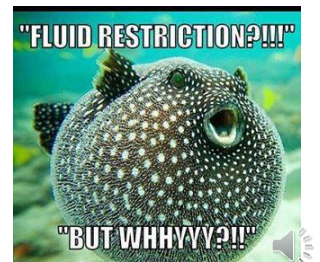


What Next?

- Consider diuretic
- Can you really tell if the patient has fluid?
 - Rales/edema/JVD absent in 50% of patients
 - If all 3 there: *sensitivity of 58% with specificity of 100%
- But what if you don't have all 3? Overload is still there 50% of the time....
- HCTZ not useful if $GFR < 30 \text{ ml/min}$
 - **Poor if $GFR < 50 \text{ ml/min}$ ****

*Stevenson *JAMA* 1989, Claire-Del Granado *BMC Nephrology* 2016

***KGIDO CKD Guidelines* 2012



And then???



- Consider a CCB; more effective in the AA population
- CCB + ACE more effective in preventing stroke
- **Dihydropyridine CCBs** can worsen proteinuria in patients with nephropathy
- Beta Blockers work well in CVD; Can cause erectile dysfunction
- Mixed alpha/beta blockers work well
- If you need to move to the centrally acting meds, consider us
- We can help you with the poorly controlled hypertensive

ALLHAT Trial, JAMA 2002, ASCOT Trial, Lancet 2005, ACCOMPLISH Trial, Lancet 2010



Hypertension Pearls

- NACL restriction is just as effective as medications
- Always tell a patient that it will take 3-4 meds for control. If you use less, they are thrilled
- Start with ACEi/ARB, then diuretic (if possible)
- When you need to increase past furosemide 40mg, go to bid (dinner!!)
- Calcium channel blockers work **VERY** well in the AA population
- With cardiovascular disease...ACE/CCB>ACE/diuretic
- If the female partner of your beta blocker patient is not yelling at you, he is not taking the med
- **NOTHING works if you cannot afford it**



Diabetic Kidney Disease (DKD) Goals

KDIGO Guidelines

- Target HbA1c of **7.0%** (early CKD) to **8%** (Stage 4/5 or older with multiple co-morbidities)

2018 ADA Goals: Aim for an A1C<8 if

- Severe hypoglycemia history
- Limited life expectancy
- **Advanced microvascular or macrovascular complications (Stage 4 CKD)**
- Extensive comorbidities
- Long-term diabetes with A1C target difficult to attain



Kidney Specific Family Details: Sulfonylureas/TZDs

- Older medications and therefore cheap
- Can cause hypoglycemia
- Glyburide (*Diabeta*) metabolized in liver
 - Metabolites excreted in kidney so not good in DKD
- Glimepiride (*Amaryl*) can be used but needs renal dosing
- Glipizide (*Glucotrol*) metabolized by liver
 - Metabolites are inactive, no renal dosing
- TZDs cause fluid retention so not great for DKD

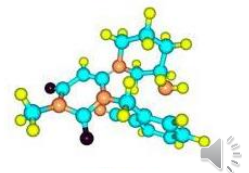


Therapeutic Considerations for Antihyperglycemic Agents in DKD CJASN May 2017

Kidney Specific Family Details: DPP-4 inhibitors

- TECOS: Sitagliptin (*Januvia*) no outcome on CKD, no matter starting GFR
- SAVOR-TIMI: Saxagliptin (*Omglyza*) improvement with UACR!
- EXAMINE: Alogliptin (*Nesina*) increase in heart failure, no renal specific issues
- CARMELINA: Trajenta (linagliptin) no increase in heart failure, no precautions on CKD

No dosing adjustment needed in CKD for Trajenta



Therapeutic Considerations for Antihyperglycemic Agents in DKD CJASN May 2017

Kidney Specific Family Details: GLP agonists

- LEADER-R: liraglutide (*Victoza*) showed reno-protective effects
 - Reduced risk of albuminuria
 - Lower progression of CKD
- ELIXA: no renal specific outcomes
- Most trials pending but looks very good for family
- Most are injectable which can cause difficulty in acceptance
- **PRECAUTION: can cause N&V**
 - **Watch for dehydration, AKI**



Therapeutic Considerations for Antihyperglycemic Agents in DKD CJASN May 2017

Kidney Specific Family Details: SGLT2 inhibitors

- FDA indication for CKD 3a/3B with albuminuria
 - **Independent of A1C lowering**
- EMPA-R (*Jardiance*®) showed protection against both albuminuria and progression of CKD (NEJM 6/2016)
- CANVASS-R (*Invokana*®) Canagliflozin showed statistically significant decrease in CKD progression, decrease in UACR/kidney failure!!
- DECLARE-TIMI (Farxiga®)38: showed protection against progression of CKD and albuminuria
- CREDENCE (*Invokana*®) Canagliflozin
 - **showed 30% decline in kidney endpoints!**
- DAPA-CKD stopped early (March 2020) for great results for patients *WITH ALBUMINURIA and NO DM*



Alicic RZ, et al. Sodium-Glucose Cotransporter 2 Inhibition and Diabetic Kidney Disease
Diabetes 2019



Lessons from the CREDANCE study

SGLT2 inhibitors

Or as nephrology calls them, the CKD drugs that masquerade as Diabetes Medications!

- 1) Start an SGLT2i if albuminuria persists AFTER maximum dose of ACE/ARB
(up to Stage 3a for all SGLT2i or Stage 3b for canagliflozin (Invocana®))
- 2) If patient on diuretic, ½ the dose....
(was researcher choice: ½ number of daily doses or ½ each dose)
- 3) Tell patient to increase fluid (water)
- 4) Monitor blood pressure; all SGLT2i are diuretics too!
- 5) There will be a drop in GFR (inc in SCr) but take a deep breath, step away from EHR and ignore

Even those with a bump in GFR, patients had better kidney outcomes

FDA package inserts + oral reports from NKF Annual Meeting 2019 + ASN Annual Meetings 2018/2019





CKD and Insulin



- All types are safe and effective for
All Stages of CKD
- Basal Insulin is VERY easy to dose in CKD
- Basal Insulin with Oral Medications is fine
- CKD Patients including Dialysis may use pumps
- Dosing Requirements decrease with decreasing Kidney Function
- Decreasing Dosing Requirements are NOT logarithmic no matter what you may have read....





Fred

81 y/o poorly controlled diabetic x 20 years, bilateral BKA, often forgets meds, has passing 'acquaintance' with diabetic diet, has issues w/exercise due to chronic leg ulcers

Labs: A1C historically 11.5-12 mmol/L, most recent 9.5, GFR 27ml/min

Meds: metformin, lisinipril, furosemide, ASA, atorvastatin

Why is his A1C closer to goal now?

- A. McDonald's has changed their menu
- B. The A1C is not reliable
- C. He doubled his metformin
- D. He has taken up marathon running





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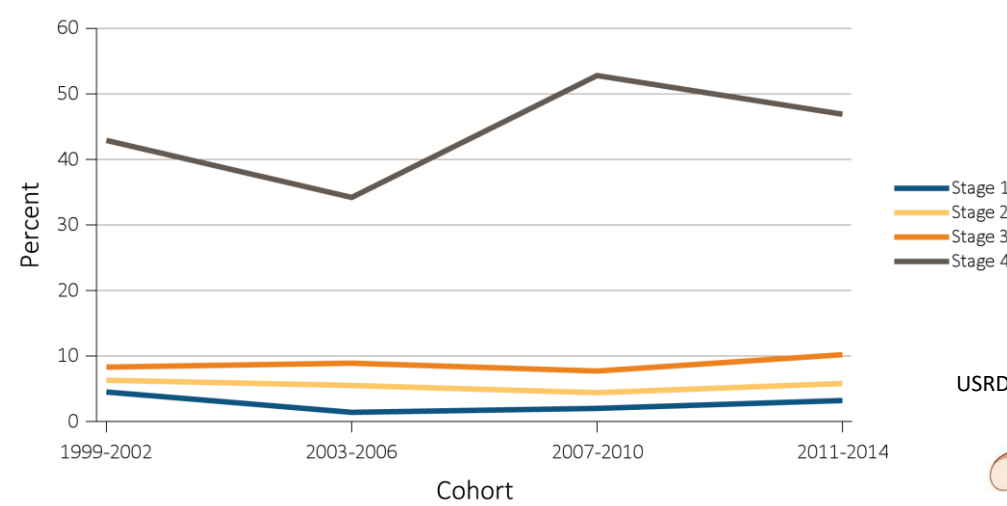
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50

Glycosylated hemoglobin (A1C) <7%



USRDS 2017



As you lose kidney function, your A1C becomes normal

50

Diabetes Pearls

- Keep a close eye on medications coming down the pipe...
- SGLT2 inhibitors look to be very reno-protective
 - *You may not see a drop in A1C even though you are seeing a drop in albuminuria and increase in GFR*
- Make sure you hydrate the new SGLT2 patient
- Doing great with the albuminuric diabetic patient
 - Largest # of new CKD patients do **NOT** have albumin prior to diagnosis
- Kidney function is lost at 2X normal if you have diabetes
- Often CKD shows up **PRIOR** to the diagnosis of diabetes
- Aim for an A1C of 7 in CKD 2-3b
- Aim for an A1C of 7.5-8% in CKD 4-5D
- You can make it worse
- **NOTHING works if you cannot afford it**



Bariatric Surgery

Nov 30th, 2016

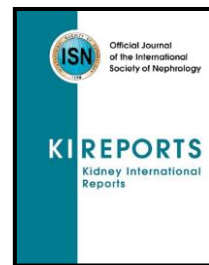
Kidney Outcomes three years after
Bariatric surgery in severely
Obese adolescents

Nehus, et al

BMI averaged 51
Those w/dec function improved GFR
+ improved UACR

No association if BMI \leq 40

eGFR increased by 3.9mL/min
For each 10-unit loss of BMI



Jul, 2016

Bariatric surgery is
associated with Improvement
in kidney outcomes

Chang, et al

58% lower risk of eGFR decline
for all subgroups: \pm CKD, HTN, DM

NOTE-97% white females!



Bariatric Surgery

Dec 4th, 2016

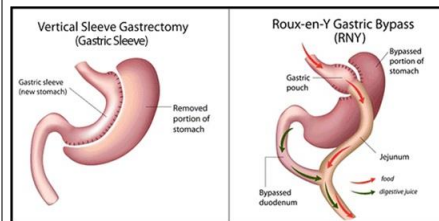
Estimated GFR before and after Bariatric surgery in CKD

Imam, et al

Large Kaiser group (714) over 3 years
44% minority, 58±8 (SD) y/o, 77% female
66% w/DM, 91% w/HTN

Surgical patients had nearly 10mL/min better GFRs at 3 years than non-surgical

RYGB had 6.6mL/min better GFR @ 3y than **sleeve gastrectomy**



Obesity Pearls

- Losing weight saves your kidneys
 - Studies show >7 year protection after bypass surgery (*JASN 2018, 2144 patients*)
- CKD diagnosis helps for Medicare coverage for Bariatric Surgery
- Some diabetic medications promote weight loss...Use them!
- If you actually followed the diabetic, kidney, hypertensive, cardiovascular diet, you would only be allowed to eat cardboard
- DASH diet is best
- High fruit and vegetables cause hyperkalemia
 - Monitor K with any new diet changes (*and in Jan*)
- **NACL holidays help with HTN and weight loss**



Cardiovascular Disease (CVD)

- More than 70% of kidney patients die of CVD
- Statins are underutilized in CKD
- CKD patients are **2-3X** more likely to have atrial fibrillation
 - Take the time to listen with that stethoscope
 - Warfarin vs DOACs is still debated but KDIGO states to use NOACs
- Smoking is an issue
 - Including vaping, marijuana and cigarette
 - No studies on chewing tobacco



KDIGO Guidelines for dosing in A Fib

CrCl (ml/min)	Apixaban* (Eliquis®)	Dabigatran (Pradaxa®)	Edoxaban** (Savaysa®, Lixiana®)	Rivaroxaban (Xarelto®)
>95	5mg bid	150mg bid	60mg qd^^	20mg qd
51-95	5mg bid	150mg bid	60mg qd	20mg qd
31-50	5mg bid (CrCl cut off 25ml/min)	150mg bid or 110mg bid^	30mg qd	15mg qd
15-30	2.5mg bid	Unknown	30mg qd could be considered	15mg qd could be considered
<15 not on dialysis	Unknown	Not recommended	Not recommended	Unknown
<15 on dialysis	Unknown	Not recommended	Not recommended	Unknown



Decrease Smoking Rates



PEDIATRICS

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

For current black smokers there is
 an 83%↓ kidney function
 19 cig/day = ↓75% kidney function
 >20 cig/day = ↓97% kidney function
 ...worse with menthol cigarettes!
J Am Heart Association, May 2016

Kidney function and tobacco smoke
 exposure in US adolescents
Pediatrics May 2013



SMOKING or VAPING KILLS NEPHRONS



Hyperlipidemia

CKD = Heart Disease



SHARP Trial: Statins or statins + ezetimibe

Fibrates are not recommended in CKD by KDIGO
 Debatably is effective in Stage 5/5D CKD

Uremia affects LDL levels making them unreliable

When you put a CKD patient on a Statin

FIRE AND FORGET

<http://kdigo.org/home/guidelines/lipids/>

SHARP: The effects of lowering LDL cholesterol with simvastatin plus ezetimibe in patients with CKD (Study of Heart and Renal Protection): a randomised placebo-controlled trial, Lancet 2011



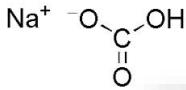
Hyperlipidemia: KDIGO Guidelines

Recommended doses (mg/d) of statins in adults with CKD		
Statin	eGFR G1-G2	eGFR G3a-G5, including patients on dialysis or with a kidney transplant
Lovastatin	GP	nd
Fluvastatin	GP	80 ¹
Atorvastatin	GP	20 ²
Rosuvastatin	GP	10 ³
Simvastatin/Ezetmibe	GP	20/10 ⁴
Pravastatin	GP	40
Simvastatin	GP	40
Pitavastatin	GP	2

Pharmacology
updates



Metabolic Acidosis



Acid hurts the heart AND kidneys

Treat if acidotic:
Base foods (*check K*)
Oral Sodium bicarb
Baking Soda ($\frac{1}{2}$ -1 tsp/day)



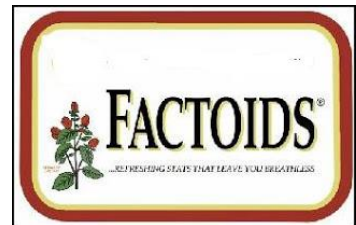
CVD Pearls

- A CKD patient is more likely to die of CVD than via kidney failure
- All CKD and DM patients should be on a statin
 - Add Vit D if leg cramps
 - **REAL** rhabdo from statins is <5%
- Managing metabolic acidosis slows loss of kidney function and protects the heart
- **All patients with CKD have heart disease**



This and That

- Drinking soda after exercise hurts the kidney
- Sleep (7h/night) is reno-protective
- Bilateral oophorectomy increases CKD risk
 - Increase 7.5% if premenopausal
- Increasing H2O does not help the kidneys
- Marijuana (oral) does not hurt the kidney and may be helpful in pain
- **ETOH is reno-protective**
- PPIs **do** cause CKD but very small risk
- As you lose kidney function, you are more likely to have a serious fall
- Untreated Hepatitis C will cause loss of GFR
- You are more likely to refer black and Hispanic patients to us and they **STILL** end up on dialysis more often!
- Gut and Dental disease are predictive of CKD



Depression in CKD

- Managing depression increases survival in CKD!
 - Depression occurs in 25-47% of CKD patients
 - Believed to be the most common psych disorder in ESRD
- Chronic Pain occurs in >58% of CKD patients
- Musculoskeletal Pain occurs in 53% of CKD patients
- Insomnia occurs in 100% of all CKD 5/5D patients
- Anxiety occurs in 27% of CKD patients

Most effective way to present this is as 'situational depression'
Since this can be a pretty bad situation to be in!





Optimal Follow-up Guidelines for CKD Office visit + Labs

CKD Stage	Length	of time	for next	appointment
3A	6 months			
3B		3.2 months		
4			2 months	
5				1.2 months

Progression to ESRD



- Kidney risk calculator: <http://kidneyfailurerisk.com>
 - Needs age, region (North America or not), sex, GFR, UACR
 - Free download (Apple/Android) via *Qx calculate*
 - Nephrology estimates are 2-8X too pessimistic and patient estimates are 20X too optimistic...
- A patient is diagnosed with diabetes
 - Risk to ESRD: 0.29% at 10 years
 - Risk to ESRD: 0.74% at 20 years



Patients, Nephrologists, and Predicted Estimations of ESKD Risk Compared with 2-Year Incidence of ESKD, CJASN 2019



The Magic Referral

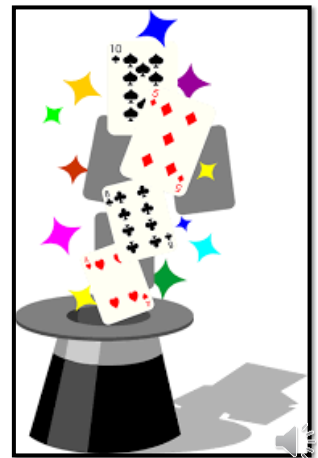
I always hear that your nephrology consultants complain about referrals...
We *are* overwhelmed but...

Start your referral with:

'Per KDIGO Guidelines,

I am referring this patient due to...'

- 1) Uncontrolled HTN
- 2) Stage 4 CKD
- 3) GFR dropped 25% in 6 months *or*
- 4) SCr increased 25% in 6 months
- 5) Patient request



In a Nutshell



- 1) All patients with ANY risk factors (age, HTN, DM, racial background, pollution, really...almost everyone) needs **BOTH a SCr and a UACR**
- 2) If at all possible, put the patient on an ACEi/ARB even if UACR is normal
Even a 'whiff' of ACEi/ARB is better than nothing
- 3) Aim for a SBP of <120
- 4) If metformin fails, continue but add an SGLT2 inhibitor
- 5) USE a STATIN!
- 6) Yellow caution medications include OTC NSAIDS but 1-2 days are very low risk
- 7) Double-check all renal dosing protocols for medications

Thank you for helping us care for CKD Patients!



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