Cardiovascular Disease and BP Management in CKD

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November 29, 2014

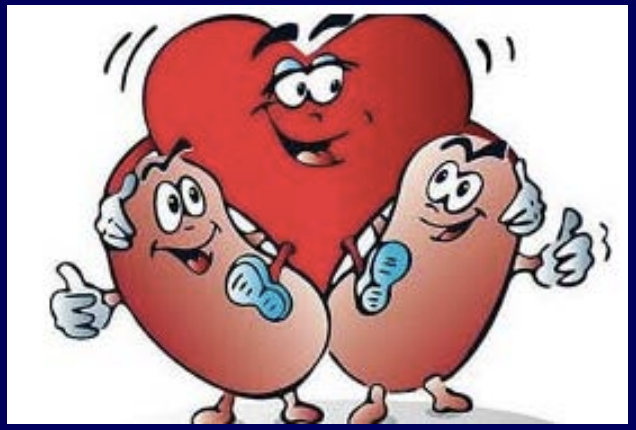
THE CKD SYMPOSIUM
FOR PRIMARY CARE PROVIDERS

No disclosures

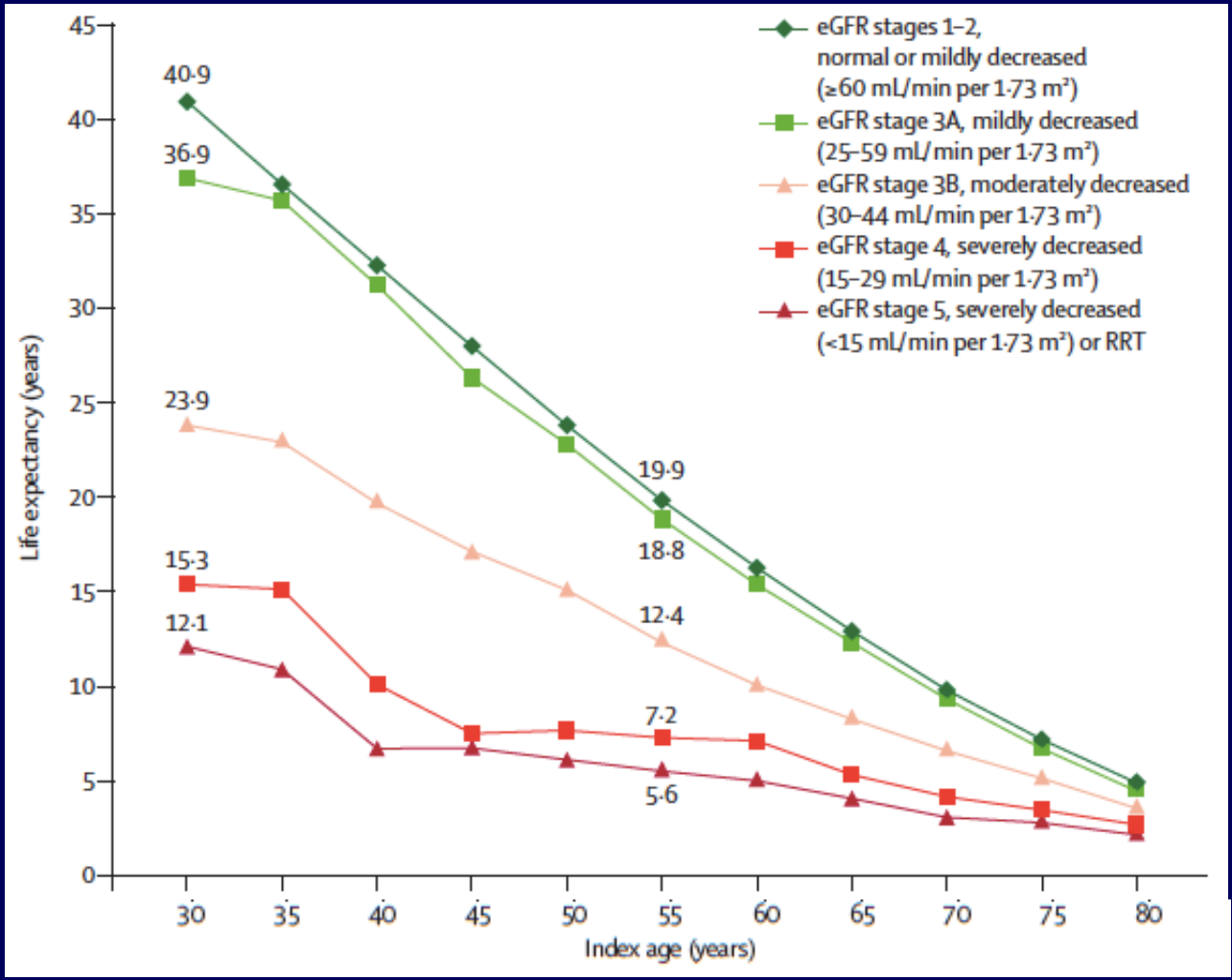
After attending this session, the participant will be able to:

- Recognize the strong link between cardiovascular disease (CVD) and chronic kidney disease (CKD)
- Have knowledge of the BP targets and preferred medications in CKD
- Understand how to manage patients with both heart failure and CKD

The link between CVD and CKD

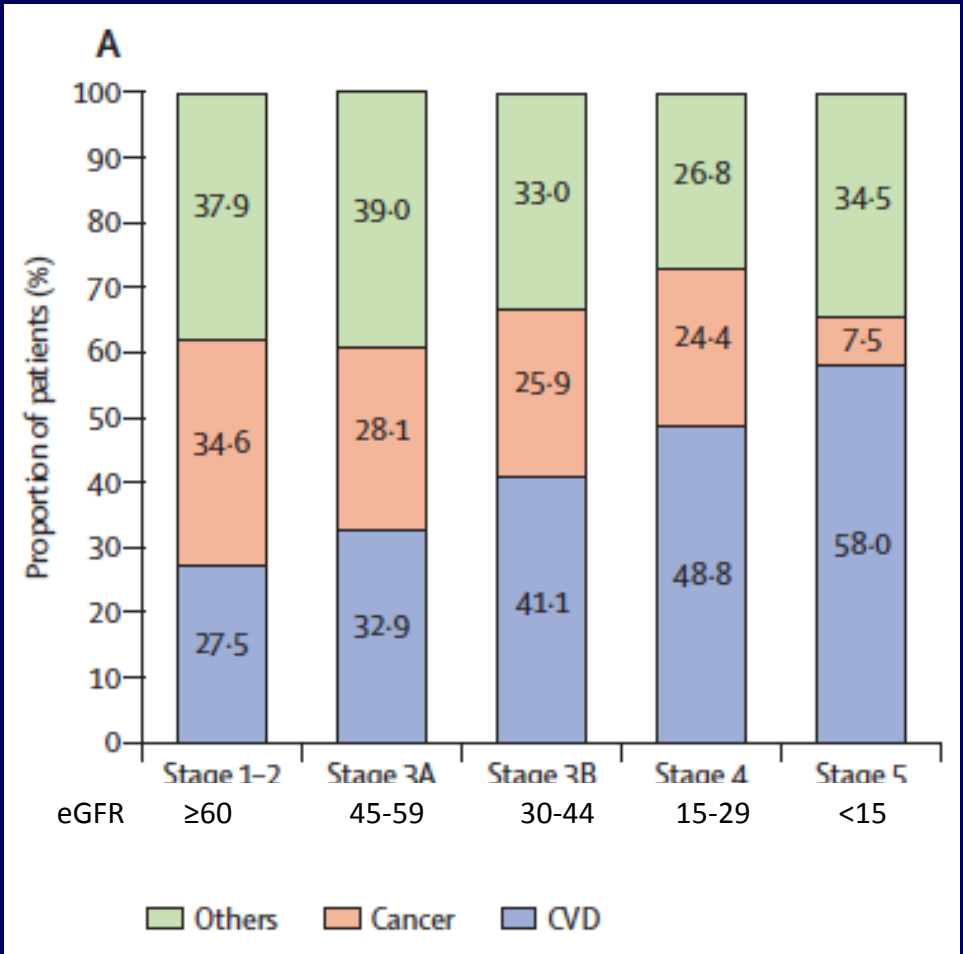


CKD Reduces Life Expectancy



Gansevoort et al, Lancet 2013;382:339-52

Chance of death from CVD increases as kidney disease gets worse



Gansevoort et al, Lancet 2013;382:339-52

Most patients with CKD are more likely to DIE from CVD than get kidney failure

Treatment of CVD in patients with CKD

Focus on Blood Pressure

An ounce of prevention… Lifestyle intervention

- Smoking cessation
- Alcohol in moderation
- Weight management
  - Target BMI 20 – 25 kg/m^2
- Physical activity
  - At least 30 min 5 days per week

Sodium Restriction

- CKD is a “salt sensitive” state
- Sodium < 2 g/day (salt < 5 g/day)
- Read food labels

Pharmacological Interventions

- Blood glucose control in diabetes
- Lipid lowering therapy
  - Statins recommended for CKD, age ≥ 50 yrs
- Blood pressure control

Blood Pressure Targets in CKD

Blood Pressure Targets in CKD
CHEP Guidelines 2014

- CKD without diabetes: <140/90 (Grade B)
- CKD with diabetes: <130 (Grade C)/<80 (Grade A)
- Use caution in individuals in whom a substantial fall in BP is more likely or will be poorly tolerated (e.g. elderly, autonomic dysfunction)
- These targets are endorsed by the CDA and the CSN

Blood Pressure Targets in CKD
KDIGO Guidelines 2012

- CKD without albuminuria: Target ≤140 /≤90
- CKD with albuminuria: Target ≤130/≤80
- Tailor treatment regimens in elderly patients by considering age, co-morbidities and pay close attention to adverse events related to BP treatment

www.kdigo.org

Individualize BP Targets According to Tolerability

Evidence Based Antihypertensive Medication Choices in CKD

	NON diabetic CKD	DIABETES with CKD
No proteinuria		ACEi or ARB
ACR 3 – 30 mg/mmol (microalbuminuria)		ACEi or ARB
ACR > 30 mg/mmol	ACEi (or ARB)	ACEi or ARB

www.hypertension.ca/chep
www.kdigo.org

Other Strategies for BP Management in CKD

- Combination therapy is usually required
- CKD is a salt sensitive state
  - Diuretics often effective as add on therapy e.g. thiazides
  - For volume overload and/or more advanced CKD (eGFR <30), loop diuretics often more effective
- In diabetics, adding a dihydropyridine CCB (e.g. amlodipine) to an ACEi is preferred over a diuretic
- Combination of ACEi and ARB should be avoided due to increased risk of adverse events

Management of Patients with CHF and CKD

CHF and CKD Commonly Coexist

Table 24. Ten Most Common Co-Occurring Chronic Conditions Among Medicare Beneficiaries With Heart Failure (N=4,947,918), 2011

Beneficiaries Age ≥65 y (N=4,376,150)*			Beneficiaries Age <65 y (N=5,71,768)†		
	N	%		N	%
Hypertension	3,685,373	84.2	Hypertension	461,235	80.7
Ischemic heart disease	3,145,718	71.9	Ischemic heart disease	365,889	64.0
Hyperlipidemia	2,623,601	60.0	Diabetes	338,687	59.2
Anemia	2,200,674	50.3	Hyperlipidemia	325,498	56.9
Diabetes	2,027,875	46.3	Anemia	284,102	49.7
Arthritis	1,901,447	43.5	Chronic kidney disease	257,015	45.0
Chronic kidney disease	1,851,812	42.3	Depression	207,082	36.2
COPD	1,311,118	30.0	Arthritis	201,964	35.3
Atrial fibrillation	1,247,748	28.5	COPD	191,016	33.4
Alzheimer's disease/dementia	1,207,704	27.6	Asthma	888,16	15.5

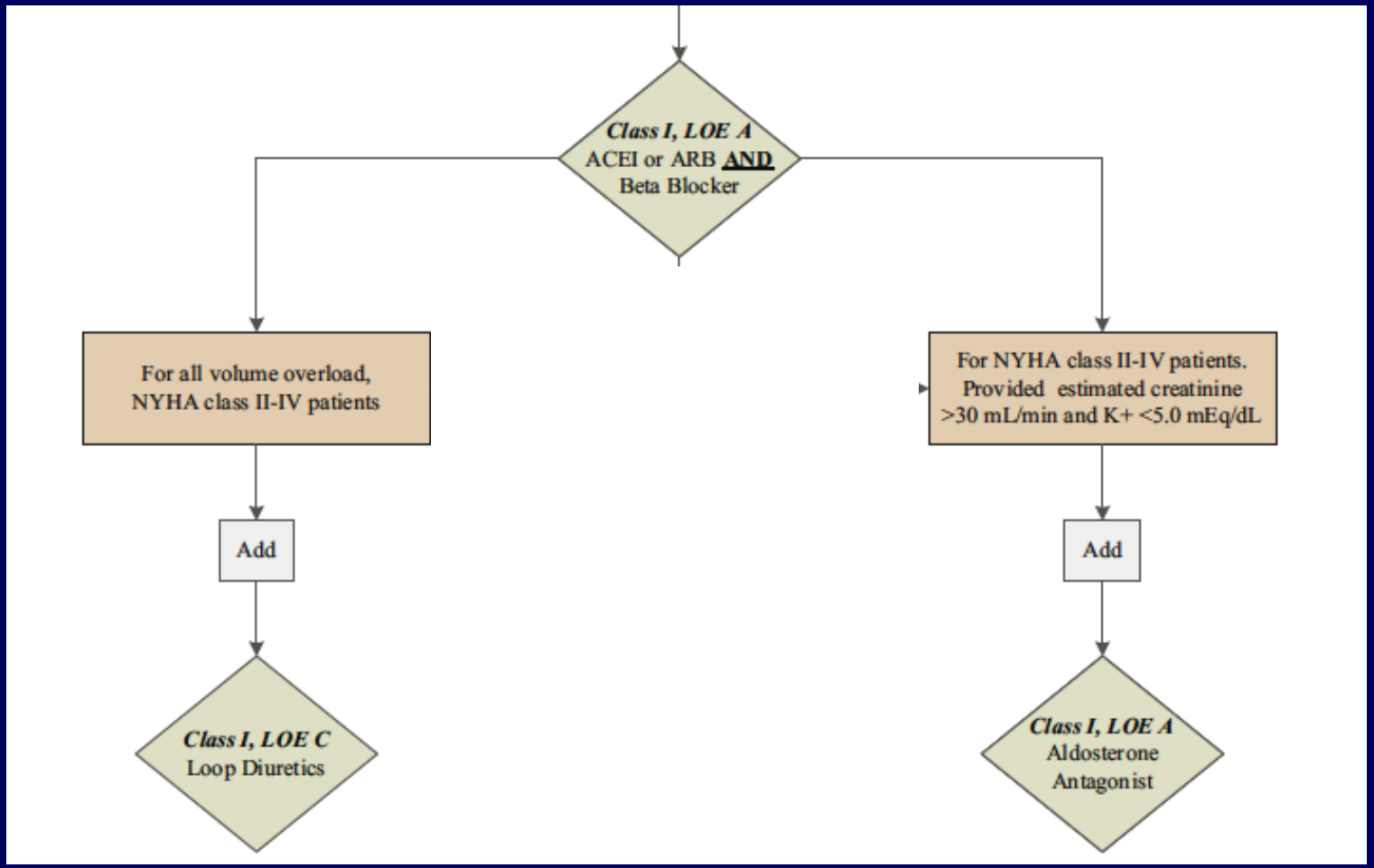
About 40% of US Medicare Beneficiaries with CHF also have CKD

ACCF/AHA Guidelines 2013

Mr. GW

- Frail 76 year old man
- PMH: HTN, CAD with LVEF 35% (NYHA Class II), AAA repair, PVD surgery both legs
- Meds: ramipril 10, spironolactone 25, metoprolol 25 bid, furosemide 40, atorvastatin 40
- Baseline creatinine is 150 - 175 (eGFR ~35), ACR < 3

Heart Failure with Reduced EF
Stage C (=Current, Prior Symptoms)



2013 ACCF/AHA guideline for the management of heart failure

Patients with CKD on CHF Therapy Need Closer Monitoring

- Increased risk of adverse effects: hyperkalemia and acute kidney injury
- More frequent office visits for assessment of treatment tolerability when unstable or when new treatments started
- For those on ACEi, ARB, loop diuretics, spironolactone, check potassium and creatinine:
  - At baseline
  - After 1 - 2 weeks of starting treatment
  - After uptitrating treatment
  - During periods of instability (e.g. acute illness)
  - And then periodically thereafter

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Mr. GW
Over the initial 2 years of follow-up

- Cardiac status stable
- Creatinine slowly creeping up to 200 range (eGFR ~27)
- Intermittent hyperkalemia: 5.3 - 6.1 mmol/L

Hyperkalemia should be anticipated…

- Frail 76 year old man
- PMH: HTN, ex-smoker, CAD with LVEF 35% (NYHA Class II), AAA repair, PVD surgery both legs
- Meds: ramipril 10, spironolactone 25, metoprolol 25 bid, furosemide 40, atorvastatin 40, tamsulosin 0.4, warfarin
- Baseline creatinine is 150 - 175 (eGFR ~35)

Vardeny et al, Circ Heart Fail. 2014 Jul;7(4):573-9.

Dietary Advice to Reduce Risk of Hyperkalemia

When to stop an ACE inhibitor or ARB

- K >5.5 mmol/L
  - May be able to continue or restart if other contributors modified: diet, medications (e.g. NSAIDS, Septra)
- Creatinine rises >30% (or eGFR falls >25%) within first few weeks of treatment
- During episodes of acute kidney injury
  - May be able to restart when patient stabilizes
- During acute illness: “sick day” advice

PATIENT TEACHING TOOL

MEDICATION CHANGES WHEN YOU ARE SICK

BCRenal agency

If you have a bad flu or other illness which causes you to vomit or have diarrhea AND you cannot eat or drink normally, you may become dehydrated (dry). Dehydration can affect your kidney function and blood pressure.

If you are vomiting or have diarrhea or feel very sick:

- Try to drink fluids. It is best to drink fluids that do not have caffeine.

If you are so sick that you cannot drink your normal amount of fluids:

- Stop taking the medications listed below until you are able to start drinking fluids again.
- **Contact your doctor or nurse if you have to stop taking your medications for more than 2 days.**

- ☐ ACE inhibitor: _____
- ☐ Angiotensin receptor blocker: _____
- ☐ Anti-inflammatory: _____
- ☐ Metformin
- ☐ Water pill: _____
- ☐ _____

Contact Phone Number:

_____

Patients most likely to benefit from receiving this teaching sheet include those who:

- Experience episodes of vomiting or diarrhea
- Are planning to go travelling
- Have had acute kidney injury and/or were recently hospitalized.

This brochure can be downloaded from the BC Renal Agency website: **bcrenalagency.ca**.

This brochure is based on a similar pamphlet developed by the KCC team at St Paul's Hospital, with appreciation.

BC Provincial Renal Agency • Phone: 604-875-7340 • Email: bcpra@bcpra.ca • Web: BCRenalAgency.ca

March 2013

http://www.bcrenalagency.ca/sites/default/files/documents/files/Medication%20Changes%20When%20You%20Are%20Sick_0.pdf

Patients Intolerant of ACEi or ARB

- Not all patients will tolerate these medications
- Use hydralazine + nitrate instead
  - Reduce mortality (V-HeFT, NEJM…1986!)

Of all strategies, knowing when to quit may be the best.

Chinese Proverb

Aldosterone Antagonists (e.g. spironolactone)

- Increased risk of hyperkalemia in CKD
  - Starting dose 12.5 mg daily
  - Do not start if K ≥ 5.0 mmol/L
  - In general, contraindicated if eGFR < 30 (or if Cr >220 in men, > 180 in women)

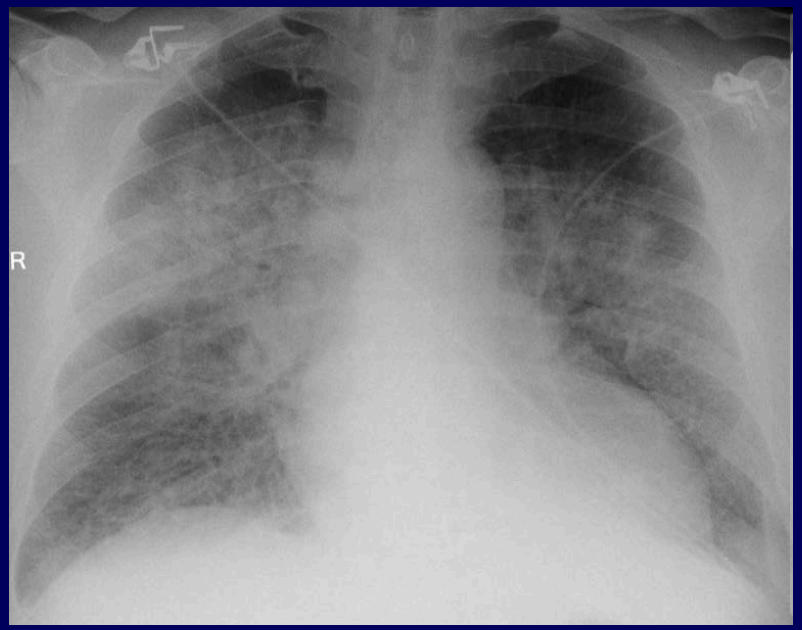
- Follow potassium levels closely

2013 ACCF/AHA guideline for the management of heart failure

Mr. GW: Acute Decompensated Heart Failure (ADHF)

- Increasing SOB, orthopnea and edema over a 2 week period
- ER: No acute coronary syndrome, he is in congestive heart failure
- Labs: Creatinine 270

  Potassium 5.6



Patients with ADHF are at high risk of worsening kidney function (AKI)

- Anticipation and prevention
  - Avoid hypotension (MAP < 60 mmHg)
  - Avoid nephrotoxins: contrast, NSAIDS
  - Avoid increasing intraabdominal pressure
    - Urinary retention, constipation

Gnanaraj et al, Kidney International (2013) **83,** 384–391

Dosing Diuretics in ADHF

- TYPE: loop diuretic (furosemide)
- Initial DOSE: equal to or higher than the home dose
- ROUTE: IV - splanchnic congestion reduces oral absorption
- FREQUENCY: twice daily to prevent rebound sodium retention
- APPROACH:
  - Escalate the dose until adequate symptom relief or renal hypoperfusion occurs (rising creatinine)
  - Diuretic resistance: consider adding a thiazide like diuretic (e.g. metolazone 2.5 – 5 mg daily to start) and specialist referral

Gnanaraj et al, Kidney International (2013) **83,** 384–391

What should I do with ACEi and ARBs in ADHF?

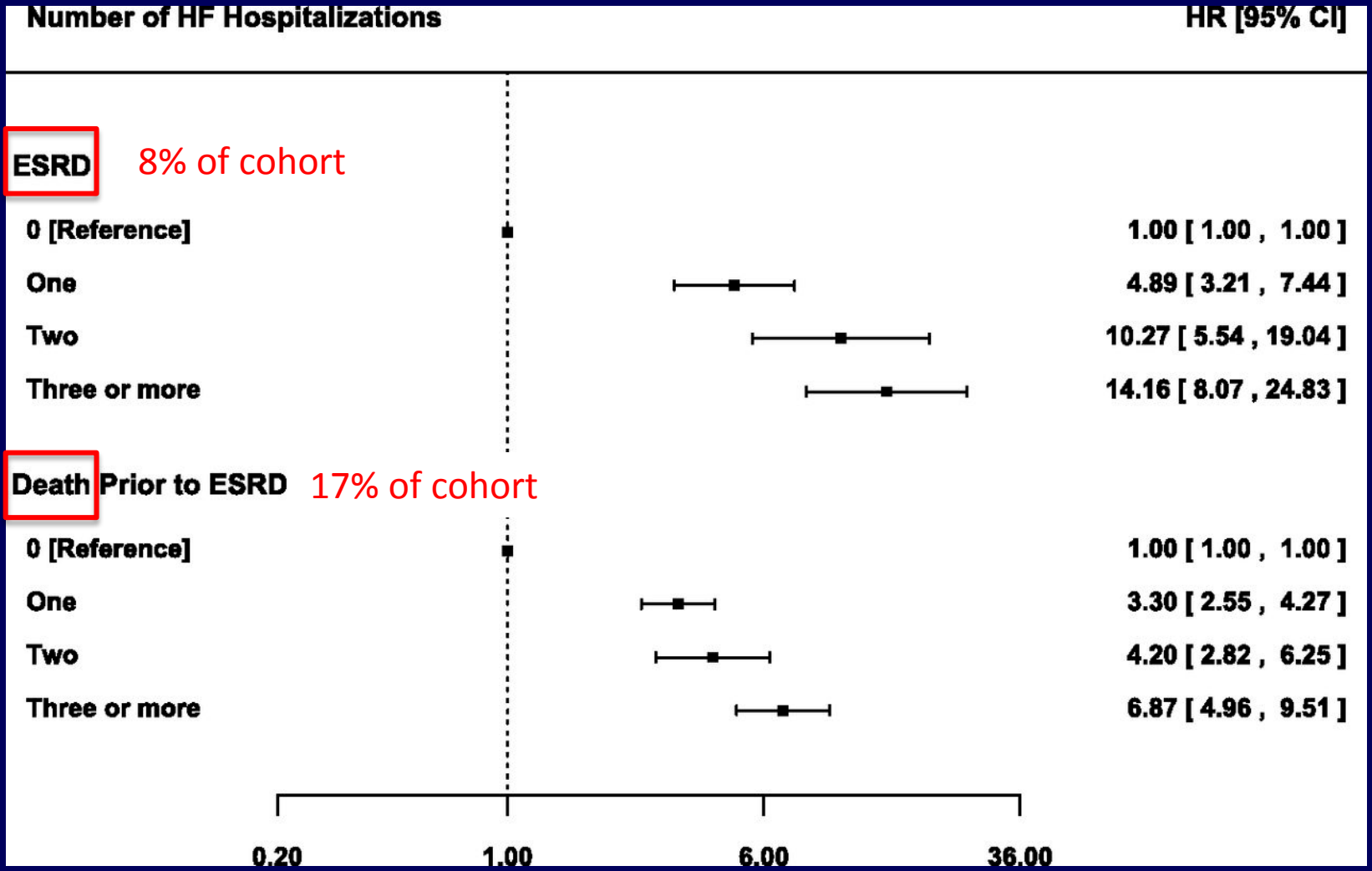
- Decongestion with diuresis is the priority in ADHF
- With aggressive diuresis, ACEi and ARB can contribute to worsening renal function
- Withhold ACEi, ARB temporarily in those at high risk for AKI:
  - Pre-existing CKD or currently has AKI
  - Elderly

Gnanaraj et al, Kidney International (2013) **83,** 384–391

Mr. GW: Hospital Treatment of ADHF

- Cardiac, renal diet (Na and K restricted)
- If hyponatremic, restrict fluid < 1.2 L/day
- Furosemide 60 mg IV twice daily
- Stop ramipril
  - Replace with nitro patch 0.4 mg/hr and hydralazine 10 – 25 mg tid
- Stop spironolactone
- Follow weights, electrolytes, creatinine daily

High Risk of ESRD and Death after Heart Failure Hospitalization in Patients with CKD



Sud M et al. JASN 2014

Referral to Nephrology, Cardiology

- Consider specialist consultation for co-management of patients with CKD and CHF

- Multidisciplinary care team (MD, RN, RD, Pharmacist, SW) to assist with:
  - Medical management
  - ESRD planning: dialysis, conservative care
  - End of life planning

Take Home Points

- Most patients with CKD are more likely to die from CVD than get kidney failure
- Be aware of target BP recommendations
  - And that these will likely change in the future
- Patients with CKD and HF are at increased risk of side effects from HF therapy (AKI, hyperkalemia)
  - More frequent monitoring is essential

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