

Chronic Kidney Disease Medical Management

2012

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How do you differentiate ARF from CRF.

- What physical exam finding tells you the pt has Chronic Kidney Disease?
- What Would you see on renal Ultrasound for a pt with CKD?

Lindsey's Nails



CKD prevalence in world Populations

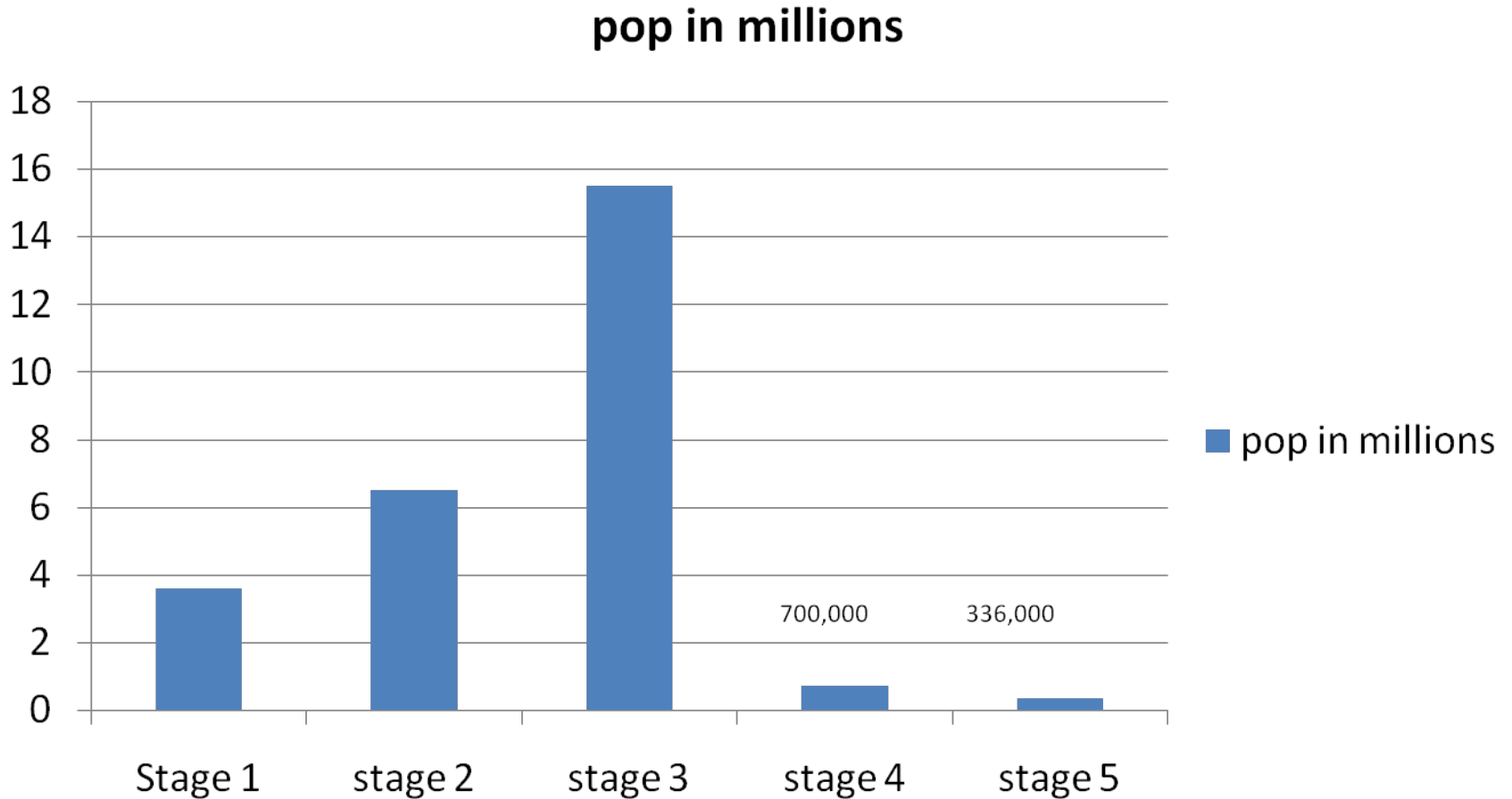
- | Country | Population | CKD est. |
|---------------|---------------|------------|
| – China | 1.298.847.624 | 35.336.295 |
| – India | 1.065.070.607 | 28.976.185 |
| – Indonesia | 238.452.952 | 6.487.322 |
| – Pakistan | 159.196.336 | 4.331.076 |
| – Phillipines | 86.241.697 | 2.346.281 |
| – Vietnam | 82.662.800 | 2.248.914 |

 - Assumes 2.72 % incidence

CKD Stages

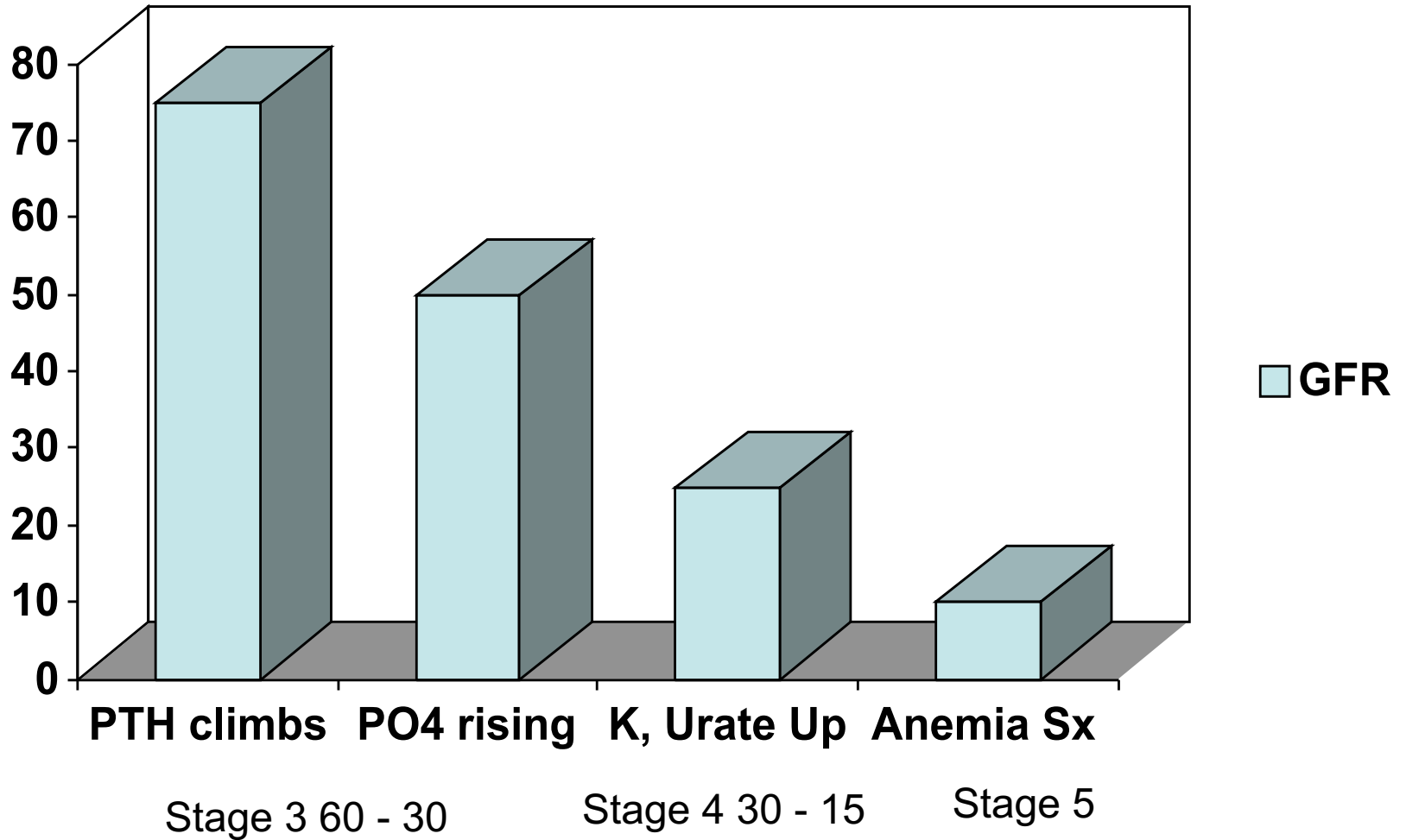
- Stage 1. Normal function with known dz
- Stage 2. GFR 60-80
- Stage 3. GFR 30-60
- Stage 4. GFR 15-30.
- Stage 5. GFR less than 15.
- Stage 6. ESRD on dialysis.

US Population with CKD



Coresh, Selvin, Stevens. Prevalence of CKD in the US. JAMA.2007;298(17)2038.

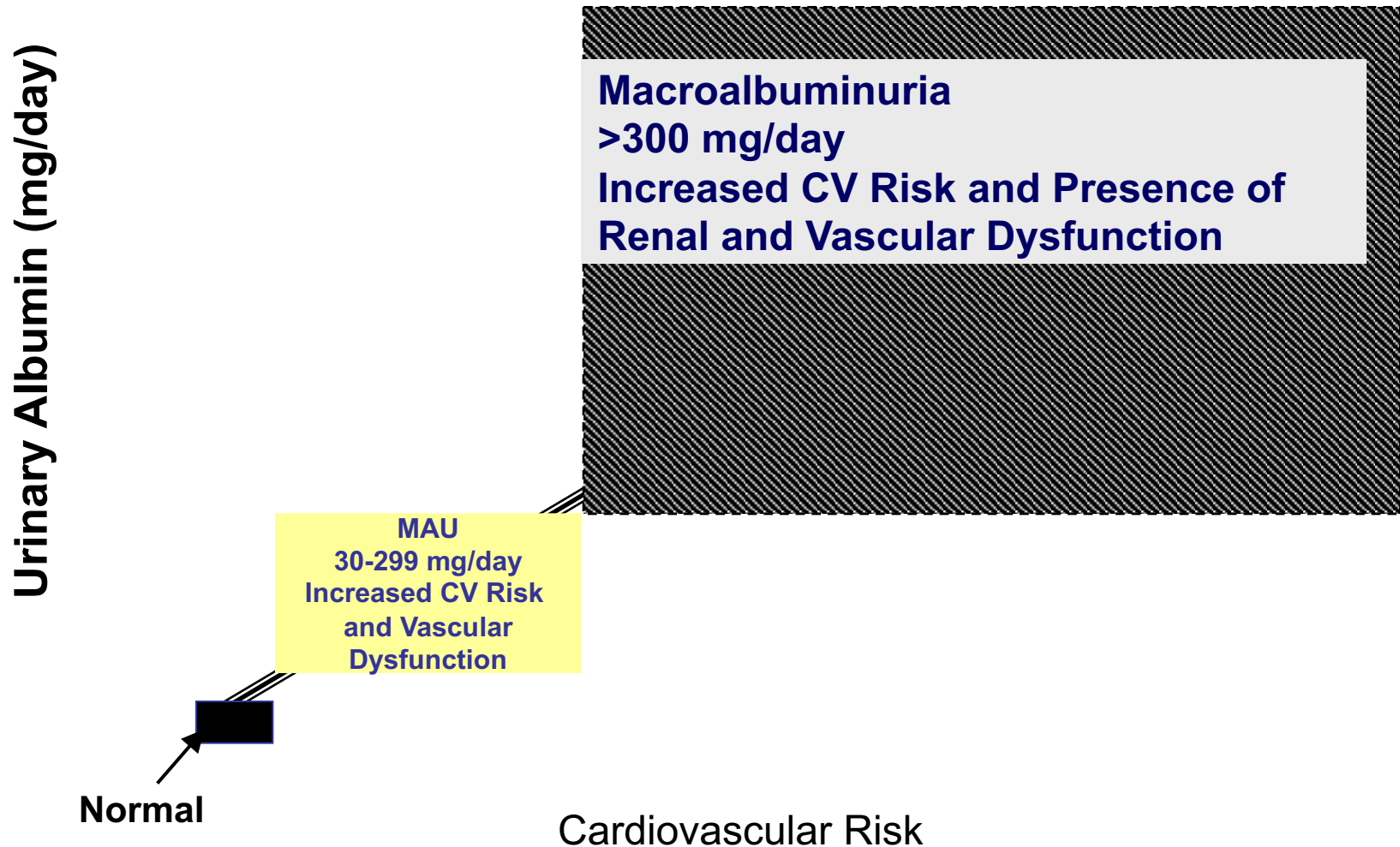
Progression of CRF



Preparation of the Patient

- Manage CRF
 - Control BP
 - Control glucose
 - stop oral agents!
 - Prevent Hyper PTH
 - Vit D
 - Calcium acetate
 - Phosphate binder
 - Diet Education

Presence of MAU Indicates a Potential Increased Risk for CV Events



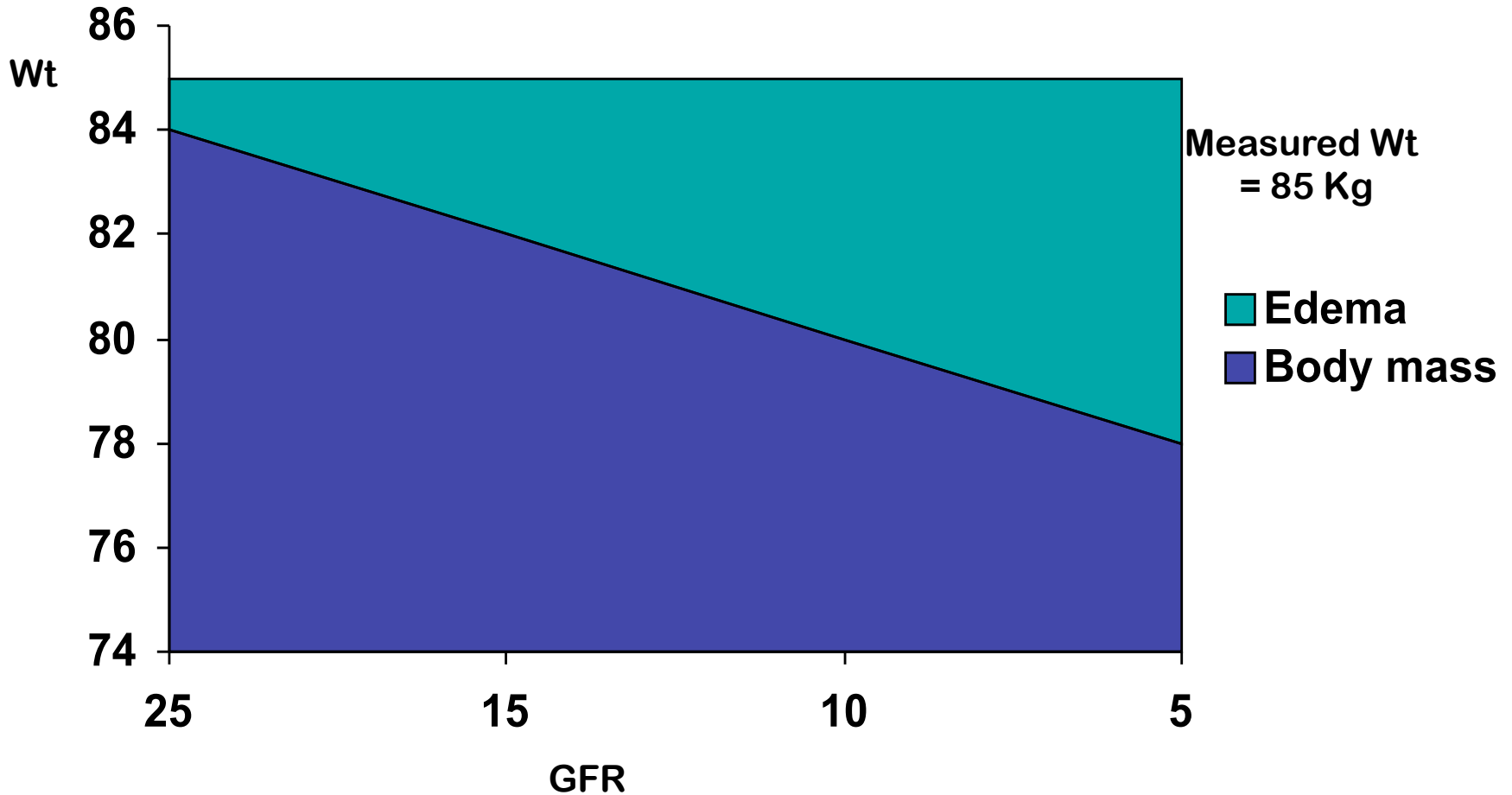
Preparation of the Patient

Most of this will be in Stage 4

- Manage Fluids
- Dialysis education
- Access Placement
- Prevent anemia
- Prevent Malnutrition
- Start ACE?
- metolazone
- NKF program
- AV fistula, PD cath
- Epogen, Iron
- This can get tricky
- Stop ACE?

Transition to End Stage

Effect of Malnutrition



Indications for Dialysis

- A acidosis
- E electrolyte abnormalities
- I intoxication/poisoning
- O fluid overload
- U uremia symptoms/complications

Dialysis for Intoxications

- T theophylline
- A aspirin
- B barbiturates
- L lithium
- E ethylene glycol, methanol
- M Metformin

Peritoneal Dialysis Catheters

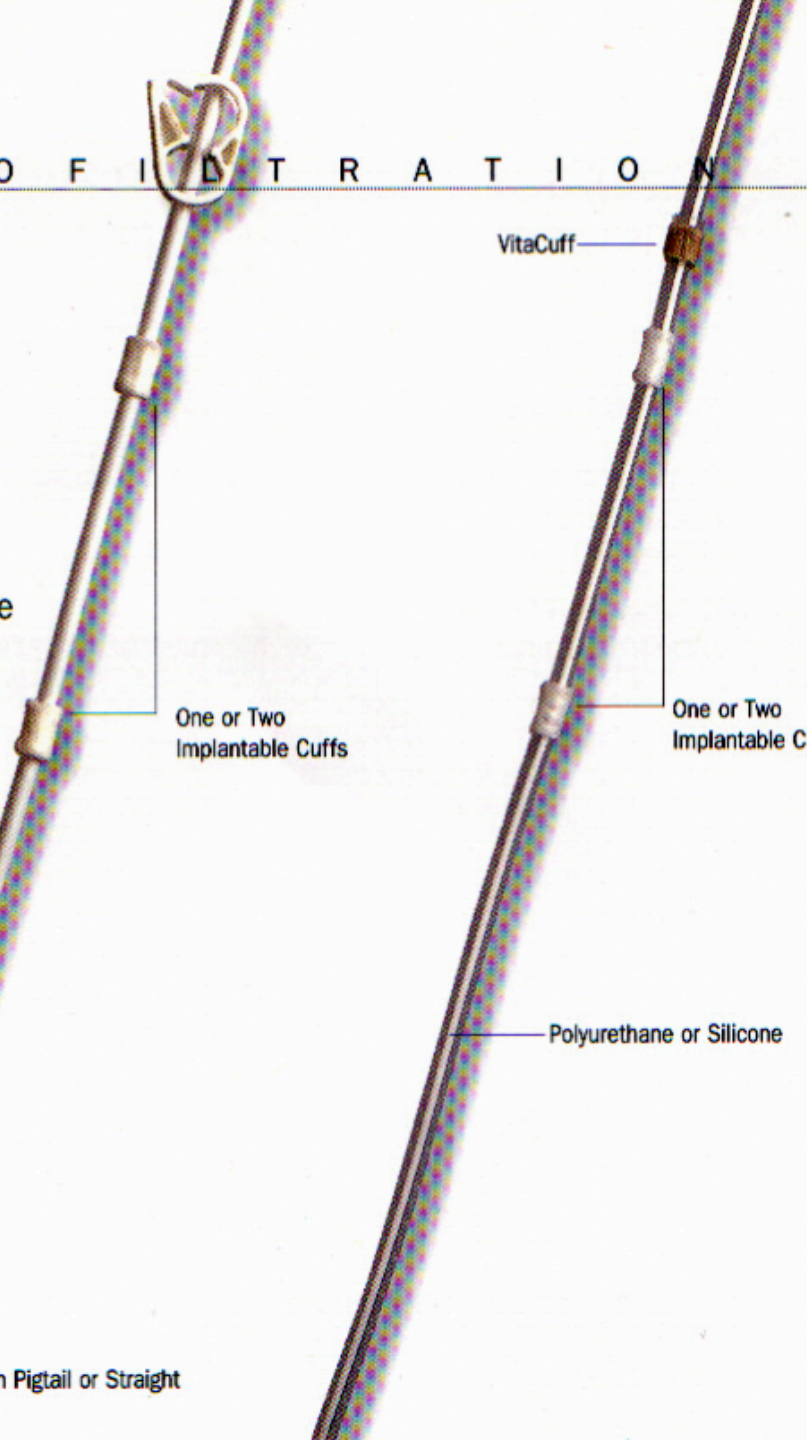
Two types of peritoneal dialysis catheters, pigtail curled catheters in short-term use and straight catheters for long-term use are available. Both are made of medical-grade silicone.

Two types of implantable cuffs are available for catheter placement.

Pigtail - Minimizes kinking; used for short-term use with dialysis treatment.



Available in Pigtail or Straight



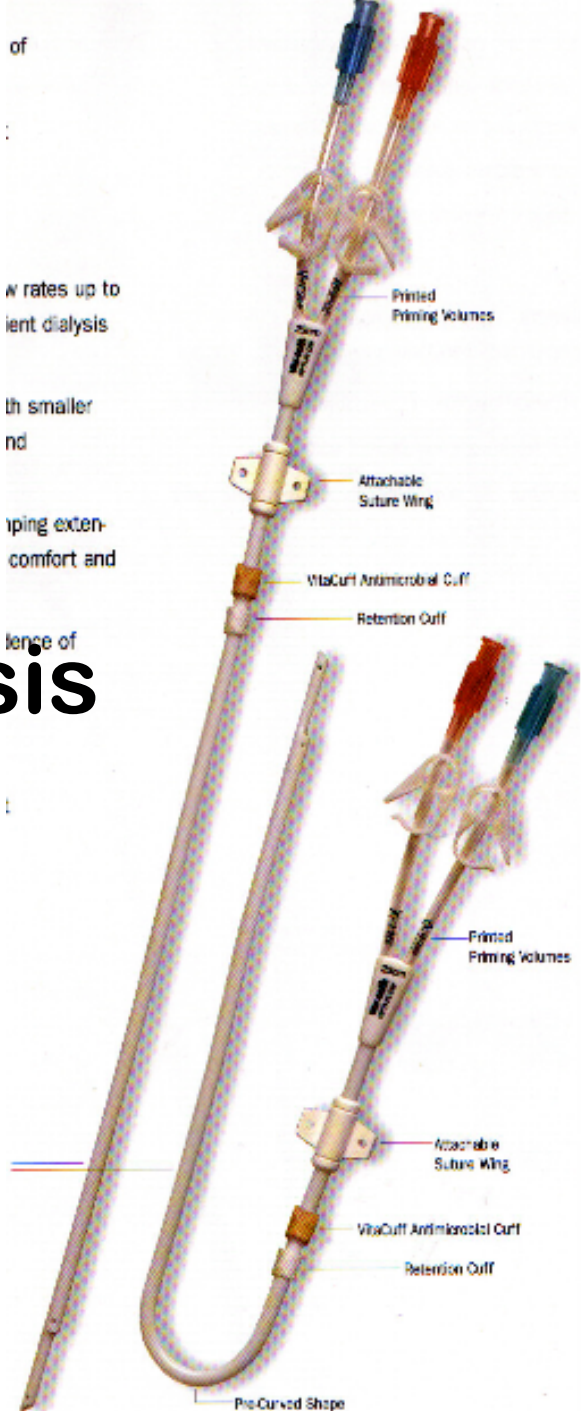
VitaCuff

One or Two
Implantable Cuffs

One or Two
Implantable C

Polyurethane or Silicone

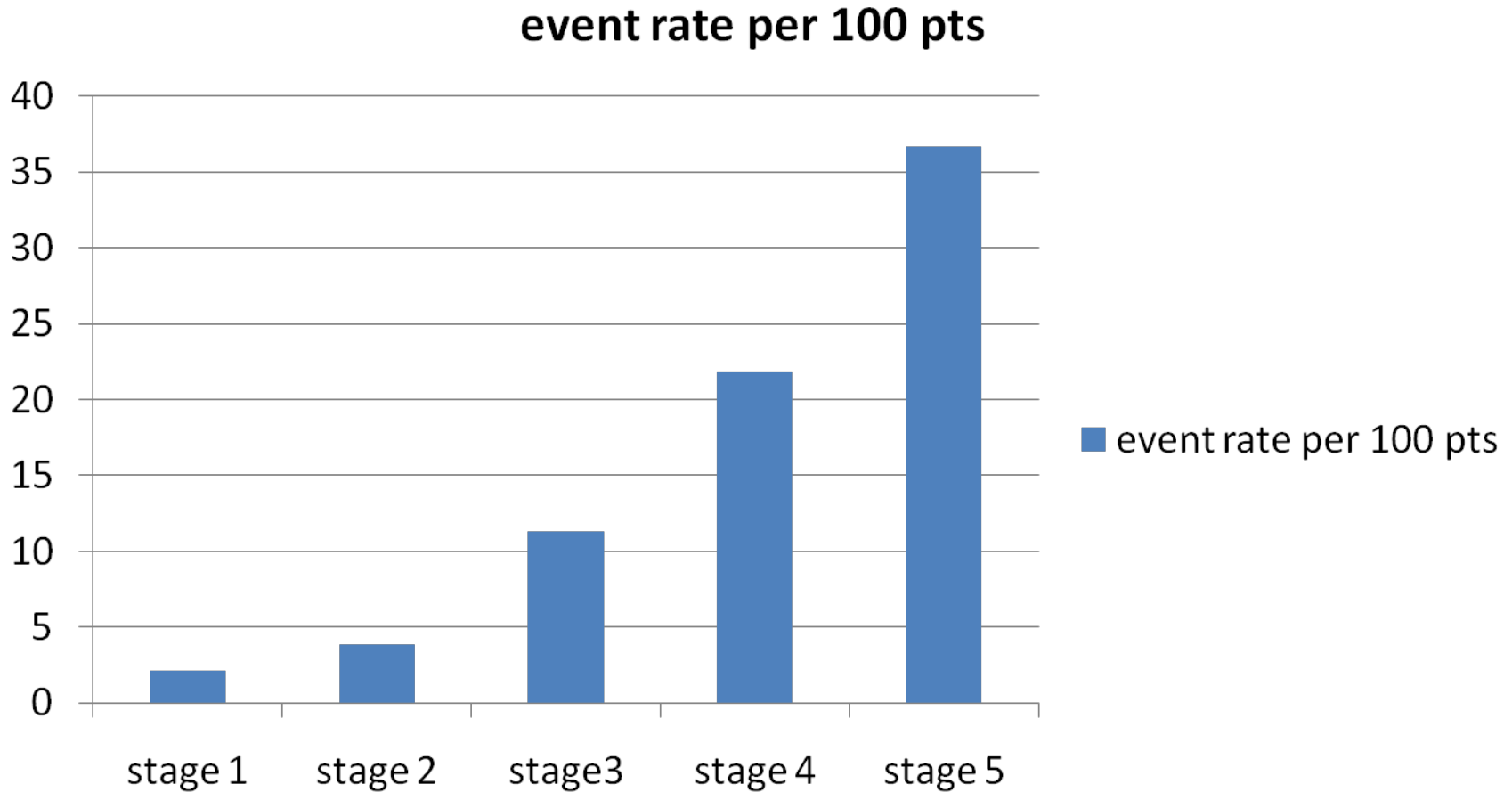
Cuffed Tunnelled Hemodialysis Catheters.



Relative Contraindications

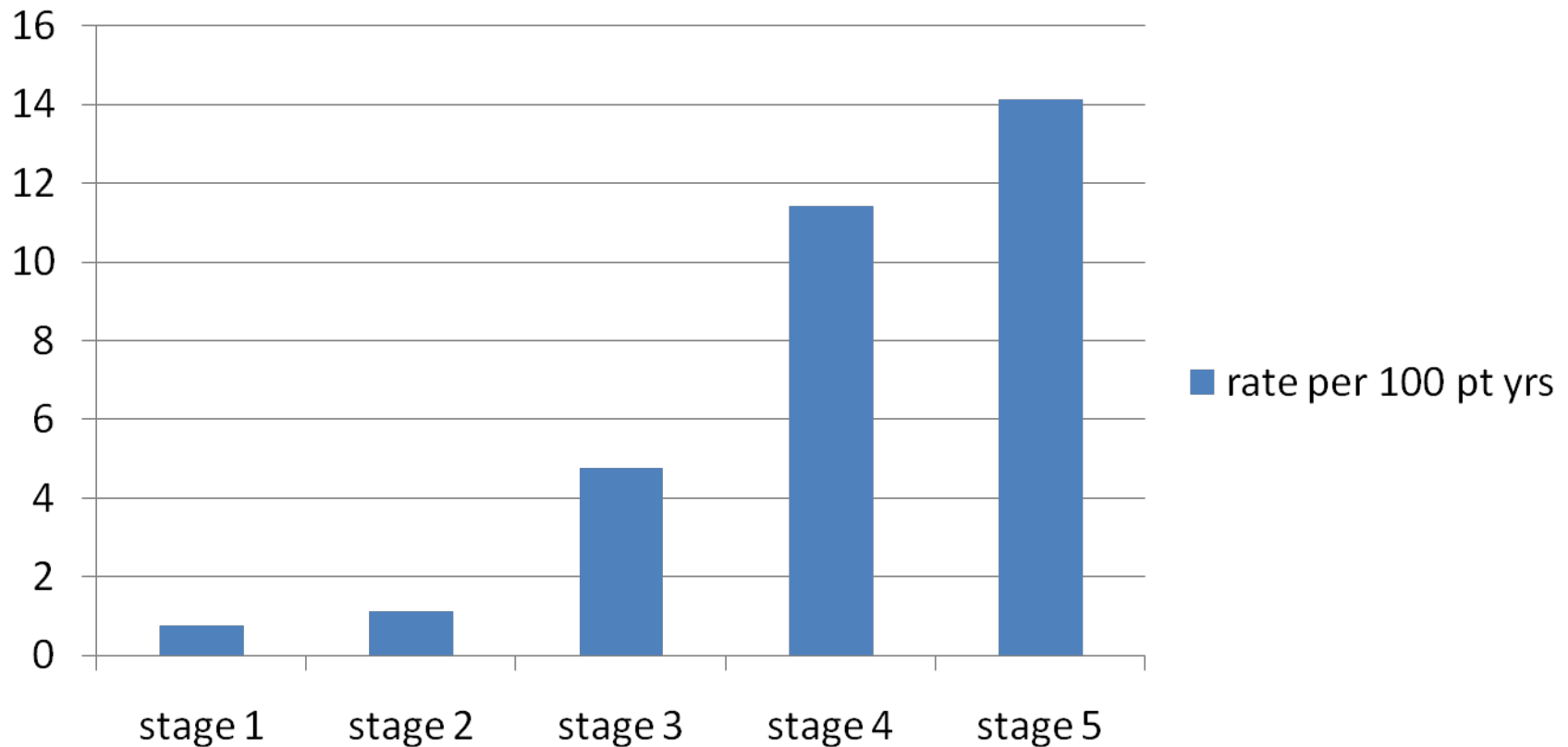
- Alzheimer' s disease
- Multi-infarct Dementia
- Hepatorenal syndrome
- Advanced cirrhosis with encephalopathy
- Advanced malignancy
- HIV with dementia

Cardiovascular events by Stage of CKD



All Cause Mortality By Stage of CKD

rate per 100 pt yrs



Causes of Outpatient Mortality

- Cardiovascular events
- GI bleed
- Infection

Inpatient Mortality

- Sepsis/Infection
- Cardiovascular events
- GI bleed

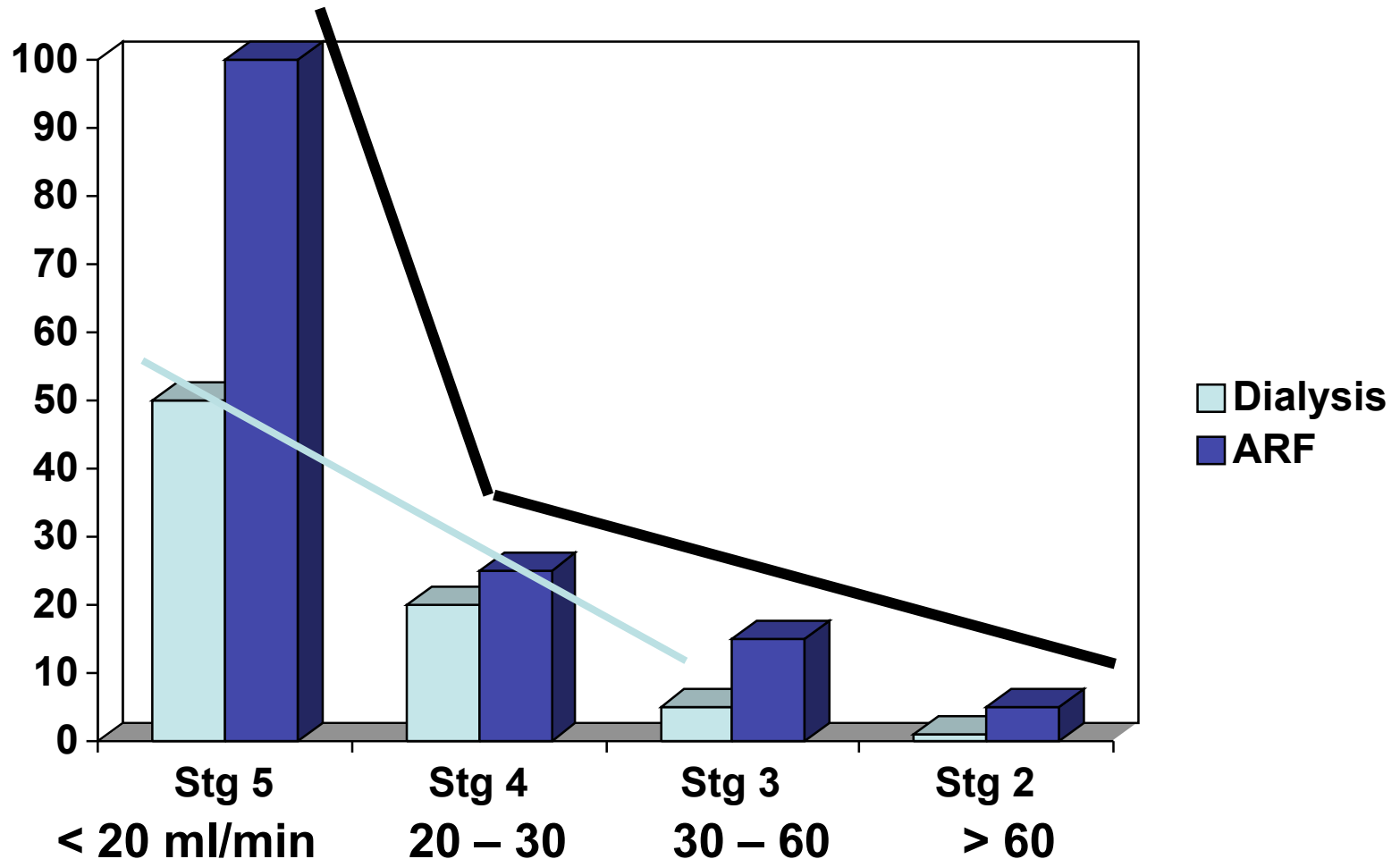
Cardiovascular Risk of Patients with CKD

- Treat them as if they have already had their first MI.
- Should be on B-Blocker, ASA, Statin, and ACE or ARB.
- May need to stop the ACE/ARB as renal function declines
- Think about restarting it once they are on dialysis.
- Be careful about writing “no ACE/ARB or Contrast” in these pts.

Risk Factors for Contrast Nephropathy

- Age over 60
- Diabetes
- Pre-Renal States
 - CHF
 - NSAIDS, ACE Inhibitors, Diuretics
- Proteinuria Includes, but not limited to Myeloma.
- Pre-existing Renal Disease

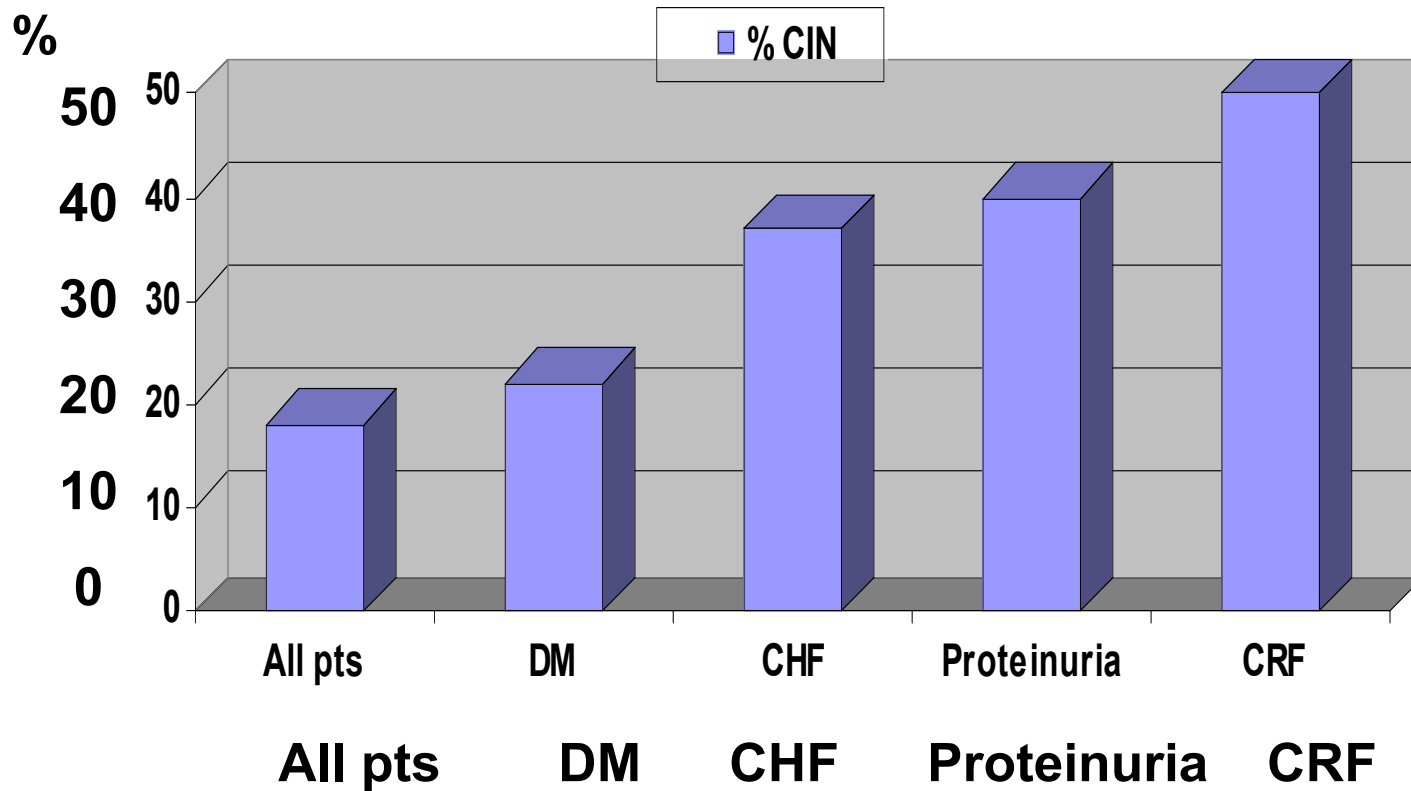
Risk of CN By Stage of CKD



Incidence of CN

- Nationally 4%
- GVH 2005 18%
- GVH 2006 5
- DHH 4%

Contrast Nephropathy at GVH 2005



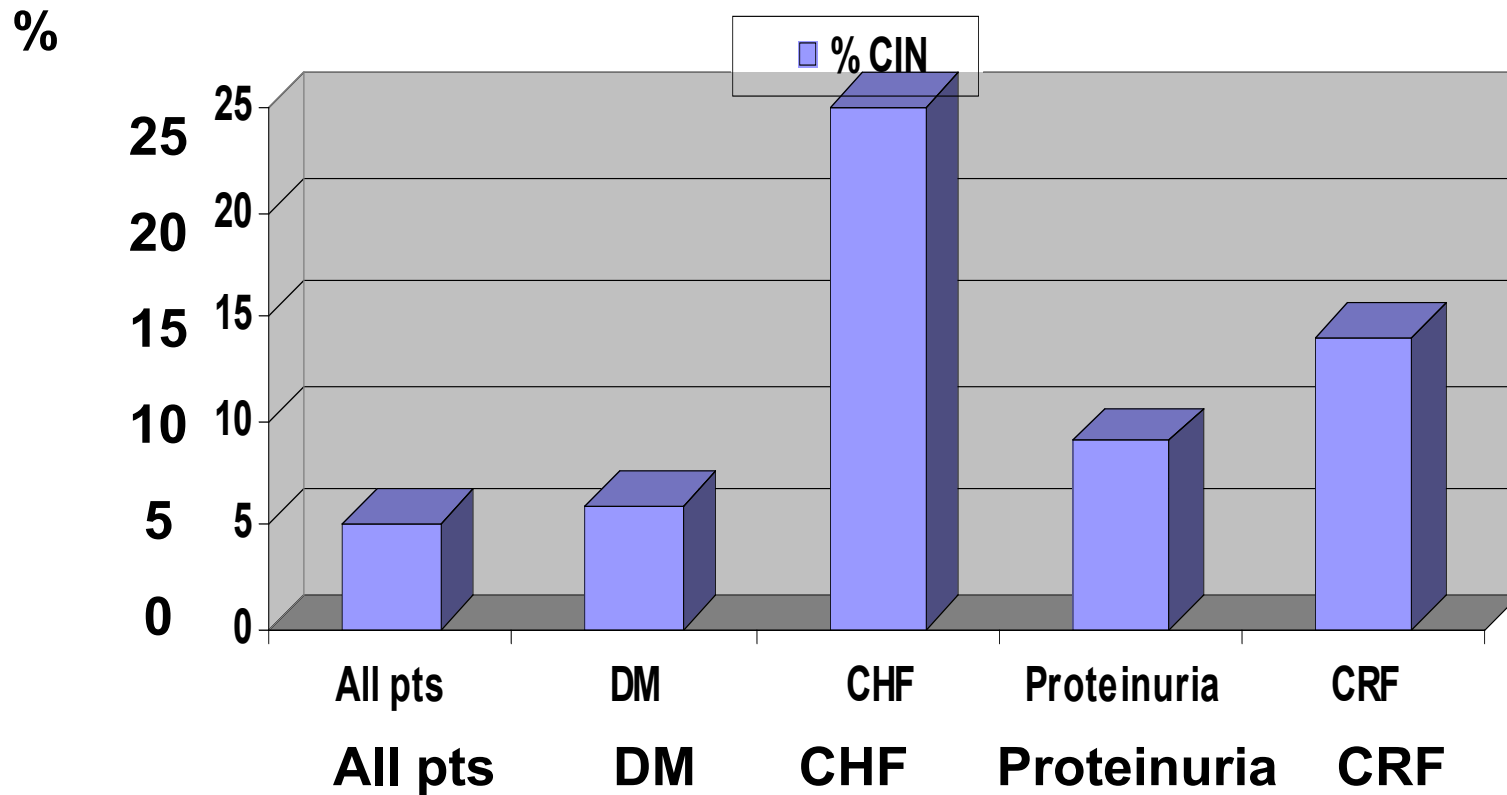
Policy / Recommendations

- Stop ACE/ ARB, NSAIDs, Diuretics day before procedure
- IVF for everyone
 - NS for low risk pts
 - Bicarb for high risk pts?
- Urinalysis for all pts/ calculate Creat Clear for all pts.
 - Proteinuria or creat clear < 40 considered High risk.
- Mucomyst for High risk pts
- Limit volume of contrast in High Risk Pts.
- Consider Nephrology consult if considering Mannitol, Corlepan, or identified as high risk.

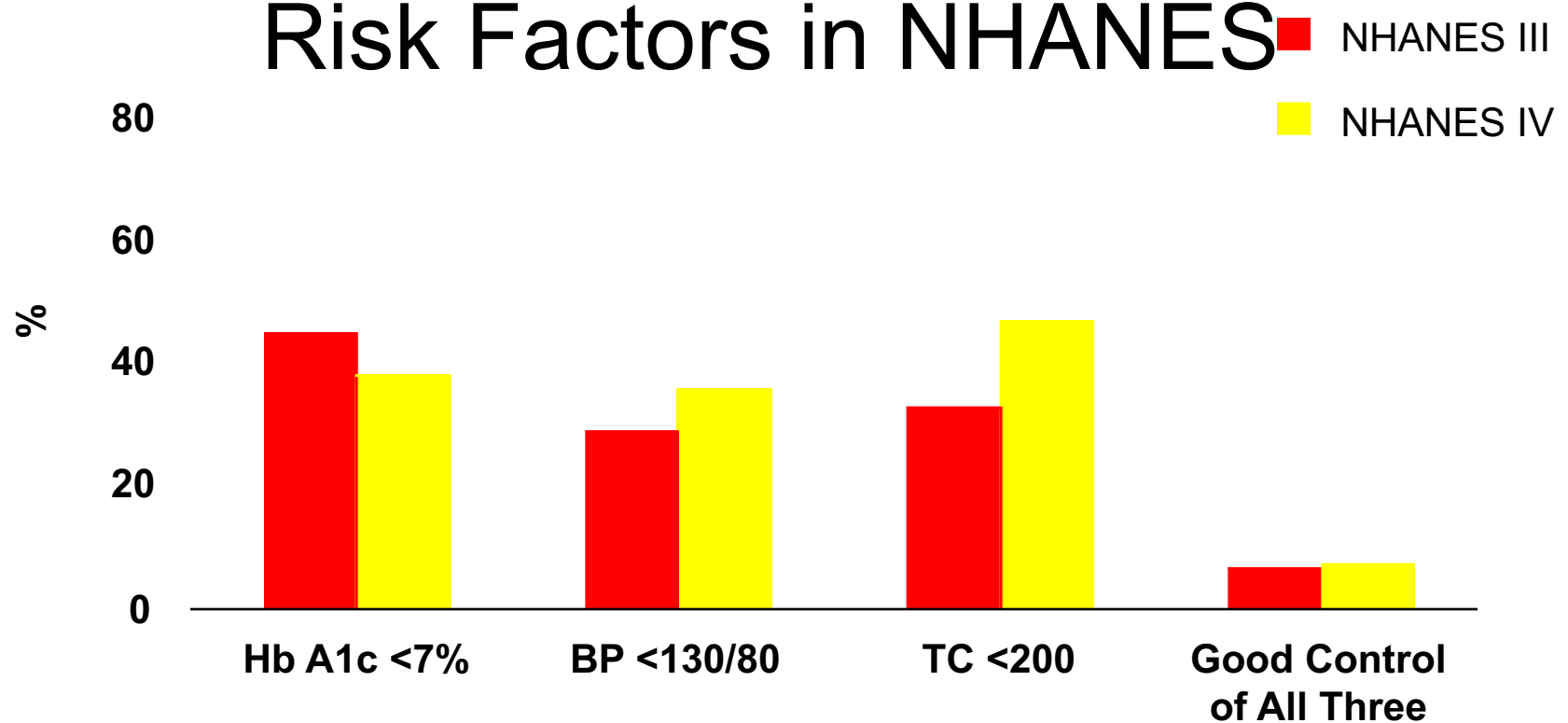
Contrast Nephropathy GVH

2006

- After Implementation of Policy



Percentage of Adults With Diabetes Who Achieved Recommended Levels of Vascular Risk Factors in NHANES



Correction of Anemia in Diabetic CHF

- Diabetic patients with Hb less than 12.5 g% treated with erythropoetin and IV iron
 - NYHA class improved by 36.8%
 - Dyspnea improved by 69.7% on Visual Analogue Scale
 - EF improved by 7.6%
 - Hospitalizations decreased by 96.6%

Pain Meds

- HD patients usually require fewer narcotics than other patients
- Typically, a patient will have an order for morphine 2-4 mg q 2-4 hours
- Alternative choices
 - Dilaudid
 - Fentanyl



Pain Meds

- If the dose is inadequate, you can always give more.
- Giving more narcotics is always easier than treating with a narcan drip and pressors
- Avoid demerol if possible
 - its metabolite normeperidine can cause seizures if it accumulates

Pain Meds

- If a patient has residual renal function, try to avoid NSAID' s
- Remember that overdosing NSAIDS can lead to salicylate toxicity
- Pts present with tinnitus, headache, nausea, and fever
- HD patients have a narrow therapeutic range and develop salicylism with less drug

Diabetics

- As kidney function declines and ceases, insulin is not cleared as quickly.
- The insulin and oral agent's effects last longer
 - Sulfonylureas
 - Avoid Metformin once GFR is less than 40 ml/min

Diabetics

- The patient's response to insulin and oral agents is a marker of getting close to dialysis
- Patients think their DM is doing great
 - needs less insulin to control blood sugars.



Diabetics

- What really happens is:
- The patient is uremic and loses his appetite
- He eats less
- The insulin hangs around
- Now the blood sugars look great and the patient needed a fistula last month

Hemostasis

- Uremic plasma factors lead to abnormal platelet aggregation and adhesion
- Dialysis removes these factors
- Unfortunately, the dialysis membrane alters the platelet membrane receptors for vWF and fibrinogen

Hemostasis

- Manifestation of this platelet dysfunction can range from oozing at a venipuncture site to GI hemorrhage
- If a patient is bleeding after a simple procedure, start with the simple treatments

Hemostasis



- DDAVP may be used if the bleeding cannot be controlled
- Use 0.3mcg/kg IV over about 20 minutes
 - 15 mcg in 50 cc NS over 15 min.
- DDAVP stimulates release of vWF
 - increases GPIIb platelet adhesion factor expression

Reminders

- When you evaluate a patient keep in mind that HD patients are different
- These patients need the same workup for the same complaints
- Your differential will be the same
- Your treatment may be modified

Hypotension

- Treat the HD patient with IV fluids
- 0.9% saline, 250cc bolus
- Albumin / Hespan
- Check for response
- You have treated the HD patients like the other patients
- All you changed was the amount of fluid

Meds to Consider

- Demerol
- Morphine
- NSAID' s
- ACEI / ARBS
- Glucophage
- Antibiotics

Meds to Avoid/Think About

- Contrast- IV contrast can be given in dialysis patients
- Keep in mind that the osmotic effects of contrast can shift fluid into the intravascular space and cause pulmonary edema
- MRI contrast (Gadolinium etc) should be avoided over creat of 2.0 or GFR less than 40 ml/min

Advances in Artificial Kidneys

- Membraneless artificial kidney
 - Uses fluid layer in microtubule for solute exchange
 - Worn on arm, connected to avf continuously
 - The fluid layer collects wastes and is exchanged periodically
 - Infocitex Inc and Columbia University
 - Reach market in 2015?

Wearable Artificial Kidney

- Miniaturized dialysis machine worn around waist. Wt 5 lbs.
- Utilizes a unique battery powered pump for blood and dialysate
- Sorbent cartridge based dialysate
- Already proven for SCUF in CHF pts.
- UCLA Victor Gura, MD

Human Nephron Filter

- Nanomembrane technology
- May be able to tailor dialysis
- Would lend itself to wearable, continuous modalities
- Philtre, Alan Nissenson, MD

Bioartificial Kidney

- Uses cloned renal tubular cells from unusable donor kidneys
- Cells line capillary tubules in a kidney similar to conventional dialysis kidney
- Renal Assist Device can assume endocrine and metabolic functions
- In phase II study reduced mortality in ICU ARF pts from 61 to 34 %.
- University of Michigan David Humes, MD

Welcome to Hell
Here's your pager!

