Chronic Kidney Disease

Basics of CKD

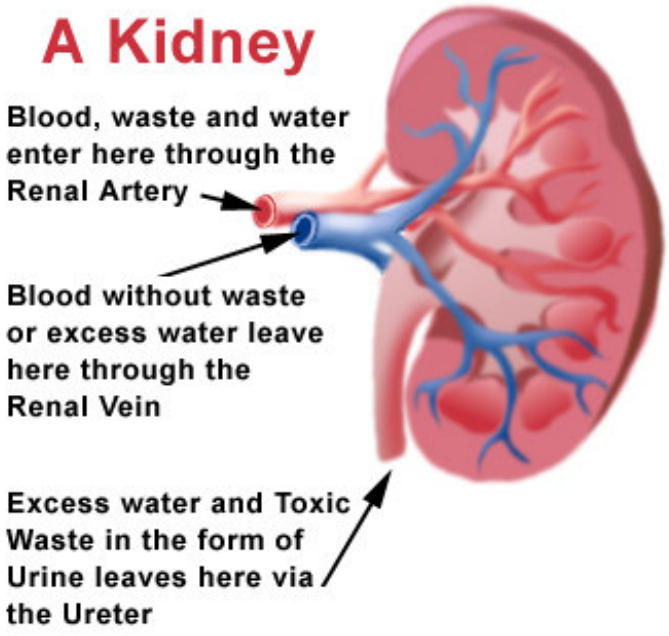
Terms Diagnosis Management

Objectives

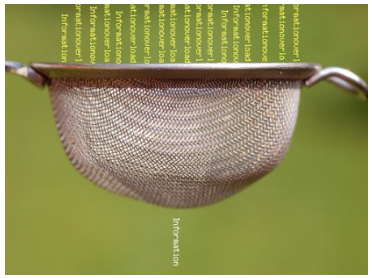
- Review the prevalence of chronic kidney disease (CKD)
- Review how CKD develops
- Review populations at risk for CKD
- Review CKD diagnosis
- Identify the key areas of medical management
- Identify the goals of CKD management

Chronic Kidney Disease Definition

- Gradual impairment of kidney function
- Inability to properly excrete waste, water, electrolytes
- Usually this function loss is permanent



Overview



- Kidneys are “filters” that remove waste and excess fluids from the blood - This waste is excreted as urine
- Kidneys filter a person’s total blood volume every 30 minutes

- CKD Involves the gradual loss of kidney function
- In the early stages of CKD, there may be few signs or symptoms

- CKD can progress to ESRD or kidney failure
  - Dangerous levels of fluid, electrolytes and waste build up in the body
- CKD is fatal without artificial filtering (dialysis) or a kidney transplant

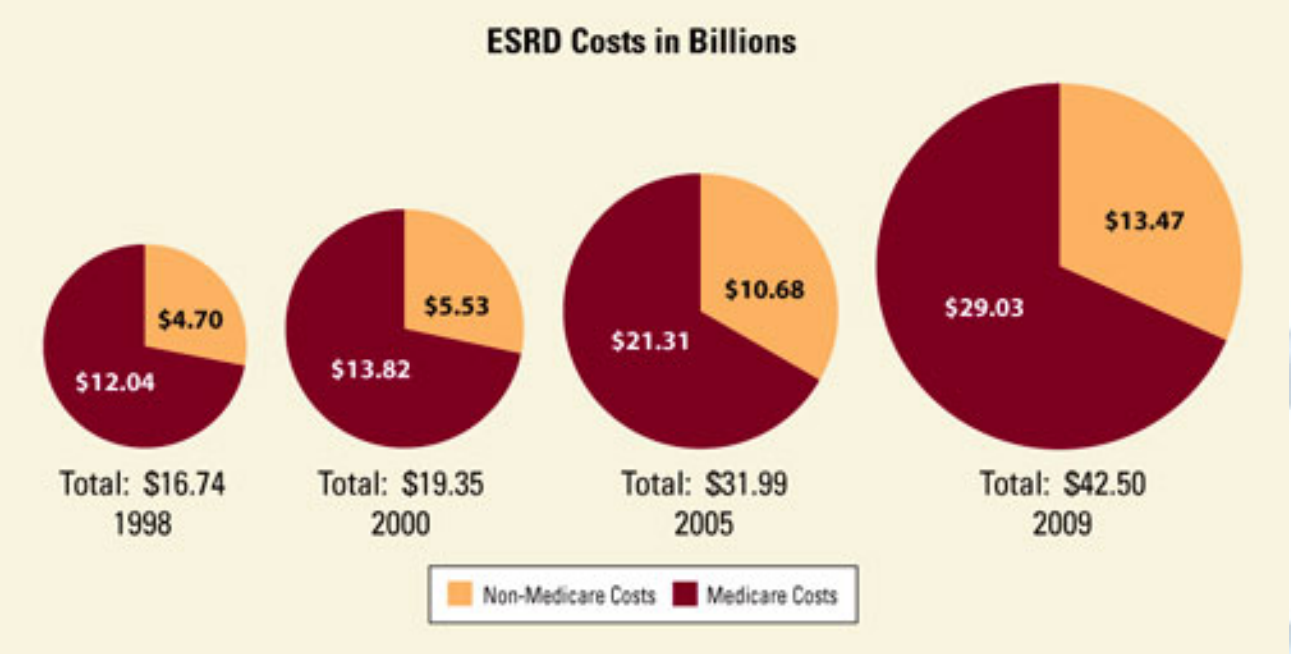
Treatment for CKD focuses on slowing the progression of the kidney damage, usually by controlling the underlying cause of the damage.

Facts about CKD

- 26 million American adults have CKD and millions more are at increased risk
- Center for Medicare and Medicaid Services (CMS) estimates that more than 10% of adults in the United States – more than 20 million people may have CKD of varying levels
- Your chances of having CKD increase with age; it increases after age 50 years and is most common among adults older than 70 years

CKD is costly

- Treating ESRD patients cost the U.S. >$40 billion in 2009



Treatment goals

- Prevention
- Early detection (prevent progression of the disease)
- Treatment to slow progression
- Management of secondary side effects of CKD
- Education/preparation for renal replacement therapy, if needed

Signs and symptoms of CKD

- Persistent itching
- Muscle twitches and cramps
- High BP that's difficult to control
- Nausea
- Vomiting
- Loss of appetite
- Change in urine output
- Fatigue
- Weakness
- Sleep problems
- Decreased mental sharpness
- Shortness of breath

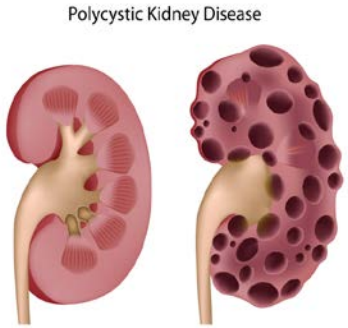
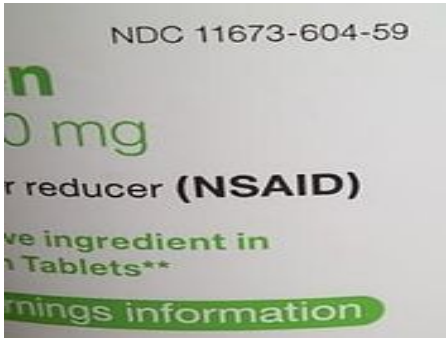
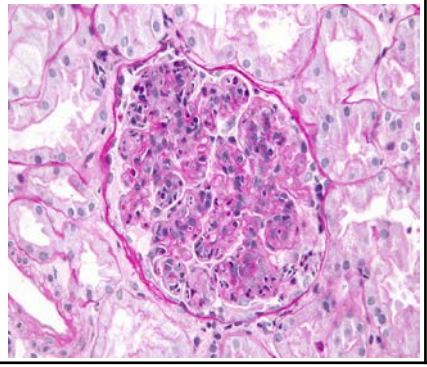
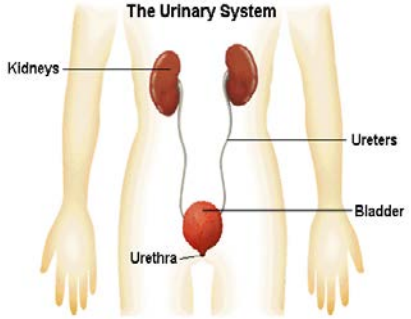
High risk groups

Diagnosis of diabetes	Pacific Islander	Family history of CKD
Diagnosis of HTN	African-American	65 years or older
	Hispanic or American Indian descent	

Most common causes of CKD

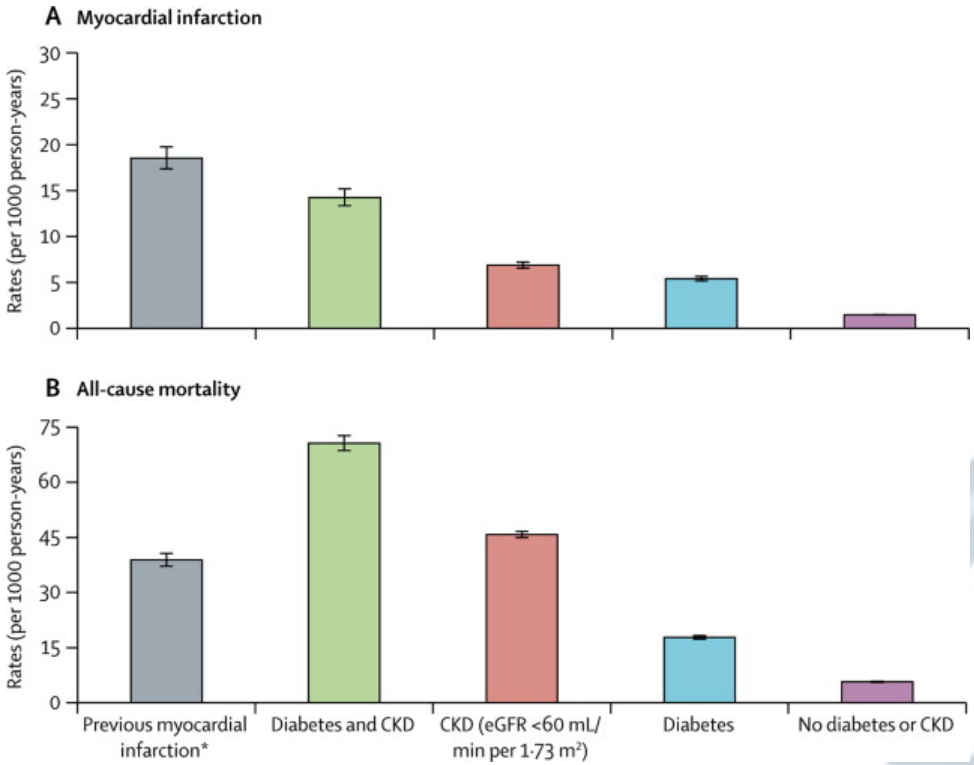
- Diabetes
- Hypertension (HTN causes CKD, and CKD can cause HTN)

Other causes

Polycystic Kidney Disease	Chronic Nonsteroidal Anti-inflammatory Drugs	Glomerulonephritis	Obstructions of the Urinary Tract
			

CKD Risk

It increases the risk of Coronary Artery Disease, ESRD and death



Terms and Definitions

Proteinuria

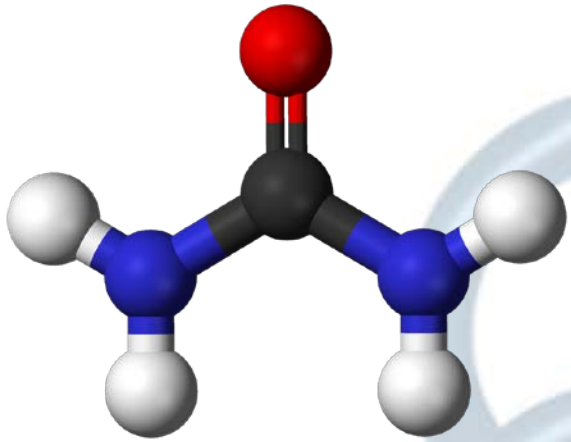
- Persistent proteinuria (protein in the urine) means CKD is present

Serum creatinine

- Creatinine is a chemical waste product that's produced through metabolism. An increased level of creatinine in the blood gives an estimate of how poorly the kidneys are filtering the blood.

Blood Urea Nitrogen (BUN)

- The amount of nitrogen in the blood produced from the waste product urea. Urea is made when protein is broken down and passed out of the body in urine. Elevated BUN can indicate the presence of kidney disease.



Glomerular Filtration Rate (GFR)

- A formula that includes a person's age, gender, race and serum creatinine levels
- Equals how much filtrate is formed each minute in the nephrons
- GFR rating scale is 1-5

Patient Care

Stage	Description	GFR	Impact on patient care
1	Kidney damage with normal or high GFR	90 or above	Primary care: • Try to ID cause to begin treatment • Maintain BP below 130/80 • If diabetes, control blood sugar levels • Initiate regular monitoring
2	Kidney damage with mildly low GFR	60-89	Primary care: • Estimates how quickly CKD is progressing • Controls BP and blood sugar levels • Continue regular monitoring • May start ACE/ARB's to protect kidneys
3	Kidney damage with moderately low GFR	30-59	Primary care: • Monitor for complications (anemia, bone disease) • Advise patients to avoid NSAID's • Start Ace/ARB's for kidney protection • Monitoring with regular blood work • Refer to nephrologist and/or endocrinologist
4	Kidney damage with severely low GFR	15-29	• Patient discusses with PCP or nephrologist what type of treatment she/he wants if kidney failure develops • PCP and specialist continue treatment monitoring & regular blood work
5	Kidney failure	Below 15	• Patient starts dialysis, has kidney transplant or begins palliative care • PCP, nephrologist and other specialist continue close monitoring

Diagnosing CKD
Controlling complication

Diagnosing CKD

Blood tests	GFR	Urine tests	Imaging tests
Serum Creatinine – see definition	GFR under 60 may indicate kidney disease	Urine microalbumin	Renal ultrasound to assess kidney structure and size
Blood Urea Nitrogen – see definition	CKD is defined as either GFR<60 for over 3 months or kidney damage through disease or injury	Albumin (common protein found in the blood)	Kidney biopsy to determine underlying causes of CKD
		Microalbumin testing	

CKD Side Effects/Complications

- Decreased kidney function can lead to:
  - Hypertension (high blood pressure)
  - Anemia (low hemoglobin)
  - Acidosis
  - Malnutrition
  - Bone disease
  - Heart disease and/or congestive heart failure
  - Hyperkalemia (high potassium)
  - And eventually, if not treated……death

Controlling CKD complications

Medication management

- Anti-hypertensives lower BP and can protect the kidneys from further damage
  - Angiotensin-converting enzyme inhibitors (ACE's)
    - Medications ending in "pril"
  - Angitensin receptor blockers (ARB's).
    - Medications ending in "sartan"
  - Diuretics to maintain electrolyte and fluid balance (HCTZ, Lasix)
  - Statins to lower LDL levels and reduce heart disease risk
- GFR and potassium (K+) levels must be monitored

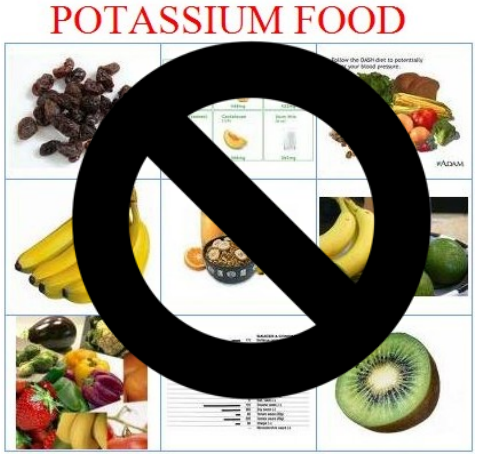
Controlling Complications
Dietary Modifications

Low-protein diet

Low protein foods include vegetables, fruits and breads and cereals

Avoid added salt

Often found in convenience foods, such as frozen dinners, canned soups, fast foods, salty snacks, canned vegetables and processed meats and cheeses



Low potassium foods

- Low-potassium foods include apples, cabbage, carrots, green beans, grapes and blueberries
- High-potassium foods include bananas, oranges, potatoes, spinach and tomatoes

Controlling Complications
Lifestyle modifications

- Alcohol in moderation or not at all
- Avoid non-steroidal anti-inflammatory (NSAIDS) meds
  - Advil, Motrin, Naprosyn (Aleve)
- Follow instructions for taking over-the-counter acetaminophen (Tylenol, others)
  - Keep dose below 300 mg/day
- Maintain a healthy weight
  - Keep cholesterol and BP in check
  - Reduce risk of heart disease and HTN
- Don't smoke
  - Smoking contributes to HTN
    - damages & narrows the small arteries that feed the kidneys

Treatments for ESRD/kidney failure

Dialysis

- Hemodialysis (HD) uses a machine to artificially filter waste products and extra fluid from the blood
- Peritoneal dialysis (PD) uses a thin tube or catheter inserted into the abdomen to fill the cavity with dialysis solution that absorbs waste and excess fluids

Kidney transplant

- A kidney transplant involves surgically transplanting a healthy human kidney from a deceased or living donor

Conservative measures

- An option not to undergo dialysis or transplant
  - Once in complete failure, life expectancy is generally only a few weeks

Psychosocial Considerations

Disruption of interpersonal and family relationships

- Changes in daily habits
- Fatigue may limit the persons ability to work or participate in activities

Self-esteem

- Limited participation in sports and social activities
- Abruption in autonomy

Behavioral factors

- Compliance
- Diet-Eating disorders
- Sleep
- Sexual dysfunction

Supportive Interventions

Starts at diagnosis

- Focus on physical, psychological and social function
  - Facilitate compliance to lifestyle changes and the treatment process
  - Assess the patients needs, identify potential problems or barriers and create a shared treatment plan and or action plan
    - Review treatment limitations
    - Options for self-care and active participation in decisions
  - Recognize and identify depression
    - Screening
    - Identify supportive relationships / prevent isolation
    - Use approaches to enhance the patients confidence to self-care

References

- AMA STEPS forward
- CDC Kidney FACT Sheet
- National Kidney Foundation Clinical Practice Guideline
- Health Science Journal, “Psychological Aspects in Chronic Renal Failure;” volume 8 (2014), issue 2