Renal Disease

Presented by UIC College of Nursing
Renal Disease

- Purpose and Objectives
- Background
- Renal disease
  - Causes
  - Statistics
- Renal disease and Hypertension
- Renal disease and Diabetes
- Types
  - Acute renal failure
  - Chronic kidney disease
  - End stage renal disease
- Dialysis
- Pre- and Post-Transition
- Resources
- References
Purpose and Objectives

- **PURPOSE:**
  - Develop an understanding of renal disease and the impact of chronic health conditions on the kidneys.
  - Improve skills for assisting a participant with renal disease.

- **OBJECTIVES:**
  - Identify the impact of chronic illness on the kidneys.
  - Differentiate between different stages of renal disease.
  - Identify areas that the TC needs to assess and plan for both before and after transition in the participant with kidney disease.
  - Identify red flags for the participant with end stage renal disease.
Semantics:

- Renal vs Kidney
  - Synonymous; just be aware
  - **Definition of Renal**
    Renal: Having to do with the kidney. From the Latin *renes* (the kidneys).
  - Google images: same for renal and kidney
What do the kidneys do?

- Main purpose: separate urea, mineral salts, toxins and other waste products from the blood.
- Conserve water and electrolytes (potassium, sodium, chloride, carbon dioxide/bicarbonate).
- At least one kidney must be functioning for life to be supported.
What do the kidneys do?

- Clean the blood, filter waste.
- Conserve water and electrolytes
- Produce 2 main hormones:
  - Erythropoietin (EPO): bone marrow and red blood cells
  - Vitamin D: Calcium, bones.
- Secrete prostaglandins: renin-angiotensin-aldosterone hormonal system to regulate blood pressure.
- Respond to other hormones: cortisol, parathyroid hormone and calcitonin.
How do they do it?

How the kidney works:

- Clean blood
- Renal vein
- Renal artery
- Ureter

Blood with waste

Wastes (urine) to the bladder

Glomerulus

Tubule

Nephron

Waste products (urine) to the bladder

Tubule

Nephron
Renal Disease

- So what could possibly go wrong???
Renal Disease

- **What is renal disease:** When your kidneys are damaged, waste products and fluid can build up in your body:
- **RED FLAGS//Symptoms:**
  * swelling  * vomiting  
  * weakness  * tremor  
  * confusion  * dizzy  
  * lethargy  * fever  
  * shortness of breath  
  * High/low BP

- Without treatment, the damage can get worse, and your kidneys may eventually stop working. That’s serious, and it can be life-threatening.
Renal Disease

ACUTE RENAL DISEASE

- Fast onset.
- Contributing factors:
  - Decreased blood flow
  - Direct damage to the kidneys themselves
  - Urine backed up/obstruction

CHRONIC RENAL DISEASE

- Slower onset; >3 months.
- Most common causes:
  - Diabetes
  - Hypertension
  - Autoimmune diseases
  - Long-lasting viruses
  - Pyelonephritis
  - Polycystic kidney disease
  - Medications
  - Illicit drugs
  - Chemicals
Renal Disease

Statistics

Approximately 1 of 3 adults with diabetes (and 1 of 5 adults with high blood pressure) has chronic kidney disease.
Renal Disease

Impact of high blood pressure:

- Over time, hypertension harms renal blood vessels.
- Damaged kidney arteries to not filter blood as well.
- Damaged kidneys fail to regulate blood pressure.
Impact of diabetes:
- High glucose/sugar increases work load of the kidneys.
- Protein increases in urine.
- If not stopped - Renal failure
Renal Disease

- Catch your breath....
- We’ve covered what the kidneys do,
- How they do it,
- Renal disease: acute, chronic
- Statistics
- Impact of HTN and Diabetes......
### Types of Renal disease

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acute Renal Failure</strong> (ARF)</td>
<td>Sudden loss of function: illness, injury, toxin</td>
</tr>
<tr>
<td><strong>Chronic Kidney Disease</strong> (CKD)</td>
<td>Long process decreasing kidney function</td>
</tr>
<tr>
<td><strong>End-Stage Renal Disease</strong> (ESRD)</td>
<td>Permanent shut-down of kidneys</td>
</tr>
</tbody>
</table>
Renal Disease

- Glomerular filtration rate (GFR):

### Chronic Kidney Disease Stages

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>GFR (mL/min/1.73m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kidney damage* with normal GFR</td>
<td>&gt;90</td>
</tr>
<tr>
<td>2</td>
<td>Kidney damage with mild ↓ GFR</td>
<td>60-89</td>
</tr>
<tr>
<td>3</td>
<td>Moderate ↓ GFR</td>
<td>30-59</td>
</tr>
<tr>
<td>4</td>
<td>Severe ↓ GFR</td>
<td>15-29</td>
</tr>
<tr>
<td>5</td>
<td>Kidney Failure</td>
<td>&lt;15 (or dialysis)</td>
</tr>
</tbody>
</table>

*Kidney damage = abnormal urine analysis or abnormal imaging of the kidneys. Adapted from Am J Kidney Dis 2002, 39 (2 Suppl 1), S40-G15.
# Renal Disease

## The Five Stages of Chronic Kidney Disease

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>Glomerular Filtration Rate (GFR)</th>
<th>Kidney Function Deterioration*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kidney damage (protein in urine) and normal GFR</td>
<td>More than 90</td>
<td>50% - 60%</td>
</tr>
<tr>
<td>2</td>
<td>Kidney damage and mild decrease in GFR</td>
<td>60 - 83</td>
<td>60% - 70%</td>
</tr>
<tr>
<td>3</td>
<td>Moderate decrease in GFR</td>
<td>30 - 59</td>
<td>70% - 77.5%</td>
</tr>
<tr>
<td>4</td>
<td>Severe decrease in GFR</td>
<td>15 - 29</td>
<td>77.5% - 85%</td>
</tr>
<tr>
<td>5</td>
<td>Kidney failure—End Stage Renal Disease (dialysis or kidney transplant needed)</td>
<td>Less than 15</td>
<td>85% and above</td>
</tr>
</tbody>
</table>
Renal Disease

- **Stage 1:**
  - Kidney damage with normal or high GFR
  - GFR: 90 or above

- **What does this mean:**
  - Your doctor will try to find the cause of your kidney disease and begin treatment.
  - Manage other health problems, such as diabetes and high blood pressure.
  - See your doctor regularly to monitor your condition.
Renal Disease

- **Stage 2:**
  - Kidney damage with mildly low GFR
  - GFR: 60 - 89

- **What does this mean:**
  - Your doctor will estimate how quickly your disease is progressing.
  - Manage other health problems, such as diabetes and high blood pressure.
  - Continue regular monitoring.
Renal Disease

- **Stage 3:**
  - Kidney damage with moderately low GFR
  - GFR: 30 - 59

- **What does this mean:**
  - Your doctor will check you for complications, such as anemia and bone disease, and begin treatment if needed.
Renal Disease

- **Stage 4:**
  - Kidney damage with severely low GFR
  - GFR: 15 - 29

- **What does this mean:**
  - Decide what type of treatment you want if kidney failure develops.
  - Continue treatment and monitoring.
Renal Disease

- **Stage 5:**
  - Kidney failure
  - GFR: < 15

- **What does this mean:**
  - Start dialysis, have a kidney transplant, or choose palliative care.
  - Continue to see your doctor for treatment and testing.
Renal Disease

- Other blood tests affected by renal failure:
- Blood urea nitrogen (BUN):
  - Breakdown of protein $\rightarrow$ Urea Nitrogen in the blood.
  - A high **BUN** usually means that kidney function is less than **normal**, but other factors may affect the **BUN level**. ... The **normal BUN level** for healthy individuals is 7-20 mg/dL in adults, and 5-18 mg/dL in children. Patients on dialysis have higher **BUN levels**, usually 40-60 mg/dL.
Renal Disease

- Other blood tests affected by renal failure:
  - Creatinine is a waste product that is produced continuously during normal muscle breakdown. The kidneys filter creatinine from the blood into the urine, and reabsorb almost none of it.
  - **Normal levels** of creatinine in the blood are approximately 0.6 to 1.2 milligrams (mg) per deciliter (dL) in adult males and 0.5 to 1.1 milligrams per deciliter in adult females.
Renal Disease

- Key test results to follow:
  - GFR
  - BUN
  - Creatinine
# Renal Disease

## Management of Renal Disease or Failure

<table>
<thead>
<tr>
<th>Disease</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Renal Failure (ARF)</td>
<td>Sudden loss of function: illness, injury, toxin</td>
</tr>
<tr>
<td>Chronic Kidney Disease (CKD)</td>
<td>Long process decreasing kidney function</td>
</tr>
<tr>
<td>End-Stage Renal Disease (ESRD)</td>
<td>Permanent shut-down of kidneys</td>
</tr>
</tbody>
</table>
Management of Acute renal failure:
- Identify and reverse the cause
- IV fluids
- Control blood pressure
- Control blood sugar
- Dialysis- time limited
Renal Disease

- Management of Chronic kidney disease:
  - Control hypertension
    - Medications, diet
  - Control diabetes
    - Medications, diet
  - Routine surveillance of kidney blood tests
    - GFR, BUN, Creatinine, electrolytes, blood sugar
Renal Disease

- Management of End-stage renal disease (ESRD):
  - Control blood pressure, diabetes.
  - Medications: blood pressure, diabetes, diuretics, electrolytes, treatment for anemia.
  - Home blood pressure monitor
  - Blood sugar testing supplies
  - Scale
  - Log to record results
Renal Disease

- Management of End-stage renal disease (ESRD):
  - Nutrition:
    - Need to consult with the nutritionist.
    - Generally: Dialysis changes dietary needs. Patients undergoing typical hemodialysis, involving about three treatments per week, follow diets that are restricted in protein, sodium, potassium, phosphorus, and fluid. ... Sodium: Sodium intake must be modified to prevent hypertension, congestive heart failure, and pulmonary edema.
Renal Disease

Management of End-stage renal disease (ESRD):

Nutrition: 15 super-foods

<table>
<thead>
<tr>
<th>Red bell peppers</th>
<th>Cabbage</th>
<th>Cauliflower</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garlic</td>
<td>Onions</td>
<td>Apples</td>
</tr>
<tr>
<td>Cranberries</td>
<td>Blueberries</td>
<td>Raspberries</td>
</tr>
<tr>
<td>Strawberries</td>
<td>Cherries</td>
<td>Red grapes</td>
</tr>
<tr>
<td>Egg whites</td>
<td>Fish</td>
<td>Olive oil</td>
</tr>
</tbody>
</table>

Renal Disease

- Management of End-stage renal disease (ESRD):
  - Kidney transplant.
  - Dialysis.
Renal Disease

- Hemodialysis:

- Peritoneal Dialysis:
Renal Disease

- Dialysis catheter:
Renal Disease

- Arteriovenous (AV) Graft: (tube connection)
Renal Disease

- Arteriovenous (AV) fistula: Direct connection (Gold standard)
Renal Disease

- **Care for dialysis catheter:**
  - Keep the catheter dressing clean and **dry**.
  - Never remove the cap on the end of your catheter. Air **must not** enter the catheter.
  - You must not wet your catheter site or catheter dressing.
  - Wear a mask over your nose and mouth anytime the catheter is opened.
  - The **caps** and the **clamps** of your catheter should be kept **tightly closed** when not being used for dialysis.
  - If the area around your catheter feels sore or looks red, call your dialysis care team at once. Ask your dialysis team about signs and symptoms that require immediate attention.
Dialysis catheter complications:

- Clots
- Infection
Renal Disease

- Care for AV Fistula:
  - Arm strengthening prior to use.
  - Monitor for signs of infection.
  - Keep site clean/dry.
  - Allow for proper blood flow.
  - Check for blood flow: bruit, thrill.
Renal Disease

- Need to know about hemodialysis:
Renal Disease

Need to know about dialysis:

- Scheduled appointments: plan ahead
- Generally 3x/week
- Lasts 3-4 hours
- Fatigue, exhaustion after
- Medications before/after
- Cannot skip
- Talk with the team; take notes
Renal Disease

- Catch your breath....
- We’ve covered renal blood tests,
- Stages, chronic-> end stage
- Management,
- Hemodialysis and Peritoneal dialysis,
- Dialysis catheter care.......
Renal Disease

Assessment prior to transition:

- Know/understand the diagnosis (literacy)
- Education/training of the participant
- Identifies all providers: primary care, specialists such as kidney doctor (nephrologist), diabetes doctor (endocrinologist), heart doctor (cardiologist), surgeon.
  - Name/contact info/ follow-up and frequency/ transportation and back-up transportation
Assessment prior to transition:

- Knowledge of proper nutrition
- Baseline results
  - Blood tests: Kidneys, diabetes (Hemoglobin A1c) HgBA1C
  - Blood sugars
  - Blood pressure
  - Weight
- Support: current; referrals
Assessment after transition:

- Discuss f/u with physician specialists; outcome.
- Review self-management at home:
  - BP, blood sugars, weight, food/fluid intake, logs
- Blood tests
- Monitor for red flags
- Support/coping
Renal Disease

- DaVita Dialysis video:
  - https://www.youtube.com/watch?v=CGwJGkCczKU
References

- http://www.webmd.com/a-to-z-guides/understanding-kidney-disease-basic-information#1
Resources

- The American Diabetes Association
  - http://www.diabetes.org

- The Kidney Foundation:
  - https://www.kidney.org/

- Mayo Clinic:

- National Institute of Diabetes and Digestive and Kidney Disease

- WebMD
  - http://www.webmd.com/a-to-z-guides/understanding-kidney-disease-basic-information#1
Renal Disease

© 2017 University of Illinois-Chicago
College of Nursing