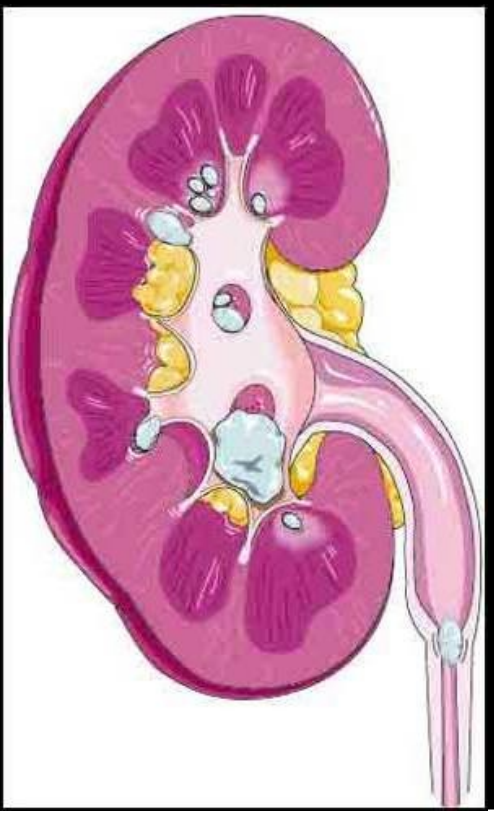
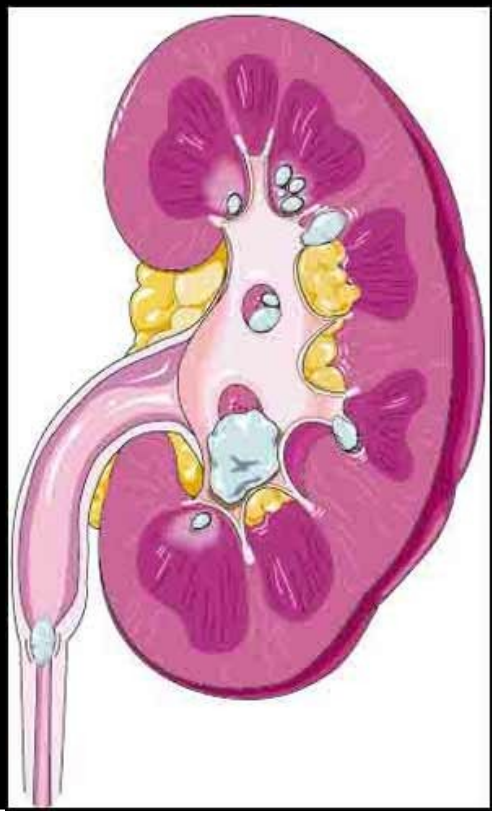
Renal Transplant



Kristen Culver
Brittney Patera
MNT II



Statistics

- Kidney Diseases affect approximately 20 million Americans per year
- In 2003 medical care costs ~ $ 20 billion
- ~14,000 kidney transplants are performed each year
  - about 1/3 is from living donors
- 55,000 people are on the waiting list….3,000 people die waiting for one
- 95% recipients survive

Nelms 2007
www.organdonor.gov

Kidney Function

-Filters blood→excretes extra fluids and wastes

-Regulates body's levels of Na+, K+, PO4

-Releases 3 hormones:

- erythropoietin (EPO): stimulates RBC
- renin: regulates BP
- calcitriol: active form of Vit. D; helps maintain Ca in bones

-Measure by GFR:

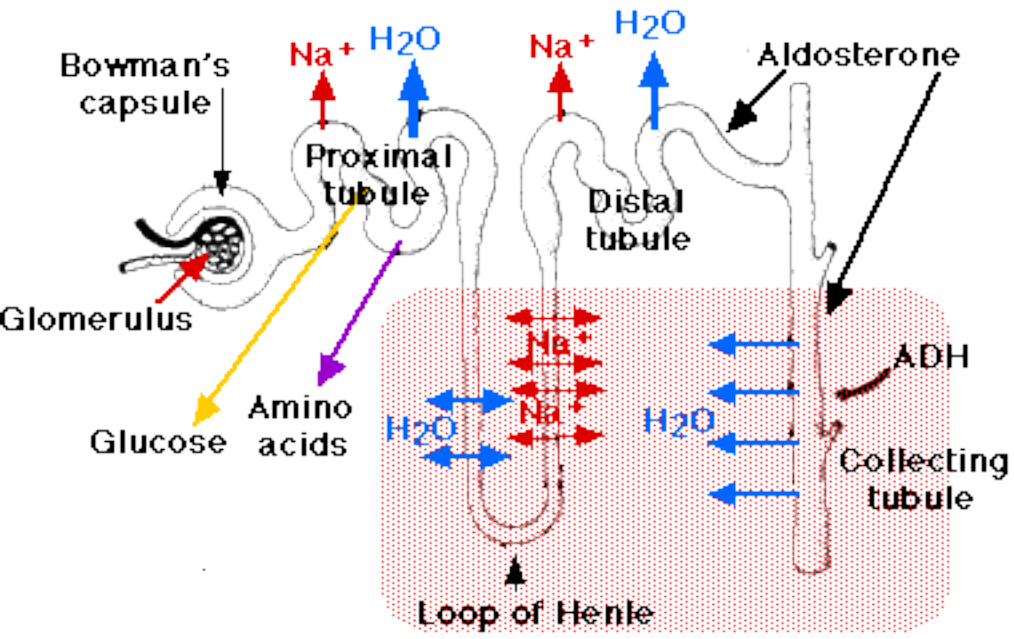
measures clearance of kidneys

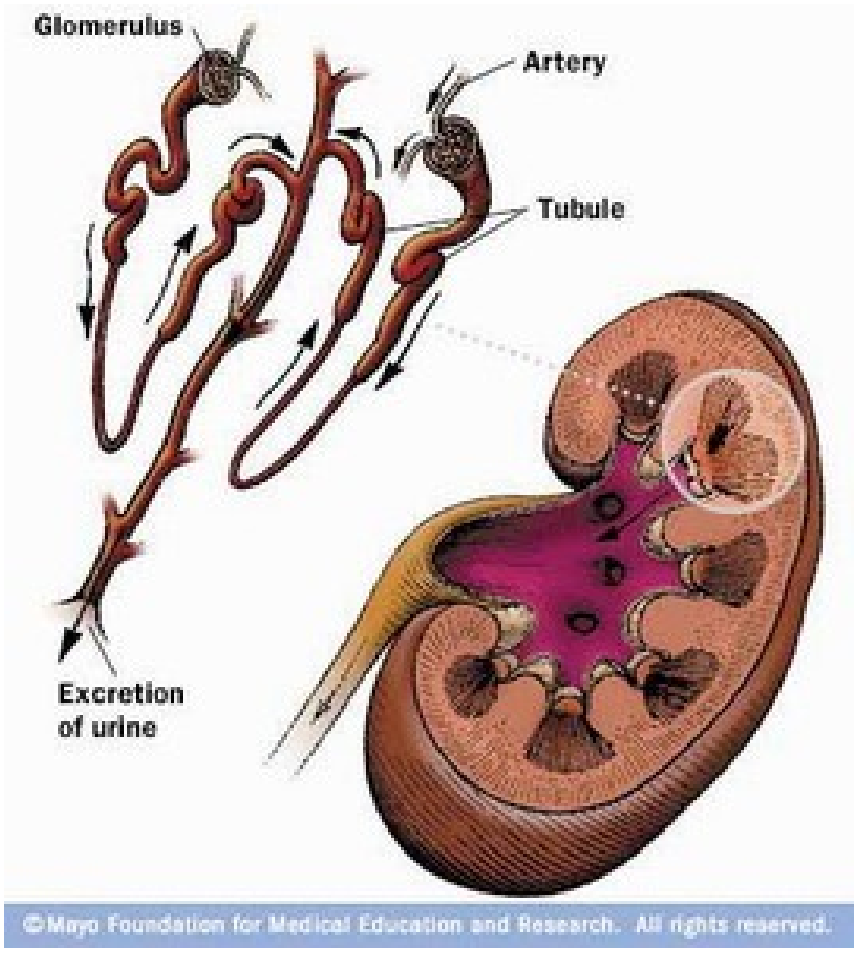
Normal: 135 – 180 L/day

http://kidney.niddk.nih.gov/

Nelms 2007

KIDNEY





http://www.engin.umich.edu/~cre/web_mod/viper/kidney_function.htm

Chronic Kidney Disease

- STAGE 5: kidney failure
  - GFR less than 15 mL per minute
  - Requires renal replacement therapy
    - Hemodialysis, peritoneal dialysis, kidney transplant

- RISK FACTORS
  - **Diabetes**
  - **Hypertension**
  - **American Indians and Alaska Natives**
  - Polycystic kidney disease
  - Blood vessel inflammation

Renal Replacement Therapy

- **HEMODIALYSIS**
  - Blood enters filter → electrolyte imbalances corrected by dialysis → returned to body
  - 3 times a week for 3-5 hours
- **KIDNEY TRANSPLANT**
  - Healthy kidney from donor take over work of failing kidneys
  - **ELIGABILITY:**
    - **BLOOD TYPE**: A,B,AB,O must be same as donor
    - **HLA**: 6 matching antigens to donor; increase life of new kidney
    - **ANTIBODIES**: mix pt's blood in a tube with donors blood
    - **PHYSICAL EXAM**: good health for successful transplant; decrease complications post-surgery
- IMMUNOSUPPRESIVE MEDICATIONS

kidney.niddk.nih.gov

Assessment

- **Name**: Enez Joaquin
- **Ethnicity**: Pima Indian
- **Age**: 26
- **Height**: 5'0"
- **Current weight**: 165 lbs
- **BMI**: 32
- **%IBW:** 165%
- **Interpretation**: obese
- **Education**: High School

- **Chief complaint**:
  - Patient admitted for deceased donor kidney transplant

Assessment

- **Patient History**:
  - Diagnosed with Type 2 DM at 13 years of age
  - Renal function progressively decompensated over 7years
  - Diagnosed with Stage 5 CKD 2 years ago and placed on hemodialysis
  - Placed on transplant list 2 years ago

- **Family History**:
  - Both mother and father diagnosed with DM

Assessment

- **Nutrition History**

  General:
  - Claims has been following diet prescribed when began hemodialysis.
  - Follows up with RD at dialysis center every few months

  Usual Dietary Intake:
  - Breakfast:
    - 1 soft cooked egg, 2 slices wheat toast with 1 tsp low fat margarine, 1 c artificially sweetened cranberry juice
  - Lunch:
    - 2 beef tamales with ¼ c chili con carne, 1 can Diet Coke
  - Dinner:
    - 2 soft-shell tacos made with ½ c black beans, 2 flour tortillas, ½ c shredded lettuce, ¼ c chopped tomatoes, ¼ c chopped onions; 1 can Diet Coke
  - Snack
    - 6 vanilla wafers

Diet Assessment

Current Diet Order:

- 35 kcal/kg = **1855 kcals**
- 1.2 g pro/kg = **64 g pro**
- **2000 mg** Potassium
- **1000mg** PO_4
- **2000mg** Sodium

Actual Intake:

- Total Calories: **1750 kcals**
- Protein = **54 g**
- Potassium = **1770 mg K**
- Phosphorous = **866 mg**
- Sodium = **3214 mg**

Nutrients of Concern

Calcium:

- ↓ serum levels
- Decrease in bone mineral content
- ↑ risk for osteoporosis

Phosphorus:

- Absorption of PO_4 and Ca+ regulated by Vit D, calcitriol
  - High levels suppress activation of Vit D

Potassium:

- ↓removal of K+ due to ↑PTH
- At risk for hyperkalemia

Sodium:

- Interacts with medication (prednisone)
- Causes ↑ Na+ and fluid retention, ↑ BP
- ↑ risk for HTN

http://lpi.oregonstate.edu/infocenter/minerals/phosphorus

Nutrients of Concern

Calcium:

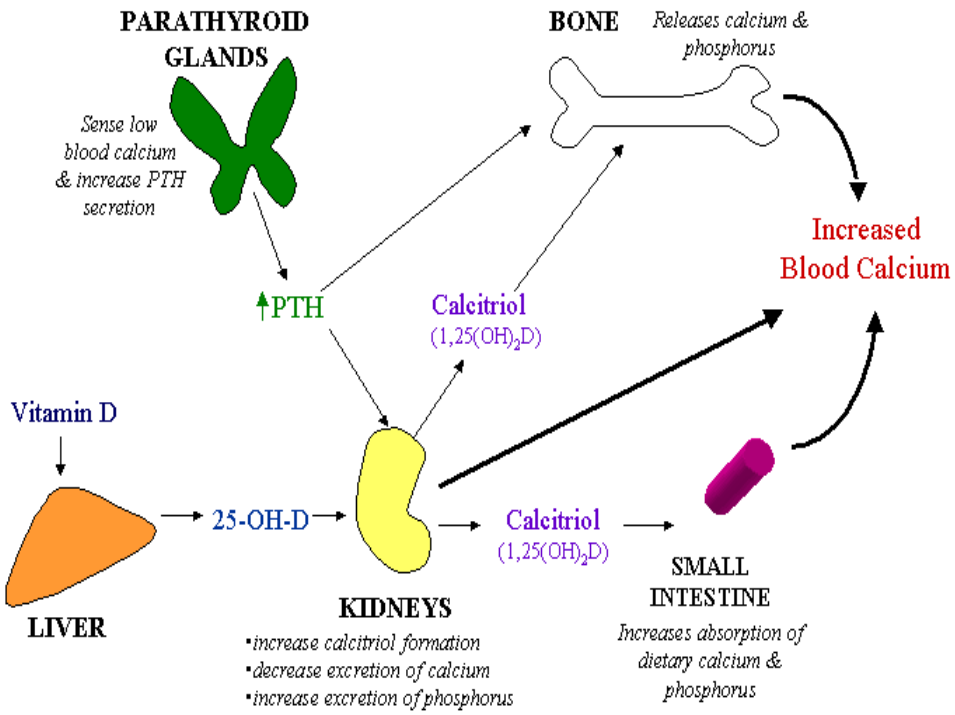
- PTH → kidneys → activate Vit D
- Calcitriol ↑ Ca+ mobilization from bones and ↓ excretion from Kidneys

Phosphorus:

- Calcitriol tells kidney to retain PO_4
- PTH ↑ removal of PO_4 via kidneys

Kidney Failure:

- Vit D not activated into calcitriol
- PO_4 not excreted
- PTH ↑ and Ca+ ↓



http://lpi.oregonstate.edu/infocenter/minerals/phosphorus

Assessment

Biochemical Marker	Abnormal Value	Normal Value	Reason for Abnormality
PO_4	6.2H	2.3-4.7	Decreased renal clearance
Glu	282 H	70-110	Diabetic
BUN	69 H	8-18	Decreased renal clearance; Diet
Creatinine	12.0 H	0.6-1.2	Decreased renal clearance; Diet
Calcium	8.9 L	9-11	Reduced activation of calcitriol
Alk Phos	131 H	30-120	Decreased renal clearance
Chol	200 H	120-199	Poor adherence to diet
RBC	4.0 L	4.2	Inadequate Fe intake
HGB	10.9 L	12-15	Inadequate Fe intake
HCT	35 L	37-47	Inadequate Fe intake

http://www.organdonor.gov/student/access/organs.asphttp://

Medications

Medication	Method	Nutrient Interactions
Glucophage	Reduces blood sugar	Lowers blood glucose production; increases response to insulin
Vasotec	High Blood Pressure/ HTN	Causes fluid and Na+ retention; avoid potassium
Phos Lo	Reduce Phosphate levels in Kidney disease	Binds to phosphate to lower blood phosphate levels
Erythropoietin	Stimulates RBC production	Requires adequate Fe
Vitamin/mineral supplement	Cell repair and functions	Replenishes body
Calcitriol	Form of Vitamin D; prevent low levels of Ca in blood	Helps body absorb Vit D; helps abosorb Ca
Sodium Bicarbonate	Monitor acid concentrations	Helps control acidic conditions of blood

www.healthsquare.com, www.davita.com/kidney-disease

Diagnosis

- PES Statements
  - Limited adherence to nutrition related recommendations (NB 1.6) related to weariness of current diagnosis as evidenced by difficulty adhering to current meds and diet recommendations, as well as poor lab values (K+, PO_4, Creatinine, BG)
  - Food and nutrition-related knowledge deficit (NB 1.1) related to new MNT and medication regimen as evidenced by status post kidney transplant

Intervention

- **Comprehensive Nutrition Education (E-2)**
  - Demonstrate understanding of principles of post-transplant dietary needs
  - Demonstrate understanding of diabetic diet
  - Demonstrate understanding of food-drug interactions
  - No further weight gain
  - Weight management: pt. recognizes hunger and satiety cues

GOALS

- **Short term:**
  - Maintain energy needs/promote healing
  - Understanding of medications
- **Long term:**
  - Full compliance to immunosuppressant medications
  - Improved knowledge of new diet
  - Maintain electrolyte balance
  - Achieve a healthy BMI of 30
  - After initial stage (8 weeks) improve weight status

Post-Surgery Intervention

Medication	Indications/Mechanism	Nutritional Implications
Neoral	Immunosuppressant	Reduces Magnesium; Avoid grapefruit
Imuran	Immunosuppressant	May decrease activity of blood thinning meds
Prednisone	Corticosteroid	Na+ and fluid retention; K+ loss, decrease absorption of glucose
Magnesium Oxide	Antacid	Indigestion; Neoral
Bactrim	Antibiotic	N/V/D, upset stomach
Neutral-phos	Decreases PO_4	N/V, Mg, Alb, Ca+ containing med's may interfere
Persantine	Platelet inhibitor	N/V
Omeprazole	Antacid	
Glucophage	Control blood sugar	Increases hunger

http://www.rxlist.com,

Weight Management

- Recognize hunger and satiety cues
- Medications increase appetite, cause fluid retention → weight gain
- Post-transplant patients are at higher risk for CVD →Diabetes and high BP
- After 8 weeks post surgery improve weight
  - o

Post Transplant Diet

- Protein:
  - Necessary for healing
  - Overcome breakdown of muscle caused by Prednisone
- Sodium:
  - HTN is common after kidney transplant
  - Important to monitor with corticosteroids and immunosuppressive agents
- Potassium:
  - Beware of hyperkalemia
- Phosphorus and Calcium
  - P often restricted due to Vitamin D metabolism
  - Be cautious of osteoporosis

Nelms, Marcia Nahikian, Sara Long, and Kathryn Sucher. *Nutrition Therapy an Pathophysiology.* Belmont, CA: Thomson Brooks/Cole, 2007.

MNT

- 30 kcal/kg to lower BMI and TG
- High Protein: 1.4g/kg
- Fiber ≥20g/day
- Sodium restriction due to HTN
- K+ restriction due to poor graft function
- Adequate Ca+, Phosphorus and Vit D
- Low Sat Fat <7%

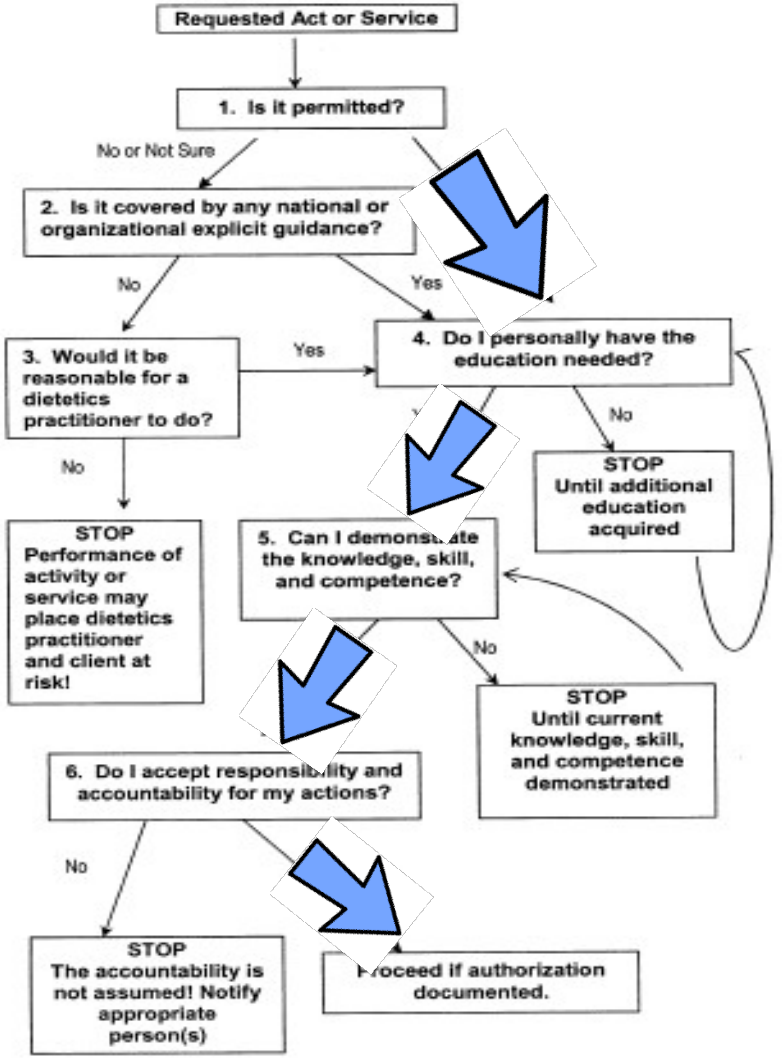
- **Kcal Needs**
  - ABW 116 lbs (53 kg)
  - 35 kcal x 53 kg = 1855 kcal
- **Protein**
  - 53kg x 1.4g/kg = 74 g/kg

Monitor and Evaluate

- Follow up:
  - Routine check ups with RD
    - 2x/wk until initial stage is over (8 weeks)
- Weigh patient to monitor fluid status and weight gain
- Monitor lab values
  - Glucose, cholesterol, LDL, K+, Na+, Po_4, Ca+
- Monitor adherence to Medication

Scope of Practice

- Nutrient-medication interaction education
- Improve Phos, Ca, Na, K, glucose levels
- Monitor weight
- Educate on Diet Order (renal diet)



References

- http://www.hepatitis.va.gov/vahep?page=diag-tests-02-08
- http://www.organdonor.gov/student/access/organs.asphttp://
- http://www.kidneyfund.org/kidney-health
- http://kidney.niddk.nih.gov/kudiseases/pubs/hemodialysis/#fail
- http://www.drugs.com
- http://www.columbiakidneytransplant.org/nutrition.html
- http://www.engin.umich.edu/~cre/web_mod/viper/kidney_function.htm
- http://www.davita.com/kidney-disease
- http://www.healthsquare.com/drugs/129007.htm
- http://www.rxlist.com
- http://www.aakp.org/aakp-library/diet-after-transplantation/

Nelms, Marcia Nahikian, Sara Long, and Kathryn Sucher. *Nutrition Therapy an Pathophysiology.* Belmont, CA: Thomson Brooks/Cole, 2007.