DIETARY ADVICE FOR POLYCYSTIC KIDNEY DISEASE

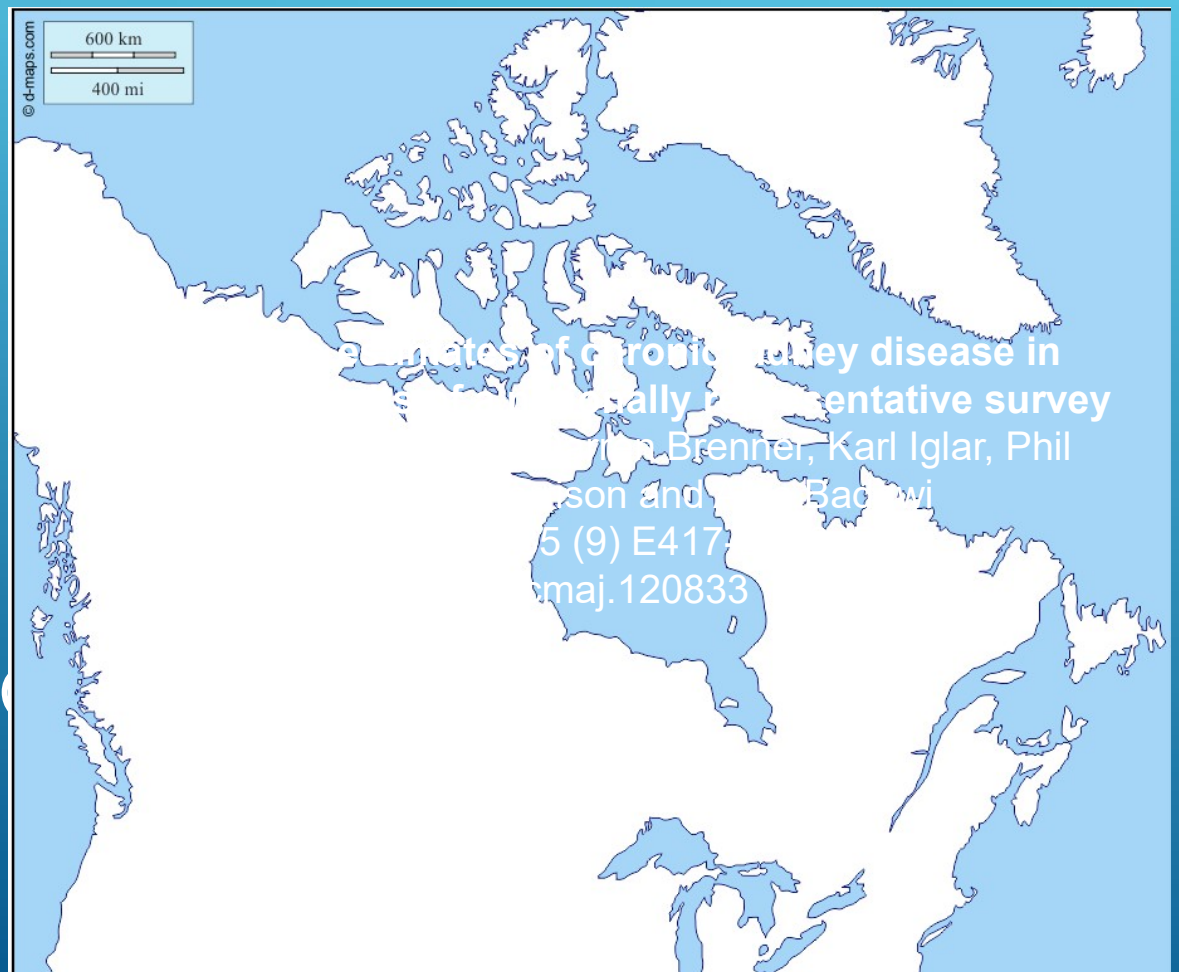
March 6, 2020

DISCLOSURE

- Honorarium for Consulting on the Reprise trial from Otsuka
- Mayo clinic preceptorship for PKD with Dr. Torres' team, sponsored by Otsuka

OBJECTIVES

1. Dietary effects of high sodium intake on people with a kidney condition
2. Discuss different strategies including low sodium, moderate to low protein, high fluid, and low purine diet
3. Summarize the effect of vitamin D on kidneys and importance of replacement
4. List different types of diet used to treat kidney conditions: low ketogenic diet, low osmolar load, alkali and Mediterranean diets



ates of chronic kidney disease in
ally representative survey
Brenner, Karl Iglar, Phil
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CKD 12.5 %

3 million Canadians

Stage 3-5: 3.1%

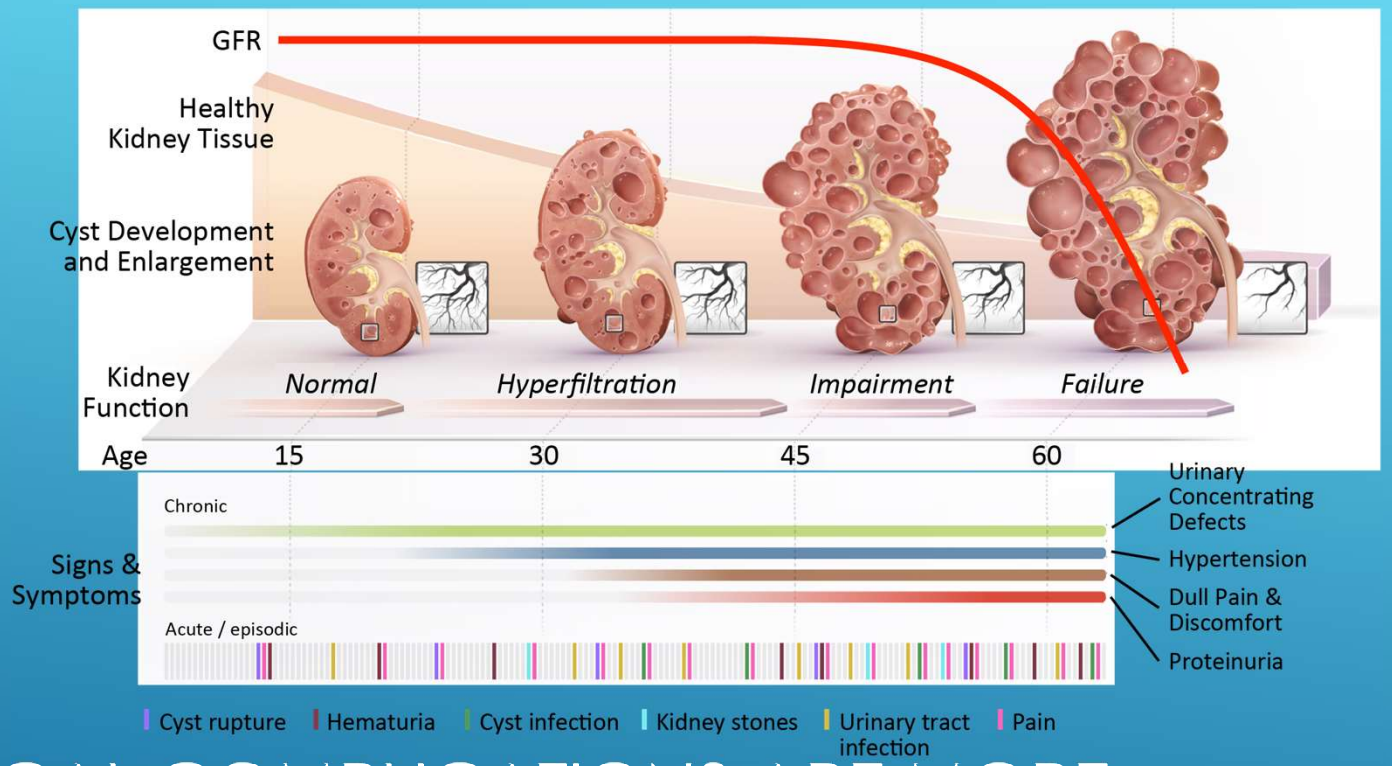
Albuminuria 10.3 %

WHAT IS ADPKD?

ADPKD…

- Is a dominantly inherited, systemic disease characterized by multiple kidney cysts
- Is a form of tubular obstructive nephropathy
- Results in slow, gradual, and massive bilateral kidney enlargement
- Results in kidney failure in the majority of individuals by the fifth or sixth decade

Adapted from:
Chapman AB. *J Am Soc Nephrol* 2007;18(5):1399-407.
Galarreta CI, *et al. Am J Pathol* 2014;184(7):1957-66.



CLINICAL COMPLICATIONS ARE MORE FREQUENT IN PATIENTS WITH BIG KIDNEYS

GFR: glomerular filtration rate.
Adapted from: Grantham JJ, *et al. N Eng J Med* 2006; 354(20):2122-30.

HIGH SODIUM DIET

- 1. PROTEIN IN URINE
- 2. HIGHER BLOOD PRESSURE
- 3. FASTER DECLINE IN RENAL FUNCTION
- 4. FLUID RETENTION
- 5.. HIGHER RATE OF HEART DISEASE AND MORTALITY

2400mg sodium = 104 mmol/day sodium = 6 g of salt

READING FOOD LABELS (SALT)

How Much Sodium is Too Much?

- Aim for a daily intake of 2000 milligrams (mg) *or less.*
- Keep in mind that one teaspoon of table salt contains 2,300 mg of sodium.
- It is a myth that sea salt and kosher salt contain less sodium than regular table salt. By weight, they are all the same and should all be used sparingly.
- Read labels for sodium content. Here are some tips:
  - Choose side dishes or snacks with 140 mg or less sodium per serving.
  - Each meal should have 600 mg sodium or less.

BENEFITS OF LOW SODIUM DIET

- Low Sodium lowers blood pressure
- Prevents fluid retention
- Lowers proteinuria
- Perhaps slows progression of kidney disease
- Helps medications like ace inhibitors to work better

METHODS TO AVOID SODIUM

- Avoid foods with preservatives, canned soups, smoked meat, cold cuts, salted nuts and chips
- Plan ahead on cooking
- Avoid eating out in restaurants or fast food places

HIGH PROTEIN INTAKE

Associated with hyperfiltration and high acid load

Higher phosphate and uric acid levels

Maybe associated with higher rate of progression of renal disease

LOW PROTEIN DIET

- In mouse models
  - Lower renal growth in ADPKD
  - Lower proteinuria
- In humans
- Feasible
- Lowers urea in urine
- Lowers net acid excretion (meat protein contains sulphur)

Good sources: Lean meat, poultry, fish and eggs are great sources of protein. Other options include beans and peas, nuts, seeds and soy products.

Food	Serving size	Protein content
Cottage cheese	1 cup (226 g) low-fat, 1% milk cottage cheese	28 g
Poultry	3 oz. (86 g) boneless, skinless grilled chicken breast	26 g
Fish	3 oz. (85 g) canned pink salmon with bones	17 g
Lentils	1/2 cup (99 g) boiled lentils	9 g

LOW PROTEIN DIET

- Protein intake 0.75-1.0 g/day

FLUID INTAKE

- Prevent dehydration, prevents kidney stones, may decrease a hormone vasopressin and decrease the growth of ADPKD kidneys
- Prevent urinary tract infections
- High fluid intake would be 2-3L/day
- Enough to make the urine look clear

URIC ACID

Less excreted with kidney function decreases

Higher levels associated with gout, worsening renal function, kidney stones and cardiovascular disease and mortality

Associated with metabolic syndrome

METABOLIC ACIDOSIS

Low bicarbonate state associated with net acid load

High net acid load in diet causes more protein in urine and kidney disease to worsen

Also worsens osteoporosis and lead to more protein degradation

TREATMENT FOR HYPERURICEMIA

Low purine diet

Medications such as allopurinol, colchicine, uloric

Weight loss

VITAMIN D AND KIDNEY

- Vitamin D deficiency is associated with higher blood pressure, heart size enlargement and increasing cyst size in ADPKD

VITAMIN D REPLACEMENT

- Vitamin D 1000U daily
- Vitamin D 10,000 IU q week
- Vitamin D 400IU daily

LOW KETOGENIC DIET

Like having low carbohydrate starvation

High fat, low protein, low carbohydrate

Associated with lower protein in the urine, less scarring of the kidneys

and slower progression of kidney disease

LOW OSMOLAR LOAD

- Aim to achieve low urine osmolality (lower vasopressin release) – dilute urine
- Low sodium (60mmol/day), low protein (0.8g/kg/day), low urea (avoid preservatives, bulking agents, food additives, chewing gum),and low sugar

- Meats: fish (rarely red meat), poultry
- Vegetables: kale, broccoli, spinach, cauliflower, carrots, Brussel sprouts, cucumbers
- Fruits: apples, oranges, bananas, pears, strawberries, grapes, figs, melons, peaches
- Nuts and seeds: almonds, sunflower seeds, pumpkin seeds, walnuts, cashews
- Legumes: beans, peas, lentils, chickpeas, peanuts
- Whole grains: whole wheat, barley, brown rice, buckwheat,
- Dairy: milk, cheese, Greek yogurt
- Herbs: garlic, basil, pepper
- Oils: olive oil, avocado oil

MEDITERRANEAN DIET

COMPONENTS OF MEDITERRANEAN DIET

- Fruit, vegetables, fish, whole grains, garlic, olive oil
- Moderation: diary products
- Avoid red meat
- Don't eat sugar sweetened beverages, added sugars, processed meats, refined oils, processed foods and refined grains

SUMMARY

Undesirable effects due to

- High sodium
- High protein
- Low fluid
- High acid load
- High osmolar load
- High phosphate
- Low vitamin D

Diets

- Low sodium
- DASH
- Low protein
- Low ketogenic diet
- Low acid load
- Alkali diet
- Low phosphate
- Vitamin D supplementation
- Mediterranean