Nutritional Management of Chronic Kidney Disease (CKD) and Diabetes

Dani Renouf, RD, MSc
Renal Resource Dietitian
St. Paul’s Hospital
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Overview

- Burden of Disease: CKD and Diabetes
- Diabetic Nephropathy
- Approaches for Nutrition Care
- Questions
Burden of Disease: Diabetes and CKD$^{1,2}$

- Worldwide, 200 Million have CKD
- Diabetes is the leading cause of kidney disease
- 50% of persons with diabetes demonstrate signs of kidney damage in lifetime
Stages of Kidney Disease

What happens?

Stage 1
90% or more
- There are no specific symptoms, but kidney function can slowly decline.

Stage 2
- 60-89%

Stage 3
- 30-59%
- Kidney function is very low, and treatment for kidney failure may be needed soon.

Stage 4
- 15-29%
- Kidneys can no longer keep up with removing waste products and extra water. This is called kidney failure. Although there is no cure, treatment options are available.

Stage 5
- < 15%

Diabetic Nephropathy

- Hyper-filtration
- Persistent Albuminuria
- Peripheral Edema
- GFR Decline
- Hypertension
- Increased Risk for CVD/Cardiac Events

https://www.slideshare.net/ahmadtanweer/diabetic-nephropathy-tanweer-1
Risk Factors for Diabetic Nephropathy

Most Risk Factors Are Modifiable

Preventative Healthcare Models need to be supported
Nutritional Care Areas

- Blood Pressure Control
- Glycemic Control
- Management of Lipids
- RD Support

Patient-Centered Care
Patient’s Experience
Approaches for Nutrition Care

- CKD and Diabetes are progressive and chronic diseases
- Relationship with food and dietitian needs to be sustainable in order to slow progression
  - Food Champion, not Food Police
  - Limit contraindications and focus on “what to eat”
  - STREAMLINED APPROACH TO NUTRITION
Nutrition Care

- What CAN patients eat?
- What FITS into their life?
- What SUCCESSES have they had already?
- What are their GOALS?
- What is most EFFICIENT?

The four principles of person-centred care:
- Support
- Collaboration
- Active Listening
- Care is... personalised
- Care is... coordinated
- Care is... enabling
- Person is treated with... dignity, compassion, respect
Nutrition Care Areas

- Glycemic Control
- Sodium Reduction
- Protein Recommendations
- Potassium Control
- Phosphate Control
- Weight Management/Physical Activity
Glycemic Control
Evidence for Glycemic Control

- DCCT/EDIC Studies show HbA1C of 7.0% prevented nephropathy, but during follow up period, effects of reduction persisted with 8.0%
- ADVANCE/ACCORD/VADT studies showed no significant benefit on GFR with more intensive glycemic control (HbA1C<7.0%)
- Risk of hypoglycemia plays a major role in setting targets
- HbA1C may be underestimated in anemia
Hypoglycemia Considerations$^{2,3}$

- Risks are higher in our patients
- Consider insulin metabolism as GFR declines (increased half life)
- Impaired gluconeogenesis with reduced kidney mass
- Consider extension of HbA1C above 7.0% with co-morbidities
- Explore lifestyle interventions as contributing factors:
  - Erratic eating pattern
  - Decreased appetite
  - Increased exercise
Dietary Management of Diabetes

- RD visit every 3 months recommended (telehealth)²
- General meal patterns/timing/portions rather than carbohydrate counting
- Hydration
- Higher fibre diet – whole grains/fruits/vegetables
- Blood glucose monitoring (scattered)
- Physical activity, not weight loss
The Healthy Plate

https://www.hsph.harvard.edu/nutritionsource/healthy-eating-plate/
Teaching Tools

Diabetes and Kidney Diet Basics

It can be hard at times to combine both diabetes and kidney diets. Here are some tips to help keep your blood sugars stable and your kidneys healthy.

3

Eat Three Meals a Day
- Eat your first meal within 1-2 hours of waking
- Avoid skipping meals
- If you are not able to eat full meals try 4-6 small meals per day

Space Meals No More Than Four to Six Hours Apart
- If meals are more than six hours apart, have a small snack
- An evening snack may be needed—talk with your dietitian

Eat Balanced Meals
- Include 3-4 food groups at each meal
- Include one choice from the meat and alternatives group (those have protein)
- Carbohydrates found in grains and starches, fruit, starchy vegetables, dairy and alternatives will turn into sugar and raise your blood sugar level. Keep serving sizes in mind.

Choose Healthy Fat
- Choose canola, olive, or flax oils and non-hydrogenated margarine more often
- Limit added fat to 3-6 teaspoons per day (oils, spreads and dressings)
- Choose lower fat dairy products such as skim or 1% milk and low fat cheese (check with your dietitian for the number of servings per day)
- Stew, poach, steam, or boil foods instead of frying. Use most heat and lower temperatures when cooking.

Limit Sodium
- Buy fresh foods more often and cook meals from scratch
- Avoid packaged or processed foods and meals
- Use spices/herbs and salt-free seasonings to flavour foods instead of salt
- Rinse canned foods with water to remove extra sodium

Eat Less Sugar
- Avoid high sugar items like pop, juice, syrup, jam, honey, cakes and pastries
- Sugar substitutes can be used instead of table sugar

Avoid Foods with Added Phosphorus
- Phosphorus can be found as an additive in many processed foods and drinks
- Avoid foods with “phos” as part of an ingredient name
- Ask your dietitian if you need to restrict other diet sources of phosphorus

Limit Alcohol
- 2 or less drinks per day for women and 3 or less drinks per day for men
- 1 drink = 5 ounces of dry wine, 1.5 ounces of hard liquor or 12 ounces of beer. (Note: beer and some wine is higher in phosphorus)
- Use club soda or diet pop as a mixer (no colas, as they are high in phosphorus)
- Make sure you eat food if you drink alcohol

Be Active
- Regular physical activity will improve blood sugar control and may improve your energy level.
- 150 minutes of moderate aerobic activity a week is recommended (this is as little as 26 minutes per day or 50 minutes 3 times per week)
- Try to include 3 days of resistance exercises like weights or stretching

Sodium Reduction

Most Sodium Comes from Processed and Restaurant Foods

- Processed and restaurant foods: 77%
- Naturally occurring: 12%
- While eating: 6%
- Home cooking: 5%

https://www.cdc.gov/salt/food.htm
Evidence for Blood Pressure Control

- RCT cross-over trial
- Low sodium diet (less than 2,000 mg per day), washout, crossover
- Significant reductions in urinary sodium (-57.3 mEq/24 h; 95% CI, -81.8 to -32.9), weight (-2.3 kg; 95% CI, -3.2 to -1.5), and 24-hour systolic BP (-10.8 mmHg; 95% CI, -17.0 to -4.6) were also observed (all $P<0.01$).
- Motivational Interviewing by RD
Salt Reduction = Label Reading

<table>
<thead>
<tr>
<th>Nutrition Typical values (cooked as per instructions)</th>
<th>per 100g</th>
<th>per 1/4 pack</th>
<th>% adult GDAs 1/4 pack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy kJ</td>
<td>1007</td>
<td>2014</td>
<td>241</td>
</tr>
<tr>
<td>Protein</td>
<td>8.4g</td>
<td>16.8g</td>
<td>41.2g</td>
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<tr>
<td>Carbohydrate</td>
<td>20.6g</td>
<td>16.8g</td>
<td>41.2g</td>
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<tr>
<td>of which sucares</td>
<td>1.8g</td>
<td>3.6g</td>
<td>7.5g</td>
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<tr>
<td>of which starch</td>
<td>18.8g</td>
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<tr>
<td>of which starch</td>
<td>13.7g</td>
<td>3.6g</td>
<td>7.5g</td>
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<tr>
<td>Fat</td>
<td>5.7g</td>
<td>11.4g</td>
<td>23.4g</td>
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<tr>
<td>of which saturates</td>
<td>5.9g</td>
<td>11.4g</td>
<td>23.4g</td>
</tr>
<tr>
<td>of which unsaturates</td>
<td>0.9g</td>
<td>1.8g</td>
<td>3.6g</td>
</tr>
<tr>
<td>Fiber</td>
<td>1.5g</td>
<td>3.0g</td>
<td>6.0g</td>
</tr>
<tr>
<td>Salt</td>
<td>0.50g</td>
<td>1.00g</td>
<td>2.0g</td>
</tr>
<tr>
<td>of which sodium</td>
<td>0.20g</td>
<td>0.40g</td>
<td>0.8g</td>
</tr>
</tbody>
</table>

GDA = Adult Guideline Daily Amounts are based on an average female. GDAs are guidelines and personal requirements may vary depending on age, gender, weight and activity.
Streamlining Food Lists

**BREADS**

These breads have fibre, and are lower in sodium, potassium, and phosphorus.

Read the label and aim for a Daily Value (DV) less than:

- Sodium: 8% (200mg)
- Potassium: 3% (100mg)
- Phosphorus: 10% (100mg)

- Silver Hills Little Big Bread
- Silver Hills Steady Eddie
- Silver Hills The Big 16
- Country Harvest Fibre
- Country Harvest 7 Grains
- Wonder Whole Wheat Fibre
- Wonder 100% Whole Wheat
- Dempster’s 100% Whole Wheat
Salt Reduction = Food Selection While Dining Out

- Dressings on the Side
- Limit Soups, Dips, Appetizers
- Ask the restaurant staff to “Not Salt Food” or offer lower salt options (call ahead)

Salt Reduction = Meal Preparation
Protein Recommendations
Protein Guidelines

http://www2.kidney.org/professionals/KDOQI/guideline_diabetes/guide5.htm
Protein: A Juggling Act

Individual Protein Needs

- Co-Morbidities
  - Obesity
- Prednisone
- Rate of Progression
- Muscle mass loss (Acidosis)
Protein Energy Wasting\textsuperscript{5}

- Loss of Kidney Function
- Uremic Toxins
- Co-Morbid Conditions
- Dietary Nutrient Intake
- Inflammation
- Metabolic Derangements (Metabolic Acidosis, Insulin/IGF-1 Resistance, CKD-MBD, Low Testosterone)
- Dialysis-Associated Catabolism
- Infection
- Cardiovascular Disease
- Frailty Depression
Protein Calculations

- Protein distribution/amounts based on preservation of muscle mass
- (0.8-1.3g/kg) – include vegetarian proteins to help reduce metabolic acidosis
- Use adjusted body weight calculations:
  - Obesity
  - Edema
  - Underweight
# Protein Education

## Protein and Your Kidneys

Good quality protein keeps you healthy, heals wounds and helps to protect you from infection. With kidney disease, you may need to change the amount and type of protein in your diet.

You need ____ servings each day.

Choose from the following high-protein foods:

- Fish
- Canned Fish
- Eggs
- Egg whites
- Poultry
- Beef

<table>
<thead>
<tr>
<th>Beans and Lentils*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nut Butters*</td>
</tr>
<tr>
<td>Milk &amp; Soy Beverage*</td>
</tr>
<tr>
<td>Yogurt*</td>
</tr>
<tr>
<td>Cottage Cheese (no added salt)*</td>
</tr>
<tr>
<td>Cheese*</td>
</tr>
</tbody>
</table>

*These are high in potassium and phosphorus. Discuss with your dietitian.

Examples of One Serving
Potassium Control

Was it REALLY the banana?

Additives?

Dairy?

Soups?
Hyperkalemia

#1: Explore Non-Dietary Causes
- Blood glucose patterns before/after meals
- Recent hospitalization/surgery (blood loss)
- Factors affecting hydration
- Bicarbonate therapy (acidosis)
- Medication changes

#2: Explore Dietary Causes
- Meal Pattern/Portions/Spacing
- Processed Foods
- Salt Substitutes
- Beverages – Wine, Coffee, Juice, Milk, Pop
- Protein portions/meal timing/spacing
- Fruits and Vegetables
Lipid Management\textsuperscript{2,6}

- Statin + Ezetimibine therapy
- Reduction of saturated fats, processed foods
- Inclusion of monounsaturated and polyunsaturated fats (nuts, canola, olive, salmon)
- Physical activity
Phosphate Control

- Organic (from food) has 40-60% absorption versus Inorganic (from additives) which has >90% absorption
- Start education when patient has pattern of levels greater than 1.4 mg/dL
- Dietary intervention prior to starting binders preferred
### High Phosphorus vs. Lower Phosphorus Food Choices

<table>
<thead>
<tr>
<th>High Phosphorus Food Choice</th>
<th>Lower Phosphorus Food Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processed meat</td>
<td>Fresh meat</td>
</tr>
<tr>
<td>Canned salmon or sardines (with bones)</td>
<td>Canned tuna</td>
</tr>
<tr>
<td>Nuts and seeds</td>
<td>Pretzels, air-popped popcorn</td>
</tr>
<tr>
<td>Peanut/nut butter</td>
<td>Jam, jelly, honey</td>
</tr>
<tr>
<td>Bran cereal</td>
<td>Corn, rice, wheat cereal</td>
</tr>
<tr>
<td>Muffin</td>
<td>Bagel, croissant or donut</td>
</tr>
<tr>
<td>Dark rye, pumpernickel bread</td>
<td>Whole wheat, light rye or white bread</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>High Phosphorus Food Choice</th>
<th>Lower Phosphorus Food Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processed cheese</td>
<td>Cream or hard cheese</td>
</tr>
<tr>
<td>Ice cream</td>
<td>Popsicle</td>
</tr>
<tr>
<td>Dairy products, non-dairy</td>
<td>Almond milk, Rice Dream Original™</td>
</tr>
<tr>
<td>Cola, root beer, ice tea</td>
<td>Clear soda, sparkling water, salt-free club soda</td>
</tr>
<tr>
<td>Hot chocolate</td>
<td>Herbal tea</td>
</tr>
<tr>
<td>Chocolate bar</td>
<td>Hard candy, gummy candy</td>
</tr>
<tr>
<td>Pizza, alfredo pasta</td>
<td>Pasta with garlic, basil and olive oil</td>
</tr>
</tbody>
</table>
Counseling for Weight Loss

- Avoid statements to patient such “lose weight”
- Losing weight usually is synonymous with losing muscle mass in CKD 4-5
- Sarcopenia results in poorer outcomes in CKD\(^9\)
- Focus should be on physical activity goal setting based on functional ability\(^9\)
Physical Activity in CKD

- NHANES III showed that CKD groups who were physically active had lower rates of mortality when compared to inactive CKD groups (HR 0.44)\(^10\)

Like Child’s Play!
Suggestions for Physical Activity

- Walking (Nordic Walking)
- Swimming
- Cycling
- Chair Exercises (NHS)\textsuperscript{11}
- Strength Training
Nordic Walking at St. Paul's Hospital

Anyone interested is welcome to join!
Meeting In The Middle

Healthy Eating, Simplified

- Fruits and Veg
- Vegetarian
- Low Sodium

- Cardiovascular Disease
- Chronic Kidney Disease

- Physical Activity
- High Fibre
- Heart Healthy Fats
A Positive Experience for Patients

- Food Champions
- “What-to-Eat” Philosophy
- Streamlined Approach
  - Fewer Rules, Lists, and Records
Questions
References


