Webinar Logistics

• All lines are muted

• Two ways to ask questions during Q&A period:
  1. Type your question into the question section and we will read your question aloud.
  2. Click the “raise hand” icon and we will call your name and unmute your line allowing you to ask your question.
Presenters

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Nutrition Therapy Recommendations for People Managing Diabetes

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Webinar Goals

• Review highlights of the American Diabetes Association (ADA) 2013 Nutrition Therapy Recommendations
• Provide evidence for the effectiveness of diabetes nutrition therapy
• Review the role of weight loss interventions in adults with type 2 diabetes
• Summarize ADA 2013 nutrient recommendations
• “Take Home” message
Polling Question: Which is an accurate statement for weight loss (WL) in adults with or at risk of T2DM?

1. WL improves glucose throughout the progression of T2DM.
2. WL is most effective in prediabetes or early after diagnosis.
3. Low carbohydrate diets are preferred for weight loss.
4. Low fat diets are essential for weight loss.
Polling Question: Which is the most accurate statement regarding carbohydrate (CHO) intake for persons with diabetes?

1. Fiber intake improves glycemic control.
2. High GI foods are absorbed into the blood stream rapidly.
3. Total kcal more important than total CHO for glucose control.
4. Adding protein to CHO snack slows absorption of CHO.
Is Diabetes Nutrition Therapy Effective?

• Prediabetes outcomes
  – Nutrition therapy along with physical activity ↓ risk of type 2 diabetes by 58%; maintained up to 14 yrs

• Diabetes outcomes
  – Nutrition therapy provided by RDs: ave. ↓ in A1C 1% to 2% (ranging from 0.5 to 2.9%) depending on type, duration, and level of control of db
  – LDL-C ↓ by 15-25 mg/dl or by 7-22%
  – SBP and DBP ↓ on average by ~5 mmHg
  – Outcomes known by 6 weeks to 3 months

Type 2 Diabetes and Nutrition Therapy: Examples

- Findings from RCTs, observational studies, systematic and Cochrane reviews demonstrate effectiveness of nutrition therapy; examples:
  - UKPDS (United Kingdom Prospective Diabetes Study): Newly diagnosed; A1C 9%; 3 mo, A1C ↓ 2%
  - Early ACTID (Early Activity in Diabetes): Newly diagnosed; A1C 6.7%; 6 mo maintained to 12 mo, A1C ↓ 0.4% (P<0.001), even with use of fewer diabetes drugs
  - LOADD Study (Lifestyle Over and Above Drugs in Diabetes): Ave duration of db: ~9 yrs; hyperglycemic despite optimized drug therapy; A1C ↓ 0.5% vs control (P=0.007); comparable to adding new drug; cost-effective

- Due to progressive nature of T2DM over time pharmacotherapy is needed but nutrition therapy continues to be essential

Type 1 Diabetes and Nutrition Therapy: Examples

- FIIT (Flexible Intensive Insulin Therapy) Using Insulin-to CHO Ratios
  - Dose Adjusted for Normal Eating (DAFNE): A1C ↓ 1% with no increase in severe hypoglycemia and quality of life improved; 44-mo follow-up: continued improvement in A1C and quality of life
  - Training programs in Germany (3-yr) and Australia (1-yr): improvements in A1C without increasing risk of hypoglycemia

- For individuals on MDI or insulin pumps, insulin does adjusted based on planned carbohydrate intake

- For individuals using fixed daily insulin doses, CHO intake should be consistent (time and amount)

What Nutrition Therapy Interventions Are Effective?

• A variety of nutrition therapy interventions, such as reduced energy/fat intake, carbohydrate counting, simplified meal plans, healthy food choices, individualized meal planning strategies, insulin-to-carbohydrate ratios, physical activity, and behavioral strategies
  
  – Type 2 db: reduced energy intake
  
  – Type 1 db: matching insulin to CHO intake

• A number of initial individual or group sessions and follow-up encounters were implemented

Acad Nutr Diet. www.andevideencelibrary.com/topic.cfm?=3252
Type 2 Diabetes: A Progressive Disease

BG remains normal until insulin deficiency
Type 2 Diabetes: A Progressive Disease

- Prediabetes: Insulin Resistance
- Onset Diabetes: Beginning of Insulin Deficiency
- Diabetes: Insulin Deficiency

Nutrition Therapy
- Nutrition Therapy Alone or with Medications
- Nutrition Therapy Medications

Meds

The Dilemma of Weight Loss in Diabetes

• “Diet” doesn’t fail—the beta cells of the pancreas fail

• Insulin resistance
  – Modest amounts of weight loss (and physical activity) can prevent or delay type 2 diabetes
  – Weight loss may improve risk factors

• Insulin deficiency
  – Focus is on nutrition strategies for normalization of blood glucose levels, lipids and blood pressure
  – Results on glucose will be known by 6 weeks to 3 months
What is Known About Weight Management?

- At ~6 months individuals can lose 5% to 10% of their starting weight
- Regardless of the intervention, plateaus and regain of weight loss are expected; compensatory mechanisms protect against weight loss
- If treatment is discontinued, weight gain occurs
- With support, modest weight loss can be maintained
Average Weight Loss Per Subject Completing a Minimum 1-Yr Intervention

80 studies; 26,455 subjects; 18,199 completers (69%)

Why Weight Loss Is Difficult?

- Genetics - ~50% of variance genetics and 50% environment
- Weight tightly regulated by neural, hormonal, and metabolic factors
  - Hormonal adaptations (↓ leptin, peptide YY, cholecystokinin, insulin, and ↑ ghrelin, gastric inhibitory polypeptide, pancreatic polypeptide) that encourage weight gain after diet-induced weight loss remain 1-yr after initial weight reduction
  - Weight loss results in adaptive thermogenesis (↓ resting metabolic rate) up to 1-yr

What Are the Benefits From Modest Weight Loss (~5% of Initial Weight)?

• Prevention or delay of type 2 diabetes
• Decreases in systolic and diastolic blood pressure in dose-dependent fashion
• Decreases in circulating inflammatory markers (C-reactive protein and cytokines)
• Potential improvement in triglyceride levels, total and LDL cholesterol

Change in Body Weight and Prevention/Delay of Type 2 Diabetes

Weight Loss Intervention Studies in Type 2 Db

• Systematic Review: 1-yr study duration; 70% completion rate; 2000 to 2013

• 11 studies (5 >1-yr): 8 compared weight loss interventions (WLI) and 3 compared WLI to usual care or control (19 WLI groups)

• Weight, A1C, lipid, and BP effectiveness

• Weight losses 1.9-8.4 kg at 1-yr
  – 17 interventions -1.9 to 4.8 kg
  – Mediterranean-style -6.2 kg; ILI -8.4 kg
  – Low carbohydrate -1.9 kg

Weight Change Outcomes

Average Weight Loss/Maintenance in Persons with Type 2 Diabetes (11 studies; 6,710 participants)
Systematic Review cont.

- 8 WLI improved A1C at 1-yr
  - Meal replacements, behavioral at 12 mo but not at 18 mo; high CHO, high protein, low-fat, MED, ILI
  - 3 with PA: MED ↓ 1.2%; ILI ↓ 0.6%; low-fat ↓ 0.6%

- 11 WLI reported NS changes in A1C at 1-yr
  - Individualized food plan; soy-meal replacement; high-MUFA; high-CHO; low-fat; high-protein

- Majority NS changes in lipids (10 ↑ HDL)

- 7 WLI improved BP; 7 NS changes in BP
Systematic Review cont.

- 5 studies compared macronutrients (all reported similar weight changes)
  - High MUFA vs high CHO (-4.0 vs -3.8 kg)
  - Low CHO vs low fat (2) (-3.1 vs -3.1 kg; -1.9 vs -3.9 kg)
  - High protein vs high CHO (2) (-3.2 vs 2.4 kg; 2.2 vs 2.2 kg)

- 8 WLI reported NS changes in A1C from baseline at 1-yr; 2 (1 high-protein, 1 high-CHO) reported improvement (-0.2%)

Why doesn’t weight loss always lead to improved glycemia?

• Usual weight loss therapies do not lead to adequate weight loss
  OR

• Persons are primarily insulin deficient—need medications to be combined with nutrition therapy
  OR

• Energy restriction leads to improved glycemia, not weight loss per se
Carbohydrate

- There is no ideal percentage of calories from carbohydrate, protein, and fat for all persons with diabetes; all 3 require insulin for metabolism

- Total energy intake is more important than the source of the energy

- Monitoring carbohydrate intake, whether by carbohydrate counting or experience-based estimation, remains a key strategy in achieving glycemic control

Evert AB. *Diabetes Care* 2013;36:3821-3842
Carbohydrate Intake

• Most individuals with diabetes do not eat a low- or high-CHO diet, but rather a moderate intake of CHO
  – CHO: ~45% of total kcal
  – Protein: ~16-18%
  – Fat: ~35-40%

• For the majority of individuals with diabetes it appears difficult to eat a high CHO diet
  – In the UKPDS, despite education to eat 50% to 55% of kcal from CHO, average intake was 43%

Glycemic Index: The GI Does Not Measure How Rapidly BG Increases!

The GI is the relative area under the postprandial glucose curve (AUC) comparing 50 g of digestible carbohydrate from a test food to 50 g of glucose.

“No statistical difference in the glucose response curve from different foods…Low GI foods do not produce a slower rise in BG nor do they produce an extended, sustained glucose response.”

GI Summary

• Two 1-year RCT of low GI diets reported to differences in A1C
  – Canadian Trial of Carbohydrates in Diabetes: compared high-GI/low GI; low-CHO/high MUFA; no significant in A1C, lipids or body weight
  – Low GI vs. ADA diet: similar reductions in A1C at 6 and 12 mo

• ADA Macronutrient Systematic Review
  – In general, there is little difference in glycemic control and CVD risk factors between low GI and high GI or other diets; slight improvement in glycemia from lower GI diets confounded by higher fiber intake

Carbohydrate: What’s Important?

- Although all CHOs can be eaten, for good health, CHOs from vegetables, fruits, whole grain, legumes, and dairy products take priority over CHO foods that contain added fat, sugars, or sodium.

- Limit or avoid intake of sugar sweetened beverages (from any caloric sweetener including high fructose corn syrup and sucrose) to reduce risk of weight gain and worsening of CVD risk.

- Macronutrient proportions should be individualized and adjusted to meet metabolic goals and individual preferences of the person with diabetes.

Protein

- In persons with type 2 diabetes, ingested protein does not increase plasma glucose levels but does increase insulin response
  - Protein should not be used to treat hypoglycemia or to prevent hypoglycemia
- In persons with normal renal function, usual protein intake (15-20%) does not need to be changed
- In persons with DKD (either micro- or macroalbuminuria), reducing protein is not recommended as this does not alter the course of the GFR decline

Protein Summary

• Protein does not need to be added to snacks or meals
  – Does not slow or change carbohydrate meal or snack glucose response

• Protein is not helpful in the prevention or treatment of hypoglycemia

• For persons with DKD (micro- or macroalbuminuria) reducing protein below usual intake is not recommended because it does not alter glycemic, CVD, or the course of GFR decline
Fats and Diabetes

- In animal and observational studies, higher intakes of total dietary fat, regardless of the fat type, produce greater insulin resistance.

- In clinical trials saturated and trans fats shown to cause insulin resistance, whereas mono- and polyunsaturated and omega-3 fatty acids do not have an adverse effect.

- Evidence inconclusive for ideal amount of total fat; fat quality more important than quantity.
Individualization Is Essential

• Individuals with diabetes eat foods, not single nutrients

• *Healthy eating* or *healthy eating patterns* emphasizing a variety of nutrient-dense foods in appropriate portion sizes continues to be the first goal of diabetes nutrition therapy

• Must address individual nutrition needs based on personal and cultural preferences and the individual’s willingness and ability to make behavior changes
What’s the best nutrition therapy intervention for diabetes?
In an “Ideal” World

• People with type 2 diabetes:
  – Lose 5% to 10% of baseline weight
  – Eat a nutrient dense eating pattern in appropriate portion sizes
  – Participate in 150 min/wk of regular physical activity

• People with type 1 diabetes:
  – Count carbohydrates
  – Adjust insulin based on insulin-to-CHO ratios
  – Use correction factors
In the “Real” World

• Facilitate behavior changes that individuals are willing and able to make based on proven lifestyle interventions

• A variety of nutrition therapy interventions and eating patterns can be implemented

• But lifestyle interventions for diabetes are effective!
Diabetes and Nutrition Resources

Joanne Gallivan, MS, RD
Director, National Diabetes Education Program
National Institute of Diabetes and Digestive and Kidney Diseases
National Institutes of Health
Tasty Recipes for People with Diabetes and Their Families
For more information, call 1-800-CDC-INFO or visit www.cdc.gov/info
NDEP Resources for Schools and Youth

Helping the Student with Diabetes Succeed: A Guide for School Personnel

Tips for Teens with Diabetes: Make Healthy Food Choices

Tips for Kids: Eat Healthy Foods
National Diabetes Information Clearinghouse (NDIC)

http://diabetes.niddk.nih.gov/
Resources from the National Kidney Disease Education Program

http://nkdep.nih.gov/
Resources from the Weight-control Information Network (WIN)

http://win.niddk.nih.gov/
Partnership with the Academy of Nutrition and Dietetics (AND)

• NDEP celebrates March as National Nutrition Month

• AND’s DCE practice group co-brands and distributes NDEP patient education materials

• **Coming Soon:** Diabetes and Kidney Disease webinar featuring Dr. Andrew Narva, Director of NKDEP on May 20, 2014 at 1PM ET

[www.eatright.org](http://www.eatright.org)
Webinar Slides and Evaluation

- Webinar Series Webpage
  - http://ndep.nih.gov/resources/webinars
- Presentation Slides
- Webinar Evaluation
- Certificate of Completion for Webinar Attendees
  - ndep@hagersharp.com
Questions and Answers
Thank you!

NDEP  National Diabetes Education Program
A program of the National Institutes of Health and the Centers for Disease Control and Prevention

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