Presented by UIC CON
Mary Craig, FNP

Diabetes
Type I and II

Welcome

Objectives

- To learn what diabetes is and how many individuals are affected by this disease
- To learn the different types of diabetes and be able to distinguish them
- To learn the symptoms of diabetes before diagnosis and after diagnosis
- To learn what some of the uncontrolled and controlled risk factors are
- To learn some ways to manage diabetes along with treatment of the disease
Diabetes Overview

- Diabetes Defined with Types
- Risk Factors
- Ways of managing diabetes
- Possible Treatments

Diabetes - Raised Blood Sugar Levels

- Type I Diabetes
- Type II Diabetes
- Diabetes Insipidus

Diabetes Insipidus

- Extreme thirst
- Excretion of excessive amount of diluted urine
- Trouble Sleeping
- Fever
- Vomiting, Diarrhea
- Delayed growth
- Weight loss
Diabetes Insipidus

Cause

Lack of Antidiuretic Hormone (ADH)
- Produced in the Hypothalamus
- Excreted by the pituitary
- Drink around 15 liters a day
  - (normal 3 liters)

The Immune system destroys Pancreatic Cells

Reason – Unknown. Found 50 genes/regions, but that alone does not mean type I diabetes. Possible environmental triggers: virus.

Who gets Type I? Anyone, gender equally, mostly before age 19; uncommon in African, Native, and Asian American

Defining the types-Type I Diabetes

Diabetes Type I-Symptoms

Classic

- Hyperglycemia without acidosis; most common in children

Renal

- Renal concentration ≥60 mg/dl exceeding this limit increases urination

Polydipsia

- Increase of sugar in blood increases osmolality; increase thirst

Weight Loss/Lethargy

- Decrease of weight because of body need for increase in catabolism (breakdown of energy) and output

Polyphagia

- Increase hunger/appetite
**Diabetes Type I - Tests for Diagnosis**

- Genetic Markers - HLA
- Immunologic Markers - Serum antibodies
- Metabolic Markers - IVGTT/OGTT & Proinsulin

**Defining the Types - Type II Diabetes**

- The body does not properly produce enough insulin or is able to use insulin - “insulin resistance”
- Insulin resistance - “acquired” affecting individuals with risk factors and who also have a hereditary factor

Who gets Type II? Anyone - Age older than 45, Family Hx - member diagnosed with diabetes, Ethnicity - African, Native, Asian, Hispanic/Latino or Pacific Islander.

**Diabetes Type II - Symptoms**

- **Classic Onset**: Anytime - when mild, sometimes individual does not notice
- **Polyuria**: Increase in urination
- **Polydipsia**: Increase in thirst - dry mouth
- **Polyphagia**: Decrease in weight
- **Polyphagia**: Increase in hunger/appetite
**Diabetes Type II symptoms Continued**

- Increased irritability
- Blurred vision
- Tingling or numbness in extremities
- Increased appetite
- Decreased energy
- Increased drowsiness
- Wounds that do not heal
- Increased yeast infections or ones that keep coming back
- Dry itchy skin
- Poor circulation

**Risk Factors Diabetes Type II**

- Acanthosis nigricans: dark rashes usually around the neck and underarms
- Depression
- Little or no exercise
- Smoking
- Stress
- Too little sleep
- Blood Pressure 140/90 or above
- Triglycerides above 250mg/dl
- HDL below 35
- Physically inactive

**Risk Factors Diabetes Type II**

- Prediabetes
- Heart or blood vessel disease
- High cholesterol-LDL and low HDL
- High triglycerides
- Overweight/obese
- Having had a baby over 9 pounds
- Having Gestational Diabetes when pregnant
- Polycystic ovary syndrome (PCOS)

**Risk Factors - Diabetes Long Term**
- Heart disease
- Stroke
- Kidney disease
- Blindness and other eye problems
- Gum disease and loss of teeth
- Nerve damage in hands, feet, and organs
- Lack of circulation - necrotic tissue and loss of extremities

**Managing Diabetes - Food**
- **Type and Amount**
  - Portion Sizes
- **Carbohydrates**
  - Types and amount
- **Well Balanced Meals**
  - Plan meals

**Management - Total Meal Portion per Day**
- 2 1/2 to 2 cups of Fruit
- 2 1/2 to 3 1/2 cups of Vegetables
- 5-6 1/2 ounces of protein (meat, beans, & seafood)
- 5-8 ounces of grain of which 1/2 is from whole grain
- No more than 7 teaspoons of oils - plan, fish, or nut oils
Management - Where Americans get most of their calories

- Check labels for portion size - eat only one portion size
- Shrink plate size
- Eat and order smaller dishes like luncheon or salad plate
- Do NOT go back for seconds or put extra food on plate
- Store leftovers in a single-serving container
- When eating out - order from the kid's menu
- Eating out - box half before beginning to eat
- Split a dish with someone
- Eat a salad/soup for an entree
Management- Portion Sizes

- Potato/better yet sweet potato-size of a computer mouse
- Pasta- size of ½ a baseball
- Waffles- size of a CD
- Bakery-bagel size- hockey puck/muffin-tennis ball
- Cheese- size of 4 dice
- Meat – size deck of cards or palm of your hand
- Peanut butter- size of a golf ball
- Rice- size of a light bulb
- Oils- size of a stack of 4 dimes

Management- Carbohydrates

Glycemic Index

- Glycemic Index- The impact of the carbohydrate on the blood glucose.
- Counting carbohydrates- no more than 45 per meal.
- Low Glycemic Index- 55 or less
- Medium Glycemic Index- 56-69
- High Glycemic Index greater than 70
  - General- Whole grain barley, oats, and rye have low rate of digestion and lower GI values.
  - Fruits such as apples, pears, oranges, grapefruit are low GI fruits.
  - Vegetables - broccoli, cauliflower, celery cucumber and green beans are low GI

Management- Well Balanced Meals

- 4 Sections
- Fruits 10-percent
- Grains (Whole) 30-percent
- Protein 20-percent
- Vegetables 40-percent

Choose MyPlate.gov
### Managing Diabetes - Exercise

| Type and Amount | • Aerobic & Muscle-strengthening |
| Schedule        | • Best time to exercise |
| Know Sugar Level| • Before, during & after |

### Management - Exercise

- Aerobic exercise - walking, jogging, bicycling, swimming
- Strength Training – lifting weights, resistance bands
- Most important – do something you like
- Start with 10 minutes and increase by 5 min increments weekly
- Check your blood sugar before, during and after exercising
- Bring a snack
- Start Safely - do a warm up and a cool down

### Management - Exercise

- Drink plenty of water during and after exercise
- Wear the proper gear - walking shoes that fit well, wicking socks and gel insoles
- Examine feet after exercise daily
- Know the signs and symptoms of Hypo and Hyperglycemia
- Consider booking a few sessions with a trainer
  - Learn about basics on safety; avoiding injury; wear a medical alert tag
  - Basics on warming up
  - Guide to setting a routine
**Management-Exercise**

**Hypoglycemia**
- Heart palpitations
- Fatigue
- Pale skin
- Shakiness
- Anxiety
- Sweating
- Hunger
- Irritability
- Tingling sensation around the mouth

---

**Management- Exercise**

**Hyperglycemia/KETOACIDOSIS**
- Head
  - Headache
  - Sleepy
  - Confused
  - Loss of consciousness
  - Coma
- Muscular
  - Weakness
  - Seizures
- Intestinal
  - Diarrhea

---

**Management-Exercise**

**Hyperglycemia/KETOACIDOSIS**
- Respiratory
  - Shortness of breath
  - Coughing
- Heart
  - Arrhythmia
  - Increased heart rate
- Gastric
  - Nausea
  - Vomiting
Management - Medically

- Checking Blood Sugars daily
  - AM blood sugars 80-130
  - 1-2 hours after a meal below 180
  - At bedtime 110-150
- Checking blood pressure at every medical visit
- Checking feet daily - especially after daily exercise
- HgA1c at least twice a year
- Baseline labs to check kidney function yearly
- Micro-albumin at least once a year

Management - HgA1c

![Diabetes diagnosis using A1C](image)

Treatment
Prandial & Basal Insulin

- Prandial Insulin - short acting insulin used to cover "mealtime"
- Basal Insulin - long acting used to provide a constant level of insulin throughout the day. Insulin whether eating or NPO
**Treatment for Diabetes I & II**

- Short Acting Insulin- Prandial Insulin
  - Regular Insulin-Humulin R
  - Lispro-Humalog
  - Glusine- Apidra
  - Aspart- NovoLog
- Intermediate Acting Insulin (NPH)
  - Humulin (Kwick Pen, Pen, N)
  - Novolin (Relion, N)
- Basal Insulin
  - Humulin R (U-100)
- Mixed Insulin
  - Humalog Mix (50/50, 75/25)
  - NovoLog Mix (70/30)

---

**Treatment- Diabetes Type I**

- Need Basal and Prandial Insulin daily
- Can use Insulin pumps
  - Use short acting insulin
  - Delivered continuously over 24 hours
  - Basal rates
  - Bolus doses for meals
  - Supplemental doses
- Can be attached to:
  - Waistband
  - Pocket
  - Bra
  - Garter belt-sock

---

**Treatment- Diabetes Type I**

**Insulin Pump Advantages**

- Elimination of individual injections
- Insulin delivery more accurate
- Improved HgA1c
- Fewer blood glucose level swings
- Delivery of bolus easy
- Increases flexibility of eating
- Eliminates the unpredictability of intermediate and long-acting insulins
- Can exercise without eating a lot of carbohydrates
**Treatment- Diabetes Type I**

**Insulin Pump Disadvantages**

- Can gain weight
- Can cause diabetic ketoacidosis (DKA) if catheter comes out
- Can be expensive - Insurance may not pay
- Can be bothersome being attached to a pump all the time
- May require a hospital stay or full day at out patient center to make sure one understands how to run their pump

---

**Treatment for Diabetes I & II**

**Long Acting Insulin**

**Basal Insulin**

- Detemir - Note has Peak 3-9 hrs; duration 6-24 hrs  
  - Levemir 100 units/ml
- Regular Insulin  
  - Humulin R-U- 500 units/ml
- Glargine  
  - Lantus 100 units/ml
  - Basalgar 100 units/ml
  - Toujeo 300 units/ml
- Degludec  
  - Tresiba 100 units/ml; 200 units/ml

---

**Diabetic Medications for Type II Diabetes**

- Alpha Glucosidase Inhibitor
  - Acarbose - Precose; Acarbose  
    - Miglitol - Glyset  
      - Prevents/slow digestion of carbohydrates (Starch and Sugar)
- Amylin Analogue/Amylinomimetic
  - Pramlintide - Symlin  
    - Injection of amylin which increases the release of insulin (can be used by Type I and Type II diabetics)
- Biguanides
  - Metformin  
    - Glucophage and Glucophage XR  
    - Glumetza  
    - Riomet  
    - Fortamet  
    - Decreases conversion of glycogen to glucose
Diabetic Medications for Type II Diabetes

- Dipeptidyl Peptidase 4-Inhibitor (DPP-4 Inhibitor)
  - Linagliptin – Tradjenta
  - Sitagliptin – Januvia
  - Stops the breakdown of GLP-1 and GIP
- Glucagon Like Peptide-1 Receptor Agonist (GLP-1)
  - Exenatide – Byetta
  - Exenatide XR- Bydureon
  - Dulaglutide – Dulucity
  - Liraglutide – Victoza
  - Albiglutide – Tanzeum
- Decrease the emptying of the stomach

Diabetic Medications for Type II Diabetes

- Meglitinide
  - Repaglinide – Prandin
  - Nateglinide – Starlix
  - Increase the production of insulin
- Sodium-Glucose Co-Transporter 2 Inhibitors (SGLT2 Inhibitors)
  - Canagliflozin – Invokana
  - Dapagliflozin – Farxiga
  - Empagliflozin – Jardiance
  - Get rid of the sugar by urination
- Sulfonyurea
  - Glimepride, Amaryl
  - Glipizide – Glucotrol
  - Glyburide – Diabeta
  - Increase insulin via Beta cell production in pancreas
- Thiazolidinedione (TZD)
  - Pioglitazone – Actos
  - Rosiglitazone – Advandia
  - Makes fat cells more sensitive to insulin

Complications Related to Diabetes

- Diabetes
- Cardiovascular Disease
- Hyperlipidemia
Potential Complications of Diabetes

Heart Disease, Stroke, Kidney Disease, Decrease in life expectancy

Management- ABC's of Diabetes

A=A1c or HgA1c 2x's/year
B= Blood Pressure @ every medical visit
C=Cholesterol 1 time per year
   • Increase LDL and decrease in HDL = increase chance of stroke
Urine Test- Microalbumin- 1 time/year
Log blood sugars daily

Management- Health Team

- Dentist
  - Floss and brush teeth daily
  - Endocrinologist
  - At least once a year
  - Diabetic Educator
  - yearly
  - Dietitian
- Ophthalmologist
  - Yearly
- Podiatrist
  - Every three months
- Pharmacist
- Social Worker
Guidelines
American Association of Endocrinologist

References

References Continued


Questions?

Thank you!

This presentation was developed by UIC CON for IDOA and DMH.