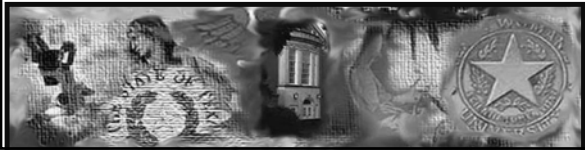


Review of Diabetes (Type I, Type II, and Gestational)

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Type I Diabetes

- Have antibodies to insulin producing cells
 - Human leukocyte antigens in 90%
 - 10% idiopathic
- Viral association?
- Do not produce insulin
- Need insulin therapy



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Type I Diabetes

- Children
- Adolescents
- Young adults
- May develop ketoacidosis

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Type I

- Peaks just prior to puberty
- Occurs 1-2 years earlier in girls than boys
- May cause menstrual irregularities
 - Glucose control may be worse during certain times of menstrual cycle

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Type I

- Most studies show no change in glucose control with oral contraceptive use

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Diagnosing Type I Diabetes

- Polyuria, polydipsia, and rapid weight loss + random plasma glucose > 200
- Fasting plasma glucose $> 126 \times 2$
- Ketonemia, ketonuria, or both
- 2 hr plasma glucose greater than 200 mg/dl during OGTT (75 grams)

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Type II Diabetes

- Resistant to insulin
- Does not produce enough insulin to overcome resistance
- Occurs in families
- Part of “metabolic syndrome”

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Type II

- Metabolic Syndrome
 - Obesity
 - Hirsutism
 - Oligomenorrhea
 - Insulin resistant state consistent with PCO

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Diagnosing Type II Diabetes

- Most over 40 and obese
- Polyuria and polydipsia present
- Ketonuria and weight loss less common
- Few or no symptoms
- Recurrent candidal vaginitis?
- Hypertension, dyslipidemia, and atherosclerosis often present

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Type II

- Diabetes = heart disease!
- 2-3 fold increase in urinary tract infections in diabetic women

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Diagnosing Type II Diabetes

- Fasting plasma glucose > 126 more than once
- 75 gm GTT >200 2 hours after oral glucose

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Type II Diabetes

- Occurs with some ethnic groups (Hispanic)
- Occurs in obese women
- Incidence increases with age

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Type II Diabetes

- Control can occur with lifestyle changes
- Diet
- Weight loss
- Exercise
- Oral hypoglycemic drugs
 - Are these drugs teratogens?
- Insulin if oral drugs are not effective

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Type II

- Can cause menstrual irregularities
- OCPs do not exacerbate
- HRT????
 - CVD in women with diabetes “a given”

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Type 1 versus Type 2

Type	Ketosis	Islet Cell Ab	HLA
I- Immune	Present	Present	Positive
I- Idiopathic	Present	Absent	Absent
II- Non-obese	Absent	Absent	Negative
II- Obese	Absent	Absent	Negative

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Treatment

Type	Treatment
I- Immune	Normal caloric healthy diet Pre-prandial rapid insulin
I- Nonimmune	Basal insulin intermediate or long acting
II- Non-obese	Normal caloric diet Diet + insulin or oral agents
II- Obese	Weight reduction Hypo-caloric diet + oral agents or insulin

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Screening for Diabetes

- Fasting plasma glucose
 - All adults over 45
 - Every 3-5 years
- Screen for gestational diabetes
 - 24-28 weeks gestation
- Assess for classical symptoms
 - Polydipsia
 - Polyphagia
 - Polyuria
 - Weight loss

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Screening before age 45

- History
 - Diabetes in first degree relative
 - Gestational diabetes
 - Infant > 4000 gm
- Physical Exam
 - 20% above ideal body weight
 - Hypertension
 - HDL cholesterol < 40
 - Triglycerides > 250

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Screening Before Age 45 Ethnic Groups

- African American
- Native American
- Hispanic



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Fasting Plasma Levels

- Normal < 110
- Initiate therapy of fasting plasma glucose is >126 more than once
- Therapy
 - Weight reduction
 - Dietary glucose control
 - Exercise

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Preconceptual Counseling

- A must!
- Many drugs such as ACE inhibitors, angiotensin 2 blockers, metformin, glitazones, and sulfourea must be discontinued
- Very tight BS control prior to conception to prevent complications

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Pregnancy and Type I Diabetes

- Congenital anomalies
- Macrosomia
 - High blood sugar
- IUGR
 - Vascular damage

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Pregnancy and Type I Diabetes

- PIH
- Ketoacidosis
- Polyhydramnios
- Fetal death
 - Especially last month of gestation
 - 1/300 – 1/400
 - Suffer uteroplacental insufficiency because of microvascular disease?

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Pregnancy and Diabetes

- Congenital abnormalities:
 - Transportation of great vessels
 - Atrial/ventricular septal defects
 - Hydrocephalus
 - Renal agenesis
 - Cystic kidneys
 - Ureter duplex

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Pregnancy and Diabetes

- Abnormalities similar in Types I, II, or gestational diabetes
- Several studies show
 - Hemoglobin A1C values more than 9 SD over nondiabetic levels have increased risk of spontaneous abortion
 - Poorest control can be associated with 1/3 greater risk

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Pregnancy and Diabetes

- Prematurity
 - 10% before 37 weeks in non-diabetic women
 - 22% in diabetics
 - Some studies cite as much as 52% premature infants

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Pregnancy and Type I Diabetes

- Need glucose control before pregnancy
- Insulin needs change during pregnancy
- Placental functioning
 - Increased HPL
 - Increased glucose
 - Increased insulin requirements

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Pregnancy and Type I Diabetes

- Very close monitoring of blood sugar
- Check retinal vessels during pregnancy
- Monitor fetus closely
- Ultrasound
- Echocardiogram

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Pregnancy and Diabetes

- Retinopathy can be accelerated with poor control
- Nephropathy increased in pregnancy
 - Increase in HTN, anemia, prematurity, perinatal mortality
- Increased plasma volume and cardiac output stress kidneys

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Pregnancy and Type I Diabetes

- Early induction
- Amniocentesis
 - Check lung maturity
 - L/S Ratio
 - Prior to induction

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Human Placental Lactogen

- Human Placental Lactogen (hPL)
- Like human growth hormone
- Promotes fetal growth
- Antagonizes insulin
- More glucose for fetus

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1-Hour Glucose Tolerance Test

- 1-hour glucose test screens for gestational diabetes
- 24th to 28th week of gestation
- 50-gram glucose drink
- 140 or above indicates need for 3-hour glucose screening test

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Insulin Metabolism First Half of Pregnancy

- Increased estrogen and progesterone
- Pancreatic β -cell hyperplasia causes hyperinsulinemia
- Increased uptake and storage of glucose
- Increased incidence of hypoglycemia

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Insulin Metabolism During Pregnancy

- Hormones peak 24-28 weeks
- All pregnant women become insulin resistant during last $\frac{1}{2}$ of pregnancy
- Must secrete 3-4 times more insulin to maintain normal glucose levels

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Insulin Metabolism Second Half of Pregnancy

- Increased serum glucose from hormones
 - Cortisol
 - Prolactin
 - Human placental lactogen

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Insulin Metabolism Second Half of Pregnancy

- Glucose intolerance
- Insulin resistance
- Increased lipolysis and gluconeogenesis
 - Provides for maternal glucose needs
 - Increased glucose and amino acids for fetus

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Insulin Metabolism and Pregnancy

- Diabetic women shift into lipolysis when insulin levels decrease
- Produce more fatty acids
- Fatty acids converted to ketones

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Causes of GD

- Inability to meet insulin secretion requirements of pregnancy
- Increase in insulin resistance
- Or BOTH
- Strong genetic predisposition
- Progresses as a woman reaches term gestation

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Risk Factors for GD

- History
 - Prior infant > 9 pounds at birth
 - Prior fetal or neonatal death
 - Prior infant with congenital anomalies
 - History of polyhydramnios

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Risk Factors for GD

- History
 - Personal history of GD
 - Family history
 - Parents or siblings with diabetes
 - Poor reproductive history
 - Preterm births or spontaneous abortions

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Risk Factors for GD

- Ethnic Background
 - Navajo
 - Hispanic
 - Chinese
 - Saudi Arabian
 - African American

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Risk Factors for GD

- Objective Data
 - Age > 30 at delivery
 - High BP
 - Obesity

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Risk Factors for GD

- Current Pregnancy
 - Proteinuria
 - Macrosomia
 - Polyhydramnios
 - Recurrent monilia vaginitis
 - Glycosuria

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Gestational Diabetes Screening

- Current Pregnancy
 - 1 hour 50 gm GTT
 - 24-28 weeks gestation
 - 140 or above abnormal
 - 3-hour 150 gm GTT diagnosis for GD

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Gestational Diabetes

- 3-Hour Glucose Screening Test needed to DIAGNOSE gestational diabetes
- Just because 1-hour test is greater than 140 does not mean diagnosis of gestational diabetes
- Need to schedule 3-hour screen!

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Gestational Diabetes 3 Hour GTT

- Elevation of 2 out of 4 values
- Normal
 - Fasting 105
 - 1 hour 190
 - 2 hour 165
 - 3 hour 145

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What does GD diagnosis mean?

- HPL increases insulin resistance.
- May be able to control hyperglycemia with diet
- Large baby
 - Shoulder dystocia?

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What does GD diagnosis mean?

- Increased risk for Type II diabetes
 - Up to 50% greater risk in 10-20 years
 - One study says 60% in Latina women
- FBS indicated at 4 to 12 weeks PP
 - Annually thereafter
 - Others say every 3 years
- Diet, maintaining normal weight, and exercise will decrease risk of Type II diabetes

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Image acknowledgments:

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