Gestational Diabetes

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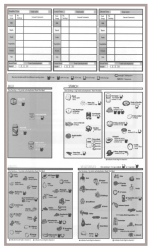
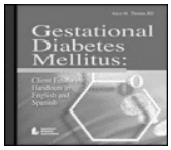
Referral for MNT and DSMT





- Refer within one week
- Nutrition Therapy
  - Food plan
  - Activity plan
  - Record Keeping
- Self Management
  - Blood glucose monitoring
  - Ketone testing
  - Use of additional therapy: if needed- glyburide or insulin

What is the evidence for the effectiveness of MNT in GDM?

- MNT in pregnancy impacts:
  - Weight
  - Nutrition
- MNT in GDM
  - Decreased hospital admissions
  - Decrease in insulin use
  - Improved likelihood of normal fetal and placental growth
  - Reduced risk of perinatal complications especially when diagnosed and treated early

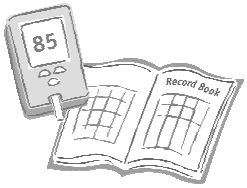
Treatment of Mild GDM

- Study question: Does treatment of mild GDM (fasting <95 mg/dL on OGT) improve pregnancy outcomes?
- 958 women tested between 24-31 wks with mild GDM
  - Control group or…
  - Nutrition intervention with self-monitoring and insulin therapy if needed
- Intervention group had:
  - 50% reduction in risk for delivering newborns with excess body fat and shoulder dystocia
  - Fewer c-sections
  - Reduction in pre-eclampsia and hypertension

Landon M. NEJM, October 1, 2009; pp 1339-1348

What's New…

Regarding glucose monitoring and targets for GDM?



Compare Glucose Levels Using CGM

Variable	Normal pregnancy (n=57)	GDM-MNT (n= 26)	GDM-Insulin (n=19)
Mean glucose mg/dL	83.7	94	110
Fasting (mg/dL)	75	--	--
Pre-prandial (mg/dL)	78.2	84	101
Post-prandial peak (mg/dL)	110	131	148
Post-prandial peak (minutes)	70.5	82	85
Mean nighttime glucose (mg/dL)	68.3	--	--

Ben-Haroush A, et al. AJObGyn (2004)p 576
Yogev et al. AJObGyn (2004) p 949

Blood Glucose Targets in GDM Pregnancy

	ADA	ACOG
Fasting	60-95 mg/dL	<95 mg/dL
1 hour post	<140 mg/dL	<130 mg/dL
2 hour post meals	<120 mg/dl	<120 mg/dL

Diabetes Care. Gestational Diabetes Position Statement. 2004 pp88-90
ACOG Practice Bulletin. Obstet-Gynecol, Sept 2001:98:525-38
2011 Clinical Recommendations, Diabetes Care January 2011, p S21

Treatment Options

- Food Plan
- Food Plan + Activity
- Food Plan + Activity + Oral Med
- Food Plan + Activity + Insulin

Medical Nutrition Therapy for GDM

- In general, Medical Nutrition Therapy for GDM is:
  - carbohydrate controlled meal plan
  - promotes adequate nutrition
  - appropriate weight gain
  - achieves normoglycemia
  - absence of ketones. *
- Individualized carbohydrate counting meal plan

*American Dietetic Assoc. Nutrition Practice Guidelines, 1997, 2002, 2008

Carbohydrates: How Much?

- 175 grams/ day for pregnancy (DRI 02)
  - 130 gm non-pregnant plus 33 gm/day for fetal brain
  - Eleven carbohydrate choices x 15gm = 175 grams
- Carbohydrate intake affects postprandial glucose levels; which are associated with increased incidence of poor outcomes
  - Control total amount of carb consumed to <45 %
  - Distribute carbohydrate across the day- small feedings

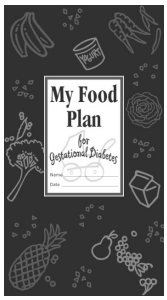
Dietary Reference Intake, 2002

My Food Plan for GDM

Sample distribution of carbohydrate

1 Choice = 15 grams carbohydrate

Breakfast	limit of 2	(30 grm)
Noon meal	3 – 4	(45-60 grm)
Evening meal	3 – 4	(45-60 grm)
3-4 Snacks	1 – 2	(15-30 grm)



Less Carbohydrate for Breakfast

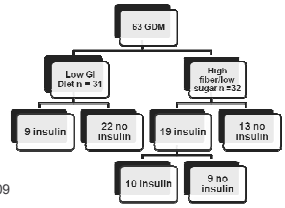
- Higher hormone levels in AM
- Test one hour after eating; target glucose <130 mg/dL
- Avoid highly processed foods, like cereals at breakfast

Carbohydrates: What type?

- Carbohydrate intake affects postprandial glucose levels; which are associated with increased incidence of poor outcomes
- Select low glycemic index carbohydrates
- Avoid sweetened beverages: soda pop, juices, sweet tea

Glycemic Index

- Can a low-glycemic index diet reduce the need for insulin in GDM?
- Individualize food plan with min. 175 gr carb; 6 sm meals; SMBG
- Randomized to Low GI 48-49 or High fiber/low sugar GI 56-58
- Insulin needed: Low GI diet 29%; high fiber/low sugar 59%



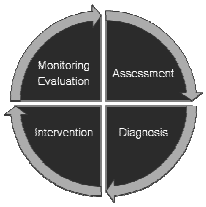
Diabetes Care June 2009

Do we have evidence to support use of artificial sweeteners?

- Benefit to controlling glucose levels
- Limited data to support use or non-use in pregnancy
- FDA approves Acesulfame-K (Sunette); Aspartame (NutraSweet); Sucralose (Splenda)
- AMA does not recommend use of saccharin
  - Crosses placenta; slow fetal clearance

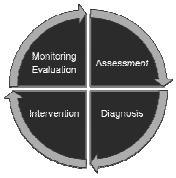
Nutrition Diagnosis

- Food and Nutrition Related Knowledge Deficit/related to lack of exposure to information, as evidenced by new diagnosis of gestational diabetes
- Impaired Nutrient Utilization/ related to gestational diabetes as evidenced by elevated glucose when carbohydrate intake is reasonable.



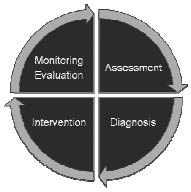
Nutrition Interventions

- Caloric restriction for obese/overweight
- Carbohydrate amount and distribution
- Protein and fat intake
- Physical activity recommendations
- Monitoring: glucose, food, weight
- Addition of pharmacologic therapy when glucose out of target
- Use of non-nutritive sweeteners
- Promotion of breastfeeding and post-partum lifestyle modifications



Nutrition Monitoring and Evaluation

- Weight changes
  - Loss due to lower carbohydrate intake
  - Excessive gain due to high fat choices, inactivity
- Post-meal glucose levels
  - Portion sizes and carbohydrate counting
  - Food choices, including regular soda, juices
  - Inactivity; bedrest; tocolytic drugs; illness
  - Certain foods raise BG more than others
- Ketones levels
  - Positive due to fear of eating; skipping evening snack
- Understanding and ability to follow the food plan



Assessment Using Food Record

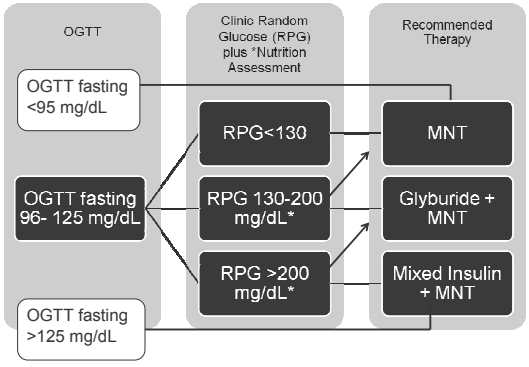
Pre		2 hr post
BG	Dose RA ___+___	BG
90	Total ___	180
	Lunch	
	6" chicken club Subway 50gm	
	1 cup skim milk 12gm	
	grams 62 = 4 choices	

- Is the patient counting carbohydrates correctly?
- Is the meal/snack within the food plan?
- Are the food choices healthy?
- What is glucose level after eating within target?
  - Less than 130 mg/dL

When to add pharmacologic therapy?

- When optimal glucose levels have not been maintained and/or the rate of fetal growth is excessive, pharmacologic therapy in conjunction with nutrition therapy is indicated
- 2 or more glucose values of target within a week, without explanation OR unable to consume adequate calories/nutrients and maintain glucose control
- Use of insulin, glyburide improves glycemic control and reduces incidence of poor neonatal outcomes

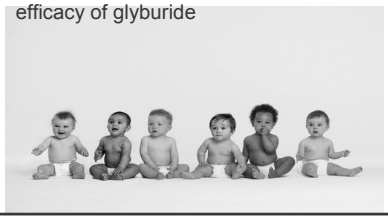
GDM Therapy Decision Path



SDM Quick Guide. IDC, 2009

Use of Glyburide in Pregnancy

- Eight studies reported that glyburide therapy is effective in maintaining glycemic control in conjunction with nutrition therapy, especially in women with less severe disease.
- 2000: Langer study showed safety and efficacy of glyburide



Metformin

- Pregnancy category B
- Does cross placenta
- Preconception
  - Type 2- glucose control, fertility, decreased miscarriage risk
  - PCOS- fertility and decrease in miscarriage risk
- Metformin vs Insulin for the Treatment of GDM
  - 751 women with GDM randomly assigned to metformin or insulin
  - Primary and secondary outcomes were statistically similar
  - Women preferred metformin to insulin
- No studies to compare metformin and glyburide

Rowan J. MiG Trial, NEJM, May 2008

Mealtime Insulin in Pregnancy

- Regular
  - Pregnancy category B
  - Used for twice daily injection regimens to cover snacks
  - Longer duration of action may lead to more hypoglycemia
- Lispro (Humalog) and Aspart (Novolog)
  - Pregnancy category B
  - Lower incidence of hypoglycemia
  - May cover post meals more appropriately; improved BG control
  - Discontinue between meal snacks or add to cover snacking

Jovanovic L. Diabetes Care 1999 Sep 22 (9) 1422-7

Background Insulin in Pregnancy

- NPH
  - Pregnancy category B
  - Used in twice daily injections
  - Can cover meals and snacks well
  - Increased risk of hypoglycemia as compared to analogues
- Glargine (Lantus)
  - Pregnancy category C
  - Has been used now for many years
  - Limited basal insulin choices may lead to more use
- Levemir (Detemir)
  - Pregnancy category C

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Weight Gain in GDM

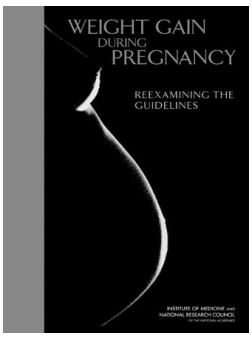
- Assessment of BMI and Weight Gain
- Caloric Intake
  - Normal and Underweight Women
  - Overweight/Obese Women

Why is Weight Gain Important?
Underweight/Normal Weight Woman

- Inadequate weight gain associated with ↑ prematurity & LBW
- LBW is a major determinant for morbidity and mortality
- LBW associated with ↑ risk of CVD, DM, HTN and obesity in later years
- Postpartum weight retention

Why is Weight Gain Important?
Overweight/Obese Woman

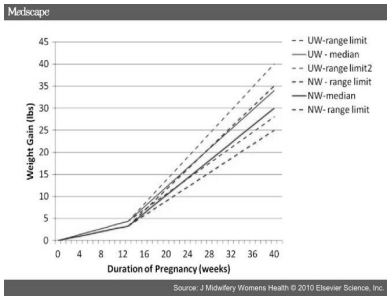
- Maternal Outcomes
  - GDM
  - Macrosomia
  - Cesarean delivery
  - Hypertension
  - Preeclampsia
  - ↓ breastfeeding rates
- Fetal/Infant Outcomes
  - ↑ birth weight
  - ↑ risk of intrauterine fetal death
  - Neural tube defects
  - Heart anomalies
  - Oral clefts
  - Childhood obesity
  - Metabolic syndrome



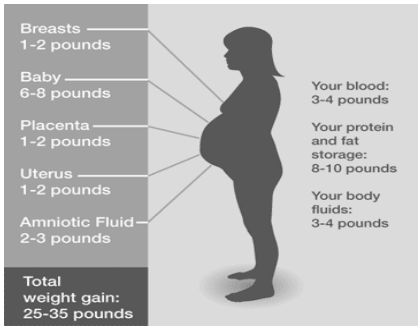
Institute of Medicine – 2009

Category	BMI	Total Gain in pounds	Total Gain in kilograms
Underweight	<18.5	28-40	12.5-18
Normal	18.6-24.9	25-35	11.5-16
Overweight	25-29.9	15-25	7-11.5
Obese	>30.0	11-20	5-9

Prenatal Weight Gain Grid



Weight Gain Distribution



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Assess Food Intake/ Micronutrient Intake

- RD should assess food intake, physical activity and medications of pregnant women, including those with GDM
- RD should encourage vitamin/mineral supplementation if usual dietary intake does not meet the DRI

Nutrition Assessment

- Pre-pregnancy weight/ usual weight
- Current height
- Appetite
- Recent appetite changes
- Current diet or food plan
- Cravings/allergies/ intolerance
- Pica
- Medications – herbal, dietary supplements, PNV, OTC
- Alcohol

Nutrition Assessment

- Snack patterns
- Dental problems
- Raw or undercooked protein foods
- GI discomforts
- Participates in food programs
- Substance use
- Ptyalism
- Physical activity
- Planned method of infant feeding

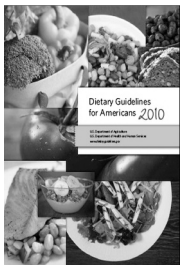
Micronutrients and GDM

Vitamins	DRI	Minerals	DRI
Vitamin A	770 mcg	Calcium	1000 mg
Vitamin D	5 mcg	Phosphorus	700 mg
Vitamin E	15 mg	Iron	27 mg
Vitamin K	85 mcg	Magnesium	350 mg
Vitamin C	85 mg	Zinc	11 mg
Thiamin	1.4 mg	Iodine	220 mcg
Riboflavin	1.4 mg	Selenium	60 mcg
Niacin	18	Fluoride	3 mg
Vitamin B_6	1.9	Chromium	30 mcg
Folate	600 ug	Sodium	2300 mg
Vitamin B_{12}	2.6	Potassium	4700 mg

Calcium, Vitamin D, Folate, Iron

- Calcium
  - Deposited in fetal skeleton mainly in 3rd trimester
- Vitamin D
  - Required for calcium homeostasis
  - Maternal deficiency associated with neonatal rickets
- Folate
  - 600 mcg/day in pregnancy
- Iron deficiency is very common in women
  - Pre-pregnant requirements: 15 – 18 mg/day
  - Pregnancy requirements: 27 mg/day

DGA Key Recommendations in Pregnancy



- Consume 8 – 12 oz. seafood/wk
- Limit albacore tuna to 6 oz/wk
- Take iron supplement as recommended by healthcare provider

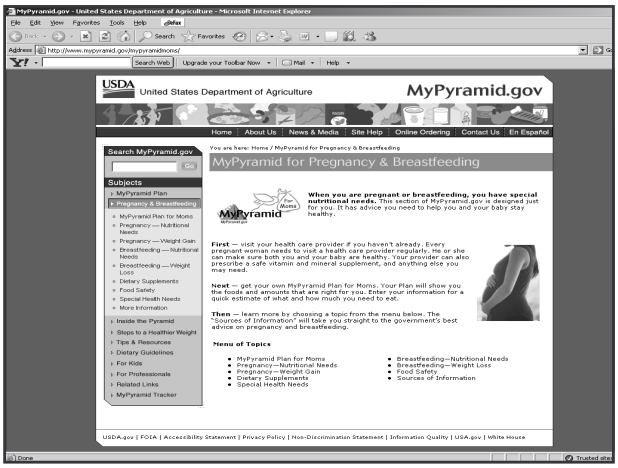
Foodborne Illness during Pregnancy

Avoid in pregnancy

- Raw or unpasteurized milk products
- Raw or soft cooked eggs
- Raw or rare meat products
- Unpasteurized juices
- Avoid cleaning litter boxes

Listeriosis

- Pregnant women more susceptible
- Found in:
  - Raw foods
  - Processed foods
- Avoid
  - Soft cheeses
  - Deli meats and hot dogs unless heated until steaming
  - Refrigerated pates/ meat spreads/smoked seafood ***unless*** in cooked dish

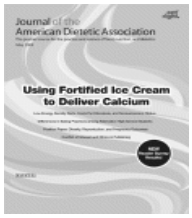


ADA Pregnancy Position Statements

Nutrition and Lifestyle for a Healthy Pregnancy Outcome

J Am Diet Assoc. 2008;108(3):553-561
2009;109(5):918-927

Obesity, Reproduction, and Pregnancy Outcomes



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Questions?