Gestational Diabetes - How to Dispel Myths, Calm Fears But Teach Realities!

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Your diabetes and pregnancy IQ – Myth or fact?

- Women with diabetes should not consider pregnancy
- Pregnancy induced diabetes is extremely rare
- Pregnant moms need to be "eating for 2"
- If I have a small baby then the risk is less that the child will get diabetes
- Pregnancy is a good time to "diet"
- If a pregnant woman did not exercise before, now is a good time to start
- If a pregnant woman has exercised all along, whatever she did before is fine now
- At all costs, try to avoid needing insulin during pregnancy
- Women with diabetes should not consider breast feeding
- Women with diabetes should plan on having a caesarean birth
- Women with diabetes should not wait to go into labour at full term
- Once diabetes disappears, the woman is in the clear
- No big deal, neonatal low blood sugar can be easily treated at birth
- The pregnant woman who has "sugar" in her urine has GDM
- Eating Chinese food can bring on labour
- Women with Type 1 who barely needs any insulin after birth is "cured"
- Oral medications can never be used in pregnancy

Pregnancy is Diabetogenic

All pregnant women are physiologically transformed

• Added nutrition demands from foetus
• Placenta as a site of exchange of nutrients
• Hormonal culprits:
    Insulin
    Oestrogen
    Cortisol
    Thyroxin
    Chorionic somatotropin
    Glucagon
    Progesterone
    Adrenaline
    Placental lactogen

Normal pregnancy

• Insulin resistance increases by 50% in 3rd trimester
• Maternal beta cells compensate with more insulin – even 3-4 X normal. If pancreas can't make extra – diabetes follows

Two distinctive types of diabetes

• Pre-gestational – developed prior to the pregnancy
• Gestational – developed during and as a result of the pregnancy

Gestational diabetes

• Occurs in end of second or third trimester
• Occurs in 7-14% of all pregnancies (an increase of 12% in the last 8 years)

• 90% of these women have a deficiency in insulin receptors

Gestational diabetes on the rise – Why?
– More obese/overweight women entering into pregnancy (higher BMI women are:
a) less likely to exercise and use birth control
b) more likely to smoke and consume alcohol*)
– Sedentary lifestyles in women of childbearing age
– Older women conceiving
– In-vitro etc. – multiples
– Heredity

Journal of Obesity – June 2011
World-wide studies:
Every 1 point increase in BMI lowers offspring's IQ by 5 points (Canada)
Offspring of obese mothers were more likely to suffer ADHD (Sweden)
Every extra BMI point increased risk of schizophrenia in the young adult offspring (Japan)
11% increase in eating disorder per every point increase (Australia)
Reasons Unclear? Hormonal, cardiovascular, immune systems

Archives of Internal Medicine - 2006
• Women who are physically active before pregnancy have lower incidence of GDM (even brisk walking 30 min = 34% less likelihood)
• The more TV women watch the higher the GDM incidence (20 or more hours/week = 2.3 x more likely for GDM)
"From a public health view, it is important for women of reproductive age to keep an active lifestyle"

Gestational diabetes
• 40% - 60% chance of developing diabetes within 5-10 years
• Offspring have increased risk of obesity after age 5 through adolescence
• Infants have higher rates of impaired glucose tolerance.
• Hampered intellectual and neurological development in offspring if Mom poorly controlled.

New research confirms
• Type 2 and Gestational Diabetes are now known to be genetically linked – culprit gene is TCF7L2
• Getting a good family history is crucial

Pre-gestational diabetes
• Known diabetes Type 1 or Type 2 prior to pregnancy.
• *Diabetes discovered in first trimester is technically pre-diabetes but still called "Gestational" (about 2%)
• 29% of all pregnancies are pre-gestational – 3-4 X more likely to have a child with birth defects
• Affects >150 000 pregnancies per year
• Perinatal mortality decreased from 25% in the 1960's to <1% in the year 2000
• High A1C increases risk for:

- Foetal malformations – heart defects in particular (aortic stenosis and atrial ventricular septal defects) but also hydrocephalus, cleft lip/palate, anorectal atresias
- Pre-eclampsia, hydramnios, pyelonephritis, pre-term deliveries
- Stillbirths
- Spontaneous abortions
- C-Birth

In known diabetes
• Classifications: White, Peterson, or Buchanan and Coustan
• Preconception counselling is the name of the game
• Thorough evaluation for complications (vascular - retinopathy, nephropathy and arteriosclerosis)
• A1C or Glycoalbumin

Preconception counselling / evaluation
• Dilated retinal exam
• Creatinine clearance and microalbuminuria
• Thyroid function
• Hypertension/Dyslipidemia
• EKG
• Depression screening
• Meds assessment (include calcium, folic acid and iron)
• Observe skills
• Consider contraception if A1C >2 SD > normal

Foetal tests and birth decisions
• 1st trimester – ultrasound
• 2nd trimester – AFP (15-18 weeks) EKG (20-22 wks)
• 3rd trimester – kick count (26 wks) NST (28 wks, 32-34, 36- delivery – 2X/week)
• Amnio – if birth scheduled <39 weeks
Biophysical Profile– ultrasound to measure foetal breathing, movement, muscle tone, amniotic fluid and heart rate – 32 wks-delivery 2X/wk (meds) or 36 wks-delivery 2x/wk (no meds)

Screening and diagnosis
– UNTIL NOW…
• Ascertain Risk
Low Risk – no known history, age <25, normal pre-pregnancy weight, normal birth weight, no history of abnormal glucose metabolism, no history of poor obstetric outcome
All present? May not need to test
• **Average Risk –** 2 step procedure Screen at 24-28 weeks 1-50 gms glucose load and 10 b.s. – if result is >130 proceed to 30 GTT 2-GTT with 100 gm glucose load 2 or more values above normal= gestational diabetes
Normal
– F < 95
– 10 < 180
– 20 < 155
– 30 < 140

• High Risk – severe obesity, strong family history, previous history of GDM, impaired glucose metabolism
Screen early in the pregnancy and keep repeating if normal

Why new guidelines now?
• H.A.P.O. (2006) – Hyperglycaemic and Adverse Pregnancy Outcomes Study – multinational, 25,000 pregnant women
• Risk of adverse maternal, neonatal and foetal outcomes increased in "high normal" ranges.
• I.A.D.P.S.G. – International Association of Diabetes and Pregnancy Study Groups, 2008- 2009 – developed revised guidelines
• Incorporated in 2011 A.D.A. Clinical Practice Recommendations

Landmark study – H.A.P.O. – Hyperglycemia and Adverse Pregnancy Outcomes
Sponsored by NIH and the ADA
• 25,000 women – 15 centres - 9 countries
• 28 weeks gestation – 2-hour GTT (75 GMS)
• Overt GDM removed from study
• Separated 2 groups: BS 75-100 and 95-100
• Measured: newborn weight, insulin levels, need for C-birth, neonatal hypoglycaemia

Findings ...
In levels 95-100:
• 4-6 X higher chance of "big" baby (largest 10% of population)
• 10 X higher chance of neonatal hyperinsulinaemia
• Higher chance of neonatal hypoglycaemia requiring treatment
• Higher incidence of C-births

Gestational diabetes – new diagnostic guidelines
According to American Diabetes Association and American Association of Clinical Endocrinologists – not yet ACOG (but is endorsed by Society of Foetal Maternal Medicine)
• High risk – Screen at first prenatal visit with normal diagnostic criteria (fasting, random or A1C)
• Normal risk - Screen at 24-28 weeks
• 75 Gms glucose load and 20 OGTT –
• 1 or more values(s) above normal= gestational diabetes.
Normal
– F < 92
– 10 < 180
– 20 < 153
– Screen GDM woman 6-12 weeks postpartum
– Lifelong GDM women screening

Who is at high risk?
Overweight and:
• Previous history of GDM, macrosomia, stillbirth or malformed infant
• Family history of diabetes – particularly first degree

• African American, Native american, Hispanic/Latina, Asian/Pacific Islander, SE Asian, East Indian
• Medications i.e. steroids, betamimetics, atypical antipsychotics
• History of pre-diabetes, PCOS, CVD, HTN, Hyperlipidemia
• Glucosuria
• Acanthosis nigricans

How to diagnose < 12 weeks?
Diagnosis of Type 2 Diabetes
• Fasting 126 or >
• Random (or 2hr pc)200 or >
• A1C 6.5% or above
Diagnosis of GDM
• Fasting 100 or >
• Random (or 2hr pc) 140-199
• A1C 5.7 – 6.4%

Diagnosis of Hyperglyacemic Disorders in Pregnancy
Screen all women for undiagnosed hyperglycaemia as follows:
Timing <12 weeks GA 12- 23 6/7 weeks GA 24-28 weeks GA
Test Obtain A1c with prenatal labs
If entry to care in 2nd tri, and /or with risk factors Obtain 2 hr 75 gm OGTT
Along with third trimester labs, test all women using a 2hr.75gm OGTT who were not previously diagnosed with DM or GDM
Diagnosis
A1c ≥6.5 Type 2 DM
A1c 5.7 to 6.4 GDM
Diagnose GDM if one or more values equal or exceed the following: FPG 92mg/dL; 1 hr 180mg/dL; 2hr 153mg/dL
Refer to Sweet Success

Gestational Diabetes Diagnosis Worksheet
*High risk factors for Type 2 DM.
Overweight and one of the following:
•Previous history of: GDM, macrosomia, unexplained stillbirth, malformed infant
•Family history of overt diabetes among first degree relatives
•High risk ethnic group: African American, American Indian, Hispanic/Latina, Asian/Pacific Islander, South-East Asian, East Indian
•Medications which adversely affect normoglycemia (steroids, betamimetics, atypical antipsychotics i.e.. Zyprexa, Abilify, Seroquel
•History of prediabetes, PCOS, CVD, HTN, hyperlipidaemia
•Glucosuria GDM2hour-75 gm Oral Glucose Tolerance Test: Patient must fast overnight for at least 8 hours prior to test, remain seated, and no smoking
†Abnormal venous plasma values *during pregnancy*:
□FBG > 92 mg/d □1 hour > 180 mg/dl □2 hour > 153 mg/dl
If one or more values are met or exceeded treat for gestational diabetes
Reclassify patients diagnosed during pregnancy type 2 DM and GDM with a Non-pregnant 2hour- 75 gm Oral Glucose Tolerance
Test by 5-12 weeks postpartum:
Abnormal venous plasma values:

FBG 100-125 mg/dl = Impaired fasting glucose
FBG > 126 mg/dl = Diabetes
2 hour 140-199 mg/dl = Impaired glucose tolerance
2 hour > 200 mg/dl = Diabetes
In the absence of unequivocal hyperglycaemia, confirm diagnosis by repeat testing.
┼ *International Association of Diabetes and Pregnancy Study Groups Consensus Panel. International Association of Diabetes and Pregnancy Study Groups Recommendations on the Diagnosis and Classification of Hyperglycaemia In Pregnancy. Diabetes Care 2010;33:676-682.
*Standards of Medical Care in Diabetes-2011. Diabetes Care: January 2011

Repurcusions to avoid
• Embryo – abortions or malformations
• Foetus – growth alterations (mascrosomia or IUGR)
• Newborn – hypoglycaemia, hypovalcaemia, hyperbilirubinaemia, polycythaemia, respiratory distress
• Child/adult – tendency toward abnormal glucose metabolism, obesity and CVD

Plus, child's risk for type 2 diabetes
• The risk does not go away in offspring of women with GDM
• NDEP's Campaign – "Small Steps, Big rewards – Prevent Type 2 Diabetes" announced the latest addition: "IT'S NEVER TOO EARLY TO PREVENT DIABETES"

Different than neonatal diabetes
• Monogenic disease
• Appears in the 1st 6 months of life
• Needs insulin initially but then can be treated with sulfonylureas
• Glucokinase channel is impaired
• Can only be identified clearly by genetic testing

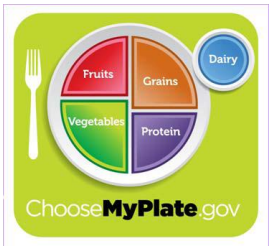
And to mother ...
• Mechanical difficulties for delivery
• Increased incidence of C-births
• Pre-term labors
• Preeclampsia
• Up to 60% likelihood of developing diabetes within 5-10 years

Diabetologia springer Berlin/Heidelberg
• Studied offspring of mothers with young onset Type 2 vs. those of fathers with young onset Type 2 and only those of the affected mothers had reduced beta cell function
• Even mild hyperglycemia during pregnancy can affect the programming of the beta cell in the offspring

Diabetes care, 2008
Copenhagen University – 597 Danish adults studied
• 21% of diabetes or pre-diabetes if mother had GDM
• 12% of diabetes or pre-diabetes if mother had a predisposition for DM
• 11% of diabetes if mother had Type 1

• Only 4% of diabetes if mothers had none or no predisposition

What Moms need to know #1: Meal Planning
• Calories for pregnancy
• Not a time to lose weight
• Eat every 3-4 hours
• Balanced, healthy meals
• No fruit juices
• No fruit or fruit juices in am
• Complex carbs for refined ones
• Lower glycaemic index foods
• Nutritional counselling



Foetal over and undernutrition is problematic
• Undernutrition – SGA – increased risk for CVD, Type 2 diabetes, obesity and hyperlipidaemia
• Overnutrition – LGA – increased risk for GDM, macrosomia, C-birth, congenital defects and childhood obesity
Overweight women tend to gain too much and underweight too little – foetal programming definitely affected

April 2011, Diabetes Journal
Study by New Zealand and Singapore investigational teams Mother's nutrition can actually make epigenetic changes in the child (not actual DNA changes) that influence
how the person responds to lifestyle factors

Research on salt intake too!
Published in Nutrition, Nutrition, July, 2011
Mother's salt intake may affect offspring's kidney development – either too much or too little results in a nephron deficit that can be a risk factor leading to hypertension

Weight gain
• IBW (BMI 20-25) – 25-35 pounds
• Underweight (BMI <20) – 28-40 pounds
• Overweight (BMI >25) – 11-15 pounds
• Obese (BMI 30-34)
• Morbidly obese (BMI > 35) - ? No weight gain
Remember, maternal weight gain is not associated with increased birth weight

What Moms Need to Know #2: Blood Sugar Testing
2-4 X/day(GDM)
4-10X/day (Pregestational)
Fasting and 2 hours after meals* (*some recommend 1- hour pc)

Blood Sugar Goals:
< 90 fasting
< 105 1-hour pc
< 120 2-hour

What Moms Need To Know #4: Urine Ketone Testing
• Once each morning upon awakening
• If positive, could mean:
not enough food intake
not enough fluids
DKA (in Type 1's)
Sugar in urine during pregnancy – not a good indicator of either blood sugar or diagnosis
CONTROVERSIAL

What Moms Need to Know #5: Exercise
• Crucial for pregnancy, in general
• No ballistic exercises
• Pulse rate not higher than 140
• No back bends
• No exercises lying flat on back
• Avoid dehydration and Overheating
• Most physically active women have a lower incidence of GDM (48% risk reduction)
• ADA endorses exercise for GDM – " helpful adjunctive therapy when diet alone is not
sufficient
• Insulin affects hyperglycaemia but exercise affects insulin resistance

Avoid exercise completely
• Heart or lung disease
• Incompetent cervix
• Persistent bleeding

What Moms Need To Know #6:Insulin
• Intensive Insulin Therapy - crucial
• Lantus nor Levemir yet approved for pregnancy – (Levemir soon)
• NPH plus Humalog or Novolog most common
• Best control – insulin pumps
• Exubera not approved for pregnancy – not made any longer

General guide to insulin calculations
• Preconception .6 units/kg
• 1st trimester .7 units/kg
• 2nd trimester .8 units/kg
• 3rd trimester .9-1.0 units/kg
• postpartum .6 units/kg
• If lactating 1st 24 hours – little if no insulin!

Glyburide
• Most data surrounding oral agents is on Glyburide

• Considered safe in third trimester
• Undetectable in cord blood of neonates
• Increases insulin secretion, onset 4 hours and duration 10 hours
• Starting dose 2.5 mg po, can be increased to total of 20 mg/day
• Less expensive and patients like it

Metformin
• Most agree that it is safe
• Given often for PCOS as a fertility treatment then maintained through pregnancy
• Many more studies in pipeline
• Metformin in Gestational Diabetes Trial compared Insulin to Metformin 46% of women required supplemental insulin no adverse affects

General Tips to Dispel Myths
• Moms do not necessarily feel symptoms
• Vaginal births are possible
• Non-induced labour is possible
• Breast feeding is not only allowable but encouraged - (for child AND mother)
• Diabetes might disappear but high future risk remains
• Insulin can be injected into abdomen and only goes to mother
• Refer to a Certified Diabetes Educator

Topic Outline:
I. Gestational Diabetes occurs in the latter of the second or into the third trimester of pregnancy as a result of the increase in pregnancy hormones that antagonize the action of insulin. Pregnant women who cannot produce the excess insulin that is needed during that time will develop gestational diabetes. Pre-gestational diabetes is diabetes that was present prior to the pregnancy whereas gestational diabetes is a result of the hormones of pregnancy.:

II. A family history of diabetes, being overweight and/or sedentary, other concomitant chronic disorders all can contribute to a higher propensity for the development of gestational diabetes:

III. Diagnosis interpretation, nutrition facts, exercise facts, blood glucose testing facts and the choices of medications and their actions

IV. How to interpret the levels of blood glucose control, estimated size of the foetus, timing of delivery and birthing options

Post Test Questions:
1. A woman with gestational diabetes has nothing to worry about as this disorder will disappear after the pregnancy.
Answer: False
2. Testing blood sugar first thing in the morning, fasting, is adequate enough for the woman with gestational diabetes.
Answer: False
3. Many women with gestational diabetes can have a normal, unscheduled, un-medicated birth if that is their choice.

Answer: True

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