Women and Diabetes
Promoting a Health Legacy
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Objectives – Women and Diabetes
1. Describe 5 issues that affect women with diabetes.
2. Discuss the unique attributes of pre-existing diabetes in pregnancy and gestational diabetes.
3. State the diagnostic criteria and management goals for gestational diabetes.
4. List potential short term and long term complications of fetal exposure to hyperglycemia.

Diabetes: Women Issues
- Polycystic Ovary Syndrome
- Heart and Vessel disease
  - Mortality and morbidity increased
- Alcohol Consumption
- Sexuality
- Financial Issues
- Pregnancy and Diabetes – preparation and future implications
Polycystic Ovarian Syndrome

- Reproductive disorder of hyperandrogenism, ovulatory dysfunction, polycystic ovaries
- About 40% have prediabetes (10% DM)
- Clinical findings
  - Infertility, amenorrhea, irregular menses, hirsutism, acne, obesity, dyslipidemia, acanthosis nigricans.
  - "PCOS is the 5 o'clock shadow of Metabolic Syndrome”
- Treatment
  - Lifestyle changes (lose wt, exercise, healthy eating)
  - Meds (Metformin and others)
  - Monitor BG for prediabetes/ diabetes

Polycystic Ovarian Syndrome and Related Issues

- Diabetes 50% of women with PCOS will have diabetes or pre-diabetes before age of 40.
- High blood pressure Greater risk of HTN
- Unhealthy cholesterol. Elevated LDL cholesterol and low HDL cholesterol.
- Sleep apnea. Overweight or obese, increase sleep apnea risk.
- Depression and anxiety are more common
- Endometrial cancer. PCOS, obesity, insulin resistance, and diabetes increase the risk of developing cancer of the endometrium

Poll question #1

- Which of the following is true about heart disease and women?
  A. Women with diabetes are more likely to die of heart disease than men with diabetes.
  B. Women with diabetes have heart disease up to 10 years later than women without diabetes.
  C. Women with diabetes have unusually low LDL levels.
  D. Women with diabetes usually experience crushing chest pain with heart attack
Women, DM, CVD

- 6x's rate of CVD than non-DM women
- 4xs risk of CVD & mortality compared to men w/ diabetes who have 2xs the risk
- Women with diabetes present 10 years earlier with CVD than women without diabetes (same as men). Lose female protection.
- Why?
  - Elevated BG, HTN, dyslipidemia, obesity, PCOS, depression, lower income, later detection

Presentation of MI

- Men more frequently describe chest pain, left arm pain or diaphoresis.
- Women more commonly describe nausea, tiredness and jaw pain, although some women may have the same symptoms as men.

INTERHEART Study - 2004

- Identified 9 Risk Factor for CV Disease in Women
  - Diabetes
  - Dyslipidaemia
  - Hypertension
  - Smoking
  - Psychosocial stress
  - Obesity—especially abdominal fat
  - Physical inactivity
  - Poor eating habits with too little fruit
  - High alcohol intake
  - Diabetes increases the risk of CVD and mortality 2-4 xs
- However, diabetes has a different impact in women and men; it increases the risk by about four times in women and about twofold in men
Alcohol Intake on Rise

- Women, older adults, racial/ethnic minorities, and socioeconomically disadvantaged
- Associated with increased alcohol use, high-risk drinking, and DSM-IV Alcohol Use Disorder
- These findings portend increases in many chronic comorbidities in which alcohol use has a substantial role.

Women Drinking More

- Binge drinking is 4 or more drinks in 2 hours.
- 1 drink equals:
  - 1 oz spirits
  - 5 oz wine
  - 12 oz beer

Washington Post – Heavy Drinking has been normalized for women. That’s dangerous. 2016

- Excessive drinking for women in US is defined as anything more than one drink a day.
- Women have smaller bodies than men, blood-alcohol levels climb faster and stay elevated longer. Women make less alcohol dehydrogenase enzymes than men to break down alcohol.
- According to CDC, women are more prone to suffer brain atrophy, heart disease and liver damage from heavy drinking.
- Women who drink have an increased risk of breast cancer.
- Females more susceptible to the unwanted biological effects of alcohol than men, even when adjusted for weight.
Women, Income and Quality of Life

- In 2012, the poverty rate was 14.5 percent for women, compared to 11 percent for men
- Eight out of 10 women have full custody of their children, and custodial mothers are twice as likely to have low SES as custodial fathers (Cawthorne, 2008).
- Domestic and sexual violence against women can often lead to a cycle of poverty through job loss, poor health, and homelessness (Cawthorne, 2008).
- In 2014, twice as many women aged 65 and older lived in poverty (over 3 million) compared to men (over 1.5 million) in the same age range (Eichner & Robbins, 2015).

Improving Sex Life for Women

- Women with diabetes get more vaginal and bladder infections
- Difficulty achieving orgasm due to neuropathy
- Painful intercourse due to lack of vaginal lubrication

Treatment
- Lower blood glucose / blood pressure
- Treat vaginal infections and UTI’s
- Water based lubricants for vaginal dryness
- Hormone replacement therapy
- Eat to prevent lows during intimacy
- Allow time, touching and romance

Women deserve special care

- Reaching out to women has the potential for slowing the diabetes epidemic
  - Focus:
    - prenatal,
    - perinatal and
    - postnatal health
Rates of GDM and Diabetes in Pregnancy increasing

- Parallels rising obesity rates
- Majority GDM
- Remainder is preexisting type 1 or 2

Diabetes – Who is at Risk?

- Pre Diabetes & Type 2- Screening Guidelines
- Screen at first OB Visit for those at age 45 or if overweight (BMI ≥ 25, Asians BMI ≥ 23) with one or > additional risk factor:
  - First-degree relative w/ diabetes
  - Member of a high-risk ethnic population
  - Habitual physical inactivity
  - PreDiabetes
  - History of heart disease

Diabetes 2 - Who is at Risk?

(ADA Clinical Practice Guidelines)

Risk factors cont’d
- HTN - BP > 140/90
- HDL < 35 or triglycerides > 250
- History of Gestational Diabetes Mellitus (GDM)
- Polycystic ovary syndrome (PCOS)
- Acanthosis Nigricans
BMI – Visual Image

Patti Labelle
"divabetic" -- that's a mix of diabetic and diva

Engaging and supporting Kids to Adults to help slow the epidemic

Environment LifeStyle
Engaging and supporting Pregnant women to help slow the epidemic

- Phases of Life
  - During Pregnancy

- Environment
  - Access to safe places to exercise
  - Access to healthy foods
  - Adequate paying job/finances
  - Access to health care resources
  - BG Assessment

- Lifestyle
  - Emphasis on weight management – keep to goal
  - Keeping Active
  - Eating healthy
  - Limit junk food/Sodas

PrePregnancy BMI and risk of GDM

<table>
<thead>
<tr>
<th>Weight Status</th>
<th>BMI</th>
<th>Odds Ratio of GDM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;20</td>
<td>0.75</td>
</tr>
<tr>
<td>Overweight</td>
<td>25-29</td>
<td>1.97</td>
</tr>
<tr>
<td>Moderately Obese</td>
<td>30-35</td>
<td>3.01</td>
</tr>
<tr>
<td>Morbidly Obese</td>
<td>&gt;35</td>
<td>5.55</td>
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</table>

- The risk of GDM is positively associated with prepregnancy BMI.

Preconception weight continues to increase

- 55% of women enter pregnancy overweight (CDC)
- < 30% of women gain recommended gestational wt
- Untreated obesity in women of childbearing age leads to adverse outcomes for mother and offspring.
- Increases risk for GDM
- Offspring of obese women face increased risk of obesity and chronic metabolic diseases
- Take home message – Assess BMI, assist with resources to optimize body weight, especially Registered Dietitian

- CDC Report 2011-2015, published Jan 2018
  [https://www.cdc.gov/mmwr/volumes/66/wr/mm665152a3.htm?s_cid=mm665152a3_w]
Nutrition Intervention: Pregnancy

- Dietitian
  - Referral within 48 hours of diagnosis
  - MNT initiated within 1 week of diagnosis
- Ketonemia from ketoacidosis or starvation ketosis should be avoided
  - Make sure adequate insulin and carbs
  - Monitor urine ketones
- Dietary Reference Daily Intake
  - 175 gms carb /day
  - 71 gms of protein /day
  - 28 gms of fiber /day

Recommended Weight Gain for Type 2

- Overweight women
  - 15-25 pounds
- Obese women
  - 10-20 pounds

Long Term Effects of GDM on Adult

- Obesity
- Visceral Adiposity
- Hyperinsulinemia
- Insulin Resistance
- Type 2
- Cardiovascular Disease
- Metabolic Syndrome
Hyperglycemia and Fetal Risk

During 2-3rd trimester insulin resistance increases = hyperglycemia

Maternal glucose can cross the placenta

Maternal insulin can NOT cross placenta

Fetus exposed to maternal glucose, but not maternal insulin. Fetus makes insulin.

Insulin stimulates fetal growth, increase in adipose tissue

Poll Question #2

- Mary just found out she is 7 weeks pregnant. Her midwife checks her fasting BG and it is 134. What does she have?
  - A. Gestational diabetes
  - B. Type 1 Diabetes
  - C. Pregnancy induced hyperglycemia
  - D. Diabetes in pregnancy

Diabetes in Pregnancy (Pre-existing DM)

- A woman with pre-existing type 1 or 2 becomes pregnant
- 2/3 of all pregnancies w/ diabetes not planned
- Preconception counseling critical to involve and empower, lower A1c, prevent complications
Diabetes in Pregnancy – Preconception Counseling Critical

- Goal – A1c less than 6.5% prior to conception
- Risk of malformation associated w/ degree of hyperglycemia during first trimester
- 1st Trimester potential complications directly proportional to A1c levels
  - Spina bifida, anencephaly, microcephaly, heart defects, organ position reversal

Uncontrolled Diabetes in Pregnancy – Potential Complications

- Spontaneous abortion
- Fetal anomalies
- Pre-eclampsia
- Intrauterine fetal demise
- Macrosomia
- Neonatal hypoglycemia
- Neonatal hyperbilirubinemia
- Increased risk of type 2 and obesity in offspring

Screen Pregnant Women for Diabetes Before 13 weeks

- Screen for undiagnosed Type 2 at the first prenatal visit using *standard* risk factors.
- Women found to have diabetes at their initial prenatal visit treated as “Diabetes in Pregnancy”
- If normal, recheck at 24-28 weeks for Gestational Diabetes
Management of Diabetes in Pregnancy

- Avoid teratogenic meds (ACE Inhibitors, Statins) in sexually active women not using reliable contraception
- Women with pregestational diabetes need baseline eye exam in first trimester, monitor every trimester
- See Stds of Care for complete listing of labs to monitor

Normal BG levels during pregnancy

- Pregnancy normally associated with lower fasting glucose and higher post meal glucose
- Early pregnancy, more insulin sensitive
  - Insulin needs may drop
- 2nd, 3rd trimester increased insulin resistance
  - Insulin needs may increase
- After delivery – insulin needs drop dramatically

Non-diabetes usual glucose ranges

- Mean fasting BG
  - 61.75 mg/dl
- Peak post prandial
  - Rarely exceeds 126 mg/dl
- Maximal post prandial excursions 60 – 90 mins after start of meal.

Blood Glucose Goals for GDM and Pre-existing type 1 or 2

- Fasting < 95 mg/dl
- One hour post meal < 140 mg/dl
- Two hour post meal < 120 mg/dl
- *A1c < 6 - 6.5%

* may need to be relaxed to < 7% if excessive hypoglycemia – A1c lower during pregnancy due to increases RBC turnover rate. Frequent A1c monitoring important.
Management of Diabetes in Pregnancy

› Provide nutrition and exercise coaching
› Insulin is preferred therapy
› All in insulins are pregnancy category B (safe), except
  › glargine, glulisine, degludec – Category C
  › Category C means more data needed
› Oral Meds are used for pregnant type 2s (off label), but not ADA recommended

Insulin Vs. Oral Meds in Pregnancy

› Insulin first line agent. For type 2s or GDM, oral meds may not be sufficient to get BG to target.
› Glyburide found in umbilical cord blood at 70% of maternal blood level.
  › Associated with increased risk of neonatal hypoglycemia and macrosomia
› Metformin found in umbilical cord blood at higher levels than maternal blood.
  › lower risk of neonatal hypo, less wt gain.
  › may slightly increase risk of prematurity
  › 50% of pts on metformin, needed insulin
› Long term studies are lacking and needed

Blood Pressure Target During Pregnancy

› Target B/P
  › Systolic 120-160
  › Diastolic 80-105
› Meds contraindicated during pregnancy
  › ACE inhibitors and Angiotensin Renin Blockers
  › Statins
› B/P Meds approved –
  › Methyldopa, labetalol, diltiazem, clonidine, prazosin.
Type 1 or 2 – Aspirin Therapy?

- Women with type 1 or 2 preexisting diabetes have increased risk of preeclampsia
- Start aspirin therapy 81mg starting at the end of the first trimester until birth
- US Preventive Task Force 2018 recommendations
- Taking ASA reduces morbidity, saves lives and lowers health care costs

Postpartum with *PreExisting DM*

- Meal plan adjustment for goals/needs
- Breastfeeding and BG balance
- Birth control planning
- Preconception counseling starts here
- Connect with long term follow up care
- Monitor for postpartum depression and provide support

Poll question 3

- What best describes gestational diabetes?
  a. Diabetes discovered within the first 12 weeks of pregnancy.
  b. Diabetes discovered in the 24-28 week of pregnancy.
  c. Risk of getting diabetes before pregnancy.
  d. Diabetes discovered at any point during pregnancy.
Gestational Diabetes
A public health perspective

- Body weight before and during pregnancy influences risk of GDM and future diabetes
- Children born to women with GDM at greater risk of diabetes
- Women with GDM more likely to get DM
- Focus on prevention

Gestational DM ~ 9% of all Pregnancies

- Detected at 24-28 weeks of pregnancy (most insulin resistant phase)
- GDM prevalence increased by ∼10–100% during the past 20 yrs
- Native Americans, Asians, Hispanics, African-American women at highest risk
- Women getting pregnant later

Poll Question 4

- Pregnant 29 yr old. FBG 89 at 8 weeks
  - At 25 weeks w/ 75gm given 1 step OGTT.
    - FBG 103
    - 2 hr 156
  - What best describes her status
    - A. Normal blood glucose with pregnancy
    - B. Pre diabetes associated pregnancy
    - C. Gestational diabetes
    - D. Diabetes in pregnancy
GDM Criteria - 2 Options
“1 Step” – 75 gm OGTT

- 24-28 weeks
- OGTT in am after overnight fast of 8 or > hrs
- **GDM Diagnosis if ANY** of the following values met or exceeded:
  - FBG  1 HR  2HR
  - ≥92  or  ≥180  or  ≥153

*Based on Hyperglycemia and Adverse Pregnancy Outcomes Study - IADPSG*

GDM Criteria – Option 2
“NIH 2 step”

Step 1
- 50 gm Oral Glucose Tolerance Test (non-fasting)
- If BG 140* at 1 hour proceed to Step 2
- Step 2 – 100 gm Oral Glucose Tolerance (fasting)
- **GDM Diagnosis if** 2 values are met or exceeded

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<thead>
<tr>
<th></th>
<th>Carpenter/Coastan</th>
<th>NDDG</th>
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<tbody>
<tr>
<td><strong>Fasting</strong></td>
<td>95 mg/dL (5.3 mmol/L)</td>
<td>105 mg/dL (5.8 mmol/L)</td>
</tr>
<tr>
<td><strong>1 h</strong></td>
<td>180 mg/dL (10.0 mmol/L)</td>
<td>190 mg/dL (10.6 mmol/L)</td>
</tr>
<tr>
<td><strong>2 h</strong></td>
<td>155 mg/dL (8.6 mmol/L)</td>
<td>165 mg/dL (9.2 mmol/L)</td>
</tr>
<tr>
<td><strong>3 h</strong></td>
<td>140 mg/dL (7.8 mmol/L)</td>
<td>145 mg/dL (8.0 mmol/L)</td>
</tr>
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</table>

NDDG: National Diabetes Data Group. *The American College of Obstetricians and Gynecologists (ACOG) recommends a lower threshold of 135 mg/dL (7.5 mmol/L) in high-risk ethnic minorities with higher prevalence of GDM; some experts also recommend 130 mg/dL (7.2 mmol/L).

Risks associated w/ elevated BG - GDM
Second and Third Trimester

- Macrosomia: fetal wt > 4000g (~9lbs)
  - Birth trauma, shoulder dystocia, clavicular fracture
  - Increased risk of C-section
- Still birth
- Polyhydramnios (excess amniotic fluid)
- Pre-eclampsia: edema, HTN, proteinuria
- Neonatal hypoglycemia (should be >40)
Management of GDM

- Provide nutrition and exercise coaching
- If BG not reaching target, start meds
- Insulin is preferred therapy
- All in insulins are pregnancy category B, except
  - glargine, glulisine, degludec – Category C
  - Category C means more data needed
- Oral Meds can be used for pregnant type 2s (off label)

Postpartum after GDM

- 50% risk of getting diabetes in 5 years
- Screen with 75gm OGTT at 4-12 wks post partum
- Repeat at 1-3 yr intervals or signs of DM
  - Encourage Breast Feeding
  - (reduces future GDM Risk by 50%)
  - Encourage weight control
  - Encourage exercise
  - Make sure connected with health care
  - Lipid profile/ follow BP
  - Preconception counseling

Risk of Future Diabetes with Gestational Diabetes

<table>
<thead>
<tr>
<th>Immediately after birth</th>
<th>6 – 12 weeks later</th>
<th>36 months later</th>
<th>5 years later</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 – 10% have diabetes</td>
<td>10% diagnosed w/ DM</td>
<td>30% have metabolic syndrome</td>
<td>50% have Type 2</td>
</tr>
<tr>
<td></td>
<td>20% have pre diabetes</td>
<td></td>
<td></td>
</tr>
</tbody>
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Inturrisi, Lintner – Diagnosis and Treatment of Hyperglycemia in Pregnancy - 2011
Start Metformin therapy

- For women with PreDiabetes and History of GDM

Postnatal Health: Maternal Behavior

- For children: Breastfeeding decreases risk type 1 and type 2 and obesity
- For mom
  - Breastfeeding decreases diabetes risk by 50%.
  - Plus breastfeeding decreases blood pressure, risk of breast cancer and helps with weight management

Engaging and supporting women to help slow the epidemic

- Phases of Life
  - After Delivery

  - Environment
    - Access to safe places to exercise
    - Access to healthy foods
    - Adequate paying job/finances
    - Access to health care / Postnatal care
    - Access to child care

  - LifeStyle
    - Breast feeding
    - Weight management
    - Keeping Active
    - Limit junk food /Sodas
    - Role model for children
Poll Question 5

Which of the following medications should be stopped for JR, who has type 2 diabetes and is trying to conceive?
A. Levothyroxine
B. Lipitor, Lisinopril
C. Metformin
D. Flonase

Health Legacy –
Great opportunity to pass on your best for generations to Come

- Weight gain before and during pregnancy matters
- Keep Active
- Family planning
- Encourage active participation in care; before, during and after.

In Summary

- Reaching out to women and providing them with the necessary tools and resources is critical
- Promote prevention of GDM
- Provide the woman and family with ongoing education, screening and resources
Thank You

› Questions?
› Email bev@diabetesed.net
› Web
  www.DiabetesEdUniversity.net