CDAPP Sweet Success Guidelines for Care

Chapter 4

Medical Management and Education for Gestational Diabetes Mellitus

2015

California Diabetes and Pregnancy Program Sweet Success Guidelines for Care

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4 MEDICAL MANAGEMENT AND EDUCATION FOR GESTATIONAL DIABETES MELLITUS

Table of Contents

Tables

Appendix

4 MEDICAL MANAGEMENT AND EDUCATION FOR GESTATIONAL DIABETES MELLITUS

INTRODUCTION

Glucose intolerance of variable severity that is first recognized during pregnancy is referred to as gestational diabetes mellitus (GDM).[1] New diagnostic criteria allow for the diagnosis of preexisting diabetes at the initial prenatal visit. The American Diabetes Association (ADA) position statement, based on recommendations from the International Association of Diabetes and Pregnancy Study Groups (IADPSG), recommends that a high-risk woman found to have diabetes at her initial prenatal visit should receive a diagnosis of type 2 diabetes and not gestational diabetes.[2] Based on this, CDAPP Sweet Success has developed the algorithm "Guidelines for Diagnosis of Hyperglycemia in Pregnancy-2011" which includes early detection of GDM (*Appendix A*).

GDM accounts for as high as 90% of all diabetic pregnancies. There is variation in prevalence of GDM at the state level related to differences in rates of risk factors for GDM. In 2008, the estimated prevalence of GDM in California was 5.9% overall with rates as low as 4.7% for non-Hispanic whites and as high as 8.7% for Asians.[3] Obesity, unhealthy diet, sedentary lifestyle, improved screening, maternal exposure to high blood glucose levels in-utero, and new diagnostic guidelines have contributed to increasing prevalence of GDM.[2,4,5]

RISK ASSESSMENT AND EARLY SCREENING

Table 1[5,6] lists high risk indicators for an early GDM screen.

Table 1. HIGH RISK INDICATORS FOR EARLY SCREEN FOR GDM *(First Prenatal Visit)*
❖ Overweight or obese
❖ History of GDM in a prior pregnancy
❖ Presence of glucosuria
❖ Diagnosis of Polycystic Ovary Syndrome (PCOS)
❖ Women of ethnic groups with a high prevalence of diabetes: African American, Latino, Native American, Asian American and Pacific Islander
❖ Family history of diabetes (e.g. first degree relative with DM)
❖ Previous delivery of large-for-gestational age infant
❖ Chronic use of medication that may affect blood glucose levels (e.g. steroids, betamimetics, atypical antipsychotics)

According to the International Association of Diabetes and Pregnancy Study Group (IADPSG), the diagnosis criteria of GDM is established when, "any single threshold value on the 75-g, 2-hour OGTT was met or exceeded (fasting value, 92 mg/dL; 1-hour value, 180 mg/dL; and 2-hour value, 153 mg/dL).[7]

The Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) Study illustrated the impact of elevated blood glucose. The study concluded that elevated fasting and 1 hour blood glucose levels were highly correlated with macrosomia, and increased newborn hypoglycemia. A mother's fasting blood glucose greater than 90 mg/dL is associated with a nearly three-fold increase of macrosomia and a nearly 20% increase in the rate of newborn hypoglycemia.[8]

A major reason we are concerned about early diagnosis of GDM and control of a pregnant woman's blood sugars is the impact that poorly controlled blood sugar has on her fetus.

Table 2[5] lists fetal complications and long-term risks to offspring due to poorly controlled maternal blood glucose.

Table 2. FETAL COMPLICATIONS DUE TO POORLY CONTROLLED MATERNAL BLOOD GLUCOSE

• Shoulder dystocia	• Jaundice
• Other birth injuries	• Respiratory distress
• Hypoglycemia	• Polycythemia
• Poor feeding	• Hypocalcemia
• Hyperbilirubinemia	• Stillbirth

Long- term risks to offspring from poor maternal glycemic control include[9]:

- ❖ Obesity
- ❖ Cardiovascular disease
- ❖ Impaired glucose tolerance
- ❖ Type 2 diabetes

The American Diabetes Association (ADA) recommends using any one of the following 4 criteria for diagnosis of overt diabetes.[10] The first 3 criteria listed have also been adopted by the International Association of Diabetes and Pregnancy Study Group (IADPSG) as criteria for overt diabetes in pregnancy.[2]

- ❖ HgbA1c $\geq$ 6.5%
- ❖ Fasting blood sugar $\geq$ 126 mg/dL (no caloric intake for 8 hours or more)
- ❖ Random plasma glucose more than 200 mg/dL
- ❖ 2 hour glucose of $\geq$200 mg/dL after initiating an oral glucose tolerance test (OGTT) with a 75 gm glucose load (WHO criteria for test)

Some patients may not tolerate an oral glucose load including those with a history of bariatric surgery or hyperemesis. For these women, one option is to have patients monitor fasting and post-prandial blood sugars for a 1-week time period between 24-28 weeks.[11]

Initial Prenatal Visit

The initial visit for diabetes care while pregnant including[12]:

- ❖ A thorough review of the medical and obstetric history, current condition(s), and medications taken by the pregnant woman.[13]
- ❖ Physical Assessment including:
  - Height
  - Weight
  - Blood pressure during the initial visit and on subsequent visits[14]
  - Test urine protein during the initial visit and as indicated, especially if the woman has signs and symptoms of preeclampsia[15]

SELF-MONITORING OF BLOOD GLUCOSE (SMBG)

Women who are diagnosed with GDM are taught to periodically self-monitor or test their blood glucose.

Timing of Self-Monitoring

The recommended timing of self-monitoring and blood glucose targets are based on documented results from Continuous Glucose Monitoring Systems (CGMS). These systems found that interstitial glucose in pregnant women peaks within 60-90 minutes of the beginning of the meal.[16,17] Another study demonstrated that the average peak blood sugar is at the 1 hour mark.[18] Based on this, monitoring at one hour after beginning the meal is preferred, since postmeal glycemic peak values correlate most closely with outcomes such as macrosomia and neonatal hypoglycemia.[19]

The blood glucose targets CDAPP Sweet Success aims for are included in Table 3.

Table 3. BLOOD GLUCOSE TARGETS DURING PREGNANCY[8,20]

Fasting/Premeal*	60 - 89 mg/dL
Premeal/ Bedtime/ Overnight	60 - 99 mg/dL
Peak postprandial (test at 1 hour from beginning of meal)	100 - 129 mg/dL
Mean daily glucose	>87 mg/dL, <100 mg/dL

* In women with GDM, fasting blood glucose greater than 90 mg/dL was associated with an odds ratio of 2.73 for macrosomia and an odds ratio of 3.62 for c-peptide levels in cord blood at delivery for neonates that had birth weights >90th percentile.

MEDICATION

Oral Hypoglycemic Agents (OHA)

When diet and exercise fail to maintain normal blood glucose levels, medication therapy is indicated. Either insulin or oral agents can be used as first-line therapy. There is no specific threshold at which medication should be initiated but some have suggested to do so when >20% of the blood glucose (BG) values in one week are out of range, or BG values are repeatedly elevated at a specific time of day; and meal plan or activity cannot be modified to correct the elevated blood glucose.[7]

While insulin has long been the treatment of choice, new evidence supports the use of OHAs in the management of GDM.[21,22] Women utilizing OHA should continue diet, exercise, blood glucose testing and receive fetal surveillance as with insulin management.

Glyburide

Glyburide Facts:

- Second generation sulphonylurea.
- "First phase insulin response" interacts on the β-cell plasma membrane, allowing immediate insulin release of preformed insulin adjacent to the membrane.
- "Second phase insulin response" is prolonged as newly formed insulin is moved to the cell membrane from inside the β-cell.[23]
- Hypoglycemia is common with glyburide use.[23,24]
- Maximum drug peak in pregnancy occurs 2-4 hours after intake with a prolonged "second stage" response.
- The glucose peak after a carbohydrate load is 90 minutes.[17]
- Generally, the medication is taken twice daily, 1 hour before meals.
- Glyburide failure occurs in approximately 20% of patients.[24,25]

Table 4 describes the Glyburide Protocol.

Table 4. GLYBURIDE PROTOCOL[26,27]
❖ Begin with 1.25 mg/day (maternal body weight < 200 lbs) or 2.5 mg (maternal body weight ≥ 200 lbs).
❖ Administer 60 minutes premeal. Administration closer to the meal may result in symptomatic hypoglycemia 1-2 hours post meal.
❖ To control fasting plasma glucose, glyburide can be given at 10 to 11 PM.
❖ Increase by 1.25 mg to 2.5 mg, every 3-7 days until glycemic targets are met or maximum daily dose of 20 mg.
❖ Teach hypoglycemia prevention and management.
❖ Adhere to MNT meal and snack regimen to avoid hypoglycemia.
❖ Monitor weight as glyburide is associated with weight gain.
❖ Glyburide can be used postpartum.

Please note that not everyone will benefit from the use of glyburide. Predictors of glyburide failure include:

- Maternal age (> 34 years)
- Early diagnosis of GDM (< 25 weeks)
- Higher gravidity and parity
- Elevated mean fasting blood glucose values[28]

Metformin

Metformin, another OHA is a biguanide or an insulin sensitizer. Metformin, with its smaller molecular weight, crosses the placental barrier.[29-31] Among 126 infants of 109 mothers with polycystic ovary syndrome who used metformin at the time they became pregnant and continued to use it throughout their pregnancy, there were no teratogenic affects. These infants had normal height, weight and motor-social development within the first 1.5 years of life.[32]

Metformin Facts:

- Does not cause hypoglycemia[33]
- If women are taking metformin prior to pregnancy or at the first prenatal visit, it is recommended they continue to take metformin[34,35]
- Crosses the placenta and crosses into breast milk[29,33]
- Metformin utilization is associated with improved fertility and reduced risk of pregnancy loss in the first trimester in women with Polycystic Ovary Syndrome (PCOS)[33,34]

Table 5 describes the protocol for the use of Metformin.

Table 5. METFORMIN PROTOCOL[36,37]
❖ Begin with 500 mg once or twice daily with food, depending on the pattern of hyperglycemia.
❖ Increase dose by 500 mg every 3-7 days as limited by GI side effects until glycemic targets are met or maximum daily dose of 2500 mg.
❖ Obtain serum creatinine at start of therapy if renal dysfunction is suspected. Metformin is cleared in the kidneys.
❖ Drug should be discontinued prior to major surgery, or radiological studies involving contrast materials.
❖ Metformin may be associated with mild weight loss.

Insulin

Hyperglycemia, both fasting and 1-hour postprandial, is positively associated with excess fetal growth and macrosomia. Initiation of insulin therapy should be decided after careful consideration of both fetal growth and maternal glycemic control.

Insulin has been the treatment of choice for pregnant women with diabetes, although there is growing support for the use of oral

hypoglycemic drugs as discussed earlier in this chapter.

The insulin regimen should be tailored to the individual, taking into account the woman's blood glucose levels, lifestyle, food intake, teachability, literacy level, stress level, activity level, and cultural factors.

An option for insulin calculation is in the following table which is modified from a study conducted by Hone and Jovanovic through The Endocrine Society.[38] This is recommended in women presenting with blood glucose values higher than or equal to120 mg/dL fasting and 180 mg/dL postmeal.

Table 6. INSULIN CALCULATION BY GESTATIONAL AGE AND BODY WEIGHT FOR GDM[38]

Gestational Age	Insulin Dose
0-12 weeks	0.6-0.7 units per kg actual body weight
13-28 week	0.7-0.8 units per kg actual body weight
29-34 weeks	0.8-0.9 units per kg actual body weight
35-40 weeks	0.9-1 units per kg actual body weight

Instructions

- Calculate the total daily dose (TDD) of insulin for 24 hours
- Divide into 50% mealtime rapid acting insulin analog (**bolus**) and 50% NPH insulin (**basal**)
    - Bolus: Divide total bolus into three doses given before breakfast, lunch and dinner
    - Basal (NPH): Divide total basal into three doses given before breakfast, dinner and bedtime
- Adjust based on blood glucose patterns, meal plan and activity, increasing or decreasing insulin by 2 units based on blood glucose findings 1 hour after meals

Example: A 50 kg woman at 29 weeks gestation has a TDD of 40-45 units (0.8-0.9 units kg x 50 kg = 40-45 units)
Divided in equal parts as bolus and basal (20-22.5 units total)
Bolus: Divided into three equal parts = 6.6-7.5 units before breakfast, lunch and dinner
Basal: Divided into three equal parts = 6.6-7.5 units before breakfast, dinner and bedtime

Key Points for Initiating Insulin Therapy

Self-monitoring of blood glucose using a blood glucose meter with memory (including date and time) is essential for optimal diabetes management with insulin. It is advised that women with GDM who are taking insulin should monitor blood glucose: AM fasting, premeal, and 1 hour after the start of each meal. Rapid-acting insulin may be increased 1-2 units (or approximately 10%) every 2- 3 days until blood glucose levels are within target range. Review blood glucose results at each visit. Once control is established and premeal blood glucose values

are consistently within target range, monitoring can be reduced to AM fasting, and 1 hour after the start of each meal. The premeal blood glucose testing can be eliminated.

Use a premeal insulin correction algorithm to adjust rapid-acting insulin when premeal blood glucose levels are not within target range. Do not use a post meal sliding scale to adjust insulin, as this practice leads to over treatment and possible fetal exposure to hyperglycemia.

Provide education on the progressive nature of insulin resistance in pregnancy. Initiating insulin must include instruction on insulin injection technique, carbohydrate counting to control postmeal peak glucose levels, and prevention and treatment of hypoglycemia.

If appropriate, teach patients how to self-adjust insulin every two to three days based on glucose patterns. Pattern control is an effective method for insulin self-adjustment. Tailor the insulin regimen to the needs and lifestyle of the patient.

Individuals with GDM and/or obesity in pregnancy are insulin-resistant and often require marked increases in total daily insulin dose. There is no maximum insulin dose. Insulin adjustments may be required every few days, or once a week as insulin needs increase during pregnancy.

Women with GDM may require antepartum hospitalization for similar problems as those impacting women with preexisting diabetes. These may include glycemic control, preeclampsia, pyelonephritis, and preterm labor.[39] If medications such as betamimetics or betamethasone are used for preterm labor or preeclampsia, women with GDM on oral hypoglycemic medication or insulin may require, at least temporarily, doubling of their insulin doses. Algorithms for increased insulin needs can be found in *Chapter 3: Medical Management and Education for Preexisting Diabetes During Pregnancy* in the section that addresses antepartum hospitalization for women with preexisting diabetes.

HELPING WOMEN PREPARE FOR LABOR AND DELIVERY

Table 7 outlines educational issues to discuss in preparation for labor delivery and postpartum. All items should be discussed with the woman and her partner. This education should take place before the 37th week of gestation.

Table 7. LABOR, DELIVERY & POSTPARTUM EDUCATION FOR GDM[40]
❖ Timing of delivery
❖ Intrapartum blood glucose targets and monitoring of blood glucose
❖ Maternal - fetal intrapartum management including potential complications
❖ Newborn management due to diabetes during pregnancy
❖ Reinforcement of benefits of breastfeeding to both mother and infant
❖ Postpartum follow-up and blood glucose retesting
❖ Lifestyle and dietary changes aimed at prevention of diabetes in the future
❖ Planning for future pregnancies

Timing of Delivery

According to American College of Obstetricians and Gynecologists (ACOG), diagnosis of GDM alone is not an indication for delivery prior to 40 weeks gestation. ACOG advises balancing the maternal risks versus those of fetal compromise.[41] Delivery prior to 38 weeks gestation may still be indicated, and the woman should undergo amniocentesis to document fetal pulmonary maturity when feasible.[41]

Intrapartum Blood Glucose Control

Intrapartum management of GDM is aimed at maintaining normoglycemia (plasma blood glucose levels of 70-100 mg/dL) during labor and delivery. Elevated maternal blood glucose levels in the last 8 hours before delivery have been associated with neonatal hypoglycemia. Control of maternal blood glucose levels during labor can reduce the incidence of neonatal hypoglycemia, even among women with poor antepartum glycemic control.[42] Maternal blood glucose concentrations greater than 110 mg/dL – 117 mg/dL increase the incidence of neonatal hypoglycemia.[43,44] During the active phase of labor, glucose usage increases but slows down after the last component of the active phase is reached. Jovanovic explains that "labor requires very little additional exogenous insulin and appears to mimic the serum insulin concentrations of a trained runner during a marathon."[45] Refer to each hospital's policy and procedure for management of GDM during labor and delivery.

IMMEDIATE POSTPARTUM MANAGEMENT OF GDM

Insulin Management

Insulin needs are reduced postpartum and are generally cut in half. Therapy goal is to keep blood glucose in the following range:

FBG < 100 mg/dL; and 1 hour postprandial < 140 mg/dL

The GDM protocol for the first three days postpartum is included in Table 8.

Table 8. GDM PROTOCOL FOR DAYS 1 - 3 POSTPARTUM

GDM A1 (diet and exercise controlled)	GDM A2 (requires addition of oral agents and/or insulin for control)
Diet	
When eating: Resume healthy diet using same caloric allotment as pregnancy for breastfeeding. It may be more valuable to evaluate BG with regular diet that patient will be eating at home rather than using a hospital carbohydrate controlled diet.	
Medication	
Glucose lowering medications not needed	• There is rarely a need for subcutaneous insulin postpartum. • May consider use of metformin if medication is needed to bring BG into normal range. Metformin use in breastfeeding was found to be efficacious.
Blood Glucose Monitoring	
At least 1 fasting, and 1 one hour after a meal before discharge	FBG and 1 hr after meals for at least 24 hours. If blood glucose remains elevated, continued monitoring is warranted. Consider possibility of type 2 diabetes.
Breastfeeding to Reduce Risk of Type 2 Diabetes	
Breastfeeding has been shown to reduce the risk of type 2 diabetes in the mother and baby whether delivered vaginally or by cesarean section. 1. Early (preferably in the first half hour of life) and often (10 -12 times per 24 hours) - breastfeeding can reduce the risk of hypoglycemia for the newborn. 2. Provide care (physical assessment and glucose monitoring) needed by couplet without separating them. 3. The newborn's first blood glucose should be obtained after breastfeeding within 30 to 60 minutes of life or earlier when indicated by symptoms in the newborn of low blood sugar. (*See Chapter 5: Impact of Maternal Diabetes on Fetal Development & Neonatal Care*)	
Follow up	
Review lifestyle changes aimed at prevention of diabetes in the future and family planning. The need for reclassification of diabetes may be necessary prior to the 6 week postpartum visit when insurance coverage is an issue. Optimally women should be retested in 6 - 12 weeks. Remind patient that a 75 g, 2-hour OGTT is recommended.	

LOOKING TOWARD THE FUTURE

Women with GDM are at increased risk for GDM in future pregnancies and the subsequent development of type 2 diabetes.[46-48] In a study of women 6 weeks to 28 years postpartum by Kim et al, it was determined that the cumulative incidence of type 2 diabetes ranged from 2.6% to over 70%. This incidence increased significantly within 5 years post-delivery and tapered off after 10 years.[49] Research has demonstrated the 2 hour OGTT is more definitive than the fasting plasma glucose in diagnosing Type 2 diabetes in women with a history of GDM.[50]

Table 9 summarized the risk factors for recurring GDM pregnancy.

Table 9. RISK FACTORS FOR RECURRING GDM[1,46,48]
❖ Obesity
❖ Failure to lose pregnancy weight gain
❖ Failure to maintain normal BMI
❖ Excessive weight gain
❖ Need for insulin during pregnancy
❖ Presence of anti-insulin antibodies
❖ Delivery of macrosomic infant
❖ Diagnosis of IGT or IFG on the postpartum oral glucose tolerance test
❖ Use of progesterone-only contraceptives in breastfeeding women

Women with GDM are at increased risk of developing cardiovascular disease.[51,52] The offspring of women with GDM, who were large or small for gestational age, are at future risk for cardiovascular disease, obesity and diabetes.[9] This risk level can be lowered if the mother chooses to breastfeed.[53] Well in advance of delivery, education concerning long-term risk reduction should be incorporated during all CDAPP Sweet Success visits.

Monitor Health Status

Women with GDM should be reclassified at 5-12 weeks postpartum using a 75 g, 2-hour OGTT, or an A1c 2-3 months postpartum. At 5-6 years postpartum 15% of women who had GDM will have impaired glucose tolerance or diabetes mellitus.[54] Lifestyle changes can reduce the rate of conversion to diabetes by up to 58%.[46,55] Some studies support the use of insulin sensitizers (such as metformin) for beta cell rest, and have shown delay in the progression to type 2 diabetes.[46,56] Women with a history of GDM have three times the likelihood of developing abnormal lipid profiles and metabolic syndrome[50 57]

Table 10 summarizes the postpartum recommendations for women with GDM.

Table 10. POSTPARTUM RECOMMENDATIONS FOR WOMEN WITH GDM[6,50]	
Periodically Evaluate Glucose Tolerance	❖ Women with GDM should be screened for diabetes with a 75 g, 2-hour OGTT at 6-12 weeks (before 3 months) postpartum; or after 3 months postpartum. An A1c should be done to determine her diabetic status. ❖ If the screen is normal, repeat at 1 year after delivery and every three years thereafter as long as values remain within normal limits. ❖ Encourage women to obtain a glucose screen before conceiving again. ❖ Subsequent pregnancy should include early prenatal care, risk assessment, and testing for GDM or diabetes with a 2 hr-75 gm OGTT. ❖ If prediabetes, Impaired Glucose Tolerance (IGT) or Impaired Fasting Glucose (IFG) is diagnosed, refer for aggressive lifestyle change. This includes seeing a registered dietitian for medical nutrition therapy; receiving instruction regarding activity and/or evaluation for the need for insulin sensitizer medication such as metformin. ❖ If diabetes is diagnosed postpartum, refer the woman to a diabetic health care provider for follow up and ongoing care.
Evaluate for Metabolic Risk Factors	❖ 1 year after delivery and yearly thereafter. ❖ Follow American Association of Clinical Endocrinologists (AACE) and National Cholesterol Education Program (NCEP) U.S. Preventive Services Task Force (USPSTF) recommendations for testing and evaluation such as lipids, waist-hip ratio, etc.
Coordination of Care	❖ Coordinate care with the primary care provider or obstetrician and the baby's pediatrician. ❖ Notify them of the woman's gestational diabetes and need for continued follow-up. ❖ Refer to a provider familiar with diabetes care who will be vigilant concerning interconception and preconception health concerns for women with previous GDM.

Encourage Healthy Eating

A primary focus of GDM education throughout pregnancy and postpartum is to encourage healthy eating. Women with GDM are given information to empower them to make healthy food choices for themselves and their families. Refer to *Chapter 7: Medical Nutrition Therapy* for additional information.

Breastfeeding provides unique benefits for women with diabetes and their offspring. Refer to *Chapter 8: Breastfeeding* for more information.

Encourage Activity

Research has demonstrated that a physically active lifestyle plays an important role in the prevention of type 2 diabetes. Physical inactivity

postpartum is associated with poor physical function, poor vitality, depressive symptoms, and increased risk of developing Type 2 diabetes.[58-62] Refer to *Chapter 6: Exercise* for additional information.

Encourage Problem Solving

Women who have had GDM should be taught to recognize signs and symptoms that are indicative of diabetes. These include increase thirst and urination, repeat vaginal yeast infection or urinary tract infections, unexplained weight loss, blurring of vision, or extreme tiredness. She should space future pregnancies at least 2 years apart and ask their healthcare provider to order a 75 g, 2-hour OGTT or A1c before her next pregnancy. A woman who has had GDM should be screened for hyperglycemia at the first prenatal visit.

Contraceptive Considerations Following a Pregnancy with GDM

Maximizing BG control during the interconception period is a priority. Delaying pregnancy for 2 years during this transition period is recommended. As is similar for women with type 2 diabetes, it is desirable to use the most effective method of birth control with the least adverse effect on carbohydrate metabolism.[63,64] Refer to *Chapter 2: Preconception and Interconception Care for Preexisting Diabetes* for a review of contraception options.

Monitoring Blood Glucose and Taking other Medications

Prescribed or over-the-counter medications may have detrimental effects on blood glucose tolerance. If an alternative is available that does not adversely affect blood glucose tolerance, it should be considered. This recommendation applies to herbal supplements and vitamins such as niacin.

Encourage Risk Reduction

In the first five years after a pregnancy with GDM, a subsequent pregnancy may increase the conversion to overt diabetes. A pregnancy longer than 5 years after a GDM pregnancy has a slower rate of conversion to type 2 diabetes and plateaus after 10 years. A systematic review by Kim discovered that conversion time from a GDM pregnancy to Type 2 diabetes was relatively similar for different racial groups despite known baseline differences in prevalence.[46,49]

Women with gestational diabetes are at increased risk of developing cardiovascular disease.[51,52] Regular physical check-ups including blood pressure, eye, dental and foot examinations is recommended. Encourage smoking cessation. Without adequate follow-up evaluation and testing, type 2 diabetes can go undetected for 7-10 years, during which time cardiovascular damage from elevated blood glucose can be a major problem.

Encourage Healthy Coping

It is important to recognize and treat depression. Depression increases the release of cortisol and other stress hormones resulting in insulin resistance and decreased energy which impacts a woman's activity level. It may also lead to increased non-optimal behaviors such as unhealthy eating or smoking. Depression can interfere with her attachment to her newborn.[65,66] In addition, assess for sleep deprivation which can increase depression and result in unhealthy coping. Refer to *Chapter 9: Behavioral and Psychosocial Components of Care* for additional information.

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Guidelines for Diagnosis of Hyperglycemia in Pregnancy – 2011

First Prenatal Visit (< 13 wks)*

Many cases of diabetes or abnormal glucose tolerance are not detected until pregnancy. Early detection reduces complications.

Test: Women who have ANY risk factor:

- ☐ Non-Caucasian
- ☐ BMI ≥ 25 (at risk BMI may be lower in some ethnic groups)
- ☐ History of GDM or pre-diabetes, unexplained stillbirth, malformed infant
- ☐ Previous baby 4000 gm or more (8 lbs 13 oz)
- ☐ 1st degree relative with DM
- ☐ Glucosuria
- ☐ Medications that raise glucose (e.g. steroids, betamimetics, atypical antipsychotics)
- ☐ Polycystic ovarian syndrome (PCOS), CVD, HTN, hyperlipidemia

ALTERNATE: Test all women for undiagnosed hyperglycemia at the first visit

Add A1c **or** FPG **or** Random Glucose to Prenatal labs
Date:_____Result: _____

- A1c ≥ 6.5% **or** FPG ≥ 126 mg/dL, **or** Random ≥ 200 mg/dL → **Diagnose Type 2 Diabetes**
- A1c 5.7 - 6.4%, **or** FPG ≥ 92 mg/dL and < 126 mg/dL → **Treat as Gestational Diabetes Mellitus (GDM)**
- A1c < 5.7% or FPG < 92 → **NORMAL Test with OGTT @ 24 - 28 wks**

Universal Testing at 24-28 wks

- 2011 ADA standard is 75 gm 2h OGTT for all women not previously diagnosed with diabetes @ 24-28 wks GA
- Fast 8 - 10 hours, remain seated during test
- Consider adding to third trimester labs

Date: _____

FPG: _____ 1 hr: _____ 2 hr:_____
_____

If any value at or above cut off, treat as GDM

REFER TO SWEET SUCCESS, Date Referred: _____
NOTE: For early diagnosis (prior to 24 wks GA) Sweet Success will obtain A1c at initial visit after referral

*** If entry to care is at 13 - 23 6/7 wks, and risk factors are present, test ASAP with a 75 gm 2h OGTT**

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