Preeclampsia and Gestational Diabetes

KNOW THE RISK

Information for Healthcare Professionals

NOV'15 UPDATE

PREGNANCY METABOLIC PROFILE

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The first and only laboratory-developed test profile that utilizes glycosylated fibronectin (GlyFn) and a panel of additional biomarkers to accurately assess the risk for metabolic complications of pregnancy, specifically preeclampsia (PE) and gestational diabetes (GDM).

Common mechanisms and outcomes in PE and GDM

PE and GDM are the two most common metabolic causes of pregnancy complications, with serious consequences for both mother and child. There is increasing evidence that these disorders share many features, including risk factors, underlying pathophysiology, and outcomes with respect to risk for subsequent disease.

- PE and GDM have similar risk factor profiles, particularly high BMI, which is thought to increase the risk of PE directly as well as indirectly through its association with GDM, which itself predisposes to PE.3-5 Both PE and GDM are associated with elevated uric acid levels.6,7
- PE and GDM result in similar changes in a number of adipokines that regulate metabolic and vascular function.8
- Maternal insulin resistance is associated with PE and PE-associated inflammation.9,10 Both PE and GDM increase the risk of subsequent type-2 diabetes.11,12 Women with preexisting type-1 diabetes are at increased risk for PE.13,14
- A previous study demonstrated that treatment of GDM reduced the rate of PE by 30%, and the recent recommendation of low-dose aspirin for PE prevention may be translatable to GDM based upon the promising effects of salicylates on glycemic control in type-2 diabetes.15-18

These data support the concept that a large proportion of cases of PE and GDM represent variations in presentation of a common metabolic derangement.

GlyFn, a metabolic biomarker for detection of GDM and PE, provides efficient identification of patients whose chances for successful pregnancy outcomes can be facilitated by cost-effective, standard interventions such as low-dose aspirin and nutritional counseling that can also reduce future healthcare expenses.
### GlyFn and PE

Fibronectin is known to regulate blood vessel organization, so that increased maternal serum levels may contribute directly to PE development.¹⁹

Recent studies indicate that a particular glycosylated version of fibronectin (GlyFn) is specifically associated with the risk of developing severe PE. Determination of GlyFn levels in maternal blood represents an improved method for detecting and monitoring PE.²⁰

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### GlyFn levels in PE are elevated as early as the second trimester

In a case-control study of 108 women, longitudinal comparison of normotensive women and women with PE showed that, within each trimester, GlyFn levels were significantly higher in patients with PE than in controls (p<0.01).²⁰

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### GlyFn levels are predictive of mild vs severe PE

In the same case-control study, increasing levels of GlyFn were also found to correlate with severity of PE.²⁰

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### PMP exhibits a sensitivity of 84% and a specificity of 97% for PE*

<table>
<thead>
<tr>
<th>Biomarker</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycosylated fibronectin</td>
<td>80 (60-93)</td>
<td>97 (90-100)</td>
</tr>
<tr>
<td>PAPP A2</td>
<td>36 (18-57)</td>
<td>94 (86-98)</td>
</tr>
<tr>
<td>Placental Lactogen</td>
<td>12 (3-31)</td>
<td>94 (86-98)</td>
</tr>
<tr>
<td>PMP for PE</td>
<td>84 (64-95)</td>
<td>97 (90-100)</td>
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</tbody>
</table>

* Data on file.
GlyFn and GDM

GlyFn is a pregnancy-specific biomarker for early identification of women at risk for GDM as early as the first trimester of pregnancy.\textsuperscript{23}

The relative change in GlyFn concentrations in GDM is greater than the changes in HbA1c, CRP, and adiponectin, although all these biomarkers are associated with GDM status.*

* HbA1c used to identify existing type 1/2 diabetes.

** Data on file.
Pregnancy Metabolic Profile: PE Test

In addition to GlyFn, the PE test panel includes pregnancy-associated plasma protein PAPPA-2, placental lactogen, and uric acid*, and employs an algorithm to estimate the risk of PE and potential adverse outcomes.

Placental lactogen is produced by the placenta, and maternal serum levels are decreased in PE, while PAPPA-2 and uric acid levels are increased.¹²

Who Should Be Tested for PE

Our PE test is recommended for pregnant patients who may have one or more of the following:

- Clinical assessment of increased risk for PE
- Nulliparous
- Family history of or previous hypertension
- PE-Family history of or preexisting type-1 or type-2 diabetes
- Clinically evaluated obesity

When to Test for PE

Initial: 17-36 weeks Follow up: 20-36 weeks

Clinical Utility:²⁰

- The PMP PE test provides the biochemical confirmation of PE.
- The test should be used in assessment of subjects suspected of PE, borderline blood pressure and proteinuria changes. The test is positive 2-4 weeks before the onset of symptoms.

Pregnancy Metabolic Profile: GDM Test

In addition to GlyFn, the GDM test panel includes hemoglobin HbA1c**, C-reactive protein (CRP), adiponectin, and employs an algorithm to estimate the risk of GDM and potential adverse outcomes.

Maternal serum HbA1c levels indicate potential hyperglycemia often seen in GDM.

Elevated CRP levels are associated with GDM, as are decreased adiponectin levels.²⁴⁻²⁷

Who Should Be Tested for GDM

Our GDM test is recommended for pregnant patients who may have one or more of the following:

- Clinical assessment of increased risk for GDM
- Family history of or preexisting type1 or type-2 diabetes
- History of GDM
- Presence of glycosuria
- History of abnormal glucose tolerance
- Overweight or obese prior to pregnancy

When to Test for GDM

7-13 weeks

Clinical Utility:²³

- The PMP GDM test performed in the first trimester is more sensitive than the Glucose Challenge Test in predicting GDM.
- 90% of subjects with a positive PMP GDM test in the first trimester will test positive with the Oral Glucose Tolerance Test (OGTT) at 24-28 weeks gestation.

* Uric acid used for assessment of renal function.

** HbA1c used to identify existing type 1/2 diabetes.
References: