

## CLASSIFICATION AND DIAGNOSIS OF HYPERTENSIVE DISORDERS OF PREGNANCY

Maurice Druzin, MD, Stanford University School of Medicine

The diagnosis and classification of hypertensive disorders of pregnancy was primarily based on ACOG Practice Bulletin No. 33, January 2002, reaffirmed 2012.<sup>1</sup> The current diagnosis and classification is based on Hypertension in Pregnancy: Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in Pregnancy published November 2013.<sup>2</sup> The definition of hypertension in pregnancy is a blood pressure of  $\geq 140$  mm Hg systolic or  $\geq 90$  mm Hg diastolic. The criteria for the diagnosis of preeclampsia, which is a pregnancy specific syndrome usually occurring after 20 weeks of gestation, include new onset:

1. Blood pressure of 140 mm Hg systolic or higher or 90 mm Hg diastolic or higher that occurs after 20 weeks gestation in a women with previously normal blood pressure AND
2. Proteinuria, defined as urinary excretion of 0.3 grams protein or higher in a 24-hour urine specimen,<sup>2</sup> OR
3. In the absence of proteinuria, new-onset hypertension with the new onset of any of the following:
  - a. Thrombocytopenia: platelet count less than 100,000/microliter
  - b. Renal insufficiency: serum creatinine concentrations greater than 1.1 mg/dL or a doubling of the serum creatinine concentration in the absence of other renal disease
  - c. Impaired liver function: elevated blood concentrations of liver transaminases to twice normal concentration
  - d. Pulmonary edema
  - e. Cerebral or visual symptoms<sup>2</sup>
4. Preexisting hypertension prior to 20 weeks gestation would be considered chronic hypertension. Preexisting proteinuria prior to 20 weeks gestation would be suggestive of chronic renal disease.

New onset hypertension without proteinuria but with signs and symptoms of major end organ involvement such as headache, upper abdominal pain, hepatic dysfunction, pulmonary edema, or severe renal dysfunction, would potentially be indicative of "atypical preeclampsia."<sup>3</sup> The updated ACOG Executive Summary has deleted the term 'atypical', and a diagnosis of "preeclampsia" is recommended in patients with this presentation.<sup>2</sup>

The term gestational hypertension is used to describe cases in which elevated blood pressure without proteinuria develops in a woman after 20 weeks gestation and blood

pressure levels return to normal postpartum (National High Blood Pressure working Group). As many as one quarter of women with gestational hypertension will develop proteinuria, i.e. preeclampsia.<sup>4</sup>

There is clearly potential for overlap of all these conditions, as a patient may present with gestational hypertension and progress to the preeclampsia/eclampsia syndrome very rapidly.

**Table 1: Classification of hypertension in pregnancy**

Chronic hypertension	<ul style="list-style-type: none"> <li>• BP of <math>\geq 140</math> mm Hg systolic or 90 mm Hg diastolic predating conception</li> <li>• Identified prior to 20 weeks gestation</li> <li>• Persists &gt; 12 weeks postpartum</li> <li>• Use of antihypertensive medications before pregnancy</li> </ul>
Superimposed preeclampsia or eclampsia on chronic hypertension	<ul style="list-style-type: none"> <li>• New onset in a woman with hypertension prior to 20 weeks</li> <li>• Sudden increase in proteinuria if already present in early gestation</li> <li>• Sudden increase in BP</li> <li>• Development of HELLP syndrome</li> <li>• Development of headache, scotomata, or epigastric pain</li> </ul>
Gestational hypertension	<ul style="list-style-type: none"> <li>• 140 mm Hg systolic or <math>\geq 90</math> mm Hg without proteinuria occurring after 20 weeks gestation</li> <li>• Transient diagnosis with normalization of BP by 12 weeks postpartum</li> <li>• May represent pre-proteinuric phase of preeclampsia or recurrence of chronic hypertension abated in mid-pregnancy</li> <li>• May evolve to preeclampsia</li> <li>• Retrospective diagnosis</li> </ul>
Preeclampsia	<ul style="list-style-type: none"> <li>• Occurring after 20 weeks of pregnancy</li> <li>• BP <math>\geq 140</math> mm Hg systolic or <math>\geq 90</math> mm Hg diastolic or higher</li> <li>• Proteinuria 0.3 grams protein or higher in a 24-hour urine specimen OR <math>\geq +1</math> per dipstick OR P/C ratio <math>&gt; 0.3</math> mg/dL</li> </ul>
Eclampsia	<ul style="list-style-type: none"> <li>• Presence of new onset grand mal seizures in a pregnant woman with preeclampsia (rule out idiopathic seizure disorder or other central nervous system pathology such as intracranial hemorrhage, bleeding arteriovenous malformation, ruptured aneurysm)</li> <li>• New onset seizures 48-72 hours postpartum (other central nervous system pathology is the likely reason for the seizure after 7 days)</li> </ul>
Severe preeclampsia	<p>If one or more of the following criteria are present:</p> <ol style="list-style-type: none"> <li>1. Blood pressure of 160 mm Hg systolic or higher or 110 mm Hg diastolic or higher on two occasions at least 6 hours apart while the patient is on bed rest</li> <li>2. Oliguria of less than 500 ml in 24 hours</li> <li>3. Cerebral or visual disturbances</li> <li>4. Pulmonary edema or cyanosis</li> <li>5. Epigastric or right upper-quadrant pain</li> <li>6. Impaired liver function as indicated by abnormally elevated blood concentrations of liver enzymes (to twice normal concentration), severe persistent right upper quadrant or epigastric pain unresponsive to medication and not accounted for by alternative diagnoses, or both</li> <li>7. Thrombocytopenia</li> <li>8. Renal insufficiency</li> </ol>
HELLP Syndrome (subset of severe preeclampsia)	<b>Hemolysis_Elevated Liver enzymes_Low Platelets</b>

Adapted from ACOG Practice Bulletin #33, Reaffirmed 2013<sup>1</sup> and Hypertension in Pregnancy: Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in Pregnancy, November 2013.<sup>2</sup>

Table 2: Hypertension in Pregnancy: Recommendations of the ACOG Task Force on Hypertension in Pregnancy: Executive Summary, published November 2013<sup>2</sup>

<p>PRIOR Terminology (ACOG Bulletin #33, 2002, reaffirmed 2012)</p>	<p>Hypertension In Pregnancy: Report of the ACOG Task Force on Hypertension In Pregnancy, November 2013</p>																		
<p>Mild preeclampsia (BP &gt; 140/90 mm Hg)</p>	<p><b>(The Term ‘mild preeclampsia’ is discouraged for clinical classification)</b>  <b>Diagnostic Criteria: Preeclampsia Without Severe Features*</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="background-color: #e0e0e0; width: 20%;">Blood pressure</td> <td> <ul style="list-style-type: none"> <li>• Greater than or equal to 140 mm Hg systolic or greater than or equal to 90 mm Hg diastolic on two occasions at least 4 hours apart after 20 weeks of gestation in a woman with a previously normal blood pressure</li> <li>• Greater than or equal to 160 mm Hg systolic or greater than or equal to 110 mm Hg diastolic, hypertension can be confirmed within a short interval (minutes) to facilitate timely antihypertensive therapy</li> </ul> </td> </tr> <tr> <td colspan="2" style="text-align: center;">and</td> </tr> <tr> <td style="background-color: #e0e0e0;">Proteinuria</td> <td> <ul style="list-style-type: none"> <li>• Greater than or equal to 300 mg per 24-hour urine collection (or this amount extrapolated from a timed collection)</li> <li>or</li> <li>• Protein/creatinine ratio greater than or equal to 0.3*</li> <li>• Dipstick reading of 1+ (used only if other quantitative methods not available)</li> </ul> </td> </tr> <tr> <td colspan="2">Or in the absence of proteinuria, new-onset hypertension with the new onset of any of the following:</td> </tr> <tr> <td style="background-color: #e0e0e0;">Thrombocytopenia</td> <td> <ul style="list-style-type: none"> <li>• Platelet count less than 100,000/microliter</li> </ul> </td> </tr> <tr> <td style="background-color: #e0e0e0;">Renal insufficiency</td> <td> <ul style="list-style-type: none"> <li>• Serum creatinine concentrations greater than 1.1 mg/dL or a doubling of the serum creatinine concentration in the absence of other renal disease</li> </ul> </td> </tr> <tr> <td style="background-color: #e0e0e0;">Impaired liver function</td> <td> <ul style="list-style-type: none"> <li>• Elevated blood concentrations of liver transaminases to twice normal concentration</li> </ul> </td> </tr> <tr> <td style="background-color: #e0e0e0;">Pulmonary edema</td> <td></td> </tr> <tr> <td style="background-color: #e0e0e0;">Cerebral or visual symptoms</td> <td></td> </tr> </table> <p>*Each measured as mg/dL.</p>	Blood pressure	<ul style="list-style-type: none"> <li>• Greater than or equal to 140 mm Hg systolic or greater than or equal to 90 mm Hg diastolic on two occasions at least 4 hours apart after 20 weeks of gestation in a woman with a previously normal blood pressure</li> <li>• Greater than or equal to 160 mm Hg systolic or greater than or equal to 110 mm Hg diastolic, hypertension can be confirmed within a short interval (minutes) to facilitate timely antihypertensive therapy</li> </ul>	and		Proteinuria	<ul style="list-style-type: none"> <li>• Greater than or equal to 300 mg per 24-hour urine collection (or this amount extrapolated from a timed collection)</li> <li>or</li> <li>• Protein/creatinine ratio greater than or equal to 0.3*</li> <li>• Dipstick reading of 1+ (used only if other quantitative methods not available)</li> </ul>	Or in the absence of proteinuria, new-onset hypertension with the new onset of any of the following:		Thrombocytopenia	<ul style="list-style-type: none"> <li>• Platelet count less than 100,000/microliter</li> </ul>	Renal insufficiency	<ul style="list-style-type: none"> <li>• Serum creatinine concentrations greater than 1.1 mg/dL or a doubling of the serum creatinine concentration in the absence of other renal disease</li> </ul>	Impaired liver function	<ul style="list-style-type: none"> <li>• Elevated blood concentrations of liver transaminases to twice normal concentration</li> </ul>	Pulmonary edema		Cerebral or visual symptoms	
Blood pressure	<ul style="list-style-type: none"> <li>• Greater than or equal to 140 mm Hg systolic or greater than or equal to 90 mm Hg diastolic on two occasions at least 4 hours apart after 20 weeks of gestation in a woman with a previously normal blood pressure</li> <li>• Greater than or equal to 160 mm Hg systolic or greater than or equal to 110 mm Hg diastolic, hypertension can be confirmed within a short interval (minutes) to facilitate timely antihypertensive therapy</li> </ul>																		
and																			
Proteinuria	<ul style="list-style-type: none"> <li>• Greater than or equal to 300 mg per 24-hour urine collection (or this amount extrapolated from a timed collection)</li> <li>or</li> <li>• Protein/creatinine ratio greater than or equal to 0.3*</li> <li>• Dipstick reading of 1+ (used only if other quantitative methods not available)</li> </ul>																		
Or in the absence of proteinuria, new-onset hypertension with the new onset of any of the following:																			
Thrombocytopenia	<ul style="list-style-type: none"> <li>• Platelet count less than 100,000/microliter</li> </ul>																		
Renal insufficiency	<ul style="list-style-type: none"> <li>• Serum creatinine concentrations greater than 1.1 mg/dL or a doubling of the serum creatinine concentration in the absence of other renal disease</li> </ul>																		
Impaired liver function	<ul style="list-style-type: none"> <li>• Elevated blood concentrations of liver transaminases to twice normal concentration</li> </ul>																		
Pulmonary edema																			
Cerebral or visual symptoms																			
<p>Chronic hypertension Gestational hypertension Superimposed preeclampsia</p>	<p><b>No Change in Definition</b></p>																		
<p>Severe preeclampsia: If one or more of the following criteria are present:</p>	<p><b>Diagnostic Criteria: Severe Preeclampsia*</b></p> <ul style="list-style-type: none"> <li>• Systolic blood pressure of 160 mm Hg or higher, or diastolic blood pressure of 110 mm Hg or higher on two occasions at least 4 hours apart while the patient is on bed rest (unless antihypertensive therapy is initiated before this time)</li> <li>• Thrombocytopenia (platelet count less than 100,000/microliter)</li> <li>• Impaired liver function as indicated by abnormally elevated blood concentrations of liver enzymes (to twice normal concentration), severe persistent right upper quadrant or epigastric pain unresponsive to medication and not accounted for by alternative diagnoses, or both</li> <li>• Progressive renal insufficiency (serum creatinine concentration greater than 1.1 mg/dL or a doubling of the serum creatinine concentration in the absence of other renal disease)</li> <li>• Pulmonary edema</li> <li>• New-onset cerebral or visual disturbances</li> </ul>																		

\*Copyright permission received for use of tables inserted above.

---

### Other common associations with Preeclampsia:

**HELLP Syndrome** (Hemolysis, Elevated Liver enzymes, Low Platelets) is suggested when women with severe preeclampsia develop hepatic and hematologic manifestations as the predominant clinical picture, and is associated with an increased risk of adverse outcomes.<sup>4-6</sup>

**Chronic Hypertension** complicating pregnancy is diagnosed by high blood pressure, BP  $\geq 140/90$  or greater, known to predate conception. When preconception blood pressures are not known, elevated blood pressure detected before 20 weeks of gestation is often due to chronic hypertension. The most common etiology of chronic hypertension is most likely essential hypertension, although secondary hypertension as a result of renal disease, autoimmune disease, or vascular disease should be considered depending on the clinical presentation of the patient.

**Superimposed Preeclampsia/Eclampsia** chronic or gestational hypertension with superimposed preeclampsia is a common finding. Patients with underlying renal or vascular disease have a high risk of developing superimposed preeclampsia, as do those with essential hypertension.

There have been a number of recommendations to further divide preeclampsia according to the gestational age of presentation into the following categories:

Less than 34 weeks gestation – early preeclampsia

Greater than 34 weeks gestation – late preeclampsia

Preeclampsia is either mild or severe under the prior accepted definitions. However, the ACOG Executive Summary is recommending the elimination of the use of the term “mild.” The recommendation is to use the terms “preeclampsia without severe features” or “preeclampsia with severe features.” The prior rigid assignment of patients with this disease into a category of “mild preeclampsia” was often detrimental to the appropriate management of patients. This disease is often not stable or static, but may evolve from “mild” preeclampsia to severe preeclampsia, HELLP Syndrome and/or eclampsia within a matter of hours. Rapid progression is typically seen in preeclampsia with onset prior to 34 weeks.<sup>7</sup>

### EVIDENCE GRADING

Level of Evidence: II-2, II-3

### REFERENCES

1. ACOG. Diagnosis and Management of Preeclampsia and Eclampsia #33. *American Congress of Obstetricians and Gynecologists Practice Bulletin Number 33*. 2002 (Reaffirmed 2012).

2. ACOG. Hypertension in Pregnancy: Report of the American College of Obstetricians and Gynecologists' Task Force on Hypertension in Pregnancy. *Obstet Gynecol.* 2013;122(5):1122-1131.
3. Sibai BM, Stella CL. Diagnosis and management of atypical preeclampsia-eclampsia. *Am J Obstet Gynecol.* May 2009;200(5):481 e481-487.
4. Sibai B, Ramadan M, Chari R, Friedman S. Pregnancies complicated by HELLP syndrome (hemolysis, elevated liver enzymes, and low platelets): subsequent pregnancy outcome and long-term prognosis. *Am J Obstet Gynecol.* 1995;172:125-129.
5. Sibai B, Ramadan M, Usta I, Salama M, Mercer B, Friedman S. Maternal morbidity and mortality in 442 pregnancies with hemolysis, elevated liver enzymes, and low platelets (HELLP Syndrome). *Am J Obstet Gynecol.* 1993;169:1000-1006.
6. Barton J, Sibai B. Hepatic imaging in HELLP syndrome (hemolysis, elevated liver enzymes, and low platelet count). *Am J Obstet Gynecol.* 1996;174(1820-1825 discussion 1825-1827).
7. Sibai BM. Evaluation and management of severe preeclampsia before 34 weeks' gestation. *Am J Obstet Gynecol.* Sep 2011;205(3):191-198.