



Contents lists available at BioMedSciDirect Publications

## International Journal of Biological & Medical Research

Journal homepage: [www.biomedscidirect.com](http://www.biomedscidirect.com)

### Review article

## Preeclampsia: Symptoms, Diagnosis and Treatment

Ufaque Muzaffar<sup>a</sup>, Maraj-ud-Din<sup>b</sup><sup>a</sup>Medical Officer, Health and Family Welfare Department, J&K, India<sup>b</sup>Assistant Professor, Department of Obstetrics and Gynaecology, GMC Srinagar

#### ARTICLE INFO

##### Keywords:

Preeclampsia  
seizures  
Multiple gestations  
pregnancy  
Obesity

#### ABSTRACT

Preeclampsia is a condition that begins during pregnancy, usually after the 20th week. However, the symptoms and signs of preeclampsia may persist after delivery, and rarely the condition might not be recognized until after the baby is born. A woman with preeclampsia develops high blood pressure and usually protein in her urine, and she often has swelling (edema) of the legs, hands, face, or entire body. When preeclampsia becomes severe, it can cause dangerous complications for the mother and the fetus. One of these complications is eclampsia, the term used when seizures develop in a woman with severe preeclampsia. Another concern is the higher risk of stroke during pregnancy and after delivery. A woman with mild preeclampsia may not notice any symptoms, or she may have only mild swelling of the hands or feet. However, most pregnant women have some degree of swelling of the feet. So not all swelling indicates preeclampsia. When preeclampsia is severe it may progress to cause seizures. Most often they are generalized seizures, causing a woman to lose consciousness and have jerking movements of the arms and legs. She also may lose control of her bladder or bowels. Preeclampsia can be especially difficult to detect in women who have a history of high blood pressure (hypertension) before pregnancy. One in four women with high blood pressure develops preeclampsia during pregnancy, so it is essential that these women be monitored closely for changes in blood pressure and for protein in the urine. The outlook for full recovery from preeclampsia is very good. Most women begin to improve within one to two days after delivery, and blood pressure returns to their normal pre-pregnancy range within the next one to six weeks in almost all cases. However, for some women, there is still a risk of complications during this time.

© Copyright 2010 BioMedSciDirect Publications IJBMR - ISSN: 0976:6685. All rights reserved.

#### Introduction

Preeclampsia is a condition that begins during pregnancy, usually after the 20th week. However, the symptoms and signs of preeclampsia may persist after delivery, and rarely the condition might not be recognized until after the baby is born. A woman with preeclampsia develops high blood pressure and usually protein in her urine, and she often has swelling (edema) of the legs, hands, face, or entire body.

When preeclampsia becomes severe, it can cause dangerous complications for the mother and the fetus. One of these complications is eclampsia, the term used when seizures develop in a woman with severe preeclampsia. Another concern is the higher risk of stroke during pregnancy and after delivery.<sup>1,2</sup>

Experts are still not entirely sure what causes preeclampsia, but recent research has provided some good clues. The best hypothesis is that preeclampsia occurs when the placenta does not anchor itself as deeply as expected within the wall of the uterus during the first trimester. What causes this abnormal anchoring is unclear, but it may be influenced by the mother's or father's genes x

Experts are still not entirely sure what causes preeclampsia, but recent research has provided some good clues. The best hypothesis is that preeclampsia occurs when the placenta does not anchor itself as deeply as expected within the wall of the uterus during the first trimester. What causes this abnormal anchoring is unclear, but it may be influenced by the mother's or father's genes or the mother's immune system, and medical conditions the mother may have, such as diabetes or high blood pressure.

Regardless of its cause, early abnormalities in placental formation lead to changes that later affect blood vessels and other organs. Arteries throughout the body can tighten (become narrower), raising blood pressure. They can also become "leaky," allowing protein or fluid to seep through their walls, which causes tissues to swell. In preeclampsia, changes in arteries decrease the blood supply to the fetus and placenta, and to the woman's kidneys, liver, eyes, brain, and other organs.

In parts of the world with more limited medical care, preeclampsia and eclampsia cause many women to die during pregnancy. Fortunately, with appropriate prenatal care and monitoring, most women with preeclampsia and eclampsia and their babies survive just fine.<sup>3</sup>

\* Corresponding Author : **Ufaque Muzaffar**

Eclampsia and, especially, death from preeclampsia are very rare in well-resourced countries like the United States. However, even with the best care, preeclampsia is a leading cause of illness for mothers and newborns. The following conditions increase the chance that a woman will develop preeclampsia:

Chronic (long-lasting) high blood pressure<sup>4,5,6</sup>

- Obesity
- Diabetes
- Kidney disease
- Being under 15 years old or over 35 years old
- It being the woman's first pregnancy
- Having had preeclampsia in a previous pregnancy
- Multiple gestations: twins, triplets, or a greater number of multiples (These pregnancies have more placental tissue. This suggests that the placenta or things it produces may play a role.)
- Certain autoimmune conditions, including antiphospholipid antibody syndrome and some autoimmune arthritis conditions
- African-American or Hispanic ethnicity
- Having a sister, mother, or daughter who had preeclampsia or high blood pressure during pregnancy
- Having a male partner whose previous partner had preeclampsia (this suggests that the father's genetic material, passed to the fetus and its placenta, may play a role)
- Having a male partner with whom you were sexually active for only a short length of time prior to becoming pregnant (this may be due to a change in the way a woman's immune system reacts to genes from the father after repeated exposure to his semen)<sup>7,8</sup>

### Symptoms

A woman with mild preeclampsia may not notice any symptoms, or she may have only mild swelling of the hands or feet. However, most pregnant women have some degree of swelling of the feet. So not all swelling indicates preeclampsia. Symptoms of severe preeclampsia can include:<sup>9</sup>

- Headache
- Visual changes
- Nausea and abdominal pain, usually in the upper abdomen
- Difficulty breathing

When preeclampsia is severe it may progress to cause seizures. Most often they are generalized seizures, causing a woman to lose consciousness and have jerking movements of the arms and legs. She also may lose control of her bladder or bowels.<sup>10</sup>

Severe preeclampsia also increases a woman's risk of stroke during pregnancy. This risk persists even after delivery but can be minimized by good blood pressure control. Diagnosis Because preeclampsia doesn't always cause noticeable symptoms, it is crucial that all pregnant women see a health care professional regularly during pregnancy for prenatal care. This gives you the best chance of having preeclampsia diagnosed and managed before it becomes severe. Your doctor or midwife will measure your blood pressure and test your urine for protein at each prenatal visit because abnormal results are the earliest, most common signs of preeclampsia.

Preeclampsia can be especially difficult to detect in women who have a history of high blood pressure (hypertension) before pregnancy. One in four women with high blood pressure develops preeclampsia during pregnancy, so it is essential that these women be monitored closely for changes in blood pressure and for protein in the urine.<sup>11</sup>

Your doctor or midwife will diagnose preeclampsia depending on your symptoms and the results of certain tests. There is no one blood test currently available to determine if someone does or does not have preeclampsia. Since a simple blood test is not available, here is how the diagnosis is determined:

- Preeclampsia without severe features (what used to be called "mild preeclampsia") is characterized by the following:
  - Blood pressure of 140/90 or above
  - Swelling, particularly of the arms, hands, or face that is reflected in greater than expected weight gain, which is a result of retaining fluid. (Swelling in the ankle area is considered normal during pregnancy.)
  - Protein in the urine. Although uncommon, a woman can have preeclampsia without protein in the urine.<sup>12</sup>
- Preeclampsia with severe features (formerly called "severe preeclampsia") is characterized by:
  - Blood pressure of 160/110 mmHg or higher in more than one reading separated by at least six hours and proteinuria

Or

  - Blood pressure of 140/90 mmHg or higher and symptoms or signs of ongoing damage to internal organs, such as:
    - Severe headache, changes in vision, reduced urine output, abdominal pain, fluid in the lungs and pelvic pain
    - Signs of the "HELLP" syndrome, which means the liver and blood-clotting systems are not functioning properly. HELLP stands for Hemolysis (damaged red blood cells), Elevated Liver enzymes (indicating ongoing liver cell damage) and Low platelets (cells that help the blood to clot). It occurs in about 10% of patients with severe preeclampsia.
- Eclampsia is diagnosed when a woman with preeclampsia has seizures. These seizures usually happen in women who have severe preeclampsia, though they can occur with preeclampsia. Eclampsia

also can happen soon after a woman gives birth. Approximately 30% to 50% of patients with eclampsia also have the HELLP syndrome.<sup>13</sup>

### Expected Duration

Preeclampsia can begin as early as the 20th week of pregnancy, or very rarely even earlier. But it is more likely to develop during the last three months of pregnancy. In fact, the majority of cases are diagnosed in the last weeks of pregnancy. When a diagnosis of preeclampsia is made long before delivery, the woman will be closely monitored; sometimes this needs to occur in the hospital.

If the condition worsens and threatens the health of the mother or fetus, delivery is usually recommended. But this also depends on whether the fetus is fully or near fully developed.

In most cases, the features of preeclampsia will start to improve after delivery. However, for reasons that are poorly understood, sometimes preeclampsia gets worse or actually is first recognized after delivery.<sup>14</sup>

### Prevention

Currently there are few recommendations that can be made to prevent preeclampsia. Because certain health problems (diabetes, high blood pressure, lupus) are associated with preeclampsia, women should be in the best health possible before becoming pregnant. This includes not being overweight and gaining the appropriate weight once pregnant.

Expert groups recommend that women who are risk of preeclampsia, especially those at high risk (for example, women who have had severe or early preeclampsia with a previous pregnancy) take a low-dose aspirin to prevent preeclampsia. The protection offered by taking a baby aspirin for women at average risk is less clear.<sup>15</sup>

Getting prenatal care is one of the most important things you can do to keep yourself healthy during pregnancy. Preeclampsia is one of the many things your doctor or midwife will be on the lookout for.

In women whose preeclampsia is getting markedly worse, magnesium sulfate and good blood pressure control can help prevent eclamptic seizures and other complications of preeclampsia. Magnesium sulfate may be given either through an intravenous line or as an injection.<sup>16</sup>

### Treatment

The optimal therapy for preeclampsia and eclampsia is to deliver the baby. (Actually, it's the delivery of the placenta, but one can't deliver the placenta without delivering the baby.) But complications can still arise after delivery, so close monitoring needs to continue, such as keeping blood pressure well controlled. How you proceed depends on the severity of your preeclampsia.<sup>17</sup>

- Preeclampsia without severe features. The goal of treating mild preeclampsia is to delay delivery until the fetus is mature enough to live outside the womb. Your doctor or midwife will monitor your blood pressure, weight, urine protein, liver enzymes, kidney function, and the clotting factors in your blood. Your provider also will monitor the well-being and growth of your fetus. Some women need to be hospitalized for adequate treatment and monitoring, while others can remain at home. If you are not hospitalized, you will need to be seen by your health care professional frequently.<sup>17</sup>

- Preeclampsia with severe features. The overall goal is to prevent serious consequences to the mother's and fetus' health, including

eclampsia, stroke, stillbirth, and liver and kidney failure. Women with severe preeclampsia are carefully monitored, and high blood pressure is treated with medication. If the condition of the mother or baby gets worse, the baby may need to be delivered early. If the pregnancy reaches a gestational age at which the consequences of premature delivery are outweighed by the risks of continuing the pregnancy (generally about 32 to 34 weeks of gestation), an obstetrician will usually recommend delivery. Your physical health and well-being will usually begin to improve after the baby is delivered. However, you will need to be closely monitored as complications can still arise after delivery.<sup>18</sup>

- Eclampsia. Magnesium sulfate is used to prevent eclamptic seizures in women with preeclampsia at highest risk for them. When eclamptic seizures occur, magnesium sulfate will be started (for those not on it already) or given again (for those in whom seizures have occurred in spite of initial treatment) in an effort to prevent recurrent seizures. Other medications, such as lorazepam (Ativan), may be used to stop ("break") a seizure in progress. The goal of treating mild preeclampsia is to delay delivery until the fetus is mature enough to live outside the womb. Your doctor or midwife will monitor your blood pressure, weight, urine protein, liver enzymes, kidney function, and the clotting factors in your blood. Your provider also will monitor the well-being and growth of your fetus. Some women need to be hospitalized for adequate treatment and monitoring, while others can remain at home. If you are not hospitalized, you will need to be seen by your health care professional frequently.<sup>19</sup>

### Conclusion:

The outlook for full recovery from preeclampsia is very good. Most women begin to improve within one to two days after delivery, and blood pressure returns to their normal pre-pregnancy range within the next one to six weeks in almost all cases. However, for some women, there is still a risk of complications during this time.<sup>20</sup>

About one of every five women with preeclampsia during a first pregnancy will have preeclampsia during a second pregnancy. Those with early or severe preeclampsia, or who have other medical conditions such as high blood pressure or diabetes, are at greatest risk for recurrence. Women who have had preeclampsia are at risk for developing high blood pressure and other cardiovascular diseases later in life. You should let your primary care provider know if you have had preeclampsia. Although at present no specific treatments are recommended for women who have had preeclampsia to prevent later problems, it is prudent to adopt a healthy lifestyle.<sup>21</sup>

This includes:

- Maintaining a healthy weight
- Exercising regularly and being physically active
- Eating a well-balanced diet
- Not smoking
- Using alcohol in moderation

## References

1. Chesley L. Chesley's Hypertensive Disorders in Pregnancy. 4th. Elsevier; 2015. [CrossRef] [Google Scholar]
2. Myatt L., Clifton R. G., Roberts J. M., et al. First-trimester prediction of preeclampsia in nulliparous women at low risk. *Obstetrics & Gynecology*. 2012;119(6):1234–1242. doi: 10.1097/aog.0b013e3182571669. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
3. Myatt L., Roberts J. M. Preeclampsia: Syndrome or Disease? *Current Hypertension Reports*. 2015;17(11):p. 83. doi: 10.1007/s11906-015-0595-4. [PubMed] [CrossRef] [Google Scholar]
4. Moussa H. N., Arian S. E., Sibai B. M. Management of hypertensive disorders in pregnancy. *Women's Health Journal*. 2014;10(4):385–404. doi: 10.2217/whe.14.32. [PubMed] [CrossRef] [Google Scholar]
5. Ghulmiyyah L., Sibai B. Maternal Mortality From Preeclampsia/Eclampsia. *Seminars in Perinatology*. 2012;36(1):56–59. doi: 10.1053/j.semperi.2011.09.011. [PubMed] [CrossRef] [Google Scholar]
6. Say L., Chou D., Gemmill A., et al. Global causes of maternal death: a WHO systematic analysis. *The Lancet Global Health*. 2014;2(6):e323–e333. doi: 10.1016/s2214-109x(14)70227-x. [PubMed] [CrossRef] [Google Scholar]
7. Abalos E., Cuesta C., Grosso A. L., Chou D., Say L. Global and regional estimates of preeclampsia and eclampsia: a systematic review. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2013;170(1):1–7. doi: 10.1016/j.ejogrb.2013.05.005. [PubMed] [CrossRef] [Google Scholar]
8. Giordano J. C., Parpinelli M. A., Cecatti J. G., et al. The burden of eclampsia: Results from a multicenter study on surveillance of severe maternal morbidity in Brazil. *PLoS ONE*. 2014;9(5):e97401 [PMC free article] [PubMed] [Google Scholar]
9. Cecatti J. G., Costa M. L., Haddad S. M., et al. Network for Surveillance of Severe Maternal Morbidity: A powerful national collaboration generating data on maternal health outcomes and care. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2016;123(6):946–953. doi: 10.1111/1471-0528.13614. [PubMed] [CrossRef] [Google Scholar]
10. Zanette E., Parpinelli M. A., Surita F. G., et al. Maternal near miss and death among women with severe hypertensive disorders: A Brazilian multicenter surveillance study. *Reproductive Health*. 2014;11(1):p. 4. [PMC free article] [PubMed] [Google Scholar]
11. Say L., Souza J. P., Pattinson R. C., WHO working group on Maternal Mortality and Morbidity classifications Maternal near miss--towards a standard tool for monitoring quality of maternal health care. *Best Practice & Research Clinical Obstetrics & Gynaecology*. 2009;23(3):287–296. doi: 10.1016/j.bpobgyn.2009.01.007. [PubMed] [CrossRef] [Google Scholar]
12. Poon L. C. Y., Kametas N. A., Chelemen T., Leal A., Nicolaides K. H. Maternal risk factors for hypertensive disorders in pregnancy: A multivariate approach. *Journal of Human Hypertension*. 2010;24(2):104–110. doi: 10.1038/jhh.2009.45. [PubMed] [CrossRef] [Google Scholar]
13. Andrietti S., Silva M., Wright A., Wright D., Nicolaides K. H. Competing-risks model in screening for pre-eclampsia by maternal factors and biomarkers at 35-37 weeks' gestation. *Ultrasound in Obstetrics & Gynecology*. 2016;48(1):72–79. doi: 10.1002/uog.15812. [PubMed] [CrossRef] [Google Scholar]
14. Kenny L. C., Black M. A., Poston L., et al. Early pregnancy prediction of preeclampsia in nulliparous women, combining clinical risk and biomarkers: The Screening for Pregnancy Endpoints (SCOPE) international cohort study. *Hypertension*. 2014;64(3):644–652. doi: 10.1161/HYPERTENSIONAHA.114.03578. [PubMed] [CrossRef] [Google Scholar]
15. Pacagnella R. C., Cecatti J. G., Parpinelli M. A., et al. Delays in receiving obstetric care and poor maternal outcomes: results from a national multicentre cross-sectional study. *BMC Pregnancy and Childbirth*. 2014;14(1):p. 159. doi: 10.1186/1471-2393-14-159. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
16. Lotufo F. A., Parpinelli M. A., Osis M. J., Surita F. G., Costa M. L., Cecatti J. G. Situational analysis of facilitators and barriers to availability and utilization of magnesium sulfate for eclampsia and severe preeclampsia in the public health system in Brazil. *BMC Pregnancy and Childbirth*. 2016;16(1):p. 254. [PMC free article] [PubMed] [Google Scholar]
17. Bilano V. L., Ota E., Ganchimeg T., Mori R., Souza J. P. Risk factors of pre-eclampsia/eclampsia and its adverse outcomes in low- and middle-income countries: a WHO secondary analysis. *PLoS ONE*. 2014;9(3) doi: 10.1371/journal.pone.0091198.e91198 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
18. Snyder S. Major changes in diagnosis and management of preeclampsia. *Journal of Midwifery & Women's Health*. 2014;59(6):596–605. doi: 10.1111/jmwh.12260. [PubMed] [CrossRef] [Google Scholar]
19. Main E. K. Decisions Required for Operating a Maternal Mortality Review Committee: The California Experience. *Seminars in Perinatology*. 2012;36(1):37–41. doi: 10.1053/j.semperi.2011.09.008. [PubMed] [CrossRef] [Google Scholar]
20. Bokslag A., van Weissenbruch M., Mol B. W., de Groot C. J. M. Preeclampsia; short and long-term consequences for mother and neonate. *Early Human Development*. 2016;102:47–50. doi: 10.1016/j.earlhumdev.2016.09.007. [PubMed] [CrossRef] [Google Scholar]
21. Tranquilli A. L., Dekker G., Magee L., et al. The classification, diagnosis and management of the hypertensive disorders of pregnancy: a revised statement from the ISSHP. *Pregnancy Hypertension: An International Journal of Women's Cardiovascular Health*. 2014;4(2):97–104. doi: 10.1016/j.preghy.2014.02.001. [PubMed] [CrossRef] [Google Scholar]