Severe Preeclampsia

Severe preeclampsia is a condition characterized by hypertension and proteinuria that develops in the pregnant woman around 20 weeks of gestation. In women with preeclampsia, the arteries and vessels in the uterus do not widen to compensate for increased blood flow that occurs during pregnancy. The combination of increased blood flow and constricted vessels result in severe hypertension. The three contributors to this mechanism include the following: vasospasm and decreased organ perfusion, intravascular coagulation, and increased permeability and capillary leakage. Severe preeclampsia is characterized by the acronym HELLP, and this syndrome refers to hepatic dysfunction and hemolysis, elevated liver enzymes, and low platelet counts.



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Mechanism of Action

Vasospasm and Decreased Organ Perfusion

Vase-spaceship and Down-arrow Pear-fuse Organs

When the vessels vasospasm, they constrict, which results in increased blood pressures. This causes hypertension and decreased perfusion into the tissues. This subsequent decrease in perfusion results in kidney, liver, and brain damage.

Intravascular Coagulation

In-vessel Clogs

As a result of the increased pressures and liver dysfunction, the red blood cells become hemolyzed and platelets adhere to tissue walls. If the intravascular coagulation issues persist, the pregnant woman will have a low platelet count and may develop disseminated intravascular coagulation (DIC).

Increased Permeability and Capillary Leakage

Up-arrow Caterpillar Leaking

As pressure increases, damage occurs allowing for capillary leakage to occur. As the capillaries leak, proteinuria, generalized edema, and pulmonary edema develop.

Signs and Symptoms

Hypertension

Hiker-BP

Hypertension occurs when the uterine vessels are unable to adequately expand to account for the increased blood flow that occurs during pregnancy. This causes the vessels to vasospasm, or clamp down, resulting in increased pressures and decreased tissue perfusion. A BP of 160/110 or greater on two separate occasions, 6 hours apart, while the pregnant woman is on bedrest is characteristic of severe preeclampsia.

Proteinuria or End-Organ Dysfunction

Mr. Protein-urinal and Organs Damaged

Proteinuria occurs in preeclampsia due to the capillaries leaking protein into the urine. This occurs as a result of the increased pressure, and poor renal perfusion, causing damage to the tissues. Proteinuria is determined if a 24-hour urine specimen is obtained with a greater than or equal to 0.3 g result. Or protein/creatinine ratio of greater than or equal to 0.3 (mg/mg) is the result in a random urine specimen or dipstick. This is considered characteristic of severe preeclampsia. Besides renal damage, patients can also develop other end-organ damage, which can manifest as headache, vision abnormality, altered mental status, blindness, dyspnea with pulmonary edema, or cardiac dysfunction.

HELLP Syndrome

Hepatic Dysfunction and Hemolysis

Broken Liver and Lysed RBCs

Hepatic dysfunction occurs in severe preeclampsia due to hypertension and decreased organ perfusion. As red blood cells travel through the narrowed vessels, they become damaged, causing hemolysis.

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Elevated Liver Enzymes

Up-arrow Liver Enzymes

Damage occurs to the liver when blood flow is decreased. Elevated liver enzymes signify damage to the liver and progression of severe preeclampsia.

Low Platelet Counts

Down-arrow Plate

Low platelet counts occur for multiple reasons. First, as damage occurs, the platelets are used up as they adhere to the vessel wall. Secondly, the liver is responsible for the development of vital clotting factors. As liver function decreases, platelet levels will also decrease in preeclampsia.

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