

Preeclampsia

Blood pressure $\geq 140/90$ after 20 weeks plus protein in urine or organ trouble. Give magnesium sulfate (a medicine that calms the brain and prevents seizures) for severe cases. Deliver the baby at 37 weeks or sooner if severe.

THE ONE-LINE TRUTH

New high blood pressure after 20 weeks of pregnancy, plus protein spilling into the urine or signs of organ damage.

The chain — how it unfolds

1. Shallow placenta invasion and starved blood flow (ischemia) (not enough blood reaching the placenta). — why: Trophoblasts fail to remodel spiral arteries deep in the uterus wall, so the placenta sits in a low-flow, low-oxygen environment and becomes blood-starved (ischemic).
2. Blood-starved (Ischemic) placenta releases excess sFlt-1 and sEng into the mother's bloodstream. — why: The starved placenta tries to signal for more blood vessels and growth factors, but instead over-produces these two anti-angiogenic (vessel-blocking) proteins that spill into the mother's circulation and neutralize VEGF, PlGF, and TGF- β .
3. Widespread endothelial dysfunction: blood vessels everywhere lose the ability to relax, become leaky, and trigger inflammation. — why: Without VEGF and PlGF to maintain the endothelium, vessels cannot make enough nitric oxide or prostacyclin to stay open and calm, so they constrict, leak protein and fluid, and activate clotting.
4. High blood pressure (Hypertension) ($\geq 140/90$), proteinuria (protein in urine ≥ 300 mg/24 hr or spot ratio ≥ 0.3), and swelling (edema) (swelling in hands, face, legs). — why: Constricted vessels raise blood pressure. Damaged kidney glomeruli leak albumin into urine. Leaky capillaries and low blood albumin let fluid shift into tissues, causing swelling.
5. Severe features develop: systolic BP ≥ 160 or diastolic ≥ 110 , severe headache, vision changes (spots, flashing lights, blurred vision), right upper quadrant or epigastric pain, elevated liver enzymes, a low platelet count (thrombocytopenia) (platelets $< 100,000$), pulmonary edema (fluid flooding the lungs), or new renal insufficiency (creatinine > 1.1 or doubling). — why: Very high pressure and severe endothelial damage push the brain, liver, kidneys, lungs, and clotting system past their compensation limits, causing organ injury.

6. HELLP syndrome: Red blood cell destruction (Hemolysis) (red cells shearing apart in damaged small vessels), Elevated Liver enzymes (hepatocyte injury), Low Platelets (consumed in microclots). — why: Microvascular damage in the liver traps and breaks red cells, inflames and swells liver tissue (raising AST/ALT and causing capsular pain), and consumes platelets in clot formation.
7. Eclampsia: generalized tonic-clonic seizure (the whole body stiffens and shakes). — why: Severe high blood pressure (hypertension) and cerebral swelling (edema) (especially in the occipital lobes, the back of the brain that processes vision) irritate neurons until they misfire in a seizure. PRES (posterior reversible encephalopathy syndrome) is the imaging hallmark.
8. Delivery of the baby and placenta stops the disease and begins recovery. — why: Removing the blood-starved (ischemic) placenta removes the source of sFlt-1 and sEng. Within hours to days, the anti-angiogenic proteins clear, endothelium begins to heal, blood pressure falls, proteinuria resolves, and organ function returns to normal over weeks (though some women remain at higher lifelong cardiovascular risk).

Spot it — what you see, and why

- High blood pressure (140/90 or higher): The placenta (the organ feeding the baby) releases chemicals that make blood vessels tighten everywhere in the body, pushing pressure up like squeezing a hose.
- Protein in the urine (proteinuria): Those same chemicals damage the tiny filters in the kidneys, so protein leaks through into the urine instead of staying in the blood where it belongs.
- Swelling of the hands and face (edema): High pressure forces fluid out of blood vessels into the surrounding tissue, especially in the hands, face, and feet—like water seeping through a cracked pipe.
- Severe headache that does not go away: Very high blood pressure swells the brain or stretches blood vessel walls in the head, triggering pain signals.
- Vision changes (blurred vision, seeing spots or flashing lights): Swelling or spasm in the tiny blood vessels at the back of the eye (the retina) scrambles the signals sent to the brain, distorting what you see.
- Pain in the right upper belly (under the ribs): The liver stretches or bleeds because high pressure and damaged vessels let blood leak into liver tissue, pressing against the capsule (the liver's outer wrapper) and causing pain.

Red flags — act now

- Blood pressure 160/110 or higher (severe range)

- Severe headache or vision changes (blurry, spots, flashing lights)
- Right upper belly pain or tenderness under the ribs
- Trouble breathing or chest pain
- Seizure (eclampsia) or confusion

Treat it — in this order

1. Magnesium sulfate: 4–6 g IV loading dose over 15–20 minutes, then 1–2 g/hr continuous infusion during labor and for 24 hours after delivery → Magnesium floods into nerve cells and blocks calcium channels, which calms overexcited neurons in the brain and spinal cord. This prevents the brain from misfiring into a seizure (eclampsia). It is the only medicine proven to stop eclamptic seizures before they happen.
2. Immediate blood pressure control with IV labetalol (10–20 mg IV push, repeat every 10 minutes), IV hydralazine (5–10 mg IV push, repeat every 20 minutes), or oral nifedipine immediate-release (10 mg, repeat every 20 minutes) when systolic BP ≥ 160 mmHg or diastolic BP ≥ 110 mmHg → These medicines relax the smooth muscle wrapped around arteries, so the vessels widen and blood pressure drops quickly. Lowering severe high blood pressure protects the brain from bleeding-driven (hemorrhagic) stroke, the heart from overload, and the kidneys from further damage.
3. Delivery of the baby and placenta: at ≥ 37 weeks for preeclampsia without severe features; at ≥ 34 weeks for preeclampsia with severe features if stable; immediately if eclampsia, HELLP syndrome, placental abruption, severe fetal distress, or pulmonary edema (fluid flooding the lungs) occurs → Removing the placenta stops the source of sFlt-1 and sEng, the chemicals that damaged the blood vessels in the first place. Delivery is the only true cure for preeclampsia because it removes the root cause.
4. Corticosteroids (betamethasone 12 mg IM, 2 doses 24 hours apart, or dexamethasone 6 mg IM every 12 hours for 4 doses) if delivery is expected before 34 weeks → Steroids cross the placenta and turn on genes in the baby's lungs that make surfactant, the slippery coating that keeps air sacs open. This helps the baby breathe on its own after early delivery and lowers the risk of respiratory distress syndrome and brain bleeding.
5. Continue or start antihypertensive medication (labetalol, nifedipine extended-release, or methyldopa) after delivery, and monitor blood pressure closely for at least 6 weeks postpartum → Keeps blood pressure under control during the weeks after delivery when the body is still clearing sFlt-1 and sEng and inflammation is still high. Prevents late postpartum eclampsia (seizures that happen days or weeks after birth) and stroke.

Your top priorities at the bedside

1. Check blood pressure every 15 minutes if systolic is 160 or higher or diastolic is 110 or higher, and give IV antihypertensive (blood pressure) medicine as ordered. — why: Very high blood pressure can cause a stroke (bleeding in the brain) or seizure. The brain blood vessels cannot handle pressure this high. Bringing blood pressure down quickly protects the mother's brain and prevents eclampsia.
2. Start magnesium sulfate IV infusion with 4 to 6 grams loading dose over 15 to 20 minutes, then 1 to 2 grams per hour continuous drip as ordered. — why: Magnesium sulfate raises the seizure threshold in the brain. It prevents eclampsia (seizures from preeclampsia) by calming overexcited nerve cells. This is the only medicine proven to prevent seizures in preeclampsia.
3. Monitor magnesium levels and check deep tendon reflexes (knee jerk), respiratory rate, and urine output every hour while magnesium is running. — why: Too much magnesium stops breathing by paralyzing the diaphragm (breathing muscle). Loss of reflexes, breathing fewer than 12 times per minute, or urine less than 30 mL per hour means magnesium is too high and must be stopped. Calcium gluconate reverses magnesium toxicity.