

HELLP Syndrome

HELLP is severe preeclampsia that attacks the liver and blood cells. Delivering the baby is the only cure.

THE ONE-LINE TRUTH

In HELLP, the lining of blood vessels gets damaged, red blood cells break apart, the liver swells and leaks enzymes, and platelets drop — all from the same upstream break in pregnancy.

The chain — how it unfolds

1. Abnormal placenta implants and releases toxic factors into the mother's blood — why: The placenta doesn't anchor deeply or remodel the mother's spiral arteries properly. In response to poor blood flow, it releases sFlt-1 and soluble endoglin (anti-angiogenic factors) into the mother's circulation. These factors soak up and neutralize VEGF and PlGF, which the endothelium (vessel lining) needs to stay healthy.
2. The endothelium (lining of blood vessels) gets damaged and inflamed all over the body — why: Without VEGF and PlGF, the endothelium loses its protective glycocalyx layer, swells up, and becomes sticky. It stops releasing nitric oxide (the signal that keeps vessels relaxed) and prostacyclin (the signal that stops platelets from clumping), and instead releases signals that promote clotting and constrict vessels.
3. Tiny clots form in small blood vessels (microangiopathy), and red blood cells get torn apart (hemolysis) — why: Platelets stick to the damaged endothelium and fibrin strands (clotting protein) form inside small vessels. Red blood cells trying to squeeze through these rough, narrow passages get sheared and break apart. You see schistocytes (broken red cell fragments) on the blood smear, haptoglobin drops (because it's all used up cleaning free hemoglobin), LDH rises (because red cells are bursting and releasing this enzyme), and indirect bilirubin rises (because the liver is overwhelmed processing all the broken cell debris). This is the 'H' in HELLP — Red blood cell destruction (Hemolysis).

4. The liver swells, liver cells die, and enzymes leak into the blood (elevated liver enzymes) — why: The liver's small vessels (sinusoids) get clogged with clots and the endothelium inside them is damaged, so liver cells (hepatocytes) don't get enough oxygen. They swell, become blood-starved (ischemic), and die, leaking AST and ALT into the bloodstream (typically AST and ALT both rise above 70 IU/L, often much higher). The liver itself swells and stretches the Glisson capsule (the tight covering around it), causing severe right upper quadrant or epigastric pain. In severe cases, blood pools under the capsule (subcapsular a pooled collection of blood (hematoma)) or the capsule ruptures, causing life-threatening internal bleeding. This is the 'EL' in HELLP — Elevated Liver enzymes.
5. Platelets get used up and destroyed, so the platelet count drops (thrombocytopenia) — why: Platelets are consumed forming microthrombi all over the body and are destroyed as they stick to damaged vessel walls. The spleen traps and destroys more platelets as it tries to filter the blood. The bone marrow can't make new platelets fast enough. The platelet count drops below 100,000/ μ L (the threshold for HELLP), and if it falls below 50,000, the risk of serious bleeding — especially during delivery or surgery — becomes high. This is the 'LP' in HELLP — Low Platelets.
6. The mother has right upper quadrant pain, nausea, vomiting, headache, and may have high blood pressure or vision changes — why: The swollen liver stretches its capsule, causing pain in the right upper belly or mid-upper belly (epigastrium). Nausea and vomiting come from liver dysfunction and gut starved blood flow (ischemia) (poor blood flow to the stomach and intestines). The damaged endothelium in the brain and the rising blood pressure cause headache, blurred vision, or seeing spots. If blood pressure spikes high enough or the brain swells, the mother can have a seizure (eclampsia) or stroke.
7. The only cure is to deliver the baby and placenta — why: As long as the placenta is inside the mother, it keeps releasing the toxic factors (sFlt-1 and soluble endoglin) that damage the endothelium. Once the baby and placenta are delivered, the source of the problem is removed. Over the next hours to days, the mother's liver enzymes start to fall, platelet count starts to rise, and red blood cell destruction (hemolysis) slows. Delivery is the definitive treatment — there is no medicine that fixes HELLP while the pregnancy continues. The timing of delivery depends on how severe the HELLP is, how far along the pregnancy is, and whether the mother or baby are in immediate danger, but once HELLP is diagnosed, delivery is planned urgently (usually within 24–48 hours if the mother is stable, or immediately if she is crashing).

8. After delivery, the mother is watched closely in the ICU or high-acuity unit because HELLP can worsen for 24–48 hours before it gets better — why: Even after the placenta is out, the cascade can continue for a day or two — platelets may keep falling, liver enzymes may keep rising, and blood pressure may spike. The team gives magnesium sulfate IV to prevent seizures, controls blood pressure with antihypertensives (like labetalol or hydralazine), transfuses platelets if the count is dangerously low or the mother is bleeding, and monitors closely for liver rupture, pulmonary edema (fluid flooding the lungs), or kidney failure. Most mothers start to improve by 48–72 hours postpartum, but recovery can take weeks.

Spot it — what you see, and why

- Right upper belly pain or pain just below the ribs on the right side: The liver is swelling because its blood vessels are getting damaged and leaking, and the stretched outer covering of the liver (the capsule) sends pain signals.
- Nausea and throwing up: The liver is not working well, so toxins build up in the blood and trigger the brain's vomit center; the swollen liver also presses on the stomach.
- Headache that does not go away: Blood pressure is too high, which stretches blood vessels in the brain and causes pain; swelling in the brain (edema) also pushes on sensitive areas.
- Seeing spots, flashing lights, or blurry vision: High blood pressure damages tiny blood vessels in the retina (the light-sensing layer at the back of the eye) and can cause swelling in the visual parts of the brain.
- Feeling very tired or weak: Red blood cells are breaking apart (hemolysis), so less oxygen reaches muscles and organs; the liver is also struggling to make energy.
- Swelling in the face, hands, or legs that comes on suddenly: The kidneys are leaking protein into the urine, which lowers protein in the blood, so fluid leaks out of blood vessels into tissues; high blood pressure also pushes fluid out.

Red flags — act now

- Blood pressure over 160/110 — the brain and placenta are at high risk of bleeding or stroke
- Platelet count below 50,000 — serious bleeding can start any moment, including in the brain or liver
- Signs of liver rupture: sudden, severe right upper belly or shoulder pain, dizziness, or fainting — this is a life-threatening emergency
- Seizure or very confused thinking — the brain is swelling or having a stroke from the high blood pressure
- Trouble breathing or chest pain — fluid may be building up in the lungs (pulmonary swelling (edema)) or the heart is struggling

Treat it — in this order

1. Deliver the baby (vaginal induction or cesarean section), ideally within 24–48 hours of diagnosis → Removes the placenta, which is the source of the toxins and signals that break the endothelium and trigger HELLP syndrome. Delivery stops the cascade at its root. After the placenta is out, the liver, platelets, and red blood cells begin to recover within 48–72 hours.
2. Magnesium sulfate IV (4–6 g loading dose, then 1–2 g/hour continuous infusion) → Magnesium blocks calcium channels in nerve and muscle cells, calming the nervous system and dilating blood vessels. This lowers the risk of eclamptic seizures (which happen in up to 30 % of HELLP cases) and helps control blood pressure spikes.
3. Antihypertensive drugs: IV labetalol (10–20 mg bolus, repeat every 10 min) or oral nifedipine (10–20 mg every 20 min) to keep blood pressure < 160/110 mmHg → Lowers blood pressure acutely, protecting the brain from bleeding-driven (hemorrhagic) stroke and reducing the shear stress that batters vessel walls and worsens red blood cell destruction (hemolysis). Keeping systolic BP < 160 and diastolic BP < 110 is the current guideline target to prevent maternal stroke.
4. Corticosteroids: betamethasone 12 mg IM every 24 hours × 2 doses OR dexamethasone 6 mg IM every 12 hours × 4 doses (if gestational age < 34 weeks and delivery is not immediately required) → Speeds maturation of the baby's lungs by triggering surfactant production in the alveoli (the tiny air sacs). If the baby is born preterm, steroids reduce respiratory distress syndrome, bleeding in the brain, and death. Some evidence suggests steroids may also help raise maternal platelet counts slightly, but this is not the primary reason for giving them.
5. Platelet transfusion (if platelet count < 20,000/μL or < 50,000/μL with active bleeding or before surgery) → Temporarily raises the platelet count so the blood can clot during delivery (especially cesarean section) and stops active bleeding from mucous membranes or surgical sites.

Your top priorities at the bedside

1. Start continuous fetal heart monitoring and measure maternal blood pressure every 15 minutes until stable — why: High blood pressure (hypertension) can cause placental blood vessels to clamp down (vasoconstriction) reducing oxygen to the baby, while fetal heart rate decelerations show the baby is already in distress and needs emergency deliver
2. Start magnesium sulfate IV with 4 to 6 gram loading dose over 15 to 20 minutes, then 2 grams per hour continuous infusion — why: Magnesium blocks calcium in brain cells (neurons) to prevent the electrical storm that causes seizures (eclampsia), which can kill both mother and baby through lack of oxygen (hypoxia) during the seizure

3. Check deep tendon reflexes (knee jerk), respiratory rate, and urine output every hour while magnesium is running — why: Too much magnesium (toxicity) stops the breathing muscles (respiratory depression) by blocking nerve signals, shown first by absent knee reflexes and breathing slower than 12 breaths per minute, requiring immediate calcium gluconate antidote