

HELLP Syndrome

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THE STORY IN ONE SENTENCE

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

Normal anatomy — the body's job

In a healthy pregnancy, the placenta (the organ that connects mother and baby) anchors into the wall of the uterus, and the mother's blood vessels relax and widen so more blood can flow to the baby. The endothelium (the smooth inner lining of every blood vessel) stays intact, platelets circulate without clumping, red blood cells flow freely, and the liver works at a steady pace filtering waste.

BODY'S JOB

The placenta's job is to deliver oxygen and nutrients to the baby and carry waste away. To do that job well, the mother's blood vessels need to stay wide and smooth. The endothelium (vessel lining) releases signals that keep blood flowing smoothly, prevent clots, and regulate blood pressure. Platelets float by, ready to patch any small injury. Red blood cells carry oxygen without breaking. The liver filters the blood, makes proteins that help blood clot when needed, and clears away old red blood cells at a normal rate.

1. Placenta implants into the uterine wall and sends out roots (villi) that bathe in the mother's blood.
2. Mother's spiral arteries (small twisty vessels in the uterus) widen and lose their muscular walls so blood flows easily and steadily to the placenta.

3. The endothelium (vessel lining) releases nitric oxide (a signal that relaxes vessels) and prostacyclin (a signal that stops platelets from clumping), keeping blood pressure normal and flow smooth.
4. Red blood cells travel through wide, smooth vessels without getting squeezed or torn.
5. Platelets circulate freely, waiting for a real injury before they clump together.
6. The liver filters blood, makes clotting factors, breaks down old red blood cells at a steady rate, and keeps enzymes (ALT and AST) inside its cells.

What breaks

In HELLP, the placenta doesn't anchor properly, and it releases substances (like soluble fms-like tyrosine kinase-1, or sFlt-1, and soluble endoglin) into the mother's bloodstream that poison the endothelium — the smooth lining inside every blood vessel. Once that lining is damaged, the vessels get sticky and narrow, tiny clots form everywhere, and the whole system goes haywire.

CLINICAL TERM

HELLP syndrome is a severe form of preeclampsia characterized by systemic endothelial injury. The primary upstream defect is abnormal placentation: the placenta releases anti-angiogenic factors (sFlt-1, soluble endoglin) that damage the vascular endothelium throughout the mother's body. This endothelial dysfunction leads to microangiopathic destroying red blood cells (hemolytic) anemia (red cells sheared by fibrin strands in small vessels), hepatocellular injury with elevated transaminases (liver swelling and starved blood flow (ischemia)), and a low platelet count (thrombocytopenia) (platelet consumption and activation). Clinically, the mother presents with right upper quadrant or epigastric pain, nausea, vomiting, and often high blood pressure (hypertension), headache, or visual changes.

How the body compensates

The body tries to keep blood pressure, oxygen delivery, and clotting balance steady for as long as it can, but in HELLP this compensation is fragile and can fail suddenly. Blood pressure may stay near-normal even as the liver swells and platelets drop. The job is to recognize the pattern early — before the liver ruptures, the mother seizes, or bleeding spirals out of control.

1. {'what': 'The body keeps making red blood cells to replace the ones being destroyed', 'why': 'The bone marrow (the spongy tissue inside bones that makes blood cells) ramps up production of reticulocytes (young red blood cells) to try to keep oxygen delivery going. But if red blood cell destruction (hemolysis) is faster than production, the mother becomes anemic, fatigued, and short of breath.'}

2. {'what': 'The liver tries to clear broken red cell debris and keep making clotting factors', 'why': 'The liver works overtime to process all the free hemoglobin and bilirubin from broken red cells, and to synthesize clotting factors (proteins needed for blood to clot). But as liver cells die and enzymes leak out, the liver's synthetic function fails — clotting times (PT/INR) can rise, raising bleeding risk even further.'}
3. {'what': 'The kidneys try to hold onto fluid and maintain blood pressure', 'why': 'The kidneys sense lower effective blood flow (because vessels are clamped down and clotted) and release renin, which triggers aldosterone and ADH (hormones that hold onto salt and water). This raises blood volume and blood pressure in an attempt to keep organs perfused, but it worsens swelling (edema) (swelling) and high blood pressure (hypertension), and can push the mother into pulmonary edema (fluid flooding the lungs) (fluid in the lungs).'}- 4. {'what': 'Vital signs may look stable while the cascade is accelerating', 'why': 'Blood pressure may be only mildly elevated, heart rate near-normal, and oxygen saturation good — but these stable numbers hide the fact that platelets are dropping, liver enzymes are climbing, and the mother is hours away from a catastrophic bleed or seizure. This is the dangerous middle: the body is compensating, so the team may underestimate how sick the patient really is.'}
- 5. {'what': 'The crash point to watch for: liver rupture, uncontrolled bleeding, placental abruption (placenta tears away early), eclampsia (seizures), or stroke', 'why': 'Once platelets drop below 50,000, liver enzymes double or triple baseline, or subcapsular a pooled collection of blood (hematoma) forms, the window for safe delivery narrows fast. Placental abruption (often signaled by sudden severe abdominal pain and vaginal bleeding) can cause fetal death and maternal bleeding (hemorrhage). Eclampsia (seizures) or PRES (posterior reversible encephalopathy syndrome, causing headache, vision loss, confusion, seizures) means the brain is under attack. Liver rupture causes sudden collapse and massive internal bleeding. All of these can happen within hours if HELLP is not recognized and the baby is not delivered promptly.'}
- 6. {'what': 'Trend the labs and symptoms, not just one snapshot', 'why': 'A platelet count of 90,000 that was 150,000 six hours ago is more worrying than a stable 90,000. Rising AST/ALT, worsening right upper quadrant pain, new headache, or new high blood pressure (hypertension) are all red flags that compensation is failing. A 'stable' patient on a downhill slope is not truly stable — she is decompensating.'}

Domino effect

1. Abnormal placenta implants and releases toxic factors into the mother's blood — 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 — 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) — 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) — 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) — 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 — 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 — 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 — 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.

Symptoms · what the patient feels, 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.
- Easy bruising or tiny red or purple dots on the skin (petechiae): Platelets (the blood cells that help clotting) are very low, so even small bumps cause bleeding under the skin.
- Yellowing of the skin or whites of the eyes (jaundice): Red blood cells are breaking apart and releasing a yellow pigment called bilirubin faster than the damaged liver can clean it out of the blood.

Focused exam

- Right upper belly pain and tenderness when you press under the ribs: The liver sits tucked under your right ribs. When HELLP syndrome attacks the liver, blood vessels inside it break and leak, making the liver swell and stretch its own capsule (the tight wrapper around it). That stretching hurts — a lot. This pain is your bedside clue that the liver is in trouble.
- Nausea and vomiting that won't stop: The swollen, injured liver presses on the stomach and releases waste chemicals the body can't clear fast enough. The body feels poisoned from the inside. When nausea and vomiting show up with belly pain in a pregnant woman past 20 weeks, HELLP syndrome moves high on your list.
- Blood pressure 160/110 mmHg or higher: HELLP syndrome is severe preeclampsia. The endothelium (the smooth inner lining of every blood vessel) breaks down, making vessels stiff and leaky. The heart pumps harder to push blood through those damaged, narrowed vessels. High blood pressure is the upstream driver that batters organs and makes red blood cell destruction (hemolysis) (red blood cell breaking) worse.
- Bleeding from gums, nosebleeds, or bruises appearing without injury: Platelets (the tiny blood cells that plug holes and start clotting) break apart and disappear in HELLP syndrome. When the platelet count drops below 100,000 per microliter — and especially below 50,000 — the blood can't clot well. Spontaneous bleeding shows the clotting system is failing.
- Sudden swelling in the face, hands, and legs: The damaged endothelium leaks fluid out of blood vessels into tissues. Protein (albumin) leaks into urine, dropping the protein level in the blood, which pulls even more fluid out. Swelling (edema) is visible proof that the vessels are broken.
- Severe headache, blurred vision, or seeing spots of light: High blood pressure and swelling can reach the brain. Vessels in the brain leak or spasm, starving parts of the brain of oxygen. Headache and vision changes mean the brain is in danger of seizure (eclampsia) or stroke. These symptoms demand immediate action.

Diagnostics · every test answers a question

- Complete blood count (CBC) with platelet count → Are platelets dropping, and are red blood cells breaking apart?
- Liver function tests: AST (aspartate aminotransferase) and ALT (alanine aminotransferase) → Is the liver injured and leaking enzymes into the blood?
- Lactate dehydrogenase (LDH) → Are red blood cells breaking apart inside the blood vessels (hemolysis)?
- Peripheral blood smear → Can we see broken red blood cells under the microscope?
- Haptoglobin level → Is hemoglobin from broken red cells being mopped up faster than normal?
- Urinalysis for protein → Are the kidney filters leaking protein because of preeclampsia damage?
- Serum creatinine → Are the kidneys failing to filter waste?
- Coagulation panel: PT, aPTT, fibrinogen → Is the clotting system breaking down into DIC (disseminated intravascular coagulation)?

Treatment logic

- 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.
- 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.
- 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.

- 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.
- Platelet transfusion (if platelet count < 20,000/ μ L or < 50,000/ μ L 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.
- Fresh frozen plasma (FFP) or cryoprecipitate transfusion (if fibrinogen < 100 mg/dL or DIC is present) → Replaces clotting factors (fibrinogen, factor V, factor VIII) that are being consumed by DIC. This helps restore the blood's ability to clot and stops uncontrolled bleeding.
- Intensive care unit (ICU) monitoring for 48–72 hours after delivery → Catches life-threatening complications early: pulmonary edema (fluid flooding the lungs) (fluid in the lungs from leaky vessels and heart strain), acute kidney injury (rising creatinine, low urine output), eclamptic seizures, liver rupture (rare but catastrophic), and DIC. Early detection allows immediate treatment before organ failure becomes irreversible.

Medications

Magnesium sulfate (IV) · Anticonvulsant; membrane stabilizer

Magnesium sulfate calms down the electrical firing in the brain and muscles so seizures (sudden, dangerous shaking fits) don't start. In HELLP syndrome, the same toxins in the blood that hurt the liver and blood cells can also irritate the brain and trigger eclamptic seizures. Magnesium acts like a natural brake on nerves: it blocks calcium from rushing into nerve cells, which stops them from firing out of control. This keeps the brain quiet and safe while the team works to deliver the baby and reverse the disease.

1. Magnesium ions enter the bloodstream through an IV and travel to the brain and spinal cord.
2. At the synapse (the gap between nerve cells), magnesium blocks NMDA receptors (a type of docking site that usually lets calcium in).
3. With less calcium allowed inside, the nerve cell stays calm and doesn't fire rapidly.
4. This electrical quieting prevents the chaotic bursts that turn into a seizure.
5. Magnesium also relaxes smooth muscle in blood vessels slightly, which can take a little pressure off the circulation, though the main job here is seizure prevention.

SAFETY WATCH

Too much magnesium can slow breathing and weaken reflexes; nurses check knee-jerk reflexes, breathing rate, and urine output every hour. · If reflexes disappear, breathing slows below 12 breaths per minute, or urine drops below 30 mL per hour, the infusion must be stopped immediately. · Calcium gluconate IV is the antidote and must be at the bedside in case of magnesium toxicity.

Labetalol (IV) or Hydralazine (IV) or Nifedipine (by mouth) · Antihypertensives (labetalol: alpha + beta blocker; hydralazine: direct vasodilator; nifedipine: calcium-channel blocker)

When blood pressure climbs to severe levels (≥ 160 systolic or ≥ 110 diastolic), the force pushing on artery walls can tear them or burst small vessels in the brain, causing a stroke. These medicines relax the muscle layer inside artery walls, letting the vessels widen and easing the pressure. Labetalol blocks adrenaline signals that squeeze vessels tight. Hydralazine tells smooth muscle in vessel walls to loosen up directly. Nifedipine stops calcium from entering muscle cells, so the muscle can't contract as hard. All three bring pressure down quickly enough to prevent a stroke without dropping it so fast that the placenta loses blood flow.

1. The drug enters the bloodstream and reaches arteries throughout the body.
2. Labetalol blocks beta-1 receptors on the heart (slowing the pump) and alpha-1 receptors on vessel walls (stopping the squeeze signal); hydralazine opens potassium channels in smooth muscle, letting the cell relax; nifedipine blocks L-type calcium channels so calcium can't trigger contraction.
3. With less contraction, the artery widens (dilates).
4. Wider vessels mean the same volume of blood flows through a roomier space, so pressure on the walls drops.
5. Blood pressure falls into a safer range, reducing stroke risk while the team moves toward delivery.

SAFETY WATCH

Blood pressure must be checked every 10–15 minutes after each dose to avoid dropping pressure too fast, which can cut blood flow to the placenta and harm the baby. · Labetalol should not be used in women with asthma or heart block; hydralazine can cause rapid heartbeat and headache; nifedipine can cause flushing and dizziness. · Goal is to keep systolic 140–150 and diastolic 90–100 – controlled, not normal – until delivery is complete.

Betamethasone or Dexamethasone (IM injection) · Corticosteroids (synthetic versions of the body's stress hormone cortisol)

If the baby must be delivered before 34 weeks, the lungs are often too immature to breathe air – the tiny air sacs (alveoli) in the lungs collapse after each breath because they lack enough surfactant (a slippery coating that keeps sacs open). Betamethasone or dexamethasone are powerful steroid hormones that cross the placenta into the baby's bloodstream, travel to the baby's lungs, and turn on the genes in lung cells that make surfactant. Within 24–48 hours, the baby's lungs produce enough surfactant to stay inflated, dramatically lowering the risk of respiratory distress syndrome (severe breathing trouble) after birth. Steroids also help mature other organs – the brain, gut, and blood vessels – and reduce bleeding in the brain.

1. The steroid is injected into the mother's muscle and enters her bloodstream.
2. Because the molecule is small and fat-soluble, it crosses the placenta into the baby's circulation.
3. In the baby's lungs, the steroid enters type II pneumocyte cells and binds to glucocorticoid receptors in the cell nucleus.
4. This binding switches on genes that code for surfactant proteins (SP-A, SP-B, SP-C, SP-D) and phospholipids.
5. Over 24–48 hours, surfactant is made and secreted into the air sacs, coating them so they don't collapse.
6. The steroid also speeds up maturation of the baby's brain blood vessels (reducing intraventricular bleeding (hemorrhage) risk) and strengthens gut and vessel walls.

SAFETY WATCH

The full benefit appears 24–48 hours after the first dose, so ideally two doses are given 24 hours apart before delivery – but if the mother is too unstable, delivery may happen before the course is complete. · Steroids can transiently raise the mother's blood sugar, so glucose should be monitored if she has diabetes. · Single course is safe; repeated courses are avoided unless delivery is delayed beyond 7 days and gestational age is still under 34 weeks.

Platelet transfusion · Blood product replacement

HELLP syndrome destroys platelets (tiny cell fragments that plug holes in blood vessels to stop bleeding). When the platelet count falls very low – usually below 20,000–50,000 per microliter – the blood can't clot properly, and even a small cut or the stress of surgery can lead to dangerous bleeding. A platelet transfusion is a bag of concentrated platelets donated by healthy people. When infused into the vein, these fresh platelets circulate immediately and start plugging any leaks, buying time until delivery stops the disease and the mother's bone

marrow can make new platelets on its own. Transfusion is used before cesarean section or if spontaneous bleeding starts (gums, nose, surgical incision, or inside the abdomen).

1. Donated platelets are collected, tested for safety, and stored in a special bag.
2. The bag is connected to the mother's IV line and infused over 30–60 minutes.
3. Fresh platelets enter the bloodstream and travel to any spot where a blood vessel is broken or leaking.
4. Platelets stick to the damaged vessel wall (adhesion), clump together (aggregation), and release chemicals that help form a clot (a mesh of fibrin protein that seals the leak).
5. This temporary patch holds until the vessel heals and the platelet count recovers after delivery.

SAFETY WATCH

Each unit raises the platelet count by roughly 5,000–10,000, so the count is rechecked 10–60 minutes after transfusion to confirm response. · Transfusion reactions (fever, chills, allergic rash) are possible; nurses watch for these during the infusion. · Platelets are in short supply and expensive, so they are reserved for true need – not given to 'normalize' a lab number if the mother is stable and not bleeding.

Packed red blood cells (pRBC transfusion) · Blood product replacement

In HELLP syndrome, red blood cells are crushed and torn apart (hemolysis) as they squeeze through damaged, narrowed blood vessels. The hemoglobin inside spills out, and the cell fragments are cleared away by the spleen. If red blood cell destruction (hemolysis) is severe, the oxygen-carrying capacity of the blood drops, and the mother may become dangerously anemic (low red cell count), causing fatigue, fast heart rate, shortness of breath, and – if extreme – organ failure. A transfusion of packed red blood cells replaces the lost cells with healthy donor cells that can carry oxygen normally. This is usually needed if hemoglobin falls below 7 g/dL or if the mother is symptomatic or bleeding heavily.

1. Donated red blood cells are separated from plasma, tested for compatibility (blood type match), and stored in a bag.
2. The bag is connected to the mother's IV and infused over 2–4 hours.
3. Fresh red cells enter circulation and join the remaining native red cells.
4. Hemoglobin inside the new cells binds oxygen in the lungs and releases it to tissues that need it.
5. Oxygen delivery improves, heart rate slows, and symptoms of anemia ease.

SAFETY WATCH

Blood must be cross-matched to avoid transfusion reactions (fever, chills, back pain, dark urine from mismatched cells being destroyed). · Each unit raises hemoglobin by roughly 1 g/dL; the count is rechecked after transfusion. · Volume overload (too much fluid in the circulation) is a risk if the heart or kidneys are weak, so infusion is slower and diuretics may be given if needed.

Red flags

- 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

Nursing priorities

1. Start continuous fetal heart monitoring and measure maternal blood pressure every 15 minutes until stable — 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 delivery
2. Start magnesium sulfate IV with 4 to 6 gram loading dose over 15 to 20 minutes, then 2 grams per hour continuous infusion — 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 — 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

4. Give antihypertensive medication (labetalol IV or nifedipine by mouth) to keep systolic blood pressure between 140 and 150 and diastolic between 90 and 100 — Blood pressure above 160 over 110 (severe high blood pressure (hypertension)) can rupture brain blood vessels causing stroke (hemorrhagic CVA), but dropping pressure too low reduces placental blood flow and harms the baby
5. Draw labs every 6 to 12 hours for platelet count, liver enzymes (AST and ALT), LDH (a red blood cell breakdown marker), and hemoglobin — HELLP syndrome gets worse rapidly as platelets drop (thrombocytopenia), liver enzymes rise (hepatocellular injury), and red blood cells burst (hemolysis), so trending labs shows if steroids are helping or immediate delivery is needed
6. Limit IV fluids to 80 milliliters per hour total and measure urine output every hour with a Foley catheter — Leaky blood vessels (capillary leak) and low protein in blood (hypoalbuminemia) let fluid escape into the lungs (pulmonary swelling (edema)) causing breathing failure, while damaged kidneys (acute kidney injury) stop making urine when fluid overloaded
7. Keep two large-bore IV lines patent and have O-negative blood, platelets, and fresh frozen plasma immediately available in the blood bank — HELLP patients can suddenly bleeding (hemorrhage) during delivery or after from low platelets and clotting factors (coagulopathy), and the liver capsule can rupture (hepatic rupture) requiring massive transfusion within minutes to prevent death from bleeding out
8. Place the patient in a quiet dim room with seizure precautions (padded side rails, suction at bedside, oxygen ready) and minimize stimulation — The swollen irritated brain (cerebral swelling (edema)) in severe preeclampsia has a lower seizure threshold, so loud noises or bright lights can trigger eclamptic seizures that stop oxygen to the baby and can cause the mother to aspirate vomit into the lungs

Sources

- ACOG Practice Bulletin No. 222: Gestational Hypertension and Preeclampsia (2020)
- American College of Gastroenterology
- UpToDate Clinical Guidelines
- SMFM (Society for Maternal-Fetal Medicine) Consult Series

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