

Carbon Monoxide Poisoning

A plain-English guide for you and your family

WHAT IS HAPPENING

Your blood has hemoglobin, a special protein inside red blood cells that picks up oxygen in your lungs and drops it off wherever your body needs it. Picture hemoglobin like a delivery truck that loads oxygen, drives to hungry cells, and unloads. Carbon monoxide sneaks in from car exhaust, broken heaters, gas stoves, generators, and fires. It looks like oxygen to hemoglobin but sticks 200 times tighter and refuses to let go. So your blood keeps circulating but carries almost no oxygen—like trucks driving around empty. At the same time, carbon monoxide slips into cells and breaks the tiny power factories (mitochondria) that burn oxygen to make energy. Your brain and heart need the most oxygen, so they fail first. Early signs are headache, nausea, dizziness, and confusion—your brain is starving. If exposure continues, you faint, have seizures, or slip into a coma. Even after you recover, damaged brain cells may die slowly over weeks, causing memory loss, trouble walking, or mood changes. None of this is random. Every symptom traces back to one problem: hemoglobin is poisoned and cannot deliver oxygen, so cells everywhere start shutting down in order. The faster we flood your body with pure oxygen (or high-pressure oxygen in a special chamber called a hyperbaric chamber), the faster we kick carbon monoxide off hemoglobin and let real oxygen reach your cells again.

What you might feel

- Headache that feels dull and throbbing
- Feeling dizzy or lightheaded
- Nausea or throwing up
- Confusion or trouble thinking clearly
- Chest pain or a tight feeling in the chest
- Shortness of breath or feeling like you cannot get enough air
- Weakness or tired muscles
- Passing out or losing consciousness
- Cherry-red skin or lips (rare and not reliable)
- Multiple people in the same place getting sick at the same time

Call the doctor right away if...

- Passing out or becoming unresponsive
- New confusion or trouble thinking clearly
- Chest pain or feeling like the heart is squeezing
- Seizures or jerking movements
- Multiple people in the same building getting sick at the same time

What the care team will do

- Remove the patient from the carbon monoxide source immediately and make sure rescuers wear protective gear if the source is still active
- Apply 100% oxygen using a tight-fitting non-rebreather mask at 15 liters per minute right away, making sure the reservoir bag stays inflated
- Place the patient on continuous cardiac monitoring and get a 12-lead ECG within the first 10 minutes
- Draw blood for carboxyhemoglobin level (CoHb), troponin (a heart enzyme), basic metabolic panel, and lactic acid (a marker of oxygen starvation) before giving oxygen if possible, but never delay oxygen to get labs
- Check neurological status every 15 minutes using Glasgow Coma Scale or a similar tool, watching for confusion, drowsiness, or any decline in thinking
- Keep the patient lying flat or with head of bed at 30 degrees and avoid sudden position changes that might drop blood pressure
- Notify the physician immediately if CoHb is above 25%, if the patient is pregnant, if there was loss of consciousness, or if chest pain or confusion is present, because these findings require hyperbaric oxygen consultation
- Continue 100% oxygen for at least 4 to 6 hours or until the CoHb drops below 5% and all symptoms resolve, rechecking CoHb every 2 to 4 hours

Medicines you may be given — and why

Normobaric oxygen (100% oxygen through a tight-fitting mask)

Carbon monoxide sticks to hemoglobin (the protein inside red blood cells that carries oxygen) about 200 times more tightly than oxygen does. When carbon monoxide grabs hemoglobin, it forms carboxyhemoglobin — a locked pair that cannot carry oxygen. Your tissues start to starve. Breathing 100% oxygen floods your lungs with pure oxygen molecules. Because there are so many oxygen molecules rushing in, they slowly push the carbon monoxide off hemoglobin and take its place. The carbon monoxide that gets pushed off leaves your body

when you breathe out. This speeds up the clearance: instead of taking about 5 hours (on room air), half the carbon monoxide leaves in about 90 minutes.

Hyperbaric oxygen (HBO, 100% oxygen breathed inside a high-pressure chamber)

Hyperbaric oxygen therapy puts the patient inside a sealed chamber that is pressurized to 2.5 to 3 times normal air pressure, like being 60 to 90 feet underwater. While inside, the patient breathes 100% oxygen. The high pressure forces much more oxygen to dissolve directly into the liquid part of the blood (plasma), even without needing hemoglobin to carry it. This extra dissolved oxygen reaches starving tissues faster. The pressure also speeds up the release of carbon monoxide from hemoglobin — the half-life (time for half the carbon monoxide to leave) drops from 90 minutes on regular oxygen down to about 20 to 30 minutes. Most importantly, hyperbaric oxygen may lower the risk of delayed brain problems (memory loss, personality changes, trouble walking) that can appear days to weeks after the poisoning.

Where this information comes from

- CDC Carbon Monoxide Poisoning Prevention
- American College of Medical Toxicology (ACMT)
- Undersea and Hyperbaric Medical Society (UHMS)
- New England Journal of Medicine

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