

Efficacy of inhaled hydrogen on neurological outcome following brain ischaemia during post-cardiac arrest care (HYBRID II): a multi-centre, randomised, double-blind, placebo-controlled trial

What was the goal?

Researchers wanted to answer: Could inhaling hydrogen gas help protect the brain after cardiac arrest? When someone has a cardiac arrest (heart stops), the brain is temporarily deprived of oxygen. Even after the heart starts beating again, the body can suffer a “second wave” of injury caused by: inflammation, oxidative stress, tissue damage from oxygen returning too quickly (called reperfusion injury).

Researchers wanted to see if hydrogen inhalation could reduce brain damage and improve survival.

How was the study done?

73 patients. Adults aged 20–80

All had:

- Out-of-hospital cardiac arrest
- Coma after being revived
- Conducted across 15 hospitals in Japan

Patients were randomly assigned to receive:

Hydrogen group

- 2% hydrogen gas + oxygen
- inhaled for 18 hours

Control group

- oxygen only (placebo/control)
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Everyone also received standard intensive care, including cooling therapy to protect the brain. Researchers then checked outcomes 90 days later.

What did they measure? Researchers looked at: Brain function recovery. Neurological outcome. Survival after 90 days. Whether people survived without brain disability.

Main findings

- ✓ More people had good brain recovery
 - **56% of hydrogen patients had a good neurological outcome**
 - **vs 39% in the control group.**
- ✓ Better survival rates. After 90 days:
 - **85% survived in the hydrogen group**
 - **vs 61% survived in the control group**

This was statistically significant.

- ✓ More people recovered with little or no disability. Some patients had completely normal neurological recovery (no symptoms at all):
 - 46% in the hydrogen group
 - vs 21% in controls



To Read The Full Study

