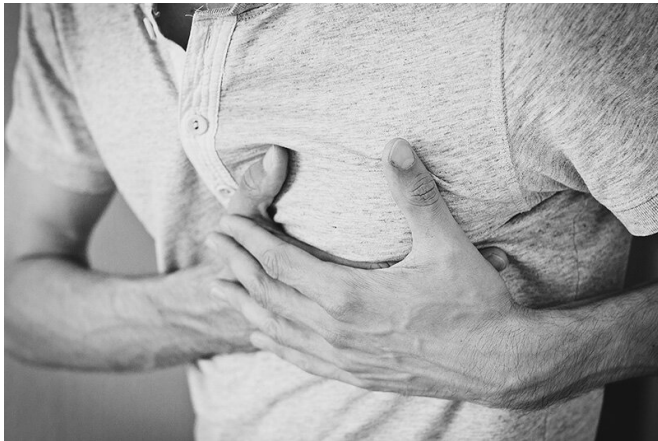


Acid reflux could cause death during epileptic seizures, study finds

10 January 2019, by Kayla Wiles



A new study suggests that acid reflux plays a role in sudden unexplained death during an epileptic seizure. Credit: Purdue University stock photo

Pedro Irazoqui had just enjoyed a huge lobster dinner.

Then he woke up that night finding he couldn't breathe.

Terrified, Irazoqui sat up and tried to relax. Air suddenly returned to his lungs like nothing had happened.

After grabbing his phone and Googling like crazy, Irazoqui, a professor at Purdue University, discovered that what he had experienced was acid reaching his larynx, causing it to contract and cut off air flow. Sitting up pushes the acid back down to the stomach with the help of gravity.

A few years later, this episode inspired a possible explanation of why one in 1,000 adults with epilepsy die suddenly during a [seizure](#) each year: [acid reflux](#).

The study, led by Irazoqui's team at Purdue, found

acid in the esophagus of animal models 100 percent of the time that they experienced [sudden death](#) during a seizure.

These findings propose another potential cause of death to investigate, as well as ideas for more targeted treatment. The team intends to start [clinical trials](#) this year on whether humans with epilepsy also experience acid reflux during a seizure.

The published paper appears in the December issue of *Epilepsy Research*.

While the sample size was small, the researchers have seen the same correlation in animals tested since this study.

"The moral of the story isn't just to not be a glutton: What if the mechanism of sudden death is not respiratory or cardiac – the two theories held at the moment – but all through the stomach?" said Irazoqui, who is a professor of biomedical engineering and electrical and computer engineering.

Treatment, then, could involve a cranial nerve called the vagus, which controls acid production.

The [vagus nerve](#) splits into many branches below the diaphragm. One of those is the gastric branch to the stomach. When this nerve is stimulated, such as during a seizure, the stomach overproduces acid that could hit the valve to the larynx.

Because the animals did not experience acid reflux with an empty stomach, even though their seizures triggered a lot of acid production, a short-term solution to preventing death could be not eating after a certain time of night.

"An empty [stomach](#) might hold acid down. Since seizures almost always happen during sleep, maybe just not eating after 5:00 p.m. could do the

trick. We're hoping to test this in humans," Irazoqui said.

A more reliable and long-term solution could be an implantable device that would block [electrical activity](#) in the gastric branch of the vagus nerve only during a seizure, preventing [acid](#) production from cutting off air flow.

Irazoqui's team has already built a prototype of this device and plans to test it in animals and humans. Their findings might also provide some insights into other unexplained mechanisms of death, such as sudden infant death syndrome.

More information: Cynthia Harden et al. Practice guideline summary: Sudden unexpected death in epilepsy incidence rates and risk factors, *Neurology* (2017). [DOI: 10.1212/WNL.0000000000003685](https://doi.org/10.1212/WNL.0000000000003685)

Provided by Purdue University

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