

Well - Tara Parker-Pope on Health

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Think Like a Doctor: The Girl in a Coma Solved

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On Thursday, we challenged Well readers to try their hand at [solving the case of a comatose young woman](#) dropped off at the emergency room by her friends after attending a concert the previous night. More than 350 people wrote in, and more than 90 of you were able to figure it out. The first person to guess the correct diagnosis was Dr. Laura Fochtmann, a psychiatrist and professor at Stony Brook University School of Medicine on Long Island, who in her [response carefully spelled out](#) how she got the right answer.

The Correct Diagnosis Is

... *Ecstasy-induced hyponatremia.*

The Diagnosis

Over the past 20 years there have been many reports of young people, mostly young women, who have had seizures or become unconscious after taking the illegal drug Ecstasy, also known as MDMA. The cause is a dangerously low level of sodium in the bloodstream. The brain is exquisitely sensitive to the exact right balance of sodium and water, and when they are out of whack, nausea, confusion and seizures can follow. It's a rare but dangerous side effect of the drug. Nearly one in five patients reported to have this complication died. Others had permanent brain damage.

When this complication was first observed, it was thought to be because of an overconsumption of water. The drug was used widely at concerts or "raves," and attendees were told to drink lots of water to replace what was sweated out in the crowded, hot concert and dance floors. Further research revealed that the drug actually alters the way the brain and the kidney work so that the body holds on to water and dumps sodium. This change is exaggerated by the presence of estrogen, so women are far more likely to be affected than men. Why the drug can have this effect on any given individual is not well understood, but it is clear that it is not because of an overdose or a contaminant. It appears to be a response to the drug itself.

One early and consistent finding in those with Ecstasy-induced hyponatremia is the loss of the ability to speak, even before the loss of consciousness. Seizures are common.

Ecstasy-induced hyponatremia is treated by restoring the proper balance to the sodium and water in the body. In mild cases, getting rid of the excess water, either by limiting fluid consumption or giving a diuretic, has been effective. In more severe cases, especially in cases in which a patient has had a seizure, the treatment is to give sodium containing intravenous fluids. That's what was done in the case of this young woman. Because she was so agitated, she was also given a sedative.

How the Diagnosis Was Made

Shaun Cole, the fourth year medical student rotating through the intensive care unit, was the first to arrive to see the patient in the E.R. He reviewed the young woman's chart and eyeballed the patient. Her restless movements had stopped, thanks to the sedative, but she was still only responsive to pain. Mr. Cole noticed that the girl's skin was dotted with glitter and she was

wearing what had clearly been a stylish outfit the night before. She had obviously been to a party or, more likely he thought, a rave.

As the medical student examined the patient, her parents and brother peppered him with questions he couldn't answer. I'm just the medical student, he told them; I have more questions than answers, I'm afraid. He asked each of them to tell him about the young woman before them in the bed, and particularly about the past 24 hours.

When the rest of the medical team arrived, they took over the questioning. They briefly examined the patient and explained to the family that she would need to be cared for in the intensive care unit. The team left to write the orders, but Mr. Cole stayed with the family. He still had so many questions about what had happened that night in the hours before the girl had lost consciousness.

A Few Questions. A Few Answers.

The patient had been out with some friends, the family told him. She didn't go out often. She was a good student and worked in a local restaurant to help pay her way, and that didn't leave her a lot of free time, though recently she'd been going out more.

Had she used drugs before? Mr. Cole asked. Of course not, the parents assured him. She drank alcohol but, beyond that, nothing, they said. And as for what happened that night -- how could they know?

Hearing that the young woman did not use drugs, Mr. Cole's initial concern was that she had been given GHB, or gamma hydroxybutyric acid, also known as the date-rape drug. Had this drug caused her sodium to drop to this dangerously low level? He quickly did a Google search on the drug on his phone; there was no reported link between GHB and low sodium.

Does she have a cellphone? Mr. Cole asked. She did. The girl's brother rummaged through the bag of belongings the emergency room staff had handed them and pulled out the phone.

She had made a bunch of phone calls to her friends -- no surprises there. Then Mr. Cole started clicking through the instant messages. He saw several references to "Molly." Who was Molly? But from the context it quickly became clear that the question wasn't who, but what, was Molly.

The young medical student had never heard the word. A quick search of the Internet provided the answer: it was another name for Ecstasy, the amphetamine-derived drug often used at concerts and raves.

PubMed, a widely used medical search engine, provided the link between the girl's hyponatremia and Ecstasy. There were dozens of case reports and studies describing how Molly, or Ecstasy, can cause this kind of extreme hyponatremia, especially in young women.

A Long Road of Recovery

It took days for the young woman to fully wake up. When she did, it was clear that her brain had been injured by the drug. She couldn't speak, her vision was impaired. She had to relearn how to read and write and even speak.

She threw herself into rehabilitation, working hard to get back all that she had lost. Incredibly, she graduated from college the following year just one semester behind the rest of her class. She's now in a top graduate school working on her Master's degree. All that remains of the terrible experience are the memories of how hard she had to work to get it all back.

"It was the worst and the best thing that ever happened to me," she told me recently. The worst thing -- well, that was obvious. But the best? Absolutely, she said. Working that hard to recover gave her a kind of focus and discipline she had never had before. She feels like her life has a direction now that hadn't been there.

A Lasting Legacy

As the young woman worked to recover, her mother wanted to prevent what happened to her daughter from happening to anyone else. Her daughters' friends had waited, maybe for hours, before bringing the young woman to the hospital. And then they just left her there. Why, the mother wondered. Were they afraid that they would be arrested if they told anyone about their drug use the night before?

She could understand their fear -- if not their actions. And she decided to do something about it. With the help of her local congressman, the mother lobbied for the passage of the Good Samaritan law in New York State. This law, which had been pioneered in New Mexico, protects those who seek medical help for someone with a drug or alcohol overdose from being prosecuted. The law was passed a year ago, too late to help her daughter, who, thankfully, recovered. But she was certain it would help other people's daughters and sons who may not be so lucky.