

Drops in blood oxygen levels may be key to sudden death in some epilepsy patients

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A new study by researchers at UC Davis Medical Center suggests that the sudden unexplained deaths of some epilepsy patients may be a result of their brains not telling their bodies to breathe during seizures.

"Significant drops in blood oxygen levels are more common than we thought in patients with partial seizures," said study senior author Masud Seyal, a professor of neurology at UC Davis Medical Center and director of the UC Davis Comprehensive Epilepsy Program.

The study, published online in the Oct. 24 issue of the journal *Brain*, studied Sudden Unexpected Death in Epilepsy, what doctors call SUDEP for short, to examine deaths of epileptics not explained by repeated convulsive seizures, accidents or other mishaps.

"What we've known for a long time is that SUDEP appears to be the most important cause of increased mortality in epilepsy patients. What we haven't known is what causes it," Seyal said.

The findings suggest that some cases of SUDEP may result from the brain not signaling the patient to continue breathing during seizures, though more conclusive evidence is needed, he said.

"It may have to do with an abnormal heart rhythm or it just may be that the brain stops sending the proper signals to maintain normal breathing," Seyal said.

In the retrospective study, Seyal and his colleagues examined records of 300 seizures in 57 epilepsy patients with chronic, recurrent, unprovoked seizures. They compared patients with severe convulsive seizures to those with milder symptoms like transient confusion, lip smacking and head turning.

One-third of all seizures were associated with drops in blood-oxygen levels below 90 percent. Seyal said he was surprised to find that 12 percent of these patients' blood oxygen levels actually dropped below 70 percent during their seizures.

They also discovered that seizures in the temporal lobe of the brain are more often associated with significant drops in blood-oxygen levels and that males are more likely than females to experience dangerously low levels of oxygen during seizures.

The findings support the idea that some cases of SUDEP may be caused by a lack of brain signaling that makes the patient keep breathing, though scientists need to do more research before they know for sure, Seyal said.

The study is important, Seyal said, because it suggests that hospitals that monitor inpatients for seizures should use both continuous blood-oxygen monitoring that sets off alarms when blood levels are too low and around-the-clock monitoring by staff or relatives.

In a hospital setting, blood-oxygen levels below 85 percent require intervention, such as giving supplemental oxygen, turning the patient on his side or suctioning the patient's airway, to help the patient breathe.

Patients hospitalized for seizure monitoring in the UC Davis Comprehensive Epilepsy Program must have a relative or friend with them around the clock who can recognize their seizures and summon

assistance when they occur, in addition to constant blood-oxygen monitoring.

Some medical centers also use video monitors that are continuously monitored by hospital staff. But many do not employ this kind of close monitoring.

"Our data show that it's important that respiratory parameters be closely monitored in the hospital," Seyal said.

The best strategy to reduce the likelihood of SUDEP is to promptly and effectively control patients' seizures, Seyal said.

Most seizures can be stopped with medication. Patients with seizures poorly controlled with medication often are candidates for surgery, which can have a high success rate. To perform the surgery, however, patients must be observed in the hospital, their medication must be reduced and seizures allowed to take place.

"This is the only way we can pinpoint the region of the brain responsible for the seizures and know where to operate," he said.

Seyal and his colleagues are working to determine the best ways to deal with patients who have severe drops in oxygen levels with seizures.

"The important thing here is to see how we can intervene to deal with the hypoxemia when it happens," he said.

Source: University of California - Davis

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