www.nytimes.com
The New York Times ON THE WEB

February 20, 2001

Epileptic Seizures Could Be Predictable

By REUTERS

Filed at 7:08 p.m. ET

SAN FRANCISCO (Reuters Health) - Studies in patients with severe epilepsy suggest that a seizure begins long before its symptoms become apparent. The signs of an impending seizure can be picked up on an electroencephalogram (EEG) anywhere from 10 minutes to hours before the seizure becomes obvious.

Now scientists at the annual meeting of the American Association for the Advancement of Science here say that a computational analysis of such EEG changes can be used to predict seizures. They also found that analysis of brain waveforms could aid the identification of the seizure source and so guide excision of brain tissue in those patients who are candidates for surgery.

In five patients with epilepsy so severe that they were candidates for surgical treatment, epileptic seizures could be reliably predicted from 20 minutes to 43 minutes before the event using this system, said Dr. Leon D. Iasemidis of Arizona State University in Tempe.

``If you could predict a seizure, you could take a drug or not drive a car, maybe have a seizure that is much less severe," noted Dr. Panos M. Pardalos, a research team member from the University of Florida in Gainesville.

The prediction system is based on continuous EEG recordings obtained from the patients over a 10-day period. This massive dataset was then analyzed using mathematical concepts used to find the best solution to problems in which chaos occurs.

This modeling approach is appropriate because epileptic brains are chaotic systems that repeatedly shift into the seizure state of chaos from the normal state of order, Iasemidis said.

In analyzing their data, the scientists found that seizures are preceded by a gradual change in widespread regions of the brain, as more and more of the EEG recordings begin to show abnormality. They then identified specific changes that are characteristic of this process and that have usefulness is predicting a seizure.

The scientists' findings in patients with epilepsy will be reported in the upcoming issue of the Journal of Combinatorial Optimization.