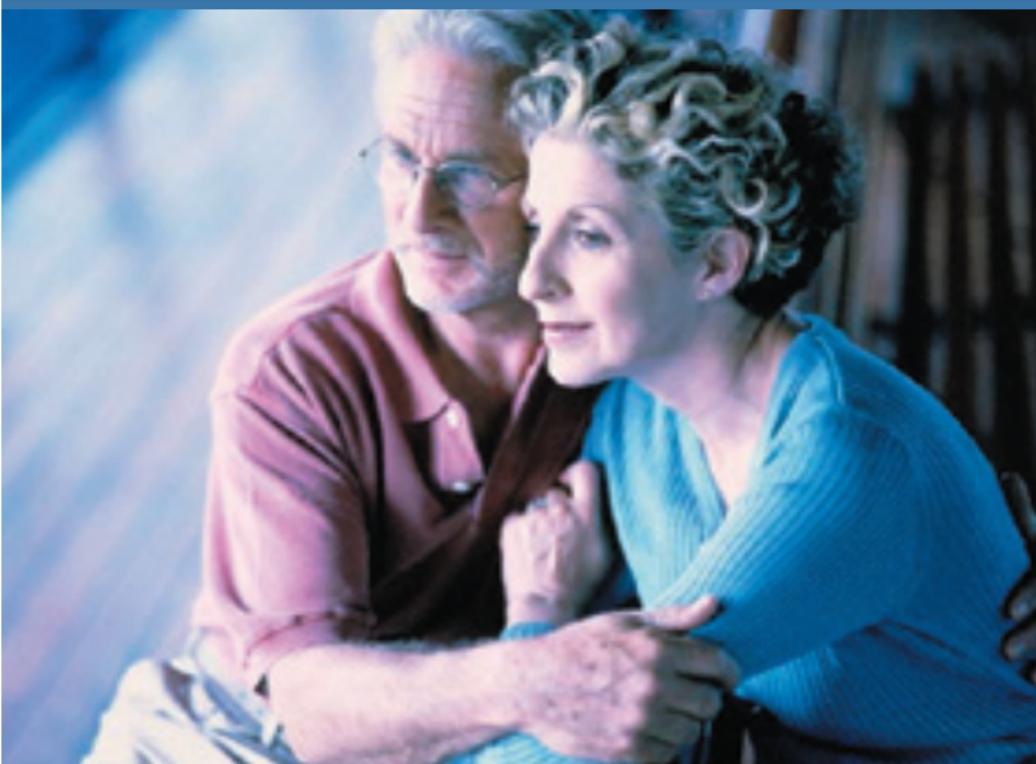


SEIZURES AND FAINTING

Exploring Potential Causes



Do you suffer from recurrent seizures despite treatment?

This overview may help you explore alternative causes with your doctor to find effective treatment.

www.seizuresandfainting.com

RECURRENT SEIZURES

Exploring Potential Causes with Your Doctor



The Uncertainty of Living with Seizures

If you suffer from unexplained, repeated seizures that have not gone away despite taking epilepsy medication, you understand the impact they can have on your life.

The following information may be useful in working with your doctor to help explore options and potential causes. ***Always continue your medications unless advised differently by your doctor.***

Recent Research Explores the Causes of Recurrent Seizures

Diagnosing recurrent seizures can be a challenging and prolonged process for your doctor. Finding the potential causes can require the involvement of several medical specialists, such as neurologists, cardiologists or psychiatrists. In addition, the unpredictable timing of seizures makes it very difficult to pinpoint an exact cause.

Recurrent seizures are the classic symptom of epilepsy, and are frequently termed “epileptic seizures.” In the majority of cases, seizures are caused by abnormal electrical activity in the brain, which can be identified during neurological testing. Fortunately, many epilepsy sufferers are receiving effective and appropriate treatment, allowing them to live full and productive lives.

However, according to The Epilepsy Foundation, one in four patients continues to have seizures despite medical treatment. Recent research* shows that in certain cases, seizure-like episodes are caused by cardiovascular problems. A team of neurologists and cardiologists collaborated to study a group of patients previously diagnosed with epilepsy, but who continued to have seizures despite epilepsy medication. Patients underwent both a cardiovascular and a neurological evaluation, and 40% were found to have cardiovascular causes for their episodes. Their “seizures” were actually ***cardiovascular syncope (sing’-koh’pee)***—fainting spells caused by a reduction in blood flow and oxygen to the brain brought on by episodes of abnormal heart rhythm or blood pressure.

Seizures and Syncope: Similar Symptoms—Different Causes

While epileptic seizures are caused by abnormal electrical activity in the brain, cardiovascular syncope, or fainting, can be the result of an abnormal heart rhythm. When the heart beats irregularly, there can be sudden loss of consciousness and collapse due to lack of blood flow and oxygen to the brain. Sometimes there are seizure-like movements such as convulsions or muscle twitching at the same time. Because seizures and syncope can mimic each other so closely, specific tests are required to confirm one or the other.

Determining with certainty whether the unexplained recurrent episodes are ***epileptic seizures*** or ***cardiovascular syncope*** is only possible with thorough neurological ***and*** cardiovascular evaluations. If your diagnosis remains uncertain, or if you continue to have seizures despite taking epilepsy drugs, a cardiovascular evaluation for syncope may be appropriate for you. ***To determine whether your seizures may be caused by a cardiovascular problem, it is important that you discuss your options with your doctor.***

*See Additional Sources of Information.

Specialists Who Can Help Determine the Causes

Your primary care physician reviews your health care needs and will usually refer you to specialists for certain conditions, such as treatment-resistant recurrent seizures. Neurology and cardiology, two medical specialties frequently involved in the diagnosis and treatment of recurrent seizure-like episodes, offer you the specialists best qualified to evaluate neurological and/or cardiovascular conditions:

	Neurology	Cardiology
Specialist	Neurologist – specializes in disorders of the brain and nervous system	Cardiologist – specializes in diseases of the heart and blood vessels
Subspecialist	Epileptologist – specializes in epilepsy	Electrophysiologist – specializes in abnormal heart rhythms

Tests Available for Cardiovascular Assessment

A number of tests are available to confirm or rule out the presence of heart rhythm problems:

ECG (electrocardiogram)—records the heart’s rhythm and rate for a few minutes.

Holter monitor—measures and records heart rhythm (EKG) over one to three days.

External loop recorder—monitors heart rhythm and rate for up to one month.

Reveal® Insetable Loop Recorder—monitors heart’s rhythm and rate for up to 14 months and may help to determine if seizure-like episodes are heart-rhythm related.

Tilt table—enables the doctor to understand how blood pressure, heart rate and rhythm respond to a change in body position.

Carotid sinus massage—massage of the neck where the carotid artery is located; shows if abnormal heart rhythms occur.

Electrophysiology study (EPS)—attempts to reproduce an abnormal heart rhythm through stimulation of the heart during a special procedure.

Finding Freedom from Seizures — A Success Story



Doris

Doris is a retired schoolteacher who began having seizure-like episodes in 1988 and had an extensive neurological assessment. Although test results were inconclusive, Doris was put on antiepileptic drugs, which did not help control the seizures and caused unpleasant side effects.

Doris’ unpredictable “spells” struck both at home and in public, at hockey games, during Bible class, and while volunteering at the local food shelf. Her family worried all the time because Doris broke her ankle twice and her wrist once, burned her upper forearm, broke a tooth, and sustained numerous bruises during the recurrent episodes. Dependent on her family and friends because she was no longer able to drive, Doris started giving up hope that the “spells” would ever stop.

When Doris’ daughter described one of her mother’s episodes to the neurologist in the spring of 1999, he began to suspect her heart might be the

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Doris (cont.)

cause and referred Doris to an electrophysiologist (heart rhythm specialist) for a cardiovascular assessment. A Reveal[®] Insertable Loop Recorder, a small device inserted just beneath Doris' skin in the upper chest area to continuously monitor her heart rhythm, confirmed that Doris' heart would stop during her episodes, temporarily causing her to faint and exhibit seizure-like movements.

Finally, Doris knew with certainty that her "seizures" were actually "syncope" or fainting—the sudden loss of blood flow to the brain caused by abnormal heart rhythm. The pacemaker Doris received immediately after the diagnosis has maintained a normal heart rhythm and stopped Doris' fainting episodes completely. After 11 years of uncertainty, Doris is grateful to be able to enjoy a full life again: "I live a life free from fainting and drugs. I feel free as a bird."

Abbott Northwestern Hospital, Minneapolis, MN.

Team with Your Doctor to Explore Your Options

Three questions will help you and your doctor determine if you are a candidate for a cardiovascular evaluation:

1. Have you experienced repeated seizure-like episodes over time?
2. Are you getting treatment for your seizures, but the treatment is not helping?
3. Are you or your doctor uncertain you have epilepsy?

If the answers to all three questions is yes, consider asking your doctor for a referral to a cardiologist or electrophysiologist (heart rhythm specialist) to help determine whether your seizure-like episodes might be related to your heart.

Key Information and Questions for the Cardiologist or Electrophysiologist (Heart Rhythm Specialist)

If your doctor refers you to a cardiologist or electrophysiologist, please have your records sent to this specialist before your appointment. You should also be prepared with several pieces of information to make your visit most productive:

1. Your history of seizures, including:
 - How long the episodes have been occurring
 - The approximate number of times you have had episodes over the last 24 months
 - The amount of time between episodes
 - Whether you have suffered any injuries as a result
 - Whether you have suffered continued seizure-like episodes despite medical treatment
 - A description of your seizures by anyone who has witnessed them
2. Other specialists you have seen for your seizures
3. Ask if your seizures could be related to your heart
4. Ask the specialist if you are in need of a cardiovascular evaluation for syncope
5. Ask what tests are going to be performed and for what purpose

Successful Treatments for Cardiovascular Syncope

If a cardiovascular assessment confirms that your recurrent "seizures" are caused by heart problems and that you are experiencing **cardiovascular syncope**, a number of proven treatment options are available. In some cases, heart medication will take care of the problem. In others, pacemaker or defibrillator therapy offers the solution, depending on whether your heart is beating too slow or too fast. And in cases where disturbances of the heart's electrical system are found, a procedure called a cardiac ablation may eliminate the cause of the syncope. Often, these treatments can reduce and even completely eliminate the episodes.

Find Certainty in Knowledge—Explore the Options with your Doctor

Like the patients in this brochure, if you are diagnosed with a cardiovascular cause for your episodes, you may be able to receive successful and effective treatment. Or, if your episodes are not heart-related, you can be referred to another appropriate specialist.

The information in this booklet was prepared to help you work with your doctor to determine if you are a candidate for a cardiovascular evaluation. We sincerely hope that, like Doris and Jack, you may find certainty in knowledge and return to living a full life—seizure-free.

Additional Sources of Information

<p>Study Referenced in Brochure: Misdiagnosis of Epilepsy—Many Seizure-Like Episodes Have a Cardiovascular Cause. A. Zaidi, S. Crampton, P. Clough, B. Scheepers, A. Fitzpatrick. <i>Journal of the American College of Cardiology</i>, July 2000 Volume 36, No. 1 p. 181-4.</p>	<p>www.seizuresandfainting.com</p>	<p>www.efa.org The Epilepsy Foundation</p>	<p>www.aan.com The American Academy of Neurology</p>	<p>Ask your doctor for a referral</p>	<p>www.naspe.org The North American Society of Pacing and Electrophysiology</p>	<p>Call 1-800-880-0875</p>
Additional Medical Research on Seizures or Epilepsy						
Finding a Neurologist or Epileptologist						
Finding a Cardiologist or Electrophysiologist						
Information About Seizures and Fainting and the Reveal® Insertable Loop Recorder						

Finding Freedom from Seizures — A Success Story



Jack

For six years, with the help of numerous doctors, Jack, a financial advisor in his 40s, had been trying to pinpoint the causes of his recurrent seizures. Living in constant fear of another episode had greatly diminished the quality of Jack's life. No longer able to drive or exercise, he also gave up most of his social activities. While he was able to work out of his home, Jack's career suffered along with his personal life, as he became a virtual recluse.

After neurological and cardiovascular testing no answers were found. The neurologist suspected that Jack's seizures were caused by epilepsy and prescribed antiepileptic drugs. But in spite of the drug treatment, Jack continued to have seizures—seven more times in a 12-month period.

(continued)

Jack (cont.)

During a follow-up visit with the cardiologist, Jack was advised to try a new monitoring device, the Reveal® Insertable Loop Recorder, a small heart monitor inserted just under the skin in the upper chest to continuously monitor the heart's rate and rhythm for up to 14 months. The Reveal device recorded heart activity during Jack's next seizure, which was interpreted by the cardiologist and finally led to a firm diagnosis. An abnormal heart rhythm was causing Jack's heart rate to slow down and stop for up to 25 seconds at a time. Unlike epileptic seizures that are caused by abnormal activity in the brain, Jack's cardiovascular syncope, or fainting, was the result of the sudden loss of blood flow to the brain when his heart beat irregularly.

Jack found relief after receiving a dual-chamber pacemaker to maintain a normal heart rhythm. With this therapy his seizure episodes stopped, and he was able to drive again, exercise, and increase his social life. "I have a new lease on life," says Jack. "The pacemaker keeps my heart on an even keel and has made the seizures a thing of the past. I am infinitely grateful for this wonderful technology."

Medtronic data on file

Medtronic is the world's leading medical technology company, providing lifelong solutions for people with chronic disease.

Medtronic Insertable Loop Recorder Disclaimer

INDICATIONS

9525 Reveal®/9526 Reveal® Plus Insertable Loop Recorder

The Reveal/Reveal Plus Insertable Loop Recorder (ILR) is an implantable patient activated monitoring system that records subcutaneous ECG and is indicated for patients who experience transient symptoms that may suggest a cardiac arrhythmia.

9790 Programmer

The Medtronic 9790 Programmers are portable, microprocessor based instruments used to program Medtronic implantable devices.

6190/6191 Activator

The Model 6190/6191 Activator is intended for use in combination with a Medtronic Model 9525 Reveal® and the Model 9526 Reveal Plus Insertable Loop Recorders.

CONTRAINDICATIONS

There are no known contraindications for the implantation of the Reveal Plus ILR. However, the patient's particular medical condition may dictate whether or not a subcutaneous, chronically implanted device can be tolerated.

WARNINGS/PRECAUTIONS

9525 Reveal/9526 Reveal Plus Insertable Loop Recorder

Patients with the Reveal/Reveal Plus ILR should avoid sources of magnetic resonance imaging, diathermy, high sources of radiation, electrosurgical cautery, external defibrillation, lithotripsy, and radiofrequency ablation to avoid electrical reset of the device, and/or inappropriate sensing.

6190/6191 Activator

Operation of the Model 6190/6191 Activator near sources of electromagnetic interference, such as cellular phones, computer monitors, etc., may adversely affect the performance of this device.

See the appropriate technical manual for detailed information regarding indications, contraindications, warnings, and precautions.

Caution: Federal law (U.S.A.) restricts this device to sale by or on the order of a physician.



Medtronic

When Life Depends on Medical Technology

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