

# CUSHING NEUROSCIENCE INSTITUTE NEWS



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## Specialized Epilepsy Care for Women

**M**ore than one million women and girls in the US have a seizure disorder. Although epilepsy symptoms are similar for men and women, there are special considerations physicians must take into account when treating women. “Women’s monthly menstrual cycles and pregnancy are concerns that need to be properly managed and addressed to protect the woman and, during pregnancy, the fetus,” said Cynthia Harden, MD, chief of the Division of Epilepsy and Electroencephalography at Long Island Jewish (LIJ) Medical Center.

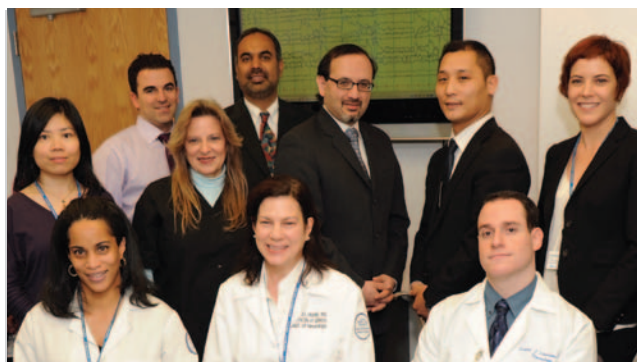
### ADDRESSING HORMONAL CHANGES

Hormones in the body impact brain activity. “Many women with epilepsy experience an increase in the occurrence of seizures right before their periods,” Dr. Harden said. Why? The hormone progesterone has an antiseizure effect on the brain, but levels of the chemical decrease before menstruation, making women more vulnerable to seizures, Dr. Harden explained.

Oftentimes, doctors will ask their patients to keep a record of when they experience seizures to determine if there is a connection between seizures and women’s monthly fluctuations in hormones. From there, doctors may adjust or add medications during those times to help prevent seizures.

### PLANNING FOR SAFE AND SUCCESSFUL PREGNANCIES

“It’s absolutely possible for women with epilepsy to become pregnant and deliver healthy babies,” Dr. Harden said. A woman with epilepsy can set herself up for a successful pregnancy by discussing her plans to become pregnant with her doctor. “Then, working together, we will find the lowest doses of medications that she can take while keeping seizures under control,” Dr. Harden said. This will minimize



**Our team of specialists help patients understand their disease, empowering everyone who walks through our doors to make informed decisions about treatment.**

the chance that a woman will have a seizure during pregnancy while exposing the fetus to the least amount of medication possible.

At North Shore-LIJ, Dr. Harden’s current research focuses on fertility in women with epilepsy. “Studies have found that women with epilepsy have lower rates of pregnancy than other women, and we’re hoping to find out why,” she said. She is currently conducting several other studies related to pregnancy and women with epilepsy thanks, in part, to the help of Connie Lau, MS, CCRC, the certified clinical research coordinator at the North Shore-LIJ Comprehensive Epilepsy Care Institute. “Connie plays a critical role in making sure these studies run smoothly, from keeping track of all documentation for the studies to managing data and information on the research participants,” Dr. Harden said. Their hope is that the research they conduct today will improve the lives of women with epilepsy in the future.

### Are you a woman with epilepsy who’s considering pregnancy?

You may be eligible to participate in a research study on fertility in women with epilepsy. For information, contact Connie Lau, MS, CCRC, research coordinator, at **718-470-7074** or [clau@nshs.edu](mailto:clau@nshs.edu).

# Advanced Treatments Help Patients with Severe Epilepsy

**F**lushing resident Ruben Serrano's seizures began at age 6 months.

For a while, medications controlled them. But after puberty, he had them every three weeks despite high doses of three anti-epileptic drugs.

"The scary part about it was I never knew when they were coming," Mr. Serrano said. "I would just pass out."

Last year, at age 21, Mr. Serrano had a two-stage brain surgery at the North Shore-LIJ Comprehensive Epilepsy Care Institute. He's been seizure-free ever since. He and his family credit the advanced care he received with turning his life around.

## MEDICATIONS: THE FIRST LINE OF TREATMENT

Sean Hwang, MD, assistant professor of neurology at the Institute, is the neurologist who coordinated Mr. Serrano's care. "When I first met Dr. Hwang, I knew he was a good doctor," Mr. Serrano said. "He explained the treatment process clearly to my whole family."

According to Dr. Hwang, Mr. Serrano's situation wasn't that unusual. "Medication works in approximately two-thirds of patients to control their seizures," he said. Medication may fail in the other one-third of patients because of factors like genetics or drug side effects, which are worse in certain people.

## SURGERY: HELP FOR ADVANCED CASES

Testing revealed Mr. Serrano's seizures took place in the right frontal part of his brain. To avoid damaging healthy brain tissue



Ruben Serrano no longer has seizures after undergoing brain surgery at the North Shore-LIJ Comprehensive Epilepsy Care Institute.

during his first surgery, the surgeons used intracranial video electroencephalography (EEG) monitoring to help further pinpoint the trouble spot.

"Video EEG technology records very small electrical signals from brain surfaces projected to electrodes that are placed in areas where we suspect the seizures originate," Dr. Hwang said. "The video portion helps us align brain activity and seizure symptoms." The electrodes were also used to stimulate Mr. Serrano's brain with electrical signals in order to test for functional areas of his brain that needed to be preserved. During the second surgery, the surgeons removed the electrodes — and the exact part of his brain causing the seizures.

"Ruben has done extremely well with regard to his seizure control and did not suffer any ill effects from the surgery itself," Dr. Hwang said. "He is currently slowly reducing the amount of medications he is taking."

Now, Ruben goes to Long Island by himself every day for a job-training program — something he couldn't have done before the operations. And he has a message for other patients who may need an operation to control their severe seizures: "Your life will be much better after the surgery."

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**For information on epilepsy** or to make an appointment with an epileptologist, a neurologist who specializes in epilepsy, call the North Shore-LIJ Comprehensive Epilepsy Care Institute at **718-470-7310** or e-mail us at [neuro@nshs.edu](mailto:neuro@nshs.edu).

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## Getting a Better Picture of the Brain

**I**f surgeons are going to get inside your head, you want them to have every bit of information they can gather about your brain. Electrocorticography, or ECoG — a recording of the brain's electrical activity directly from the brain rather than from the scalp — can help.

## MAPPING THE BRAIN BEFORE EPILEPSY SURGERY

ECoG is an option only for patients who are candidates for epilepsy surgery. "ECoG

uses electrodes placed on the brain surface after a craniotomy, or the surgical opening of the skull," explained Sanjay Jain, MD, a neurologist at the Comprehensive Epilepsy Care Institute.

"Our goal is to pinpoint where seizures begin so we can remove the least amount of tissue while reducing or stopping seizures altogether," said Sean Hwang, MD, also an attending neurologist at the Institute.

## FOCUSED TESTING, ENHANCED OUTCOMES

ECoG is an enhanced and more accurate electroencephalography (EEG). A typical EEG study uses disk electrodes placed on the scalp to record brain signals. "But scalp EEG recordings can also pick up electrical artifacts [signals not coming from the brain but that contaminate the EEG recording] and may not be able to record from deeper brain structures where seizures can arise,"

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# Epilepsy Surgery Stops Uncontrolled Seizures

Christine Lobo had suffered from epilepsy since age 4, but it wasn't until college that the disease began taking over her life. "They kept changing my pills, but the medications weren't controlling my seizures," she said. "I was having seizures four or five times a week, and I never knew when it would happen."

Eventually, Ms. Lobo's search for a solution brought her to Ashesh Mehta, MD, PhD, director of epilepsy surgery at the Comprehensive Epilepsy Care Institute at Long Island Jewish (LIJ) Medical Center. Dr. Mehta recommended surgical removal of the focus — the area of the brain where her seizures originated. "My parents were afraid that something could go wrong. But I was old enough to make my own choice, and I decided to have the surgery," Ms. Lobo said. "I had confidence that everything would turn out well."

Her confidence proved to be well placed. Almost a year after her surgery, Ms. Lobo, 23, is still seizure-free. She's taking classes at LaGuardia Community College and looking forward to the kind of life that seemed out of reach before. "I mostly want to do what everyone else does," she said. "I would like to have my own place. And I would like to get a driver's license so I can go wherever I want to go."

## GOAL: SEIZURE-FREE

A positive outcome is the rule rather than the exception among Dr. Mehta's patients. "About 90 percent of our patients have either no seizures or rare seizures after epilepsy surgery," Dr. Mehta said.

Yet brain surgery is usually not a first-choice treatment. It's reserved for patients who, like Ms. Lobo, don't respond to medications. "In up to a third of epilepsy patients, the seizures are not controlled with medications alone," Dr. Mehta said. Even among this group, however, not all turn out to be good candidates for surgery. "We won't undertake the surgery unless we think we have a good chance of making the patient seizure-free," he said.

To achieve this objective, "we need to reliably locate a brain area called a seizure focus that is causing seizures to start," Dr. Mehta said. "Just as important, we need to be able to remove it without harming any functional brain areas in the process." Sometimes an electroencephalography (EEG) and magnetic resonance imaging (MRI) scan can pinpoint where the seizures are coming from and where brain areas important for function are located, but often further testing is needed.

## WHAT'S A WADA?

A Wada test is a procedure in which one side of the brain and then the other is put to sleep for a short time. It's used to determine which half of the brain controls language. It also shows whether memory function is found on the right side, left side or both.

Before the test, interventional neurologist Jeffrey Katz, MD, performs an angiogram to look at blood flow in the brain and check for any obstructions. Dr. Katz inserts a catheter into the leg and threads it up through the body and into one of two carotid arteries — large vessels on either side of the neck that supply blood to the brain. Then he injects a dye that can be seen on X-ray. "There is a risk of having a stroke during the angiogram, but it's very small — less than one in 200," Dr. Katz said.

Next Dr. Katz injects an anesthetic medication into the same catheter. If the medication is injected into the left carotid, it puts the left side of the brain to sleep. The patient remains awake and able to interact, however. During this process, neurologist Sanjay Jain, MD, monitors the brain electrical activity with an EEG to confirm that one side of the brain is asleep.

The anesthetic starts wearing off in just two minutes. During this brief window of time, clinical neuropsychologist Sarah Schaffer, PhD, tests language function by asking the patient to repeat words and phrases, follow simple commands and name familiar objects and pictures. "I tell the patient, 'If you can't name it, don't worry. Just look at it and remember it,'" Dr. Schaffer said. Once the anesthetic has fully worn off, she tests memory by seeing whether the patient does, in fact, remember these things. Finally, Dr. Katz moves the catheter to the opposite carotid, and the process is repeated on the other side.

For Ms. Lobo, having a Wada test was a relatively low-key experience. She said, "I felt a sting when the needle first went in, but it wasn't bad."

## MAPPING THE BRAIN

Sometimes, the Wada test shows that the side of the brain with the focus has neither language nor good memory function. However, if that isn't the case, or if the seizure focus isn't clearly defined, an additional step may be needed.

"In this situation, we do a diagnostic surgery first to implant electrodes in the brain," Dr. Mehta said. "Typically, about 100 to 150 electrodes are placed." The electrodes are connected to an EEG monitor so that, when a seizure occurs, the EEG shows exactly



**Christine Lobo looks forward to the future now that she is seizure-free.**

where it's coming from. To reliably pinpoint the focus, it's essential to have data from four or five seizures, which often takes one to two weeks.

While the electrodes are in place, they can also be used to map language more precisely. As the electrodes are stimulated two at a time, Dr. Schaffer tests language function. "If all of a sudden the person is unable to name a picture, we know it is sitting on top of an important language area," Dr. Schaffer said. "Once we see exactly where language is and exactly where the seizures are, the hope is that they're not overlapping."

For Ms. Lobo, the week and a half she spent with implanted electrodes was the most challenging part of the process. "When people came to see me, they would ask, 'What's that connected to your head?'" Ms. Lobo said. "By the last few days, the bandages were getting uncomfortable, too." Yet this was a crucial period in her treatment. Her neurologist, Sean Hwang, MD, was able to determine where her seizures were located from the data the electrodes recorded about her brain.

### STOPPING THE SEIZURES

Last but not least is the surgery to remove the seizure focus. Armed with a map of the patient's brain down to the centimeter, "I basically cut on the dotted line," Dr. Mehta said. "Patients are generally back to themselves within one to three months after the procedure."

Any brain surgery has risks, including bleeding, stroke and hematoma. "Even implanting the electrodes can cause brain swelling," Dr. Mehta said. But these risks need to be balanced against the risks of allowing uncontrolled seizures to continue unabated. There's actually a one percent risk of sudden death per year in people with very severe epilepsy," Dr. Mehta said.

Ms. Lobo was surprised by how fast and easy her recovery was. "I woke up, and I felt like nothing had happened. It was the most amazing thing," she said. "I was able to move and talk right away. I never had any pain." For two weeks after surgery, she slept and relaxed. But after that, she began getting back to her normal life. "I started going to movies, watching games, hanging out with my friends" — all the things she used to do, minus the seizures.

Today Ms. Lobo is more convinced than ever that epilepsy surgery was the right choice for her. "There's really nothing to be afraid of," she said. "You just need to have faith in yourself and your doctor."

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### Wondering if you are a candidate for epilepsy surgery?

To make an appointment, please call the North Shore-LIJ Comprehensive Epilepsy Care Institute at **718-470-7310** or e-mail us at [neuro@nshs.edu](mailto:neuro@nshs.edu).



## Brain Tests Determine Epilepsy's Source

**B**rain scans and electroencephalograms (EEGs) can tell doctors what's going on inside your head. But they don't reveal how brain patterns affect your actions. For that, experts turn to neuropsychological testing. "These tests are at the intersection of neurology and psychology, based on what we know about brain-behavior relationships," said Sarah Schaffer, PhD, a neuropsychologist at the North Shore-LIJ Comprehensive Epilepsy Care Institute.

### UNDERSTANDING THE BRAIN

A neuropsychological evaluation determines how the brain functions with language, memory and other tasks. "Two types of epilepsy patients usually get this evaluation: Those having cognitive problems and those considering surgery," Dr. Schaffer said.

During a six- to eight-hour session, presurgical patients might:

- memorize words or repeat numbers;
- build with blocks; or
- describe what they see in pictures.

Trouble completing a task can signal which part of the brain isn't working properly. For instance, memory problems might mean the temporal lobe — a common site for seizures — is compromised. This may be due to an injury that resulted in permanent damage or the impact of seizure activity.

### PINPOINTING THE PROBLEM

Epilepsy often goes hand in hand with memory loss and trouble paying attention. Depression is also common. The neuropsychological evaluation can help doctors tease out whether these problems are caused by damaged brain tissue or by another factor, such as mood problems or medication side effects.

Neuropsychological testing also helps when done before epilepsy surgery. Combining the results with data from EEG and brain imaging ensures surgeons operate on only the area of the brain where seizures begin and don't harm healthy tissue.

"Once we know what's going on, we can figure out what to do about it and how to improve a patient's quality of life," Dr. Schaffer said.

# Brain Signal Research Helps Doctors Better Understand the Brain

Physicians at the Comprehensive Epilepsy Care Institute get to know a patient's brain well before epilepsy surgery. "We observe the brain's electrical activity for days so that we can target the part giving rise to seizures. This way we have a greater chance of success — no seizures and no complications," said Sanjay Jain, MD.

## WATCHING THE BRAIN SPEAK TO ITSELF

To observe the brain's internal dialogue, physicians measure electrical signals in a procedure called electrocorticography (ECoG), which records brain activity from small electrodes placed on the brain's surface through surgery. New research is being developed at North Shore-LIJ to use functional magnetic resonance imaging (fMRI) to observe this dialogue noninvasively.

Care for people with epilepsy has advanced significantly over the past decades. Through research being conducted at the Cushing Neuroscience Institutes, physicians have a greater understanding of how to identify where seizures start and how they spread.

"The immediate application is for our patients with epilepsy, but the knowledge gained may be useful in providing a broader understanding of how different regions of the brain are connected and communicate with each other. Simply put, we are getting to know a little bit better how the brain works," Dr. Jain said.

## AT THE FOREFRONT OF SCIENTIFIC RESEARCH

Every brain is different, explained Ashesh Mehta, MD, PhD, a neurosurgeon and director of epilepsy surgery at the Institute. "Some brain functions may be located in similar regions, but each of our brains is unique," he said.

Dr. Mehta and his team are observing how electrical signals dart around the brain under stimulation. "We're looking at how the brain

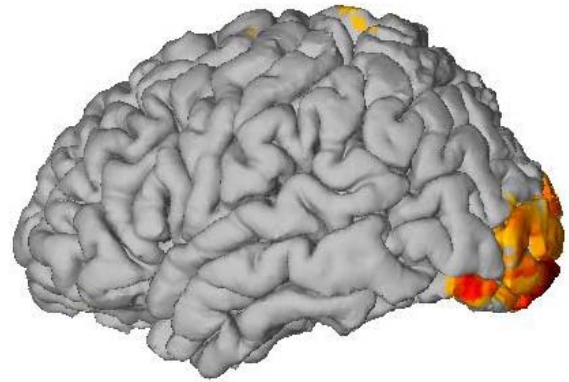


Photo of the brain showing the seizure areas talking to each other. The colored areas are the spots that are participating in the "conversation."

speaks to itself," he said. "It's the communication between different areas of the brain that we're seeking to understand."

This communication is responsible for both normal brain function and the spread of seizures. "By tracking down the path of electrical activity, we aim to disrupt those pathways that cause seizures to spread and to preserve the pathways that are important for normal brain functions, such as language and movement," Dr. Mehta said.

Study data has been collected for about four years. Dr. Mehta and his team have already presented findings to various scientific organizations, including the Society for Neuroscience. They expect to publish the bulk of their findings in June 2011.

"This research really goes beyond curiosity," Dr. Mehta said. "The way we're looking at communication in the brain has the potential to be revolutionary in our understanding of the brain."

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**For information on current research at the Comprehensive Epilepsy Care Institute** call **718-470-7310** or send an e-mail to **neuro@nshs.edu**.

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### Getting a Better Picture of the Brain

Dr. Hwang said. Because it is internal and closer to the source of brain signals, "ECoG is a more focused technique."

At the Institute, specialists determine where to place electrodes long before a patient reaches the operating room. They

make their decisions based on clinical, EEG, positron emission tomography (PET) and magnetic resonance imaging (MRI) results.

"We are one of the only centers in the region that can assemble this kind of expert team of neurologists, neurosurgeons and

neuropsychologists to help successfully treat individuals with epilepsy when they feel they are not able to achieve satisfactory control despite the use of multiple medications at optimal dosages," concluded Dr. Jain.

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# When to Seek Emergency Care for Epilepsy

For people with epilepsy, knowing when to seek emergency care is a common concern. The Comprehensive Epilepsy Care Institute at the North Shore-LIJ Health System has the expertise to handle emergencies and follow-up care.

## IS IT AN EMERGENCY?

When a person with epilepsy has a seizure, there may be warning signs. These include, but are not limited to, a strange smell or taste, a feeling of déjà vu, nausea, numbness or light-headedness. But warning signs and a seizure alone are not enough to warrant a trip to the Emergency Department (ED).

If you've been diagnosed with epilepsy, go to the ED if you experience:

- any seizure that lasts longer than four to five minutes;
- more than two seizures within one hour;
- any severe adverse reaction to epilepsy medication; or
- new symptoms unlike previous seizures.

Call 911 or have a family member or friend drive you to the ED — do not drive yourself. “We advise our patients to call our practice at the same time as the ambulance,” said Scott Stevens, MD, a neurologist specializing in epilepsy at the North Shore-LIJ Health System’s Cushing Neuroscience Institutes. “We’re always on call and can guide emergency care.”

## EVALUATION AND FOLLOW-UP

A neurologist who specializes in epilepsy at The Comprehensive Epilepsy Care Institute is on call 24 hours a day, seven days a week for emergencies. Technicians are available during the week and on weekends to conduct tests on patients brought to the ED.

Appropriate follow-up care after having a seizure is important. Some patients require weekly visits while others just need an annual follow-up visit. Most patients see their doctor every few months for medication management and laboratory tests.

Doctors at the Epilepsy Institute can help you find the most effective medication with the fewest side effects for the best quality of life. Imaging tests, including computed tomography scan, magnetic resonance imaging and electroencephalogram, are used in conjunction with your history and physical examination to determine whether you have a seizure disorder, the type of disorder and what medication might work best. Sometimes surgery is the best choice, and the doctors at the Epilepsy Institute can guide you through the surgical workup.

## PATIENT-CENTERED CARE

At the Epilepsy Institute, patients are an integral part of the decision-making process. Doctors spend a full hour with new patients and 30 minutes at each follow-up visit.

The staff includes four neurologists trained in epilepsy, an epilepsy-trained surgeon and a social worker to educate patients and direct them to support groups.

“When patients understand their condition, we get better compliance and fewer ED visits,” said Dr. Stevens. “Our goal is to help patients live their best lives possible.”

**For information about North Shore-LIJ’s Comprehensive Epilepsy Care Institute, call 718-470-7310, e-mail us at [neuro@nshs.edu](mailto:neuro@nshs.edu) or visit us on the web at [northshorelij.com/neurosciences](http://northshorelij.com/neurosciences).**