

Introduction

Seizures or epilepsy is an abnormal brain activity that results in movements that a person cannot control. Such uncontrolled movements may lead to injury. The seizures may also cause a person to become unconscious.

Doctors may sometimes recommend surgery to prevent or reduce epileptic seizures. If your doctor recommends surgery, the decision whether or not to have surgery is yours.

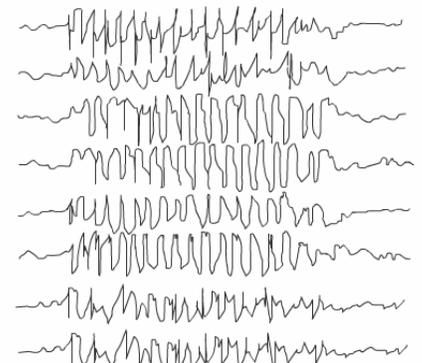
This reference summary will help you understand the benefits and risks of this surgery.



Anatomy

The brain is the control center of the body. Directions on how to move and function go from the brain to muscles and other body parts through the nerves.

A brain wave test, or EEG, shows brain activity. This is an EEG chart. The electrical activity of the brain shown by brain waves may indicate which parts of the brain are most active at a certain time. Direct stimulation experiments as well as studies from patients with strokes have helped determine that different parts of the brain control different functions, such as seeing or speaking.



EEG Chart

The brain has two parts, or hemispheres. A left hemisphere and a right hemisphere. The right and left hemispheres do not have exactly the same functions. Some parts of the brain have important functions, such as moving, seeing, and speaking. Other parts are called “silent” and do not have very important functions.

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Symptoms and Their Causes

The involuntary movement and shaking that comes with an epileptic seizure may last for a short or long period. The seizures may come often or only once in a while.

Some seizures may make it seem as though there are funny smells or strange sensations. A severe seizure may cause unconsciousness.

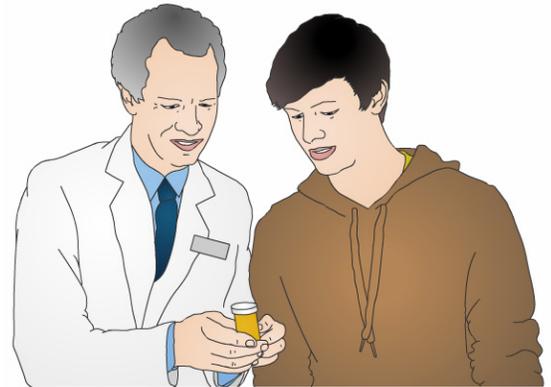
Children who have frequent seizures may find it hard to learn new things.

Adults with frequent and/or severe seizures may be unable to drive or work.

During a seizure, abnormal activity shows up on the EEG. The abnormal brain activity that causes a seizure may come from one or several parts of the brain.

Alternative Treatments

Most patients with epilepsy can be treated successfully with a combination of medications. However, some patients still have seizures, often interfering with their learning, work, and lifestyle. In this case, patients can explore surgical treatment with a surgeon.



The doctor will recommend surgery after careful monitoring, and only if several conditions are met.

One such condition is the ability to locate the source of the seizures to one area of the brain. That area should be a silent area, so it can be removed without affecting the patient's speech, vision, movements, or sensations.

Before surgery is recommended, several monitoring procedures are performed to locate the source of the abnormal brain activity.

Surgical Treatment

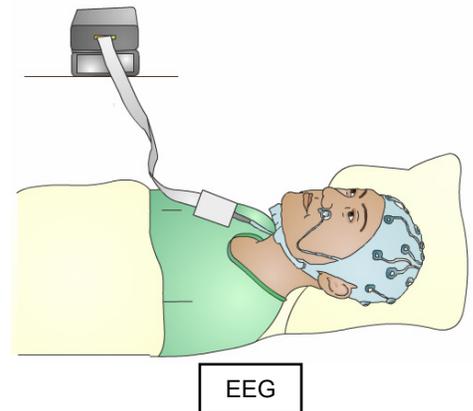
To locate the source of the seizure, the doctor records brain activity using EEG. Leads from a recording machine are attached to the patient's head. Sometimes, additional leads are attached through the nose under the brain.

The patient may reduce or stop medication at this time to make a seizure more likely to happen during recording.

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The patient's movements are recorded on video. When a seizure occurs, it is possible to look at the brain wave pattern for that moment. This EEG will help locate the general area of the source of the seizure.

In rare cases, the next step is to monitor the brain waves from the surface or the inside of the brain to determine where the seizure focus is. This requires surgery. One technique involves placing a grid or strip of leads over the brain. Another technique involves placing a strip of leads in the brain itself, called "depth electrodes." After this monitoring, your surgeon will decide whether or not an operation to remove the focus of seizures may be helpful in treating the seizures.



There may be several areas of the brain involved in making the seizures. The seizures may come from an area with an important function, such as speech. This situation makes surgery difficult without damaging the function. The doctor may not recommend surgery if this is the case.

If the source of the seizures is a silent area of the brain, the surgery may be recommended. Depending on the location of the seizure focus, the operation to remove it may be done under general or local anesthesia. Either anesthesia will keep the patient from experiencing severe pain. Local anesthesia allows the patient to stay awake and to respond to questions from the doctor.



The hair in the proposed area of the head is usually clipped. A skin incision is made. Holes are made in the skull and a piece of bone is taken out. During the focus resection operation, the part of the brain responsible for the seizure is removed.

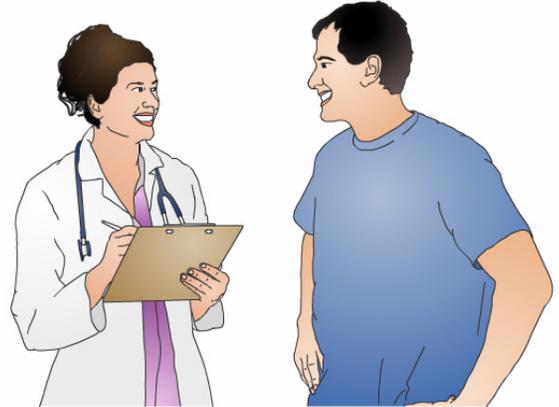
When local anesthesia is used, the doctor can ask the patient to speak or to move. The doctor can then tell what areas of the brain are involved in those activities and will avoid them during surgery.

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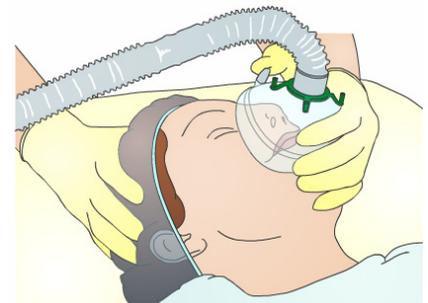
All leads are removed after surgery. In both cases, if a piece of skull is removed at the beginning of the operation it is replaced at the end of the surgery and the skin is closed. In the electrode placement operation, the electrodes are tunneled to the outside and connected to the monitoring devices.

Risks and Complications

The operations involved in seizure surgery are relatively safe. These include the initial placement of the leads or electrodes and the focus resection. There are, however, several possible risks and complications. You need to know about them just in case they happen. By being informed, you may be able to help your doctor detect complications early.



The risks and complications include those related to anesthesia, and those related to any type of surgery. Risks of general anesthesia include nausea, vomiting, urinary retention, cut lips, chipped teeth, sore throat, and headache. More serious risks of general anesthesia include heart attack, stroke, and pneumonia. Your anesthesiologist will discuss these risks with you and ask you if you are allergic to certain medications.



Blood clots in the legs can occur due to inactivity during and after the surgery. These usually show up a few days after surgery. They cause the leg to swell and hurt. Blood clots can become dislodged from the leg and go to the lungs, where they will cause shortness of breath, chest pain and possibly death. It is extremely important to let your doctors know if any of these symptoms occur. Sometimes the shortness of breath can happen without warning. Getting out of bed shortly after surgery may help decrease the risk of blood clots in the legs.

Some of the risks are seen in any type of surgery. These include:

1. Infection, deep in the brain or at the skin level.
2. Bleeding.
3. Scar that may be painful or ugly.

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Other risks and complications are related specifically to this surgery. These are also unlikely; however, it is important to know about them. There are risks that are typical of brain operations. These risks include, but are not limited to, stroke, paralysis, weakness, inability to understand or speak, blindness, personality changes, seizures, and death.

There is also the possibility of bleeding. This can happen in the operating room or after the operation. This may require another operation to remove a blood clot. A blood transfusion may be necessary.

Infections may also occur. They can be limited to the skin only, or they can be in the bone of the skull. The infection can also involve the brain itself, requiring long-term antibiotics and possibly another operation.

There is also a possibility that the surgery may not help with seizure control, and may, rarely, make it worse.

In summary, the risks and complications of brain surgery are possible, but not common.

After the Surgery

After the surgery you will probably spend a day or two in the intensive care unit (or ICU), depending on how well you are doing. The nurses in the intensive care will watch you carefully. This involves the repeated checking of your neurological status, as well as close watch over your heart rate and blood pressure. You will be repeatedly asked to move your arms and legs. You will also be asked lots of questions to determine whether you are confused.

You will probably continue to take some seizure medication after the operation. After careful consultation with your doctor, you may reduce seizure medication over time. The full results of the surgery may not be known until months or even years after the surgery.

Your doctor will tell you how long it will take before you are healed, and when you can go back to your usual activities. This depends on your age, type of work, and medical condition.



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Summary

Surgery to treat seizures can reduce or prevent seizures and a variety of serious symptoms. Such surgery is recommended only after close monitoring by the doctor. Some of these monitoring tests involve surgeries.

The surgical procedures for monitoring seizures and the surgical treatment of seizures are relatively safe. However, as you have learned, complications may still happen. Knowing about them will help you detect them early if they happen.



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