



PERSPECTIVE

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Brain Stimulation in Thalamotomy for Essential Tremor

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Description

A thalamotomy is a surgical treatment where a hole is formed in the thalamus to enhance a patient's general brain function. It was first developed in the 1950s and works well for tremors like those caused by Parkinson's disease. A part of the thalamus is surgically removed (ablated). The thalamus is precisely located by neurosurgeons using sophisticated tools, and they often operate only on one side (the side opposite that of the worst tremors). Due to increased difficulties and risk, including visual and speech issues, bilateral operations are poorly accepted. Tremors immediately benefit from the improvements. Other less harmful methods, such as subthalamic deep brain stimulation, which can similarly reduce tremors and other PD symptoms, are occasionally favoured.

Surgical techniques

There are two ways to execute thalamotomy: invasively or not. In an invasive procedure, a neurosurgeon fixes a frame on the patient's head with four pins to keep it steady while stereotactic technology pinpoints the precise area of the brain that requires treatment before the operation. The doctor will then perform a thorough brain scan with Computed Tomography (CT scan) or Magnetic Resonance Imaging (MRI) to determine the exact site for surgery and the route the surgeon will travel through the patient's brain to get there. The patient is awake throughout the procedure, although an anaesthetic is used to numb the area of the scalp where the surgical tools are introduced. A small hole is drilled in the skull, and the surgeon inserts a hollow probe through it to the desired place after making a 2 inch long incision in the scalp. The targeted brain tissue can be removed, liquid nitrogen can be circulated inside the probe to kill brain

cells, or an electrode heated at a temperature of about 200°F (93°C) can be inserted to denature the cells. Even though the hospital stay after the procedure is often only two days, a full recovery normally takes six weeks. Ultrasound waves can be used to accomplish thalamotomy without making an incision. The thalamus is the target of the concentrated ultrasonic waves, which results in thalamotomy through an unbroken skull. The thalamus is located during this surgery with MRI assistance. The tissue is gradually warmed up by the ultrasound waves until ablation happens, which is clinically evident as tremor relief. Patient is awake during the process. Thus, the area of the thalamus that is treated can be changed prior to ablation if any negative consequences are noticed. Positive outcomes have so far been noted in patients with Parkinson's Disease (PD) with essential tremors.

Complications

In Cuban trials, some patients experienced severe involuntary movements as a result of the procedure; however, after three to six months, the symptoms subsided (to the point where patients could bear them). The most frequent side effects are a chance of having a stroke, disorientation, and speech or vision issues. Even though unilateral subthalamotomy carries some dangers, dual subthalamotomy significantly increases those risks.

Indications

Neurosurgeons with specialised training perform the complicated thalamotomy technique. It is usually used to treat stroke, damage to the third ventricle of the brain, brain haemorrhage, head injuries caused by accidents, thalamic edoema, subdural haemorrhage, and cerebrovascular accidents. Additional data relates to thalamocortical dysrhythmia.

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