Implanted Brain Monitoring Device

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Technology description

Dr. Theodore Schwartz has an active research program directed to applying advanced imaging techniques to neurosurgery. He is a neurosurgeon with an active practice at the Weill Cornell Medical College and is an expert in use of implanted grids of electrodes used in brain monitoring (See his chapter, "Subdural grid placement," in the 2002 textbook, Fundamentals of Operative Techniques in Neurosurgery).

Implanted electrode grids are used in surgical planning in the subset of drug-resistant epileptic patients who cannot be treated, or are treated with great risk, because the brain tissue that is the source of the seizures cannot be accurately located using non-invasive imaging techniques.

However, even these implanted grids often leave the treatment team with insufficient information to proceed, as their resolution is not high, and because they provide information only regarding brain electrical activity. There is currently an unmet medical need for improved implantable grids for the localization of epileptogenic foci.

Dr. Schwartz and his team have designed a subdurally implantable device that addresses the issues discussed above and have the resources and lab facilities for initial animal testing. The devices potential for high spatio-temporal resolution would allow the accurate localization of neocortical epileptic foci. The device should also allow better monitoring to detect and prevent complications following hemorrhagic stroke and traumatic brain injury.

The invention: A thin pad or rod that is implanted in the brain and can measure key parameters using electrodes and optical components.

Planning brain surgery (for epilepsy or following traumatic brain injury (TBI), for example)

Determining if a patient needs brain surgery (stroke patients and patients with TBI who may need part of their skull removed to relieve pressure)

Providing feedback for closed-loop control of neurostimulation devices (used in Parkinsons, TBI, and under consideration for several other indications).

For surgical planning and monitoring, there are about 100,000 patients per year who could benefit from an improved device. Current implanted grids cost approximately $500-$1000. The annual US market potential is therefore ~ $50-100 million.

The neurostimulation market is estimated to reach about $1 billion by 2009.

Institution

Cornell University

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