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Robotic system gives surgeons 'GPS' for the brain



Steve Dorfman - Palm Beach Post Staff Writer
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Neurosurgeon Dr. Badih Adada, director of Cleveland Clinic Florida's Neurological Institute, stands beside the facility's new ROSA Brain robotic surgery system, which allows doctors to perform minimally invasive brain surgery on those with epilepsy, Parkinson's, essential tremors and other neurological disorders. CONTRIBUTED

The words "minimally invasive brain surgery" might sound like a contradiction in terms.

But thanks to advancements in robotics, they're not — and that's potentially life-altering news for folks who suffer from certain neurological disorders.

Epilepsy.

Parkinson's.



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Some brain tumors.

They, and other conditions, are all now potentially treatable — perhaps even solvable — thanks to the ROSA Brain robotic surgery system, said neurosurgeon Dr. Badih Adada, director of Cleveland Clinic Florida’s Neurological Institute (the first facility in our area to acquire the pricey device).

Treating epilepsy

PUBLICITÉ



“For people who suffer from recurring epileptic seizures that can’t be controlled with medication, this gives us a more effective option than we’ve ever had,” Adada said.

According to the U.S. Centers for Disease Control and Prevention, around 3 million Americans have “active epilepsy” — meaning they either take medication to try to control it, or have had a seizure in the past year, or both.

Epilepsy can be caused by stroke, traumatic brain injury, tumor and/or nervous system infection — but often the cause is unknown.

“Around 20 percent of people with epilepsy don’t respond to medication,” explained Adada.

And for those folks, seizures can be a daily threat.

Conventional brain surgery for epilepsy — which necessitates a craniotomy — is highly invasive and often limited in its efficacy.

When doing an epilepsy procedure, doctors first have to “electrically monitor” the patient’s brain to determine the origin point(s) of the seizures.

They do this by strategically placing wires in areas of the brain assumed to be responsible for causing the seizures. Epileptic seizures result from excessive electrical discharges in a group of brain cells and may occur in different parts of the brain.

“With our previous method, there was a limited portion of the brain we could explore,” Adada said. “The ROSA enables us to be far more precise and cover more of the brain’s surface — as well as both hemispheres. It’s like the difference between a two-dimensional and three-dimensional object for the surgeon.”

The ROSA, designed to mimic a human arm, enables surgeons to use microscopically thin instruments, increasing the accuracy in locating and resolving recurrent seizures. The device gives surgeons the ability to perform “stereo-electroencephalography” — that is, the installation of electrodes in the brain to monitor its electronic activity and determine the spot where the seizures originate.

The ROSA also provides other benefits for patients and surgeons, said Adada, including:

- Increased safety when placing the electrodes
- Less bleeding and post-operative pain
- Shorter time on the operating table

Treating Parkinson’s

Another use for the ROSA is to treat certain Parkinson's symptoms — trembling, stiffness and akinesia (slowness in beginning and coordinating movements) — via deep-brain stimulation (DBS).

"The ROSA lets us precisely implant two electrodes into a specific area of the brain — then link those electrodes up to a neurostimulator," explained Adada.

The electrical impulses emitted from the neurostimulator are supposed to interrupt the messaging that is causing the worst of the motor symptoms.

"For Parkinson's patients who don't respond to medication for their symptoms, this procedure has proven remarkably effective," he said.

Adada noted that DBS procedures with the ROSA also can help those who suffer from essential tremors and general dystonia (intense, involuntary muscle contractions).

He also stressed that any procedures Cleveland Clinic Florida does with the ROSA are "multidisciplinary team efforts. The neurosurgeon works in concert with neuropsychologists, neuro-trained surgical nurses, epileptologists and Parkinson's specialists."

ROBOTIC SURGERY

Robotic surgery — in which surgeons are "assisted" by computer-controlled devices — has gained increased prominence in the past decade. As more hospitals have acquired the technology, and surgeons have become trained, an array of conditions are now being treated with the minimally invasive procedure. They include:

- Coronary artery bypass
- Tubal ligation
- Hip replacement
- Hysterectomy
- Kidney removal/transplant
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- Head/neck tumors
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