New Therapies in Endovascular Neurosurgery

New Hope: Deep Brain Stimulation

Cranial Base Surgery
Dr. Alan S. Boulos adjusts camera-fitted lighting in the new BrainSuite, a pair of adjoining operating rooms that makes use of a moveable CT scanner and computerized navigational system.
Welcome to the inaugural issue of Albany Neuroscience Perspectives from both the neurosurgery and the neurology departments. Our intention in this newsletter is to provide programmatic information regarding the Albany Medical Center Neurosciences Institute, a collaborative institute comprising the Division of Neurosurgery, the Department of Neurology, and the Center for Neuropharmacology and Neuroscience (CNN).

In this issue, we feature two of our newest programs within the Neurosciences Institute. The first is our Movement Disorders program, which includes five fellowship-trained movement disorder neurologists, Drs. Eric Molho, Adolfo Ramirez-Zamora, Era Hanspal, Jennifer Durphy, Dzintra Celmins, fellowship-trained neurosurgeon Dr. Julie Pilitsis, Neuropsychologist Anne Barba, PhD and Neurosurgical Physician Assistant Meghan Wilock demonstrating the advantages of deep brain stimulation to treat movement disorders. Dr. Pilitsis is the current Chair of the Women in Neurosurgery organization and Chair of the Joint Section of Pain nationally in Neurosurgery. She also collaborates with Dr. Damian Shin in the CNN, developing a better understanding of the mechanisms by which deep brain stimulation works to improve the condition of patients with movement disorders.

The second program featured is our endoscopic skull base surgery team, lead by Drs. Tyler Kenning and Carlos Pinheiro-Neto. Both are recent additions to the AMC faculty and together they have advanced the development of a multidisciplinary pituitary clinic. Additionally, they collaborate in surgery, performing advanced minimally invasive skull base surgery with faster recovery time via an endonasal approach.

Along with highlighting these two programs, we have also included in this issue an abbreviated synopsis of the many programs available at the AMC Neurosciences Institute. We also present a short description of upcoming important lectures and local meetings available to the reader. Finally, a brief synopsis of faculty and resident presentations is provided. Our aim is to publish this newsletter on a semiannual basis to share timely information about the Institute and feature articles about our diverse faculty and innovative programs. We hope you enjoy our inaugural issue.
Deep Brain Stimulation (DBS) has treated nearly 100,000 people worldwide suffering from Parkinson Disease, Essential Tremor, Dystonia, and Obsessive Compulsive Disorder. DBS has virtually replaced pallidotomy and thalamotomy in the United States. Randomized controlled studies in the *New England Journal of Medicine* and *JAMA* show that DBS is more efficacious than continued medical treatment of Parkinson’s disease and dystonia in appropriately selected patients, i.e., those whose symptoms continue despite medications. Also shown to be beneficial is the treatment of essential tremor with DBS. Essential tremor is about 10 times more common than other movement disorders, but is often controlled by beta-blockers or with alcohol to reduce the tremor. Due to the paucity of medications for ET, DBS may be useful in some cases where patients are unable to eat or write. DBS is also currently in clinical trials for treatment of major depressive disorder and is in pilot study for Alzheimer disease.

Results depend on patient management prior to, during, and following the operation. Therefore, it is important to have DBS performed at a center that is well-versed in the team approach to the patient. Because of the complex nature of the procedure and follow-up, it is important for candidates to have a strong support group, including family, friends, other patients who have gone through the process, and your health care providers. Patient evaluation and selection involves extensive testing that includes motor assessment both on and off medication, neuropsychiatric assessment for cognitive function, and counseling to ensure the patient fully understands the risks and potential benefits of surgery. Team meetings are held to review and select appropriate candidates, and to schedule electrode and battery implantation and subsequent programming. The DBS team at AMC also includes: Dr. Eric Molho, Dr. Adolfo Ramirez-Zamora, Dr. Era Hanspal, Dr. Jennifer Durphy, Dr. Dzintra Celmins, Dr. Anne Barba and Meghan Wilock PA-C.

Julie G. Pilitsis, MD, PhD

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Julie G. Pilitsis, associate professor of neurosurgery, was featured on WRGB CBS October 21, 2012 discussing Deep Brain Stimulation (DBS) surgery for Parkinson Disease. The story featured a member of the local band Urban Gumbo Bob Girouard who had suffered with Parkinson Disease for the past decade. After medications failed, Bob underwent DBS surgery with Pilitsis and is on the road to a recovery. Bob has since been able to resume drumming and Urban Gumbo has played several events.

Intra-operative photograph from deep brain stimulation procedure. This photo demonstrates patient’s head within stereotactic frame with cannula through microdrive depicting entry point and trajectory of stereotactic placement of DBS electrode.
DBS implantation involves placement of electrodes based on MR imaging into the deep structures of the brain—the subthalamic nucleus, the ventralis intermedius nucleus of the thalamus or the globus pallidus—areas that control movement. Frame-based stereotaxy which allows the MR locations to be placed in vector coordinates is combined with electrophysiological localization. Neuronal activity of the nuclei is monitored with the patient awake and the location ultimately selected based on the neurophysiology of the individual patients. During a separate procedure, the electrodes are then connected to wires that snake from the skull, behind the ear and down to a battery-powered impulse generator that is placed beneath the skin, under the collarbone. Patients are typically discharged the next day for both surgeries.

Device optimization occurs in the outpatient setting with the neurology team programming the device 3-4 weeks after surgery to allow cerebral edema to dissipate. The programming is much like adding an additional medication to a complex patient and may take 4-6 months to reach ideal settings. Medication use is often able to be reduced 30-50%. In Parkinson’s patients, national outcomes data suggests a 50 to 80 percent improvement in motor outcomes, rigidity, tremor, and dyskinesias. Results with ET may be even more dramatic from 70 to 90%. Having this capability at AMC is considerably more convenient than traveling elsewhere for multiple visits. Further every effort is made to group visits whenever possible. Initial evaluations can be scheduled within two weeks at 518-262-5088.

Julie G. Pilitsis, MD, PhD is the only functional neurosurgeon with fellowship training in the Capital Region. She is nationally recognized and the Chair of the American Association of Neurological Surgeons/Congress of Neurological Surgeons Section on Pain and an Executive Council Member for the American Association of Stereotactic and Functional Neurosurgeon. She is well-published and has obtained NIH funding in the field.

When musician Bob Girouard received a diagnosis of Parkinson’s disease, his drumming career was halted. Using advanced deep brain stimulation technology, neurologists and neurosurgeons at Albany Med were able to control Bob’s symptoms—giving him his beat back.
Surgeons at Albany Medical Center continue to provide the most sophisticated diagnostic and treatment approaches to patients. Our surgeons are able to remove skull base tumors through the nose and nasal sinuses instead of using the traditional, more invasive techniques that require open cranio-facial surgery.

FROM MICROSCOPE TO ENDOSCOPE

Surgery at the base of the skull has always been a challenging and daunting task. It is a region of complex and vital anatomy whose bony confines significantly limit surgical access. Traditional cranial base surgery often involves a multidisciplinary group of surgeons and a variety of potentially disfiguring transcranial and transfacial approaches. Variable amounts of brain retraction, neurovascular manipulation and cosmetic compromise may be required.

In the 1960s, the introduction of the intraoperative microscope and approaches through the paranasal sinuses revolutionized the surgical resection of skull base tumors. By accessing the cranial base through the natural apertures of the face, namely the nostrils and mouth, the resection of these tumors, specifically pituitary tumors, could now be performed with less morbidity. Although the microscope’s addition of both illumination and magnification significantly improved the procedure, it did have some limitations. The tunnel-shaped cone of light and the rigidity of the nasal speculum created a narrow field of view and line of sight and limited maneuverability. The lateral sphenoid sinus anatomy and cavernous sinuses were poorly visualized putting the carotid arteries and optic nerves at risk of injury. In addition to limiting visualization of lateral structures, both the sellar floor and the suprasellar space were suboptimally seen. Intraoperative orientation could be aided with fluoroscopy, but this exposed both the patient and surgical staff to radiation. Finally, intranasal structures were at greater risk and nasal septal perforations were common.

The introduction of the endoscope has brought pituitary and cranial base surgery into the modern era. In comparison to using the microscope, there are several advantages of the endonasal endoscopic technique. The absence of a nasal speculum results in less lateral limitation of movement and creates the possibility of bi-narial access as both nostrils can be used to manipulate the endoscope and surgical instruments. The avoidance of submucosal septal dissection means that there is no need for postoperative nasal packing, leading to less patient pain and discomfort and improved nasal healing and function. Finally, the wide views afforded by both the standard (0 degree) and angled (30 and 45 degrees) endoscopes permits identification of surrounding structures not able to be seen with a microscope and results in potentially safer surgery with improved tumor resections. Because morbidity from this surgery is so low, it is possible to now treat patients with tumors that were previously considered non-resectable or as having too poor a prognosis for more invasive surgery.

With endonasal endoscopic surgery moving the optical source directly to the pathology, magnification is not required and the orientation of the operative field is now reversed; instead of the extensive superficial exposure necessary to allow the microscope’s cone...
of light to visualize the end of a deep corridor, the superficial 'minimal access' approach of the endoscope expands the surgical field from the camera at the tip of the scope to a wide working field of depth (figure). With this paradigm shift in cranial base surgery, the previous generation of surgical instruments is no longer suitable and new operative skills need to be required. Still in its relative surgical infancy, endoscopic endonasal cranial base surgery is being performed by fellowship-trained surgeons in only a very few centers in the country and around the world.

TEAM APPROACH

One of the most important factors in performing endonasal endoscopic cranial base surgery well is a collaborative effort between neurosurgeons and otolaryngologists. Through a combined effort, emphasis is placed not only on addressing the cranial base pathology but also in preservation of function and improvement in patients’ quality of life. Expanding on the experience gained through the resection of pituitary tumors, the endoscopic technique can now be utilized to address a number of disorders of the cranial base, from the resection of benign and malignant tumors (sinonasal malignancies, meningiomas, craniopharyngiomas, esthesioneuroblastomas), the decompression of neural structures including the cervicomedullary junction (pannus from rheumatoid arthritis or congenital anomalies, such as platybasia) and the reconstruction of skull base defects (cerebrospinal fluid leaks and meningoencephaloceles).

Tyler J. Kenning, MD of Neurosurgery and Carlos Pinheiro-Neto, MD, PhD of Otolaryngology are both fellowship-trained in endoscopic cranial base surgery and closely collaborate with a team of highly-skilled neurologists, medical oncologists, radiation-oncologists, ophthalmologists, plastic surgeons, endocrinologists and radiologists at Albany Medical Center. To make an appointment, call 518-262-5088.
SAVE THE DATE

CURRENT TOPICS IN NEUROSURGERY
For the Primary Care Practitioner

WEDNESDAY, OCTOBER 9, 2013
5:00 PM - 8:20 PM

Hilton Garden Inn at ALBANY MEDICAL CENTER
USS Albany Ballroom
62 New Scotland Avenue
Albany, NY 12208

To Register Please Visit:
www.amc.edu/academic/CME/upcoming_events.cfm