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On The Move!

The official newsletter for the University of Colorado Movement Disorders Center

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In This Issue

Surgical Interventions for Parkinson's Disease

By: Drew S. Kern, MD, MS

Surgical treatments for Parkinson's disease (PD) became popular in the 1950's with the finding that damage to a portion of the brain called the thalamus greatly reduces tremor. With the successful introduction of levodopa in the 1960's, surgery became less performed. Over the past few decades there has been increased excitement about surgical interventions for PD. The most commonly used surgical treatments for PD are ablation (damaging a portion of the brain) and deep brain stimulation (DBS). Gene therapy involving surgically injecting genes into specific regions of the brain is currently in clinical trials.

In PD, surgical treatments should be considered when symptoms progress resulting in worsening of movement symptoms that impact the patients' quality of life despite best medication regimens. Candidate selection for surgical interventions is patient specific and can be challenging. There are many factors that must be considered in the decision to proceed with an elective surgery. Therefore, patients should be evaluated by centers with multidisciplinary DBS teams that have the expertise in ideal patient selection for surgery, surgical technique and management after surgery.

DBS

The equipment for DBS includes an electrode implanted into the brain that goes into specific regions. The electrode is anchored to the skull so that it does not move and extension connection wires are tunneled under the skin to a battery that is implanted under the chest skin typically just below the collar bone. Stimulation can be adjusted to increase, decrease and shape the electricity to maximize clinical benefit and lessen stimulation induced adverse effects. The main targets for DBS in PD are the globus pallidus pars interna (GPi) and subthalamic nucleus (STN). The ventralis intermedius (VIM) portion of the thalamus may be implanted as this is an effective target to reduce tremor but other symptoms of PD are not improved. STN and GPi DBS improve all major features of PD including tremor, rigidity (stiffness), slowness of movement and dyskinesias. GPi or STN DBS results in similar overall benefit in movement with an estimate of 30-50% improvement as well as in activities of daily living. The selection of which target, GPi or STN, is dependent upon the goals of the patient as well as in part preferences of the surgical center. Future developments in DBS include investigating other targets. Another exciting future development in DBS is having the stimulation adjust itself based upon specific brain firing patterns, called "closed-loop systems." Finally, the use of genetic testing may be of great value in selecting the best patients for DBS.

(Continued on page 2)

(Continued from page 1)

ABLATION SURGERIES

The first ablation surgeries were radiofrequency procedures. In this surgery, the initial surgical methodology is comparable to DBS with exception that the electrode inserted into the brain is heated up with current to create a thermal lesion (burn) and then the electrode is removed. With the development of new technologies including DBS and non-cutting techniques, such as gamma knife (GK) radiation and MRI guided focused ultrasound (MRGFUs), radiofrequency ablation has become rarely performed.

GK radiosurgery delivers gamma radiation that kills cells and has mainly targeted the thalamus to treat tremor. In addition, the vast majority of studies only treat one side of the brain to help the dominant hand. In general, clinical benefit is comparable to radiofrequency ablation. There is often a delay, on average of 5 months, before any improvement is observed after GK radiosurgery. Predicting the potential adverse effects in GK radiosurgery is problematic, as there is currently no way to know the unwanted extension into structures given the delay in cell death.

MRI guided high intensity focused ultrasound is also a non-incisional (non-cutting) and relatively new technology for delivering thermal ablation to target structures in the brain. Initial lower temperature can be delivered to produce a temporary change in symptoms allowing the surgeon to know if therapy is having some benefit. Based on the response, the target can be moved appropriately before a final, higher temperature is delivered resulting in a permanent lesion. MRGFUs has been FDA approved for targeting one side of the brain of the thalamus for treating essential tremor. However, it is currently an experimental therapy in Parkinson's disease.

GENE THERAPY

Currently in clinical trial, surgical implantation of gene therapies to specific regions of the brain are underway. One study, VY-AADC gene therapy, increases availability of levodopa within the brain allowing patients to reduce oral medications with promising results in improvement movement symptoms and quality of life. Future studies are planned that involve implantation of gene therapy that further change the abnormal brain circuitry in PD.

CONCLUSIONS

Surgical treatments are well established in the treatment of PD. New technologies are improving current surgical treatments as well as opening the field to novel treatments that hold hope to provide even greater benefit with less risk.

Meet the MDC Team

Movement Disorders Center Nursing Professionals

Wendy Cernik, RN, BSN

Wendy is a movement disorders nurse for the Neurology Department at UCH. She is also the nurse for the palliative care team in the Neurology Department with past experience as a home hospice nurse/care manager. Her passion is palliative care, striving to find ways for the physical, spiritual, emotional, and home care needs of the patient and their family to be met.

Joy Mulder, RN, CCTM

Joy has 28 years of compassionate nursing experience in a variety of settings. She is skilled in the assessment and care of the movement disorders patient and the frail, acutely ill elderly. Experienced in caring for patients with multiple chronic illnesses and complex family dynamics across the healthcare spectrum, Joy fosters the dignity and value of every patient, providing emotional support while collaborating with multidisciplinary teams to ensure patient-centered, holistic, culturally sensitive care.

Tammy Rogers, RN

Tammy has enjoyed learning different aspects of nursing in various settings. Her 24 years of nursing experiences include pulmonary, outpatient lab, adult congenital, dialysis, telemetry, and hospice-oncology in both direct chare and management. She is excited to be a new member of the Movement Disorders Team and ready to embrace the challenges this experience offers. She is a Colorado native, but has spent time in Texas and Minnesota

Sleep and Parkinson Disease

By: Brian D Berman, MD, MS

All living creatures sleep. Giraffes sleep around 2 hours a day, brown bats for around 20 hours a day, and humans for around 8 hours a day. In humans, sleep is characterized by alternating phases of rapid eye movement (REM) sleep and non-rapid eye movement (NREM) sleep. REM sleep is associated with dreaming and thought to be important for memory, though the actual function of REM sleep remains unclear. NREM sleep is often divided into three stages that range from light sleep to deep sleep and is also thought to be important for memory processing. Sleep-wake cycles, along with the amount and quality of NREM sleep, change with age and can be affected by neurodegenerative disorders like Parkinson's disease (PD). In addition, PD is frequently associated with sleep issues including insomnia and sleep interruptions (fragmentation), excessive sleepiness (hypersomnia), and REM sleep behavior disorder.

Insomnia and sleep fragmentation are the most common sleep complaints in PD and affect up to 80% of patients. There are often multiple causes for these sleep disturbances, even in the same patient. Sleep can be interrupted overnight by symptoms of tremor, akinesia (slowed movement), pain, anxiety, depression, and urination urges. There is also increasing evidence that the neurodegenerative process in PD itself impacts dopamine and other brain chemicals that control sleep/wake cycles and causes circadian rhythm dysfunction. Excessive sleepiness is also a common complaint in PD and affects up to 50% of patients. Hypersomnia can occur as a result of insomnia and sleep fragmentation, but also may be associated with dopaminergic medications, disordered breathing during sleep, and likely low melatonin secretion and circadian rhythm disruptions as well.

REM sleep behavior disorder is a disorder characterized by the acting out of dreams during REM sleep when such actions are normally suppressed. This disorder is common in PD add affects about half of patients over the course of the disease. Interestingly, the presence of REM sleep behavior disorder is itself associated with a very high risk of developing a neurodegenerative disease such as PD over a person's lifetime and so it likely results from the degeneration of specific brain structures essential for the regulation of REM sleep. Antidepressant medications, however, are also known to increase the risk of developing REM sleep behavior disorder symptoms.

Sleep difficulties are extremely common in PD and have been found to have a significant impact on a patient's quality of life. Consequently, their assessment and treatment need to be part of regular clinical care critical to do even in the early stages of the disease. Presently, however, there are limited evidence-based recommendations for the treatment of sleep disturbances associated with PD. Nevertheless, a first step is often to evaluate whether there is a medication or medical/psychiatric condition contributing to the sleep problem. Additionally, dopaminergic medications should be reviewed and optimized for beneficial effect while limiting their adverse effects such as excessive sleepiness.

Long-acting formulations of dopaminergic medications may be helpful in improving sleep quality and maintenance in some PD patients. Treatments targeting insomnia include cognitive behavioral therapy as well as various sleep aids (hypnotics) such as doxepin, zolpidem and eszopiclone. Bright light exposure and melatonin may be helpful in improving circadian rhythm dysfunction and reducing daytime sleepiness. Although there is insufficient evidence to support their efficacy in treating daytime sleepiness, stimulants including caffeine, methylphenidate and modafinil may be helpful in alleviating symptoms. Treatment options for REM sleep behavior disorder include melatonin, clonazepam, and the use of bed alarms.

(Continued on page 4)

Farewells

Olga Klepitskaya, MD

The Movement Disorders Center recently said goodbye to Associate Professor Olga Klepitskaya who has taken the Medical Director position at Neurocrine Inc., a company developing new medications for movement disorders and other neurological, psychiatric, and endocrine conditions. Dr. Klepitskaya is looking forward to the next chapter in her career in the biotechnology industry where she hopes to create new medications and treatments to help patients. She is particularly interested in working on gene therapy treatments for neurological conditions from the research and development perspective. This will give her an opportunity to make a global impact and help even more patients.

Christen Epstein, FNP

Christen has been a Neurology Nurse Practitioner with primary clinical focus in the subspecialties of movement disorders and neurobehavioral over the past six years. She also served as a senior instructor of Neurology at the University of Colorado School of Medicine. Christen will now be seeing pediatric and adult psychiatric patients at Mile High Psychiatry where they utilize and integrate multiple therapeutic modalities and establish plans of care that incorporate well-being, collaboration, and patient empowerment.

Best wishes and many thanks to Dr. Klepitskaya and Christen for their years of service to the Neurology Department.

(Continued from page 3)

In addition to sleep serving as a time when the brain can consolidate memories and recharge itself, there is increasing evidence that sleep has neuroprotective properties including playing a key role in the removal of toxic waste byproducts that have accumulated throughout the day. Consequently, sleep disturbances in PD may hasten its progression further underscoring the importance of treating sleep difficulties in PD. Interestingly, a recent study using electroencephalograms (EEG) to study the pattern of the brain's electrical activity during sleep in patients with PD, brain activity changes during sleep was linked to the development of dementia. Thus, developing means to enhance normal brain activity during sleep might lead to a novel treatment approach for PD that can slow disease progression and prevent the development of dementia.

Event Recaps

5th Annual Parkinson Disease Symposium

The University of Colorado Movement Disorders Center hosted its 5th Annual Parkinson Disease Symposium on October 27, 2018 at the Bruce Schroffel Conference Center. The symposium was the largest symposium to date with over 300 attendees. The Center also hosted its first silent auction featuring artwork handmade by the PD community. The auction raised over $2,000 to support education, outreach, and research for Movement Disorders. Speakers included Dr. Maureen Leehey, Christen Epstein, FNP, Jessica Barr, PAC, Dr. Michelle Fullard, Dr. Trevor Hawkins, and Dr. Drew Kern from the Movement Disorders Center. Dr. Samantha Holden (Behavioral Neurologist) and Dr. Stephen Duntley (Sleep Neurologist) also gave talks that were received enthusiastically by the attendees. Interactive sessions with Rebekah Stewart of Rehabilitative Rhythms, Emily Nauman of LSVT, and Sarah Leversee of Reconnect with Your Body got attendees up and moving.

2nd Annual Huntington's Disease Patient and Family Education Conference

The Movement Disorders Center's Huntington Disease Society of America Center of Excellence hosted its second Huntington's Disease (HD) Patient and Family Education Conference on May 4, 2019 on campus. The theme this year was The Art of Self Care. Topics included The Art of Medication Management (with Dr. Sarah Fischer and Dr. Jacci Bainbridge), Art of Living Well: Improving QOL in HD through Supportive Care with Dr. Christina Vaughan, Art Therapy with Amy Jones, and State of the ART in research (Dr. Lauren Seeberger and Isabelle Buard. Attendees asked direct questions in the "Picture of Health Interactive Q & A Panel" with (Dr. Kirsten Rapp, Meghan Smith-Cunningham, LSW, and Chaplin Ryan Kahn, and enjoyed a presentation on "Huntington's Disease: The Long View" with key Note speaker Dr. Martha Nance, and free resources such as Caregiver Lifehacks and art therapy samples. The free program was possible with the financial support from Huntington Disease Society of America and TEVA Pharmaceuticals.

Save the Dates!

6th Annual Parkinson Disease Symposium
Saturday, October 26, 2019 | 9:15 AM—2:30 PM
Register now: https://6thPDEvent.eventbrite.com
Registration is free, but required.

3rd Annual Huntington's Disease Patient and Family Education Conference
Saturday, May 2, 2020
Event details will follow at a later date.

Interested in Participating in Research?

We're always looking for patients interested in research. For more information or to get involved with our research, please contact our Research Recruitment Specialist, 303-724-4644.

To view a list of our studies, please visit www.ucdenvermovement.org. Click on the "Research" tab and then follow the link to view a list of our current research studies.

Get Involved!

Our world-class team of physicians and researchers are dedicated to providing the highest quality of care for patients today while developing cures and novel treatments for tomorrow.

Private support is essential to pushing the boundaries of science and bringing life-changing research and care to the patients who need it most. With your support, we will continue providing the region's most comprehensive patient care and conducting innovative research that will transform healthcare around the country.

Learn how you can help:
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