Progressive Neuroscience
A publication for physicians produced by the Institute for Neurosciences at Winthrop-University Hospital

- CO₂ Laser Enhances Brain & Spine Surgery
- Award-Winning Stroke Program
- Peripheral Nerve Stimulation for Intractable Pain
Message from the Chiefs

We are pleased to report that Winthrop-University Hospital’s Board of Directors has approved the creation of the Department of Neurosciences, moving the Divisions of Neurosurgery and Neurology under one administrative structure.

The action underscores the outstanding reputation of the Hospital’s robust neuroscience program, and elevates our commitment to advanced patient care, comprehensive medical education and leading-edge research to a new — and even higher — level.

Boding well for the New Year, the move strengthens and further supports our ongoing efforts to provide efficient, effective and highly coordinated care.

In this issue of *Progressive Neuroscience* we continue to bring you clinically relevant articles, covering:

- The use of CO₂ laser surgery to remove tumors
- Our award-winning stroke program
- Intraoperative neurophysiology monitoring
- Peripheral nerve stimulation for intractable pain relief
- Clinical trials conducted by our neuroscientists
- An overview of the treatment of peripheral neuropathy

While we look forward with great excitement to the changes slated for 2011 in our new Department of Neurosciences, what will not change is our dedication to caring for your patients with compassion and the most sophisticated techniques.

Michael H. Brisman, MD
Acting Chairman,
Department of Neurosciences
Chief, Division of Neurosurgery
Co-Director, Institute for Neurosciences

Malcolm H. Gottesman, MD
Chief, Division of Neurology
Co-Director, Institute for Neurosciences
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A 60-year-old grandmother, NP loves her Harley. But, she had to stop riding when she began seeing stationary objects moving throughout her visual field.

“It was very weird,” she reported. “I would be sitting on my bike at a light, and the car next to me seemed to be moving, even though I knew it wasn’t. I knew something was really wrong when my eye doctor recommended an MRI.”

The MRI revealed a 4.5 cm left sphenoid wing meningioma, and she was referred to Winthrop-University Hospital neurosurgeon Lee Tessler, MD, who specializes in the multimodality treatment of benign and malignant brain tumors. “Although there was no significant edema within this patient’s brain or overt double vision, because of the size of the lesion and her subjective complaints, we discussed surgical resection as a treatment option,” he said.

“Based on our findings — and because her tumor was especially fibrous and located in a tight surgical corridor — we decided to use the latest generation CO₂ laser scalpel to perform a left pterional craniotomy and stereotactic resection of the lesion on this patient. The pathology was meningioma WHO grade I.”

CO₂ Laser Rebirth

When surgical lasers were introduced 30 years ago, they were cumbersome and used a rigid arm that could be directed only at tumors within the surgeons’ direct line of sight. The lack of flexibility and inability to maneuver the beam were considered significant shortcomings, and the technology fell out of favor.

Today’s advances in fiber optics have dramatically improved the apparatus, creating a renaissance in the use of the CO₂ laser. The current instrument consists of very flexible CO₂ laser-compatible fibers coupled with a pen-like surgical instrument that fits in the palm of the hand. Within each fiber, many microscopic layers of alternating glass and polymer create a reflective system
that can be used to channel different wavelengths of light.

“The limitations inherent in older, conventional fiber optics have been resolved, and the new-found flexibility allows neurosurgeons to bend and maneuver the beam so we can operate in remote and sensitive regions of the brain and spine,” said Michael Brisman, MD, Winthrop’s Chief of Neurosurgery, Acting Chairman of Neurosciences and Co-Director of the Institute for Neurosciences.

Since Winthrop is at the forefront of neurosurgical technology, and its neurosurgeons are trained in the latest procedures, the CO2 laser quickly became part of the Hospital’s surgical armamentarium.

“The improved technology offers us greater precision and control over penetration depth into tissue,” explained Dr. Brisman, who specializes in stereotactic surgery and radiosurgery for brain tumors and trigeminal neuralgia. “It is especially valuable when lesions of the central nervous system are near, or embedded in, critical or eloquent areas. In such instances, use of a conventional scalpel could damage adjoining tissue and increase patient risk.”

CO2 laser energy serves as an enhanced scalpel, combining precise cutting on a microscopic level, debulking, ablation and microvascular coagulation with minimal collateral thermal damage. It can be easily maneuvered around blood vessels and specific nerve structures, meticulously vaporizing the tumor one thin layer at a time.

“Shallow penetration makes the CO2 surgical laser especially safe and effective in the treatment of skull base tumors, meningiomas, acoustic neuromas, pituitary tumors and schwannomas, as well as spinal cord tumors,” Dr. Tessler explained. “The laser allows us to reduce tissue retraction and manipulation, shorten operative time, limit postoperative edema and improve chances for a more rapid recovery.”

NP did well following the surgery, returning home on postoperative day two neurologically intact. “She no longer has any problem with her vision, and doesn’t have any weakness, numbness or after effects of the surgery,” Dr. Tessler reported after a follow-up office visit.

According to NP, life has returned to normal. Within three weeks after being discharged from the Hospital, she was back on her bike. “I feel perfect,” she said. “It’s as if nothing ever happened.”

For more information, call the Institute for Neurosciences at 1-866-NEURO-RX or visit www.winthrop.org.
Award-Winning Stroke Program Focuses on Critical Element of Time

by
Jay Yasen, MD,
Director, Stroke Service

Kathleen Michel, CNRN, MSN, FNP-BC
Cerebrovascular Program Coordinator

Karin Antaky, CNRN, MSN, FNP-BC
Cerebrovascular Nurse Practitioner

As 52-year-old BC sat in his car, he felt tingling on the right side of his face and noticed he couldn’t move his right arm properly. His wife called 911, and he was taken to Winthrop-University Hospital. He had blood work drawn while answering several key questions, and was immediately brought for a CT scan then given IV t-PA to dissolve a suspected blood clot in his brain. Because of the staff’s rapid action and appropriate care, he did not develop potentially debilitating side effects so common with strokes. “As a trial lawyer, I have to be sharp,” he said. “And, thanks to the care I received at Winthrop, I have not lost my edge.”

Stroke is the leading cause of serious long-term disability. Intravenous t-PA (tissue-plasminogen activator), the only FDA-approved medication for the treatment of acute ischemic stroke, is administered for the purpose of improving neurological recovery and minimizing disability.

For a variety of reasons, some patients may not be candidates for IV t-PA, which should be administered within three hours of onset of symptoms — the earlier the treatment, the better the outcome. Unfortunately, stroke victims commonly do not recognize their symptoms or may ignore the warning signs. Thus, they may arrive outside the three-hour window. However, there are other options for these patients.

Based upon the results of a European stroke trial (ECASS-III), the American Stroke Association Science Advisory gave a Class I, Level of Evidence B recommendation for certain patients who can be treated with t-PA in the three-to-four-and-one-half-hour window. While this is still somewhat controversial, it is another option for some patients.

In November 2010, the New York State Department of Health (NYSDOH) defined acute stroke as onset within six hours of hospital presentation. Patients who arrive at Winthrop-University Hospital within six hours of stroke symptom onset are screened by emergency room staff using the Cincinnati Pre-hospital Stroke Scale to assess for facial droop, arm weakness or speech disturbance. If they have any of these deficits, they are immediately evaluated by the Hospital’s expert and highly commended Stroke Team, known for extraordinary and comprehensive management of stroke patients at a moment’s notice.

NY State Stroke Center

A regional leader in neuroscience, Winthrop is a designated New York State Department of Health Certified Primary Stroke Center (PSC). The designation recognizes hospitals
that make exceptional efforts to foster better outcomes for stroke patients, using best practices to provide the highest standards of aggressive care. The Hospital’s Acute Stroke Team — comprising Board Certified neurocritical care neurologists, neurosurgeons, neurointensivists, radiologists and emergency medicine physicians, as well as specially trained nurse practitioners, physician assistants, registered nurses, physical therapists, occupational therapists and social workers — is available 24 hours a day, seven days a week. Team members maintain the required CME credits and NIHSS certification per DOH guidelines.

Treatment decisions are significantly aided by rapid assessment with neuro-imaging. CT angiography allows Winthrop stroke neurologists to identify a large vessel occlusion or stenosis in the neck or in the circle of Willis. CT perfusion can provide information about the amount of brain tissue already infarcted (“infarct core”), compared with the total area of decreased perfusion. If there is a significant mismatch between these areas (“ischemic penumbra”), this may imply the presence of salvageable brain tissue. While previous treatment decisions were based solely upon time, CT perfusion can now provide physiological information that may help guide treatment decisions.

At Winthrop, if patients are not candidates for IV t-PA, they are considered for treatment with intra-arterial t-PA or clot retrieval systems (MERCI® and Penumbra®), with the procedures performed by world-class endovascular surgeons. After these interventions, patients are managed in a state-of-the-art Neuroscience Intensive Care Unit, with multidisciplinary rounds led by a neurocritical care neurologist. Certified neuroscience nurses (CNRN), trained in the care of stroke patients, help ensure the use of best practices in stroke care.

Get With the Guidelines

Winthrop participates in the American Stroke Association’s Get With the Guidelines (GWTG) quality improvement program database for monitoring performance and quality measures to evaluate and improve treatment of stroke patients. Data on TIA and stroke patients are recorded, and GWTG evaluates adherence to the following 12 core measures:

- IV t-PA given if patient presents within two hours of symptom onset
- Early antithrombotics
- DVT prophylaxis
- Antithrombotics at discharge
- Antiocoagulation for atrial fibrillation
- Target LDL <100 and treatment with statin
- Dysphagia screening
- Stroke education
- Smoking cessation information
- Rehabilitation
- NIHSS (Stroke scale documentation)
- Discharge destination

GWTG recognizes the achievements of stroke centers, presenting awards for meeting core measure compliance at 85 percent or greater. At the February 2011 International Stroke Conference, Winthrop received the Silver Performance Achievement Award for compliance over 12 consecutive months.

Clinical research is an important part of Winthrop’s cerebrovascular program. The Hospital’s neuroscientists participate in several national studies including ALIAS — a National Institutes of Health-sponsored double-blind, placebo-controlled trial of albumin in acute ischemic stroke — and ARUBA, another National Institutes of Health-sponsored trial of patients with unruptured brain arteriovenous malformations, randomized to medical management versus interventional therapy (endovascular procedures, neurosurgery or radiotherapy, alone or in combination).

Even with the availability of state-of-the-art facilities and treatment, studies show that very few stroke patients arrive at a hospital in time to benefit from these services. Community awareness programs, Emergency Medical Services training and inpatient education are vital to getting individuals with stroke symptoms to immediate care.

For more information, call the Institute for Neurosciences at 1-866-NEURO-RX or visit www.winthrop.org.

Winthrop’s Cerebrovascular Program

Stroke Team (key members)
- Jay Yasen, MD, Director, Stroke Service
- Sara Cherian, MD, Stroke Neurologist
- Kathleen Michel, CNRN, MSN, FNP-BC, Cerebrovascular Program Coordinator
- Karin Antaky, CNRN, MSN, FNP-BC, Cerebrovascular Nurse Practitioner
- Barry Rosenthal, MD, MPH, Chairman, Emergency Medicine
- Jonathan Brisman, MD, Director, Cerebrovascular and Endovascular Neurosurgery
- John Pile-Spellman, MD, Endovascular Neuroradiologist
- Neuroscience Physician Assistants
- Certified Neuroscience Nurses

Neuroscience Intensive Care Unit
- Elzbieta Wirkowski, MD
  Co-Director, NeuroICU
  Director, Cerebrovascular Disorders Program
- Michael Brisman, MD
  Co-Director, NeuroICU
  Chief, Neurosurgery
  Acting Chairman, Neurosciences
Intraoperative Neurophysiologic Monitoring Improves Patient Outcomes

Patients undergoing complex neurosurgical procedures that place the nervous system at risk are benefiting greatly from the rapidly advancing field of intraoperative neurophysiologic monitoring (IONM) and its critical role in the operating room.

“IONM employs a wide range of complex modalities individually and together, with each technique playing a specific role. For a given surgery, the modalities selected depend on the neural structures at risk. The choice of modality to be employed occurs preoperatively during consultations between the surgeons and neurophysiologists.”

IONM Techniques

- **Somatosensory Evoked Potentials (SSEP)** monitor the sensory pathways by stimulating peripheral nerves and recording over the sensory cortex. They are most often used to assess the functional integrity of the spinal cord’s dorsal column.
- **Motor Evoked Potentials (MEP)** analyze and evaluate responses evoked by transcranial or direct cortical stimulation and recorded from the spinal cord or limb muscles in order to assess the integrity of motor pathways.
- **Brainstem Auditory Evoked Potentials (BAEP)** involve electrical responses to auditory stimuli, allowing for the functional monitoring of the entire auditory pathway, including the acoustic nerve, brainstem and cerebral cortex. They are used principally to monitor brainstem function and help preserve hearing in patients with acoustic neuromas and brainstem tumors.
- **Electromyography (EMG)** is used to detect incipient nerve damage in spinal and skull base surgery. Cranial and spinal nerves can be monitored. EMG can be spontaneous or evoked.
- **Pedicle Screw Stimulation** uses evoked muscle responses to analyze pedicle screw placement and avoid nerve root damage caused by a breach in the pedicle.
- **Electroencephalography (EEG)** records spontaneous brain activity. It is used to monitor the functional integrity of the cerebral cortex in order to avoid ischemic injuries, to determine resection margins for epilepsy surgery, and to monitor for seizures during electrical stimulation of the brain while cortical function is being mapped.

“The signals are sensitive to many factors, including anesthesia, tissue temperature, surgical stage and stress on tissues. Therefore, clear and constant communication among the surgeons, anesthesiologists and neurophysiologists in the OR is critical to positive patient outcomes.”

Over the years, IONM technology has improved, and recording techniques have been refined. For example, the development of transistors and integrated circuitry has upgraded differential amplifiers. Additionally, equipment size has been reduced for more efficient use in the OR, signal-averaging techniques have improved, and computerized equipment with microprocessors has enabled multichannel recordings. A major breakthrough occurred when the FDA approved the use of motor evoked potentials to monitor the integrity of the motor pathways during neurosurgery.

“The intraoperative recordings, which provide surgeons and anesthesiologists with vital, real-time data regarding the status of the nervous system, identify immediate changes in brain, spinal cord and peripheral nerve function prior to irreversible damage.”

For more information, call the Institute for Neurosciences at 1-866-NEURO-RX or visit www.winthrop.org

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PATIENTS UNDERGOING COMPLEX NEUROSURGICAL PROCEDURES THAT PLACE THE NERVOUS SYSTEM AT RISK ARE BENEFITTING GREATLY FROM THE RAPIDLY ADVANCE FIELD OF INTRAOPERATIVE NEUROPHYSIOLOGIC MONITORING (IONM) AND ITS CRITICAL ROLE IN THE OPERATING ROOM.

“IONM EMPLOYS A WIDE RANGE OF COMPLEX MODALITIES INDIVIDUALLY AND TOGETHER, WITH EACH TECHNIQUE PLAYING A SPECIFIC ROLE. FOR A GIVEN SURGERY, THE MODALITIES SELECTED DEPEND ON THE NEURAL STRUCTURES AT RISK. THE CHOICE OF MODALITY TO BE EMPLOYED OCCURS PREOPERATIVELY DURING CONSULTATIONS BETWEEN THE SURGEONS AND NEUROPHYSIOLOGISTS.”

IONM TECHNIQUES

- **SOMATOSENSORY EVOKED POTENTIALS (SSEP)** MONITOR THE SENSORY PATHWAYS BY STIMULATING PERIPHERAL NERVES AND RECORDING OVER THE SENSORY CORTEX. THEY ARE MOST OFTEN USED TO ASSESS THE FUNCTIONAL INTEGRITY OF THE SPINAL CORD’S DORSAL COLUMN.
- **MOTOR EVOKED POTENTIALS (MEP)** ANALYZE AND EVALUATE RESPONSES EVOKED BY TRANSCRANIAL OR DIRECT CORtical STIMULATION AND RECORDED FROM THE SPINAL CORD OR LIMB MUSCLES IN ORDER TO ASSESS THE INTEGRITY OF MOTOR PATHWAYS.
- **BRAINSTEM AUDITORY EVOKED POTENTIALS (BAEP)** INVOLVE ELECTRICAL RESPONSES TO AUDITORY STIMULI, ALLOWING FOR THE FUNCTIONAL MONITORING OF THE ENTIRE AUDITORY PATHWAY, INCLUDING THE ACoustic NERVE, BRAINSTEM AND CEREBRAL CORTEX. THEY ARE USED PRINCIPALLY TO MONITOR BRAINSTEM FUNCTION AND HELP PRESERVE HEARING IN PATIENTS WITH ACoustic NEUROMAS AND BRAINSTEM TUMORS.
- **ELECTROMYOGRAPHY (EMG)** IS USED TO DETECT INCIPENT NERVE DAMAGE IN SPINAL AND SKULL BASE SURGERY. CRANIAL AND SPINAL NERVES CAN BE MONITORED. EMG CAN BE SPONTANEOUS OR EVOKED.
- **PEDICLE SCREW STIMULATION** USES EVOKED MUSCLE RESPONSES TO ANALYZE PEDICLE SCREW PLACEMENT AND AVOID NERVE ROOT DAMAGE CAUSED BY A BREACH IN THE PEDICLE.
- **ELECTROENCEPHALOGRAPHY (EEG)** RECORDS SPONTANEOUS BRAIN ACTIVITY. IT IS USED TO MONITOR THE FUNCTIONAL INTEGRITY OF THE CEREBRAL CORTEX IN ORDER TO AVOID ISCHEMIC INJURIES, TO DETERMINE RESECTION MARGINS FOR EPILEPSY SURGERY, AND TO MONITOR FOR SEIZURES DURING ELECTRICAL STIMULATION OF THE BRAIN WHILE COR-TICAL FUNCTION IS BEING MAPPED.

“THE SIGNALS ARE SENSITIVE TO MANY FACTORS, INCLUDING ANESTHESIA, TISSUE TEMPERATURE, SURGICAL STAGE AND STRESS ON TISSUES. THEREFORE, CLEAR AND CONSTANT COMMUNICATION AMONG THE SURGEONS, ANESTHESIOLOGISTS AND NEUROPHYSIOLOGISTS IN THE OR IS CRITICAL TO POSITIVE PATIENT OUTCOMES.”

OVER THE YEARS, IONM TECHNOLOGY HAS IMPROVED, AND RECORDING TECHNIQUES HAVE BEEN REFINED. FOR EXAMPLE, THE DEVELOPMENT OF TRANSISTORS AND INTEGRATED CIRCUITY HAS UPGRADED DIFFERENTIAL AMPLIFIERS. ADDITIONALLY, EQUIPMENT SIZE HAS BEEN REDUCED FOR MORE EFFICIENT USE IN THE OR, SIGNAL-AVERAGING TECHNIQUES HAVE IMPROVED, AND COMPUTERIZED EQUIPMENT WITH MICROPROCESSORS HAS ENABLED MULTICHANNEL RECORDINGS. A MAJOR BREAKTHROUGH OCCURRED WHEN THE FDA APPROVED THE USE OF MOTOR EVOKED POTENTIALS TO MONITOR THE INTEGRITY OF THE MOTOR PATHWAYS DURING NEUROSURGERY.

“THE INTRAOPERATIVE RECORDINGS, WHICH PROVIDE SURGEONS AND ANESTHESIOLOGISTS WITH VITAL, REAL-TIME DATA REGARDING THE STATUS OF THE NERVOUS SYSTEM, IDENTIFY IMMEDIATE CHANGES IN BRAIN, SPINAL CORD AND PERIPHERAL NERVE FUNCTION PRIOR TO IRREVERSIBLE DAMAGE.”

THIS CRITICAL MONITORING, WHICH HELPS THE SURGEONS WITH DECISION-MAKING AS THEY OPERATE, IS EFFECTIVE IN LOCALIZING ANATOMICAL STRUCTURES, INCLUDING PRIMARY SENSORIMOTOR CORTEX AND PERIPHERAL NERVES. MONITORING GUIDES SURGEONS DURING DISSECTIONS, ALLOWING FOR THE INSTANT IMPLEMENTATION OF CORRECTIVE MEASURES THAT CAN REDUCE THE RISK OF SUCH DEBILITATING POST-OPERATIVE MORBIDITIES AS MUSCLE WEAKNESS, PARALYSIS, SENSORY LOSS, HEARING LOSS AND LOSS OF NORMAL BODY FUNCTIONS.

OVER THE YEARS, IONM TECHNOLOGY HAS IMPROVED, AND RECORDING TECHNIQUES HAVE BEEN REFINED. FOR EXAMPLE, THE DEVELOPMENT OF TRANSISTORS AND INTEGRATED CIRCUITY HAS UPGRADED DIFFERENTIAL AMPLIFIERS. ADDITIONALLY, EQUIPMENT SIZE HAS BEEN REDUCED FOR MORE EFFICIENT USE IN THE OR, SIGNAL-AVERAGING TECHNIQUES HAVE IMPROVED, AND COMPUTERIZED EQUIPMENT WITH MICROPROCESSORS HAS ENABLED MULTICHANNEL RECORDINGS. A MAJOR BREAKTHROUGH OCCURRED WHEN THE FDA APPROVED THE USE OF MOTOR EVOKED POTENTIALS TO MONITOR THE INTEGRITY OF THE MOTOR PATHWAYS DURING NEUROSURGERY.

“WITH TODAY’S SOSPICIOPHISTICATED COMPUTER TECHNOLOGY, STIMULATING AND RECORDING ELECTRODES AND INTERACTIVE SOFTWARE, WE CAN SELECTIVELY ACTIVATE STIMULATING ELECTRODES AND DISPLAY THE ELECTROPHYSIOLOGIC SIGNALS AS THEY ARE PICKED UP BY THE RECORDING ELECTRODES,” SAID DR. AVSHALUMOV.
Peripheral Nerve Stimulation: Safe, Effective Help for Intractable Pain

The intractable, occipital pain immobilized 42-year-old KL, transforming her from an active, self-reliant mother of four into a helpless, bedridden woman unable to function. She could not work, drive, perform routine daily activities or even summon the energy to talk. Worst of all, she could no longer care for her children.

“My life stopped,” she said. “I was in agony. No medication worked. The pain was so intense and relentless and unbearable that I couldn’t think straight and often became confused.”

According to neurosurgeon Brian Snyder, MD, who specializes in the surgical treatment of pain and movement disorders at Winthrop-University Hospital, the current wide range of high-tech approaches to pain-relief are helping individuals like KL regain a quality of life they once considered lost.

“My life stopped,” she said. “I was in agony. No medication worked. The pain was so intense and relentless and unbearable that I couldn’t think straight and often became confused.”

According to neurosurgeon Brian Snyder, MD, who specializes in the surgical treatment of pain and movement disorders at Winthrop-University Hospital, the current wide range of high-tech approaches to pain-relief are helping individuals like KL regain a quality of life they once considered lost.

“Today, there’s a lot of hope for patients with refractory pain,” said Dr. Snyder. “If there’s pain anywhere in the body, there’s something we can do to alleviate it. Our pain team is exceptionally well trained and experienced in the use of every available technique designed to modulate pain.”

The advanced approaches provided by Winthrop’s pain specialists include deep brain stimulation, motor cortex stimulation, spinal cord stimulation and peripheral nerve stimulation (PNS) —

“PNS is a minimally invasive, safe and effective way to improve severe neuropathic pain with little risk or morbidity, but it’s palliative. It’s not designed to treat the cause of the pain.”

Brian Snyder, MD
Neurosurgeon

Continued on pg. 8
Peripheral Nerve Stimulation... Continued

A relatively new, minimally invasive and safe addition to the pain-relief armamentarium.

A neuromodulation technique, PNS involves the application of low-level electrical current through stimulator leads placed percutaneously in the region of the pain, along the course of the offending peripheral nerves. The electrodes are connected to a power supply — a small energy generator (battery), which delivers electrical impulses that inhibit pain perception and produce a slight tingling sensation that covers the pain. “The PNS impulses create a barrier that stops pain signals from traveling between the peripheral nerves and the brain,” explained Dr. Snyder.

Treatment with PNS occurs in two phases: **Phase One**, the trial period, consists of placing temporary electrodes in the region of maximum pain. Once secured, the electrodes are connected to a small external stimulator, which is used for approximately one week to determine if the process reduces the patient’s pain.

If the patient’s pain is sufficiently alleviated during the trial period, **Phase Two** is implemented. The trial electrodes are removed and, via a small incision, permanent electrodes are placed in the same area and connected to a small pulse generator that is implanted under the skin in the chest, back or abdomen. Programmed to deliver treatment appropriate for the patient, the device can be regulated to modify the intensity of the stimulation. Self-contained, the system resembles a cardiac pacemaker. It is adjustable and reversible, and can be turned on and off, as necessary, to provide optimal pain relief.

PNS is indicated for patients in severe pain with conditions that have failed conventional surgical therapies and the best medical management. Individuals with a wide range of conditions — including failed back surgery, persistent and debilitating neck or back pain, complex regional pain syndrome, trigeminal neuropathic pain, supraorbital neuralgia, tibial neuralgia, inguinal neuralgia, and traumatic nerve injuries — can benefit from the technique.

“PNS is a minimally invasive, safe and effective way to improve severe neuropathic pain with little risk or morbidity,” explained Dr. Snyder. “But it’s palliative. It’s not designed to treat the cause of the pain. Most patients continue taking pain medication, but at a significantly reduced dosage. That’s one of the technique’s greatest benefits.

“Our aim is to bring symptomatic relief. An estimated 70 percent of patients treated with PNS are helped, with pain scales reduced by roughly 50 percent.”

That is exactly what PNS did for KL. “My pain has been reduced by at least half,” she reported. “While I’m still taking medication, now it’s working. I’m back to my daily routine and able to look after my own children. I have my life back.”

For more information, call the Institute for Neurosciences at 1-866-NEURO-RX or visit www.winthrop.org.
The past 10 years have been a breakthrough decade for advances in the treatment of neurological disorders and diseases. As clinical trials have increased, disease management options have evolved from employing a single medication for a given condition to using a combination of multiple drugs and other advanced treatment modalities.

“We’re constantly looking for new and better ways to treat conditions affecting the nervous system. By virtue of the clinical research conducted here, we are able to offer our patients advanced investigational therapies.”

Malcolm Gottesman, MD
Chief, Neurology
Co-Director, Institute for Neurosciences

“W e’re constantly looking for new and better ways to treat conditions affecting the nervous system,” said Malcolm Gottesman, MD, Winthrop-University Hospital’s Chief of Neurology and Co-Director of the Institute for Neurosciences. “By virtue of the clinical research conducted here, we are able to offer our patients advanced investigational therapies that would otherwise not be available to them.”

Focusing on assessing the safety and effectiveness of a new medication or device, a different dose of medication commonly used, an already marketed medication or device for a new indication, or a new medication or device compared to standard therapy, Winthrop’s neuroscientists participate in multicenter, Phase III clinical trials, as well as original research. An overview of several active studies — which include investigations into the management of multiple sclerosis, stroke and glioblastoma — follows:

MULTIPLE SCLEROSIS

New York State Multiple Sclerosis Consortium (NYSMSC)
Under the rubric of the NYSMSC, the
Hospital’s Multiple Sclerosis Center is collaborating with other centers within the state to amass one of the world’s largest and most comprehensive epidemiological databases for studying the demographic and clinical aspects of MS. (PI: Malcolm Gottesman, MD)

**Tysabri®-Related Clinical Trials**

- **STRATIFY-2**: Tysabri®, FDA-approved for treatment of relapsing remitting MS, is associated with an increased risk of progressive multifocal leukoencephalopathy (PML); JC is the virus linked to PML. This study focuses on gaining a better understanding of whether MS patients with JCV antibodies are at higher or lower risk of developing PML. (PI: Malcolm Gottesman, MD; SIs: Shicong Ye, MD; Sakshi Bajaj, MD; Sharon Friedman-Urevich, DNP)

- **TYGRIS**: The purpose of this study is to collect information on serious infections, cancers and other significant side effects that may occur in MS patients treated with Tysabri®. (PI: Malcolm Gottesman, MD; SI: Sharon Friedman-Urevich, DNP)

**CARES-MSII Trial**

This is a Phase III, randomized, rater- and dose-blinded study comparing two annual cycles of IV low- and high-dose Alemtuzumab to three-times weekly subcutaneous Interferon Beta-1a (Rebi®) in relapsing remitting MS (RRMS) patients, who have relapsed on therapy. Winthrop is the only participating study site on Long Island. (PI: Malcolm Gottesman, MD; SIs: Shicong Ye, MD; Lawrence Shapiro, MD; Jason Yasen, MD; Naveed Masani, MD; Huiying Yu, MD; Sharon Friedman Urevich, NP)

**STROKE**

**ALIAS Trial**

Sponsored by the National Institutes of Health National Institute of Neurological Disorders & Stroke, this is a Phase III, randomized, multicenter study of high-dose human albumin therapy for neuroprotection in patients with acute ischemic stroke. (PI: Jay Yasen, MD; SI: Barry Rosenthal, MD)

**ARUBA Trial**

Sponsored by the National Institutes of Health, this is a trial of patients with unruptured brain arteriovenous malformations, randomized to medical management versus interventional therapy — endovascular procedures, neurosurgery, or radiotherapy, alone or in combination. (PI: Elzbieta Wirkowski, MD; SIs: Jonathan Brisman, MD; Jay Yasen, MD)

**GLIOBLASTOMA**

**Hyperbaric Treatment of Glioblastoma**

This Phase II pilot study examines the benefits of treating glioblastoma patients with hyperbaric hyperoxegenation in conjunction with radiation and chemotherapy. The trial is based upon the knowledge that tumor tissue is hypoxic, and hypoxia contributes to resistance to radiation and chemotherapy. This approach, considered novel for glioblastoma, is geared to improving patients’ quality of life. (Pls: Paul Duic, MD; Jai Grewal, MD)

For more information, call the Institute for Neurosciences at 1-866-N EU RO-RX or visit www.winthrop.org.

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**Pending Neuroscience Clinical Trials at Winthrop-University Hospital**

- A Historical-controlled, Multicenter, Double-blind, Randomized Trial to Assess the Efficacy and Safety of Conversion to Lacosamide 400mg/day Monotherapy in Subjects with Partial-onset Seizures (PI: Shicong Ye, MD; SIs: Huiying Yu, MD; Sarah Cherian, MD; Sakshi Bajaj, MD)

- A Multicenter, Open-label Extension Trial to Assess the Long-term Use of Lacosamide Monotherapy and Safety of Lacosamide Monotherapy and Adjunctive Therapy in Subjects with Partial-onset Seizures (PI: Shicong Ye, MD; SIs: Huiying Yu, MD; Sarah Cherian, MD; Sakshi Bajaj, MD; Jay Yasen, MD)

- An Extension Protocol For Multiple Sclerosis Patients Who Participated in Genzyme Sponsored Studies of Alemtuzumab (also known as the CARE-MSSM Extension Study) (PI: Malcolm Gottesman, MD; SIs: Shicong Ye, MD; Naveed N. Masani, MD; Huiying Yu, MD; Lawrence Shapiro, MD; Jay Yasen, MD; Sharon Friedman-Urevich, DNP)

- Progesterone for the Treatment of Traumatic Brain Injury (ProTECT™ III) (PI: Elzbieta Wirkowski, MD; SIs: Jay Yasen, MD; Sarah Cherian, MD)

- Platelet-Oriented Inhibition in New TIA and Minor Ischemic Stroke (POINT) (PI: Sarah Cherian, MD; SIs: Elzbieta Wirkowski, MD; Jay Yasen, MD)

- A 96-Week, Prospective, Multicenter, Randomised, Double-Blind, Placebo-Controlled, 2-Parallel Group, Phase 3 Study to Compare Efficacy and Safety of Masitinib 6 mg/kg/day versus Placebo in the Treatment of Patients with Primary Progressive or Relapse-Free Secondary Progressive Multiple Sclerosis (PI: Malcolm Gottesman, MD)
Peripheral Neuropathy: An Overview

By Huying Yu, MD
Neurologist, Winthrop-University Hospital

Patients over age 55 are commonly referred for neurological consultations due to peripheral neuropathy — which can produce pain, loss of sensation, weakness and loss of coordination. Because there are numerous types and causes of neuropathy, the exact incidence cannot be determined. However, we do know that the condition affects three-to-four percent of people in this age group.

Types of Neuropathy

The different types of peripheral neuropathy — each with its own characteristic symptoms, pattern of development and prognosis — are classified based on pathology (axonal or demyelinating), pattern of presentation (symmetrical or asymmetrical), how many nerves are involved (mononeuropathies, mononeu-ritis multiplex or diffused polyneuropathies), or the type of nerve affected (motor, sensory or autonomic).

Symptoms

Symptoms reflect the type of nerve affected, with severity varying significantly:

- **Sensory nerve damage** can cause numbness; tingling; changes in temperature sensation and pain perception; loss of pain sensation, light touch, vibration and position sense; and the inability to maintain balance.
- **Motor nerve damage** commonly causes muscle weakness.
- **Autonomic nerve damage** is associated with changes in sweating, as well as loss of bladder, bowel and blood pressure control.

Causes

Most neuropathies are acquired, falling into three categories: those caused by systemic disease, those triggered by trauma from external agents, and those resulting from infections or autoimmune disorders. Specific causative agents include traumatic nerve injuries, tumors, toxins, nutritional imbalances, alcoholism, connective tissue diseases, and vascular and metabolic disorders. Over 30 percent of all neuropathies in the US result from diabetes and approximately 10-to-25 percent of polyneuropathies are idiopathic. Inherited neuropathy is relatively uncommon, associated with hereditary disorders, such as Charcot-Marie-Tooth disease.

Diagnosis

Diagnosis is often difficult because the symptoms are highly variable. An extensive patient history (documenting symptoms, work environment, social habits, exposure to toxins, history of alcoholism, risk of HIV or other infectious diseases, and family history of neurological disease), as well as a thorough neurological examination are required. Diagnostic tests are guided by the suspected cause, as suggested by the history, symptoms and exam.

Laboratory tests are key to evaluation. Blood tests check for underlying medical problems, such as diabetes, vitamin deficiencies, thyroid problems and other conditions. Nerve conduction studies and needle EMG examinations can confirm the presence of neuropathy and provide information regarding the type and severity of the condition, as well as its clinical phase (acute or chronic). CT and MRI scans, nerve and skin biopsies or other tests and procedures are often required in some cases.

Treatment

Most patients with peripheral neuropathies cannot be cured. However, many can be helped. Treatment involves addressing the underlying medical disorders and controlling symptoms with the right medications. The goal is to minimize symptoms and help patients achieve the ability to care for themselves and gain independence.

Neuropathic Pain

Reducing neuropathic pain is the primary focus of treatment. Antidepressants and anticonvulsants are the two pharmacological classes most widely studied and represent first-line agents in the management of neuropathic pain. (Table 1) The number of pharmacological agents that have demonstrated effectiveness for neuropathic pain continues to expand.

Although neuropathic pain management remains challenging because the response to therapy varies considerably and pain relief is rarely complete, a majority of patients can benefit from monotherapy using a well-chosen agent or polypharmacy that combines medications with different mechanisms of action.

For more information, call the Institute for Neurosciences at 1-866-NEURO-RX or visit www.winthrop.org.

<table>
<thead>
<tr>
<th>Table 1 – Medications Commonly Used to Treat Neuropathic Pain</th>
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<tbody>
<tr>
<td><strong>Tricyclic Antidepressants:</strong> Amitriptyline, Nortriptyline, Imipramine</td>
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<tr>
<td><strong>Serotonin-Norepinephrine Reuptake Inhibitors (SNRIS):</strong> Duloxetine (Cymbalta), Venlafaxine (Effexor)</td>
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<td><strong>Calcium Channel Alpha-2-delta Ligands:</strong> Gabapentin (Neurontin), Pregabalin (Lyrica)</td>
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<td><strong>Topical Lidocaine:</strong> Lidocaine transdermal patch</td>
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<tr>
<td><strong>Opioid Analgesics:</strong> Oxycodone, Methadone, Morphine, Levorphanol</td>
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<tr>
<td><strong>Tramadol (Ultram)</strong></td>
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<tr>
<td><strong>Topical Capsaicin</strong></td>
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<td><strong>Medications with Less Efficacy:</strong></td>
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<tr>
<td>- <strong>Serotonin Reuptake Inhibitors (SSRIs):</strong> Paroxetine (Paxil), Citalopram (Celexa), Fluoxetine (Prozac), Escitalopram (Lexapro), Bupropion (Wellbutrin)</td>
</tr>
<tr>
<td>- <strong>Anticonvulsants:</strong> Lamotrigine (Lamictal), Lacosamide (Vimpat), Carbamazepine (Tegretol), Oxcarbazepine (Trileptal), Topiramate (Topamax), Levetiracetam (Keppra), Valproic acid (Depakote)</td>
</tr>
</tbody>
</table>
Contributing Surgeons & Physicians

Michael H. Brisman, MD
Acting Chairman, Dept. of Neurosciences
Chief, Division of Neurosurgery
Co-Director, Institute for Neurosciences
516.255.9031

Dr. Michael Brisman specializes in stereotactic surgery and radiosurgery for brain tumors and trigeminal neuralgia. He is Board Certified by the American Board of Neurological Surgeons and is a Fellow of the American College of Surgeons. His postgraduate training includes a neurological residency and surgical internship at The Mount Sinai Medical Center in New York, where he was Chief Resident. He received his medical degree from Columbia University’s College of Physicians and Surgeons. Dr. Brisman has published numerous articles in professional journals. He is also on the Board of Directors of the New York State Neurosurgical Society and is President-elect of the Nassau County Medical Society.

Malcolm H. Gottesman, MD
Chief, Division of Neurology
Co-Director, Institute for Neurosciences
Director, MS Treatment Program
516.663.4525

Dr. Malcolm Gottesman specializes in the treatment of multiple sclerosis (MS), and is the founder of Winthrop’s MS Treatment Program. The program conducts original clinical research and participates in state-of-the-art clinical trials. Dr. Gottesman was instrumental in the establishment of the Stroke Program and Neuroscience Intensive Care Unit at Winthrop. He is Board Certified in Psychiatry and Neurology. His postgraduate training includes a residency in neurology at Long Island Jewish Medical Center, where he was Chief Resident. He also completed an internship and residency in psychiatry at Boston University Medical Center. Dr. Gottesman received his medical degree in an accelerated BS-MR program jointly sponsored by Rensselaer Polytechnic Institute and Albany Medical College. He has published numerous articles in professional journals and presents at national and international conferences. Dr. Gottesman received an MS Leadership award from the Long Island MS Society.

Karin Antaky, CNRN, MSN, FNP-BC
Cerebrovascular Nurse Practitioner
516.663.4525

A Board-Certified Family Nurse Practitioner and Certified Neuroscience Nurse, Karin Antaky has 20 years of experience in her field. With advanced training and exceptional skill, Ms. Antaky is an important member of Winthrop-University Hospital’s Stroke Team. She is a first responder for all acute stroke page activations, and is one of those responsible for assessing critically ill stroke patients in the Hospital’s Emergency Department and within the facility. Ms. Antaky is also actively involved in helping Winthrop maintain its certification as a New York State Department of Health designated Primary Stroke Center. She received her Bachelor of Science degree in Nursing at the University at Delaware and her Nursing Master’s of Science Degree at Long Island University/C.W. Post Campus.

Marat V. Avshalumov, PhD
Neurophysiologist
516.255.9031

Dr. Marat Avshalumov specializes in intraoperative monitoring of spinal cord and brain function during complicated surgical procedures. He received a doctorate in neuroscience from the Rostove State University in Russia. Following this, Dr. Avshalumov completed several years of postdoctoral training in neurophysiology at the New York University School of Medicine, where he became an assistant professor of research. He also received advanced training in clinical neurophysiology at Mount Sinai Medical Center in New York. An active researcher, Dr. Avshalumov has conducted studies related to Parkinson’s disease. He has published numerous articles in peer reviewed journals, including Proceedings of the National Academy of Sciences and The Journal of Neuroscience. He is currently co-investigator of the NIH-funded project focusing on the role of potassium channels in the regulation of physiological properties of dopaminergic neurons.

Kathleen Michel, CNRN, MSN, FNP-BC
Cerebrovascular Program Coordinator
516.663.4325

An American Nurses Credentialing Center (ANCC) Board Certified Family Nurse Practitioner and Certified Neuroscience Registered Nurse (CNRN), Kathleen Michel has over 15 years of experience in her field. With advanced training and exceptional skill, Ms. Michel coordinates Winthrop-University Hospital’s Cerebrovascular Program, and is an important member of the Hospital’s Stroke Team, participating in acute stroke response and management. She is also actively involved in staff and community education, oversees the Stroke Support Group, and is instrumental in assisting the Hospital in maintaining certification as a New York State Department of Health designated Primary Stroke Center. For the past nine years, Ms Michel has been an adjunct professor of nursing at Long Island University/C.W. Post Campus. In addition, she was a nurse practitioner at South Franklin Family Health Center in Hempstead, NY, and at New York-area hospitals, including Long Island College Hospital and New York Methodist Hospital in Brooklyn. She has also been a medical missionary since 2001, including most recently providing relief days after the earthquake in Haiti. She received her Bachelor of Science degree in Nursing at Adelphi University in Garden City, NY, and her Nursing Master’s of Science Degree at Long Island University/C.W. Post Campus.
Dr. Joseph Moreira is a Board Certified Neurologist specializing in intraoperative neurophysiology. He also has expertise in evaluating and treating disorders of the spine and neuromuscular system. Dr. Moreira was an assistant clinical professor of neurology at New York Medical College and served as Director of the Electromyography Laboratory and Intraoperative Neurophysiology at St. Vincent’s Hospital and Medical Center in New York. His postgraduate training includes Fellowships in Electromyography and Neuromuscular Disease at Cornell University Medical Center’s Hospital for Special Surgery in New York. He completed a residency in neurology and neuromuscular research/clinical neurology at St. Vincent’s, where he also completed an internship in internal medicine. Dr. Moreira has conducted extensive research, published in numerous peer reviewed journals and presented various techniques of intraoperative monitoring using transcranial motor-evoked potentials at the American Academy of Neurology.

Dr. Tessler specializes in the multimodality treatment of malignant and benign brain tumors, which includes stereotactic surgery and radiosurgery. He is proficient in CyberKnife® Radiosurgery. His postgraduate training includes a residency in neurosurgery and internship in general surgery at New York University Medical Center and Bellevue Hospital Center, where he was Chief Resident. He earned his medical degree at The Ohio State University College of Medicine and Public Health in Columbus, Ohio, with clinical honors in neurosurgery and general surgery.

Dr. Jay Yasen’s primary areas of interest include acute stroke management and cerebral venous thrombosis. He joined Winthrop from Montefiore Medical Center, where he served as Director of Stroke Service for more than six years. Dr. Yasen is Board Certified in Neurology and is a Diplomate in the subspecialty of Vascular Neurology. His postgraduate training includes a Fellowship in Stroke and Neurocritical Care at Beth Israel Medical Center in Manhattan. He completed a residency in neurology at the Albert Einstein College of Medicine and an internal medicine internship at Columbia Presbyterian Medical Center. Dr. Yasen earned his medical degree from the Albert Einstein College of Medicine. He has conducted research into the prevention of second strokes and has authored several publications dealing with stroke.

Dr. Huiying Yu, Board Certified in Neurology and Electrodiagnostic Medicine, has a special interest in neuromuscular diseases. Dr. Yu’s postgraduate training includes an Electromyography Fellowship at Harvard University Medical College/Massachusetts General Hospital, a Fellowship in Physiology at the University of Virginia Medical Center and four years as a postdoctoral researcher in neurobiotechnology at Ohio State University. She has spent time as a research scientist in the Department of Psychiatry at New York University Medical Center, where she also completed a residency in neurology and served as a medical intern. Additionally, Dr. Yu was a neurology resident at the Peking Union Medical College Hospital in Beijing. She earned her medical degree from the Norman Bethune University of Medical Sciences School of Medicine in the People’s Republic of China. Dr. Yu has presented at professional meetings and published numerous articles in peer reviewed journals, including Clinical Imaging and the Beijing Medical Journal.
Winthrop-University Hospital’s Institute for Neurosciences

Winthrop-University Hospital is a 591-bed teaching hospital located on Long Island in Mineola, NY. A major regional healthcare resource, the Hospital has been a leading healthcare provider for more than a century, dedicated to the integrity, dignity and well-being of every individual. Winthrop offers a full complement of advanced inpatient and outpatient services with a deep commitment to medical education and research.

Physicians and surgeons in Winthrop’s Institute for Neurosciences are pioneering the use of technologically advanced approaches for the diagnosis and treatment of diseases of the brain and spine, including computerized imaging systems, state-of-the-art surgical interventions and the latest generation of medication therapies.

The Institute’s interdisciplinary team includes neurologists; neurosurgeons; neurointensivists; pediatric neurologists and neurosurgeons; neuroradiologists; vascular surgeons; orthopaedic spine surgeons; neuro-oncologists; neuropathologists; neurophysiologists; and specially trained nurse practitioners, physician assistants and nurses. Specialized physical and occupational therapy, social work and other supportive services are also key components of the Institute. The Institute’s experts are up to date on the latest developments in neuroscience and help pave the way for new discoveries through participation in clinical research trials, which enable them to provide patients with access to tomorrow’s most promising therapies.

**Programs & Services Offered by the Institute for Neurosciences**

**Neuroscience Intensive Care Unit**
The 14-bed acute care NeuroICU is reserved for patients with serious, complex neurological issues. The focus is on providing continuous monitoring and instantaneous results of critical values, allowing the expert staff, experienced in using advanced technology and providing neurocritical care, to employ aggressive interventions that treat neurological deterioration.

**Neurology**
Epilepsy Program
Movement Disorders Program
Multiple Sclerosis Treatment Center

**Neurosurgery**
3D Spinal Navigation
Aneurysm Coiling & Clipping
Disc Replacement
Brain Aneurysm Program
Brain Tumor Program
Brain & Skull Base Surgery
Carotid Stenting & Endarterectomy
Cerebrovascular & Endovascular Surgery
Chiari Decompression Surgery
Complex & Minimally Invasive Spinal Surgeries
Complex Cranial Surgery
Computer-Assisted Resection of Brain Tumors
CyberKnife® Radiosurgery
Endoscopic Pituitary Surgery
Epilepsy Surgery Program
Facial Pain/Trigeminal Neuralgia Program
Image-Guided Spine Surgery
Kyphoplasty

**Neuroradiology**
Aneurysm Treatment
CT Perfusion Scanning
Interventional Neuroradiology
Neuroangiography

**Pediatric Neurology**
Attention Disorders & Learning Disabilities Treatment
Craniostenosis Surgery
Brain Tumor Treatment
Evaluation & Treatment of Children with Headaches
Evaluation & Treatment of Neurological Disorders

For more information, call the Institute for Neurosciences at 1-866-NEURO-RX.