A clinical resource by the
MERCY NEUROLOGICAL INSTITUTE OF GREATER SACRAMENTO

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SYNAPSE

Volume Two, Issue One | Winter 2011

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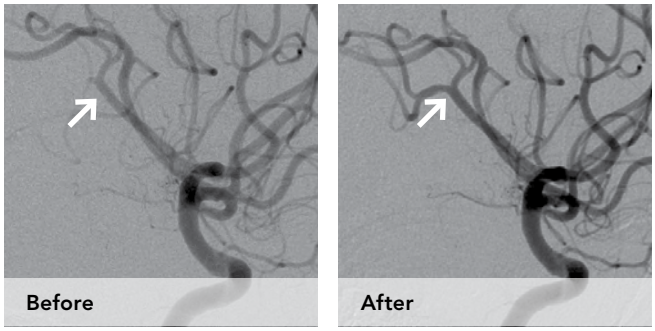
Twist of Fate Brings Traveler to Mercy

Carolyn Laiblin thought the toughest part of the thousand-mile journey from her home in Tacoma, Washington, to see her family in Los Angeles would be driving in the unrelenting rain. However, after she and her husband George decided to stop on a November night in Sacramento, their trip took a frightening—and life-threatening—turn. "We had dinner and I was feeling absolutely great. But when we got back to the hotel, I got dizzy and couldn't figure out how to make the elevator work," remembers 68-year-old Carolyn. "I couldn't speak



Before **After**

and my husband didn't know what was going on. The hotel clerk knew something was wrong and called 911." Within minutes, Carolyn was in Mercy General's Emergency Department, being treated for ischemic stroke.

As fate would have it, Carolyn and her husband just happened to stop for the night minutes away from the very team that would save her life. "When Carolyn arrived at Mercy General, she was completely aphasic," explains Alex Nee, MD, Mercy Neurocritical Care Specialist. "Fortunately, she arrived here within 15 minutes of the onset of symptoms. We were able to treat her with intravenous tPA very quickly." However, her symptoms did not immediately improve. George Luh, MD, Mercy Interventional Neuroradiologist, then performed a cerebral angiogram, which revealed the clot in Carolyn's brain. Using a catheter threaded through the femoral artery, Dr. Luh administered intra-arterial tPA directly to the clot. He also used a mechanical device to break up the clot. Over the course of an hour, Dr. Luh could see that the treatment was working and blood flow was returning to that area of Carolyn's brain. While being removed from the angio table, Carolyn spoke for the first time.

"She really made quite a dramatic recovery," Dr. Luh says. "It was really remarkable."

By the next day, Carolyn, whose only known stroke risk factor was hypertension, was speaking even more and was up and mobile. "My niece flew in and came to the hospital and was walking down the hall with a physical therapist and me," remembers Carolyn. "And she actually laughed and said, 'You just had a stroke and I still can't keep up with you!' It was amazing—I had had a stroke the day before—but I felt fine!" In fact, just two days after being admitted, Carolyn was discharged and she and George made the drive home to Tacoma. "I still can't believe this happened to me. But as my husband told everyone at Mercy, we sure are glad it happened where it did!"

Carolyn says she has fully recovered from her stroke and is looking forward to spending the holidays at home with her family. Drs. Nee and Luh credit the quick action of everyone

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Neuropsychological Assessment Offered Through the Mercy Neurological Institute

Caron Nogen, PsyD

Patients and physicians often ask "What exactly is clinical neuropsychology?" Clinical neuropsychology is defined as an applied science with a concentration on brain-behavior relationships. With historical origins in both neurology and psychology, clinical neuropsychology focuses on the diagnostic assessment and treatment of individuals with neurocognitive difficulties.

Brain functioning is assessed through the use of structured and scientifically validated tests.

Neurological examinations and brain scans are clearly beneficial, looking at the structural, physical and metabolic conditions of the brain. However, the neuropsychological examination is a primary way to formally assess brain function. Brain functioning is assessed through the use of structured and scientifically validated tests. These objective measures provide quantitative results examining a variety of abilities, including attention, memory, language, visuospatial skills and executive functions. Mood and personality are also assessed. The obtained data can be compared to normative standards based on a variety of demographic information, including age range and, in some instances, gender and educational background. This gives the examiner a valid comparison of how the individual has performed in comparison to other non brain-injured individuals of similar demographic. Likewise, qualitative data is just as important. Examining patterns of performance, observing how the individual approaches specific problems and general behavioral observations complement the assessment of underlying brain and emotional function.

What is an appropriate referral? Neuropsychological testing is beneficial in helping to clarify diagnoses (e.g., depression versus dementia), assist with treatment planning and determine readiness for returning to work or driving. Testing is also helpful in detecting changes over time with progressive neurobehavioral disorders as well as tracking improvement following a brain injury or surgical intervention. Finally, localizing cerebral language lateralization and memory function during Wada testing and tracking cognitive status pre-and-post surgery are helpful when working with our epilepsy patients.

A neuropsychological evaluation consists of a clinical interview and testing. Generally, a family member or someone close to the patient will be asked to participate in the hour-long interview to provide collateral information. An evaluation can range from an abbreviated assessment (three to four hours of face-to-face interaction)

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Caron Nogen, PsyD

Recognizing Vertebrobasilar Strokes

Tracy Adams, MSN, RN, CNRN, FNP-C

Emergency department physicians, specialists and general practice physicians may encounter patients with posterior circulation strokes. The vertebrobasilar arterial system perfuses the brainstem and occipital cortex, and infarction can be due to either large or small vessel thrombosis or embolism.

The clinical features of posterior circulation strokes are different from those of disease affecting the cerebral hemispheres. Hemianopsia, cerebellar and brainstem deficits and alteration of consciousness are the hallmarks of posterior circulation strokes. Seventy percent of patients will exhibit an abnormal level of consciousness, hemiparesis or tertaparesis (usually asymmetric) and 40% of patients have bulbar manifestations (facial weakness, dysphagia, dysarthria, dysphonia). Cerebellar signs (e.g., dysmetria, ataxia) are also frequent. Pupillary and oculomotor abnormalities also are common and unilateral Horner syndrome occurs with brainstem lesions. Occipital lobe lesions result in visual field loss or visuospatial deficits.

When cranial nerves or their nuclei are involved, the corresponding clinical signs are ipsilateral to the lesion and the corticospinal signs are crossed, involving the opposite arm and leg. Involvement of the ascending sensory pathways may affect the spinothalamic pathway or dorsal columns, resulting in a condition referred to as dissociated sensory loss.

This condition occurs when there is loss of one sensory modality on one side and preservation of other sensory modalities in the opposite limbs. Vertigo, nausea and vomiting, along with nystagmus, represent additional manifestations of vestibular system injury. Cortical deficits, seen in hemispheric strokes, such as aphasia and cognitive impairments, are absent in vertebrobasilar damage.

Emergency room evaluation of all patients with stroke should include: Complete blood count electrolytes, blood urea nitrogen and creatinine, prothrombin time and activated partial thromboplastin time. Electrocardiography should be performed in all patients on initial evaluation and continued cardiovascular monitoring. Up to 20% of patients with acute stroke have an arrhythmia, and ischemic changes on the ECG should be investigated with serum studies of creatine kinase, cardiac isoenzymes and troponin levels.

CT scanning usually is the primary imaging study performed, because it has a sensitivity of more than 95% for identification of hemorrhage. Once it has been determined that recanalization with thrombolysis could be completed, angiography is a first-line diagnostic test after a CT scan.

Establishing the mechanism of the stroke is important. Embolism due to atrial fibrillation and thrombosis due to atherosclerotic disease are common causes of stroke in middle-aged and older adults. Patients who are younger than 45 years or who have no evidence of atherosclerosis should be investigated for the presence of hypercoagulable states, such as: Lupus anticoagulant and anticardiolipin antibodies, protein C, protein S, antithrombin III deficiencies and Factor V Leiden mutation as well as echocardiography, looking for cardiac anomalies, such as valve defects or patent foramen ovale. MRI and MRA can demonstrate the areas of ischemia and can show abnormalities of the vessels.

Embolism due to atrial fibrillation and thrombosis due to atherosclerotic disease are common causes of stroke in middle-aged and older adults.

Intravenous thrombolysis with tPA has been available for a number of years, and angioplasty or mechanical thrombectomy have more recently become available for treatment of posterior circulation strokes.

Patients with acute basilar artery occlusion have a mortality rate of more than 85%. Survivors usually are left with significant neurologic deficit. For symptomatic patients who survive, the risk of recurrent stroke is 10–15%.

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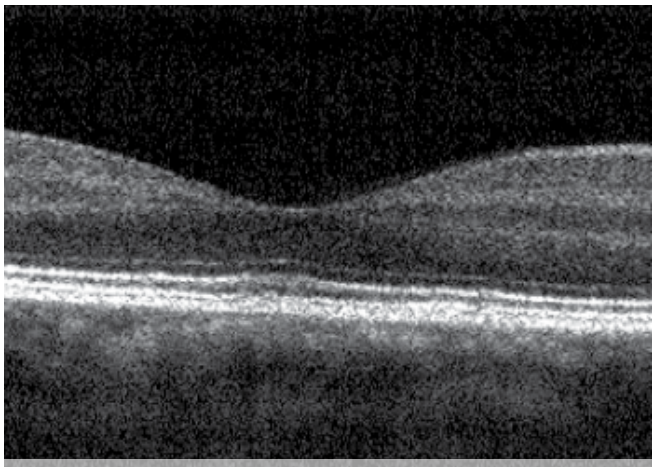
What OCT Brings to Mercy

Robert Bellinoff, MD

Recently, Mercy Medical Group purchased an Optical Coherence Tomography (OCT) machine. OCT was first described in 1991. Basically, this machine uses a non-invasive method via an optical analogue of ultrasound to measure various aspects of a patient's eye. The OCT allows scanning speeds of up to 55,000 axial scans/sec with resolutions of five microns. Several structures such as



Normal retina featuring the 10 basic layers. The depression in the center is a typical foveal depression in the retina where best vision is obtained.

the macula (the central aspect of the retina where vision is sharpest), the optic nerve and nerve fiber layer, and corneal thickness can be visualized and measured with this machine. The angle of the eye can also be evaluated to help determine if there is risk for angle closure glaucoma.

Optic nerve imaging is performed to see what damage, if any, is occurring from glaucoma or other optic neuropathies. Precise views of the retina, specifically the macular region, can also be imaged, which helps in determining whether there is edema of the retina due to such causes as inflammation from surgery, vascular occlusion or infectious processes, diabetic retinopathy, as well as visualizing retinal holes or extra-retinal membranes. These findings can then guide us to which treatments are appropriate, and whether referrals to other specialists are necessary.

A further benefit from OCT imaging is the possibility of determining what damage is occurring from Multiple Sclerosis (MS). Images of the retinal nerve fiber layer can be measured for actual thickness down to the micron level, in the hope that it could help predict consequences and clinical implications from episodes of Optic Neuritis. Subtle retinal nerve fiber layer defects in MS may be present even in the absence of a prior episode of Optic Neuritis. Disease progression, as reflected by duration and amount of disability, have been shown to correlate to OCT measurements.

OCT, now at both Mercy Medical Group and Woodland Healthcare, opens exciting new realms of possibility for the Mercy Neurological institute.

If you have comments or questions for Dr. Bellinoff, please e-mail us at mercyneuro@chw.edu.

Robert Bellinoff, MD

Neuropsychological Assessment Offered Through the Mercy Neurological Institute, continued from page 2

to a more comprehensive evaluation (approximately eight hours of face-to-face contact). The neuropsychologist will then score the tests, complete a thorough report and provide appropriate recommendations regarding treatment planning and use of specific compensatory strategies to assist the patient in his/her day-to-day life. Finally, the patient is provided with a comprehensive feedback session where test results, impressions and recommendations are reviewed in detail.

Currently, two neuropsychologists provide assessment services through The Mercy Neurological Institute of Greater Sacramento. Dr. Caron Nogen is located at Mercy General Hospital, splitting her time between inpatient and outpatient rehabilitation services. Dr. Joel Solomon is located at the Mercy Outpatient Rehabilitation Center in Roseville.

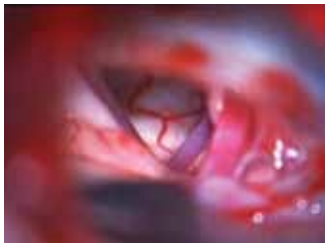
If you have comments or questions for Dr. Nogen, please e-mail us at mercyneuro@chw.edu.

Hemifacial Spasm

Kavian Shahi, MD, PhD

Hemifacial Spasm (HS) is a movement disorder which typically begins with spontaneous, intermittent flickering of the orbicularis oculi muscles. Symptoms usually begin insidiously in the sixth decade of life and affect women more frequently than men. The spasms are unilateral and occur more often on the left side than the right.

Over time, the spasms spread caudally to involve the other muscles of the face, and may include the platysma. Rarely, the spasms begin in the buccinator and spread to the orbital and frontalis muscles. Involuntary contractions can last for several seconds or may occur in volleys lasting minutes with resultant eye closure and grimacing, which can interfere with vision or be of great cosmetic concern. The spasms occur spontaneously but can also be triggered by volitional facial movements. They may persist even during sleep. Occasionally, patients develop tinnitus and can have mild hearing loss in the ipsilateral ear. While spontaneous remission occasionally occurs, usually the spasms last for years.



Before
Facial nerve compressed at the root entry zone by artery.

After
Teflon sponge placed between the artery and facial nerve.

Hemifacial spasm is almost always caused by vascular compression of the facial nerve at or proximal to its root entry zone. Rarely, tumors or vascular malformations can be the source of compression.

Treatment options include medications such as Tegretol or benzodiazepines, although benefit of these agents is seldom more than slight, and effectiveness wanes over time. Botulinum toxin injections usually provide satisfactory reduction in the spasms, but the benefit lasts no more than a matter of months, requiring repeated injections over time. Additionally, the injections may cause transient, though bothersome unwanted weakness of eyelids or lower facial muscles. Finally, microvascular decompression of the facial nerve can give excellent results in most cases. A small one-inch craniotomy is made behind the ear and the offending vessel is identified and permanently moved away from the nerve by placing a small Teflon sponge between it and the nerve. Relief can be immediate.

If you have comments or questions for Dr. Shahi, please e-mail us at mercyneuro@chw.edu.

Kavian Shahi, MD, PhD

Brain Waves: Updates from the Mercy Neurological Institute

WOODLAND'S NEW NEUROSCIENCES CENTER OPENS TO PATIENTS

Woodland Healthcare recently opened the Cancer and Neurosciences Center in Woodland. Medical services relocating to the Cancer and Neurosciences Center include Hematology, Oncology, Neurology, Infusion Services and the Sleep Disorders Center.

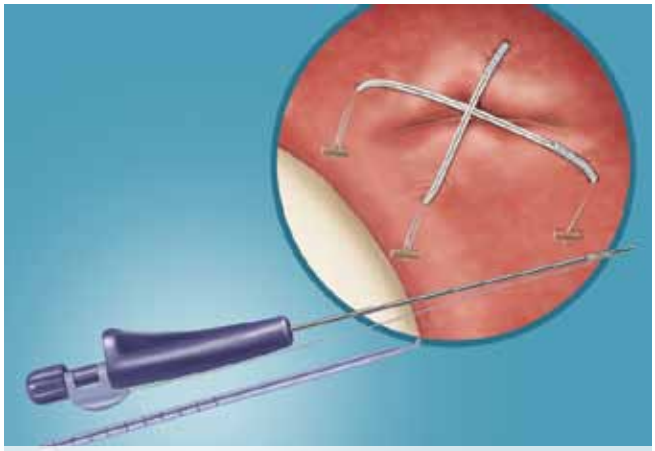
The Neurosciences Center delivers expertise in the diagnosis and treatment of neurological disorders such as sleep disorders, epilepsy, multiple sclerosis, brain tumor, migraine, Alzheimer's disease, spinal disorders and neuromuscular diseases, peripheral nerve disorders and stroke. Woodland Healthcare is designated a Primary Stroke Center by the Joint Commission, meaning a dedicated team ensures rapid response and follow-up of stroke cases. As part of the Mercy Neurological Institute of Greater Sacramento, Woodland Healthcare's Neurosciences Center has access to the latest treatments and ongoing research.

"It will be a pleasure to serve our patients in a brand new Cancer and Neurosciences Center," says Richard Beyer, MD, Neurology. "Our new facility will now match the excellent care we deliver every day."

Minimally Invasive Procedure Helps Disk Surgery Patients Recover Faster

Michael Robbins, MD

Low back pain is one of the top three diagnoses that motivate patients to seek care from their doctor. The prevalence is as high as 85% of the population who will at some time in their lifetime experience back pain that will interfere with their activities of daily living. It is further estimated that up to 3% of these patients will suffer a herniated lumbar disk that may require surgical intervention.



Anulex repair implant.

Lumbar disk surgery has undergone many refinements and proposed methods of treatment since the original laminectomy and diskectomy procedure of Mixter and Barr in the 1950s. The introduction of illumination devices, magnification instruments, dilating tubes and various forms of disk-resecting devices have not changed the overall strategy, which is to remove the offending disk material and promote healing of the back wall of the disk, or anulus.

There have been proponents over the years who have advocated near complete removal of the entire offending disk and those who advise removal of as little disk as possible to accomplish the objective of sciatic nerve pain relief and return to normal activity. Either of these strategies is also tempered by the desired outcome of avoidance of recurrence of the rupture, which may occur in up to 20% of cases nationwide. One area that has drawn much attention over the years has been the ability to close the defect in the outer wall of the disk in order to promote faster healing and reduce the risk of re-herniation. Currently, the Anulex repair implant is being used at Mercy General Hospital, allowing a quick return to activity for disk surgery patients. Combined with small incisions and minimal tissue dissection, this has reduced the recovery time for our patients.

Currently we are performing a minimal incision (1 to 1 1/2 inches) on most patients. By using our state-of-the-art operating microscopes and removing as little of the disk material as needed to relieve pressure on the nerves, we are limiting operating room time to under 45 minutes in most cases. The Anulex repair system is put into place after removal of the disk fragments and prior to closure of the incision. This device consists of two plastic mini-anchors, which are placed through the ends of the anulus opening where the disk is removed. A suture attached to the anchors is then tightened to bring the ends of the anulus back together. The patients are taken to the recovery room and have the option of being discharged home the same day or the following morning.

At this time, there is a large study being done to determine just how effective this new technology is, but early results indicate at least a 50% reduction in the recurrent disk herniation rate for these patients. There have been no negative effects of the materials or on healing of the operative site. This is an exciting new system which may allow better, faster, and overall long-term improved outcomes on back health for our patients.

If you have comments or questions for Dr. Robbins, please e-mail us at mercyneuro@chw.edu.

Michael Robbins, MD

Recognizing Vertebrobasilar Strokes, continued from page 3

Early rehabilitation has been shown to play a pivotal role in recovery from any acute stroke. Functional gains, mood, psychological assessment, home modifications and social issues are important factors to address in subsequent outpatient care. Risk factor reduction can be managed by primary care physicians.

CASE REVIEW:

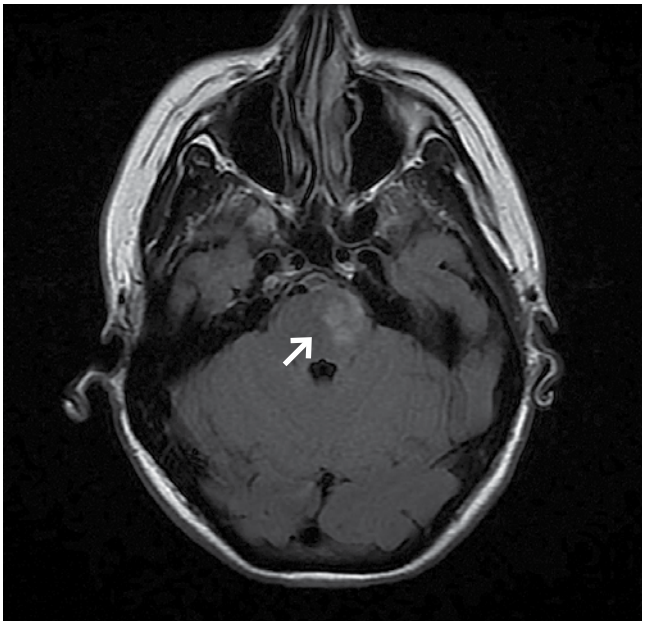
After a week of waxing and waning nausea, vertigo and a mild headache, a 42-year-old female visited her physician and was diagnosed with an inner ear infection.

She was sent home on antibiotics and told to rest and return if her symptoms worsened. The following day she awoke with a severe headache and decided to go back to sleep. Her husband woke her up later that morning and noticed left-sided facial droop and slurred speech, and she complained of right-sided numbness and increased feeling of nausea and vertigo.

An ambulance was called and the patient was transported to an emergency department. The stroke alert process was initiated. Head CT was negative for hemorrhage or visible ischemic changes. ECG and laboratory tests were normal. A neurologist evaluated the patient after responding to the in-house stroke alert and on the basis of ataxia and pupillary abnormalities suspected a posterior circulation stroke.

Although the window of time for IV tPA had passed, the decision was made to perform a cerebral angiogram as the window of opportunity for interventional procedures is considered to be longer. The angiogram revealed a narrowing of the left vertebral artery due to thrombosis.

An interventional radiologist was consulted and the decision was made to give intra-arterial tPA and to aspirate the thrombus with a penumbra catheter. Her outcome was a gratifying return to baseline function.



Diffusion weighted MRI showing area of restricted diffusion in the left pons, indicative of acute infarction.

This patient received up-to-date diagnostic tests and interventional therapy. This was made possible by collaboration between the ED, the neurologist, stroke nurses, radiologists, neurointerventionalists, and subsequently by hospitalists, nursing and rehabilitation services. All of these specialists form the cornerstone of the Mercy Neurological Institute.

For more information or if you have comments or questions, please e-mail us at mercyneuro@chw.edu.

Twist of Fate Brings Traveler to Mercy, continued from page 1

involved with Carolyn's outstanding outcome.
"As we always say, time is brain," says Dr. Luh. "Her husband wasted no time in getting Carolyn into the ED and our staff, including the stroke coordinator on call that night, responded incredibly quickly. This success story really is a tribute to the entire Mercy team."

If you have comments or questions, please e-mail us at mercyneuro@chw.edu.

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WOODLAND HEALTHCARE

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UPCOMING EVENTS

Save the Date: Insights & Innovations

Mercy's annual evening CME event, Insights & Innovations, is scheduled for May 18 from 5:30–9 p.m. at the Sheraton Grand Hotel. Mark your calendar and visit **mercyneuro.org** for more information.

Join Us Monthly for Neuro Grand Rounds

Mercy General Hospital
First Thursday of each month at 12:30 p.m.

Mercy San Juan Medical Center
First Friday of each month at 12:30 p.m.

Questions or program suggestions can be directed to Candy Collins, CHW CME Office, at 916.733.6334.