Synapse
a clinical resource
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Understanding Comprehensive Care in Multiple Sclerosis

John Schafer, MD

Multiple sclerosis is a relatively common disorder, but it differs from many other neurological diseases in a number of ways. It is sometimes difficult to diagnose, and both missed diagnoses and misdiagnoses are common. The severity of impact on the life of a person with MS is remarkably variable. Some fortunate individuals live a full life with no or minor disability. Others become disabled and require, at the very least, accommodation to perform usual activities, or at worst become unable to care for themselves. MS most commonly begins in young adults who are in their prime of professional and family life, and it is a lifelong disorder with effects that are highly unpredictable.

Mercy MS Center Meets the Need

Mercy Multiple Sclerosis Center, established in 2009, was the first in Northern California to be designated by the National Multiple Sclerosis Society as a Partner for Comprehensive Care. This designation means that optimal care can be provided over a patient's entire lifetime and over a spectrum of severity, from newly diagnosed to advanced stages. MS may cause profound changes in quality of life, not only for the patient but for family, friends and professional colleagues. Comprehensive care means not only a doctor's visit, an MRI scan and a prescription for a medication, but also managing complications, including the physical as well as cognitive, emotional and social aspects.

Teamwork is Key to Comprehensive Care

Comprehensive care requires a team approach to diagnosing and managing MS. Neurologists and physician extenders generally make the diagnosis, recommend treatment and monitor the course of the disease and effects of treatment. An MS nurse provides critical education and counseling to patients at the time of the visits as well as by phone between visits and serves as coordinator of care, managing referrals and monitoring medications. Close working relationships with radiologists, urologists, ophthalmologists, physical medicine specialists, pain management specialists and behavioralists who are experienced in multiple sclerosis are critical. Vitally important to management at essentially all stages of the disease is the rehabilitation team, who provide physical, occupational, speech and cognitive evaluation and treatment.

Mercy MS Center's team includes two neurologists, John Schafer, MD and M. Karsten Dengel, MD, as well as physician assistant Kellie Zumot, PA—all of whom are MS Certified Specialists. They are supported by Sofia Rogado, RN, who is preparing for certification. The Center's medical assistants and receptionists are very experienced in MS patient care, since more than 800 patients have been served. The Mercy Outpatient Rehabilitation Center provides a spectrum of therapies, and a number of the therapists are MS Certified Specialists. Mercy Imaging has perfected MRI imaging and reporting protocols that are especially tailored for diagnosing and monitoring multiple sclerosis.

Mercy MS Achievement Center to Open This Year

The ability of the Mercy MS Center to provide help to those with MS at all stages of disability will be immensely expanded with the establishment later this year of the Mercy MS Achievement Center. Made possible by a large grant from the Conrad N. Hilton Foundation, the Mercy MS Achievement Center will be a day program for those with disability from MS. It will provide long-term opportunity for fitness, cognitive activities, recreation and

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John Schafer, MD

Mercy Neurological Institute of Greater Sacramento
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For your convenience in neurological referrals, call the Dignity Health Doctor Direct referral line at 855.685.5050.

Mercy Telehealth Network Continues to Grow After Five Years

Alan Shatzel, DO

Early in 2008, the Harry C. & Deborah L. Elliott Family Foundation gave a very generous $500,000 gift to Mercy Foundation, with the intention that it be used to improve stroke care in communities outside the metropolitan area. Due to a lack of stroke specialists in suburban and rural communities, care in those areas was slow to keep up with technological advances, leaving patients in outlying areas without access to the very latest in stroke care.

A driving force for the need for improved stroke care in suburban and rural areas was the 1996 FDA approval of recombinant Alteplase (tPA) for treatment of acute stroke. This drug must be administered within a narrow three-hour window—a timeframe that was often too short for patients treated outside urban areas where tPA, and the stroke specialists who oversee its administration, were available.

A Growing Burden on Outlying Hospitals

The Institute of Medicine report on *Quality through Collaboration: The Future of Rural Healthcare* nearly one decade ago acknowledged that the rapid pace of medical science and technological advances have placed an added burden on small suburban and rural hospitals. Because of location and resource constraints, these hospitals are unable to deliver consistent and reliable results for their patient population. Addressing this need by connecting specialized physicians to patients has become a core competency and strength of Dignity Health's Mercy Telehealth Network.

A High Tech Answer to a Problem of Access

At the time of the Elliott family's gift in 2008, remote presence technology and robotic telemedicine were barely more than science fiction. However, after dealing with legal, administrative and technological questions, Mercy Telehealth's first robotic telemedicine service was launched at Mercy Hospital Folsom in October 2008 using the RP7 Robot. The RP7, aptly named "Elliott," was the first of a succession of devices added in subsequent years. The robot could be driven and maneuvered by the offsite telestroke neurologist using a joystick. Two-way audio and visual contact between the neurologist and the patient, as well as the patient's family and ER staff, allowed for an intimate interaction much like that conducted in any bedside exam. The robot's zoom lens allowed the neurologist to evaluate even the patient's pupils and eye movements.

MTN Provides Access and Success

Mercy Telehealth Network Director, Jim Roxburgh, and Operations Manager, Jason Close, have developed a robust infrastructure that allows for clinical experts to deliver necessary care in the right place at the right time. In the five years since inception, MTN has successfully partnered with 13 hospital centers (with several more in the pipeline) which lacked consistent stroke care. Many partner sites fall below the national benchmarks for tPA delivery due to lack of clinical expertise, protocol and process to appropriately identify and treat stroke. MTN provides access to specialized

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Alan Shatzel, DO

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physicians and brings focus and clarity for patient-centered program development. Thrombolytic rates consistently at or around 24–25% place MTN telestroke service in an elite group achieving results similar to our tertiary-level comprehensive centers at Mercy General Hospital and Mercy San Juan Medical Center. From December 2008 to June 2013, MTN provided 1,696 telestroke consults. The administration rate of tPA is greater than 24%.

With the addition of services besides acute stroke, MTN now has more than 40 robotic telemedicine endpoints providing direct connection to specialty services not otherwise accessible to the population in need. TeleICU, TeleMental Health, TeleNursery (neonatology), TelePediatric ICU, TeleMS Specialty clinic, TeleNephrology, TeleCardiology, TelePulmonary, TeleEMS, TeleSkilled Care, TeleHome and many more services are being implemented to enhance the patient experience and access to necessary care.

MTN Continues to Evolve

During its five years, Mercy Telehealth Network has continued to evolve as technology has evolved. Heavy laptop computers and joysticks have been replaced by iPads. Physicians rounding in the ICU can now direct the robot to approach a specific room. Compared to other telemedicine programs, Mercy Telehealth Network has the largest and most sophisticated combination of robotic devices including the newest generation RP-Vita, which is self-driven and allows for focused attention to the patient interaction.

Mercy Telehealth Network was born from the generous gift of the Elliott Family Foundation and has blossomed into an extensive matrix connecting clinical experts to patients in need. Continued incremental growth and development are expected in the next five years as the landscape of medicine is changed to even out disparities and improve access to care. ■

MNI Mourns the Passing of Epilepsy Advocate

Robert Burgerman, MD

Mercy Neurological Institute lost a great clinician and friend with the passing of Robert Burgerman, MD, on July 12. Dr. Burgerman passed away unexpectedly at the age of 54.

Dr. Burgerman was a great champion for advancing care for patients suffering from intractable epilepsy. For more than 20 years he dedicated his professional life to serving the needs of patients and their families, setting the community standard for comprehensive epilepsy care. Dr. Burgerman was a great advocate for MNI and actively supported the Institute's continued growth and development, particularly in the comprehensive epilepsy surgery program.

Dr. Burgerman is survived by his wife Linda Ramatowski, RN, FNP, who is also deeply involved in the care of patients with neurological disorders. ■

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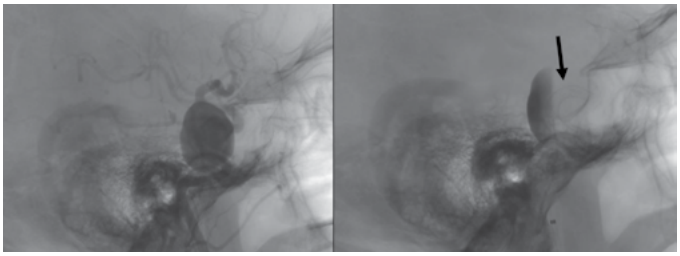
social support which are not available through traditional insurance.

The success of Mercy MS Center has been greatly facilitated by affiliation and interaction with other organizations. The National Multiple Sclerosis Society co-sponsors the Center's ongoing patient lecture series and will play an important role in operation of the Mercy MS Achievement Center. Valuable resources have been provided by the Consortium of Multiple Sclerosis Centers, of which Mercy MS Center is a member and a contributor at the Consortium's annual meeting.

Mercy MS Center looks forward to expanding MS care through the addition of more social services and provider education; and further development of telemedicine visits, which have been conducted over the past two years, greatly improving care to patients distant from the center. ■

New Tool in Endovascular Aneurysm Treatment

George Luh, MD



Lateral view right carotid angiogram shows a large cavernous carotid aneurysm. The patient presented with multiple cranial nerve palsies from mass effect.

Following placement of the PED (arrow) there is immediate stasis of contrast within the aneurysm. The patient's cranial nerve palsies have almost completely resolved.

Approximately 18 million people in the United States have an unruptured intracranial aneurysm. The main concern for brain aneurysms is subarachnoid hemorrhage (SAH), which occurs in 30,000 people each year in the United States. The 30-day mortality rate for SAH is 45% with approximately half of the survivors suffering irreversible brain damage. In addition, for those whose aneurysm does not rupture, about one in three (six million) people will have significant psychosocial impairment just from knowing that they have a brain aneurysm.

The two main options for brain aneurysm treatment include surgical clipping with craniotomy and endovascular therapy. Endovascular therapy is a rapidly changing field with new technology constantly emerging. One of the most recent developments is an intracranial stent, the Pipeline Embolization Device (PED), designed to divert blood flow away from the aneurysm thereby promoting aneurysm thrombosis. This new stent is made of 75% cobalt chromium and 25% platinum tungsten, which provides enough flexibility for navigation into the tortuous intracranial vasculature, while at the same time offers a tighter mesh that provides three to five times more surface coverage than other intracranial stents. Placing the PED across the neck of the aneurysm decreases blood flow into the aneurysm by 85%. This promotes thrombosis. Once thrombosis occurs this allows endothelialization of the stent, forming a biological seal across the aneurysm. As opposed to treating a brain aneurysm with coils which causes immediate aneurysm occlusion, the PED causes gradual aneurysm thrombosis which may take weeks to months to occur.

The main advantage of the PED is that it allows treatment of aneurysms that are not amenable to treatment with coils or brain surgery. Aneurysm location and shape, such as fusiform aneurysms, may often preclude treatment by any other means. Aneurysms treated with the PED show >90% occlusion rate at six months and one year. By comparison, wide neck aneurysms treated with coils often show <70% occlusion rate. In addition, when a brain aneurysm is treated with coils a microcatheter has to be placed inside the aneurysm, which often is technically difficult and dangerous. To treat a brain aneurysm with the PED you don't have to enter the aneurysm itself; rather, the stent is deployed across the aneurysm neck.

The main disadvantage of the PED is the requirement of antiplatelet medications to prevent stent thrombosis. Individual patient response to antiplatelet therapy requires meticulous attention and continuous monitoring. For unknown reasons, delayed intracerebral hemorrhages unrelated to the aneurysm occur in approximately 1-8% of patients.

Large and wide neck aneurysms still pose a significant challenge for endovascular therapy; however, with the development of the PED and other emerging technologies, hope for a cure is on the horizon. To be sure, the Mercy Neurological Institute is at the forefront for research and development of these new devices. In fact the Mercy Neurological Institute (MNI) is the only place in Northern California where unrestricted use of the PED is available. In addition MNI is actively involved in testing the next generation intracranial stent used in the treatment of wide neck aneurysms.

For references, comments or questions please email Dr. Luh at MercyNeuro@DignityHealth.org. ■

George Luh, MD

"Diabetic Neuropathy" without Diabetes?

Ryan Armour, DO

Small fiber sensory polyneuropathy is a clinical condition characterized by burning, tingling, pain, loss of light touch sensation or temperature disregulation of the skin, which typically develops in a length-dependent manner. Toes and feet are affected first, followed by the calves and knees. Once neuropathy reaches the knees, it can be expected to begin to involve the fingers and hands. Small fiber neuropathy may also include dysfunction of the autonomic nervous system resulting in sweating abnormalities, cardiac dysrythmia, orthostasis and gastrointestinal dysmotility among other symptoms.

There is increasing evidence that patients who have glucose intolerance but do not meet diagnostic criteria for diabetes mellitus may still have small fiber neuropathy.

Polyneuropathy is often secondary to an underlying etiology, which may include metabolic, toxic, inflammatory, vascular or genetic conditions. When a patient is diagnosed with polyneuropathy the clinician is tasked with determining the underlying cause and treating, if possible, to prevent further progression. It is common practice to screen patients for diabetes, thyroid dysfunction, vitamin deficiencies and monoclonal gammopathy. The majority of patients with small fiber polyneuropathy already carry a diagnosis of diabetes or become diagnosed after proper screening.

Alterations in glucose metabolism may be detected through various means. Fasting blood glucose and hemoglobin A1c are useful screening tests. The 2-hour glucose tolerance test is a more sensitive measure of a patient's ability to metabolize an oral glucose load. Patients who have abnormal glucose tolerance tests but normal fasting blood glucose and hemoglobin A1c levels are labeled as being glucose intolerant. The terms "prediabetes" and "borderline diabetes" are also used in the literature to describe this situation as the implications are more easily understood by patients. It is standard practice for most neurologists to order a 2-hour glucose tolerance test for patients with newly diagnosed polyneuropathy. Some series have demonstrated that up to 50% of patients who are diagnosed with idiopathic polyneuropathy will have an abnormal glucose tolerance test.

There is increasing evidence that patients who have glucose intolerance but do not meet diagnostic criteria for diabetes mellitus may still have small fiber neuropathy. When patients present to the clinic they complain of burning neuropathic pain similar to that experienced by patients with established diabetes, and they are significantly more likely to demonstrate dysfunction of small fiber sudomotor axons and epidermal nerve fiber degeneration on skin biopsy analysis.

Identifying patients with glucose intolerance is important so that measures can be taken early to prevent progression to diabetes and all of the complications of that disease. Often, lifestyle and diet changes are enough and this may also slow or halt the progression of polyneuropathy, but medications may eventually be necessary. Medications that alter glucose metabolism , such as corticosteroids, must be used with caution in these patients.

There is an increasingly clear connection between small fiber neuropathy and glucose intolerance. Patients with idiopathic polyneuropathy, particularly small fiber type, should be screened for glucose intolerance. Early detection and management of abnormal glucose metabolism may be key for controlling and preventing progression of polyneuropathy. ■

Ryan Armour, DO

Mercy Neurological Institute Welcomes New Physicians

Kenneth Cheung, MD

Neurologist Kenneth Cheung, MD, graduated from Stanford University with both a Bachelor of Science and a Master of Science. Dr. Cheung attended UC Davis Medical School and served his internship and residency there as well. Dr. Cheung has a special clinical interest in mild traumatic brain injuries. ■

Reza Pirasheli, MD

Reza Pirasheli, MD, joins Mercy Neurological Institute from Stanford University Medical Center where he completed his fellowship training in neurocritical care. Dr. Pirasheli is board certified in neurology, vascular neurology and internal medicine. ■

Transient Global Amnesia: Mysterious Memory Loss

Peter Skaff, MD

Transient Global Amnesia (TGA) is a dramatic clinical entity characterized by a temporary but profound impairment in memory that begins abruptly and can last up to 24 hours. An inability to form new memories (anterograde amnesia) is accompanied by a variable degree of retrograde amnesia that is temporally graded, with recent memories being less accessible than more distant memories. Despite this disruption, immediate recall, or working memory, is generally unaffected as are other domains of cognition such as language, ability to calculate and praxis. Personal identity also remains intact and aside from memory impairment, the physical and neurological examinations are unremarkable.

Patients with TGA are typically brought to medical attention by a friend or relative who finds the patient in an acute confused state. In the midst of the amnestic attack, these patients appear perplexed, befuddled and sometimes anxious, as they cannot recall the historical details that explain their immediate situation or surroundings. This leads to the hallmark sign of repetitive questioning by the patient who may ask, "What am I doing here?" or "Where are we going?" Even when re-oriented by a loved one or medical professional, the provided information is soon lost to the patient and the question is repeated again and again.

Most attacks of TGA occur spontaneously but precipitating factors sometimes seem to be present and may include physical or emotional stress. Examples are sexual intercourse, immersion into hot or cold water, physical exertion, particularly involving overhead work, acute pain, Valsalva maneuvers and medical procedures including cerebral angiography. The annual incidence of TGA has been estimated at 3-10 cases per 100,000 and is more common after the age of 50. There is no sexual preponderance and recurrence is unusual.

The precise mechanism of TGA has yet to be determined, but involvement of the medial temporal lobe, particularly the hippocampus, was predicted by neuroanatomical models of memory. Recently, high-resolution MRI has revealed transient signal abnormalities in the CA1 region of the hippocampus; cells which are highly susceptible to ischemic, metabolic or oxidative stress. These "lesions," best seen with Diffusion and T2-Weighted Images, are evident within a few days of symptom onset and resolve within 2 weeks. Hippocampal hypometabolism and elevated lactate levels have been demonstrated during acute attacks by FDG-PET and MR Spectroscopy, respectively.

The investigative work-up for patients with suspected TGA is directed at identifying other causes of acute amnesia. Constitutional symptoms such as fever and headache should prompt a Lumbar Puncture to evaluate for encephalitis. A history of ingestion of amnestic agents should be sought. Common examples include anti-cholinergics, benzodiazepines and non-benzodiazepine GABA agonists. Brain MRI may reveal a strategically placed infarct the medial temporal lobe or thalamus, which can produce an acute amnestic state in which associated, posterior circulation signs are subtle and easily missed. Sharp temporal discharges on electroencephalography (EEG) suggest an epileptic etiology. A distinct clinical entity, Transient Epileptic Amnesia (TEA), is characterized by recurrent episodes of acute amnesia that are typically briefer than in TGA and may be accompanied by inter-ictal memory impairment that can be mistaken for dementia. Functional or psychogenic amnesia is characterized by profound retrograde amnesia without anterograde amnesia and a loss of self-identity.

Transient Global Amnesia should be considered along with other causes in patients presenting with an acute impairment of memory function. Although the cause is unknown, disruption of hippocampal function is consistent with neuroanatomical models of memory and supported by advanced imaging findings. The history, physical examination and certain investigative studies are employed to make a specific etiological diagnosis of the acute amnestic state. ■

Peter Skaff, MD

Cervical Spine Degenerative Disease and Stenosis: Diagnosis and Treatment

Hamid Aliabadi, MD

Cervical spinal stenosis occurs when the spinal canal narrows. Stenosis is most frequently caused by aging. The discs that separate and cushion vertebrae dry out with time and, as a result, the space between the vertebrae shrink and the discs lose their ability to act as shock absorbers. Furthermore, the ligaments that make up the spine degenerate and thicken. These changes result in a narrowing of the spinal canal, which can impinge nerve roots and the spinal cord.

Cervical spondylosis is another term occasionally used in cases of stenosis; however, spondylosis generally refers to a more widespread age-related change of the spine. Thus, multi-level stenosis is seen in spondylotic cases. Spondylosis is the most common cause of spinal cord compression in individuals over 55 years of age.

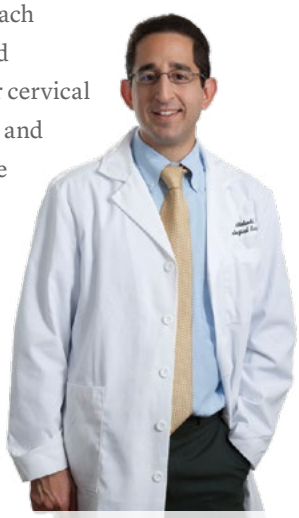
Although most people over the age of 50 have radiologic evidence of cervical spine stenosis, only a small percentage experience neurological symptoms. Symptoms may include neck or arm pain, numbness and weakness in both hands, unsteady gait when walking, muscle spasms in the legs, and even loss of coordination. These symptoms may be due to nerve root compression and/or spinal cord compression.

Diagnosis is based on history, symptoms, physical examination and diagnostic studies. Radiological and other studies are very important in confirming the etiology of this condition. Modalities include computed tomography scans (CT) which can show the shape and size of the spinal canal, its contents, and the structures around it; nerve conduction and electromyography studies, which measure the electrical impulse along nerve roots, peripheral nerves, and muscle tissue; magnetic resonance imaging (MRI), which produces three-dimensional images of body structures using magnets and computer technology showing the spinal cord, nerve roots, and surrounding soft tissue areas; and finally myelograms which are a more invasive method of showing pressure on the spinal cord or nerves due to herniated discs, bone spurs or tumors.

Treatment is usually nonsurgical, initially, especially in patients with common neck pain not involving trauma or spinal cord compression. Most patients with cervical disc herniations improve with conservative treatment and do not require surgery. Conservative treatment includes pain medication, bed rest, reduction of physical activity, physical therapy including traction in some cases, and even steroid injections. Medications may reduce the pain or inflammation, including spasms of muscles.

Surgery may be an option if conservative therapy fails or one experiences progressive neurological symptoms involving arms and legs. Surgery is indicated if difficulty with balance and loss of coordination are present, and imaging confirms spinal cord compression. There are several different surgical procedures which can be utilized, the choice of which is influenced by the anatomy and severity of the stenosis.

Surgical procedures may be performed via an anterior or posterior approach to the neck. The approach is customized to the patient's anatomy and pathology. Such surgeries include anterior cervical discectomies or corpectomies with fusion and fixation, or posterior spinal decompressive laminectomies with foraminotomies and possible fusion with fixation. The former surgery involves microscopic removal of the disc or bone spur to remove pressure on the spinal cord or nerve root, and the latter primarily removal of ligament and bone which may be causing this pressure dorsally. ■



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CONTINUING MEDICAL EDUCATION 2013

Monthly Neuro Grand Rounds

Mercy San Juan Medical Center

Conference Rooms 2, 3 and 4

First Friday of each month at 12:30 p.m.

tPA and Neurocritical Care Case Conferences

Mercy General Hospital

Third Tuesday of each even month at 6 p.m.

(February, April, June, August, October, December)

Mercy San Juan Medical Center

Third Tuesday of each odd month at 6 p.m.

(January, March, May, July, September, November)

Call for meeting room locations: 916.962.8751

Epilepsy Case Conference

Mercy General Hospital, North Auditorium

Fourth Tuesday of each month at 6 p.m.

Interventional Neuroradiology (INR) Case Conference

Mercy General Hospital

Held the first Thursday of every month, alternating between Mercy General Hospital and Mercy San Juan Medical Center. Contact MercyNeuro@DignityHealth.org for more information.

If you have any questions about upcoming opportunities, or would like to coordinate WebEx access, contact MercyNeuro@DignityHealth.org or call 916.962.8751.

Spine & Nerve Pain

An Insights & Innovations Exclusive CME Event

Join Mercy Neurological Institute for a CME opportunity presenting the latest comprehensive treatment options for patients affected by spine and nerve pain.

Wednesday, Nov. 6, 2013, 5:30 to 8:30 p.m.

North Ridge Country Club
7600 Madison Avenue, Fair Oaks, CA 95628

Register for this event online at DignityHealth.org/NeuroCME or call 916.962.8751.

Contact MercyNeuro@DignityHealth.org or call 916.962.8751 for monthly access information.