

SYNAPSE

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Quick Action Makes Difference for Sudden Cardiac Arrest Victim

Walt Lytle certainly doesn't fit the profile of sudden cardiac arrest patients who David Smith, MD, usually sees in the Emergency Department at Mercy Hospital of Folsom.

A five-time marathoner, Walt is 48 years old, trains regularly and watches what he eats.

Nonetheless, he collapsed during a run on the American River trail on the morning of June 6 near Hazel Avenue.

The frantic next half hour included CPR from female cyclists who were passing by and defibrillator shocks from EMS first responders. By the time Dr. Smith saw Walt at Mercy Folsom, the patient had a heart rhythm and pulse, but what he witnessed didn't give him much hope this patient could be saved.

"What concerned me is he wasn't responding at all," Dr. Smith remembers. "I expected to see some resumption of activity, but he was just lying there like a rag doll."

Dr. Smith also noted that Walt's body tensed up in an unusual posture that made him suspect that Walt may have suffered a severe brain injury.

That's why Dr. Smith immediately called Mercy General Hospital to consult with cardiac, neurological and intensive care specialists. The specialists recommended that the hypothermia protocol be started immediately because while Walt's spontaneous circulation had returned, his neurologic function had not.

"What made the most difference in this case was that resuscitative efforts and brain protective therapy (hypothermia) happened quickly. Time is brain," said neurologist Edwin Cruz of the Mercy Neurological Institute.

With the serious cardiac and neurological implications, Dr. Smith knew that Walt needed the resources of a multidisciplinary hospital. His team began cooling his patient down and preparing him for transport to Mercy General.

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How Hypothermia Can Save Brain for OHCA Patients

Edwin Cruz, MD

Every year, approximately 300,000 people across the United States have an out-of-hospital cardiac arrest (OHCA). While advances in resuscitative efforts have increased the number of survivors of cardiac arrest, less than 50% leave the hospital alive, and those who do often have significant neurologic deficits.

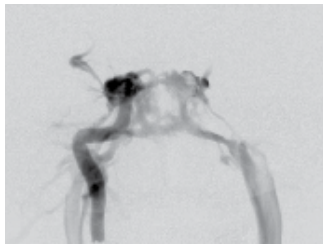
The American Heart Association has proposed the term cardio-pulmonary-cerebral resuscitation to emphasize the importance of studying cerebral perfusion after cardiac arrest. Irreversible brain injury can occur within five minutes after arrest. The concept of "TIME IS BRAIN" has been emphasized, indicating that intervention in the shortest possible

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Case Study Shows How Institute Benefits Outlying Hospitals

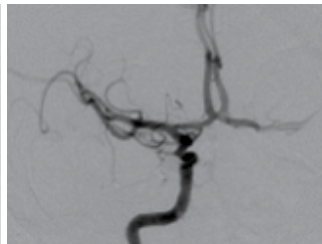
George Luh, MD

This patient is a young female in her 40's who suffered multiple trauma following a motor vehicle accident. While recovering at Enloe Medical Center in Chico, she was noted to have chemosis of her left eye. The neurosurgeon astutely ordered a cerebral angiogram, whereupon the diagnosis was made of a right carotid cavernous fistula. He immediately called the Mercy Neurological Institute to arrange transfer to Mercy General Hospital for endovascular embolization of the carotid cavernous fistula. The fistula was successfully treated and the patient was stabilized and transferred back to Enloe Medical Center.



Before

Right carotid angiogram, AP projection, shows a right carotid cavernous fistula. The contrast is darker in the internal carotid artery and shows lighter in the veins (namely the cavernous sinuses, right superior ophthalmic vein, and bilateral internal jugular veins).



After

Right carotid angiogram, AP projection, shows no evidence of carotid cavernous fistula. The internal carotid artery and its branches appear normal. The veins no longer opacify because the fistula is closed.

“A direct carotid cavernous fistula is a direct communication between the ICA and cavernous sinus, often as a result of trauma.”

Interestingly, the patient's symptoms were in her left eye even though the fistula was located on the right carotid. There is an intercavernous communication between the right and left cavernous sinuses via the circular sinus and symptoms lateralize to the side with the higher venous pressures. This is an important point to consider when diagnosing carotid cavernous fistulae. Carotid cavernous fistulae can present with unilateral (ipsilateral or contralateral) or bilateral symptoms.

There are two general types of carotid cavernous fistula, direct or indirect. A direct carotid cavernous fistula is a direct communication between the ICA and cavernous sinus, often as a result of trauma. An indirect carotid cavernous fistula is a communication between dural branches of the external carotid and/or internal carotid artery to the cavernous sinus. The treatment of choice is endovascular embolization. +



George Luh, MD

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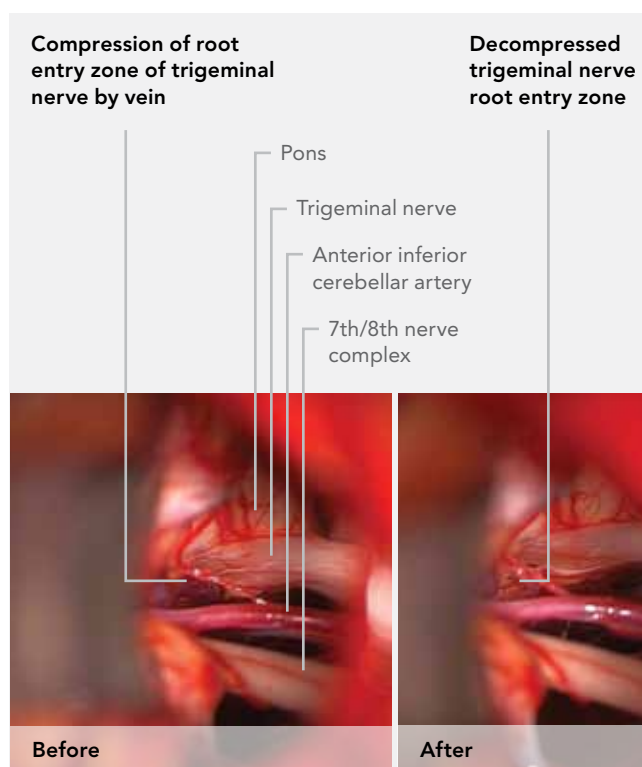
Surgical and Medical Options for Treatment of Trigeminal Neuralgia

Kavian Shahi, MD, PhD

Trigeminal neuralgia, also known as tic douloureux, is a painful disorder affecting the face. It presents with paroxysmal intense electric shock-like pain in one or more distributions of the trigeminal nerve. The annual incidence is estimated at approximately 4/100,000 with women being affected at twice the rate of men. It most commonly is caused by compression of the root entry zone of the trigeminal nerve by a blood vessel.

Although an MRI scan of the brain is helpful to rule out other mass lesions that can compress the nerve, the diagnosis of trigeminal neuralgia is primarily made by taking a careful history. The neurological exam is almost always normal. The pain attacks come on abruptly and can last anywhere from several seconds to several minutes with pain-free intervals lasting minutes to months. The pain is usually triggered by benign sensory stimuli to the mouth and face such as chewing, talking, brushing teeth or wind blowing on the face. Patients typically stop talking and sit still during pain attacks. This avoidance of triggers is unique and sets trigeminal neuralgia apart from other facial pain syndromes.

“The pain is usually triggered by benign sensory stimuli to the mouth and face such as chewing, talking, brushing teeth or wind blowing on the face.”



Fortunately, this condition is amenable to treatment. Eighty percent of patients respond to medications. Tegretol is the drug of choice with the other antiepileptics (neurontin, baclofen and dilantin) playing a smaller role in medical therapy.

Surgical treatments are reserved for those patients refractory to medical management or with unacceptable side effects of medications. The surgical treatment of choice and the one with the longest symptom-free results is Microvascular Decompression (MVD). In patients who are surgical candidates, a small craniotomy is performed behind the ear. Using microsurgical techniques, the trigeminal nerve is identified and decompressed. Current techniques allow for very low morbidity. The advantage of MVD over alternative surgical approaches is that it is the only procedure that preserves the function of the nerve. 🏥



Kavian Shahi, MD, PhD

First Unprovoked Seizure in Children and Adolescents

A COMMON PROBLEM WITH MULTIPLE RAMIFICATIONS

Shailesh M. Asaika, MD

Seizures are one of the most common reasons for seeking consultation with a pediatric neurologist. Approximately 120,000 children in the U.S. present with a new onset of seizures each year. Approximately one-third to half of them will develop recurring seizures or epilepsy. Many first seizures in children are provoked from the effects of fever, meningitis, encephalitis, trauma, structural lesions of the brain and toxic metabolic conditions. Such provoked seizures occur only when the precipitating situation is present. These do not require treatment other than addressing the underlying cause.

In contrast, unprovoked seizures do not result from immediate precipitating events. An unprovoked seizure suggests the possibility of an underlying neurological disorder that more than likely predisposes the child to recurrences. The causes of unprovoked seizures are presumed genetic as in idiopathic epilepsy or symptomatic as associated with lesions in the brain. In most of these situations, seizures will recur and a decision to treat the child needs to be made.

Most children who experience their first seizure receive their initial treatment in an emergency department or in an urgent care setting. Here, treatable medical causes of seizures are addressed and eliminated. Often, children are not seen immediately by their primary care provider after their first seizure. When they do arrive at the primary care, pediatrician, or family practitioner's office, their families have many questions that need to be answered and a referral to a pediatric neurologist is often initiated.

Evaluating the first seizure involves an accurate description of the seizure. This allows classification of the seizure type to be generalized, focal, or secondarily generalized. This process requires critical details to be elucidated during history taking, as these are not often forthcoming from the patient or family. The process is usually achieved by

asking a set of well-honed leading questions. Knowledge of localization of auras as well as details about the onset and termination of a seizure become critically important during this process. Often, the standard classification of seizures is inadequate in describing ictal phenomenology in children and infants who are pre-verbal and often produce bland semiology of ictal events. It is not uncommon to have hypomotor, akinetic spasms and complex motor behavior as a part of ictal semiology in infants and children. From a diagnostic standpoint, children who present with the first seizure to the clinic or the emergency department often get standard lab tests, including CBC, electrolytes, glucose, calcium, and magnesium. These are rarely helpful. Toxicology screens should be considered when illicit drugs or overdose is suspected. Additional tests in children should include metabolic screens, which consist of plasma amino acids, urine organic acid, ammonia levels, lactate, pyruvate, and a biotinidase screen.

A big question is whether or not the child needs a lumbar puncture. For all febrile children and children under the age of one where meningial signs are difficult and unreliable, it is often prudent to perform a lumbar puncture. PCR for herpes and bacterial cultures are also mandatory. We will often save a tube for ancillary tests, such as CSF glycine and neurotransmitter assay.

The EEG is the most important test in classifying seizure type and diagnosing the epileptic syndrome. An EEG is recommended for all children who experience an unprovoked seizure. It is important to note that a normal EEG does not exclude the diagnosis of epilepsy. Approximately 20 percent of children with epilepsy will have a single EEG which is normal. The yield of the EEG can be improved by repeating it, having the child be sleep-deprived, or doing a prolonged study like a 24-hour ambulatory EEG or a Digitrace recording. The Digitrace recording provides both EEG and video of the patient without necessitating a hospital admission.

When children have a focal onset of seizures, imaging is mandatory. For primary generalized epilepsy, neuro-imaging may be considered optional. CT scans have very

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INSIGHTS & INNOVATIONS 2010

An accredited CME opportunity for primary and specialty physicians about important advancements in neurological care



Insights & Innovations attracted nearly 100 medical professionals to the Arden Hills Country Club on May 6 as the Mercy Neurological Institute of Greater Sacramento provided a CME opportunity for primary care and specialty physicians.



Leading the discussion about advancements in neurological care were neuroradiologist John Winn, MD; host and neurosurgeon Kavian Shahi, MD; neurointerventional radiologist George Luh, MD; and neurologist El-Hadi Mouderrres, MD.



Sacramento area physicians Michael Sotak (right) and Leonard Magnani joined nearly 100 medical professionals at Insights & Innovations.



Neurologist John Schafer, MD, addresses the Mercy Neurological Institute's commitment to the diagnosis and treatment of MS.



Neurologists Edwin Cruz, MD, and Marc Lenaerts, MD, have a moment to connect with Neurological Institute Manager Deidre Wentworth, RN, neurologist M. Karsten Dengel, MD, and Mercy Hospital of Folsom President Don Hudson.

Mercy Telehealth Update: Robotic Telemedicine Improves Access, Quality and Safety

Alan Shatzel, DO



Mercy Neurological Institute of Greater Sacramento continues to expand the Mercy Telehealth Network. Mercy is improving safety, efficacy and functional recovery for patients affected by neurological disease who do not have access to emergency neurological care. Expanding the reach of our team of stroke experts by using remote presence (robotic) technology ensures that patients will receive the right care, at the right time, every time.

The neuroscience network now includes seamless 24/7/365 hyperacute stroke care coverage for Mercy Folsom Hospital, Sierra Nevada Memorial Hospital and Bakersfield Memorial Hospital.

This innovative technology improves access for patients who need rapid evaluation and treatment of acute ischemic stroke. In the past, patients who presented to distant spoke hospitals may not have received the benefits of being evaluated by experienced, knowledgeable and highly skilled stroke neurologists or, when appropriate, receiving thrombolytic agents, which must be given within a narrow window of time after onset. Using the Mercy Telehealth Network, the stroke specialist is at the bedside in minutes using two-way audio and video technology mounted on the remote-controlled robotic base. This virtual presence saves lives and reduces disability.

Patient access to high quality and affordable healthcare is a primary focus of healthcare reform. According to the American College of Emergency Physicians (ACEP), the state of California is in crisis. In fact, our state is ranked absolutely last for access to emergency care and received

a grade of "F" for access, a "D-" for quality & safety and "D+" for Disaster preparedness.

"Access to Emergency Care throughout California is in crisis... The state is desperately in need of specialists. Emergency physicians in the state report problems in finding specialists to provide critical on-call services to emergency patients."

Mercy Neurological Institute's robotic Telehealth Network is a solution to these deficiencies of emergency and critical care services.

A very generous philanthropic gift from Elliott Homes Family Foundation has seeded the development of the entire Telehealth Network and the grant continues to support the efforts to improve access to high quality stroke care throughout our state.

Here is an example of a telehealth consultation for stroke care:

W.L. is a 90-year-old gentleman who developed acute right-sided weakness, difficulty speaking and difficulty understanding or following direction of his family. W.L. was eating dinner and his family witnessed the onset of his symptoms at about 21:25. His family called 911 and EMS found the patient right hemiplegic, not speaking and not following commands. Finger stick glucose: 97. Pulse Ox: 96%. Cardiac rhythm irregular. The patient was transported to Sierra Nevada Memorial Hospital (primary stroke center) and underwent rapid assessment and evaluation with the onsite emergency stroke team led by Emergency Room physician Dr. Van Horn. The patient was within the window of opportunity for treatment with intravenous thrombolytic therapy. The FDA-approved recombinant Tissue Plaminogen Activator (rTPA) is standard therapy for acute ischemic stroke patients who meet inclusion criteria and have no exclusions.

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Alan Shatzel, DO

Mercy Hospital of Folsom ED: Meeting the Area's Neuro Needs

By this Fall, Mercy Hospital of Folsom hopes to join its five Sacramento-area sister hospitals in being recognized as a Primary Stroke Center, as designated by the Joint Commission. This distinction will recognize the exceptional care provided by Mercy Folsom physicians, nurses and staff, particularly for patients arriving in the Emergency Department in neurological crisis.

One of Mercy Folsom's first steps toward meriting a Primary Stroke Center designation came in 2008, when the hospital opened the \$28 million Cummings Emergency Pavilion. This new facility expanded Mercy Folsom's Emergency Department to 25,000 square feet, with 25 all-private, fully monitored rooms, as well as an advanced digital imaging and radiography unit. "Our physical facility is now of the same caliber as the care we provide," explains Amy Hooper, RN, BSN, MBA, Director of Emergency Services at Mercy Folsom. "And by being able to close doors and provide privacy, we are reducing the level of anxiety for patients and their families throughout the ED."

Another hurdle to Mercy Folsom's application for the Primary Stroke Center designation was the requirement to have access to the neurological specialists 24 hours a day, seven days a week. For this suburban facility, the answer to that problem was telemedicine—specifically the InTouch Health RP-7™—a wireless telemedicine robot, known at Mercy Folsom as Elliott. After a generous donation from the Elliott Family Foundation, the hospital acquired the system in 2009 and was the first in the region to use it. Elliott allows neurological patients to be evaluated by the neurologists of the Mercy Neurological Institute (typically from their offices at Mercy San Juan or Mercy General). The specialists control the mobile robot remotely, enabling them to examine and talk directly to patients and their families, and consult with Mercy Folsom's on-site physicians and staff. The specialists are able to assess the patients and direct therapy and treatment plans. This immediate access to specialists is particularly crucial when considering

the use of thrombolytic drug therapy (such as TPA for stroke patients), which must be given within a specific time frame from onset of symptoms.

For Ken Johnson, MD, Medical Director for Mercy Folsom's ED, the face-to-face connection between specialist and patient is invaluable. "In this situation, patients' families recognize the seriousness of their loved one's condition—they're not speaking or one side of their body is not moving. When they are face to face with an expert who is immediately directing their loved one's care—they appreciate that. They have a face-to-face connection and they can see they are getting the best care possible."



Mercy Folsom's Emergency Department offers 25 all-private, fully monitored rooms.

Mercy Folsom physicians, staff and leadership are proud to provide the communities in and around Folsom such exceptional neurological care. By seeking the Primary Stroke Center designation, they hope to ensure that stroke patients in those communities will no longer face a long ambulance ride into Sacramento—especially when minutes matter so much. "The level of care being provided in this Emergency Department represents tremendous progress for this community," explains Dr. Johnson. "The programs we have in place here are allowing us to change people's lives for the better. It is a pleasure to be a part of that." +

Reporting Lapses of Consciousness with Patient and Public Safety in Mind

Peter T. Skaff, MD

One of the most confusing aspects of medical practice is determining when a physician should report a patient's lapse of consciousness to public health authorities. This confusion stems in part from the widely varying legal requirements which differ from state to state. In maintaining the good practice of medicine with regards to patient and public safety and to remain in compliance with state health and safety codes, physicians must be familiar with these legal requirements.

California is one of several mandatory reporting states. Specifically, California Health & Safety Code §103900 states, "every physician and surgeon shall report immediately to the local health officer in writing, the name, date of birth and address of every patient at least 14 years of age or older whom the physician and surgeon has diagnosed as having a case of a disorder characterized by lapses of consciousness."

This raises several questions. First, what are "lapses of consciousness?" This is defined legally as not simply losses of consciousness but rather alterations of consciousness "severe enough to be likely to impair a person's ability to operate a motor vehicle." Moreover, it is the disorder, not the lapse of consciousness itself, which is important. For example, if someone is struck in the head and knocked out, this is a lapse of consciousness, but not necessarily a case of a disorder characterized by lapses of consciousness. Conversely, though, patients with dementia are not expected to experience periodic loss of consciousness, they may have a significant impairment of responsiveness to external stimuli which would preclude safe driving, and if so, must be reported.

So, what are the commonly reported disorders? The most common is epilepsy. Recurrent seizures resulting in altered consciousness or new seizures, which are likely to recur, must be reported. Reporting is not mandatory for simple partial seizures without alteration of consciousness, seizures occurring only in the context of sub-therapeutic

anti-epilepsy drug levels or medication adjustments or for purely nocturnal epilepsy. However, a physician "may report a patient's condition even if it may not be required" if the physician thinks it will serve the public interest, and in any case the physician "shall not be civilly or criminally liable to any patient for making the report" but may be liable for non-reporting. Other reportable conditions include syncopal cardiac disorders (e.g. arrhythmias), substance abuse, diabetes with hypoglycemia and sleep disorders with daytime hypersomnolence (e.g. sleep apnea, narcolepsy, etc.).

To whom and when does the physician report? The report is sent to the Department of Public Health, using the same "Confidential Morbidity Report" employed for communicable diseases. The health officer then reports to the Department of Motor Vehicles. On-line reporting is available at www.sacmr.net. With regard to the immediacy of reporting referred to in the health code, this is defined generally as within a week of the incident or diagnosis. Reporting is not required for persons who are physically incapable of driving, who do not drive and do not intend to drive, or those who have been previously reported and are not currently driving. Finally, physicians should always explain these legal requirements to their affected patients and should document the pertinent details of those discussions in the medical record. 🏥



Peter T. Skaff, MD

Aging and the Driving Population

Tracy Adams, MSN, RN, CNRN, FNP

More than 40 million baby boomers will be flooding American highways and byways by 2030. According to data from the National Highway Traffic Safety Administration (nhtsa.dot.gov), drivers over age 65 have the second-highest rate of fatal crashes, based on miles driven, of any group (drivers under

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Taking a Team Approach to Back Pain

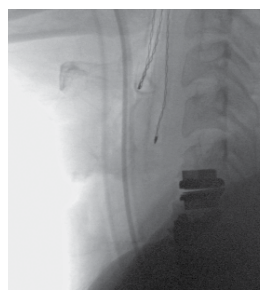
Kawanaa Carter, MD

Lower back pain is one of the most widely experienced health problems in the world. Eight out of 10 people will have back pain at some point in their lives. Next to the common cold, it is the main reason for missed work days and physician visits. It is estimated that the costs of lower back pain range between \$30 billion and \$70 billion every year. While many of our patients who are seen in outpatient primary care settings present with a chief complaint of back pain, it is often difficult to determine when the problem is primarily musculoskeletal versus neuropathic in origin. More frustrating, is knowing when to refer to a spine specialist.

“Lower back pain is one of the most widely experienced health problems in the world.”

In the primary care setting, the evaluation should always begin with a thorough history and physical. The next goal is to differentiate between an acute versus chronic process. The physician should inquire about back pain and leg pain, and most importantly bowel and bladder incontinence. Back pain alone is less concerning than back and leg pain together. The presence of leg pain increases the probability that there is nerve root compression which could lead to chronic radicular-like symptoms, even once the nerve root is decompressed. Indications for emergent or urgent surgery include acute development or worsening of motor weakness, urinary retention, saddle anesthesia, bowel incontinence or patients who have intolerable pain despite adequate narcotic pain medication.

In the past, patients have been advised to pursue conservative management for radicular-like symptoms. It was believed up to the last few years that 90% of patients get better without any intervention. Between 2006 and 2008, three articles were published reporting findings and conclusions from The Spine Patient Outcomes Research



C5-6 arthroplasty

Trial (aka SPORT). This five-year study looked at three of the most common back conditions, (1) intervertebral disc herniation, commonly known as a slipped or ruptured disc, (2) spinal stenosis, and (3) degenerative spondylolisthesis. The study compared surgical and non-surgical treatments.

Approximately 2,500 patients took part in the study, which was conducted at 13 sites across the country. The findings showed that patients who were treated surgically showed substantially greater improvement in pain and function through two years follow-up compared to patients treated non-surgically.

Currently, there are implantable devices on the market, with many more to come, that are called motion preservation devices or artificial discs. This technology provides more options in the acute setting of disc herniations. This is especially crucial for younger patients who have active lifestyles. “Spine wisdom” is that fusion begets fusion. If a patient undergoes a fusion, it is likely that they will develop adjacent level disease requiring additional segments to be fused. Once arthritis (spondylosis) sets in, however, it is unlikely that this technology can be offered, and fusion becomes the only option. Spondylosis is the process that occurs from chronic inflammatory processes that cause fluid to form in the joints of the spine and ultimately enlargement and degeneration of the joints.

As our knowledge about the spine grows, we are able to offer our patients who suffer from back pain more options if they are referred in a timely manner.

Mercy incorporates evidence-based medicine as well as a holistic approach to addressing the individual needs of each patient.

Many options are available for those who require surgery but who are not surgical candidates. Our collaboration includes physical therapists and corrective exercise specialists, pain management, and physical medicine and rehabilitation (PM&R) specialists. The team approach model ensures the best outcome for our patients. ✚



Kawanaa Carter, MD

Shared Visits: Model for Caring for Patients with Chronic Medical Disorders

John Schafer, MD

The Mercy Multiple Sclerosis Center has completed four bimonthly shared visits since November 2009. In a shared visit, also known as a group visit, a number of patients are seen as a group. Typically, about a dozen patients share an appointment that lasts for 90 minutes. Like a standard visit, each patient receives specific attention from the physician, the medical records are updated with regard to history, medications, diagnoses and plan of care, and a charge is made for the visit. An examination may be performed and may be abbreviated compared to the examination on a regular visit.


“The plan of the MS Center is to conduct the group visits every other month. The attendees would be different each time, since the point is not to replace all standard visits with shared visits.”

Unlike a standard visit, each patient's complaints and update on his/her status, as well as the recommendations by the physician, are heard by the other patients. This requires that each patient, at the beginning of the appointment, signs a privacy statement. While the physician leads the interaction with the patient, the visit is best carried out when a moderator and a note taker are present. In the case of the Mercy MS Center, the moderator is our MS nurse, who welcomes patients and may lecture on some topics, and the note taker is a medical assistant who records details of the history and the disposition into the electronic medical record.

While the time spent discussing an individual patient's status is in many cases less in a shared visit than in a standard visit, the advantages of the shared visit are many. Advantages to the patients are that each learns from the nature and solutions to the symptoms described by the other participants, and the group setting lends itself to providing counseling to the group on specific symptoms which can be more detailed than when presented to each individually in the standard visits. In the case of multiple sclerosis, difficulties with fatigue, mobility and bladder function can be addressed in group instruction and discussion. Advantages to the physician include the efficiency of being able to see a dozen patients in 90 minutes and the fact that the assistant completes the chart entry. Additionally, providers may find satisfaction in delivering educational information once to a group of patients rather than repeating the information multiple times to individuals.

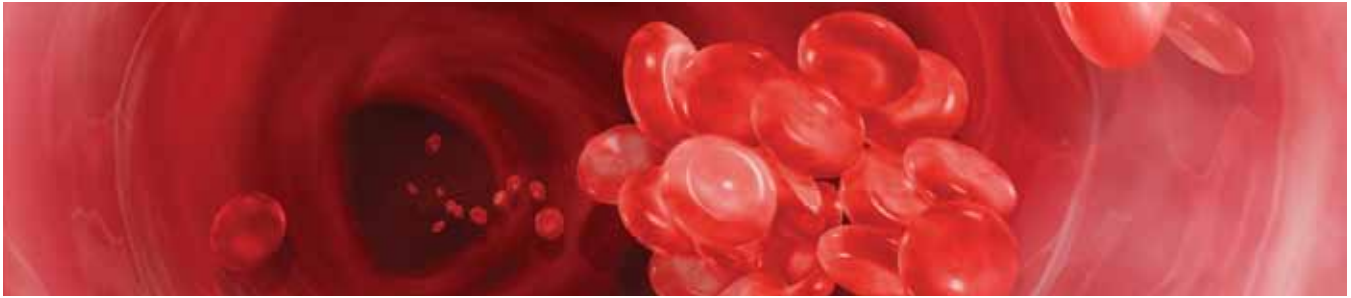
All of the MS Center shared visit patients have been asked to complete an exit questionnaire in which they provide comments and details of what they learned. They are also asked to rate their level of satisfaction as: (A) very satisfied, (B) satisfied or (C) not satisfied, and asked if they want to return for another group visit or for a regular visit. Out of a total of 38 responses for the four visits, only one rated the visit as not satisfied and they were evenly divided about whether they wished to have further group visits.

The plan of the MS Center is to conduct the group visits every other month. The attendees would be different each time, since the point is not to replace all standard visits with shared visits.

The concept of group visits was developed by Edward B. Noffsinger, PhD and is described in detail in his book “Running Group Visits in Your Practice” (Springer 2009). The book outlines variations of the group visit which may be appropriate for different disorders and different settings. 



John Schafer, MD



Pursuit of Knowledge

The Mercy Medical Group Academic Affairs department, chaired by Alan Shatzel, DO, has created *The Office of Clinical Research*, at Mercy Medical Group. Caroline Lenaerts, RN, MPH, CCRP, is the clinical research coordinator for the Research Team.

Physicians interested in clinical trials review protocols with the research team, analyzing each study for patient safety, clinical relevance and availability of patient population. Most trials considered are in phase 3 or 4. The team works to ensure quality of care and quality of data for research and to fulfill regulatory requirements.

To date, three trials are active: (1) Peter Jurisich, MD, is principal investigator for a stroke prevention trial focusing on an anticoagulation agent in people with atrial fibrillation; (2) Marc Lenaerts, MD, is principal investigator for a chronic migraine treatment trial sponsored by the NIH looking at the association of Topiramate and a b-blocker for treatment; and, (3) Dr. Shatzel is the on-site investigator for a sleep disorder study targeting shift workers, in association with Harvard Medical School.

In addition, acceptance has been granted for a multiple sclerosis trial and an adolescent migraine trial, but neither is under way yet. Mercy Neurological Institute has opened the doors to outpatient clinical research in order to improve the quality of care, patient safety and health outcomes of our greater community. 🏥

Mercy Telehealth Update: Robotic Telemedicine Improves Access, Quality and Safety, continued from page 6

Sierra Nevada Medical Center's new robot allowed our stroke team based in Sacramento to work with the team at Sierra Nevada so we could confirm the stroke scale score, confirm onset time and details of the history and help make the decision to treat the patient. Through remote presence technology, our stroke team was able to communicate with the patient's wife and inform her how best to help him and improve his outcome.

Since inception of the Mercy Telehealth Network in December 2008, the stroke team has provided more than 43 robotic consultations. At last analysis, 19 of 43 telemedicine patients met criteria and received IV-rTPA. Five patients were brought to Mercy's comprehensive neurovascular center for interventional therapies to

help restore blood flow using advanced endovascular procedures.

The Mercy Telehealth Network and the stroke services of Mercy Neurological Institute helped the patient by ensuring he received the best known treatment for acute ischemic stroke. Mercy Neurological Institute is committed to providing safe, high quality and effective care for patients. Patients at distant locations often do not have access to specialty stroke care and may not receive the best treatment option. The Mercy Telehealth Network improves access and care for patients. 🏥

Woodland Sleep Center Adds to Coverage of Neuro Institute

Richard A. Beyer, MD

Even before becoming part of the Mercy Neurological Institute, the Woodland Health Care Sleep Disorders Center (WHCSDC) had partnered with the Mercy Sleep Center for many years, sharing expertise, personnel and marketing. When I founded the Woodland center in 1989, it was first accredited by the American Sleep Disorders Association in 1994, and has been reaccredited three times since, the latest in 2009. Situated on the second floor of Woodland Memorial Hospital, the center runs two beds per night four to five days per week. The physical plant also contains offices and exam rooms for the Sleep clinic outpatients who are seen there throughout the week. Staff at the center diagnose and treat the full spectrum of sleep disorders from the very prevalent Obstructive Sleep Apnea Syndrome (OSAS), to Restless Legs Syndrome, insomnias, parasomnias (odd behaviors during sleep) and narcolepsy/cataplexy syndromes.

A unique feature of the care at the center is the CPAP Follow-Up Clinic, run by Lead Technologist, Dianne Carlson

Biggs under my supervision as medical director. CPAP (Continuous Positive Airway Pressure) is the gold standard for treating OSAS but can be difficult to adjust to, and as a result there is a pretty steep learning curve to using it. The skilled professionals ease patients into using the equipment and persevering with it. The center provides a medical home for the patients by providing the knowledge, expertise, and assurance that their OSAS will be treated appropriately. This includes procuring the initial and subsequent equipment that may be needed and making the right connections for patients between home care provider and insurance communications and requirements. The unique location, northwest of Sacramento but only minutes from downtown, allows the Mercy Neurological Institute to provide excellent geographical coverage to the entire greater Sacramento service area for the treatment of sleep disorders.

Late this year, the Woodland center will be moving to newly renovated and expanded state-of-the-art facilities in a stand-alone building on the Woodland campus to provide even better service. The new sleep rooms promise to be as comfortable and quiet as home! 🏠

How Hypothermia Can Save Brain for OHCA Patients, continued from page 1

time after the event can improve neurologic outcome and reduce brain injury.

The emphasis of resuscitation has shifted to interventions that decrease brain injury after cardio-pulmonary resuscitation. The role of the neurologist has also shifted to a more aggressive treatment of neurologic complications, including coma, encephalopathy, seizures, increased intracranial pressure and metabolic abnormalities.

Cardiac arrest leads to whole body ischemia and subsequent reperfusion injury. This causes complex biochemical changes that in turn lead to progressive cell destruction and multi-organ failure. Many of these processes are temperature sensitive. Inducing

therapeutic hypothermia in selected patients has proven to be the most important clinical advancement in the science of resuscitation.

Hypothermia protocol involves cooling the patient to 32 to 34 degrees centigrade for 12 to 24 hours, followed by a re-warming phase. Exclusion criteria include recent surgery in the past 14 days, sepsis and bleeding diathesis.

Mechanism of hypothermia includes decreasing cerebral metabolism, preventing glutamate neuro-toxicity, reducing free radical production as well as anti-inflammatory and rheologic beneficial properties.

The neurologic examination on day three post CP arrest can prognosticate long-term functional recovery. Findings

Quick Action Makes Difference for Sudden Cardiac Arrest Victim, continued from page 1

Walt's wife, Cindy, and their sons, 19 and 17 years old, saw him before the transfer. "I remember that his face was swollen and he looked dead. I thought I was about to become a widow."

She had plenty reason to be concerned. According to Dr. Cruz, less than half of the people survive who fall victim to sudden cardiac arrest outside of the hospital.

What a difference the next 24 hours made. After arriving at Mercy General about noon on June 6, intensivist Donald Rifas, MD, continued to oversee Walt's care under the hypothermia protocol and cardiologist Michael Chang, MD, took Lytle for a trip to the cardiac cath lab, where an angioplasty and stent opened a blocked artery.

"The care he received was amazing and the nurses at both Mercy Folsom and Mercy General were awesome," Cindy says.

She especially recalls a Mercy Folsom nurse who cried with her and a Mercy General nurse who explained to her what was happening to her husband and gave her

predictive of poor outcome include absent papillary or corneal response, as well as extensor or absent motor response by day three. Evidence of myoclonic epilepsy in the first 24 hours also indicate poor prognosis, as well as absent N20 cortical response of a median nerve SSEP (Somatosensory Evoked Potential) or an NSE (Neuronal Serum Enolase) level of >33ug/li. +



Edwin Cruz, MD



Walt and Cindy

hope that he was turning the corner. "They were so compassionate and understanding," she says.

On Monday, June 7 at about noon, Cindy realized her hopes when Walt woke up after his care team warmed him and reduced his medications.

He began talking and recognized her.

"Those women on the bicycles were angels," she says. "A friend of ours who has done EMS work for 22 years said that (sudden cardiac arrest victims) he sees either don't make it or have brain damage."

And what about Walt?

He says his support group of family and friends have been there for him, and they have really helped him understand that while the near-death experience had a profound effect on him, it was just as difficult for them.

He's keeping them happy by taking it slow, starting with 30-minute walks as he begins to build himself up to resume his running ways.

"I feel in as good of health as I did before this happened," he says.

If you have a patient who would benefit from the varied specialties of the Mercy Neurological Institute of Greater Sacramento, call the 24-hour toll-free number of 1.888.Mercy41 (1.888.637.2941). +

First Unprovoked Seizure in Children and Adolescents, continued from page 4

little to offer in first seizure workups in the absence of trauma. The preferred modality of imaging remains an MRI. Since most children have to be sedated during an MRI, a study with and without GAD is performed for the sake of completeness. This approach obviates the need for repeat sedation/anesthesia should one decide that GAD was necessary in retrospect. The urgency for imaging is dependent of the exam and the presence or absence of encephalopathy. When metabolic causes are in the differential diagnosis, an MRS is often helpful. Dedicated imaging of the temporal lobes with volumetrics, 3T, or surface-coil imaging are often needed to clarify etiology, especially when one suspects cortical dysplasias.

Parents need to be assured that unprovoked seizures recur in only 30 to 40 percent of children. The presence of developmental delay, abnormal neuro exam, focal seizures, and abnormal EEG increases the recurrence risk by 50 to 80 percent. Strangely, new onset of status epilepticus independently does not increase recurrence risk. The family needs assurance that brief seizures are not life-threatening and do not cause brain damage.

Medications on a long-term basis are not usually prescribed after a first unprovoked seizure. It is not uncommon to give the parents a prescription for rectal valium along with instructions on emergency management of seizures and age-appropriate accident precautions. A second unprovoked seizure by definition indicates epilepsy and significantly increases the risk of recurrent seizures. The physician is often obliged after doing a risk-benefit analysis to offer medication. On rare occasion, patients may be candidates for medication after the first seizure. These are children who have multiple risk factors, such as a significantly abnormal exam, abnormal EEG, abnormal MRI, or a neurocutaneous disorder. Each treatment decision must be individualized and must be based on the child and the family's needs.

Antiepileptic drugs fully control 60 to 70 percent of all children with epilepsy. About 10 to 15 percent of children require their AEDs to be switched or the supplemented

with a second drug for full control. Less than 1 to 3 percent of children require a third drug. Twenty to 30 percent of childhood epilepsy is medically refractory. Monotherapy is the goal. Two drugs are used with reluctance and three or more drugs almost never. Being cognizant of drug-drug interactions and cognitive and behavioral side effects is very important. Early surgical options in cases of intractability, so as to salvage critical periods of development, are often a consideration.

Children who continue medication until they are seizure-free for two years are then reassessed for medication taper. This is again done after discussing risk-benefit ratios with the family. Most children outgrow their epilepsies, although certain epileptic syndromes may require longer treatments. Large follow-up studies suggest that remission rates for generalized epilepsies are about 50 percent. The remission rate for lesional partial epilepsies is much lower at about 25 percent. The highest remission rates of 70 to 80 percent are found in idiopathic partial epilepsies of childhood.

In the last 10 to 15 years, multiple new medications have become available for treatment of children with epilepsy. In 2009, rufinamide, lacosamide, and vagabitrin became available for use in the U.S. market and there remain more drugs in the pipeline. The choices at times can be bewildering. To choose medications, one must consider seizure type, ease of administration, and cost. It is also important to discuss side effects, black box warnings, and potential drug interactions. The key to successful management is building a partnership of care, while educating the child and the family and keeping in mind the ultimate goal of giving the child with epilepsy the greatest possibility of succeeding at home, school, and playground. 🏠

**Shailesh M. Asaikar, MD**

Aging and the Driving Population, continued from page 8

age 24 have the highest rate). Compared to an overall national average of 1.44 fatalities per 100 million vehicle miles traveled (MVMT), drivers over the age of 75 have a fatality rate of 3.7 deaths per 100 MVMT; those over the age of 85 have a fatality rate of 8.0 deaths per 100 MVMT (Stutts & Potts, 2006). The high death rate is in part due to the fact that older people are less likely to survive an injury than younger people. This statistic might be related to frailty from chronic medical conditions and taking longer to recover from serious injuries sustained in the crash. The increased severity of these motor vehicle crashes can be due to aging-related changes such as impaired vision, hearing loss, decreased mobility, neurological and cognitive impairment.

A conflict may arise between reasonable transportation opportunities for persons handicapped by medical problems, including neurological diseases, and society's need to protect public safety.

For the aging population, driving signals independence, the ability to care for themselves and the freedom to travel as they wish. For the general public, the issues with elderly drivers are safety and risk assessment. Driving is a complex task that requires having satisfactory synergistic operational, cognitive and higher executive functions. These functions can be compromised to a greater or lesser extent in neurological disorders, such as stroke, traumatic brain injury, peripheral neuropathy, dementia, Parkinson's disease and epilepsy.

In cases of clear-cut or extreme ill health, assessment is not a challenge. For those patients who fall in between, careful evaluation and informed judgment on the part of the physician is required. It is not uncommon for maturing individuals and their family to have differing opinions on the individual's driving ability. The driver must have adequate motor strength, speed and coordination. Also, higher cognitive skills including concentration, attention, adequate visual perceptual skills, insight and memory

need to be present. Higher cortical functions required for driving include strategic and risk-taking behavioral skills, including the ability to process multiple simultaneous environmental cues in order to make rapid, accurate and safe decisions.

The task of driving requires the ability to receive sensory information, process the information, and to make proper, timely judgments and responses. Older drivers are more likely than other age groups to have crashes at intersections, when making left turns, and on limited access highways when merging, exiting or changing lanes. Some common areas of difficulty include yielding, responding to signs and signals, scanning the roadway environment, staying in their lane, keeping up with the flow of traffic, passing and stopping (Phillips, Rousseau & Schwartzberg, 2006).

Classroom driver education for teenagers might not be unfamiliar to those who have adolescents in the household, but there are new programs for senior citizens that could aid in automobile safety. Several automobile associations offer refresher courses in driving skills, age-related physical changes and a review in driver safety, but where in this continuum do clinicians fit into the assessments of the senior driver and where does liability begin and end?

While most of us learn to drive when we are teenagers and consider driving second nature, maneuvering a motor vehicle is actually a complex skill that requires advanced planning, memory, and decision-making skills and high levels of attention and eye-hand coordination—as well as the ability to respond quickly to changing road conditions. Some or all of these abilities may be affected by neurological disorders. In addition, prescription medications can cause drowsiness or other side effects that may impair driving. Of course, alcohol and recreational drugs diminish reflexes and judgment as well. 🏠





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