Synapse
a clinical resource
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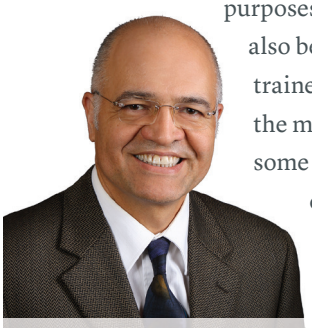
Alternative Pain Management – Medical Acupuncture

Kamran Sahrakar, MD

Managing pain is integral to a provider's practice—no matter what specialty. And it is fair to say most practitioners spend entire careers updating and perfecting their pain management skills. The difficulty arises from the complex nature of pain—its subjective nature, its somewhat unclear origin, its many characters, its relationship to emotional and stress state, the environment in which it exists, as well as the provider's approach. Nevertheless, the provider must treat, based on evidence and experience, a wide variety of pain in a diverse population of patients every day. Over time, practitioners have relied on a wide spectrum of medications, behavioral interventions, and procedures—primarily based on the Western understanding of disease and pain. In Eastern medicine, the understanding of disease and pain has traditionally been different—based on an "energy" imbalance. The Eastern practitioner also has treated these with medications (e.g. herbs), behavioral interventions (e.g. meditation, yoga), and procedures (e.g. manipulation, massage, acupuncture). In more recent history (last 50 or so years), Eastern medicine has adopted Western principles, and Western medicine has increasingly adopted Eastern thought as well. Applying these, at times competing, ideas in the context of the other for complementary purposes is sometimes challenging but can also be very rewarding for the Western-trained healthcare professional. Today, the modern Western physician has some understanding of the principles of Eastern medicine and can adopt them in parallel to his or her diagnostic and therapeutic armamentarium. Medical acupuncture is this type of skill.


Kamran Sahrakar, MD

Acupuncture has been the beneficiary of increasing interest as an alternative or an adjunct to opioid narcotics for pain. Accordingly, it has been subjected to the scientific methodology to assess its safety and efficacy. Despite the inherent limitations of the application of the scientific method to Eastern principles, some solid conclusions can nevertheless be made. Several treatment paradigms in acupuncture which have been subjected to rigorous Western research scientific methods do address pain; others address nausea, ileus, hiccups, anxiety, and arthritis, amongst other problems.

Musculoskeletal Pain. Acupuncture has been most accepted and embraced in North America for musculoskeletal pain associated with bruises, sprains, and spasms. In some medical practices that have adopted medical acupuncture, acupuncture is used as the primary treatment modality for these problems. However, it is applied in a setting of Western medical diagnosis and treatment, and it is monitored and followed by providers who are comfortable in its role as a primary treatment modality.

Post-operative Pain. Interestingly, the rise of medical acupuncture as a discipline started with the highly publicized appendectomy of James Reston, a journalist with the New York Times, who had his postoperative pain treated with acupuncture while travelling to China with President Richard Nixon in 1971. Studies addressing pain after knee arthroplasty, tonsillectomy, thoracic surgery, and meta-analyses addressing a wider spectrum of surgeries have been published in the recent peer-reviewed literature. These studies strongly support establishing a process at high-volume surgical centers for the implementation and monitoring of medical acupuncture in post-operative inpatient pain management.

Other Acute Pain. Ample literature has addressed the acupuncture treatment of acute pain in tandem with conventional Western medicine. This includes the treatment of migraines, burn pain, dysmenorrhea, and renal colic, for

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Concussion is Not Just a Guy Thing

Ashutosh Raina, MD

Rates of emergency room visits related to traumatic brain injury (including concussions) among women almost doubled from 2001 to 2010, according to the Centers for Disease Control and Prevention (CDC). Significantly, many of these were caused by sports injuries.

Nearly two million U.S. high school students participate in sports every year where concussion is common: football, ice hockey, lacrosse, and soccer. But high school girls in the United States are 56 percent more likely than boys to suffer a concussion in sports that are played by both genders. The largest discrepancy was found in the concussion rate for girls' softball, which was four times the rate of concussion for boys' baseball, a recent study says.

Because of football and hockey, both male-dominated contact sports, more male athletes suffer brain injuries than girls. However, in soccer, 25 girls per 1,000 reported a brain injury in 2017-18, compared to 12 per 1,000 boys. In basketball, 22 per 1,000 girls suffered brain injuries compared to nine per 1,000 boys. In lacrosse, girls had 20 per 1,000 with boys 17 per 1,000, while softball reported seven per 1,000 and baseball three per 1,000.

In soccer, basketball, and lacrosse, the majority of boys' concussions came as a result of person-to-person contact. But girls suffered the majority of concussions in person-to-object collisions, whether that object was a ball, equipment, wall, or floor.

According to the American Medical Society for Sports Medicine Position Statement: Concussion in Sport 2012:

- Recent data suggest that in sports with similar rules, female athletes sustain more concussions than their male counterparts.
- Female athletes experience or report a higher number and severity of symptoms as well as a longer duration of recovery than male athletes in several studies.

In a recent study of 207 male and female athletes at a concussion specialty clinic in Ontario, the clinic's medical director, Shannon Bauman, MD, found that women didn't just report more symptoms of concussion post-injury but also had more objective signs (according to a physical exam and their medical histories) such as migraine and trouble maintaining balance.

Why the Difference?

Female athletes may be at greater risk for concussion due to what phase they are in with their monthly hormones at the time of injury, an increase in angular acceleration at the neck, or neck strength-to-head size ratios. There is some research that shows female athletes are more likely to report their injuries compared to men.

California Legislation on Concussion

In 2017, the California Legislature introduced a law to protect student athletes (the Youth Sports Concussion Protocols) stating: "An athlete who is suspected of sustaining a concussion or other head injury in an athletic activity shall be immediately removed from the athletic activity for the remainder of the day and shall not be permitted to return to any athletic activity until he or she is evaluated by a licensed health care provider. The athlete shall not be permitted to return to athletic activity until he or she receives written clearance to return to athletic activity from a licensed health care provider. If the licensed health care provider determines that the athlete sustained a concussion or other head injury, the athlete shall also complete a graduated return-to-play protocol of no less than seven days in duration under the supervision of a licensed health care provider."

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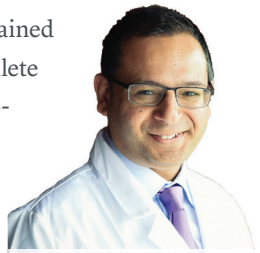

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Antiseizure Drugs: Guidelines Update

Hemant Kudrimoti, MD, PhD

Clinical providers are familiar with time-tested antiseizure drugs (ASDs) such as Luminal (phenobarbital), Dilantin (phenytoin), Depakote (valproate), Ativan (lorazepam), Clonopin (clonazepam), and Tegretol (carbamazepine). In the last 25 years, many new ASDs have received FDA approval in the U.S. These include felbamate, gabapentin, lamotrigine, topiramate, levetiracetam, zonisamide, oxcarbazepine, pregabalin, tiagabine, vigabatrin, lacosamide, rufinamide, perampanel, eslicarbazepine, brivaracetam, and cannabidiol. These drugs were studied in trials in which patients with medically-refractory focal seizures were already on other ASDs. For ethical reasons, monotherapy trials with a placebo-only arm were not permitted. Given, however, that over 50% of patients respond well to a single ASD, the American Academy of Neurology published guidelines in 2018 addressing how data from these and other less rigorous trials could be extrapolated to monotherapy.

On review were 2,388 abstracts and 478 rated articles from two online databases that included controlled trials, observational studies, cohort studies, and open-label studies from January 2004 to November 2015. An important guideline that emerged from this exercise is that in patients with new-onset focal epilepsy, lamotrigine use should be considered to decrease seizure frequency (Level B recommendation). Other than oxcarbazepine, which has evidence from a Class I study suggesting efficacy in new-onset focal epilepsy, there are no data for any of the other above-listed drugs for use as monotherapy for new-onset focal epilepsy.

The takeaway from these guidelines is that it is reasonable to start an individual with new-onset focal epilepsy (the most common type of seizure disorder) on lamotrigine or oxcarbazepine. A 2017 Medicare claims database study indicated, however, that levetiracetam is actually the most commonly prescribed anticonvulsant (Martin et al., 2017). While levetiracetam's safety and efficacy at starting doses, and its lack of drug interactions, are likely responsible for this therapeutic bias, the psychiatric and neurobehavioral side effects seen with its use in a significant number of patients (22.1%, Chen et al., 2017) has tempered enthusiasm for its use in the epilepsy clinic. On the other hand, the risk of rash with lamotrigine (8%, Bloom & Amber, 2017) and a resulting need for a slow titration may limit its use in hospital discharge settings. Oxcarbazepine, a better-tolerated "cousin" of carbamazepine, can be titrated to a therapeutic dose within a week and may serve as a reasonable alternative to levetiracetam.

With respect to the use of other newer ASDs in monotherapy, it may be useful to follow the principle of "absence of evidence of efficacy does not mean evidence of absence of efficacy."

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Hemant Kudrimoti, MD, PhD

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What is Dignity Health Doing About This?

Nearly one million high school athletes in California will be safer thanks to a new partnership announced between Dignity Health and the California Interscholastic Federation (CIF). Student athletes across the state will now have access to the Dignity Health Concussion Network before taking to the track or field.

The Dignity Health Concussion Network is designed to provide young athletes the knowledge and tools to prevent and identify concussions in themselves and their teammates. The program offers concussion education to high school athletes through an online curriculum, pre- and post-concussion assessment testing, and telehealth software that gives athletic trainers and physicians 24/7 access to consultation with a neurologist specializing in concussions and traumatic brain injuries.

CIF is the governing body for high school sports in the state of California and represents 1,606 public and private member schools and more than 918,100 student athletes. The organization will launch and offer concussion education at the start of fall sports in 2019. CIF conducts regional and state championships in 22 sports including badminton, basketball, cross country, football, golf, soccer, swimming, diving, tennis, track and field, volleyball, water polo, and wrestling.

Dignity Health is currently working to introduce these protocols in Sacramento, including IMPACT and balance testing and comprehensive concussion rehabilitation protocol.

Remember: return to learn before return to play. Players are students first and athletes second. ■

Challenges in the Treatment of Acute Ischemic Stroke

Lucian Maidan, MD

Stroke, the fifth leading cause of death in the United States, affects more than 800,000 Americans every year. Emergent treatment of acute ischemic stroke, which represents almost 85% of the total number of strokes, can dramatically improve patient outcomes.

For more than two decades, the only FDA-approved treatment for acute ischemic stroke was intravenous tissue plasminogen activator. The recent approval of the mechanical thrombectomy for the treatment of strokes caused by large vessel occlusion (LVO) in the anterior circulation of up to 24 hours from the onset of the symptoms, significantly increased the number of patients that can be treated.

Mechanical thrombectomy for strokes due to LVO is very effective with numbers needed to treat NNT=3 to achieve a Modified Rankin Score (mRS) less than 2 at 90 days in the IA EXTEND trial. Few medical treatments approach this effectiveness. Approximately 15-30% of all acute ischemic strokes are believed to be due to LVO.

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Bringing the right patient to the right place to be treated as soon as possible remains the biggest challenge. The median time between symptom onset and the arrival of the patient in the hospital is 339 minutes. Education of the population on stroke symptoms and activation of emergency medical services can decrease this time.

Another challenge is the capability of the facility to which the patient is initially transported. If the hospital cannot offer mechanical thrombectomy 24/7, then the patient will have to be transferred emergently to a center where this procedure can be performed. Numerous studies show that the time from stroke symptom onset to treatment initiation in this scenario increases by 148 minutes. This translates in a 6.4% decrease in the probability of a good outcome for every hour of delay.

Once the patient has arrived at the hospital, protocols are in place to shorten the time it takes to administer IV t-PA, evaluate the patient for an LVO, and provide emergent transport to the angiography suite. Direct-to-CT protocols, integrating the pharmacists as part of the stroke team, and point-of-care laboratory testing for INR are a few measures that can decrease the door-to-needle time.

It is estimated that almost 20% of transferred patients become ineligible for mechanical thrombectomy due to the progression of the infarction resulting from the added time. Emergent identification of patients with LVO by first responders is very important. Currently, there is no optimal prehospital stroke scale that can identify patients as candidates for mechanical thrombectomy. The specificity for detecting LVOs varies from 40% to 94%.

Identifying the best candidates for mechanical thrombectomy is another challenge. Strict criteria were adopted in the multiple trials that led to the approval of mechanical thrombectomy: NIHSS more than 6, small core infarction (less than 70 mL), and a large penumbra. However, meta-analysis of multiple trials through the HERMES collaboration and multiple real-world registries like SWIFT-PRIME suggests that more patients can be treated with good outcomes even if they have larger core infarctions. There are three ongoing trials (TESLA, TENSION and IN EXTREMIS) evaluating mechanical thrombectomy in patients with large core infarctions. Characteristics associated with a good outcome in this subgroup of patients include young age, occlusion site, eloquence of the region at risk, and penumbra size.

Patients who present with LVO and mild symptoms (NIHSS less than 6) will have more than a 53% chance of an unfavorable outcome if they are not offered any treatment. ASA/AHA guidelines suggest that intravenous thrombolysis is beneficial for this subgroup of patients. However, there is no consensus regarding mechanical thrombectomy. The natural history of this disease is less than benign, leading to significant disability.

In conclusion, more rapid administration of IV t-PA and evaluation for mechanical thrombectomy are shown to improve patient outcomes; however, there are multiple challenges that can be overcome by developing stroke systems of care, communication, and teamwork. ■

Lucian Maidan, MD

Mercy MS Achievement Center in its Sixth Year

Founded in 2014 by MS specialist, John Schafer, MD with a very generous grant to Mercy Foundation from the Conrad N. Hilton Foundation, the MS Achievement Center is a wellness program which provides long-term physical, cognitive, and social opportunities to those with disability from multiple sclerosis.

In this unique center, of which there are less than a half dozen in the country, members attend a weekly program in which they participate in physical activities, including exercise, stretching, and yoga, all modified for each individual's capabilities, and activities providing cognitive stimulation, recreation, socializing, and educational topics related to MS, wellness, and emotional health. The Empowered to Achieve program is held for 5 hours 3 days per week, and for those whose stamina does not permit, the 2-1/2-hour Achieving Wellness programs provide similar opportunities. Participants pay a monthly fee, based on a sliding scale so that no one should be prevented for financial reasons from participating. Participants may continue in the program for as long as they wish. Although the Achievement Center was founded by the Mercy MS Center and Mercy Foundation, it is open to patients of any medical provider.

Besides the core day programs, the Achievement Center offers outreach education including Supporting Our Loved Ones, an ongoing support partner group, moderated by a neuropsychologist. Book club, "Writing As Healing," and a variety of other recreational, educational, and exercise activities are offered, as well. Commenting on the book group, one participant stated that it gave her back the joy of reading which she had lost because of the visual and cognitive challenges caused by her multiple sclerosis.

The immense gratitude expressed by the participants is due not only to the attention from the trained staff to individual needs of each one but also to the community sharing of experiences. "When I come here everyone understands me and my MS," is a frequently expressed sentiment. Unsteady walking, difficulty with speech, and using a walker or a wheel chair are challenges in public but are accepted and understood by all at the Achievement Center. To say that the Center is a life-changing experience for many is not an exaggeration. A man whose life has been dramatically affected by MS recently remarked "in the 15 years I've had MS, this is the best thing that's ever happened to me!"

Pictured left to right: Lacey Sayre, Tiffany Malone, Jim Warner, Linda Zisko, Brian Hutchinson, Zoe Edwards

An important part of wellness programs is to identify and track markers of the benefits of the program on the lives of participants. The Achievement Center has developed a battery of markers which are evaluated at the start of the program and periodically over time for each participant. The results have been presented at national conferences. A poster at the Consortium of Multiple Sclerosis Center's annual meeting in 2018 received an award for the best rehabilitation presentation.

Three very generous grants from the Conrad N. Hilton Foundation have made this remarkable and unique program possible, and numerous other individual and corporate donors to Mercy Foundation have helped to perpetuate its life-changing value.

The Multiple Sclerosis Achievement Center is located at 7777 Greenback Lane in Citrus Heights. Further information is available at dignityhealth.org/msachievementcenter, and candidates may call 916.453.7966 to inquire or apply. Donations may be made through Mercy Foundation. ■

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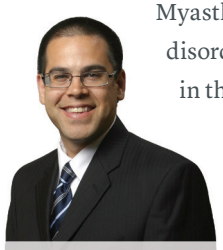
In fact, many if not all these ASDs are commonly and successfully used off-label in monotherapy in epilepsy clinics. The efficacy of all ASDs is comparable, and tolerability as well as other factors such as specificity of use in certain epilepsy syndromes, usability in pregnancy, and drug interactions, determine the choice of medication. ■

Myasthenia Gravis

Ryan Armour, DO


Ryan Armour, DO

Myasthenia gravis (MG) is an autoimmune disorder caused by autoantibodies to structures in the neuromuscular junction. These antibodies bind to acetylcholine receptors or related structures on the cell membranes of the neuromuscular junction, ultimately resulting in destruction of these receptors. Clinically, this will cause weakness and easy fatigue of skeletal muscles. Typical patients will present with weakness in facial and neck muscles, complaining of ptosis, diplopia, dysarthria, and dysphagia. Weakness in the limbs, trunk, and muscles of respiration are affected in more severe cases or in case of exacerbation of the disease.

Symptoms typically fluctuate and can worsen suddenly for no clear reason or may be triggered in the setting of a stress to the body, such as infection or surgery. Many medications, including neuromuscular blockage for anesthesia, may trigger an exacerbation of weakness in patients with myasthenia gravis. During times of symptom exacerbation, patients should be carefully monitored as respiratory failure may occur quickly.

Symptoms typically fluctuate and can worsen suddenly for no clear reason or may be triggered in the setting of a stress to the body, such as infection or surgery.

When myasthenia gravis is clinically suspected, diagnosis can often be made through blood tests. Elevated levels of antibodies to the acetylcholine receptor antibody, muscle specific kinase (MuSK) or lipoprotein-related protein (LRP4) can be detected in 80-90% of patients with myasthenia gravis. Nerve conduction studies with repetitive stimulation can be helpful to make the diagnosis in the correct clinical context, but these have low specific and sensitivity compared to blood tests. For cases that are seronegative, abnormal single fiber electromyography (EMG) can be used to make the diagnosis. Single fiber EMG is technically difficult to perform and is not widely available. Application of ice over the eyelid in patients with myasthenia gravis will often result in improvement of ptosis. While not diagnostic, this "ice pack test" can be useful to raise suspicion for myasthenia gravis. In the past, rapid improvement in muscle weakness after edrophonium was used to diagnose MG but the medication is no longer available in the United States.

Recently, eculizumab, a monoclonal antibody binding complement, has been approved by the FDA.

A CT scan of the chest should be included as part of evaluation of patients diagnosed with myasthenia gravis. A thymoma, or more uncommonly a thymic carcinoma, are found in 10-15% of patients with myasthenia gravis. Patients who are found to have a thymoma should be referred to thoracic surgery, and muscle weakness often improves after the thymoma is resected.

Several treatments are available for myasthenia gravis. Pyrisostigmine is a short acting oral cholinesterase inhibitor used to temporarily improve muscle weakness. Many patients will require immunosuppressant medication to decrease antibody production. Most patients with MG have a dramatic response to high dose oral prednisone after 1-2 weeks, but may clinically worsen during the first week of treatment and should be carefully monitored. For long-term immunosuppression, steroid sparing agents such as azathioprine or mycophenolate mofetil are effective. Recently, eculizumab, a monoclonal antibody binding complement, has been approved by the FDA. IVIG and plasmapheresis may be used during myasthenic crisis in patients with acute respiratory failure or severe dysphagia. Patients with myasthenia gravis should be followed by a neurologist with experience treating this disease. ■

Brain Waves: Updates to Dignity Health Neurological Institute

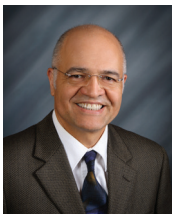
Dignity Health welcomes new expertise to Greater Sacramento.

Marc Cabanne, DO, Neurosurgeon

Dr. Marc Cabanne is a neurosurgeon specializing in innovative neurosurgical procedures. His training includes a residency in neurological surgery at Riverside University Health System and a fellowship in complex spine surgery at Kaiser Permanente Oakland. Dr. Cabanne firmly believes in a holistic approach for each individual patient, empowering them to make educated decisions regarding spine and brain diseases. He employs a multidisciplinary team approach with input from primary care physicians, orthopedic spine surgeons, physical therapists and pain specialists in an effort to provide comprehensive care.

Yi-Ren Chen, MD, Neurosurgeon

Dr. Yi-Ren Chen, MD is a neurosurgeon with offices in Sacramento. He completed a residency and internship at Stanford Hospitals and Clinics. Dr. Chen's special clinical interests include minimally invasive spine surgery, degenerative spinal conditions, spinal deformity surgery and revision spinal surgery, spine tumors, metastatic tumors to the brain and spine, primary brain tumors, meningiomas, skull base and pituitary surgeries, arteriovenous malformations and aneurysms.



Kamran Sahrakar, MD, Neurosurgeon

Dr. Kamran Sahrakar is a board certified neurosurgeon. A fellow of the American College of Surgeons and American Association of Neurological Surgeons, Dr. Sahrakar earned his medical degree from the University of Nevada School of Medicine.He completed residencies at UC Davis Medical Center and Emory University. Dr. Sahrakar is practicing with Mercy Medical Group with offices in Sacramento and Carmichael.

Alternative Pain Management – Medical Acupuncture— continued from page 1

example. Providers across the spectrum can be trained in integrative approaches to disease entities that are relevant to their specialty; and approaching the patient with additional diagnostic methods and therapeutic tools can be empowering and rewarding when treating these pains.

Chronic Pain. Acupuncture can play an important role as a complementary treatment option to the multidisciplinary approach of chronic pain management; this would include chronic low back and neck pain, the pain of joint osteoarthritis, fibromyalgia, and entrapment syndromes. Treating chronic pain is extremely challenging, as is integrating acupuncture into a treatment plan. A full understanding of both allopathic pathology and physiology and Eastern energetics is required for an effective treatment plan, and the physician trained in medical acupuncture is uniquely positioned to provide this.

A recent resurgence of interest in acupuncture for pain management has been sparked by recognition of the global opioid use and abuse problem and a quest for alternative and complementary methods for treatment of pain. The versatility, safety, and effectiveness of acupuncture in this arena is increasingly appreciated, and from this appreciation has emerged a new generation of integrative practitioners who are able to use it every day in their office or hospital practices. Several programs across the country offer acupuncture training, specifically, and integrative and complementary medicine, in general, for physicians.

For references, please email DignityHealthNeuro@DignityHealth.org. ■

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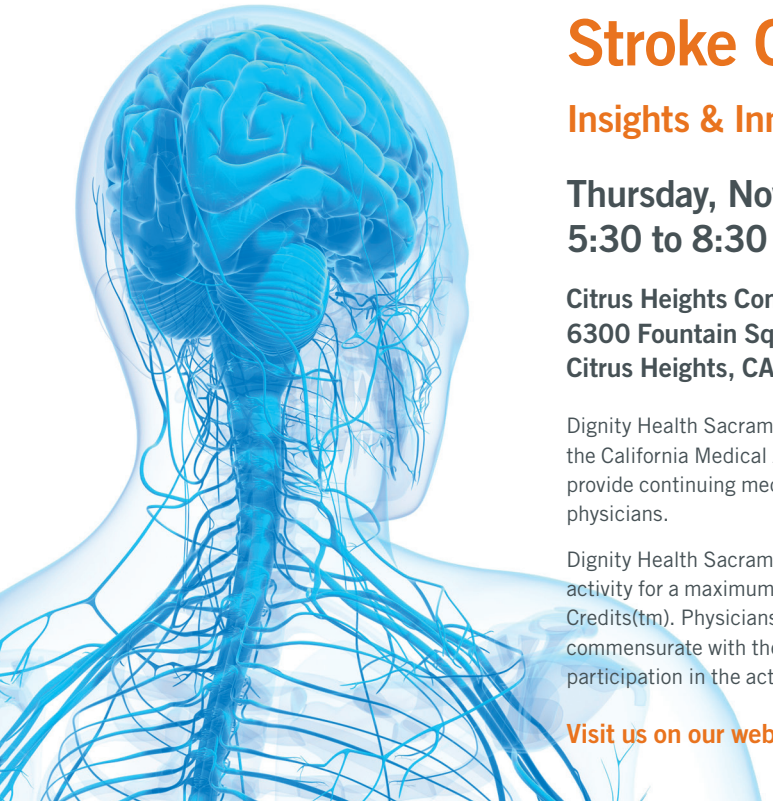

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Maheer Gandhavadi, MD

Atypical Stroke Presentations & the Role of Disability in Stroke Management
Ben Usatch, MD

Current Management of Unruptured Intracranial Aneurysms
Lucian Maidan, MD

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