A clinical resource by the
Mercy Neurological Institute of Greater Sacramento

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SYNAPSE

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Mercy Breaks Ground with New Aneurysm Treatment

In February, the Mercy Neurological Institute became the only provider in the Sacramento region to perform a new treatment for certain types of aneurysms previously thought to be untreatable. The technique—which uses what is known as the Pipeline Embolization Device, manufactured by ev3—uses what is essentially a stent to block blood flow to aneurysms in the internal carotid artery. "This device provides a viable treatment to patients who previously had no options," says George Luh, MD, Mercy's medical director for interventional neuroradiology. "This is a totally new way to treat brain aneurysms."

The first patient to undergo the Pipeline procedure was 63-year old Pam Hathaway. Hathaway came to Dr. Luh with an aneurysm pressing on her optic nerve, causing her to lose vision in her left eye. "Ms. Hathaway was an ideal candidate because of the shape of her aneurysm," explains Dr. Luh. "It was very large and incorporated most of the vessel wall." Such oddly shaped aneurysms cannot be treated with surgery or coils, the typical treatment for aneurysms. Prior to the Pipeline device, an aneurysm like Hathaway's would have been left untreated.

A microcatheter is placed into the brain and positioned across the aneurysm neck.

As part of the new technique, a microcatheter is placed into the brain and positioned across the aneurysm neck. The Pipeline stent is then inserted through the microcatheter and deployed across the aneurysm neck, cutting off blood flow to the aneurysm. The blood remaining in the blocked-off aneurysm then forms a clot, reducing the likelihood the aneurysm will grow or rupture. Eventually the aneurysm shrinks.

In Hathaway's case, she began to experience the positive results of the procedure within a week. "I felt great when I woke up, like nothing had happened," she remembers. "My vision was still impaired, but Dr. Luh said that was to be expected. It started to get better about a week later and eventually just returned to normal."

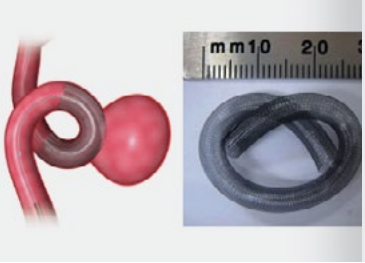

Figure 1.
The flexibility of the Pipeline stent allows it to navigate into the tortuous intracranial vasculature and the tight mesh design diverts blood flow away from the aneurysm.

Hathaway also had two similar aneurysms on the opposite side affecting vision in her right eye. Using the Pipeline stent, Dr. Luh was able to successfully treat those as well. "She tolerated both procedures extremely well without any complications," he explains. "We kept Hathaway in the hospital overnight simply to watch her because of the risk of blood clots forming on the stent. She began a regimen of aspirin and Plavix about a week prior to her procedure, but that was it."

For Hathaway, the idea that, were it not for this procedure, her aneurysms would have been untreatable seems especially cruel. "I was diagnosed with stage four breast cancer in 2007," she explains. "I was not expected to survive, but after four

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REM Sleep Behavior Disorder

Vasanthi Krishna, MD

Case History: A 50-year-old man with a past medical history of obstructive sleep apnea and coronary artery disease presents with a one and half year history of acting out his vivid dreams that typically occur in the early morning hours. His most recent was described as "diving off the bed" when he dreamed that he was swimming! According to his wife, he has on three occasions in the last year hit her, punched her and smothered her with a pillow, while he was asleep. He awakens easily after these incidents and can recall his dreams. He is being treated effectively with CPAP for his sleep apnea and hence reports restful sleep. His wife reports somniloquy (sleep talking) almost on a daily basis with yelling, cursing, screaming and flaying his arms wildly during sleep. In addition, he has had increased leg movements during sleep and has kicked his wife on many occasions. These episodes occurred infrequently in the past, but since starting fluoxetine for his depression one month ago, they now occur several times a week, and he complains of increased daytime somnolence and fatigue. He and his wife sleep in separate rooms and are now in family counseling. His family history is positive because his father had similar episodes, but onset was in his 70's. His neurological exam is within normal limits.

These violent behaviors can lead to injury to self or bed partners, including vertebral fractures and subdural hematomas.

This is a typical scenario for REM sleep behavior disorder (RBD). Normally, the brain is highly activated in REM sleep, but there is a paradoxical suppression of skeletal muscle tone, thus allowing safe sleep. In RBD, this natural atonia is lost and hence dreams can be physically acted out, resulting in loss of safe sleep. This disorder was first described in 1986 and is seen predominantly in men between the ages of 40–70 years, with a prevalence of 0.5% in elderly men. The diagnosis is made on the basis of increased muscle EMG tone in the limbs and chin, documented on a polysomnogram (sleep study), along with a clinical history of violent dream enactment or documented events in REM sleep during the polysomnogram. These violent behaviors can lead to injury to self or bed partners, including vertebral fractures and subdural hematomas. As may have occurred in this case, selective serotonin reuptake inhibitors (SSRIs), serotonin norepinephrine reuptake inhibitors (SNRIs) and mirtazapine may unmask or aggravate the symptoms.

The extrapyramidal system and the REM sleep generators in the brainstem have strong neuronal connections and resulting in shared pathologic states such as Parkinson's and RBD. A mean interval of 13 years for between onset of RBD and developing Parkinson's disease has been reported in men over 50 years of age. The course is progressive and

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Non-traumatic Intracranial Hemorrhage—a Neurological Emergency

Karsten Dengel, MD

Intracranial hemorrhage (IH) refers to a group of conditions that require emergent evaluation and treatment in order to avoid a catastrophic outcome. Prognosis and treatment approaches differ for different categories of IH. Bleeding can occur into the brain tissue itself or into any of several spaces within or surrounding the brain.

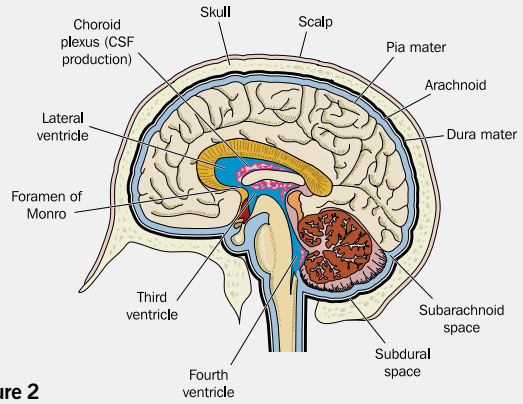

Figure 2

Intracerebral hemorrhage (ICH) means bleeding into the brain parenchyma. Other hemorrhages are defined based on their relation to the meninges:

- Subarachnoid hemorrhage (SAH): Bleeding into the space between the pia mater and the arachnoid membrane.
- Subdural hemorrhage (SDH): Bleeding into the space between the arachnoid membrane and the dura mater, the outermost layer of the meninges.
- Epidural hemorrhage: Bleeding between the skull and the dura mater, typically caused by trauma.
- Intraventricular hemorrhage: Bleeding into the brain's ventricular system.

ICH often presents with focal neurological symptoms such as hemiplegia, loss of balance or depressed level of consciousness. The most common etiology of ICH is hypertension and often occurs in deep brain structures such as the basal ganglia. In the elderly, cerebral amyloid angiopathy is an important cause and is most commonly lobar in location. Vascular abnormalities such as arteriovenous malformations, venous sinus thrombosis, tumors or hemorrhage into an area of ischemic infarction also have to be considered.

Subarachnoid hemorrhage is commonly caused by rupture of a cerebral aneurysm. In its mildest form, SAH may result in a visit to primary care or ER with only a sentinel headache, sudden onset of severe head pain. Making this diagnosis may be life-saving since it may presage a more severe SAH which may result in death in a significant fraction of patients even before they reach the hospital.

When SDH presents indolently, a high degree of suspicion is required since symptoms may be subtle such as imbalance or episodes of confusion in an elderly person.

An early step in evaluation of any of the above entities is a non-contrast head CT as well as screening for any coagulopathy which may need correction by transfusion. Control of often highly elevated blood pressure is vitally important to prevent hemorrhage extension. IH is the most feared adverse effect of anticoagulant therapy. Recently, FDA approval of new anticoagulants such as dabigatran and rivaroxaban has led to new challenges in workup and treatment of iatrogenic IH. Quantitative detection of anticoagulation with dabigatran, for instance, requires measurement of thrombin time or ecarin clotting time, which are not widely available. Transfusion with fresh frozen plasma, the traditional treatment for reversal of warfarin-associated anticoagulation, may not be the most effective therapy.

In IH, rapid availability of targeted interventions can be life-saving. Elevated intracranial pressure may need treatment with mannitol, hypertonic saline or surgically with intraventricular catheter placement or decompression. Aneurysms are coiled endovascularly or surgically clipped to prevent future bleeding. Delayed but treatable complications from bleeding include development of cerebral edema and arterial vasospasm. The former may cause further damage from mass effect. Vasospasm, which is common in aneurysmal SAH, may lead to ischemic strokes up to several weeks following the original hemorrhage.

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Karsten Dengel, MD

Determining Patients' Decision-making Capacity

Leslie McDaniel, MD

Informed consent, the process by which patients agree to treatment, requires that patients be informed, competent and free of coercion. Competency is a legal term regarding ability to perform a specific function. Decisional capacity is the medical term used by physicians. All adults are presumed competent unless deemed incompetent. Judges declare patients incompetent for global or specific functions, but physicians assess a patient's capacity in certain areas.

Physicians are required to obtain informed consent for treatment, except in the following cases:

- Imminent emergency, in which delay would seriously threaten the patient's well being;
- Waiver, in which a competent patient voluntarily waives right to receive information;
- Incompetence, in which case a patient is found to lack competence, and consent must be obtained from a surrogate;
- Therapeutic privilege, rare situations in which disclosure would cause significant injury to the patient's mental or physical health.

Competent patients have the right to consent to or refuse treatment. Incompetent patients are legally unable to consent or refuse treatment. Patients can have capacity for some decisions and not others. Capacity is task specific, not a general determination and applies to medical treatment, assigning Designated Power Of Attorney, standing trial, managing finances, etc. Capacity is not diagnosis-specific, and those with psychosis, mental retardation, dementia, etc. may retain capacity for some decisions. 5150 is irrelevant. Capacity is not a static determination, may fluctuate over time with changes in mental condition and may be restored with improvement in psychiatric or cognitive condition.

Decisional capacity involves intellectual and judgment components. Patients are required to have the ability to process and retain information given, and have a thought process rational enough to weigh the information and arrive at a choice. Patients may be able to repeat information back, but not appreciate its significance, due to impairment in judgment or reality sense.

A patient must demonstrate ability to (a) process and retain relevant information regarding their illness, severity, proposed treatment, potential benefits and risks of treatment, and no treatment; (b) appreciate its significance; (c) rationally manipulate/weigh information to arrive at decisions; (d) communicate choice. Patients with severe communication difficulty cannot technically give informed consent, whether or not they're competent.

The same level of competence is not required for all decisions. Expected rigor of competency test/standard varies as risk/benefit ratio changes. The more favorable the risk/benefit ratio (more treatable illness, more risk if not treated), the lower the standard for competence to refuse, (i.e. physician must be confident the patient has capacity to refuse a highly treatable but serious disorder). The more unfavorable the risk/benefit ratio is (less treatable problem, less benefit from treatment), the lower the standard for capacity assessment.

Potentially treatable causes of incapacity should be assessed.

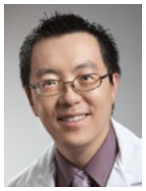
To assess judgment/reasoning, the physician should request patients to express treatment preference and reasons, and explain their understanding and decision in their own words. Interviewing the patient alone reduces coercive factors in treatment decisions. If the patient is unable to speak, use writing or yes/no answers. Obtain psychiatric evaluation if suspected incapacity is due to potentially treatable/reversible mental illness, or if questionable decisional capacity. Potentially treatable causes of incapacity should be assessed.

If the patient is found to lack capacity for decision, a surrogate decision maker should be identified to provide consent. If no surrogate is available, a legal process may be initiated for necessary treatment.

If you have comments or questions for Dr. McDaniel, please email her at MercyNeuro@DignityHealth.org. ■

Brain Waves: Updates from the Mercy Neurological Institute

NEUROCRITICAL CARE PHYSICIAN RECEIVES NATIONAL HONOR



Alex C. Nee, MD, of the Mercy Neurological Institute has been recognized nationally, receiving certification in Neurocritical Care from the United Council for Neurologic Subspecialties (UCNS). Dr. Nee, who joined Mercy in October 2010, is the only fellowship-trained neurocritical care neurologist in the Sacramento area. The medical subspecialty of neurocritical care is devoted to the comprehensive, multisystem care of the critically ill neurological patient. Like other intensivists, Dr. Nee assumes the primary care role for his patients in the ICU, coordinating both the neurological and medical management of the patient. Most uniquely, neurocritical care is concerned with the interface between the brain and other organ systems in the setting of critical illness. Before coming to Mercy, Dr. Nee served a two-year fellowship in critical care neurology at UCLA. Dr. Nee's fellowship was one of the criteria that made him eligible for the UCNS certification. In addition, he needed to be a Diplomate in good standing of the American Board of Medical Specialties and have a current active license to practice medicine in the United States or Canada.

SUPPORT MS BY JOINING MERCY'S TEAM FOR "WAVES TO WINE" RIDE

The Mercy Neurological Institute has once again formed a team for Bike MS: Waves to Wine Ride 2012—an event that raises funds for MS research, programs and services. You can join team captain Peter Skaff, MD, and other Mercy colleagues on Sept. 22–23 for the ride of your life that starts in San Francisco and finishes the next day in Rohnert Park. People participating in the ride include people living with MS, their friends, families and the health care professionals who care for them. Seventy-five or 100-mile routes are available on Saturday, and 50 or 75-mile routes are available on Sunday. You can join Mercy's team by going online to bikecan.nationalmssociety.org/ or if you have questions, contact Dr. Skaff at Peter.Skaff@DignityHealth.org.

MERCY TEAM TO PRESENT GROUP VISITS AT SAN DIEGO CONFERENCE

Mercy MS Center Staff, John Schafer, MD, Edie Happs, RN, and Gina Riedl, LPT, will present a workshop on group visits at the annual meeting of the Consortium of MS Centers in San Diego on June 2. The meeting is attended by about 1,500 people from North and South America.

MERCY JOINS CONSORTIUM TO COMBAT SPORTS CONCUSSIONS

In a unified effort to improve concussion care management for Sacramento's student athletes, the Mercy Neurological Institute has joined forces with Wells Fargo's Student Insurance Services, Kaiser Permanente, Sutter Health and UC Davis Health System to establish the Sacramento Valley Play It Safe Concussion Care Consortium. The program improves identification and management of sports-related concussion and provides young athletes with increased access to medical services. The Play It Safe program will provide baseline neurocognitive testing to student athletes at risk for concussion and will help educate coaches and families about proper concussion management. Wells Fargo also offers excess insurance coverage to protect the financial well-being of young athletes and their families. Testing and coverage will cost $5 per student. ■

Mercy Breaks Ground With New Aneurysm Treatment, continued from page 1

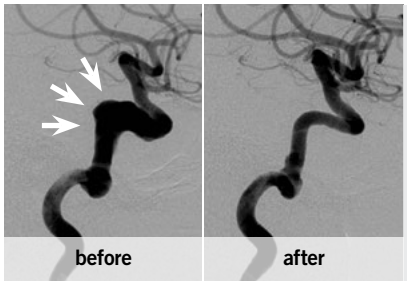


Figure 3. Following placement of the Pipeline stent there is occlusion of the aneurysm (arrows) and reconstruction of the parent artery.

years of treatment I went into remission. Eight months after I finished chemo, we discovered my aneurysm."

Hathaway credits her Mercy oncologist, Paul Spears, MD, with quickly identifying her aneurysm and referring her to Dr. Luh, who Dr. Spears said was using some innovative techniques. "When Dr. Spears found the aneurysm, I thought, 'What bad luck!" But now I feel like my luck was actually *great*—because I was in the right place at the right time, with the right doctors. Those two saved my life!"

Dr. Luh anticipates the Pipeline device having a similar effect on many patients' lives in the future. "Because it is easier and quicker to use, and because we don't actually have to enter the aneurysm itself, it really will change how we approach aneurysms," he says. "It is truly the beginning of a new era in treatment."

If you have comments or questions, please email us at MercyNeuro@DignityHealth.org. ■

Non-traumatic Intracranial Hemorrhage—a Neurological Emergency, continued from page 3

Mercy General Hospital has seen a sharp increase in referrals from Northern California due to around-the-clock availability of neurointerventional and neurocritical care services adept at managing these complexities. Mercy San Juan Medical Center will soon have equivalent imaging capabilities and will then serve as a second hub for the Mercy Neurological Institute in receiving referrals.

If you have comments or questions for Dr. Dengel, please email him at MercyNeuro@DignityHealth.org. ■

REM Sleep Behavior Disorder, continued from page 2

spontaneous remission is rare. Associated sleep talking, sleep walking, abnormal eating, sexual behaviors and periodic limb movements in sleep are reported. One must rule out other parasomnias, neuro-psychiatric disorders, nocturnal seizures, medication or alcohol effects, severe sleep apnea and post-traumatic stress disorder. Counseling the patient and family and instituting safety measures to prevent injury to self and bed partners are the cornerstone of treatment. Medications proven to be efficacious in completely or substantially treating these REM-related motor behaviors are clonazepam, melatonin and in refractory cases sodium oxybate. Appropriate diagnosis and management can be life altering for patients. The recognition of RBD as a clinical entity has gained importance since its recent popularity in cases of medico-legal significance.

Counseling the patient and family and instituting safety measures to prevent injury to self and bed partners are the cornerstone of treatment.

If you have comments, questions or seek references for this article, please email Dr. Krishna at MercyNeuro@DignityHealth.org. ■

Vasanthi Krishna, MD

Mercy Receives Epilepsy Designation

The National Association of Epilepsy Centers (NAEC) has designated Mercy General Hospital as a Level IV Epilepsy Center, recognizing it as a provider of comprehensive epilepsy care. This is the highest designation given by the NAEC.

According to NAEC guidelines, Level IV Epilepsy Centers must provide not only basic epilepsy care but also more complex forms of diagnostics and treatment. A Level IV Center must provide intensive neurodiagnostic monitoring and extensive medical, neuropsychological and psychosocial treatment, as well as a broad range of surgical intervention procedures.

The Mercy Epilepsy Center team offers patients a multi-disciplinary approach that includes integration with two neuropsychologists—something that is unique in the Sacramento region. In addition, Mercy General offers extensive inpatient monitoring, specially-trained nursing staff and neurodiagnostic technologists—all key components to the comprehensive diagnostic care and treatment of epilepsy patients.

"Level IV designation is exciting for the Mercy Neurological Institute because it represents another elite service of the comprehensive care we offer," says Chris Wood, Mercy Neurological Institute Senior Director. "Thanks to our specially-trained physicians and staff, as well as the technology available at our facilities, we can treat all aspects of each patient's condition."

Given the complexity of epilepsy diagnosis and treatment, that comprehensive approach is critical. "Through our epilepsy team, we are able to determine the most appropriate treatment for each individual," explains Dr. Edwin Cruz, Mercy epileptologist. "Our ongoing goal with each patient is zero seizures and zero side effects. This designation recognizes that we have the tools to achieve that goal for our patients." ■

INSIGHTS & INNOVATIONS **2012**

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

Saturday, May 5, 2012 7:30 a.m. to 1 p.m., at the Sheraton Grand Sacramento

Join the Mercy Neurological Institute of Greater Sacramento for this special half-day educational opportunity presenting the latest treatment options and clinical guidelines for patients affected by epilepsy and stroke.

CONTINENTAL BREAKFAST & NETWORKING: 7:30 to 8 a.m.

Check in and enjoy the opportunity to connect with your colleagues, eat breakfast and peruse our vendor demonstrations.

EPILEPSY PRESENTATIONS: 8 to 10 a.m.

Current Concepts on Epilepsy Care and Monitoring—Edwin Cruz, MD—Director, Mercy Epilepsy Centers' Monitoring Program

The Role of Monitoring in Evaluating Patients with Uncontrolled Seizures—Robert Burgerman, MD—Director, Sacramento Comprehensive Epilepsy Program

Surgical Epilepsy Treatment Today—Cully "Terry" Cobb III, MD—Mercy Neurosurgeon

STROKE PRESENTATIONS: 10 a.m. to Noon

Stroke Medical Management and Prevention: A New Beginning—Lucian Maidan, MD—Director, UCSF Fresno Vascular Interventional Neurology

An Exploration of Cerebrovascular Medicine and Interventional Neuroradiology—Lotfi Hacein-Bey, MD—Interventional Neuroradiologist, Radiological Associates of Sacramento

Neurosurgery and Hemorrhagic Stroke—Kavian Shahi, MD, PhD—Neurosurgery Medical Director, Mercy Neurological Institute of Greater Sacramento

LUNCH & KEYNOTE PRESENTATION: Noon to 1 p.m.

The Promise of Telemedicine—Christopher V. Fanale, MD—Medical Director, Swedish and Colorado Neurological Institute Stroke Programs

Register for this prestigious event by calling 916.851.2167 or visit MercyNeuro.org/cme.

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Mercy Neurological Institute of Greater Sacramento
3400 Data Drive
Rancho Cordova, CA 95670

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Recurring Opportunities

Continuing Medical Education 2012

Monthly Neuro Grand Rounds

Mercy San Juan Medical Center
First Friday of each month through June 2012, resuming in September 2012
12:30 p.m. in Conference rooms 2, 3, 4 or via webinar

Neuroscience Case Conferences

Mercy San Juan Medical Center
First and third Tuesdays of each month at 6 p.m. in CC3

tPA and Neurocritical Care Conferences

Mercy General Hospital
Second Tuesday of each even month (alternating) at 6 p.m. in the Greenhouse

Mercy San Juan Medical Center
Second Tuesday of each odd month (alternating) at 6 p.m. in CC3

Epilepsy Case Conference

Mercy General Hospital
Fourth Tuesday of each month at 6 p.m. in the North Auditorium

Contact Ann.Engwer@DignityHealth.org or 916.962.8751 for more information.