NEUROSURGERY

UCI Department of Neurological Surgery Newsletter

VOLUME 1, ISSUE 2 - SPRING 2006 www.ucihs.uci.edu/com/neurosurgery

MAILING ADDRESS:

UCI School of Medicine
Dept. of Neurological Surgery
101 The City Drive South
Bldg. 56, Ste. 400, ZOT 5397
Orange, CA 92868-3298

Trigeminal Neuralgia

by Mark Linskey, M.D.

Trigeminal neuralgia (TN) is a facial pain syndrome that affects the distribution of the trigeminal nerve; cranial nerve 5. Typical TN is a sudden shock-like, electric, or sharp-stabbing pain, that resolves as suddenly as it starts. Early on, the pain lasts only seconds and between episodes, the patient is pain-free. As things progress, the pain can last longer and background constant symptoms can develop. The pain usually arrives in an unpredictable manner, but also can be triggered by simple occurrences such as a cold wind on the face, brushing teeth, washing face, putting on make-up, talking, or even chewing. Standard neurological examination is usually normal, but careful testing can reveal subtle sensory reduction in the center of the lower face in up to one-third of patients. The likelihood of decreased facial sensation increases with syndrome duration and with surgical attempts at treatment. Spontaneous periods of symptom disappearance, or remission, lasting up to 6 months are common in up to 50% of patients. However, recurrence is the rule as the syndrome is slowly progressive in severity, frequency, and area of the face affected. TN pain is so excruciating that the patient will abruptly stop anything they are doing, and usually hold themselves immobile until it passes.

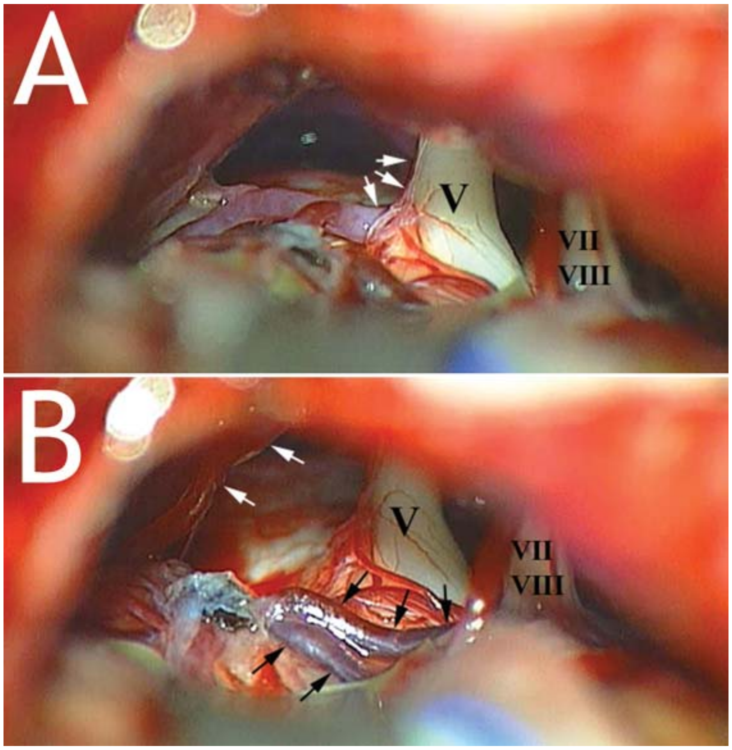


FIGURE 1: Intraoperative photographs under the operating microscope in a patient with right-sided TN showing the trigeminal nerve (V) and the seventh and eighth cranial nerve complex (VII & VIII). The trigeminal nerve is compressed from below from a loop of the superior cerebellar artery (white arrow heads in figures A and B). Once the artery is moved away and the cerebellum mobilized to show the nerve as it blends with the brain stem (Figure B), the nerve is also found to be cross-compressed from above by two veins (black arrow heads).

TN must be distinguished from other facial pain syndromes, including temporomandibular joint syndrome, post-herpetic neuralgia, cluster headache, and nerve damage pain. Approximately 98% of cases are thought to be caused by vascular compression of the trigeminal nerve, breaking down the insulation of the nerve, as it enters the lower portion of the brain. The remaining 2% of patients include those with: multiple sclerosis, tiny brain stem strokes, or patients with tumors, cysts, or vascular problems near the lower brain. MRI scanning is useful to rule out these alternative causes. However, it does not rule in, or rule out, vascular compression as a cause of the pain.

Initial therapy involves anti-seizure medications to raise the threshold for stimulation of the trigeminal system. Carbamazepine (Tegretol) and oxcarbazepine (Trileptal) have been proven to be the most effective drugs for the treatment of TN. Oxcarbazepine is currently preferred due to a more favorable toxicity and side effect profile, but lacks the long-term proof that it will continue to work as well as carbamazepine. Other medications often tried include Dilantin, Neurontin, and Baclofen, among many others. Approximately 95% of TN patients will initially respond to anti-seizure medicines. Unfortunately, some are intolerant of side effects, some have unpredictable drug reactions, and the remainder tend to gradually become resistant to higher and higher doses as the syndrome progresses. Approximately 56% of patients will fail carbamazepine therapy for one of these reasons over a period of 16 years. Despite these observations, it remains a sad truth that most TN patients have undergone several dental procedures over a period of several years before the correct diagnosis is made. The average TN patient has suffered with the syndrome for greater than 5 years and has seen 2-4 neurologists before they are finally referred to a neurosurgeon.

In experienced hands, surgical alleviation of blood vessel compression of the trigeminal nerve leads to initial cure with no pain and no medications in approximately 80% of patients. This success remains durable at 70% of patients for up to 20 years, which is the longest period observed so far. Other important palliative treatment options include procedures that selectively and partially damage parts of the nerve root. These include heat (percutaneous radiofrequency lesion), chemicals (percutaneous glycerol rhizotomy), mechanical crush (percutaneous balloon compression), or highly concentrated radiation (Gamma Knife Stereotactic Radiosurgery - GKSR). Palliative means that these methods provide relief of symptoms without curing the syndrome, since they do not address the syndrome cause. In essence, they are trading the risk of facial numbness and, more rarely, nerve damage pain, for relief of the pain syndrome.

The definition of success is the most critical factor in comparing procedure results. Patients can often be confused by reports where success is defined less strictly than being pain-free with or without the need for medications. All four palliative procedures are initially effec-

continued page 3

A Note From The Chair

Mark Linskey, M.D.
Chairman

Welcome to the second UCI Neurosurgery Newsletter. Our first Fall 2005 issue was extremely well received throughout the Medical Center, School of Medicine, and our community at large. We have received very positive feedback from many of our current and former patients and their families. We are extremely grateful for the generous donations that we have received, which are helping us establish the funds necessary to create a first-class neurosurgery research effort as well as reestablish our residency training program. It is only with a persistent, long-term, and concerted effort of our faculty, health systems leadership, industry colleagues, patients, and community that we will succeed in achieving these important goals.

The department has aggressively moved forward with our faculty recruiting efforts. I am happy to report that we have successfully recruited two outstanding new neurosurgeons to join our department beginning this summer. Recruitment of our second research Ph.D. is nearing completion, and I hope to be able to report our success to you with our next issue.

Dr. Devin Binder received his A.B. Magna Cum Laude from Harvard University and both his M.D. and his Ph.D. in Neurobiology from Duke University. He completed his Neurosurgery residency at UCSF in June 2005. Dr. Binder received the Van Wagenen Fellowship from the American Association of Neurological Surgeons, which he spent at the University of Bonn in Germany studying experimental and clinical epilepsy/functional neurosurgery and neuroscience with Dr. Johannes Schramm and colleagues. Starting August 7, 2006, Dr. Binder will serve as Head of the UCI Department of Neurological Surgery Epilepsy and Functional Neurosurgery Service as well as Surgical Director of the UCI Epilepsy Program.

Dr. Burak Ozgur is a Southern California and UCI native. He received his B.S. at UCI and his M.D. at the University of Vermont. Starting July 1, 2006, he is coming to us from UCSD, where he has completed his Neurosurgery residency as well as a one-year subspecialty fellowship training in Complex Spine Surgery in a combined Neurosurgery-Orthopedic Spine Surgery Program. Dr. Ozgur will be Head of the Neurosurgery Spine Service for the Department of Neurosurgery and will serve as Co-Director of our developing UCI Multidisciplinary Spine Program with Dr. Nitin Bhatia of Orthopedic Surgery.

Development of the UCI Multidisciplinary Spine Program is well under way. This comprehensive program will include sub-specialists trained in the latest operative, interventional, and non-operative techniques from Neurosurgery, Orthopedics, Physical Medicine, and Anesthesia, all coordinated and integrated under one program. It will also integrate exciting translational research opportunities through the Reeve-Irvine Research Center for spinal cord injury and the Henry Samueli School of Engineering at UCI. In recognition of this exciting development, and serving as a fitting "kick-off", we have organized a full-day UCI Multidisciplinary Spine CME Symposium for Saturday, May 20, 2006, to be held at the Beckman Conference Center on the edge of the UCI Irvine Campus. The featured speaker will be Dr. Richard Fessler, Chairman of Neurosurgery at the University of Chicago and a national expert on spine surgery and artificial disc technology. Dr. Fessler is joining us as our third annual John A. Kusske Lecturer. Dr. Fessler will be speaking on artificial disc arthroplasty in the cervical and lumbar spine. Please plan to join us for this special and landmark event.

This January, UCI Neurosurgery and four other surgical services at UCI, hosted the first Pacific Rim International Robotics Symposium (http://www.pacrimrobotics.com). Over 253 surgeons from four surgical specialties and 14 different countries convened in Anaheim for this unique landmark symposium on the emerging new field of surgical robotics. The neurosurgery sessions included key note addresses from Professor Garnette Sutherland from the University of Calgary in Canada and Professor Kazuhiro Hongo from Shinshu University in Japan. Professor Sutherland presented on intraoperative MR compatible prototype and Professor Hongo's group presented a four-hour live telemedicine demonstration of their endoscopic robotics system from their university in Matsumoto, Japan.

We are very happy to announce that installation of our new intraoperative MR scanner is officially scheduled to occur this May and June, and we are expecting the unit to be up and running for patient care by July 1, 2006. The Polestar N20 is the newest, and most advanced version of the highly successful Polestar series. This will be the first intraoperative MR scanner south of Los Angeles and is expected to have significant impact in improving the care, safety, and clinical outcomes of Orange County patients with brain tumors, pituitary tumors, and epilepsy.

It remains our goal to establish and solidify our position as the only academic neurosurgery service in Orange County. We aim to be the primary Orange County site for advanced neurosurgery patient care, as well as the main Orange County site for neurosurgery clinical outcomes studies, clinical trials, and translational neuroscience research. We intend to establish a top-tier neurosurgery training program, and to be the preferred regional site for neurosurgery CME. With the continuing support of our Medical Center and School of Medicine leadership, our referring physicians, private industry, and the community, along with the enthusiastic efforts of our faculty members, we are well on our way to achieving these goals. I would like to thank our Vice Chairman, Dr. John Kusske for his hard work, support, and leadership in spear-heading essential programs and department development projects for UCI Neurosurgery. I would also like to thank our Database Manager, Website Designer, and Newsletter Coordinator, Minh Tran, for his excellent work in producing such a professional newsletter. ■

tive in about 65-80% of cases, pain-free with or without medications at 1 year. However, because they do not treat the cause of the syndrome, they each have an annual recurrence rate of approximately 6-10% per year, so that by 5 years after treatment this number drops to approximately 50%. The need for repeat palliative intervention is common. Currently, GKSR appears to have the lowest rate of treatment-related numbness, and avoids invasive procedures. Unfortunately, it is not immediately effective, usually requiring 6-8 weeks before pain relief is experienced.

The best treatment option for a given patient is very individual-specific. It centers upon each patient's age, clinical situation, personal goals, priorities, fears, and degree of risk tolerance. Patients are usually best served by referral to a neurosurgeon experienced in all aspects of TN care early in their course so that the personal issues involved, as well as best timing for surgical intervention can be carefully considered without time pressure. Excellent information for patients can be obtained from the national Trigeminal Neuralgia Association (TNA) as well as from the local TNA support group in Orange County currently led by Mrs. Linda Benson (octngroup@yahoo.com). Dr. Linskey at the Department of Neurological Surgery at UCI is one of only 14 physicians nationally from all specialties currently serving on the Medical Advisory Board for the TNA and has extensive experience treating TN patients. He trained at the University of Pittsburgh under Peter Jannetta, who developed and championed microvascular decompression, as well as L. Dade Lunsford who is an expert in radiofrequency lesioning, glycerol rhizotomy and Gamma Knife radiosurgery. Dr. Linskey is able to offer all four procedures for selected patients. Appointments can be made by calling 714-456-6392. ■

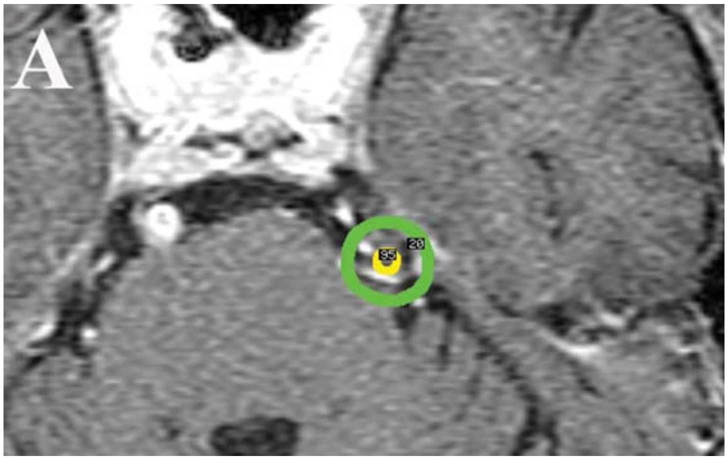


FIGURE 2A: Targeting MR scan during Gamma Knife stereotactic radiosurgery showing the radiation focus spot targeted on the trigeminal nerve root. The yellow line is the 85% dose prescription line and the green line shows the limit for 20% of this dose. The brainstem receives less than 20% of the prescription dose.

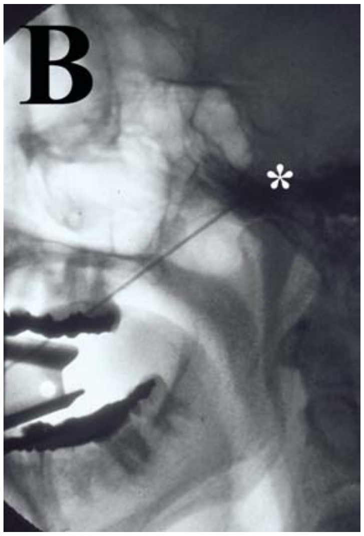


FIGURE 2B: Lateral intraoperative fluoroscopic view of a needle being passed from the cheek outside the mouth through the opening in the skull base for the trigeminal nerve (foramen ovale) to reach the ganglion of the nerve during a chemical percutaneous glycerol rhizotomy.

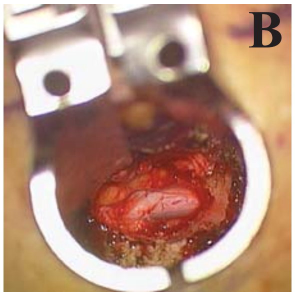
Minimally Invasive Spine Surgery

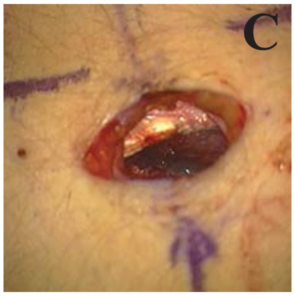
by Laura Paré, M.D.

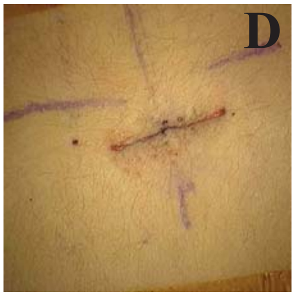
Minimally invasive surgery is gaining popularity among both patients and surgeons in many different surgical fields. Spinal surgery is no exception and many of the techniques now used in minimally invasive spine surgery have been adapted from other surgical fields. Minimally invasive spinal surgery can be defined as surgical techniques designed to accomplish all the objectives of the surgical spinal procedure while disrupting normal tissues as little as possible.

The development of minimally invasive spinal surgery has been greatly influenced and made possible by recent significant advances in technology. Advances in endoscopy using thin scopes that can be placed into body cavities, and surgical navigation, which gives the ability to precisely locate an anatomic structure while it is still covered by skin, muscle, or bone, have accelerated the development of minimally invasive techniques in the spine. There are many spinal surgeries today that can be performed with minimally invasive, percutaneous techniques, passing instruments through the skin with tiny incisions. However, not all spine problems can be helped with minimally invasive techniques and sometimes the traditional, open surgical techniques are superior for certain disorders. The following spinal procedures can be performed with minimally invasive techniques at UCI Medical Center: lumbar discectomy, lumbar fusion, kyphoplasty, vertebroplasty, cervical discectomy, cervical foraminotomy, lumbar interbody fusion, and stereotactic spinal radiosurgery.

Many patients prefer minimally invasive surgeries because there is less pain, faster recovery time, and smaller scars. ■





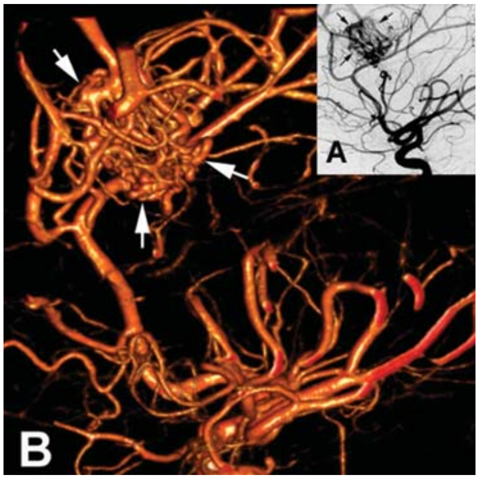


Minimally Invasive Lumbar Discectomy: A. Dilating tubes inside minimally invasive tubular retractor in lumbar spine. B. Tubular retractor in lumbar spinal area; light area at bottom is a dural tube (contains spinal nerves). C. Size of incision after tube removed is less than one inch long. D. Incision closed with sutures hidden under skin and closed with skin glue.

Microsurgery for Arterio-Venous Malformations

by Chiedozie Nwagwu, M.D.

Arteriovenous malformations (AVMs) of the brain consist of abnormal connections between arteries and veins. Normally, the connections between arteries and veins are through a network of minute blood vessels called capillaries, which enable the delivery of oxygen and nutrients into the brain tissue. In AVMs, the arteries and veins have a direct connection, bypassing the capillary network formed during embryonic development. An AVM is structurally a tangle of dilated blood vessels that disrupts normal blood flow in the brain by directly shunting blood within its dense center or nidus into veins. This effect deprives neighboring capillaries of vital oxygen and nutrients and may cause neurologic symptoms. These abnormal vessels may enlarge over time. The arteries and veins are tortuous, dilated, and are at increased risk of rupturing due to increased pressure within their channels. AVMs derive blood supply from one or a combination of vessels that normally supply the brain.



Standard digital subtraction cerebral angiogram (A) as well as specialized three-dimensional reconstruction (B) showing the twisted tangle of abnormal blood vessels forming the nidus of an arteriovenous malformation (Arrowheads) located in the frontal lobe. This patient presented with an intracerebral hemorrhage.

In the United States, about one in ten thousand people harbor an AVM in the brain. AVMs are the leading cause of stroke in young people. Often "silent" for many years, AVMs cause problems for patients between 10 and 30 years of age. They may experience severe headaches, seizures, or suffer a stroke from bleeding in the brain. Roughly 4% of AVMs bleed every year. Common symptoms of an AVM hemorrhage include loss of consciousness, sudden and severe headache, nausea, vomiting, urinary incontinence, and blurred vision. A stiff neck can occur as the result of increased pressure within the skull and because of irritation of the linings of the brain. These strokes can cause specific neurological problems such as paralysis, decreased sensation to touch, speech or vision problems, or they can cause a generalized decrease in consciousness and coma. Often symptoms can be due to problems related to the pressure exerted by the AVM on the normal surrounding brain tissue as well as decreased blood flow due to the shunting of blood away from its natural target tissue. AVMs in certain locations may impair the circulation of spinal fluid within the brain, causing high pressure in the brain, a condition known as hydrocephalus.

AVMs can be diagnosed using several imaging techniques. Angiography provides the most accurate pictures of blood vessel structure in AVMs. This invasive technique requires injecting a special water-soluble liquid, called a contrast agent, into an artery. The agent highlights the structure of blood vessels so that it can be recorded on conventional x-rays. Two of the most frequently employed noninvasive imaging technologies used to detect AVMs are computed axial tomography (CT) and magnetic resonance imaging (MRI) scans. A recently developed application of MRI technology—magnetic resonance angiography (MRA)—can record the pattern and velocity of blood flow through vascular lesions as well as the flow of cerebrospinal fluid throughout the brain and spinal cord. CT, MRI, and MRA provide three-dimensional representations of AVMs by taking images from multiple angles.

The goals of treatment include reduction of the risk of fatal or debilitating hemorrhagic stroke, or improving blood flow to the brain restoring normal neurologic function. Twenty years ago, many patients were told their AVMs were inoperable because the risks of treatment were considered too high. Today, advanced techniques make the treatment of AVMs safer and highly effective. A multidisciplinary team of neurosurgeons, neuroradiologists, and neurologists work together to formulate a treatment plan. Current acceptable treatment usually involves a number of techniques. The first, embolization; involves the delivery of various substances through the arteries which block blood flow within the AVM. Traditional open skull surgery with microsurgical techniques may then be used to remove the AVM. Finally, radiosurgery, which destroys the AVM tissue by focused x-ray, is utilized in those AVMs that cannot be resected. Benefits from treating AVMs using radiosurgery are delayed, up to 18 months, and in the intervening period, the patient continues to be at risk of AVM rupture.

Microsurgical procedures are carried out under general anesthesia, using an operating microscope. Using precise microsurgical tools and meticulous dissection, the neurosurgeon removes the AVM. In some instances, the entire AVM cannot be removed, and in such cases, the residual AVM may be effectively treated with radiosurgery. The length of stay in the hospital usually varies between 5-7 days with some short-term rehabilitation. The option of surgery depends on the general health of the patient and the nature of the AVM. The advantage of surgical treatment is that cure is immediate if all of the AVM tissue is removed. Risks include damage to nearby brain tissue and stroke to other areas of the brain.

Irrespective of the treatment methods, it is important for the treating team to have all of these options in a state-of-the-art facility housing dedicated angiography suites, microsurgery equipped operating rooms, and radiosurgery. ■

UCI Department of Neurological Surgery
presents

A Multidisciplinary Spine Symposium:

Contemporary and Emerging Approaches to Degenerative Diseases of the Spine and Spinal Cord Injury

and

THE THIRD ANNUAL

John A. Kusske Lecture

featuring

Richard G. Fessler, M.D., Ph.D.

Saturday, May 20, 2006

Arnold and Mabel Beckman Center of the
National Academies of Science and Engineering
University of California, Irvine

Previous Speakers:
Professor M. Gazi Yasargil
Martin Weiss, M.D.

Meet Our Faculty

Mark E. Linskey, M.D.

Associate Professor and Chairman of the Department of Neurological Surgery at UCI as well as Co-Director of the UCI Chao Family Comprehensive Cancer Center Neuro-Oncology Program. Dr. Linskey attended Columbia University College of Physicians and Surgeons, completed his neurosurgery residency at the University of Pittsburgh in 1993, as well as a neuro-oncology fellowship at the Ludwig Institute for Cancer Research in London in 1994. He is certified by the American Board of Neurological Surgery (ABNS). His clinical interests include skull base microsurgery, adult and pediatric malignant and benign brain tumors, Gamma Knife stereotactic radiosurgery, and microvascular decompression for cranial nerve disorders. Research interests include molecular epidemiology and biomarkers for brain tumors, developmental glial biology, radiobiology, brain tumor clinical trials, and clinical outcomes studies.

Chiedozie Nwagwu, M.D.

Assistant Clinical Professor of Neurological Surgery, Head of Cerebrovascular Neurosurgery, and Co-Director of the UCI Comprehensive Cerebrovascular Program. Dr. Nwagwu attended Mt. Sinai School of Medicine in New York City and completed his neurosurgical residency at New York Medical College in 2003. He completed a fellowship in endovascular surgery and interventional neuroradiology in Indianapolis in 2005. He is eligible for certification by the ABNS. His clinical interests include general neurosurgery as well as microsurgery of cerebral aneurysms and AVMs, carotid endarterectomy, cerebral revascularization, stereotactic radiosurgery for AVMs, and endovascular management of complex vascular lesions involving the nervous system including coiling, glues, stenting, embolectomy, and thrombolysis. His research interests include advancing endovascular technology, aneurysm wall structure and dynamics, cerebrovascular clinical trials, and clinical outcome studies.

Other Faculty Members

John A. Kusske, M.D.
Kim Anderson, Ph.D.

Volunteer Faculty Members

Michael Muhonen, M.D.
William Loudon, M.D.
Laurie Ackerman, M.D.
Christopher Duma, M.D.
Richard Kim, M.D.
E. Thomas Chappell, M.D.
Robert Jackson, M.D.
Bradley Noblett, M.D.
Sylvain Palmer, M.D.

Laura Paré, M.D.

Associate Clinical Professor of Neurological Surgery and Medical Director of the General Neurosurgery Ambulatory Care Clinic. Dr. Paré attended the University of Chicago Pritzker School of Medicine, completed her Neurosurgical Residency at the Montreal Neurological Institute, McGill University, Canada in 1991, as well as a spine fellowship at UCLA in 1997. She is certified by the ABNS as well as being a fellow of the Royal College of Surgeons of Canada. Her clinical interests include general neurosurgery, complex and minimally invasive spine surgery, normal pressure hydrocephalus, and the surgical treatment of depression. Her research interests include cerebrospinal fluid physiology, intracranial pressure wave form analysis, antibody cytokine interruption and human stem cell transplantation for spinal cord injury, and the effects of vagal nerve stimulation on depression and cognition.

To schedule an appointment or to refer a patient, please call (714) 456-6392.

"YOUR HELP

would make a great deal of difference to the quality of education that we can offer to our residents in the future."

Dear Friends:

We are writing to ask whether you would consider helping to make a real difference in the development of the faculty of neurological surgery as well as the research and educational activities in the Department of Neurological Surgery at UCI. The process of re-establishing a residency program in neurological surgery is well underway. This will enable us to acquaint young physicians with the skills they will need to master the goals of being competent and caring neurosurgeons. This is the realm of education. One of the charges of our university residency program will be to encourage our residents, along with talented investigators, to explore, to question, to push beyond known boundaries, and in that process to develop better, safer therapies for the neurosurgical diseases of mankind. This is the realm of research.

We are impressed by the immense potential for combining clinical efforts at UCI Medical Center with the work of world renowned basic neuroscientists on the UCI main campus. Research in brain tumors, cerebrovascular disease, brain and spinal cord injuries, movement disorders, come quickly to mind. With the reestablishment of our residency program this will undoubtedly come to fruition, but this will develop much more quickly and at a higher level of excellence with your help and participation. These activities will occur in the laboratory, in the operating room, as well as at the bedside. In order to support these young people fully with a first class educational and research experience, a UCI Neurological Surgery Resident Education fund and a UCI Neurological Surgery Research fund have been created. In addition, a fund to endow faculty chairs in Neurological Surgery has also been established. A funded chair will enable us to recruit the best and brightest neurosurgeons into this high priced Southern California market.

We are seeking to raise a $2,000,000 fund to support resident education and a $2,000,000 fund to support neurosurgical research. An endowment of $5,000,000 is needed to assure the establishment of a neurosurgical faculty chair. Funds for the endowment will be reinvested until a minimum of $1,250,000 is attained. If the amount does not reach this number by July 2010, the endowment fund, at that time, will revert to the research/education funds. These sums are very large, but we firmly believe it is an essential goal if we are to go beyond what we already know and what we are already doing in order to further improve the quality of the care we provide to our patients and our community. We would be honored if you would consider a gift to this fund, which is fully tax deductible to the extent of the law. Your help would make a great deal of difference to the quality of education that we can offer to our residents in the future. In turn, we aim to repay your thoughtfulness and generosity with new levels of skill, new therapies, and other research advances that will benefit all who have need of us. Please join us in supporting this effort by considering a generous donation on either a one-time or annual basis.

Sincerely,

Mark E. Linskey, M.D.
Chairman

Neurosurgery FAQ's

What is the role of neuroprosthetics in neurosurgery?

Neuroprosthetic devices are undergoing intense development at this time. These devices help brain and nerve function by inducing artificial signals such as, for example, a perceived tingle to replace pain. Deep brain stimulation is now being utilized for control of tremor of Parkinson's disease. Spinal cord stimulation is used to decrease painful sensations throughout the body. Vagal nerve stimulation is used to partially control some forms of epilepsy and has recently been approved for treating depression. Further from clinical use are studies being undertaken at a number of institutions looking at the use of fine microelectrodes to detect the brain's intent for action, and subsequently to use these signals to control external devices, such as a robotic arm. Some researchers believe that severely disabled patients, such as those who are quadriplegic because of spinal cord injury, will be able to control devices such as a wheelchair, a keyboard, or a robotic arm utilizing these techniques, and will enhance their quality of life and independence.

How has radiosurgery effected the treatment of brain tumors?

Stereotactic radiosurgery, according to an article in the May 2004 Lancet, can reduce the risk of local recurrences, decrease tumor size and brain edema, improve performance status, and reduce reliance of steroids in patients with up to three brain metastases; that is tumors spread from other parts of the body to the brain. Radiosurgery offers patients a minimally invasive, outpatient alternative to surgery as part of a treatment plan. The entire procedure is carried out in a single day, permitting patients to undergo other necessary treatments with minimal delay. During radiosurgery, beams of radiation are focused directly on the tumor or tumors avoiding normal brain tissue. Radiosurgery is also being used for treating benign tumors such as meningiomas and acoustic neuromas, as well as arteriovenous malformations. Patients with trigeminal neuralgia can be treated as well.

Dr. Mark Linskey, Chairman of the Department of Neurological Surgery, is actively involved in providing these treatments for patients with metastatic brain tumors as well as for many other intracranial lesions.

Is MRI scanning now available for surgical patients in the operating room?

Until the recent past, neurosurgeons have relied on images of the brain obtained before surgery to guide them in complex intracranial procedures. Now, new technology permits surgeons to perform tumor surgery while viewing the brain in real time. The intraoperative MRI system utilizes electromagnetic waves to produce detailed pictures of the brain as the operation progresses. The brain, because it is composed of soft tissue, constantly shifts during surgery and therefore is never in exactly the same position before an operation as during it. Now, instead of reviewing scans taken before and after surgery, doctors can visualize the brain in three-dimensional detail during all stages of an operation. Scans are obtained immediately before the first incision is made revealing the exact location of the tumor. This permits an operative approach which minimizes contact with normal brain. During surgery, the scans allow minor adjustments to be made in the removal of the tumor so that the neurosurgeon can remain precisely on target. At the termination of the procedure, scans can also reveal whether any tumor remains allowing for it to be removed without another surgical procedure.

The machine is portable, and when not in use, is stored in a special compartment in the operating room. The intraoperative MRI is being installed during the spring and is expected to be functional by this summer. UCI will then be the only medical center south of Los Angeles to possess such technology. The bottom line is that this technological advance will increase the precision and safety of many neurosurgical procedures performed to remove tumors.

How can the carpal tunnel syndrome effect me and what can be done about it?

The carpal tunnel syndrome (CTS) is not a new condition of the computer age, caused by long hours at the computer keyboard. Instead, evidence of this syndrome dates back to the 19th century. The carpal tunnel is a narrow passageway, bounded by ligaments and bones, on the palm side of your wrist. This tunnel protects the median nerve, a main nerve to your hand, and nine tendons that bend your fingers. The syndrome usually starts gradually, with mild aching in your wrist that can extend to your hand or forearm. Other common signs and symptoms include tingling or numbness in your fingers or hand, especially your thumb, index, or middle fingers, but not your little finger. There may also be pain radiating from your wrist up your arm to your shoulder or down into your palm or fingers. You may experience a sense of weakness in your hands and in severe cases a constant loss of feeling in some fingers.

Studies have shown that CTS can result from overuse or strain in certain jobs that require a combination of repetitive, forceful and awkward, or stressed motions of your wrists and hands. Examples include the use of power tools such as grinders, chippers, chain saws, or jackhammers, and heavy assembly line work. Repetitive computer work is commonly assumed to cause the syndrome, but the scientific evidence for this is weak. Women are three times as likely as men to develop CTS with the incidence being highest after menopause. The risk in men increases during middle age. CTS sometimes occurs during pregnancy but almost always improves after childbirth.

The diagnosis depends on the pattern of sensory and motor involvement in your hand and arm. Often, after a careful examination, an electromyogram and nerve conduction studies are performed. These tests are important in checking for conditions that may mimic CTS. Treatment includes taking more hand rest breaks and applying cold packs to reduce swelling. If these techniques are ineffective, treatment options include wrist splinting and medications. When the pain or numbness of CTS persists, surgery may be the best option. Your surgeon may use one of a few accepted techniques. But in all techniques, the ligament pressing on your nerve is cut. Surgery usually results in marked improvement, but you may experience some residual numbness, pain, stiffness, and weakness. If you think you have CTS, the Department of Neurological Surgery at UCI offers facilities for evaluation and treatment of this disorder.

Thank You for your generous donations!

Lan Huynh
David Hartman
Bernadette Kramer
Van Le
Scott Larson
Brenda Marshall
Nita Shyer

UNIVERSITY OF CALIFORNIA, IRVINE
DEPARTMENT OF NEUROLOGICAL SURGERY

This newsletter is presented to you by the UCI Department of Neurological Surgery.

NEWSLETTER CREATED BY:
Minh D. Tran

PLEASE VISIT US ONLINE AT:
www.ucihs.uci.edu/com/neurosurgery

If you do not wish to receive any further UCI Department of Neurosurgery fundraising communications, please contact Minh D. Tran at (714) 456-6966.

NEUROSURGERY

UCI School of Medicine
Department of Neurological Surgery
101 The City Drive South
Bldg. 56, Ste. 400, ZOT 5397
Orange, CA 92868-3298

Please visit us online at:
www.ucihs.uci.edu/com/neurosurgery

To schedule an appointment or to refer a patient, please call (714) 456-6392.