



*The
Western
Neurosurgical
Society*



Jointly Sponsored by: AANS



CALENDAR OF EVENTS

Friday, September 11, 2009

12:00PM – 4:00PM	Executive Committee Meeting	Fireside Room
2:00PM – 5:30PM	Registration	Homestead Lobby
7:00PM – 9:30PM	Opening Reception and Buffet	Merchant Trader Lawn

Saturday, September 12, 2009

6:30AM – 7:45AM	Breakfast Members/Professional Guests	Homestead 2 & 3
6:30AM – 12:00PM	Exhibitors	Homestead 2 & 3
6:30AM – 12:00PM	Registration	Homestead Lobby
7:45AM – 12:00PM	Scientific Session	Homestead 1
8:30AM – 10:00AM	Breakfast Spouses	Heritage 1
10:00AM–10:30AM	Break – Visit Exhibits	Homestead 2 & 3
1:00PM -- 6:00PM	Golf	Meadows Golf Course
1:30PM – 5:00PM	Tennis	Sun river Tennis Courts
7:00PM -- 10:00PM	“A Night at the Museum”	The High Desert Museum

Sunday, September 13, 2009

7:00AM – 8:00AM	Members Business Meeting & Breakfast	Heritage 1 & 2
7:00AM – 8:00AM	Breakfast Professional Guests	Homestead 2 & 3
7:00AM – 12:00PM	Exhibitors	Homestead 2 & 3
7:00AM – 12:00PM	Registration	Homestead Lobby
8:00AM – 12:00PM	Scientific Session	Homestead 1
8:00AM – 10:00AM	Breakfast Spouses	Heritage 1
1:00PM– 6:00PM	Golf	Woodlands Golf Course
1:30PM - 5:00PM	Tennis	Sun river Tennis Courts
7:00PM – 7:45PM	Formal Reception	Great Hall Bachelor Lawn
7:45PM – 10:00PM	Formal Banquet/Dance	Great Hall

Monday, September 14, 2009

6:30AM – 7:30AM	Breakfast Members/Professional Guests	Homestead 2 & 3
6:30AM – 12:00PM	Exhibitors	Homestead 2 & 3
6:30AM – 12:00PM	Registration	Homestead Lobby
7:30AM – 12:00PM	Scientific Session	Homestead 1
8:30AM – 10:00AM	Breakfast Spouses	Heritage 1
10:00AM – 10:30AM	Break – Visit Exhibits	Homestead 2 & 3
12:00PM	Scientific Meeting Adjourned	

**See you at the 56th Meeting of the WNS at the El Dorado Hotel
in Santa Fe, New Mexico**



Western Neurosurgical Society

55th ANNUAL MEETING

Sunriver Resort
Sunriver, Oregon

September 11 – 14, 2009

www.westnsurg.org

Jointly sponsored by



American
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Neurological
Surgeons

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Speakers, paper presenters/authors and staff (and the significant others of those mentioned) who have disclosed a relationship* with commercial companies whose products may have relevance to their presentation are listed below.

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Antonio DeSalles	Brain lab and Medtronic	Research Support
Mark Belza	Relieva Websystems	
Howard Yonas	Neurologica	Stock
Thomas Chen	Pharmokinesis	Consultant

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Michael Lawton	Zachary Litvack	Fernando Vinuela
L Philip Carter	Karin Rajneesh	Antonio DeSalles
Mark Belza	Nick Hopkins	Neil Martin
Praveen Mummaneni	Richard Rapport	David Guillaume
Nate Selden	Skip Jacques	Ali Murad
Michael De Georgia	Marvin Bergsneider	Neil Roundy
Steve Giannotta	Larry Shuer	



WESTERN NEUROSURGICAL SOCIETY

55th ANNUAL MEETING 2009 Learning Objectives

The purpose of this meeting is to provide an update in the basic and clinical sciences underlying neurosurgical practice through lectures, discussions, interactive sessions with neurological surgeons, neurologists, neuroradiologists, and other allied health personnel.

Upon completion of this program, participants should be able to:

- 1) Discuss recent advancements in managing cerebrovascular diseases.
- 2) Identify new techniques for improving lumbar and cervical surgical outcomes.
- 3) Review radiosurgical and surgical treatment options for CNS neoplasms.



MEDICAL EDUCATION ACCREDITATION/CONTINUING

This Activity has been planned and implemented in accordance with the Essentials and Standards of the Accreditation Council for Continuing Medical Education (AACME) through the joint sponsorship of the AANS and the Western Neurosurgical Society. The AANS is accredited by the AACME to provide continuing medical education for physicians.

The AANS designates this educational activity a maximum of 10.5 AMA PRA Category 1™ credits. Physicians should only claim credit commensurate with the extent of their participation in the activity.

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2009 GUESTS

Michael De Georgia	Society
Nelson "Nick" Hopkins	Society
Howard Yonas	Paul Turner
Theodore Hole	Moose Abou Samra
Karin Rajneesh	Resident Award
Ali Murad	Society
Neil Roundy	Society
Zachary Litvack	Resident Award
Kerry Cloward	Jeff Rush
David Shafron	Timothy Harrington
David Guillaume	Kim Burchiel
Praveen Mummaneni	Grant Gauger
Jodi Kellogg	Johnny Delashaw



Dr. George Ablin
1923-1999

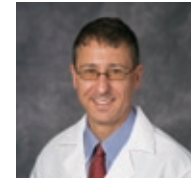
In 2000, the members of the Western Neurosurgical Society inaugurated a new lectureship designed to honor, in a tangible and enduring manner, one of the Society's most outstanding members. In its long history, the Society has had no more devoted contributor than Dr. George Ablin. He brought to the group stunning ability and experience, especially in matters of local, national, and international organization, in which he had few peers. He contributed through service in many areas including a memorable term as President. He was a wise and thoughtful counselor whose advice concerning many professional and personal questions always included a careful analysis, given with words of encouragement. There was no more active and engaged participant in all of the Society's affairs.

George Ablin was raised in Chicago, received his B.S. and M.D. from the University of Michigan, interned at Charity Hospital, New Orleans, Louisiana, did his residency at the University of Wisconsin, later was Instructor at the University of Michigan, and also became a Clinical Professor at California State University, Bakersfield. Dr Ablin was Board Certified in Neurological Surgery, A Fellow of the American College of Surgeons, and a Diplomat of the National Board of Medical Examiners.

Dr Ablin began practice in neurosurgery in Bakersfield, California, in 1953, was President of the Kern County Medical Society in 1984, and was very active in the California Medical Association in various leadership positions. He was Treasurer of the California Medical Review Board and received Distinguished Service awards from the Congress of Neurological Surgeons and the American Association of Neurological Surgery. He was named Honorary President of the World Neurological Society and in 1989 he was selected as the Kern County Physician of the Year. George was the devoted father of seven children, three of whom became physicians.

George combined an exceptionally perceptive understanding of others, including hundreds of fellow neurosurgeons, with warmth and gentleness and lively humor. He loved his colleagues and friends, and he loved this Society. With this permanent lectureship, the members of the Western Neurosurgical Society honor George Ablin his cherished wife, Millie.

This year's Ablin Speaker was supported by a generous gift from the Ablin Family.



Michael A. De Georgia, MD, FACP, FAHA, FCCM

Ablin Lecturer

Dr. Michael De Georgia is the Director of the Reinberger Neuroscience Intensive Care Unit at University Hospitals Case Medical Center in Cleveland, Ohio. He is Professor of Neurology at Case Western Reserve University School of Medicine where he holds the Maxeen Stone and John A. Flower Endowed Chair in Neurology. Dr. De Georgia is also the Director of the Center for Neurocritical Care and Co-Director of the Cerebrovascular Center of University Hospitals' Neurological Institute.

Dr. De Georgia is an internationally recognized leader in the field of neurological intensive care, which encompasses stroke, bleeding within and around the brain, head trauma, brain edema, and coma. He is active in research related to lowering the temperature of the brain to protect it after injury and new innovative neuromonitoring approaches in the intensive care unit (such as monitoring blood flow and oxygen levels in the brain) along with the use of complex systems analysis tools in the ICU.

From 2001 to 2007, Dr. De Georgia directed the Neurological Intensive Care Program and the Neurology-Neurosurgery Intensive Care Unit at the Cleveland Clinic. Previously, he was Director of the Neurocritical Care and University Stroke Program at the State University of New York Health Science Center in Syracuse.

Dr. De Georgia earned his medical degree with honors at the Northeastern Ohio Universities College of Medicine after completing an accelerated six-year combined B.S./M.D. program. He then completed an internal medicine residency at the University of Michigan Medical Center in Ann Arbor, a neurology residency at the Tufts University-New England Medical Center in Boston and a neurocritical care fellowship at the University of Heidelberg in Germany. He is board certified in Internal Medicine, Neurology, Vascular Neurology, and Neurocritical Care and is an honorary fellow of the American College of Physicians, the American Heart Association, and the American College of Critical Care Medicine.

Fluent in both English and German, Dr. De Georgia is a dynamic and frequently invited speaker around the world and health commentator for the media. An amateur historian, Dr. De Georgia is the author of the new book *Struck Down: The Collision of Stroke and World History*, that illustrates the devastating impact of cerebrovascular disease on the lives of many world leaders including Woodrow Wilson, Vladimir Lenin, Gustav Stresemann, Franklin D. Roosevelt, Josef Stalin, and Winston Churchill.

Finally, when not practicing medicine, teaching, conducting research, writing books, or speaking, Dr. De Georgia plays in a rock band called "The Codes".

ABLIN LECTURES

- 2000 Arthur L. Day, MD, Professor of Neurosurgery, University of Florida, Co-Chairman and Residency Program Director,
"Unruptured Intracranial Aneurysms and Sports Medicine in Neurosurgery"
- 2002 Tom Campbell, JD, Ph D., Professor of Law, Stanford University, Former Congressman,
"Is Freedom Possible in Medicine"
- 2003 Frederic H. Chafee, Ph D., Director, W. M. Keck Observatory,
"The W. M. Keck Observatory at the Dawn of the New Millennium"
- 2004 Gerald Kooyman, Ph D., Research Professor, Scripps Institute of Oceanography,
"Emperor Penguins: Life at the Limits"
- 2005 Rocco Armonda, MD, Neurological Surgeon, Lt.Col., U.S. Army,
"The Modern Management of Combat Neurotrauma Injuries: Battlefield to the Medical Center"
- 2006 August Turak, Spiritual and Business Consultant,
"Spirituality and the Neurosurgeon"
- 2007 Donald Trunkey, MD, Internationally Renowned Trauma Surgeon,
"The Crisis in Surgery with Particular Emphasis on Trauma"
- 2008 Michael Bliss, PhD, Emeritus Professor, University of Toronto,
"Working Too Hard and Achieving Too Much? The cost of Being Harvey Cushing"



Ralph B. Cloward
1908-2000

In 2002, the Western Neurosurgical Society established a Medal and Lecture to honor one of its most innovative and pioneering members, Ralph Bingham Cloward. With the gracious support of the Cloward family, this award honors both Ralph and his devoted wife, Florence.

Ralph Cloward was born in Salt Lake City, Utah, in 1908. He completed his undergraduate studies at the Universities of Hawaii and Utah and his medical education at the University of Utah and then at Rush Medical School in Chicago. He interned at St Luke's Hospital, Chicago, and then trained to become a neurosurgeon under Professor, Percival Bailey, at the University of Chicago. He began his practice of neurology and neurosurgery in the Territory of Hawaii in 1938.

His academic accomplishments include visiting professorships at the University of Chicago, University of Oregon, University of Southern California, and Rush Medical School. He was Professor of Neurosurgery at the John A Burns School of Medicine at the University of Hawaii. He is the author of numerous papers and book chapters and has lectured and operated all over the world.

Dr Cloward's pioneering contributions encompass many areas of neurosurgery, but his enduring interest was the spine, where he devised three major operations. He first performed the posterior lumbar interbody fusion in 1943, reporting it in the Hawaiian Territorial Medical Association in 1945 and publishing it in the Journal of Neurosurgery in 1953. His unique approach for treating hyperhydrosis was reported in 1957. Independently, he conceived an anterior approach to the cervical spine, devised instruments for its implementation, and published his classic paper in the Journal of Neurosurgery on anterior cervical discectomy and fusion in 1958. He designed over 100 surgical instruments which continue to be used today by practicing neurosurgeons.

Throughout his career he educated the international community of neurosurgeons in the performance of the operations he devised. He contributed his time generously to patients who have been healed by his operations in the US and throughout the world. Hundreds of thousands of patients have benefited both directly and indirectly from his technical genius, insight, and enthusiasm as a teacher. Ralph loved the Western Neurosurgical Society and it's fitting that the WNS can now honor him with this Medal.



L. Nelson Hopkins, M.D.

Cloward Award Lecturer

Professor and Chairman of Neurosurgery, Professor of Radiology, and Director of the Toshiba Stroke Research Center, University at Buffalo, State University of New York

After completing his undergraduate studies at Rutgers University, Dr. Hopkins earned a doctor of medicine degree cum laude from Albany Medical College. His post-graduate training included a surgical internship at Case Western Reserve, followed by neurology and neurosurgical training at the University at Buffalo.

Active in national neurosurgery, Dr. Hopkins has served as a member of the Board of Directors of the American Association of Neurological Surgeons (AANS) and of the Executive Committee of the Stroke Council of the American Heart Association. He has served as Scientific and Annual Meeting Chairman for both the AANS and Congress of Neurological Surgeons and Chairman of the Joint Section on Cerebrovascular Surgery, and president of the American Academy of Neurological Surgery. Dr. Hopkins is currently the principal investigator of several national clinical trials testing catheter-based technologies for the treatment of neurovascular diseases. He is the endovascular principal for the editorial board of NEUROSURGERY, and the author of over 300 publications centered on the prevention and treatment of stroke.

Dr. Hopkins is an advocate of cross-specialty and multidisciplinary collaboration. He fostered the creation of the Toshiba Stroke Research Center, bringing together physicists, chemists, aerospace engineers, neurosurgeons, cardiologists, and radiologists to study the neurovascular circulation and develop innovative technologies and approaches for the diagnosis, treatment, and prevention of neurovascular diseases. A proponent of the global approach to revascularization for the improvement of outcomes for patients with vascular disease, Dr. Hopkins has served on the faculty of numerous symposiums nationally and internationally and each year hosts multidisciplinary seminars along with industry leaders focused on assessing and managing complications associated with minimally invasive catheter-based interventions.

He and his wife, Bonnie, live in Buffalo, New York and have three children and nine grandchildren.

CLOWARD AWARD

- 2003 George Ojemann, M.D., Professor of Neurosurgery, University of Washington, *"Investigating Human Cognition during Epilepsy Surgery"*
- 2005 Donald Prolo, M.D., Clinical Professor of Neurosurgery, Stanford University, *"Legacy of Giants in the Treatment of Spinal Disorders: Ralph Cloward and Marshall Urist"*
- 2006 Martin Weiss, M.D., Professor of Neurosurgery, U.S.C., *"A Historical Walk through Pituitary Surgery"*
- 2007 Charles B. Wilson, M.D. Past Chairman, Department of Neurosurgery, UCSF, *"The Future of Neuroscience"*
- 2008 Peter Jannetta, M.D., Past Professor and Chairman, Department of Neurosurgery at the University of Pittsburg, *"Vascular Compression in the Brainstem: Main Streaming Neurosurgery"*

WESTERN NEUROSURGICAL SOCIETY
2009 Annual Meeting

SCIENTIFIC PROGRAM
SESSION I
DAY 1, SATURDAY, SEPTEMBER 12, 2009

Moderators: Jeff Rush, Charlie Nussbaum

7:45-7:50 **Welcome Larry Shuer**

7:50-8:05 1 **“Should Qualitative OEF Play a Role in the Selection of Patients for EC-IC Bypass?”**
Howard Yonas

8:05-8:10 Discussion

8:10-8:25 2 **“A Supplemental Grading System for Brain Arteriovenous Malformations and Application to 300 Surgical Patients”**
Michael Lawton

8:25-8:30 Discussion

8:30-8:45 3 **“Quality Measurers in Neurosurgery”**
Phil Carter

8:45-8:50 Discussion

8:50-9:05 4 **“Thermal Ablation of the Basivertebral Nerve: An Alternative Treatment for Low Back Pain”**
Mark Belza

9:05-9:10 Discussion

9:10-9:50 **SPECIAL LECTURE**

“Mini Open Approaches to the Lumbar and Thoracic Spine”
Praveen Mummaneni

9:50-10:00 Discussion

9:50-10:30 BREAK—VISIT EXHIBITS

**SCIENTIFIC PROGRAM
SESSION II
DAY 1, SATURDAY, SEPTEMBER 12, 2009**

Moderators: Grant Gauger

10:30-10:45 5 **“Modified Orbitozygomatic Craniotomy for Craniopharyngioma Resection in Children”**
Nate Selden

10:45-10:50 Discussion

10:50-11:00 Introduction of Ablin Lecturer
Larry Shuer

11:00-12:00 **ABLIN LECTURE**

“Struck Down: The Collision Of Stroke And World History”

Michael De Georgia

Professor of Neurology Case Western Reserve Hospital

**SCIENTIFIC PROGRAM
SESSION III
DAY 2, SUNDAY, SEPTEMBER 13, 2009**

Moderators: Mark Linskey and Austin Colohan

8:00-8:15 6 **Eliminating Hearing Loss Associated with Microvascular Decompression for Trigeminal Neuralgia: Optimazation of Technique**
Steve Giannotta

8:15-8:20 Discussion

8:20-8:35 7 **Development of an Implantable Brain Pump for Metronomic Convection Enhanced Delivery**
Thomas Chen

8:35-8:40 Discussion

8:40-8:55 8 **RESIDENT AWARD – CLINICAL SCIENCE**

Dural Splitting Decompression for Chiari 1 Malformation – Safety, Efficacy, and Cost Analysis

Zachary Litvack

9:00-9:05 Discussion

9:05-9:20 9 **RESIDENT AWARD – BASIC SCIENCE**

Optical Detection of Cerebral Edema

Kiran Rajneesh

9:20-9:25 Discussion

9:25-9:30 Introduction of Cloward Lecture
Austin Colohan

9:30-10:00 **CLOWARD LECTURE**

Neurosurgeons and Stroke: From Prevention to Treatment

Nick Hopkins

Professor and Chairman Department of Neurosurgery
University at Buffalo, State University of New York

10:00-10:30 BREAK—VISIT EXHIBITS

SCIENTIFIC PROGRAM
SESSION IV
DAY 2, SUNDAY, SEPTEMBER 13, 2009

Moderators: Linda Liau and Moose Abou-Samra

- 10:30-10:45 10 **How to Recycle a Used Brain Surgeon**
Richard Rapport
- 10:45-10:50 Discussion
- 10:50-11:05 11 **Transplantation of Human Embryonic Stem Cells Preserves the Normal Structure of the Hippocampus after Kainic Acid Injection in to the Rat Brain**
Skip Jacques
- 11:05-11:10 Discussion
- 11:10-11:25 12 **Endoscopy Improves the Image-Complete Resection Rate of Larger Pituitary Macroadenomas without Increasing Intra-operative Morbidity**
Marvin Bergsneider
- 11:25-11:25 Introduction of WNS President
Linda Liau

11:30-12:00 **PRESIDENTIAL ADDRESS**

Change In Neurosurgery
Larry Shuer

SCIENTIFIC PROGRAM
SESSION V
DAY 3, MONDAY, SEPTEMBER 14, 2009

Moderators: Neil Martin

7:30-10:00

MINI SYMPOSIUM

CEREBROVASCULAR CHALLENGES

MODERATOR: Neil Martin

1. Lori Shutter

Topic: Update on Acute Stroke Management

2. Fernando Vinuela

Topic: Update on Recent Advances in Endovascular Techniques for CNS Vascular Lesions

3. Antonio DeSalles

Topic: Stereotactic Radiation Management of Giant AVMs

4. Neil Martin

Topic: Surgical Treatment of Aneurysms and AVMs

Panel Discussion 30 minutes

10:00-10:30 BREAK—VISIT EXHIBITS

SCIENTIFIC PROGRAM
SESSION VI
DAY 3, MONDAY, SEPTEMBER 14, 2009

Moderators: Jeff Rush

- 10:30-10:45 13 **Improving Imaging and Therapy for Disseminated Medulloblastoma: Studies in the Nude Rat**
Daniel Guillaume
- 10:45-10:50 Discussion
- 10:50-11:05 14 **Effectiveness of Controlled Lumbar CSF Drainage in Medically Refractory Increased Intracranial Pressure**
Ali Murad
- 11:05-11:10 Discussion
- 11:10-11:25 15 **Intraoperative Integration of Neuronavigational Modalities**
Neil Roundy
- 11:25-11:30 Discussion
- 11:30 Meeting Adjournment



ABSTRACTS

See you in Sante Fe, New Mexico, in 2010

1. Should Qualitative OEF Play a Role in the Selection of Patients for EC-IC Bypass?

Howard Yonas, MD, Edwin Nemoto, PhD, Tudor Jovin, MD, Albuquerque, NM

Various approaches for the identification of a subgroup of patients with cerebral occlusive vascular disease with an increased risk of stroke have identified. A strategy based upon baseline oxygen extraction data is currently incorporated within the COSS NIH funded trial that is examining the efficacy of extra cranial to intracranial bypass surgery. Alternative approaches have reported equal efficacy using a physiological challenge strategy in which the response to a vasodilatory challenge is measured. The later provides a measure of the cerebrovascular reserve (CVR).

In order to better understand the relationship of these two strategies for identification of a high risk subgroup, both studies have been obtained in the same patient and at the same time using PET.

Methodology: 015 generated at the University of Pittsburgh PET center was utilized to measure the CBF, CMR02, OEF the response of these variables to a vasodilatory challenge induced by acetazolamide. Calculation of OEF was made by the count based method (qualitative) used within the COSS trial and also by traditional quantitative measurements. All 17 patients were known to have extensive occlusive vascular disorders but were not candidates for inclusion into COSS for varied reasons. All patients were studied under IRB approved protocols with NIH support (Quovadis study).

Results: The correlation of OEF qualitative and quantitative was poor. OEF was weakly correlated with the cerebrovascular reserve (CVR) but the OEF reserve was highly correlated with the CVR. Correlation of OEF and CVR was the weakest in areas associated with prior white matter infarction.

Conclusion: Conclusions drawn about stroke prediction based upon qualitative OEF data needs further study. CVR appears to be a robust and reliable approach to identifying patients with increased stroke risk due to hemodynamic compromise.

2. A Supplementary Grading System for Brain Arteriovenous Malformations and Application to 300 Surgical Patients

Michael T. Lawton, MD, Helen Kim, PhD, Charles E. McCulloch, PhD, Bahar Mikhak, MS, MPH, William L. Young, MD, San Francisco, CA

OBJECTIVE: Patient age, hemorrhagic presentation, nidus diffuseness, and deep perforating artery supply are important factors when selecting patients with brain arteriovenous malformations for surgery. We hypothesized that these factors outside of the Spetzler-Martin grading system could be combined into a simple, supplementary grading system that would accurately predict neurological outcome and refine patient selection.

METHODS: A consecutive, single-surgeon series of 300 patients with AVMs treated microsurgically was analyzed in terms of change between preoperative and final postoperative Modified Rankin Scale scores. Three different multivariable logistic models (full, Spetzler-Martin, and supplemental models) were constructed to test the association of combined predictor variables with the change in MRS score. A simplified supplemental grading system was developed from the data which combined age, hemorrhagic presentation, and diffuseness in a manner analogous to the Spetzler-Martin grading system, with points assigned according to each variable and added together for a supplemental AVM grade.

RESULTS: Predictive accuracy was highest for the full multivariable model (receiver operating characteristic curve area, 0.77), followed by the supplemental model (0.73), and least for the Spetzler-Martin model (0.66). Predictive accuracy of the simplified supplemental grade was significantly better than that of the Spetzler-Martin grade ($P = 0.042$), with ROC curve areas of 0.73 and 0.65, respectively. The predictive accuracy of the supplemental grade was only slightly less than a full point score with all 7 weighted variables ($P = 0.364$), with areas under the ROC curve of 0.73 and 0.75, respectively.

CONCLUSIONS: This new AVM grading system supplements rather than replaces the well established Spetzler-Martin grading system, and is a better predictor of neurological outcomes after AVM surgery. The supplemental grading scale has high predictive accuracy on its own and stratifies surgical risk more evenly. Supplemental grades can confirm risk predicted by the Spetzler-Martin grade, or in cases of mismatched grades, may alter management decisions. The supplemental grading

system is easily applicable at the bedside, where it is intended to improve preoperative risk prediction and patient selection for surgery.

3. Quality Measures in Neurosurgery

L. Philip Carter, MD, Carol Volk, RN, Ellice Mellinger, RN,
Martin Weinand, MD., Tucson, Arizona

Traditionally, neurosurgical quality has been measured by morbidity and mortality. More recently cost analysis, length of stay, and patient satisfaction have been incorporated as quality measures.

In 2006, CMS in an attempt to reduce the costs of surgical complications, initiated the "Surgical Care Improvement Project" (SCIP). It targeted surgical site infections, adverse cardiac events, venous thromboembolism, and postoperative pneumonia in selected surgical procedures by ICD-9 codes. Since then it has expanded to include most surgical procedures, as well as ambulatory surgery.

In September of 2006, the University of Arizona Medical Center implemented SCIP with an education process for nurses and physicians. A task force composed of teams to target the SCIP indicators. This included representation from Preop, Anesthesia, Surgery, Intraoperative Nursing, PACU, and ICU, since all these disciplines were involved.

Our results from 3rd Quarter 2006 to 4th Quarter 2008 are reported. Antibiotic compliance (start, appropriate, and discontinued) improved rapidly, while beta blockers took longer, postop normothermia and serum glucose control have been more problematic. These results are publicly reported and now CMS is adding new indicators. All surgeons are affected by compliance tracking, re-credentialing, pay for performance, and public reporting. Neurosurgery has always endeavored to improve outcome and reduce complications, SCIP is a start for general complication reduction but does not address specific neurosurgical problems.

4. Thermal Ablation of the BasiVertebral Nerve: An Alternative Treatment for Low Back Pain

Mark G. Belza, MD, Bend, Oregon

Back pain is the number one cause of healthcare expenditures in the United States. It impacts one third of the population and costs \$80 billion annually. This disease disables fifty million people and 500 million lost workdays occur annually. It is the most common cause

of disability in persons under 45 years of age. Of the 12 million patients who present with chronic back pain annually, more than 2 million fail to respond to conservative treatment. As a result, these patients have two options--either escalating use of pain medication or major spine surgery such as fusion.

Spinal stabilization has been demonstrated to relieve the inflammatory and painful effects of degenerative arthritis. A variety of sources of this pain have been postulated. Anatomical studies have demonstrated the presence of a rich neural plexus of nociceptive fibers congregating along the endplates of vertebral bodies. These fibers arise from the BasiVertebral nerve that consistently enters the posterior midbody of each vertebrae.

These anatomical findings have led to the proposal that thermal ablation of the BasiVertebral nerve could result in a method to control and diminish low back pain. An intraosseous nerve ablation system has been developed and consists of a radiofrequency generator, with a novel Jamshidi-type access instrumentation, and proprietary radiofrequency probe.

A pilot feasibility study including six sites globally has been established. Fifteen patients have been treated to date. No procedural or device related adverse events have occurred. Profound and immediate relief has been reported, although the numbers are not statistically significant. Additional studies are ongoing.

The purpose of this presentation is to alert the audience to a new minimally invasive technology in the treatment of low back pain, and describe the tools created to perform this procedure, as well as discuss the science behind the theory.

5. Modified Orbitozygomatic Craniotomy for Craniopharyngioma Resection in Children

Nathan R. Selden, MD, PhD, Kiarash J Golshani, MD,
Johnny B. Delashaw, Jr., MD, Kirk Lalwani, MD, Portland, OR

Object: To evaluate the efficacy and safety of modified orbitozygomatic (OZ) craniotomy for resection of craniopharyngioma in pediatric patients.

Methods: A prospective, Institutional Review Board approved database was retrospectively reviewed for pediatric patients undergoing craniopharyngioma resection by a single surgeon.

Results: Ten patients underwent craniopharyngioma resection surgery between July 2000 and January 2006 (4 females, ages 1.5–17 years). Nine patients presented primarily and one remotely after surgery and radiation elsewhere. Nine patients presented with visual field deficits (2 with unilateral or bilateral light perception only) and 5 with endocrine dysfunction. Eight patients had large tumors significantly displacing the optic chiasm and hypothalamus. All patients underwent a modified fronto-temporal OZ osteotomy in a single piece. The lamina terminalis was opened in 4 patients with 3rd ventricular extension. One patient required a staged transphenoidal operation to remove residual tumor in the sella and 1 patient underwent a contralateral subtemporal approach to resect a daughter lesion in the prepontine cistern. Complete radiographic resection was achieved in all patients. Follow-up averaged 55 months (range 12–95 months). Vision was improved in 8 patients and stable in 2. All patients had postoperative endocrine dysfunction. One patient experienced transient 4th nerve palsy and 1 suffered a small caudate stroke 5 months after surgery without sequelae. Two patients experienced polyphagia and weight gain without other symptoms of hypothalamic dysfunction. There were no other new neurological deficits.

Conclusion: Modified OZ craniotomy provides excellent exposure of the suprasellar region with minimal brain retraction, allowing complete resection of craniopharyngiomas in children with good visual and neurological results.

6. Eliminating Hearing Loss associated with Microvascular Decompression for Trigeminal Neuralgia: Optimization of Technique

Arron F Bond, PhD, Gabriel Zada, MD, Andres A Gonzalez, MD, Chris Hansen, BA, CNIM, Steven Giannotta, MD, Los Angeles, CA

Objective: To retrospectively assess the surgical outcomes and complication rates following microvascular decompression (MVD) for trigeminal neuralgia, using a targeted, restricted retrosigmoid approach.

Methods: During the period 1994-2008, 106 patients underwent MVD for trigeminal neuralgia. A retrospective review was conducted in order to assess pain outcomes following surgery and at most recent follow-up. The intraoperative findings, Barrow Neurologic Institute (BNI) pain scores, medication usage, brainstem auditory evoked potential records, and complication rates (including postoperative hearing status) were reviewed and subsequently analyzed.

Results: Of the 106 patients that underwent MVD, 54 (51%) were male and 52 (49%) were female. The mean age was 60 years (range 22-86 years). Operative findings included 83 patients (78%) with arterial compression, 14 patients (13%) with isolated venous compression, 1 patient (1%) with a small arteriovenous malformation, and 8 patients (8%) with no obvious source of compression. Follow-up data was available in 96 patients, of which 87 patients (91%) had successful outcomes (BNI scores I-IIIb). Sixty-nine patients (72%) were pain free and off medications, 5 (5%) had occasional pain but were off medications, 5 (5%) had no pain but required continued use of medications, and 8 (8%) had persistent pain that was adequately controlled with medications. Four patients (4%) had persistent pain which was not controlled with medications, whereas 5 patients (5%) experienced no relief following surgery. No perioperative deaths or major complications, including hearing loss, occurred in any patients. Minor complications occurred in 11 patients (10%), and included a transient trochlear nerve palsy in 1 patient, transient nystagmus in 1 patient, CSF leaks or wound infections requiring revision in 4 patients, and 5 patients requiring lumbar drains or antibiotics alone without surgical revision.

Conclusions: The use of a small craniectomy (< 20mm) in conjunction with a restricted retrosigmoid approach, inferiolateral cerebellar retraction, and maintenance of the vestibular nerve arachnoid may minimize complications and optimize surgical outcomes associated with microvascular decompression surgery.

7. Development of an Implantable Brain Tumor Pump for Metronomic Convection Enhanced Delivery

TC Chen, MD, PhD, J Shachar, MD, W Wu, MD, K Zimmerman, MD, Los Angeles, CA

Convection enhanced delivery has been used with limited success in the treatment of malignant gliomas. Although direct delivery of biological agents to malignant glioma patients has been performed safely with good volume of distribution, increased survival has not been demonstrated. One reason for this lack of success is in the limitation of current convection enhanced delivery techniques, as multiple externalized catheters are inserted into the tumor for limited time periods (ie 5-7) days and removed; repeat infusions require another surgery for catheter placement. For the past two years, we have been designing and performing proof of principle experiments on an implantable magnetic breather pump system for malignant gliomas.

The system has five components: 1) an intratumoral delivery catheter (for unresectable tumors) or an intracranial pouch (for tumor cavity in resected tumors), 2) a reservoir for tapping the catheter or intracranial pouch, 3) a connecting catheter to link the reservoir, 4) an internalized pump with canisters containing biological agents of choice, capable of delivering drugs at microliters/hour, 5) a lab-on-a-chip to sample tumor fluid to measure specific cytokines (ie vascular endothelial growth factor) or drug levels to monitor treatment progress. The magnetic breather pump will be implanted much like a shunt, with the delivery pump secured at the chest wall. The canisters in the delivery pump may be accessed via subcutaneous ports to “refill” the drugs, and can be wirelessly reprogrammed to deliver at specific time intervals and different cycles using Medical Implant Communication Service (MICS) interface. We have finished developing a “pathfinder” with all five components connected to demonstrate proof of principle in-vitro. We are now in the process of “miniaturization” to reduce the pump to an implantable system so that it can be tested in-vivo in animal models. Successful completion of animal studies will result in human Phase I studies.

8. Dural-Splitting Decompression for Chiari I Malformation—Safety, Efficacy and Cost Analysis

Zachary N. Litvack, MD, Rebecca A. Lindsay, BA,
Nathan R. Selden, MD, PhD, Portland, OR

Introduction: There is little consensus on the optimal treatment of uncomplicated Chiari I malformation with proponents for both dural-splitting and dural-expansion decompression.^{3,5} Meta-analysis of over 500 patients found no difference in efficacy between the two techniques.² We hypothesize that dural-splitting procedures utilize fewer health-care resources at no cost to early clinical outcomes.

Methods: We reviewed all cases (n = 110) of Chiari I decompression performed by a single surgeon at a tertiary academic pediatric hospital between 2000-2009. Student’s t-test was used for group means, and Chi-Squared / Fisher’s-Exact tests were used for proportional outcomes to evaluate differences in safety, efficacy and cost.

Results: Dural-splitting procedures were performed in just over half (57%) of our cohort. Patients presenting with syringomyelia (43%) underwent dural-expansion. The sub-groups had equivalent gender distributions (46.4% male) and length of follow-up (16 months). The dural-splitting group was an average of 2.1 years younger. (P = 0.026)

Improvement in headache (90.5% vs. 93.6%, P = 0.73), long tract signs (92.9% vs. 88.2%, P=1.00), bulbar symptoms 100.0% vs. 100.0%, P=1.00) and/or dysphagia (90.0% vs. 100.0%, P = 1.00) was equivalent in both groups. Expansion duraplasty demonstrated better results in patients with syringomyelia (OR = 3.58 [0.63, 20.1]).

Dural-splitting procedures were associated with a lower incidence of post-operative complications, including aseptic meningitis (0.0 vs. 6.38%, P = 0.08) and re-exploration for pseudomeningocele (0.0 vs. 2.13%, P = 0.43). There were no significant differences in the incidence of superficial wound infection or revision surgery.

Dural-splitting was associated with significantly lower total cost of care (\$26,836.74 vs. \$29,862.47, P=0.015), shorter operative time (105.5 vs. 168.9 minutes, P <0.001) and shorter length of hospitalization (2.4 vs. 2.8 days, P = 0.011).

Conclusions: Dural-splitting decompression for uncomplicated Chiari I malformations is a safe and effective procedure when compared to dural-expansion and is associated with significant cost-savings in total charges, operative time and length of stay.

9. Optical Detection of Cerebral Edema

Karin F Rajneesh, MD, MS, James J Yeh, BS, Mike Hsu, MS,
Devin K Binder, MD, PhD, Irvine, CA

Introduction: Cerebral edema in traumatic brain injury is associated with significant morbidity and mortality. The current clinical standard to detect cerebral edema is intracranial pressure (ICP) measurements. A direct, minimally invasive method to interrogate water movement would be a valuable tool in neurocritical care.

Methods: A dual fiberoptic probe was connected to a laser diode generating near-infrared light (850nm wavelength). The water intoxication model of wild type mice was used to induce cytotoxic cerebral edema. The fiberoptic probe was inserted into the brain of wild-type mice stereotactically. An ICP was inserted contralaterally. A steady optical baseline was obtained before injecting water (30% body weight, i.p.) in experimental animals and normal saline in control animals. “Optical trigger” was calculated as two standard deviations reduction in optical signal.

Results: The optical trigger was detected 31.7 minutes before the ICP measurements changed from baseline pressure of 3-6mm Hg to a pathological ICP of 20mm Hg (n = 3, p < 0.001). Significant change in optical signal was also detected well before ICP rises to 10 and 15mm Hg. The saline injected controls showed a steady optical baseline.

Conclusion: We have validated a novel near-infrared optical probe to detect the early phase of cerebral edema. This type of detector could be clinically applicable to patients with various types of brain injury.

10. HOW TO RECYCLE A USED BRAIN SURGEON

Richard Rapport, MD, John Howe, MD, Richard Ellenbogen, MD, Seattle, WA

The neurosurgical apprenticeship is arduous, and the rigor of the discipline combined with the demands of any type of neurosurgical practice is, if not exhausting, at least wearying. By the age of sixty or so, operating all day and taking call all night is no longer as compelling as it was earlier. However, preparing to retire, we might discover that having become a Board Certified Neurosurgeon has excluded many other options. Accustomed to working, though, complete retirement is not appealing to some. Maybe there is more to offer, more delight to be found, more care to be rendered.

In mid 2008, a neurosurgical hospitalist service was established at the University of Washington's Harborview Medical Center, now staffed by two senior faculty members who did not actually retire. This paper describes why and how that was achieved, and may have direct application to neurosurgeons near the end of their careers, as well as to institutions in search of ways to provide cost effective methods for enhancing patient care and satisfaction as well as other resources.

Harborview, a leading Level One Trauma Center in the WWAMI Region, may often have 60-90 inpatients in the house with at least an element of neural injury. Limitations on work-week hours have restricted the direct patient care that can be provided by residents, and the younger attending surgeons have not only an enormous clinical load, but also teaching, research and travel responsibilities. Changes in traditional management of patients tend to herd surgeons toward the operating room and away from the bedside. The confluence of these circumstances has led to certain reductions in the traditional availability of attendings for rounds, family conferences, and consultation with other services, especially the neuro-intensivists.

The neurosurgical hospitalist service at Harborview is one long-term solution to these shortcomings. The pressure of RVU reimbursement plus high volumes has resulted in a reduction in neurosurgical attendings presence on the wards and a concomitant vanishing of both traditional mentoring roles and ongoing consultation with patients and families, thereby creating a void. Senior neurosurgeon hospitalists are in conferences with families of gravely ill patients, supervise residents and mid-level practitioners and, in general, do those tasks the younger faculty members simply can no longer do. This service has increased everyone's satisfaction: Patients, families, residents, other attendings, staff—and our own.

11. Transplantation of Human Embryonic Stem Cells Preserves the Normal Structure of the Hippocampus after Kainic Acid Injection into the Rat Brain

Oleg Kopyov, MD, PhD, Alex Kopyov, BS, Sabeena Khan, BS, Anatol Bragin, PhD, Dean Jacques, MD, Los Angeles, CA

Purpose: The goal of this study was to investigate the ability of human-derived embryonic stem cells to prevent hippocampal atrophy as the morphologic substrate of epileptic focus in rats with a Kainic model of epilepsy.

Methods: Human brain-derived embryonic stem cells (hESC) were obtained according to NIH Ethical Committee guidelines. These stem cells uniformly expressed stem cell markers (Oct-4, TRA-1-60, TRA-1-81, SSEA-4, and Telomerase) and showed a high mitotic index (Ki-67). Kainic acid was stereotactically injected in the posterior hippocampus of male Sprague-Dawley rats. One group of animals received a simultaneous intraventricular injection of 500,000 hESC. The second group was injected with vehicle. All animals were immune suppressed with oral Cyclosporine. Animals in both groups were euthanized 6 months after Kainic acid injection, and standardly selected serial brain slices were analyzed for cavity formation and volume of ventricular system using image acquisition and processing software 9Image Pro Plus, Media Cybernetics Inc., Bethesda, MD), which reflect the extent of hippocampal atrophy.

Results: Ipsilateral intraventricular injection of hESC immediately after Kainic acidinjection markedly decreases hippocampal atrophy and ventricular enlargement. Kainic acid injection followed by vehicle injection in control animals resulted in cavity formation and ventricular enlargement. This data indicates that stem cells can prevent cell death when they are injected immediately after specific neuronal toxins.

12. Endoscopy Improves the Image-Complete Resection Rate of Larger Pituitary Macroadenomas Without Increasing Intra-Operative Morbidity

Marvin Bergsneider, MD, Marilene Wang, MD,
Anthony Heaney, MD, PhD, Los Angeles, CA

Rationale: Compared to the speculum-based microscopic technique (SPEC), the expanded, endoscopic endonasal approach (EEEA) enhances the direct visualization of the para- and suprasellar regions. Theoretically, this should result in an increased success rate of complete removal of larger pituitary tumors with EEEA because blind dissection techniques inherent with the microscope technique are avoided.

Methods: The study is a retrospective, consecutive operative case series from a single hospital. Entry criteria were adult age, tumor size ≥ 10 mm, and first operation. From 2006-2007, all cases were SPEC cases (n = 45) from a single surgeon, whereas from 2008 on all were EEEA cases (n = 50) done by a different surgeon. Complete resection was judged based on the Radiology report of the immediate post-operative MRI. Intra-operative morbidity was defined as an intra-operative CSF leak or post-operative diabetes insipidus.

Results: Image-complete resection rates were comparable between the SPEC and EEEA groups for tumor size ranges of 10-19 mm (70% vs. 94%) and 20-29 mm (61% vs. 65%, respectively), but diverged for tumor size 30-39 mm (1 of 11 = 9% vs. 9 of 12 = 75%). No tumor ≥ 40 mm achieved a complete resection in either group. The intra-operative CSF leak rate in the SPEC cases was higher for smaller tumors (35% vs 61%), but similar for tumors ≥ 30 mm (53% vs. 47%). There were no differences in post-operative DI rates.

Conclusion: With respect to degree of tumor removal, the benefit of EEEA is more apparent for macroadenomas between 30-39 mm in size. The improved resection capabilities do not appear to be accompanied by increased morbidity. The role of potential confounding variables, such as cavernous sinus invasion, will require larger comparison cohorts. Further study will be required to determine whether long-term cure rates correlate with immediate post-operative imaging findings.

13. IMPROVING IMAGING AND THERAPY FOR DISSEMINATED MEDULLOBLASTOMA STUDIES IN THE NUDE RAT

Daniel Guillaume M.D., Leslie Muldoon Ph.D., Seth Lewin B.S.,
Seymour Gahramanov M.D., Edward Neuwelt M.D., Portland, OR

Dissemination of medulloblastoma is associated with a poor prognosis, and is a critical factor in determining stage, therapy and outcome. Current therapies for leptomeningeal disease are toxic and often unsuccessful. We have characterized a clinically relevant model of disseminated medulloblastoma and begun testing novel therapeutic approaches.

DAOY human medulloblastoma cells were injected into cisterna magna of 50 adult male nude rats. Cells were labeled with quantum dots (Q-dots) in two animals, and super paramagnetic iron oxide (SPIO) nanoparticles in four rats to allow early histological and radiographic tumor localization. Rats underwent weekly or biweekly MRI (T2, T1 with and without gadolinium) on 3T or 12T scanners. Ventricular/ cerebral ratio and tumor volume was measured. Brain slice histology was assessed. To evaluate cerebrospinal fluid (CSF) clearance, trafficking of ultra-small SPIO (USPIO) nanoparticles from the ventricular system to the cervical lymph nodes was measured.

MRI and histological analysis of animals undergoing cisterna magna injection of Q-dot- and SPIO-labeled DAOY cells showed early dissemination throughout the subarachnoid space at 24 hours. Tumor dissemination was not evident on 3T MRI, but was detectable on 12T MRI. Moderate to severe hydrocephalus occurred in 65% of rats, suggesting that DAOY cells in the CSF space interfere with CSF clearance. Degree of hydrocephalus increased over 4 weeks after inoculation of DAOY cells. After brain slicing, tumor cells were found disseminated throughout the CSF space, growing along the base of the brain, with brain invasion. Ventriculomegaly with necrotic periventricular tissue was observed.

In summary, we have created a nude rat model of disseminated medulloblastoma, with rats demonstrating diffuse leptomeningeal tumor spread not evident on routine 3T MRI, but detectable on a 12T scanner. Two-thirds of the animals developed moderate to severe hydrocephalus that increased over a 4-week period. This model is currently being used to test therapeutic strategies.

14. Effectiveness of Controlled Lumbar CSF Drainage in Medically Refractory Increased Intracranial Pressure

Ali Murad, MD, Samer Ghostine, MD, Austin Colohan, MD,
Loma Linda, CA

Introduction: Use of Lumbar cerebrospinal fluid (CSF) drainage is uncommon for control of increased intra-cranial pressure (ICP). There have been some case series reporting the use of lumbar drainage for this purpose. We present the results of a prospective study to evaluate the efficacy of lumbar CSF drainage to treat increased ICP refractory to medical management.

Methods: 15 patients with elevated ICP secondary to traumatic brain injury or ruptured aneurysm were enrolled in an IRB approved prospective study. Their management included ventriculostomy placement, sedation, mild hyperventilation, hyperosmolar therapy, and maintenance of normothermia. A lumbar drain was placed if ICP trended above 20 mm Hg for an average of 3 hours. Patients with a hematoma requiring surgical intervention were excluded.

Results: After lumbar drain placement, ICP was reduced from a mean of 28.2 mm Hg \pm 9.5 to 10.1 mm Hg \pm 7.5; Cerebral perfusion pressure (CPP) improved from 69.1 mm Hg \pm 18.1 to 80.9 mm Hg \pm 14.4. Requirements for hyperosmolar therapy and sedation were also reduced.

One patient developed a unilateral fixed and dilated pupil 4 hours after a lumbar drain placement which resolved after emergent craniectomy.

Conclusion: We demonstrate the effectiveness and safety of lumbar CSF drainage in the setting of high ICP as a treatment modality for elevated ICP refractory to medical management. While the number of patients involved in the study is small, combined with the successful results from other studies, this therapeutic modality should be considered in certain patients with elevated ICP prior to the performance of a craniectomy.

15. The Integration of Neuronavigational Modalities

Neil Roundy, MD, Aclan Dogan, MD, Portland, OR

Introduction: The integration of neuronavigational modalities in the peri- and intraoperative setting has long been a goal of such emerging technologies as functional magnetic resonance imaging (fMRI) and diffusion tensor imaging (DTI). These modalities in the operative setting

help to delineate functional eloquent areas of brain near cerebral lesions with the goal of decreasing postoperative neurological deficits.

Methods: At Oregon Health & Science University we have successfully integrated fMRI and DTI into the stealth neuro-navigational station and have used this intraoperatively to localize and protect areas of eloquence.

Case Results: We present the case of a patient with a left opercular mass who presented with tongue seizures and intermittent expressive aphasia as an example of how integration and use of neuronavigational modalities has led to more accurate and precise resection and improvement in postoperative functional outcome. fMRI demonstrated left sided brocas area displaced medially by the mass. A DTI study showed the superior longitudinal fasciculus immediately adjacent to the mass and displaced medially. Fusion of fMRI and DTI images with the stereotactic sequence allowed for a more precise resection and postoperatively, the patients expressive aphasia had improved without signs of other neurologic deficit.

Conclusions : Integration of the described imaging modals has proved invaluable in cases where lesions have been near functional areas with significant deformation of underlying white matter tracts.

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Soocho Choi, USC	1999
Michael Y. Wang, USC	2000
Odetta Harris, Stanford	2001
Raymond Tien, OHSU	2002
Michael Sandquist, OHSU	2003
Iman Feiz-Erfan, Phoenix	2004
Johnathan Carlson, OHSU	2005
Mathew Hunt, OHSU	2005
Kirash Golshani, OHSU	2006
Edward Chang, UCSF	2006
Jonathan Miller, OHSU	2007
Kenneth Liu, OHSU	2007
Justin Cetas, OSHU	2008
Edward Chang, UCSF	2008

*deceased **WNS Member

PAST MEETINGS OF THE SOCIETY

1. Biltmore Hotel, Santa Barbara, CA	Nov 25-26, 1955
2. Timberline Lodge, OR	Dec 9-11, 1956
3. Holiday Hotel, Reno, NV	Sept 29-Oct 1, 1957
4. Del Monte Lodge, Pebble Beach, CA	Oct 19-22, 1958
5. La Valencia Hotel, La Jolla, CA	Sept 27-30, 1959
6. Del Monte Lodge, Pebble Beach, CA	Oct 23-26, 1960
7. Bayshore Inn, Vancouver, BC	Oct 29-Nov 1, 1961
8. Camelback Inn, Phoenix, AZ	Oct 28-31, 1962
9. El Mirador Hotel, Palm Springs, CA	Oct 20-23, 1963
10. Fairmont Hotel, San Francisco, CA	Oct 18-21, 1964
11. Olympic Hotel, Seattle, WA	Oct 3-6, 1965
12. Hotel Utah, Salt Lake City, UT	Nov 6-9, 1966
13. Kona Kai Club, San Diego, CA	Oct 15-18, 1967
14. Mauna Kea Beach Hotel, Kamuela, HI	Nov 16-19, 1968
15. Del Monte Lodge, Pebble Beach, CA	Oct 15-18, 1969
16. Bayshore Inn, Vancouver, BC	Oct 4-7, 1970
17. The Broadmoor, Colorado Springs, CO	Oct 31 -Nov 3, 1971
18. The Skyline Country Club, Tucson, AZ	Oct 29-Nov 1, 1972
19. Airport Marina Hotel, Albuquerque, NM	Sept 16-19, 1973
20. Santa Barbara Biltmore Hotel, CA	Oct 27-30, 1974
21. Mauna Kea Beach Hotel, Kamuela, HI	Sept 28-Oct 1, 1975
22. Harrah's Hotel, Reno, NV	Sept 26-29, 1976
23. La Costa Resort Hotel, Carlsbad, CA	Sept 18-21, 1977
24. The Lodge, Pebble Beach, CA	Oct 8-11, 1978
25. Camelback, Inn, Scottsdale, AZ	Sept 23-26, 1979
26. Mauna Kea Beach Hotel, Kamuela, HI	Sept 21-24, 1980
27. The Empress Hotel, Victoria, BC	Sept 20-23, 1981
28. Jackson Lake Lodge, Jackson Hole, WY	Sept 12-15, 1982

PAST MEETINGS OF THE SOCIETY

29. Hotel del Coronado, Coronado, CA	Oct 2-5, 1983
30. The Broadmoor, Colorado Springs, CO	Sept 9-12, 1984
31. Silverado Country Club & Resort, Napa, CA	Sept 22-25, 1985
32. Maui Intercontinental, Wailea, Maui, HI	Sept 28-Oct 1, 1986
33. Banff Springs Hotel, Banff, AB	Sept 6-9, 1987
34. The Ritz-Carlton, Laguna Niguel, CA	Sept 11-14, 1988
35. The Lodge, Sun Valley, ID	Sept 10-13, 1989
36. Mauna Lani Bay Hotel, Kawaihae, HI	Sept 9-12, 1990
37. The Pointe, Phoenix, AZ	Sept 22-25, 1991
38. The Whistler, Whistler, BC	Sept 20-23, 1992
39. Mauna Lani Bay Hotel, Kawaihae, HI	Sept 19-22, 1993
40. Le Meridien Hotel, San Diego, CA	Sept 18-21, 1994
41. Salishan Lodge, Gleneden Beach, OR	Sept. 9-12, 1995
42. Manele Bay, Island of Lanai, HI	Sept 14-17, 1996
43. Ojai Valley Inn, Ojai, CA	Sept 20-23, 1997
44. Silverado Resort, Napa, CA	Sept 12-15, 1998
45. Coeur d'Alene Resort, Coeur d'Alene, ID	Sept 18-21, 1999
46. Mauna Lani Bay Hotel, Hawaii, HI	Sept 9-11, 2000
47. Ocean Pointe Resort, Victoria B.C., Canada	Sept 15-18, 2001 (Cancelled)
48. Delta Victoria Resort, B.C. Canada	Oct 12-15, 2002
49. Hapuna Beach Prince Hotel, Kamuela, HI	Sept 20-24, 2003
50. Rancho Bernardo Inn, San Diego, CA	Sept 11-14, 2004
51. Squaw Creek Resort, Lake Tahoe, California	Sept. 17-20, 2005
52. Semiahmoo Resort & Spa, Blaine, Washington	Sept. 16-19, 2006
53. Mauna Lani Bay Hotel, Kawaihae, HI	Sept. 8-11, 2007
54. Hotel Captain Cook, Anchorage, AK	Aug. 16-19, 2008

FUTURE MEETINGS

El Dorado Hotel, Santa Fe, NM	October 8-11, 2010
Grand Hyatt, Poipou, HI	Sept. 9-12, 2011

PAST VICE-PRESIDENTS

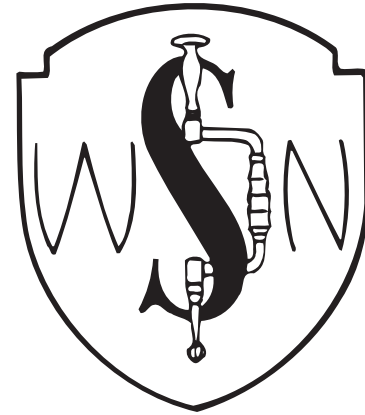
John Raaf*	1955	Robert W. Rand	1980
Frank Turnbull*	1956	Theodore S. Roberts*	1981
Howard A. Brown*	1957	Ulrich Batzdorf	1982
Rupert R. Raney*	1958	George Ablin*	1983
Edmund J. Morrissey*	1959	George A. Ojemann	1984
C. Hunter Sheldon*	1960	Gale C. Clark*	1985
Ernest W. Mack*	1961	Robert Weyand	1986
Hale A. Haven*	1962	Robert Florin	1987
Frank M. Anderson*	1963	John A. Kusske	1988
Edwin B. Boldrey*	1964	Basil Harris	1989
Herbert C. Crockett*	1965	W. Ben Blackett	1990
Karl O. Von Hagen*	1966	Ronald F. Young	1991
Samuel W. Weaver*	1967	Edward Reifel	1992
Chester B. Powell*	1968	Grant E. Gauger	1993
Peter O. Lehman*	1969	Ralph F. Kamm	1994
Charles W. Elkins*	1970	Steven L. Giannotta	1995
Nathan C. Norcross*	1971	Randall W. Smith	1996
James R. St. John*	1972	Gail A. Magid	1997
Edward K. Kloos*	1973	Donald Prolo	1998
Ralph B. Cloward*	1974	Lawrence Shuer	1999
Thomas K. Craigmile*	1975	John C. Oakley*	2000
Lyman Maass*	1976	L. Phillip Carter	2001, 2002
Gale C. Clark*	1977	William L. Caton III	2003
William A. Kelley	1978	Gerald Silverberg	2004
Byron C. Pevehouse	1979	Kim Burchiel	2005
		John Adler	2006
		Philip Weinstein	2007
		Betty MacRae	2008

*deceased

PAST PRESIDENTS

David L. Reeves*	1955	William A. Kelly	1980
John Raaf*	1956	Byron C. Pevehouse	1981
Frank Turnbull*	1957	Robert W. Rand	1982
Howard A. Brown*	1958	Theodore S. Roberts*	1983
Rupert R. Raney*	1959	Thomas K. Craigmile*	1984
Edmund G. Morrissey*	1960	Ulrich Batzdorf	1985
C. Hunter Sheldon*	1961	Gale C. Clark*	1986
Ernest W. Mack*	1962	Lyman Maass*	1987
Hale A. Haven*	1963	Gordon B. Thompson	1988
Frank M. Anderson*	1964	George Ablin*	1989
Edwin B. Boldrey*	1965	Robert Weyand	1990
John R. Green*	1966	Basil Harris	1991
Arthur A. Ward, Jr.*	1967	W. Ben Blackett	1992
Lester B. Lawrence*	1968	Francis E. LeBlanc	1993
John D. French*	1969	Ronald F. Young	1994
Chester B. Powell*	1970	John A. Kusske	1995
Robert W. Porter	1971	Melvin L. Cheatham	1996
Henry M. Cuneo*	1972	Robert Florin	1997
Edward K. Kloos*	1973	Frank P. Smith*	1998
W. Eugene Stern	1974	Ralph F. Kamm	1999
Ralph B. Cloward*	1975	Steven L. Giannotta	2000
James R. St. John*	1976	Donald J. Prolo	2001, 2002
Eldon L. Foltz	1977	Grant E. Gauger	2003
John Tytus*	1978	Randall W. Smith	2004
Donald B. Freshwater	1979	John P. Slater	2005
		Moustapha Abou-Samra	2006
		Kim Burchiel	2007
		Gerald Silverberg	2008

*deceased



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Timothy Steege, M.D.

Tacoma

W. Ben Blackett, M.D.
Richard Wohns, M.D.

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