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Snacc Newsletter

## Snacc/Asa Breakfast Panel

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The ASA breakfast panel organized by SNACC was held on Tuesday, October 12, 1999, and entitled New developments in neuroanesthesia for interventional neuroradiology. The session was chaired by Piyush Patel, MD (University of California, San Diego).

The first two speakers, Wade Wong, MD (the University of California, San Diego) and William Young, MD (Columbia University) discussed the emerging field of interventional neuroradiology for the treatment of CNS disease. The anesthesiologist's presence is requested during interventional neuroradiology procedures to provide patient immobility, hemodynamic management, and to aid in treating complications. Anesthetic techniques for these procedures may vary from general anesthesia to intravenous sedation. Anesthetic techniques will partly be determined by the need for neurologic assessment. One of the most common interventional neuroradiology procedures is embolization of an arteriovenous malformation (AVM). Some of the feeder vessels are embolized to reduce the risks of bleeding and normal perfusion pressure breakthrough syndrome during subsequent resection. With the high flow AVM system, accurate targeting of embolic materials is critical. During these procedures, patient immobility and techniques to decrease blood flow (e.g., hypotension) may be required. At the University of California, San Diego, adenosine is currently being investigated to see if transient asystole permits more accurate placement of embolic materials.

For complete obliteration of a cerebral aneurysm, surgical clipping is still preferable. If the aneurysm is not amenable to surgical obliteration, the aneurysm may be coiled. Although it may not completely obliterate the aneurysm, coiling may decrease the risk of aneurysm rupture. Patient immobility is ideal for accurate coil placement and can be achieved by general anesthesia. The anesthesiologist must be ready if aneurysm rupture does occur. Following subarachnoid hemorrhage, vasospasm can be treated by balloon angioplasty of the affected vessel. Providing anesthesia coverage in the neuroradiology suite entails the appropriate management of hemodynamics during key points of the procedure. Deliberate hypertension may be required to improve collateral blood flow for a planned or inadvertent vascular occlusion. If a patient develops cerebral hemorrhage, blood pressure will need to be rapidly controlled and anticoagulation immediately reversed.

The breakfast panel continued with a presentation on the nonsurgical approach to carotid artery disease by Dennis Doblar, MD, from the University of Alabama. Trials have demonstrated the benefit of surgery for severe carotid stenosis. Trials of treating severe carotid artery disease by a

nonsurgical approach, percutaneous transluminal angioplasty, are still undergoing further evaluation. The procedure involves placement of a saline-filled balloon preloaded with a stent under angiographic guidance, and occluding the carotid artery for 1-3 minutes with 15 atmospheres of pressure. The anesthetic technique for this procedure involves minimal sedation. This procedure thus avoids general anesthesia and the trauma associated with a surgical approach. However, this procedure can cause severe bradycardia requiring pacing. The complications associated with percutaneous transluminal angioplasty are less clear and more randomized trials with strict enrollment criteria are required. Some criticisms of this nonsurgical approach to carotid artery disease include a 1.2% stroke rate due to angiography alone, the lack of established training standards, and clinical trials lagging behind equipment development. Five hundred patients with carotid stenosis in one multicenter trial with fairly strict enrollment criteria were randomized to surgery or angioplasty. In this relatively small population, there was no difference in stroke or death rate within 30 days of treatment. However, the incidence of restenosis at 12 months was 12% for angioplasty versus 5% for surgical carotid artery endarterectomy. There are currently three more trials ongoing and clearly more data is required.

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## The 1999 National Meeting

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The 27th Annual Meeting of the Society of Neurosurgical Anesthesia and Critical Care (SNACC) was held on October 8, 1999 at the Wyndham Anatole Hotel in Dallas, Texas. This year's meeting had an attendance of 211. The Program Chair, Christian Werner, MD (Institut für Anaesthesiologie, Germany), opened the meeting and Patricia Petrozza, MD (Wake Forest University), President of SNACC, welcomed the attendees. James E. Cottrell, MD, SUNY Health Science Center at Brooklyn, and past President of SNACC, then introduced the keynote speaker, Walter Zieglgänsberger, MD, of the Max-Planck-Institut für Psychiatrie, Germany.

The education session started with Dr. Zieglgänsberger's interesting and informative talk on The glutamate cascade in anesthesiology. He pointed out that glutamate is the most prominent excitatory neurotransmitter in the mammalian central nervous system (CNS) and has an essential role in neuronal migration, differentiation, and plasticity. Excitatory glutamatergic synaptic transmission in the mammalian brain is mediated by activation of ionotropic and metabotropic receptors. After describing the variety of receptors in detail, he spoke of a novel approach in which glutamate was applied to dendrites of neurons in rat neocortical slices. When infrared-guided laser stimulation was used to release glutamate, a burst of light flashes caused a depression of glutamate receptors (similar to long-term depression), confined to the region of stimulation. He pointed out that it is still unclear whether general anesthetics induce enhancement of neuronal inhibition or attenuation of neuronal excitation. Some anesthetics suppress excitatory transmission and potentiate inhibitory chloride currents evoked by GABA or glycine. They may facilitate inhibitory GABAergic synaptic transmission by a presynaptic mechanism, in addition to their well-known postsynaptic actions. Low concentrations of intravenous anesthetics like propofol, etomidate, and alfaxalone facilitate GABA release from cortical nerve terminals. Propofol has uniform depressant actions, potentiates GABA-mediated pre- and postsynaptic inhibition, and decreases the release of excitatory transmitters like glutamate. Propofol possibly inhibits NMDA receptor mediated excitation. Current research also suggests that the molecular targets for general anesthetics probably include transporters and elements of presynaptic release mechanisms along with metabolic enzymes and modulatory molecules in addition to various pre- and postsynaptic receptors.

The attendees then spent an hour viewing the scientific posters, which was followed by the Young Investigator's Award to Lisa W. Faberowski, MD, from the University of Florida. She presented her work entitled Hypoxia- and ischemia-induced neuronal apoptosis is decreased by halothane and isoflurane. She studied neuronal cortical cell cultures deprived of glucose and oxygen. The control

group showed significant apoptosis after 48 hours when compared to cultures exposed to halothane or isoflurane prior to hypoxemia-ischemia. This investigation introduced a new concept that attenuation of apoptosis (programmed cell death) may be an additional mechanism for brain protection provided by anesthetics.

Mary Ann Cheng, MD, from Washington University, moderated the session of oral scientific presentations. Cathy De Deyne, MD, from ZOL Campus St-Jan (Belgium), presented her experience of combined use of jugular bulb oximetry and BIS monitoring to assess changes in CBF during cerebral aneurysm clipping. She recommended the use of BIS as a monitor to assure a stable anesthetic level, and then use changes in jugular venous oxygen saturation (SjvO<sub>2</sub>) as a monitor of CBF changes. Mathew Chan, MD, from Chinese University of Hong Kong, presented the results of an investigation entitled Measurement of regional cerebral blood flow using near Infrared spectroscopy-the influence of extracranial contamination. They compared the accuracy of CBF measurements derived by near-infrared spectroscopy (NIRS) with that of xenon-enhanced computed tomography before and after correction for extracranial NIRS signals in 10 awake volunteers. The estimated contribution of the extracranial circulation was  $7.0 \pm 6.1\%$  (mean  $\pm$  SD).

A study of the incidence of venous air embolism (VAE) during craniostomy surgery was presented by Lisa Faberowski, MD, from the University of Florida. They studied 23 infants and children and monitored them with a precordial Doppler. In 19 of 23 patients, 62 episodes of VAE were observed. The most frequent time of VAE was during cranial osteotomy, with location of osteotomy not demonstrating an effect on the incidence of VAE. Despite the high frequency of VAE, no significant neurologic sequelae were observed and the authors did not recommend the routine placement of a central venous catheter in small children. Brenda Fahey, MD, from the University of Maryland, presented the results of an investigation entitled Caspase 9 translocation from cytosol to nuclei of neurons undergoing apoptosis following human traumatic brain injury. This study used histologic and immunohistochemical techniques for probing changes in human cortical neurons within a few hours to 2 days following traumatic brain injury. They concluded that translocation of caspase 9 from cytosol to nuclei is an early event in neuronal death and may be a trigger for apoptosis.

Andrew Kofke, MD, from West Virginia University, presented the results of an investigation of (M-opioid temporal lobe activation in human and subhuman primates. He studied three monkeys (fentanyl) and four human volunteers (remifentanyl) who were given a narcotic infusion. The metabolic rate for glucose utilization was studied by positron emission tomography before and after narcotic infusion. He concluded that unlike most anesthetics which depress brain metabolism, anesthetizing doses of remifentanyl could modestly increase brain metabolism in the temporal lobe in humans. The final oral presentation was by Marek Mirski, MD, PhD, of Queen's Medical Center, Honolulu. He presented data supporting a positive impact of a neuroscience intensive care unit on patient outcome.

The final session of the morning was a lecture by Tod Sloan, MD, from the University of Texas Health Science Center at San Antonio entitled An update on intraoperative electrophysiological monitoring of the CNS. He reviewed the common monitoring modalities used to monitor the central and peripheral nervous system. Dr. Sloan pointed out that at present, monitoring of somatosensory-evoked potentials during scoliosis surgery and monitoring of the facial nerve during surgery for acoustic neuroma are considered standard of care.

This session was followed by a luncheon business meeting in which it was reported that the financial health of SNACC is good and membership stable at about 500 members. Dr. Petrozza

encouraged the members to continue to recruit new members whenever possible. She also announced that SNACC wishes to increase the participation by members in the function of SNACC. Towards that end, formation of several new task force committees were announced and she asked that those interested in serving on these committees get in touch with the incoming president, Jeffrey Kirsch, MD (Johns Hopkins Hospital). The nominating committee recommended Tod Sloan, MD, as the incoming secretary-treasurer and he was elected to that post. Concezione Tommasino, MD, IRCCS San Raffaele Hospital in Milan, was elected to fill a vacancy on the nominating committee.

The afternoon session was composed of two lively panels and a poster walk around with discussion facilitators. For the first panel, Donald Prough, MD, University of Texas at Galveston, introduced the two participants, John Drummond, MD, (University of California, San Diego) and Bendt Nellgard, MD, (Sahlgrenska University Hospital, Sweden), who debated the issue Management of cerebral perfusion pressure in head-injured patients: Keep the pressure up. Dr. Drummond argued in favor of the proposition. He presented data from the national traumatic coma databank, and pointed out that for patients with severe head injury, hypotension and hypoxia had a negative impact on neurologic outcome. Dr. Drummond suggested that attempts to maintain normotension in these patients should be aggressive and may include the use of volume resuscitation and vasopressors. While there is no hard data on the ideal cerebral perfusion pressure (CPP), a CPP > 70 mm has been proposed. Dr. Drummond also quoted results of a recent study of head injury patients, suggesting that secondary ischemic injury can be prevented with a CPP=70mm targeted management protocol.

Dr. Nellgard argued that a high CPP might increase ICP and be detrimental. He discussed the Lund model of treatment for brain injury which is comprised of four components:

- \* normovolemia, preferably with colloids
- \* clonidine to promote vasodilation thereby preserving CBF
- \* antihypertensive treatment to preserve the microcirculation
- \* use of prostacyclin.

He emphasized that an increase in colloid osmotic pressure or a decrease in hydrostatic pressure will decrease transcapillary filtration, interstitial fluid accumulation, and hence ICP. His group has had convincing improvement in outcome with this treatment regimen.

A poster walk around session with discussion facilitators was interposed between the two debates. Attendees viewed 107 posters organized in several groups covering CBF, pharmacology, monitoring, drugs and techniques, critical care, cerebral ischemia, molecular biology, cerebral protection, and anesthetic mechanisms. All participants received a copy of the abstracts published in the *Journal of Neurosurgical Anesthesiology* 1999;11:309-336.

In the last session Michael Todd, MD, the University of Iowa, introduced Adrian Gelb, MD, Western Ontario University, and Steven Frank, MD, Johns Hopkins Medical Center who debated the pros and cons of employing hypothermia for neurosurgical patients. This was discussed in a lively and entertaining manner. First Dr. Gelb pointed out that neurologic injury secondary to ischemia is a well-recognized problem in patients with head injury, subarachnoid hemorrhage, and those undergoing carotid endarterectomy. He referred to a recent survey of SNACC members indicating that 89% of neuroanesthesiologists use some brain protection strategy during aneurysm surgery,

emphasizing that those providing clinical care believe that there is a merit to using such a strategy. He then reviewed studies demonstrating the value of hypothermia as a potential brain protection strategy referring to a pilot trial of mild hypothermia as a protective therapy and the definitive international, multicenter trial that has recently been funded by the NIH.

Next Dr. Frank pointed out that although cerebral protection afforded by hypothermia in experimental animals has been shown effective in multiple studies, only one human study to date has demonstrated efficacy. A recent clinical trial of hypothermia in patients with head injury was stopped due to preliminary data showing futility of such intervention. It was emphasized that many animal studies used deep hypothermia for short periods of time and such a degree of hypothermia in humans may be accompanied by complications that outweigh any marginal benefits. Yet another concern about the use of hypothermia as a therapeutic intervention in neurosurgical patients is that there is not enough data to guide when hypothermia should be induced, for how long, and to what degree and if it will work after the insult. The debate had many moments of humor and ended with a consensus that while hypothermia may not be beneficial in head-injury patients, aneurysm surgery provides a situation where an intervention can be made prior to the onset of potential ischemia and mild hypothermia may be beneficial.

Dr. Christian Werner then thanked the audience for attending the meeting with a reminder that next year's SNACC Annual Meeting will be held in San Francisco, California. The meeting was followed by the traditional wine and cheese reception.

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