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Society of Neurosurgical Anesthesia and Critical Care Newsletter

SYMPOSIUM PRECEDING THE SNACC ANNUAL MEETING 1998: DEPTH OF ANESTHESIA AND AWARENESS

The symposium was chaired by Arthur M. Lam, MD (University of Washington, Seattle). As the President of the SNACC, Dr. Lam introduced the scientific content of the evening. Dr Lam related the difficulties involved in holding such a dinner/event, mainly from the economic point of view. Aspect Medical System was the sole sponsor for the evening, but had not been consulted on the choice of the speakers or the content of the presentations.

Karen B. Domino, MD (University of Washington, Seattle, Washington) opened the evening with an interesting presentation entitled "Awareness in anesthesia—Experience with the closed-claim analysis: Is monitoring cost-effective today?" During her lecture, Dr. Domino first made an important distinction between awareness during general anesthesia and awake paralysis, the latter representing a significant lack in standard of care in a high percentage of cases. She reminded us that awareness is a rather frequent phenomenon even in the general surgical population (0.2%), and that the risk to experience intraoperative awareness was higher with low doses of volatile anesthetics, particularly when anesthetizing a female patient (for unknown reasons). Nevertheless, lawsuits for awareness are infrequent, and the financial compensation is low—the idea of standards of care being prominent in the decision whether to compensate a patient. Dr Domino concluded her talk by stating that if the bispectral index (BIS) monitor was meant at diminishing the incidence of awareness, then the actual cost of potentially saving a single case of awareness would be in the range of $12,500, only taking into account the cost of the scalp electrodes.

Peter S. Sebel, MD (Grady Health System, Atlanta, Georgia), was the next lecturer, with a presentation entitled: Monitoring of depth of anesthesia—EEG and evoked potentials. His presentation began with a humorous look at the history of surgery, with some flavorful anecdotes about patients' recall during anesthesia. This introduction paved the way to the core of his presentation—the significance of electrophysiologic parameters such as spectral edge frequency, median frequency, and bispectral analyses to assess depth of anesthesia. Dr Sebel traced an oriented history of the monitors of depth of anesthesia from Guedel's signs of anesthesia to the development of processed EEG. Demonstration was made that BIS fulfilled all the goals and objectives of a perfect monitor of the depth of anesthesia. Only the prediction of movement could not be achieved, probably meaning that it should not be included in the definition of the anesthetic state.

The series of lectures ended with the presentation of Marc J. Bloom, MD (University of Pittsburgh, Pennsylvania), entitled: Bispectral analysis—Clinical applications and pitfalls. This extensive and enthusiastically presented lecture went into great detail about EEG processing and the BIS. The advantages of the technology were presented, as well as some of the most important pitfalls, the limited capacity of the device in detecting the effect of opiates being one of the most prominent. The last part of the presentation was mainly dedicated to anesthetic recipes on how to use BIS, with a final statement that the BIS is not a substitute for clinical judgment. The most important question of the evening was asked by Dr. Lam to Dr. Karen Domino: If a BIS monitor that is available is not used (or incorrectly used) on a patient who later complains of awareness, then what happens from the medicolegal point of view ? Dr. Domino stated that it becomes a matter of whether it has become a standard of care in the particular hospital you are working in, which is an interesting perspective for the future of our speciality.

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THE 1998 NATIONAL MEETING

The 26th Annual Meeting of the Society of Neurosurgical Anesthesia and Critical Care was held on October 16, 1998, at the Omni Rosen Hotel, Orlando, Florida. After President Arthur Lam, MD, welcomed members and guests, Jeffery Kirsch, MD, this year's program chairman, made a few

comments concerning changes in the format of the program and gave special mention to the extra efforts of Michael Mahla, MD, and the University of Florida for supplying and setting up the equipment used for the workshops.

The education session began with Dr. Richard Traystman's introduction of the keynote speaker, Dr. Michael V. Johnston, Professor of Neurology and Pediatrics from Johns Hopkins University. The address entitled "Mechanisms of Brain Injury in Infants and Children. Is Brain Maturity an Important Factor in the Evolution of Injury?" reviewed the pathogenesis of brain injury and how this insult is manifested differently in the infant compared with the adult. With similar hypoxic insults, the infant will develop lesions of the motor system manifested by cerebral palsy, whereas the adult will develop memory loss with little motor involvement. Dr. Johnston went on to state that selective vulnerability of the brain to hypoxia is age dependent, with injuries of the preterm fetus (28–32 weeks gestation) targeting the central periventricular areas of the germinal matrix. In contrast, by age 40 weeks, injury to the thalamus, basal ganglia, and putamen are prevalent with asphyxia. Two factors, brain oxygen/glucose consumption and regional cerebral blood flow change dramatically from preterm to term infants and may provide a clue for the differences noted in ischemic damage between the age groups. Dr. Johnston also noted that age-specific differences exist in the density and subunit composition of the glutamate receptor, nitric oxide synthetase, and free radical scavengers such as glutathione, which may make the immature brain more sensitive to hypoxic ischemia than the adult brain.

Immediately after the keynote address, all members were invited to attend the walk around poster discussion sessions. Interesting discussions developed, and group leaders encouraged audience participation, which covered diverse subjects grouped under such topics as physiologic mechanisms of and clinical studies concerning cerebral blood flow, cerebral ischemia and cerebral protection, the clinical neurosciences, pharmacology, and neurophysiologic monitoring. A complete listing and copy of all abstracts presented can be found in the Journal of Neurosurgical Anesthesia 1998;10:259–292. The Young Investigator Award and oral abstract presentations followed the walk around poster session. Dr. Jeffery Kirsch introduced Dr. Mackensen, from Duke University, whose winning contribution was entitled "Sympathetic Ganglionic Blockade Masks Beneficial Effect of Isoflurane on Histologic Outcome From Near Complete Ischemia in Rats." This study demonstrated an isoflurane anesthetic to have a greater neuroprotective effect compared with a fentanyl/N_20 anesthetic because of isoflurane's ability to modulate the increase in plasma catecholamine levels that normally occur during ischemia. This neuroprotective effect was lost with the concomitant administration of the ganglionic blocker trimethaphan.

Oral presentations were moderated by Dr. Hans Hennses (Mainz, Germany) and included several laboratory investigations and one retrospective clinical study. Dr. Soriano (Childrens Hospital, Boston) presented data on the role of selectins P and E and their effect on infarct volume after an ischemic insult. These selectins help leukocyte adhesion and extravasation, known to contribute to tissue damage after ischemia. This study attempted to determine whether rats totally devoid of intravascular selectin would have decreased cerebral infarct volumes after an ischemic event compared with their normal litter mates. However, no difference in infarct volume between groups demonstrated that selectin deficiency offered no advantage during cerebral ischemia. The second presentation by Dr. Jevtovic-Todorovic (Washington University, St. Louis) dealt with prolonged nitrous oxide exposure and its effect on rat neurons. N_20 blocks NMDA glutamate receptors like other antagonists such as ketamine and MK801. NMDA antagonists have been shown to be detrimental to specific neurons of the cingulate/retrosplenial cortex, depending on the length of administration. This study determined that neuron cultures exposed to anesthetic concentrations of N_20 for 4 or 8 hours suffered no apparent damage, but that these same neurons exposed to similar concentrations for 16 hours were damaged or destroyed. Future studies to determine the threshold times for this toxicity are now being done.

R.G. Giffard (Stanford University) next presented data on the neuroprotective effect of heat shock protein (HSP 70), which may enhance cellular survival during cerebral ischemia by preventing cellular protein unfolding. Transgenic mice that overexpress the HSP 70 gene were compared with normal litter mates for volume of infarct after an ischemic event. No differences were apparent between the two groups, and HSP 70 was found to offer no cerebroprotective effect.

The final laboratory investigation presented by Dr. Himmelseher (Munich, Germany) investigated the short term effect of hypertonic/hyperoncotic saline on healthy and damaged hippocampal neurons and astrocytes. After 1 hour of exposure, hypertonic saline decreased the survival rate of injured neurons and increased the water space of healthy ones. Increased water space may lead to cerebral edema in injured astrocytes and disturb oxidative metabolism, which could reduce neuron survival.

Finally, Dr. Waggoner (Mayo Clinic) presented a retrospective clinical study on the changing transfusion practices for carotid endarterectomy. A database of 1115 patients was stratified into an older group (pre-HIV screening reference) and a recent practice group. Patients in the recent practice group had more comorbidity, were older, and had higher Sundt grades than the reference group. Though the recent practice group had significantly less transfusions and were discharged home with significantly lower Hb levels, there was no appreciable difference in their incidence of stroke or MI compared with the reference group.

The luncheon/business meeting followed, with Dr. Arthur Lam reporting that, financially, the organization was in the black, with revenues of approximately 10,000 dollars and total expenses of approximately 98,000 dollars. He stated that membership has been stable but unchanged and urged the members of the society to increase their efforts to enlarge the organization. Members also were encouraged to supply their e-mail address for SNACC on-line.

After the luncheon, members were invited to a presentation on the use of hypertonic saline. Dr. Donald Prough (University of Texas, Galveston) served as moderator, with Christian Spiss, MD (University of Vienna) and Marek Mirski, MD, PhD (Queens Medical Center, Honolulu) serving as protagonist and antagonist, respectively, as they debated the question "Is perioperative use appropriate in the neurosurgical patient?" Positive points were presented, including the property of hypertonic saline to reduce brain water without depleting intravascular volume. Dr. Mirski however, emphasized the fact that some studies have demonstrated 0.9% saline to be safe and of equal efficacy as hypertonic saline in reducing cerebral edema. Other potential adverse effects of hypertonic saline (coma, seizures, central pontine myelinolysis, CHF, hemolysis, metabolic acidemia, and leukocyteinhibition) were mentioned in support of his contention that caution be exercised when using hypertonic saline for treatment of both acute and chronic cerebral edema.

Additional time was allotted for viewing of posters, after which time Dr. Daniel Cole (Loma Linda University) presented an overview of different synthetic hemoglobins and their use in the treatment of cerebral ischemia. Therapeutic applications of these synthetic hemoglobins were discussed, as well as some of the experimental information on the interaction of these synthetic hemoglobins with nitric oxide. These blood substitutes may represent new resuscitative fluids for the treatment and management of intraoperative cerebral ischemia.

The finale of the educational program pitted Dr. Rene Tempelhoff (Washington University, St. Louis) against Dr. Gregory Crosby (Brigham and Women's Hospital, Boston) as they discussed neuromonitoring: Is the Benefit Worth the Cost? The session was expertly moderated by Dr. William Fitch (Glasgow, Scotland). Dr. Tempelhoff, the protagonist, began his presentation by noting that science has been affected throughout history by political, religious, and economic forces. Examples from Hippocrates, Aristotle, Maimonides, Galileo, Sir Francis Bacon, Darwin, and others were represented in an attempt to describe how science, primarily derived from observation, has not always been encouraged or welcomed in certain political or economical environments. Dr. Tempelhoff concluded that neurophysiologic monitoring may not be foolproof, but its development has been important in improving outcomes for certain neurosurgical procedures. The economic forces that through history have stifled research should not be allowed to influence observation and development of new technology. Dr. Crosby, the antagonist, relied less on history and more on the current idea that the technology we now use has limited benefit because these methods have not been proven or substantiated by good scientific studies. His major concern was that we may alter our clinical practice and respond to a monitor rather than our own clinical judgment. A lively debate followed, with the consensus being that neurophysiologic monitoring, though not without its problems, is still a useful tool to the practicing neuroanesthesiologist and should be supported and developed further.

The highly successful educational program concluded with the traditional wine and cheese mixer, election of officers, and the neuromonitoring workshops. In addition to the popular somatosensory and motor evoked potentials (Tod Sloan, MD, PhD/Susan Black, MD), EEG monitoring (Marc Bloom, MD, PhD/Cheri Sulek, MD) and Transcranial Doppler Ultrasound workshops (Arthur Lam, MD/Michael Mahla, MD), two new workshops on cerebral oximetry (Satwant Samra, MD) and JVO_2 monitoring (John Ulatowski, MD, PhD/Dietrich Gravenstein, MD) were also presented.

As a final reminder, next year's SNACC national meeting will be held in Dallas, Texas.

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