

# STATE OF THE SCIENCE ORAL AND POSTER SESSIONS: PART 1

The AANA Foundation extended an invitation to participate in the first State of the Science Oral and Poster Sessions at the AANA Annual Meeting in Boston, Massachusetts, August 2-6, 2003. This type of forum offers unique opportunities to talk directly to researchers about their research findings. The interaction among colleagues in a less formal setting set the stage for invigorating discussions and exploration of the research findings.

Each year, Poster Session candidates are selected by the AANA Foundation Board to present their research for the poster presentation. This year, some

of the abstracts from the State of the Science Oral and Poster Sessions were submitted for potential publication in the *AANA Journal*, and 40 abstracts were selected, pending receipt of final copy from authors. Approximately half of the abstracts are published in this issue, and the remainder are scheduled for publication in the December 2003 *AANA Journal*.

For further detail and reference citations concerning individual abstracts, please contact the authors.

**Lorraine M. Jordan, CRNA, PhD**

*AANA Director of Research and AANA Foundation*

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## A1

### **von Willebrand disease and regional anesthesia in the parturient**

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**Introduction:** There is limited information in the literature regarding regional anesthesia in parturients with von Willebrand disease (vWD). The purpose of this retrospective study is to demonstrate the safety of regional anesthesia in selected vWD patients.

**Methods:** Following IRB approval, chart review was conducted and data collected on patients with vWD who delivered a viable fetus at Magee-Women's Hospital (Pittsburgh, PA) from July 1993 to June 2002. Data collected included age, race, parity, anesthesia type, coagulation tests, hemoglobin and hematocrit, delivery blood loss, previous history of clinical hemorrhage, use of dDAVP (desmopressin), family history of vWD, and recorded complications. Subjects were divided into two groups; those who received regional anesthesia (RA group) versus those who did not (control group). Data were analyzed using the student's t-test or chi-square analysis-of-contingency table, and the alpha level was set at 0.05.

**Results:** There were a total of 51 subjects; 34 in the RA group and 17 in the control group. Patients in the RA group had significantly greater mean ages (30.0 vs. 25.9 yrs.,  $p < 0.02$ ), lower incidence of clinical hemorrhage (2/34 vs. 7/17,  $p < 0.01$ ), shorter mean bleeding time (7.4 vs. 10.8 min.,  $p < 0.002$ ) and received dDAVP less frequently (5/34 vs. 7/17,  $p < 0.04$ ). No hemor-

rhagic or neurologic complications and no 5 minute Apgar scores  $< 7$  were noted in either group. Spontaneous vaginal delivery rate was greater in the control group (15/17 vs. 18/34,  $p < 0.01$ ), and instrumented vaginal delivery rate was greater in the RA group (8/34 vs. 0/17,  $p < 0.03$ ).

**Conclusions:** Our data support the general safety of regional anesthesia for selected parturients with vWD presenting for labor and delivery.

**Source of Funding:** Department of Anesthesiology, Magee-Womens Hospital; University of Pittsburgh School of Nursing Nurse Anesthesia Program; University of Pittsburgh School of Medicine

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## A2

### **The influence that epidural catheter insertion depth has on the quality of analgesia and insertion complications in the laboring parturient**

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**Introduction:** Past research has indicated that catheter insertion depths in epidural analgesia have a profound impact on analgesic efficacy and complication rates. The purpose of this randomized study was to determine if a difference in efficacy and complications exists between groups of parturients who had their epidural catheters inserted either 3 or 5 cm into the epidural space for their laboring analgesia.

**Methods:** Seventy-seven parturients were randomized

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to receive epidural analgesia following catheter placement of either 3 or 5 cm into the epidural space. Quality of analgesia was assessed using a 0-10 Verbal Numeric Rating Score (VNRS) at initiation of epidural analgesia, hourly during labor, and at request for treatment of breakthrough pain. Complications, including intravenous or intrathecal catheter placement, complete loss of block indicating migrated catheter, failed sensory block, one-sided sensory block or "patchy" block, were recorded. Other variables measured included demographic information, mode of delivery, and adequacy of epidural anesthesia for cesarean section.

**Results:** No significant difference between groups was noted for any measurement. Complications as defined above were rare and not different between groups. A p-value of <0.05 was considered significant.

**Conclusions:** Based on the findings of this study, there appears to be no basis to arguments of 3 versus 5 cm epidural catheter insertion depths. Both provided excellent analgesia with a low incidence of complications.

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### A3

#### **Comparison of inhaled isopropyl alcohol and ondansetron to control postoperative nausea and vomiting over twenty-four hours**

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**Introduction:** Postoperative nausea and vomiting (PONV) has been extensively studied yet the incidence remains as high as 75%. We compared the efficacy of inhaled isopropyl alcohol (IPA) to ondansetron for the control of PONV over a twenty-four hour period.

**Methods:** One hundred ASA class I-III women undergoing laparoscopic surgery were randomized into two groups and received a standardized anesthetic. Nausea was measured using a 0-10 verbal numerical rating scale (VNRS). The control group received ondansetron 4 mg IV at the onset of PONV and promethazine suppositories as a rescue in the same day surgery unit (SDSU) and at home. The experimental group inhaled isopropyl alcohol vapors from a standard alcohol pad at onset of PONV and as first line treatment in the SDSU and at home. Ondansetron 4 mg was the rescue for the experimental group in SDSU and promethazine suppositories after discharge.

**Results:** Of 100 enrolled in the study, 72 subjects adhered to the study protocol. Demographic characteristics were similar between groups. Anesthesia

times, surgical times, opioid use, and PACU/SDSU times were also similar between the groups. Significance was noted in the average mean time to 50% reduction of symptoms. The experimental group reported  $15.00 \pm 10.6$  minutes while the control group required  $33.88 \pm 23.2$  minutes ( $p=0.001$ ). A significant difference in nausea events at home was noted between groups. Five subjects in the ondansetron group required promethazine suppository administration while at home vice one subject in the IPA group ( $p=0.032$ ).

**Conclusions:** IPA is a valuable first-line treatment for PONV in the PACU and following discharge into the home setting. Results suggest that IPA has a faster time to fifty percent relief of nausea as compared with ondansetron. It is easily administered, inexpensive, and has a more rapid onset than ondansetron.

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### A4

#### **The efficacy of prophylactic transdermal scopolamine versus intravenous ondansetron on postoperative nausea and vomiting in patients undergoing outpatient laparoscopic gynecological procedures**

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**Introduction:** Years of extensive research on the prevention of PONV have yet to provide the perfect solution. PONV can lead to multiple complications for the patient and hospital. The study's purpose was to examine the effectiveness of transdermal scopolamine versus ondansetron in the prevention of PONV.

**Methods:** This was an IRB approved study including 41 ASA I/II subjects between 18-50. There were two randomly assigned groups. Only the primary researchers had knowledge of the group assignments. Group A received a scopolamine patch and an IV placebo. Group B received a placebo patch and 4 mg of IV ondansetron. Anesthesia induction and maintenance were standardized. The patient's level of nausea and occurrences of vomiting were documented in the PACU, ambulatory unit, and 24 hours postoperatively.

**Results:** A total of 41 subjects were enrolled in the study, 20 received scopolamine, and 21 received ondansetron. There were no significant demographic differences between groups. A total of 26 subjects (63%) experienced nausea, 11 received scopolamine (55%), and 15 received ondansetron (71%). Five patients experienced vomiting (12%), 4 received

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scopolamine (20%), and 1 received ondansetron (5%).  
**Discussion:** There was no statistical difference between the two groups regarding PONV. However, in the PACU patients receiving ondansetron experienced less nausea, 9% versus 20%. As postoperative time increased, scopolamine patients experienced less nausea, 62% versus 45%. Subjects receiving ondansetron had a lower incidence of vomiting, 5% versus 20%.

**Conclusion:** Due to the alarmingly high overall rate of nausea (63%) it appears that neither transdermal scopolamine alone nor 4 mg of intravenous ondansetron is an effective prophylaxis for PONV. Further studies are required to evaluate the effectiveness of higher doses of ondansetron versus scopolamine, as well as a combination of the two versus a single treatment.

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## A5

### Occupational exposure to halothane by anesthesia personnel in Belize

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**Introduction:** Approximately one third of the anesthesia providers in Belize have reported suffering visual disturbances, dizziness, and headaches on a daily basis. Two anesthetists contracted hepatitis they believe to be from halothane exposure. Nurse anesthetists in Belize working with Health Volunteers Overseas (HVO) questioned if physical symptoms were related to excessive halothane exposure. This research conducted in collaboration with the International Federation of Nurse Anesthetists, HVO and MSHS, was conducted to measure halothane levels in operating rooms associated with HVO in Belize.

**Methods:** Halothane levels were measured using the Anesthetic Gases Monitor badge by Assay Technology in all six HVO operating rooms in three hospitals in Belize for a total of 21.7 hours. Measurements were compared with the National Institute of Occupational Safety and Health International Chemical Safety Card limits for exposure to waste anesthetic gas.

**Results:** Halothane levels were above the maximum level of 2.0 ppm in seven of the fourteen time periods monitored. In those seven time periods, levels ranged from 2.1 to 11 ppm (mean 5.2 ppm, SD 3.6). Halothane levels above 2 ppm occurred primarily in cases when mask anesthesia was being performed.

**Conclusions:** A mean halothane level of 1.4 ppm for all measured time periods does not indicate providers

are at risk of long-term excessive halothane exposure. However, elevated levels in half of the time periods indicate that providers may be briefly exposed to high halothane levels during mask cases. Interestingly, while conducting this study hospitals associated with HVO in Belize began incorporating isoflurane and improving passive scavenging systems.

**Source of Funding:** Self-funding was supplemented by the International Federation of Nurse Anesthetists, Lab Safety Supply, and MSHS.

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## A6

### Regional anesthetic admixture calculation module

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**Introduction:** Dosage miscalculation is the second leading type of drug error made by nurses. Despite the critical importance of calculating drug dosages, the amount of instruction delivered to students is often limited by time constraints of a set curriculum.

**Methods:** This investigation examined the effectiveness of a self-learning module to improve student nurse anesthetist's ability to calculate drug admixtures. This study utilized a pretest-posttest, control group design. Nineteen nurse anesthesia students, attending the Uniformed Services University of Health Sciences (USU) Nurse Anesthesia Program for their didactic training, completed the study.

**Results:** Pretest scores revealed a range from 5% to 100% (M = 54.7, SD = 29.83). Posttest scores significantly improved (p = 0.04) showing a range from 10% to 100% (M = 80.2, SD = 25.68). No significant improvement was found between the group's scores (p = .27). However, positive feedback concerning the module's effectiveness was received from 17 out of 19 participants.

**Conclusion:** The results were not statistically significant. However, the focus was not to replace the traditional lecture with a self-learning module, but to show that the module really helped to enhance the participant's ability. The sample size limited the ability to show a significant improvement in posttest scores. Evidence supporting the module's effect of enhancing student's perceptions of learning was obtained through the satisfaction evaluations. Eighteen out of nineteen participants confirmed that the module was helpful and enhanced their learning experience. It makes a valid point, especially for adult learners, to

investigate further use of self-learning modules to enhance classroom instruction.

**Source of Funding:** Uniformed Services University of the Health Sciences Graduate School of Nursing

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## A7

### **Interactions of stroke volume, heart rate, systemic vascular resistance, and mean arterial pressure during epidural anesthesia for cesarean section**

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**Introduction:** This study examined the influence of heart rate (HR), stroke volume (SV), and systemic vascular resistance (SVR) on maternal mean arterial pressure (MAP) during epidural block and cesarean section (CS). A core assumption is that epidural hypotension is due to peripheral pooling & reduced venous return to the heart. If so, SV should fall during hypotension and IV fluid should prevent hypotension. No study has identified a volume of IV fluid that prevents hypotension. Changes in SV during hypotension are unknown.

**Methods:** Hemodynamics were measured prospectively during epidural block & CS in 60 healthy term pregnant women. Injectate was 2% lidocaine, 5 µg/mL epinephrine, 1 mEq bicarbonate/10 mL, & 100 µg fentanyl. Mean block height was T-4.4. MAP was measured noninvasively. SV & HR were measured by thoracic bioimpedance. SVR was calculated. Path analysis determined the amount of variance in MAP directly attributable to SV, HR, and SVR. Pearson correlations determined total (direct and indirect) effects.

**Results:** The direct effect of SVR on MAP was 55% greater than SV or HR. The total (direct & indirect) effect of SVR on MAP was  $r = .80$  while those of SV & HR were  $-0.11$  &  $0.05$ . Volume of IV fluid & MAP were inversely correlated ( $r = -0.33$ ).

**Conclusions:** SVR was the primary determinant of MAP. IV fluid alone is unlikely to prevent maternal hypotension and may contribute to it.

**Source of Funding:** NIH/NINR, AANA Foundation, Sigma Theta Tau Beta Theta at Large Chapter

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## A8

### **A prospective comparison of respiratory parameters using volume versus pressure controlled ventilation in obese and non-obese patients under general anesthesia**

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**Introduction:** Volume controlled ventilation (VCV) and pressure controlled ventilation (PCV) are the two ventilation modes available on most new anesthesia machines. Pressure controlled ventilation may offer an advantage in certain patient populations. The lower inspiratory pressures associated with PCV may be beneficial in patients with reduced lung compliance, such as obese patients. Obese patients present to the operating room with unique respiratory parameters and are at increased risk for perioperative complications. The purpose of this study is to compare the effects of VCV and PCV in obese and non-obese surgical patients.

**Methods:** Patients scheduled for orthopedic surgical procedures lasting more than 2 hours were enrolled. A standardized general anesthetic with endotracheal intubation was used. All patients were initially ventilated with VCV for one hour and then converted to PCV. The tidal volume (VT) for all patients and during both modes of ventilation was adjusted to maintain the end tidal CO<sub>2</sub> (EtCO<sub>2</sub>) at 30-35 mmHg. Data collection was initiated 10 minutes after the desired EtCO<sub>2</sub> was achieved. Respiratory parameters were monitored and recorded every 10 minutes for both groups.

**Results:** Twenty-one patients were enrolled in this study (13 obese and 8 non-obese). The average body mass index for the obese patients was 33 compared to 22 for the non-obese patients. Other than body weight the patients were demographically similar. The oxygen saturations of both groups on volume controlled ventilation were comparable. The mean oxygen saturation of the obese group was significantly lower on pressure controlled ventilation than the non-obese patients. The peak inspiratory pressures required to maintain the end tidal CO<sub>2</sub> within the designated range was significantly higher for the obese patients on pressure-controlled ventilation. The pressures were not significantly different between the groups on volume-controlled ventilation.

**Conclusion:** The obese patients required higher peak pressures and had lower oxygen saturations when on the pressure control mode compared to their non-obese counterparts. The results of this study should be interpreted cautiously as they are limited by small and unequal sample sizes.

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## A9

### **New onset conduction defects in coronary artery bypass graft patients**

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**Introduction:** Coronary artery bypass graft surgery (CABG) is associated with the development of new conduction disturbances. The type and incidence may vary with the type of operation, age of the patient, as well as with the use of medications that may alter conduction. The specific aim of this study was to test the hypothesis that patients undergoing CABG surgery in 2001 would exhibit a statistically significant increase in the incidence of new onset perioperative conduction defects, compared to patients undergoing CABG surgery a decade prior, in 1991.

**Methods:** A retrospective chart review of the medical records of adult patients at the Mayo Clinic Rochester who had undergone CABG surgery in two time periods, 1991 and 2001. We restricted our study to CABG surgery patients only. We limited the study to those who have developed new conduction disturbances; therefore any with pre-existing blocks were excluded. The study is descriptive in nature, quantitative and correlational.

**Results:** There was a decrease in the incidence of new onset conduction defects from approximately 18% in patients from 1991, to approximately 10% in patients who had their CABG in 2001.

**Conclusions:** While we hypothesized that the incidence of new conduction defects would increase between 1991 and 2001 in CABG patients, we identify almost a 50% decrease over this decade. This suggests meaningful improvements in perioperative care.

**Source of funding:** Department of Anesthesiology Discretionary Fund, Mayo School of Health Sciences, Rochester, Minnesota

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## A10

### **Ketorolac versus ibuprofen: An assessment of post-operative pain scores following gynecologic laparoscopic procedures**

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**Introduction:** Gynecologic laparoscopic procedures are often associated with postoperative pain and discomfort due to the technique of the procedure itself. Non-steroidal anti-inflammatory drugs (NSAIDs) are commonly used for patients having these procedures, and are known to provide effective analgesia for moderate postoperative pain. Usage of enteral and/or parenteral forms of NSAIDs are routine following gynecologic laparoscopic procedures; however, it is unknown as to which route of administration is most effective in

alleviating postoperative pain. The purpose of this study therefore, is to compare enteral and parenteral administration of NSAIDs, to assess which appears to have the greatest effect in minimizing post-operative pain following laparoscopic gynecologic procedures.

**Methods:** Following IRB approval and informed consent, ASA I and II female patients were randomly categorized into one of two groups. A standardized anesthetic regime was used. Additionally, group one patients received 800 mg of ibuprofen enterally preoperatively, and group two patients received a total of 60 mg of ketorolac, 30 mg intravenously preoperatively, and 30 mg intramuscularly shortly after the induction of anesthesia. Patients were asked to rate their pain based on a verbal/visual analog pain scale upon arrival to the post-anesthesia care unit, and every fifteen minutes thereafter until discharged home. Data was analyzed and tested for statistical significance between the two groups using analysis of variance. A P value <.05 is considered significant.

**Results:** Twenty-three of the thirty-six subjects have been enrolled in the study; group (n=14) and group 2 (n= 9). Demographically, the two groups are similar. There were no statistically significant differences seen between the two groups for mean pain scores during the first and second hour in PACU. Additionally no differences were seen in the amount of rescue drugs required in the PACU and time spent in PACU.

**Conclusions:** Initial data demonstrates that oral ibuprofen is comparable to parenteral toradol for pain management post-laparoscopy; however, achievement of sample size is necessary for conclusive outcome.

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## A11

### **Effect of hypoxia on the bispectral index value**

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**Introduction:** Hypoxia familiarization training is a requirement for all naval aircrew. This training is typically accomplished by exposure to a simulated altitude of 25,000 ft ( $\approx$  7% oxygen) in a hypobaric chamber that carries with it the risk of decompression sickness and barotrauma. In response to those risks, we have developed a reduced oxygen breathing device (ROBD) capable of inducing sea-level hypoxia. Ongoing research to assess the cognitive effects of sea-level hypoxia using the ROBD has afforded us an opportunity to examine the effects of hypoxia on Bispectral Index (BIS) values.

**Methods:** Following Institutional Review Board

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approval, oxygen saturation (SaO<sub>2</sub>) and BIS values were continuously measured in 58 healthy volunteers. Each subject breathed 7% oxygen for a maximum of 4 min. SaO<sub>2</sub> and BIS values were plotted as a function of time to examine the association between these factors.

**Results:** The BIS value decreased to a mean of 90 in conjunction with the expected decline in SaO<sub>2</sub> during the 4 min hypoxia period. The decline in BIS value lagged behind the decline in SaO<sub>2</sub> by approximately 90-105 s. In addition, we observed that when the SaO<sub>2</sub> declined below 60%, even briefly, the BIS value consistently dropped below 90. This prompted the comparison of BIS and SaO<sub>2</sub> values for 18 subjects with at least one SaO<sub>2</sub> < 60%. This comparison showed a similar lag time between decline of the SaO<sub>2</sub> and the decline of the BIS value; however, in this subgroup the BIS value achieved a mean of approximately 80.

**Conclusions:** These data suggest that hypoxia-induced decrements in neuronal function can be assessed using the BIS. Oxygen saturations of < 60% were associated with a BIS value congruent with pharmacologically induced sedation.

**Source of Funding:** Office of Naval Research, Arlington, Virginia

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## A12

### **A randomized study of the effect of venous leg compression on parturient blood pressures following spinal anesthesia for elective cesarean section**

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**Introduction:** Hypotension is a common side effect following spinal anesthesia in the pregnant patient despite adequate preload and the use of left uterine displacement. Preventing hypotension is important because it can lead to decreased blood flow to the placenta and baby. The administration of vasopressors is not without risk including an increased incidence of arrhythmias and severe bradycardias. The purpose of this study is to determine if there is a relationship between venous leg compression and the incidence of hypotension in pregnant women undergoing elective cesarean sections under spinal anesthesia.

**Methods:** Following IRB approval and written consent, 30 pregnant women undergoing elective cesarean section were randomly assigned to two groups. Group 1 (n=16) had their legs wrapped with Esmarch® elastic bandages from the ankle to mid-thigh while group 2 (n=14) acted as a control group. Blood pressures were measured every one minute until delivery, then

every three minutes until the case ended. Significant hypotension was defined as a decrease of greater than or equal to 20% of baseline or a systolic pressure less than 100 mmHg. If pressure dropped to the above levels, then vasopressors would be administered until the blood pressure was above baseline. A P value of less than 0.05 was considered significant.

**Results:** Thirty patients were enrolled in this study. The demographic characteristics of each group were comparable with the exception of patient weight. The control group had a mean weight of 209 pounds, and the experimental group had a mean weight of 187 pounds with p=0.033. There was no difference in blood pressure at 10 or 20 minutes, but the experimental group received a significantly lower amount of ephedrine to sustain blood pressure within normal limits.

**Conclusion:** The results of this study demonstrated that venous leg compression in the pregnant woman undergoing elective cesarean section is a safe and effective adjunct to reduce the amount of neosynephrine given to maintain blood pressure within 20% of baseline or above 100 mmHg. Although the mean blood pressures were not significant, the total amount of neosynephrine was significantly different, with p=0.035.

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## A13

### **Renin-angiotensin system antagonists and hypotension during anesthetic induction**

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**Introduction:** Should angiotensin converting enzyme inhibitors (ACEI), a primary class of agents for several cardiac disorders including primary hypertension, be discontinued before surgery? It is generally desirable to continue cardiac medications throughout the perioperative period. Severe episodes of refractory hypotension during induction of anesthesia have been reported thus the debate over what is the safest practice is ongoing.

**Methods:** A randomized retrospective chart review was conducted on 28 patients who underwent coronary artery bypass. All of the patients were chronically treated for hypertension with an ACEI. Half of the patients (group 1) had taken lisinopril within 24 hours before surgery and were considered to be "on the drug." The other 14 patients (Group 2) had discontinued lisinopril, at least 48 hours before surgery, and were therefore considered to be "off the drug."

**Results:** The two groups were demographically similar and without statistically significant differences in

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induction dose or NPO status. The changes in blood pressure over time during induction were similar in both groups and did not reach statistical significance. However, two patients in group 1 and one patient in group 2 developed hypotension with a drop in systolic blood pressure of >30%.

**Conclusions:** Withholding ACEIs before surgery in hypertensive patients can not be justified by the findings of this study. The anesthesia provider must however be aware of the potential risk of severe hypertension in these patients especially if the medication was taken at a time that would allow for peak effect to coincide with induction. Additional research is needed to further test the effects of ACEIs during induction.

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#### A14

##### **Neuroprotective effects of propofol and etomidate in PC12 cells exposed to chemical induced hypoxia**

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**Introduction:** Propofol (PPF) and etomidate (ET) are commonly used agents in neurosurgery. Both agents exhibit neuroprotective properties. The mechanism for this action is not well defined. The purpose of this study was to determine the neuroprotective effects of PPF and ET preventing nerve cell injury by chemical induced hypoxia.

**Methods:** Studies were performed using PC12 cells cultured using RPMI-1640 media supplemented with 10% heat inactivated horse serum and 5% fetal bovine serum, incubated at 37°C, with 5% CO<sub>2</sub>. Hypoxia was induced in PC12 cells with sodium cyanide (NaCN) at doses of 10 and 30 mM. Cell damage was assessed by determining cell viability and media lactate dehydrogenase (LDH). Cell viability was assessed using the trypan blue exclusion technique. The neuroprotective effects of PPF and ET on PC12 cells exposed to NaCN induced hypoxia were determined using varying doses of each agent. Data were analyzed using ANOVA with Tukey's multiple comparisons test. A p value <0.05 was considered statistically significant.

**Results:** NaCN administration resulted in a dose dependent decrease in PC12 cell viability and increased LDH release, indicative of cell injury. Pretreatment of PC12 cells with either PPF or ET resulted in significant attenuation of the hypoxia induced damage. The mean % cell viability for NaCN treated cells in the propofol study was 1.03 ± 1.01. Pre-treatment with PPF followed by cyanide, the mean % cell viability increased dose-dependently, 25.5 ± 2.9, 69.3 ± 5.0 and 70.2 ± 10.5 for 10 uM, 100 uM and 1000 uM respectively. ET

also attenuated the effects induced by NaCN. The mean % cell viability value for the NaCN group was 22.8 ± 4.3. When ET was administered at doses of 10 uM and 100 uM prior to NaCN the decrease in cell viability induced by NaCN increased to 70.3 ± 5.6 and 80.0 ± 4.6 respectively.

**Conclusion:** In the present study, PPF and ET, at clinically relevant concentrations, attenuated cell injury and cell death induced by chemical induced hypoxia. The mechanism for these results requires further investigation. However, it appears to reduce hypoxia induced necrosis independent of an anti-oxidant action.

**Source of Funding:** AANA Foundation Research Grant

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#### A15

##### **Reducing anxiety in parents accompanying their child to the operating room for the induction of anesthesia**

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**Introduction:** Parental presence at the induction of anesthesia is gaining popularity to help facilitate anxiety of the child at the time of surgery. Prior to patient involvement in the operating room, parents need to have a thorough understanding of the process. The viewing of an educational pediatric anesthesia videotape may decrease parental anxiety and increase satisfaction with the hospitalization experience.

**Methods:** Upon obtaining IRB approval and written consent, 40 participants were enrolled. Children presenting for elective surgery requiring general anesthesia were selected. Exclusion criteria included an ASA status of > 2 and a history of chronic illness. Convenience sampling was used with random assignment to one of two groups. Only one group viewed an educational pediatric anesthesia videotape preoperatively. After induction, the parent completed a demographic data sheet, a self-evaluation anxiety assessment tool and a satisfaction survey.

**Results:** The mean scores on the two evaluation tools were compared using an independent sample T-test. There was no significant difference between the video and non-video groups regarding their perceived anxiety levels. There was a significant difference between the groups on the satisfaction survey mean scores. The non-video group had a higher overall satisfaction score. The parents in the video group lacked consensus on the future value of having parents view the film. There were significant demographic differences between the groups. The non-video group was significantly older and had a higher educational level. The results of this study may have been confounded by these factors.

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**Conclusions:** This study found the viewing of an educational pediatric anesthesia video by parents did not enhance their satisfaction with the induction process or affect their perioperative anxiety level. The use of this video in the future was not substantiated by these findings.

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## A16

### **Differences in clinical manifestations in malignant hyperthermia episodes with succinylcholine or volatile anesthetics**

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**Introduction:** Malignant hyperthermia (MH), an inherited disorder of skeletal muscle triggered by volatile anesthetics and succinylcholine, is characterized by a hypermetabolic response resulting in muscle damage, hyperthermia and death if left untreated. The purpose of this study was to examine the MH Registry database for differences in onset and severity of symptoms in patients with MH episodes with different volatile anesthetics and succinylcholine.

**Methods:** In this study, the highest temperature, highest end tidal CO<sub>2</sub>, onset of symptoms and time until initial MH treatment for halothane, enflurane, isoflurane, desflurane, sevoflurane was identified. The data were also separated into cases with and without succinylcholine. Analysis of Variance and Fisher's Least Significant Difference statistical tests were used.

**Results:** From the database 479 MH patients diagnosed with a positive MH halothane/cafeine test were identified. There was a statistically significant difference in maximum temperature and time of onset ( $p < 0.001$ ) for the group that received volatile anesthetic alone compared to those who received succinylcholine alone or both. The time of onset of symptoms for halothane (M=37.8 minutes) was statistically significantly less than enflurane (M=123.7 minutes,  $p < .05$ ) and isoflurane (M=122.3 minutes,  $p < .001$ ). There was a statistically significant difference in the time of onset of symptoms for those who received succinylcholine compared to those who did not receive succinylcholine ( $p < .002$ ). The time until discontinuance of triggering agent for those who received succinylcholine alone was less than the group that received volatile anesthetic alone ( $p < .001$ ).

**Conclusion:** These results infer that the clinical manifestation of an MH episode can differ depending on the type of anesthetic administered.

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## A17

### **A national survey of Certified Registered Nurse Anesthetists' knowledge, beliefs and assessment of herbal supplements in the anesthesia setting**

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**Introduction:** The purpose of this study was to explore Certified Registered Nurse Anesthetist, (CRNAs') knowledge of the 8 most common herbal supplements identified by current research that have a potential for peri-operative complications, their beliefs regarding herbal-anesthesia interactions, and their preoperative assessment practices regarding herbal supplement use.

**Methods:** A descriptive survey design randomly sampled registered CRNAs from the American Association of Nurse Anesthetists (AANA). A multiple-choice questionnaire assessing attitudes and perceptions of herbal supplement use along with knowledge of common potential adverse effects of 8 herbal supplements was created and used. Although the response was low (19%, N=191), respondent demographics corresponded with the AANA 2002 CRNA membership.

**Results:** The mean score of adverse herbal/anesthesia interaction knowledge was only 3.4 out of 16 questions (21%). CRNA confidence in their familiarity with herbal/anesthesia interactions was also quite low with only 17% indicating confidence. A majority agreed that herbal supplements: (1) should be assessed in the pre-operative setting, (2) are medically active, and (3) can have an impact on surgical outcomes. Many CRNAs (93%) would like more educational opportunities regarding anesthesia and herbal supplements. Only 23% of the participants correctly identified the ASA recommendation to discontinue herbal supplements two weeks before surgery.

**Conclusion:** The dismal knowledge scores and lack of confidence in familiarity with herbal/anesthesia interactions highlights the need for CRNA education. Since many CRNAs participating, from under three years of practice to more than 20 years of practice, strongly agreed more herbal education is needed, a review of anesthesia educational curriculums and continuing education programs is necessary to ensure adequate herbal instruction.

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