

# ABSTRACTS



## PREDICTORS OF HYPOTHERMIA DURING SPINAL ANESTHESIA:

Steven M. Frank, Hossam K, El-Rahmany, Christine G, Rcahel A, Barnes,

**BACKGROUND:** Body temperature often is ignored during regional anesthesia. Despite evidence that hypothermia occurs commonly. Because hypothermia is associated with adverse clinical outcomes, it is important to reorganize predictors of hypothermia and to monitor and control body temperature in patients at risk. The current study was designed to determine the predictors of core hypothermia in patients receiving spinal anesthesia for radical retro public prostatectomy.

**RESULT:** The mean core temperature at admission to the post anesthesia care unit was 35.10.6 C (range, 33.6-36.3 C) duration of surgery, ambient operating room temperature and body habitues were not predictors of hypothermia. A high Level of spinal blockade and increasing age were predictors of hypothermia. For each increment increase in block level, core temperature decreased 0.15 C and for each increase in age core temperature decreased by 0.3 C.

**CONCLUSION:** Although high level spinal blockade has been associated with decreased thermoregulatory thresholds, no previous study has shown that a higher level of blockade is associated with a greater magnitude of core hypothermia in the clinical setting. As with general anesthesia, Advanced age is associated with hypothermia during spinal anesthesia, (key words: body temperature: regional anesthesia, Thermoregulation:) REF: Anesthesiology 2000,92:1330-4

## PATIENTS WITH DIABETIC NEUROPATHY ARE AT RISK OF A GREATER INTRAOPERATIVE REDUCTION IN CORE TEMPERATURE.

Akira Kitamura, Takeshi Hoshino, Tadashi Kon. Ryo Ogawa

**BACKGROUND:** Core hypothermia develops after the induction of general anesthesia, but intraoperative vasoconstriction usually prevents its progression. However Diabetes mellitus is of often associated with autonomic neuropathy, Which leads to abnormal peripheral neurovascular function. According, we tested the hypothesis that diabetic patients experience a greater reduction in core temperature during general anesthesia than non diabetic patients do.

**RESULT:** Thirteen patients in the diabetic group showed abnormal responses to two or more of the basal automatic function test (patients with autonomic dysfunction) changes in core temperature among the groups were of anesthesia. However the core temperature of the diabetic patients with autonomic dysfunction was lower from 120 min (35.1 C) on ward compared with the young or older non diabetic patients and the diabetic patients similar at 90 minutes after the induction with normal autonomic function. Peripheral vasoconstriction, evaluated using the forearm-fingertip skin surface temperature gradient, was delayed in patients with autonomic dysfunction compared with the others.

**CONCLUSION:** The current results indicate the diabetic autonomic neuropathy is associated with more Severe intraoperative hypothermia. We postulate that diabetic patients become more hypothermic because their peripheral neuropathy delays the onset of thermoregulatory vasoconstriction and reduces its efficacy once triggered. These patients may therefore fail to develop a normal core temperature plateau. (Key words: Anesthesia; diabetes. Autonomic insufficiency; thermoregulation; vasoconstriction) Ref: Anesthesiology 2000: 92:1311-8

## AGE IS NOT AN IMPEDIMENT TO EFFECTIVE USE OF PATIENT-CONTROLLED ANALGESIA BY SURGICAL PATIENTS

Lucia Gagliese , Marla Jackson, Paul Ritvo, Adarose Wowk , Joel Katz.

**BACKGROUND:** Obstacles to the use of patients controlled analgesia (PCA) by elderly surgical patients have not been well document, Age differences in preoperative pain and analgesic consumption, treatment, satisfaction, and concerns regarding PCA were measured to identify factors important to effective PCA use.

**RESULTS:** The older patients expected less intense pain ( $p < 0.03$ ) and preferred less information about ( $p < 0.002$ ) and involvement in ( $p < 0.002$ ) health care than young patients There were no age difference with regard to pain at rest ( $p < 0.003$ ) or with movement ( $p < 0.68$ ) The older group self-administered less opioid than the young group ( $p < 0.0001$ ) and received PCA for more days than the young group ( $p < 0.004$ ) The groups did not differ in concerns about pain relief, Adverse drug effects including opioid addiction and equipment use or malfunction, satisfaction with PCA was high and did not difference between the groups.

**CONCLUSIONS:** Patient controlled analgesia use was not hindered by age differences in beliefs about postoperative pain and opioids. Younger and older patients attained comparable levels of analgesia and were equally satisfied with their pain control. Ref: Anesthesiology 2000: 92:1311-8

## SEDATION DURING SPINAL ANESTHESIA

**BACKGROUND:** Central neuraxial anesthesia has been reported to decrease the dose of both intravenous and inhalational anesthetics needs to reach a defined level of sedation. The mechanism behind this Phenomenon is speculated to be decreased afferent stimulation of the reticular activating system The authors performed a two part study ( nonrandomized pilot study and a subsequent randomized, Double blind, Placebo-controlled study) using the bispectral index (BIS) monitor to quantify the degree of sedation in unmedicated volunteers undergoing spinal anesthesia.

**RESULTS:** In part 1 , significant changes in BIS scores of the volunteers occurred progressively ( $p = 0.003$ ) the greatest variations from baseline BIS measurement occurred 1t 30 and 70 minutes. In part ii, There were significant Decreases in OAA/S and self-sedation scores for patients receiving spinal anesthesia versus control patients ( $p = 0.004$  and 0.01, respectively ) The greatest decrease in OAA/S scores occurred at 60 minutes. Bis scores were similar between groups ( $p = 0.4$ ).

**CONCLUSIONS:** Spinal anesthesia is accompanied by significant sedation progressively when compared with control as measured by OAA/S and self-sedation scores> this effect was not Related to block height. The late sedation observed by OAA/S at 60 minutes may indicates a second mechanism of sedation, such as delayed rostral spread of local anesthetics Bis was not a sensitive measure of the sedation associated with spinal anesthesia in the randomized, Blinded portion of this study (key words: Bispectral monitoring: local anesthetics) REF: Anesthesiology 2000: 92:1311-8

## TRANSDERMAL NITROGLYCERINE ENHANCES SPINAL NEOSTIGMINE POSTOPERATIVE ANALGESIA FOLLOWING GYNECOLOGICAL SURGERY.

Gabriela, Lauretti, Ana-paula , Oliveria, Maria-do-carmo C, Juliao , Marlene p. pies. Newton L. pereira, B.pharm.

**BACKGORUND:** Intrathecal neostigmine causes analgesia by inhibiting the breakdown of acetylcholine, experimental data suggest that the production of endogenous nitric oxide is necessary for tonic cholinergic inhibition of spinal pain transmission. The purpose of this study was to determine whether association of transdermal nitroglycerine would enhance analgesia from the a

low dose of intrathecal neostigmine in patients undergoing gynecologic surgery during spinal anesthesia.

**RESULT:** Patients in the groups were similar regarding age, weight, height, and American Society of Anesthesiologists status, sensory level to pin prick at 10 minutes, surgical duration anesthetic, during and visual analog scale score for pain at the time of administration of first rescue medication were statistically the same for all groups. The time to administration of first rescue analgesic (min) was longer in the neostigmine-nitroglycerin group (550 min; range; 458-1,440 min; median, 25-75<sup>th</sup> percentile) compared with the other groups ( $p < 0.001$ ) the neostigmine-nitroglycerin group required fewer rescue analgesics in 24 hours than did the control groups ( $p < 0.0005$ ), whereas the neostigmine group required less analgesics compared with the control group ( $p < 0.02$ ). The incidence of perioperative adverse effects (nausea, vomiting, headache, and back pain) was similar among groups ( $p > 0.05$ ).

**CONCLUSION:** Although neither intrathecal 5 g neostigmine alone nor transdermal nitroglycerine alone (5 mg/day) delayed the time to administration of first rescue analgesic, the combination of both provided an average of 14 hours of effective postoperative analgesia after vaginoplasty, suggesting that transdermal nitroglycerin and the central cholinergic agent neostigmine may enhance each others antinociceptive effects at the dose studied. REF: Anesthesiology 2000; 92:1311-8

#### ANALGESIC EFFECTS OF CAUDAL AND INTRAMUSCULAR S(+)-KETAMINE IN CHILDRENS;

Herbert Koinig, Peter Marhofer, Claus G Krenn, Walter Klimscha, Eckart Wildling, Wolfgang Erlacher, Ajsa Nikolic Klaus Turnheim, Margot Semsroth.

**BACKGROUND:** Previous studies suggest that caudal administration of ketamine cause effective analgesia. The purpose of current study was the compare the clinical effectiveness and the plasma concentration of the S(+) ketamine after caudal or intramuscular administration in children to distinguish between local and systemic analgesia.

**RESULTS:** A significantly longer duration of analgesia ( $p < 0.001$ ) was observed after caudal administration (528 minutes [220-1,440 min], median [range] when compared with intramuscular administration (108 min [62-1,440 min] of S(+) Ketamine plasma levels of ketamine were significantly lower from 10 to 45 min after caudal administration then after intramuscular injection.

**CONCLUSION:** Caudal S(+)-ketamine provides good intra- and postoperative analgesia in children. Despite similar plasma concentration during most of the postoperative observation period, Caudal S(+)-ketamine provided more effective analgesia than did intramuscular S(+)-ketamine indicating a local analgesic effect. REF: Anesthesiology 2000; 92:1311-8

#### THE ROLE OF HUMAN LUNGS IN THE BIOTRANSFORMATION OF PROPOFOL.

Andrzej L. Dawidowicz, Emilia Fornal, Marek Mardarowicz, Anna Fijalkowska,

**BACKGROUND:** The metabolism of propofol is very rapid and its transformation takes place mainly in the liver. There are reports indicating extrahepatic metabolism of drug. And the alimentary canal, Kidneys, and lungs are mentioned as the most probable places where the process occurs. The aim of this study was to determine whether the human lungs really take part in the process of propofol biotransformation.

**RESULTS:** The concentration of propofol in the central venous system (right atrium or pulmonary artery) is greater than in the radial artery, whereas the opposite is observed for propofol's metabolite, 2,6-diisopropyl-1,4-quinol. Higher propofol concentrations are found in blood taken from the radial artery

than in the blood collected from the radial artery.

**CONCLUSION:** Human lungs take part in the elimination of propofol by transforming the drug in to 2,6 diisopropyl-1,4 quinol. REF: Anesthesiology 2000; 92:1311-8

#### ANESTHESIA-RELATED CARDIAC ARREST IN CHILDREN:

Initial findings of the pediatric perioperative cardiac Arrest (POCA) registry:

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Alvin Hackel, Rober A. Caplan, Karen B. Domino, Karen Posner, Frederick W. Cheney,

**BACKGROUND:** The pediatric perioperative cardiac arrest (POCA) registry was formed in 1994 in an attempt to determine the clinical factors and outcomes associated with cardiac arrest in anesthetized children.

**RESULTS:** In the first four years of the POCA registry, 63 institution enrolled and submitted 289 cases of cardiac arrest, Of these, 150 arrested were judged to be related to anesthesia, cardiac arrest related to anesthesia had an incident of  $1.4 \pm 0.45$  (mean SD) per 10,000 instances of anesthesia and a mortality rate of 26%. Medication-related (37%) and cardiovascular (32%) causes of cardiac arrest were most common together accounting for 69% of all arrested, cardiovascular depression from halothane, alone or in combination with other drugs, was responsible for two third of all medication-related arrests. Thirty three percent of patients were American society of anesthesiologists physical status 1-2; in this group, 64% of arrests were medications related, compared with 23% in American society of anesthesiologists physical status 3-5 patients ( $p < 0.001$ ) infants younger than 1 year of age accounted for 55% of all anesthesia related arrests. Multivariate analyses demonstrated two predictors of mortality: American Society of Anesthesiologists physical status 3-5 (odds ratio, 12.99; 95% confidence interval, 2.9-57.7), and emergency status (odds ratio, 3.88; 95% confidence interval, 1.6-9.6)

**CONCLUSION:** Anesthesia related cardiac arrest occurred most often patients in younger than one year of age in patients with severe underlying disease. Patients in the latter group, as well as patients having emergency surgery were mostly likely to have a fatal outcome. The identification of medication-related problems as the most frequent cause of anesthesia-related cardiac arrest has important implications for preventive strategies. (key-words: Anesthetic Complication, Outcomes, and Pediatric.) REF: Anesthesiology 2000; 93:6-14.

#### RANDOMIZED TRIAL OF DIASPIRIN CROSS-LINKED HEMOGLOBIN SOLUTIONS AS AN ALTERNATIVE TO BLOOD TRANSFUSION AFTER CARDIAC SURGERY.

Maurice L. Lamy, Elaine K. et al

**BACKGROUND:** Risks associated with transfusion of the allogenic blood have prompted development of methods of avoid or reduce blood transfusion. New Oxygen-carrying compounds such as diaspirin cross-linked hemoglobin (DCLHb) could enable more patients to avoid allogenic blood transfusion.

**RESULTS:** During the period from the end of cardiopulmonary bypass surgery through postoperative day 7 or hospital discharge, 20 of 104 (19%) DCLHb recipients did not receive a transfusion of pRBCs compared with 100% of control patients ( $P < 0.05$ ). The overall number of pRBCs administered during the 7 days postoperative period was not significantly different. Mortality was similar between the DCLHb (6 of 104 patients) and the control (8 of 105 patients) groups. Hypertension, jaundice / hyperbilirubinemia, increased serum glutamic oxalo-acetic transaminase, abnormal urine, and hematuria were reported more frequently in the DCLHb group, and there was one case of renal failure in each group. The hemodynamic effects of DCLHb included a consistent and slightly greater increase in systemic and pulmonary vascular resistance with associated increase in systemic and pulmonary arterial pressures compared with pRBC. Cardiac output values decreased more in

the DCLHb group patients after the first administration than the control group patients. At 24 h postinfusion, the plasma hemoglobin level was less than one half the maximal level for any amount of DCLHb infused.

**CONCLUSIONS:** Administration of DCLHb allowed a significant number (19%) of cardiac surgery patients to avoid exposure to erythrocytes postoperatively. (Key words: Blood Substitute; erythrocyte substitute; oxygen carrier; oxygen - carrying compounds.)

#### EFFECT OF AMBIENT TEMPERATURE ON HUMAN PAIN AND TEMPERATURE PERCEPTION.

Lrina A.Strigo, FrancoCarli, Catherine Bushnell,

**BACKGROUND:** Animal studies shows reduce nociceptive responses to noxious heat stimuli and increase in endogenous b-endorphin levels in cold environment, suggesting that human pain perception may be dependent on ambient temperature. However studies of changes in the local skin temperature on human pain perception have yielded variable results. This study examines the effect of both warm and cool ambient temperature on the perception of noxious and innocuous mechanical and thermal stimuli.

**RESULTS:**mean skin temperature was altered by ambient temperature ( cool room :30.1 C; neutral room :33.4C ; warm room : 34.5 C;  $P<0.0001$ ). Ambient temperature effected both heat (44-50 C) and cold ( 25-0 C) perception ( $p<0.01$ ). Stimulus intensity ratings tended to be lower in the cool than in the neutral environment ( $p<0.07$ ) but were not different between the neutral and warm environments. Unpleasantness ratings revealed that cold stimuli were more unpleasant than hot stimuli in the cool room and that noxious heat stimuli were more unpleasant in a warm environment. Environment temperature did not alter ratings of warm (37 and 40 C) or mechanical stimuli.

**CONCLUSIONS:**These results indicates that in humans, a decrease in skin temperature following exposure to cool environments reduces thermal pain. Suppression of A primary afferent cold fiber activity has been shown to increase cold pain produced by skin cooling. Our current findings may represent the reverse phenomenon i.e, a reduction in thermal nociceptive transmission by the activation of A cutaneous cold fibers. (keywords: cold, cool, psychophysics; warm) REF: Anesthesiology 2000, 92:699-707

#### LUMBAR PLEXUS BLOCK REDUCES PAIN AND BLOOD LOSS ASSOCIATED WITH TOTAL HIP ARTHROPLASTY.

Robert D. Stevens, Elisabeth VanGessel, Nicolas Flory, RoxaneFournier, Zdravko Gamulin,

**BACKGROUND:** the usefulness of peripheral nerve blockade in the anesthetic management of hip surgery has not been clearly established. Because sensory afferents from the hip include several branches of the lumbar plexus, the authors hypothesized that a lumbar plexus block could reduce pain from a major hip producer.

**RESULTS:** The proportion of patients receiving supplemental fentanyl intraoperatively was more than 3 times greater in the control groups ( 20 or 30 vs. 6 of 29,  $p=0.001$ ) in the postanesthesia care unit, a greater than fourfold reduction in pain scores was observed in the plexus group (visual analogue scale[vas] pain score at arrival 1.3 + 2 vs. 5.6+3,  $p<0.001$ ) and "rescue" morphine boluses ( administered if VAS >3) were administered 10 times less frequently (in 2 of 28 vs, in 22 of 29 patients,  $p<0.0001$ ). Pain scores and morphine consumption remained significantly lower in the plexus group until 6h after randomization (VAS at 6h, 1.4 + 1.3vs, 2.4+1.4,  $p=0.007$ ; cumulative morphine at 6h, 5.6+4.7 vs, 12.6+7.5 mg,  $p<0.0001$ ). operative and postoperative (48 h)blood loss was modestly decreased in the treated group. Epidural -like distribution of anesthesia occurred in 3 of 28 plexus group patients, but no other side effect were noted,

**CONCLUSIONS:**Posterior lumbar plexus block provides effective analgesia for total hip arthroplasty, reducing intra- and postoperative opioid requirements. Moreover, blood loss during and after the procedure is diminished. Epidural anesthetic distribution should be anticipated in a minority of cases. (keywords: Hip surgery, regional anesthesia.) REF: Anesthesiology 2000, 93:115-21

#### ATTENUATION OF THE PREOPERATIVE STRESS RESPONSE WITH MIDAZOLAM.

Effects on postoperative outcomes.

Zeev N. Kain, Ferne Sevarino, Sharon Pincus, Gerianne M. Alexander, Shu Ming Wang, Chakib Ayoub, Boonsri Kosarussavadi,

**BACKGROUND:** Previously, effects of preoperative sedatives were assessed mainly with respect to preoperative outcomes such as anxiety and compliance. the purpose of this investigation was to evaluate the effects of preoperative sedatives on postoperative psychological and clinical recovery.

**RESULTS:** Surgery length did not differ significantly between the treatment and placebo groups(118+45 min vs 129+53 min;  $p=ns$ ) throughout the first postoperative week subjects in the treatment group reported a greater reduction in postoperative pain compared with subjects in the placebo group(  $f=3.5$ ;  $p=0.0035$ ). moreover, at 1 week, ibuprofen use was reported by less subjects in the treatment group than in the placebo group (0% vs 17.25  $p=0.026$ ). subjects in the treatment group also reported a greater reduction in postoperative anxiety throughout the follow up period ( $f=9.2$ ;  $p=0.04$ ). however, global health indexes (SF-36) did not detect any significant differences between the experimental groups (multivariate  $F=0.44$ ,  $p=0.51$ ).

**CONCLUSION:**Subjects treated with midazolam preoperatively self-report improved postoperative psychological and pain recovery. However the clinical significance of these findings is unclear at the present time. (keywords: Anxiety; Benzodiazepines; recovery; surgery)REF: Anesthesiology 2000, 93:141-7

#### REEVALUATION OF RECTAL KETAMINE PREMEDICATION IN CHILDREN COMPARISON WITH RECTAL MIDAZOLAM.

Makoto Tanaka, Masayoshi Sato, Atsushi Saito, Toshiaki Nishikawa,

**BACKGROUND:**Results of previous studies of rectal ketamine as a pediatric premedication are clouded because of lack of dose-response relation, in appropriate time of assessing sedative effects, and previous administration or co-administration of benzodiazepines. therefore, the authors reevaluated the efficacy of rectally administered in comparison with 1 mg/kg rectal midazolam.

**RESULTS:**most children's (88%)who received rectally 10mg/kg ketamine or 1 mg/kg midazolam separated easily from their parents compared with those(31%) who received 7 or 5mg/kg rectal ketamine ( $p<0.05$ ) similarly, more children who received 10mg/kg or 1 mg/kg midazolam underwent mask induction without struggling or crying compared with those who received 7or 5mg/kg ketamine ( $p<0.05$ ). There were no clinically significant changes in blood pressure, heart rate, and oxyhemoglobin saturation after administration of either drug. Immediately after surgery, more children's receiving midazolam or 5 mg/kg ketamine, ketamine, 7 and 10 mg/kg, provided postoperative analgesia, but the largest dose of ketamine was associated with delayed emergence from general anesthesia.

**CONCLUSIONS:** The results indicate that rectally administered ketamine alone produces dose-dependent sedative effects in childrens, when evaluated as its predicted peak plasma concentration. Ketamine, 10 mg/kg, has a delayed on set but it as effective as 1mg/kg midazolam for sedating healthy childrens before general anesthesia. However, 10mg/kg rectal ketamine is not recommended for brief surgeries because of prolonged postoperative sedation. (keywords: Anesthetics: hypnotics; Pre in-

duction) REF: Anesthesiology 2000, 93:1217-24

#### COMPARISON OF THE COSTS AND RECOVERY PROFILES OF THREE ANESTHETIC TECHNIQUES FOR AMBULATORY ANORECTAL SURGERY.

Shitong Li, Margarita Coloma, Paul F. White, Mehernoor F. Watcha, Jen Chiu, Hong Li, Philip J. Huber, Jr.

**BACKGROUND:** given the current practice environment, it is important to determine the anesthetic techniques with the highest patient acceptance and lowest associated costs. The authors compared three commonly used anesthetic techniques for anorectal procedures in the ambulatory setting.

**RESULTS:** the mean cost were significantly decreased in group 1 (\$69+20 compared with \$104+18 and \$145+25 in the groups 2 and 3, respectively) because both intraoperative and recovery costs were lowest ( $p < 0.05$ ). Although the surgical time did not differ among the three groups, the anesthesia time and time to oral intake and home-readiness were significantly shorter in group 1 (vs. groups 2 and 3). There was no significant difference among the three groups with respect to the postoperative side effects or unanticipated hospitalization. However the need for pain medication was less in groups 1 and 2 (19% and 19% vs 45% for group 3;  $p < 0.05$ ). Patient in group 1 had no complaints of nausea (vs. 3% and 26% in groups 2 and 3 respectively.) more patients in group 1 (68%) were highly satisfied with the care they received than in groups 2 (58%) and 3 (39%).

**CONCLUSIONS:** The use of local anesthesia with sedation is the most cost effective techniques for anorectal surgery in the ambulatory setting. (keywords: Cost-benefit; Monitored Anesthesia care; Pharmacoeconomics; fast-track anesthesia.) REF: Anesthesiology 2000, 93:1225-30

#### INTRAVENOUS MAGNESIUM REDUCES INFARCT SIZE AFTER ISCHEMIA/REPERFUSION INJURY COMBINED WITH A THROMBOGENIC LESION IN THE LEFT ANTERIOR DESCENDING ARTERY.

Ravn HB; Moeldrup U; Brookes CI; Ilkjaer LB; White P; Chew M; Jensen L; Johnsen S; Birk-Soerensen L; Hjortdal VE

Experimental studies have demonstrated that intravenous magnesium (Mg) can protect the ischemic myocardium and has an antithrombotic effect. In patients with myocardial infarction, the reperfusion injury is complicated by the presence of a thrombogenic area in the affected coronary artery that may cause repetitive thrombus formation and embolization. We investigated the effect of Mg on infarct size in a randomized study in pigs. Myocardial infarction was induced by a 50-minute mechanical occlusion of the left anterior descending artery combined with an arterial injury, which stimulated a dynamic thrombus formation with emboli shedding on reperfusion. Magnesium sulfate (6 mmol/20 min plus 3 mmol/h) or saline was started at 30 minutes after coronary occlusion. Real-time ventricular pressure-volume loops were generated from the left ventricle by using a microtip pressure manometer and a conductance catheter. Platelet accumulation in the myocardium was evaluated by using  $^{111}\text{In}$ -labeled platelets. After 4 hours of reperfusion, the infarct size/area at risk ratio in the placebo group was  $46 \pm 0.06\%$  ( $n=8$ ) compared with  $22 \pm 0.07\%$  ( $n=6$ ) in the Mg-treated animals ( $P=0.03$ ). Ejection fraction decreased significantly in the control group but not in the Mg-treated animals ( $P=0.03$ ). Platelet accumulation in the myocardium did not change significantly between the Mg- and placebo-treated animals (placebo group,  $191 \pm 19\%$ ; Mg group,  $177 \pm 29\%$ ; NS). The present study demonstrates that intravenous Mg infusion is able to reduce infarct size by  $>50\%$  and preserve the ejection fraction in this

model where ischemia/reperfusion injury was evaluated in the presence of a thrombogenic area in the nutrient artery. Arteriosclerosis, Thrombosis, & Vascular Biology. 1999; 19:569-574.

#### ANTAGONISM OF VECURONIUM-INDUCED NEUROMUSCULAR BLOCK IN PATIENTS PRETREATED WITH MAGNESIUM SULPHATE: DOSE-EFFECT RELATIONSHIP OF NEOSTIGMINE.

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We have investigated the dose-effect relationship of neostigmine in antagonizing vecuronium-induced neuromuscular block with and without magnesium sulphate ( $\text{MgSO}_4$ ) pretreatment. Neuromuscular block was assessed by electromyography with train-of-four (TOF) stimulation. First, we determined neostigmine-induced recovery in patients pretreated with  $\text{MgSO}_4$  (group A) or saline (group B) ( $n = 12$  each). The height of T1, 5 min after neostigmine, was 43 (7)% in group A and 65 (6)% in group B ( $P < 0.01$ ). Respective values after 10 min were 59 (7)% and 83 (5)% ( $P < 0.01$ ). TOF ratio, 5 min after neostigmine, was 29 (6)% in group A and 29 (5)% in group B. Respective values after 10 min were 38 (11)% and 51 (7)% ( $P < 0.01$ ). To gain insight into the mechanisms leading to delayed recovery after  $\text{MgSO}_4$ , we calculated assisted recovery, defined as neostigmine-induced recovery minus mean spontaneous recovery. Spontaneous recovery was assessed in another 24 patients. Patients in group C received  $\text{MgSO}_4$ /vecuronium and patients in group D vecuronium only ( $n = 12$  each). Five minutes after neostigmine, assisted recovery was 22 (7)% in the  $\text{MgSO}_4$  pretreated patients and 28 (6)% in controls ( $P < 0.05$ ). Ten minutes after neostigmine, values were 24 (7)% and 22 (6)%. Maximum assisted recovery was not influenced by  $\text{MgSO}_4$  pretreatment (27 (6)% in group A and 32 (6)% in group B) and time to maximum effect was comparable between groups: 6 (4-10) min and 7 (5-8) min, respectively. We conclude that neostigmine-induced recovery was attenuated in patients treated with  $\text{MgSO}_4$ . This was mainly a result of slower spontaneous recovery and not decreased response to neostigmine. Ref. Br J. Anaes. 1999;82:61-65

#### DOSE OPTIMIZATION OF INTRAVENOUS MAGNESIUM SULFATE AFTER ACUTE STROKE.

Muir KW; Lees KR

**BACKGROUND AND PURPOSE:** Parenterally administered  $\text{MgSO}_4$  is neuroprotective in standard animal models of focal cerebral ischemia and in many other paradigms of brain injury. Previous small clinical trials in stroke patients have explored the safety and tolerability of different infusion regimens. This study was undertaken to optimize the regimen for a multicenter trial. **METHODS:** Within 24 hours of the onset of clinically diagnosed stroke, patients were randomized to receive placebo or one of three intravenous  $\text{MgSO}_4$  infusions: a loading infusion of 8, 12, or 16 mmol, followed by 65 mmol over 24 hours. Cardiovascular parameters, serum magnesium concentrations, and blood glucose concentrations were determined. Outcome at 30 and 90 days was recorded. **RESULTS:** Twenty-five patients were recruited and treated at a mean time of 20 hours after stroke. No tolerability problems were identified. No effects of magnesium on heart rate, blood pressure, or blood glucose were evident. Serum magnesium concentrations rose to target levels most rapidly in the highest loading infusion group and were maintained in all groups for at least 24 hours. **CONCLUSIONS:**  $\text{MgSO}_4$  infusions that rapidly elevate the serum magnesium concentration to potentially therapeutic levels are well tolerated and have no major hemodynamic effects in patients with acute stroke. The 16-mmol loading infusion achieved target serum concentrations most rapidly and has been chosen for further trials. Ref. Stroke. 1998;29:918-923

