Pain Control After Cardiac Surgery--Morphine vs Fentanyl

Morphine-Based Cardiac Anesthesia Provides Superior Early Recovery Compared With Fentanyl in Elective Cardiac Surgery Patients.

Murphy GS, Szokol JW, et al:

Anesth Analg 2009; 109 (August): 311-319

Morphine compared to fentanyl improves quality of life and decreases pain following cardiac surgery.

Background: With an increasing number of patients who are being fast tracked after cardiac anesthesia, fentanyl and sufentanil have become the opiates of choice. Morphine has fallen into disfavor due to concerns over prolonged postoperative intubation times. Studies, however, have demonstrated cardioprotective and anti-inflammatory properties of morphine. Previous trials have also demonstrated that morphine improves pain control and patients' mood following cardiac surgery.
Objective: To demonstrate that morphine used with a balanced anesthetic improves health status and recovery during the early postoperative period.
Participants/Methods: 90 patients undergoing primary CABG or single-valve surgery were randomized to receive morphine or fentanyl. Sicker patients undergoing re-operation or multiple procedures and who had poor left ventricular function, renal failure, or obesity were excluded. During the surgery, patients received either 40 mg of morphine or 600 µg of fentanyl. Quality of life during recovery was assessed with the QoR-40 questionnaire preoperatively and on days 1 to 3 after surgery. Pain was determined with a visual analog scale (VAS) on days 1 to 3 postoperatively. The use of intravenous or oral pain medication was recorded. Hemodynamic variables, time to extubation, febrile reactions, organ morbidities, and length of ICU and hospital stay were evaluated.
Results: Patients who received morphine has statistically significantly higher QoR-40 scores in the emotional dimension, physical comfort dimension, and pain during the first 3 postoperative days. VAS scores and the use of pain medication were lower in morphine-treated patients. There were also a smaller number of recorded febrile reactions in the morphine group. No difference in other parameters was noted.
Conclusions: Patients treated with morphine demonstrated high quality-of-life scores and decreased postoperative pain compared to patients treated with fentanyl after cardiac surgery.
Reviewer's Comments: In animal studies, morphine has been demonstrated to exert preconditioning effects on myocardium that are similar to ischemic preconditioning. Further studies in humans have demonstrated decreased inflammatory response and improved myocardial function after cardiac surgery when morphine was used for pain control. No increase in extubation time was demonstrated. With additional favorable results of the present study, it may very well be that an old agent will gain popularity once more. (Reviewer-Mojca Remskar Konia, MD).

Keywords: Cardiac Surgery, Morphine, Fentanyl Postoperative Quality Of Life, Pain Control

Print Tag: Refer to original journal article

Cardiopulmonary Bypass, Hemodilution, and Biomarkers of Organ Function

The Association of Hemodilution and Transfusion of Red Blood Cells With Biochemical Markers of Splanchnic and Renal Injury During Cardiopulmonary Bypass.

Huybregts RAJM, de Vroege R, et al:

Anesth Analg 2009; 109 (August): 331-339

Low hematocrit is associated with increased renal and splanchnic markers of ischemia.

Background: Cardiopulmonary bypass (CPB) is associated with renal and splanchnic damage due to hypoxia and nonpulsatile flow. Intestinal fatty acid binding protein (IFABP) is a marker of intestinal mucosal hypoxia, and *N*-acetyl-β-D-glucosaminidase (NAG) is a marker of functional kidney damage. Hypoxia is caused by isovolemic hemodilution induced by CPB, which redirects oxygen to the brain and the heart at the expense of renal and splanchnic vasculature. Decreased hematocrit below 24% has been related to kidney damage. Correction of hematocrit with packed red blood cells (PRBC), however, has also been demonstrated to increase the mortality rate.
Objective: To determine the effects of hematocrit concentration and PRBC transfusion on the release of renal and intestinal injury markers during mild hypothermia CPB.
Participants/Methods: 50 patients between 45 and 75 years of age who were undergoing first CABG and who had good left ventricular function were included. Anesthesia and CPB were initiated in a standard fashion. While on CPB, mean arterial pressure was maintained around 60 mm Hg, and temperature was decreased to 30°C to 32°C. Intraoperatively, PRBCs were transfused if the hemoglobin (Hb) was <7.2 g/dL. Postoperatively, PRBC were transfused if the hemoglobin was <9.7 g/dL. Blood samples for blood gas, hematocrit, lactate, and creatinine were drawn intraoperatively and up to 3 days postoperatively. Urine was collected to measure NAG and IFABP.
Results: Intraoperative lactate and postoperative NAG and IFABP were higher in patients with a hematocrit <24%. There was a correlation between low hematocrit and transfusion of PRBC during CPB and higher lactate, NAG, and IFABP levels.
Conclusions: The results indicate that low hematocrit and subsequent transfusion of PRBC correlate with increased markers of ischemic injury of the kidneys and splanchnic system.
Reviewer's Comments: This study demonstrated that low hematocrit during CPB induces the release of ischemic injury markers from the kidneys and the gastrointestinal tract. These results are in accordance with previous studies indicating the detrimental effects of a low hematocrit. Conclusions about the long-term effects on morbidity and mortality cannot be made based on this study due to its short follow-up. This trial further demonstrated increased markers of ischemia in patients who received PRBC transfusion while on CPB. To make conclusions about the effects of PRBC, the study would have to have a 2 x 2 design with a group of patients with low hematocrit who did not receive PRBC, which may be ethically questionable. Several studies in the recent literature, however, have raised a question of low hematocrit on CPB and the safety of PRBC transfusions. Larger studies are necessary to answer the question. (Reviewer-Mojca Remskar Konia, MD).

Keywords: Cardiopulmonary Bypass, Hemodilution, Transfusion

Print Tag: Refer to original journal article

Technology Measures Aortic Blood Flow and Stroke Volume

A Comparison of Stroke Volume Variation Measured by Vigileo™/Flotrac™ System and Aortic Doppler Echocardiography.

Biais M, Nouette-Gaulain K, et al:

Anesth Analg 2009; 109 (August): 466-469

Stroke volume variation determined by peripheral arterial pressure waveform analysis and echocardiographically determined central stroke volume variation show similar performance in determining volume responsiveness in liver transplant patients.

Background: A patient's volume responsiveness can be predicted from stroke volume variation (SVV). SVV can be measured by analysis of arterial blood pressure waveform by the Vigileo™/FloTrac™ system, or by Doppler echocardiography by estimating aortic valve area and velocity time integral.
Objective: To determine agreement between SVV measured from peripheral artery waveform and SVV measured from the aorta. The secondary objective was to determine whether SVV can predict volume responsiveness in liver transplant patients.
Patients/Methods: 30 patients with good ejection fraction undergoing liver transplant were included. Patients were studied while completely relaxed and mechanically ventilated on norepinephrine infusion. SVV measurements were obtained by the Vigileo/FloTrac system from an arterial line pressure waveform and by echocardiographic Doppler measurements at the level of the aortic valve. Measurements were taken before and after a bolus of 20 mL x body mass index of 4% albumin infused over 20 minutes.
Results: There was good agreement in measurements of SVV by both methods. Both methods were also able to predict volume responsiveness with good sensitivity and specificity.
Conclusions: Measurement of SVV by either method can help us determine volume responsiveness of mechanically ventilated patients undergoing liver transplants.
Reviewer's Comments: SVV is an attractive option to determine a patient's volume status. As this article demonstrates, it can be measured by different methods and can help us predict volume responsiveness of the patient. We must be aware that the measurements obtained from the arterial line waveform can be affected by changes in systemic vascular resistance (SVR) and mechanical ventilation. Echocardiographically obtained measurements also have technical limitations related to physical laws that govern ultrasound. Furthermore, the presented study included only patients with normal SVR and preserved heart function. Additional studies will be necessary to determine the validity of these techniques in a general population. Measurement of SVV, however, adds important information to currently available flawed methods and may become an important tool. (Reviewer-Mojca Remskar Konia, MD).

Keywords: Stroke Volume Variation, Volume Status

Print Tag: Refer to original journal article

Intubating in C-Spine Injuries--AWS Plus Bougie

Approach Combining the Airway Scope and the Bougie for Minimizing Movement of the Cervical Spine During Endotracheal Intubation.

Takenaka I, Aoyama K, et al:

Anesthesiology 2009; 110 (June): 1335-1340

The Airway Scope and bougie combination decreases movement of the cervical spine during intubation.

Background: Management of cervical spine-injured patients requiring intubation can be challenging. The Airway Scope (AWS) is a new videolaryngoscope designed to match the anatomy of the upper airway. It does not require the alignment of the oral, pharyngeal, and laryngeal axes to visualize the glottis. A bougie also reduces movement of the cervical spine for intubation.
Objective: To determine the efficacy of the bougie for intubation with the AWS on movement of the cervical spine.
Participants/Methods: 30 patients (ASA 1 and 2) were scheduled for elective orthopedic surgery under general anesthesia with an endotracheal tube (ETT). All patients with a body mass index >30, cervical spine abnormality, risk of aspiration, and anticipated difficult intubation were excluded. Patients were assigned to 2 groups: AWS only, or bougie along with AWS. For intubation, the AWS was inserted, the epiglottis was fully elevated with the blade tip, the glottis was exposed, and the ETT was passed into the vocal cords. Similarly, with the bougie, elevation of the epiglottis was stopped at minimal glottic view, the bougie was passed, and the ETT was inserted. The time to intubation was from insertion of the AWS blade to passing of the bougie and then the ETT. If this was >120 seconds, then intubation was a considered a failure. The cervical spine motion was observed at fluoroscopy.
Results: All patients were intubated at the first attempt. Laryngoscopy with the AWS produced extension at cervical spine C0-C4; the extension angle was 16° with the AWS and 6.5° with the bougie combination. Between C0 and C2, the angle was 15° with the AWS and 7 with the bougie. Use of the bougie reduced the amount of extension at C0-1, C1-2, C0-2, and C0-4. The mean time to intubation was 18.2 seconds with the AWS and 19.4 seconds with the bougie. **Discussion:** Determining the maximum permissible movement in an unstable cervical spine is difficult and depends on other factors. Disadvantages of the AWS blade are that it is available only in a single size and, if the length is insufficient, then intubation may be difficult. In such cases, a bougie may be advanced into the vocal cords even though they are not clearly visualized. This study had various limitations. All data were subjective observation to the laryngoscopist, including the glottic view and cervical spine mobility. The use of the bougie with a Macintosh laryngoscope was not studied, which might have shown a reduced movement as well.
Conclusions: The aid of the bougie with AWS laryngoscopy reduces movement at the cervical spine and can be used for unstable cervical spine intubations.
Reviewer's Comments: The authors explored a logical and common-sense solution to a difficult problem and showed that the AWS, along with the bougie, can be used as an alternative method for intubation in cervical spine-injured patients, although it has its limitations and should be used with caution. (Reviewer-Sunita Goel, MD).

Keywords: Airway Scope, Bougie, Cervical Spine Intubation

Print Tag: Refer to original journal article

PLMA vs cLMA for PPV in Infants

Prospective, Randomized Comparison of Proseal™ and Classic™ Laryngeal Mask Airways in Anaesthetized Neonates and Infants.

Micaglio M, Bonato R, et al:

Br J Anaesth 2009; 103 (263-267):

The Proseal laryngeal mask airway is effective for positive pressure ventilation in neonates and infants.

Background: The Classic™ laryngeal mask airway (cLMA) has been used for airway management and has been incorporated in the airway algorithm. The smallest size available is pediatric size 1 for infants from 2 to 5 kg and is used during resuscitation. The use of positive pressure ventilation in neonates and infants has been controversial. Proseal™ LMA (PLMA) has recently been introduced with a better seal and a larger bowl of the mask for a better fit. This mask also incorporates a drain tube to prevent against aspiration. Recently, the pediatric PLMA sizes of 1, 1.5, 2, and 2.5 were introduced.
Objective: To compare size 1 in the cLMA and PLMA for positive pressure ventilation (PPV) in neonates undergoing cardiac surgery procedures.
Participants/Methods: 46 ASA III infants ranging from 2 to 5 kg in weight were scheduled to undergo elective cardiac surgery. Infants were randomized into 2 groups, and routine monitoring was used in all patients. General anesthesia was administered by midazolam, fentanyl, and propofol, and bag mask ventilation was performed, followed by insertion of the LMA. The LMA was cuffed to pressures of 60 cm of H_2O. The cLMA was introduced by the digital method, and the PLMA was introduced with a specific introducer. The time between picking up the LMA and the first capnographic trace was considered the insertion time. The number of attempts to position was recorded. Removal of the LMA was considered a failed attempt. Ease of placement was rated with the visual analog scale (VAS). The lower the VAS, the easier the placement. The adjustable pressure-limiting valve was closed, and the airway pressure at which an audible leak was heard was recorded as P_{leak}. If the pressure was >35 cm of H_2O, then the valve was opened.
Results: The demographic data and the success rates were comparable in both groups. A 10 F nasogastric tube was inserted in the first attempt in all patients in the PLMA group. The quality of airway was better with the PLMA; there was more gastric insufflation with cLMA, but this was not significant. No blood, mucosal injuries, or any adverse events were noted in either group. **Discussion:** Since the introduction of the PLMA, it has been shown to be a better device than the cLMA; it helps prevents the risk of aspiration due to the presence of a drain tube. The drain tube also helps keep the PLMA in place. Gastric insufflation was observed in 4 cases with cLMA versus none with PLMA. The leak for size 1 PLMA was higher than for cLMA under anesthesia without neuromuscular blockade.
Conclusions: PLMA was a better device to use in neonates and infants.
Reviewer's Comments: This study reinforces the effectiveness of PLMA for PPV in neonates and shows the advantages of PLMA over cLMA. Limitations of this study are that it was a small group to determine the efficacy of PLMA and that the airway assessment was subjective. (Reviewer-Sunita Goel, MD).

Keywords: Proseal LMA, Positive Pressure Ventilation, Infants, Classic LMA

Print Tag: Refer to original journal article

Dexamethasone After Laparoscopic Hysterectomy--Which Dose Works Best?

The Effective Analgesic Dose of Dexamethasone After Laparoscopic Hysterectomy.

Jokela RM, Ahonen JV, et al:

Anesth Analg 2009; 109 (August): 607-615

Dexamethasone may be used as a supplement for pain care during the perioperative period.

Background: Glucocorticoids are known to have antiemetic, anti-inflammatory, analgesic, antipyretic, and antiallergic properties. Although they have analgesic properties, the exact dosage is not determined.
Objective: To determine the analgesic efficacy of 3 different dosages of dexamethasone after laparoscopic hysterectomy.
Participants/Methods: 129 ASA I, II, or III patients were recruited in 14 months. Patients had a body mass index <35 kg/m2. Those with a history of diabetes and gastric or duodenal ulcers were excluded. Patients were randomized into 4 groups: placebo or 5 mg (D5), 10 mg (D10), or 15 mg (D15) of dexamethasone. Medication was given at the beginning of anesthesia. At the end of anesthesia, a bolus of oxycodone was given. In the PACU, if the patient had a visual analog scale (VAS) score >4, a bolus of oxycodone was administered, and then a PCA mixture of oxycodone and droperidol was started. Ibuprofen was given just before discontinuation of PCA, and acetaminophen with codeine was given as rescue medication. The rescue antiemetic was droperidol and ondansetron. Pain was assessed by VAS scores at 2, 4, 6, 8, 12, and 24 hours.
Results: 120 patients were studied, and demographic data were comparable in all 4 groups. The dose of oxycodone in the first 2 hours was less in D10 and D15 patients; therefore, D15 patients had a decreased total dose of oxycodone in 24 hours. The VAS scores for pain, PONV, and side effects were similar at the end of 24 hours in all 4 groups. **Discussion:** In the first 24 hours, oxycodone dose was smaller in the D10 and D15 groups; therefore, the opioid-sparing effect of dexamethasone was dose dependent. In addition, immediately after surgery, the analgesic effect of 10 mg and 15 mg dexamethasone was more rapid, and the oxycodone requirement was much lower within the first 2 hours. Although dexamethasone has antiemetic properties, there was no difference in the incidence of PONV.
Conclusions: Dexamethasone 15 mg reduced the analgesic requirement in the first 24 hours in patients undergoing laparoscopic hysterectomy.
Reviewer's Comments: Dexamethasone is commonly used in surgery as an analgesic and for its antiemetic properties. In this study, 15 mg dexamethasone was shown to decrease the total dose of analgesics in 24 hours and can be used as a complement to effectively reduce analgesic requirements. (Reviewer-Sunita Goel, MD).

Keywords: Dexamethasone, Analgesia

Print Tag: Refer to original journal article

Epinephrine Impairs Lipid Resuscitation From Bupivacaine Overdose

Epinephrine Impairs Lipid Resuscitation From Bupivacaine Overdose: A Threshold Effect.

Hiller DB, Di Gregorio G, et al:

Anesthesiology 2009; 111 (September): 498-505

Epinephrine may impair the ability of lipid infusion to reverse the cardiac toxicity of bupivacaine.

Background: Administration of intravenous lipid emulsion for the rescue of local anesthetic toxicity has become generally accepted. Factors that can enhance or impair the effectiveness of the lipid resuscitation are currently being defined.
Objective: To determine the effect of escalating doses of epinephrine on recovery with lipid infusion in a rat model of bupivacaine overdose.
Design: Prospective trial using male rats.
Methods: The rats were anesthetized with isoflurane, were intubated, and had invasive hemodynamic monitoring. A 20 mg/kg bolus of bupivacaine was given over 20 seconds, and the isoflurane was stopped. CPR was performed when the rats became asystolic. Chest compressions were performed to achieve a rate-pressure product (RPP) of at least 50% of baseline values. The RPP is defined as the systolic blood pressure times the heart rate. The animals were then given a bolus dose, and a continuous infusion of saline or intralipid and varying doses of epinephrine was administered. The bolus dose of lipid or saline was repeated 2 minutes later. CPR was continued until there was a return of spontaneous circulation or until 10 minutes had elapsed after administration of the intralipid bolus. Chemistry panels were drawn 15 minutes after the lipid bolus.
Results: Lipid infusion provided reliable rescue from the bupivacaine toxicity. Only 1 rat in the saline control group achieved a spontaneous return of circulation. Lower epinephrine doses (1 and 2.5 μg/kg) did not appear to impair the effectiveness of the lipid infusion. The pH, $PaCO_2$, PaO_2, base excess, and bicarbonate levels were similar to those of the lipid control group, but a general trend toward acidosis, relative hypoxia, and hypercarbia was demonstrated. In the higher epinephrine dose groups (10 and 25 μg/kg), significantly worse acidosis, oxygenation, and base excess were demonstrated compared to the lipid control group. Serum lactate levels were progressively higher in the higher epinephrine groups. Fewer animals in the higher-dose epinephrine groups had a spontaneous return of circulation.
Conclusions: Epinephrine, above a threshold dose, impairs recovery from bupivacaine in general and the effectiveness of lipid reversal in particular.
Reviewer's Comments: This study seems to agree with the general conclusion that "high-dose" epinephrine is bad for long-term outcome regardless of the cause of the cardiac arrest. Further studies to determine the optimal dose of epinephrine for these circumstances are required. (Reviewer-Allen Miranda, MD).

Keywords: Bupivacaine, Lipid Emulsion, Epinephrine

Print Tag: Refer to original journal article

Using NMBA May Improve Intubation

Avoidance of Neuromuscular Blocking Agents May Increase the Risk of Difficult Tracheal Intubation: A Cohort Study of 103 812 Consecutive Adult Patients Recorded in the Danish Anaesthesia Database.

Lundstrøm LH, Møller AM, et al:

Br J Anaesth 2009; 103 (283-290):

The use of neuromuscular blocking agents may help avoid a difficult-to-intubate situation.

Background: Several recent studies have suggested that avoiding neuromuscular blocking agents (NMBA) may be associated with difficulty in intubating patients in some circumstances.
Objective: To determine whether avoiding NMBA is associated with difficult tracheal intubation (DTI).
Design: Retrospective, database review involving patients in Denmark who underwent surgery during a 3-year period and who required endotracheal intubation. Those who were <15 years of age, were already intubated, or were undergoing flexible or rigid bronchoscopic intubation were excluded.
Methods: Multivariate regression analysis was performed. Data gathered included age, gender, body mass index, ASA status, Mallampati score, history of previous difficult intubation (PDI), priority of surgery, time of surgery, and use of NMBA. A DTI score was also devised that included criteria of the number of attempts at intubation, how many anaesthetists were involved, and the method in which the airway was secured.
Results: The frequency with which patients were administered NMBA decreased over the study period. The overall frequency of DTI was approximately 5%, and failure to intubate occurred in <1%. Predictably, increasing body mass index, higher Mallampati score, increasing age, and PDI were all significantly associated with DTI. In the univariate analysis, the priority of surgery, time of surgery, and male gender also proved to be significantly associated with DTI. In the multivariate analysis, ASA status and time of surgery failed to be significant. However, a significant association with surgical priority and NMBA use was demonstrated. An analysis of this association revealed that patients who underwent nonscheduled surgery and who did not receive NMBA had the highest risk of DTI. In the multivariate analysis, the avoidance of NMBA was significantly associated with DTI. A further multivariate analysis suggested that patients intubated with only a nondepolarizing NMBA may be more at risk for DTI than those intubated with a depolarizing agent only.
Conclusions: Avoiding NMBA was found to be a risk factor for difficult and failed intubation independent of other risk factors.
Reviewer's Comments: A prospective, randomized trial of NMBA in patients who are difficult to intubate may be a hard study to complete, but it is clearly needed to help determine whether we should be paralyzing these patients in order to successfully intubate them. (Reviewer-Allen Miranda, MD).

Keywords: Neuromuscular Blocking Agents, Difficult Intubation

Print Tag: Refer to original journal article

How Common Are Seizures After Regional Block in Patients With Seizure History?

Regional Blockade in Patients With a History of a Seizure Disorder.

Kopp SL, Wynd KP, et al:

Anesth Analg 2009; 109 (July): 272-278

Perioperative seizures after a regional block are not associated with pre-existing history of seizures in the majority of cases.

Background: Low blood levels of local anesthetics (LA) decrease brain electrical activity and are potent anticonvulsants, whereas high levels of LA may lower the seizure threshold. It is not known if patients with a seizure disorder are at higher risk of CNS toxicity from LA.
Objective: To determine the frequency of seizure activity following a regional block in patients with a history of seizure disorder.
Design: Retrospective cohort study.
Methods: The medical records of 335 patients who underwent epidural, caudal, or peripheral nerve block and who had a known seizure disorder were reviewed during a 14-year period (1988 to 2001). Data collection included patient demographics, seizure disorder history, details of the regional block, type of procedure, adjuvant drugs, and the presence of any CNS activity. The main end point was any seizure activity documented during hospitalization.
Results: 411 regional procedures were performed in 335 patients with a seizure disorder. Twenty-four patients had at least 1 episode of seizure activity in the perioperative period. Of these patients, 16 had a single injection of local anesthetic, and 8 patients had a continuous infusion of local anesthetic. No patient experienced seizures during or immediately after administration of LA initial bolus (<50 minutes). Patients with recent preoperative seizures were more likely to experience a seizure during the perioperative period. In 19 of the 24 patients, no causal association between the regional block and the seizure activity was found because of the extended time interval between the seizure and the block. However, in 5 patients, the local anesthetic may have contributed to the seizure activity because it occurred during LA infusion. Based on these data, the overall incidence of seizures was 5.8%, of which 1.2% (95%, CI, 0.4% to 2.8%) may have been attributed to local anesthetic CNS toxicity.
Conclusions: The etiology of perioperative seizures in patients with a pre-existing seizure disorder is multifactorial and includes stress, fatigue, sleep deprivation, antiepileptic medication drug level fluctuation, perioperative medications, and altered drug absorption. Local anesthetic toxicity may contribute to perioperative seizures in a small percentage of patients. The authors recommend being prepared to treat seizure activity in patients with a recent seizure, regardless of the anesthetic and analgesic technique.
Reviewer's Comments: The incidence of seizures after regional anesthesia is quite sparse. It is reported to be between 0.01% after an epidural block and up to 0.8% following a supraclavicular brachial plexus block. These rates are much lower than those reported in this study. It would have been valuable if the authors compared the incidence of seizures in general and regional anesthesia in patients with pre-existing seizure disorder. Since there is no comparison group, the authors should not make inferences about the association between regional block and perioperative seizure activity in this patient group. (Reviewer-Ioanna Apostolidou, MD).

Keywords: History of Seizures, Regional Block, CNS Toxicity

Print Tag: Refer to original journal article

Impact of Cell Saver in Adult Cardiac Surgery

The Efficacy of an Intraoperative Cell Saver During Cardiac Surgery: A Meta-Analysis of Randomized Trials.

Wang G, Bainbridge D, et al:

Anesth Analg 2009; 109 (August): 320-330

Cell saver during the entire cardiac surgery reduces the rate of allogeneic blood transfusion.

Background: Cardiac surgery utilizes >80% of blood products transfused during surgery. Transfusion of allogeneic red cells is associated with adverse events ranging from transmission of infection to increased morbidity, mortality and resource utilization. There is controversy on the benefits versus risks of cell saver (CS) use during adult cardiac surgery.
Objective: To determine whether an intraoperative CS reduces blood product utilization, morbidity, mortality, and resource utilization in cardiac surgical patients.
Design: Meta-analysis of published, randomized trials.
Methods: A search of the literature was performed to identify randomized studies that compared clinical or economic outcomes in adult cardiac patients who had intraoperative CS versus no CS. The main outcomes were the number of patients requiring any blood products and the type of blood products used. Other outcomes included mortality, stroke, MI, atrial fibrillation, renal failure, infections, neurocognitive dysfunction, re-exploration, chest tube drainage, postoperative hemoglobin, time on ventilator, length of stay, and hospital costs. Statistical analysis compared the odds ratios for dichotomous variables and the weighted mean differences for continuous variables. Statistical significance was considered for $P < 0.05$.
Results: Of 297 citations screened, 31 randomized trials involving 2282 patients were included in the meta-analysis. The use of an intraoperative CS reduced the risk of exposure to any allogeneic blood product (OR, 0.63, 37% risk reduction) and red blood cells (OR, 0.60). CS also decreased the mean volume of total allogeneic blood products transfused per patient (mean difference, 256 mL). No difference was found between the 2 groups in the risk of exposure to fresh frozen plasma (FFP) or platelets, hospital mortality, stroke, transient ischemic attack, MI, atrial fibrillation, renal dysfunction, infection, reoperation rate, postoperative hemoglobin, and chest tube drainage. CS has no effect on the duration of ventilation or ICU and hospital length of stay. The 2 studies assessing hospital costs did not find a statistical difference in the cost between CS and no CS use. CS use throughout the surgery resulted in greater benefit regarding the risk of allogeneic blood product exposure than CS use during cardiopulmonary bypass (CPB).
Conclusions: Cell saver use in cardiac surgery reduces the risk of exposure to allogeneic blood products. The impact is greater if CS is used throughout the surgery, not only during CPB. Indeed, CS only during CPB may have no effect or may increase FFP transfusion. Timing of the CS use might explain the disagreement with recent studies.
Reviewer's Comments: Intraoperative CS decreases but does not eliminate allogeneic blood product utilization in cardiac surgery. According to the Society of Thoracic Surgeons and the Society of Cardiovascular Anesthesiologists' Clinical Practice Guidelines (*Ann Thorac Surg* 2007), the approach to decrease exposure to blood products should be multimodal and should combine the following: drugs (eg, erythropoietin, antifibrinolytics), devices that conserve blood (eg, CS), autologous predonation, and institution-specific blood transfusion algorithms with point-of-care testing. (Reviewer-Ioanna Apostolidou, MD).

Keywords: Cell Saver, Cardiac Surgery, Transfusion of Blood Products

Print Tag: Refer to original journal article

What Are the Predictors of IOP Increase in the Steep Trendelenburg Position?

The Effects of Steep Trendelenburg Positioning on Intraocular Pressure During Robotic Radical Prostatectomy.

Awad H, Santilli S, et al:

Anesth Analg 2009; 109 (August): 473-478

IOP increases significantly in anesthetized patients undergoing robotic prostatectomy in the steep Trendelenburg position.

Objective: To quantify the intraocular pressure (IOP) changes in patients undergoing radical robotic prostatectomy as a function of body position during various stages of the procedure and to identify perioperative factors influencing IOP changes.
Design/Participants: Prospective, clinical study involving 33 adult patients (ASA physical status I to II) scheduled for elective robotic prostatectomy.
Methods: All surgeries were performed in the morning or early afternoon, thus avoiding diurnal variations in IOP. IOP measure was obtained at 7 discrete time points: awake and resting, in the supine position before anesthesia induction (T1); 10 minutes after general anesthesia induction, in the supine position (T2); after abdominal carbon dioxide (CO_2) insufflation, in the supine position (T3); in the steep Trendelenburg position with abdominal insufflation (T4), in the steep Trendelenburg position with the abdomen insufflated at the end of the procedure (T5); before awakening, in the supine position (T6); and 45 to 60 minutes after awakening, in the supine position (T7). With each measurement, arterial blood pressure, heart rate, peak airway pressure, plateau airway pressure, end-tidal desflurane concentration, end-tidal carbon dioxide concentration ($ETCO_2$), IV fluid volume, and blood loss were recorded.
Results: Transient conjunctival edema was observed in the postanesthesia care unit in 7 patients, but it resolved the next day. IOP was 13.3 ± 0.58 mm Hg higher, on average, at the end of the steep Trendelenburg position (T5) compared with the supine position (T1) (P <0.0001). IOP at T4, T5, and T6 was also significantly higher than at T1 (P <0.0001). IOP at T2 was significantly lower than IOP at T1 (P <0.0001). No eye complaints were reported. On univariate analysis, $ETCO_2$, peak airway pressure, mean arterial pressure (MAP), plateau pressure, and surgical duration were significant predictors of change in IOP over the time periods of T1 to T5. In the multivariate model, peak airway pressure, MAP, $ETCO_2$, and surgical duration were significant predictors of change in IOP during the same time period. Surgical time and $ETCO_2$ were the only significant covariates in the final model during the time period of T4 to T5. The best linear fit from mixed model analysis was: IOP = 7.95 + 0.21 ($ETCO_2$) + 0.053 (time).
Conclusions: Peak IOP readings were obtained at the end of the steep Trendelenburg position. Time and $ETCO_2$ were the only significant predictors of IOP increase in the steep Trendelenburg position.
Reviewer's Comments: IOP increases to the magnitude reported in this study could be of concern in patients with already elevated baseline IOP in whom it can theoretically cause an ischemic optic neuropathy. It would have been nice if the authors had correlated changes in IOP with the degree of tilt. (Reviewer-K. George Bojanov, MD).

Keywords: Steep Trendelenburg Position, Intraocular Pressure, Robotic Radical Prostatectomy

Print Tag: Refer to original journal article

Neostigmine Reduces Bupivacaine Requirement of PCEA

Neostigmine Decreases Bupivacaine Use by Patient-Controlled Epidural Analgesia During Labor: A Randomized Controlled Study.

Ross VH, Pan PH, et al:

Anesth Analg 2009; 109 (August): 524-531

Adding neostigmine to epidural bupivacaine for labor analgesia demonstrates significant bupivacaine-sparing effects, with no side effects.

Objective: To test the hypothesis that continuous epidural neostigmine infusion could significantly decrease bupivacaine requirements in women with maintenance patient-controlled epidural analgesia (PCEA) for labor.
Design/Participants: This study was designed as a 2-phase study—a pilot safety assessment before elective cesarean section delivery and a double-blind, randomized, controlled study. Included in the study were 12 healthy adult parturients not in labor and scheduled for elective cesarean delivery and 50 healthy women who were in labor and received PCEA for labor analgesia. All subjects had a single fetus.
Methods: Neostigmine methylsulfate with preservatives and preservative-free bupivacaine, together with normal saline, were used in making epidural study solutions. Neostigmine methylsulfate with preservatives had been previously assessed for safety. Phase I of the study included giving neostigmine 40 μg to 6 patients and 80 μg to the next 6 patients through an epidural catheter. Fetal heart rate (FHR), uterine contractions, maternal vital signs, and pulse oximetry (SpO_2) were followed for 20 minutes. Phase II included patients randomized to receive either 15 mL of bupivacaine 1.25 mg/mL or bupivacaine 1.25 mg/mL with neostigmine 0.004 mg/mL. Epidural analgesia was initiated with the assigned solution via PCEA (basal rate 6 mL/hour; bolus 5 mL; lockout, 10 minutes; maximum dose, 30 mL/hour). Sensory and motor block, sedation, nausea, pain, shivering, hypotension, abnormalities of fetal heart tones, mode of delivery, infant weight, Apgar scores, total volume of study solution, bolus demands, and any administered medications were recorded.
Results: During Phase I, 9 of 12 women exhibited hypesthesia to pinprick 15 minute after neostigmine injection. Maternal vital signs did not differ between neostigmine-dosed groups and were not altered after neostigmine injection. There were no episodes of fetal bradycardia or changes in long-term beat-to-beat variability. During Phase II, maternal heart rate, fetal heart tones, Apgar scores, cervical dilation, and labor progress were unaffected by the addition of neostigmine. Sedation was increased in the neostigmine + bupivacaine group, but not in the bupivacaine alone group (P <0.05), during, but not after, the initial dosing period. The addition of neostigmine reduced the mean hourly epidural dose of bupivacaine by 19% and by 25% for those receiving the study solution for >4 hours (P <0.05). Pain scores were similar for both study groups.
Conclusions: Neostigmine, added to epidural bupivacaine, reduces up to 25% of the bupivacaine requirement of PCEA during labor.
Reviewer's Comments: The present study is interesting and promising, but inadequately powered to exclude uncommon and rare side effects. The bupivacaine-sparing effects of neostigmine are similar to those of fentanyl, but without itching and nausea. (Reviewer-K. George Bojanov, MD).

Keywords: Neostigmine, Bupivacaine Dose, Patient-Controlled Epidural Analgesia, Labor

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FNEMG May Be Useful in Predicting Movement in Anesthetized Patients

Facial Nerve Electromyographic Monitoring to Predict Movement in Patients Titrated to a Standard Anesthetic Depth.

Jellish WS, Leonetti JP, et al:

Anesth Analg 2009; 109 (August): 551-558

FNEMG, but not bispectral index, shows promising results as a predictor for patient movement in patients undergoing craniofacial and skull-based surgeries.

Objective: To determine whether facial nerve (FN) electromyographic (EMG) monitoring (FNEMG) or bispectral index (BIS) monitoring can predict movement in nonparalyzed patients during craniofacial and skull-based surgeries.
Design/Participants: Prospective clinical study involving 63 healthy, ASA I or II, adult patients scheduled for elective craniofacial or skull-based surgeries.
Methods: Patients were equally divided and randomly assigned to 1 of 2 study groups: desflurane (DES; n=32) or total IV anesthetic (TIVA; n=31). DES patients received anesthesia maintenance with desflurane adjusted to end-tidal concentration of 6% to 9% in a 50% air/oxygen mixture. TIVA patients received propofol infusion at 100 to 200 µg/kg per minute and remifentanil at 0.25 to 0.5 µg/kg per minute. Bispectral Index (BIS) and FNEMG monitoring started shortly after anesthesia induction. FN monitoring was achieved with subdermal needle electrodes placed in the orbicularis oculi or orbicularis oris muscles ipsilateral to the surgical field. The anesthesiologists were blinded to the BIS and FNEMG values. Demographic data, site and type of surgery, vital signs, incidence of first observed movement, BIS, incidence and quantification of spontaneous increased FNEMG activity, and the time of these events were recorded.
Results: There was a significant difference between the numbers of patients who moved in the DES group compared to the TIVA group. Of the 10 patients who moved intraoperatively, 8 had an FNEMG event. A total of 22 patients had FNEMG events; among them, 8 moved and 14 did not. The negative predictive value of a FNEMG to predict movement was 95% and the positive predictive value was 36%. Sensitivity and specificity of FNEMG to predict movement was 80% and 74%, respectively. The sensitivity and specificity for BIS changes to predict movement was 83% and 20%, respectively. The positive and negative predictive values were 56% and 50%, respectively.
Conclusions: FNEMG was an effective monitor for predicting movement in patients undergoing craniofacial and skull-based surgeries. Even though BIS events correlated with FNEMG events, BIS was inadequate to predict movements in the studied patient population.
Reviewer's Comments: The BIS is based on electroencephalographic measurements and reflects higher level cortical activity, thus reflecting awareness and hypnosis more so than muscle movement. Due to innervations arising from the brainstem and reflecting subcortical reflexes, facial muscle activity can indicate early signs of arousal from anesthesia. (Reviewer-K. George Bojanov, MD).

Keywords: Facial Nerve Monitoring, Electromyography, Movement Prediction, General Anesthesia

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Excellent Skills Required for Laparoscopic Surgery in Neonates

Cardiac Arrest in the Neonate During Laparoscopic Surgery.

Lalwani K, Aliason I:

Anesth Analg 2009; 109 (September): 760-762

The source for a massive venous air embolism can be a bleeding umbilicus stump of an umbilical vein damaged by the trocar in a newborn undergoing laparoscopic surgery.

Background: Circulatory collapse secondary to carbon dioxide (CO_2) embolism during peritoneal insufflation for laparoscopic procedures is well known.
Objective: To provide the case report of circulatory collapse before peritoneal insufflation in a neonate. **Case Report:** A 2-kg newborn with trisomy 21 and duodenal atresia was scheduled for laparoscopic repair. After routine monitoring and rapid sequence induction, the trachea was intubated with a 3.0 endotracheal tube and anesthesia was maintained with sevoflurane in oxygen and air. Shortly after the incision and insertion of the umbilical trocar, the end-tidal CO_2 dropped from 26 to 6 mm Hg. The pulse oximetry trace was lost, the heart rate dropped from 135 to 100/minute, and the infant's blood pressure was 40/20 mm Hg. The differential diagnosis was tension pneumothorax or hypovolemia due to vessel injury through the trocar. At that stage, the surgeons confirmed that no insufflation had yet taken place. The neonate was examined for pneumothorax on auscultation, and the surgeons examined the abdomen for trauma. CPR and administration of atropine and epinephrine was begun secondary to discoloration of the abdomen, trunk, and head. The cardiac team was called for echocardiography, and large amounts of air in the right ventricle, pulmonary arteries, aorta, and liver tissue were seen. CPR was continued, and the baby's condition slowly improved (metabolic acidosis was treated, volume infused). After removing the umbilical trocar, active bleeding from the stump of the vein was noticed. The surgeons ligated the vein and closed the abdomen; the child was brought to the ICU. An MRI of the brain was performed because of seizure-like activity, but no abnormalities were seen. The child was operated on 2 days later, and after extubation, no signs of neurological impairment were noticed. The child was discharged 10 days after the event.
Conclusions: The massive venous air embolism with paradoxical embolism via the foramen ovale and ductus arteriosus was responsible for the collapse. The source of entrainment was probably the bleeding umbilicus stump of the umbilical vein.
Reviewer's Comments: This report demonstrates that laparoscopic procedures in infants and young children should only be performed by surgeons with very good skills to avoid devastating complications. (Reviewer-Olga Plattner, MD).

Keywords: Neonates, Resuscitation, Laparoscopic Surgery

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New Storz Video Laryngoscope Successful in Intubating Difficult Airways in Children

Management of the Difficult Infant Airway With the Storz Video Laryngoscope: A Case Series.

Hackell RS, Held LD, et al:

Anesth Analg 2009; 109 (September): 763-766

The new Storz video laryngoscope Miller 1 blade is effective in intubating children with difficult airways.

Background: The Storz video laryngoscope (SVL) improves intubation success in adults. The pediatric size blades allow the use of these laryngoscopes in children.
Objective: To report on 7 various cases that show the success rate of the SVL in children with difficult airway.
Case Reports: Case 1 was that of a 4.5-kg female child (age, 4 months) with many deformations, a history of a tracheoesophageal fistula, as well as micrognathia and a short neck. She was also known to be difficult to intubate, but underwent a direct laryngoscopy (DL) at the third attempt by the otolaryngologist using the Miller 1 SVL. A Cormack and Lehane Grade 1 view was gotten, and intubation was successful at first attempt. Case 2 was a 6-kg, 9-month-old child with micrognathia, short neck, and a large tongue. Intubation was also successful at first attempt with the Miller 1 SVL. Case 3 was similar, but directing the tube was difficult and at 3 attempts was eventually successful. Case 4 describes a 9-kg child, 13-month-old child, with Goldenhar Syndrome and mandibular retrusion plus cleft palate in addition to instability in the cervical spine. The child was previously intubated fiberoptically and DL failed to reveal any glottis structures with the Miller 1 SVL. A Cormack and Lehane Grade 1 view was obtained, and intubation was successful at first attempt. Case 5 was a 4.8-kg, 36-week infant. The child had a history of stridor and dysphagia. It required 5 attempts before the pediatric anesthesia fellow was able to intubate using the Miller I SVL. Both of the last cases were similar—a 9.3 kg and a 5.5 kg child with difficult airway and failed DL. Both children were successfully intubated with the Miller 1 SVL.
Results: The SVL integrates video technology into a Miller-type blade. The deflection of the blade at the tip is approximately 12°, and the camera has a built in 60° lens. The SVL requires a stiletted (with a bent tip) endotracheal tube. Limitations are a lack of a built-in antifog system and excessive secretions.
Conclusions: The above described 7 cases show that the new Storz video laryngoscope with the Miller 1 blade was successful in the intubation of children with difficult airways.
Reviewer's Comments: More studies are needed to test the efficacy of the Storz video laryngoscope 1 Miller blade in children. Furthermore, comparisons with other devices, such as the Airtraq, would be interesting. (Reviewer-Olga Plattner, MD).

Keywords: Infants, Difficult Airway, Storz Video Laryngoscope

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Preventing Propofol-Induced Pain in Children

Prevention of Propofol-Induced Pain in Children: Combination of Alfentanil and Lidocaine vs Alfentanil or Lidocaine Alone.

Kwak HJ, Min SK, et al:

Br J Anaesth 2009; 103 (September): 410-412

No patient had moderate or severe pain in the combination group (alfentanil 15 µg /kg, diluted with normal saline to make 0.1 mg/mL of alfentanil over 15 seconds, followed by propofol premixed with lidocaine over 20 seconds).

Background: Propofol has the disadvantage of pain on injection.
Objective: To evaluate different analgesic modalities to reduce the pain of propofol on injection.
Design: Prospective, randomized, double-blind clinical study.
Participants: 120 children (age range, 3 to 10 years) undergoing general anesthesia for elective surgery were included in the study.
Methods: All children had a 24-gauge cannula inserted before arriving in the operating room. After routine monitoring of vital signs, patients were randomly assigned to 1 of the 3 following groups: (1) the alfentanil group, which received alfentanil 15 µg/kg diluted with normal saline to make 0.1 mg/mL of alfentanil over 15 seconds, followed by propofol premixed with normal saline after 90 seconds; (2) the lidocaine group, which received normal saline over 15 seconds, followed by propofol premixed with lidocaine 0.1% over 20 seconds; or (3) the combination group, which received alfentanil 15 µg/kg, diluted with normal saline to make 0.1 mg/mL of alfentanil over 15 seconds, followed by propofol premixed with lidocaine over 20 seconds. Blinded investigators scored the movements as 1 (no pain), 2 (slight pain), 3 (moderate pain, where there was a clear facial/verbal response or motor reaction to the injection), or 4 (severe pain, where the patient complained of pain and withdrew the arm).The assessment was made from the start of the propofol injection to the point when the patient lost consciousness; side effects were also recorded. Anesthesia was then carried out as to the anesthesiologist's convenience. The pain difference between the groups was analyzed with the Bonferroni correction, and a corrected *P*-value <0.05/3 was deemed significant.
Results: 118 patients were analyzed (2 had been excluded secondary to technical problems). The incidence of pain on injection of propofol was significantly lower in the combination group compared to the other 2 groups. No patient in the combination group experienced moderate or severe pain.
Conclusions: No patient in the combination group (alfentanil 15 µg/kg, diluted with normal saline to make 0.1 mg/mL of alfentanil over 15 seconds, followed by propofol premixed with lidocaine over 20 seconds) had moderate or severe pain.
Reviewer's Comments: There are studies demonstrating a similar effect with remifentanil, but due to the side effects (bradycardia and the costs), maybe alfentanil is preferable. (Reviewer-Olga Plattner, MD).

Keywords: Propofol-Induced Pain, Children, Anesthesia

Print Tag: Refer to original journal article

Droperidol's Role in Nausea, Vomiting--Early vs Late Tx

Droperidol Has Comparable Clinical Efficacy Against Both Nausea and Vomiting.

Apfel CC, Cakmakkaya OS, et al:

Br J Anaesth 2009; 103 (September): 359-363

Droperidol prevents POV and PON equally, but is most effective within the first 2 hours.

Background: Some studies show that droperidol prevents postoperative nausea (PON) to a greater extent than it prevents postoperative vomiting (POV).
Objective: An International Multicenter Protocol was designed to assess the single and combined benefits of Antiemetic strategies in a Controlled clinical Trial of factorial design (IMPACT). With this data set, the effect of droperidol on nausea and on vomiting could be analyzed.
Design: Post hoc analysis of a large multicenter trial.
Participants: Patients undergoing general surgery with inhalation anesthetics were included in the study.
Methods: 1734 patients of a sub-data set of IMPACT, who received droperidol for PON, POV, and postoperative nausea and vomiting (PONV) following anesthesia, were the subjects for this study. Patients were monitored for nausea and vomiting for the first 24 hours postoperatively. The time span, severity, and characteristics of all emetic episodes were recorded on standardized forms. Patients who experienced PON, POV, or both were considered as having suffered PONV and received rescue medication (droperidol or a placebo). At 2 hours and 24 hours following surgery, a blinded investigator recorded emetic episodes according to the standardized protocol, including a patient self assessment using an 11-point scale. Differences were significant when the point estimate of one outcome was not within the limits of the confidence interval (CI) of the other outcome and the risk ratio differences were at least 20%.
Results: The overall 24-hour period of PON was reduced from 42.9% in the placebo group to 32.0% in the droperidol group. Vomiting was reduced from 15.6% in the placebo group to 11.8% in the droperidol group. During the first 2 hours after surgery, droperidol prevented nausea (relative risk [RR], 0.57) and vomiting (RR, 0.56) about the same; after 2 hours, the RR was 0.83 for nausea and 0.89 for vomiting. The efficacy of droperidol showed a decrease in nausea during the early postoperative period (0 to 2 hours) of 43% to 17% for the late postoperative period (2 to 24 hours) and from 44% for the early postoperative period to 11% for the late postoperative period for vomiting.
Conclusions: Droperidol equally prevents POV and PON, but is most effective within the first 2 hours.
Reviewer's Comments: Due to the short-lived antiemetic coverage of droperidol, a controlled pump therapy would show higher efficacy as has been previously demonstrated. (Reviewer-Olga Plattner, MD).

Keywords: PON, POV, Antiemetic Tx, Droperidol

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Magnesium Sulphate Attenuates Arterial Pressure Increase During Laparoscopic Cholecystectomy

Magnesium Sulphate Attenuates Arterial Pressure Increase During Laparoscopic Cholecystectomy.

Jee D, Lee D, et al:

Br J Anaesth 2009; 103 (October): 484-489

IV magnesium sulphate attenuates blood pressure due to attenuation of the release of catecholamines in patients undergoing laparoscopic cholecystectomy.

Background: Laparoscopic surgery with carbon dioxide (CO_2) insufflation induces cardiovascular response elevations of the arterial blood pressure and systemic vascular resistance due to the release of catecholamines. Magnesium inhibits the release of catecholamines from the adrenergic nerve terminals and the adrenal gland.
Objective: To test the efficacy of magnesium sulphate in reducing hemodynamic responses to CO_2 insufflation of the peritoneum.
Design: Prospective, randomized, blinded, clinical study.
Participants: 35 patients undergoing elective laparoscopic surgery for cholecystectomy.
Methods: Anesthesia was given according to the protocol. Before insufflation of the peritoneum, subjects were randomly assigned to 1 of the following groups—the control group consisting of 17 patients and the magnesium group consisting of 18 patients. The control group received IV saline 0.5 mL/kg, and the magnesium group received 0.5 mL/kg of 10% magnesium sulphate (50 mg/kg) over 2 to 3 minutes. Anaesthesia was maintained with 1.5% to 2.5% end-tidal sevoflurane and 1:1 O_2/N_2O. No opioids or other analgesics were used during surgery. Monitoring was standardized, and the arterial blood pressure and heart rate was measured before pneumoperitoneum (P0), at 5 (P5) (abdominal pressure maintained at 14 mm Hg), 10 (P10), 20 (P20), and 30 (P30) minutes after commencement of pneumoperitoneum, and after surgery. Blood samples for serum magnesium, plasma renin activity (PRA), plasma epinephrine, norepinephrine, cortisol, and vasopressin concentrations were obtained before surgery, at P5, P10, and postoperatively from the antecubital vein. Catecholamines were measured with high-performance liquid chromatography, and PRA, cortisol and vasopressin were measured by radioimmunoassay. Patients who needed opioids, antihypertensive therapy, or pneumoperitoneum were terminated within 30 minutes and were excluded from the study. Intergroup differences were analyzed with the unpaired *t*-test, and a *P*-value <0.05 was deemed significant.
Results: 32 patients (ASA physical status I) were included in the study. Blood pressure was significantly higher in the control group than in the magnesium group at P10, P20, and P30 minutes. Heart rates were similar in both groups. In the control group, epinephrine and norepinephrine levels were significantly higher than in the magnesium group at (P5) and (P10).
Conclusions: IV magnesium attenuates the hypertensive response seen in patients undergoing laparoscopic cholecystectomy.
Reviewer's Comments: This study shows that magnesium sulphate leads to a decrease in blood pressure in patients undergoing laparoscopic surgery, but the exact mechanism is unknown. Nevertheless, it is an available option to minimize blood pressure increases during creation of a pneumoperitoneum. (Reviewer-Olga Plattner, MD).

Keywords: Laparoscopic Cholecystectomy, Magnesium Sulphate, Arterial Pressure

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Preoperative Forced-Air Warming Does Not Help Anxiolysis

Pre-Operative Forced-Air Warming as a Method of Anxiolysis.

Wen RJ, Leslie K, Rajendra P:

Anaesthesia 2009; 64 (October): 1077-1080

Preoperative forced-air warming cannot be recommended for anxiolysis, but it does increase thermal comfort of patients.

Background: Preoperative forced-air warming is a possible method of anxiolysis, but recent studies have shown conflicting results.
Objective: To evaluate the efficacy of preoperative forced-air warming for anxiolysis.
Design: Prospective, randomized, partly-blinded, placebo-controlled, clinical study.
Participants: Patients scheduled for elective surgery under general anesthesia.
Methods: Before surgery, patients were brought into a quiet room with dimmed lights. Wearing a cotton gown and covered by a cotton blanket, they were monitored for pulse-oximetry and blood pressure; bispectral index monitoring was also begun. All patients received oxygen (6 L/minute) via a plastic mask. Subjects were randomized to 1 of the following 4 groups: (1) the control group (single cotton blanket and saline injection); (2) the warming group (full-body Bair HuggerTM blanket, Bair Hugger forced-air warmer, and saline injection); (3) the midazolam group (single cotton blanket and IV midazolam 30 µg/kg), or (4) the combined group (forced-air warming as noted above and IV midazolam 30 µg/kg. The study period was 20 minutes. Visual analog scale (VAS) scores for anxiety and thermal comfort and the State-Trait Anxiety Inventory (STAI) questionnaire were recorded at baseline and after 20 minutes. ANOVA was utilized to determine intergroup differences in VAS anxiety, VAS thermal comfort, and STAI state. A P <0.05 was considered significant.
Results: 120 patients, with similar baseline characteristics, completed the study. At baseline, women were more anxious than men. Midazolam reduced anxiety on the VAS to -10 and on the STAI to -5, but had no effect on thermal comfort. Forced-air warming had no influence on the VAS for anxiety (P =0.50) or STAI state (P =0.33), but the effect on thermal comfort was +23. There were no differences in blood pressure and oxygen saturation between the groups**. Conclusions**: Preoperative, forced-air warming cannot be recommended for anxiolysis, but it does increase thermal comfort.
Reviewer's Comments: A similar study was also done in 2007, where it was shown that forced-air warming provided thermal comfort, but no decrease in the anxiety status of patients prior to surgery. (Reviewer-Olga Plattner, MD).

Keywords: Forced-Air Warming, Anxiolysis

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Soybean Oil in Generic Medications Can Be Responsible for Anaphylaxis

Hypersensitivity to Generic Drugs With Soybean Oil.

Dueñas-Laita A, Pineda F, Armentia A:

N Engl J Med 2009; 361 (September 24): 1317-1318

Generic drugs may contain unlabelled additives, such as soybean oil, that can be responsible for anaphylaxis.

Background: Anaphylaxis is a serious consequence that may occur with drug administration. Although the incidence is rare, the outcome can be grave. The increasing costs associated with manufacturing new drugs, and the subsequent use of these new drugs, can increase health-care costs. Thus, many practitioners are resorting to alternate drugs (generics). However, complete data may be unavailable when generic drugs are being used.
Design/Objective: The authors describe their experience with anaphylaxis in 2 women who were given the commonly used drug omeprazole. The only thing that the patients did was switch from a previous prescription of omeprazole to another prescription of a generic variety that resulted in severe anaphylaxis. The authors describe their work-up and resolution of anaphylaxis in these 2 patients. **Case Reports:** 2 women, 58 and 81 years of age, developed anaphylaxis after ingesting a generic omeprazole capsule. They experienced severe hypotension and dyspnea. A medical evaluation resulted in a diagnosis of anaphylaxis to an additive in the generic capsules; the additive was soybean oil. The women were resuscitated and allergy testing, as demonstrated by skin-prick tests and soybean-specific IgE assays, confirmed allergy to soybean oil. They did not have skin-test sensitivity to additives in the nongeneric omeprazole that they had been previously been consuming
. Conclusions: As there is a uniform increase in generic consumption of medications, anesthesia providers must be aware of additives present in the generic variety that are not present in the nongeneric variety. Patients could be allergic to these additives, and this possibility should be included in the differential diagnosis.
Reviewer's Comments: I agree with the authors that we need to be vigilant to additives in generic medications that may be responsible for anaphylactic reactions. A good history will be required along with a strong index of suspicion to diagnose and treat such rare but serious occurrences. (Reviewer-Kumar G. Belani, MD).

Keywords: Anaphylaxis, Generic Drugs, Soybean Oil, Additives

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