Table of Contents
April 2011

Cardiovascular Anesthesiology

MP4OX 治療脊麻下初次髖關節成形術患者圍術期低血壓的一項隨機雙盲多中心臨床研究
(范羽譯 薛張綱校)
A Double-Blind, Randomized, Multicenter Study of MP4OX for Treatment of Perioperative Hypotension in Patients Undergoing Primary Hip Arthroplasty Under Spinal Anesthesia
  o Philippe van der Linden,
  o Tadeusz S. Gazdzik,
  o David Jahoda,
  o René J. Heylen,
  o Jan C. Skowronski,
  o David Pellar,
  o Ivo Kofranek,
  o Andrzej Z. Górecki,
  o Bengt Fagrell,
  o Peter E. Keipert,
  o Yun J. Hardiman,
  o Howard Levy,
  o and The 6090 Study Investigators


簡報：心臟手術病人應用抗血小板因數 4/肝素免疫分析高劑量肝素確診試驗的診斷價值
(孫曉瓊譯 陳傑校)
Brief Report: The Diagnostic Value of the Anti-PF4/Heparin Immunoassay High-Dose Heparin Confirmatory Test in Cardiac Surgery Patients
  o Sixten Selleng,
  o Natalie Schreier,
  o Hans-Georg Wollert,
  o and Andreas Greinacher

*Anesth Analg* April 2011 112:774-776; published ahead of print March 8, 2011
急性冠狀動脈綜合征患者的急診心臟手術：一項針對醫藥和機械治療的證據和圍術期診斷的綜述
(楊秀娟譯 馬皓琳 李士通校)

Review Article: Emergency Cardiac Surgery in Patients with Acute Coronary Syndromes: A Review of the Evidence and Perioperative Implications of Medical and Mechanical Therapeutics

- Charles Brown,
- Brijen Joshi,
- Nauder Faraday,
- Ashish Shah,
- David Yuh,
- Jeffrey J. Rade,
- and Charles W. Hogue


Ambulatory Anesthesiology

Rolapitant用於預防術後噁心嘔吐：一項前瞻性、雙盲、安慰劑對照、隨機試驗
(黃劍譯 薛張綱校)

Rolapitant for the Prevention of Postoperative Nausea and Vomiting: A Prospective, Double-Blinded, Placebo-Controlled Randomized Trial

- Tong J. Gan,
- Jiezhen Gu,
- Neil Singla,
- Frances Chung,
- Michael H. Pearman,
- Sergio D. Bergese,
- Ashraf S. Habib,
- Keith A. Candiotti,
- Yi Mo,
- Susan Huyck,
- Mary R. Creed,
- Marc Cantillon,
- and for the Rolapitant Investigation group

Anesth Analg April 2011 112:804-812; published ahead of print March 8, 2011

阿瑞匹坦聯合地塞米松與昂丹司瓊聯合地塞米松在預防開顱術後病人噁心嘔吐的比較
A Comparison of the Combination of Aprepitant and Dexamethasone Versus the Combination of Ondansetron and Dexamethasone for the Prevention of Postoperative Nausea and Vomiting in Patients Undergoing Craniotomy

- Ashraf S. Habib,
- John C. Keifer,
- Cecil O. Borel,
- William D. White,
- and Tong J. Gan

*Anesth Analg* April 2011 112:813-818; published ahead of print November 16, 2010

The Efficacy of Several Neuromuscular Monitoring Modes at the P6 Acupuncture Point in Preventing Postoperative Nausea and Vomiting

- Yong H. Kim,
- Kyo S. Kim,
- Hee J. Lee,
- Jae C. Shim,
- and Sung W. Yoon

*Anesth Analg* April 2011 112:819-823; published ahead of print March 8, 2011

Brief Report: Preoperative Abnormal P and QTc Dispersion Intervals in Patients with Metabolic Syndrome

- Volkan Hancı,
- Serhan Yurtlu,
- Mustafa Aydın,
- Serhat Bilir,
- Gülay Erdoğan,
- Rahşan Dilek Okay,
- Hilal Ayoğlu,
- and İsıl Özoğçak Turan

*Anesth Analg* April 2011 112:824-827; published ahead of print September 22, 2010

**Anesthetic Pharmacology**
Sedative Drug Modulates T-Cell and Lymphocyte Function-Associated Antigen-1 Function

- Koichi Yuki,
- Sulpicio G. Soriano,
- and Motomu Shimaoka

*Anesth Analg* April 2011 112:830-838; published ahead of print March 8, 2011

The Inhibitory Effect of Lidocaine on the Release of High Mobility Group Box 1 in Lipopolysaccharide-Stimulated Macrophages

- Huan-Liang Wang,
- Wen-Hua Zhang,
- Wei-Fu Lei,
- Chang-Qing Zhou,
- and Ting Ye


The Effects of Neuropeptide S on General Anesthesia in Rats

- Tetsuya Kushikata,
- Hitoshi Yoshida,
- Mihoko Kudo,
- Severo Salvadori,
- Girolamo Calo,
- and Kazuyoshi Hirota


Continuous Cardiac Output Measurement with a Doppler-Equipped Pulmonary Artery Catheter

- Shigeru Akamatsu,
Yuji Kondo, Norio Ueda, Akiko Kojima, Naokazu Fukuoka, Motoshi Takada, Shuji Dohi, and Tomoki Hashimoto

A Comparison of Three Methods of Hemoglobin Monitoring in Patients Undergoing Spine Surgery

Ronald D. Miller, Theresa A. Ward, Stephen C. Shiboski, and Neal H. Cohen

Airway Scope for Tracheal Intubation in the Lateral Position

Ryu Komatsu, Kotoe Kamata, Jing You, Daniel I. Sessler, and Yusuke Kasuya

Early Determinants of Death Due to Multiple Organ Failure After Noncardiac Surgery in High-Risk Patients

Suzana M. Lobo,
Epinephrine Improves 24-Hour Survival in a Swine Model of Prolonged Ventricular Fibrillation Demonstrating that Early Intraosseous Is Superior to Delayed Intravenous Administration

Mathias Zuercher,
Karl B. Kern,
Julia H. Indik,
Michael Loedl,
Ronald W. Hilwig,
Wolfgang Ummenhofer,
Robert A. Berg,
and Gordon A. Ewy

Anesth Analg April 2011 112:884-890; published ahead of print March 8, 2011
Review Article: High-Risk Surgery: Epidemiology and Outcomes
   - Suneetha Ramani Moonesinghe,
   - Michael Gerard Mythen,
   - and Michael Patrick William Grocott

Anesth Analg April 2011 112:891-901; published ahead of print May 21, 2010

Obstetric Anesthesiology

分娩硬膜外鎮痛時控制計劃性間斷給藥的時間間隔和給藥劑量對總藥物用量的影響：一個隨機對照試驗
(徐妍君譯，馬皓琳 李士通校)

The Effect of Manipulation of the Programmed Intermittent Bolus Time Interval and Injection Volume on Total Drug Use for Labor Epidural Analgesia: A Randomized Controlled Trial
   - Cynthia A. Wong,
   - Robert J. McCarthy,
   - and Bradley Hewlett

Anesth Analg April 2011 112:904-911

產科麻醉的知情同意
(龔寅譯 馬皓琳 李士通校)

Focused Review: Informed Consent in Obstetric Anesthesia
   - Brian M. Broaddus and
   - Shobana Chandrasekhar

Anesth Analg April 2011 112:912-915

Pediatric Anesthesiology

家長對於麻醉資訊的回憶：為知情同意的實踐提供資訊
(姚敏敏譯 薛張綱校)

Parental Recall of Anesthesia Information: Informing the Practice of Informed Consent
   - Alan R. Tait,
   - Terri Voepel-Lewis,
   - and Virginia Gauger

Anesth Analg April 2011 112:918-923; published ahead of print February 2, 2011
Neuroscience in Anesthesiology and Perioperative Medicine

A Comparison of the Effects of Preanesthetic Administration of Crystalloid Versus Colloid on Intrathecal Spread of Isobaric Spinal Anesthetics and Cerebrospinal Fluid Movement

Byung Seop Shin, Chung Su Kim, Woo Seok Sim, Chul Joong Lee, Sung Tae Kim, Gunn Hee Kim, Si Ra Bang, Sang Hyun Lee, Sun Ji Hyun, and Gaab Soo Kim

Anesth Analg April 2011 112:924-930; published ahead of print February 2, 2011

Sevoflurane Preconditioning Induces Neuroprotection Through Reactive Oxygen Species-Mediated Up-Regulation of Antioxidant Enzymes in Rats

Qianzi Yang, Hui Dong, Jiao Deng, Qiang Wang, Ruidong Ye, Xuying Li, Sheng Hu, Hailong Dong, and Lize Xiong

Anesth Analg April 2011 112:931-937; published ahead of print March 8, 2011

Analgesia

Pain Mechanisms
The Effects of Intrathecal and Systemic Gabapentin on Spinal Substance P Release

Toshifumi Takasusuki and Tony L. Yaksh

Anesth Analg April 2011 112:971-976; published ahead of print March 8, 2011

Inhibition of Acid Sensing Ion Channel Currents by Lidocaine in Cultured Mouse Cortical Neurons

Jun Lin, Xiangping Chu, Samaneh Maysami, Minghua Li, Hongfang Si, James E. Cottrell, Roger P. Simon, and Zhigang Xiong

Anesth Analg April 2011 112:977-981; published ahead of print March 8, 2011

Is a Patella Motor Response Necessary for Continuous Femoral Nerve Blockade Performed in Conjunction with Ultrasound Guidance?

Richard Brull, G. Arun Prasad, Rajiv Gandhi, Reva Ramlogan, Masood Khan, and Vincent W. S. Chan

Brief Report: A Low Approach to Interscalene Brachial Plexus Block Results in More Distal Spread of Sensory-Motor Coverage Compared to the Conventional Approach

Jung H. Kim, Junping Chen, Henry Bennett, Jonathan B. Lesser, Francesco Resta-Flarer, Anna Barczewska-Hillel, Peter Byrnes, and Alan C. Santos


Brief Report: The Diagnostic Value of the Anti-PF4/Heparin Immunoassay High-Dose Heparin Confirmatory Test in Cardiac Surgery Patients

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There are limited and conflicting data on how a confirmatory step using high-dose heparin can improve diagnostic specificity of the antiplatelet factor 4/heparin enzyme immunoassay for heparin-induced thrombocytopenia (HIT). We investigated sera from a recently published study on cardiac surgery patients and found that only half of the sera that were heparin-induced platelet activation assay positive could be inhibited (optical
density <40%) by high-dose heparin (100 IU/mL) in the enzyme immunoassay. More importantly, only 2 of the 3 patients with definite HIT were confirmatory test positive. Therefore, the high-dose heparin confirmatory test should be used with caution to exclude platelet-activating antiplatelet factor 4/heparin antibodies or clinical HIT.

阿瑞匹坦聯合地塞米松與昂丹司瓊聯合地塞米松在預防開顱術後病人噁心嘔吐的比較

A Comparison of the Combination of Aprepitant and Dexamethasone Versus the Combination of Ondansetron and Dexamethasone for the Prevention of Postoperative Nausea and Vomiting in Patients Undergoing Craniotomy

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背景：開顱術後常常出現噁心嘔吐。預防性應用昂丹司瓊和地塞米松的患者，術後48小時嘔吐發生率為45%。除了會引起患者身體上的不適以外，嘔吐的生理反應可能會增加顱內壓或腦血管壓，危及生理止血和腦灌注。阿瑞匹坦是長效的神經激肽1受體拮抗劑且無鎮靜的副作用。一項在接受腹部手術病人中進行的大型多中心研究中，預防性應用阿瑞匹坦比昂丹司瓊能更有效地預防術後24小時和48小時嘔吐發生。作者假設，與昂丹司瓊聯合地塞米松相比，阿瑞匹坦聯合地塞米松將降低全麻開顱手術病人術後嘔吐的發生率。

方法：此項前瞻性、雙盲、隨機化的研究納入物件為行全麻開顱手術病人。病人被隨機分為兩組：分別在麻醉誘導前1-3小時口服阿瑞匹坦40mg（或安慰劑），或手術結束30分鐘內靜脈注射4mg昂丹司瓊（或安慰劑）。所有病人在麻醉誘導後給予地塞米松10mg。施行標準化麻醉。術後48小時內由不知情人員定期收集資料。應用Welcoxon秩和核對總和χ²檢驗進行統計分析。若P<0.05則認爲有統計學意義。

結果：104名患者完成了此項研究。阿瑞匹坦組的48h嘔吐累積發生率為16%，而昂丹司瓊組為38%（P=0.0149）。且阿瑞匹坦組的2h和24h嘔吐發生率也相應的比昂丹司瓊組低，分別為6%對21%, P = 0.0419和14%對36%, P = 0.0124。0至48h中，兩組在噁心發生率(69%對60%)、評分、搶救性止吐藥需求率(65%對60%)、完全有效率(無PONV, 無搶救, 22%對36%)、PONV管理的病人滿意度方面並無明顯差異。

結論：阿瑞匹坦聯合地塞米松較昂丹司瓊聯合地塞米松能更有效地預防全麻開顱手術病人的術後嘔吐。而噁心發生率、嚴重度、止吐藥需求或者完全有效方面組間並無差異。

（孫曉瓊 譯 陳傑 校）

BACKGROUND: Postoperative nausea and vomiting (PONV) occur commonly after craniotomy. In patients receiving prophylaxis with ondansetron and dexamethasone, vomiting occurred in 45% of patients at 48 hours. In addition to causing patient discomfort, the physical act of vomiting may increase intracranial pressure or cerebral intravascular pressure, jeopardizing hemostasis and cerebral perfusion. Aprepitant is a
neurokin-1 receptor antagonist with a long duration of action and no sedative side effect. In a large multicenter study in patients undergoing abdominal surgery, aprepitant was significantly more effective than was ondansetron in preventing vomiting at 24 and 48 hours postoperatively. We hypothesized that the combination of aprepitant with dexamethasone will decrease the incidence of postoperative vomiting when compared with the combination of ondansetron and dexamethasone in patients undergoing craniotomy under general anesthesia.

METHODS: Patients scheduled to undergo craniotomy under general anesthesia were enrolled in this prospective, double-blind, randomized study. Patients were randomized to receive oral aprepitant 40 mg (or matching placebo) 1 to 3 hours before induction of anesthesia or ondansetron 4 mg IV (or placebo) within 30 minutes of the end of surgery. All patients received dexamethasone 10 mg after induction of anesthesia. The anesthetic technique was standardized. Data were collected at regular intervals by blinded personnel for 48 hours after surgery. Statistical analysis was performed using Wilcoxon's ranked sum test and χ² test. P < 0.05 was considered statistically significant.

RESULTS: One hundred four patients completed the study. The cumulative incidence of vomiting at 48 hours was 16% in the aprepitant group and 38% in the ondansetron group (P = 0.0149). The incidence of vomiting was also decreased in the aprepitant group at 2 hours (6% vs. 21%, P = 0.0419) and 24 hours (14% vs. 36%, P = 0.0124). From 0 to 48 hours, there was no difference between the aprepitant and ondansetron groups in the incidence of nausea (69% vs. 60%), nausea scores, need for rescue antiemetics (65% vs. 60%), complete response (no PONV and no rescue, 22% vs. 36%), or patient satisfaction with the management of PONV.

CONCLUSION: The combination of aprepitant and dexamethasone was more effective than was the combination of ondansetron and dexamethasone for prophylaxis against postoperative vomiting in adult patients undergoing craniotomy under general anesthesia. However, there was no difference between the groups in the incidence or severity of nausea, need for rescue antiemetics, or in complete response between the groups.

脊柱手術患者血紅蛋白的三種監測方法的比較
A Comparison of Three Methods of Hemoglobin Monitoring in Patients Undergoing Spine Surgery
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背景：血紅蛋白含量可方便地判斷是否需要術中輸血。目前血紅蛋白有兩種有創檢測方法，一種是實驗室的碳氧血氧儀法（tHb），另一種是可即時檢測的HemoCue法（HCue）。目前一種新型無創連續的光譜感測器（Masimo SpHb）開始在臨床應用。本文比較了SpHb相對tHb，HCue相對tHb在測定上的準確度。

方法：20名年齡40至80歲的患者參與本研究。均為俯臥位接受全麻下脊柱手術，通過橈動脈置管獲得血液樣本。分別在麻醉誘導後手術開始前及手術開始後的
BACKGROUND: Hemoglobin values (Hb) can facilitate decisions regarding perioperative transfusion management. Currently, Hb can be determined invasively by analyzing blood via laboratory Co–Oximetry (tHb) or by point-of-care HemoCue (HCue). Recently, a new noninvasive, continuous spectrophotometric sensor (Masimo SpHb) was introduced into clinical practice. We compared the accuracy of the SpHb and HCue with tHb.

METHODS: Twenty patients, ages 40 to 80 years, were studied. They received general anesthesia and underwent spine surgery in the prone position. All blood samples were obtained from a radial artery catheter. SpHb, tHb, and HCue were determined immediately after induction of anesthesia, but before the start of surgery and approximately every hour thereafter. Primary outcomes were defined on the basis of the following differences between measures: SpHb − tHb or HCue − tHb. All patients had 3 to 5 observations taken on each measure. Differences and absolute differences were analyzed by several techniques to assess accuracy. We also investigated the relationship between observed differences and the following variables: tHb level, duration of surgery, age, weight, and perfusion index.

RESULTS: Data consisted of 78 measurements of SpHb, tHb, and HCue made on the 20 patients. Absolute differences between SpHb and tHb were <1.5 g/dL for 61% of observations, between 1.6 to 2.0 g/dL for 16% and >2.0 g/dL for 22% of the observations. Observed differences displayed significant decreases with time and higher perfusion index values. No systematic relationships were observed with age or weight. Except for 1 value, all of the HCue values were <1.0 g/dL of tHb.

CONCLUSIONS: Although HCue was consistently accurate, our data confirm that SpHb often correlated well with tHb values. Yet our study indicates that SpHb may not be as accurate as clinically necessary in some patients. Improved refinement of continuous, noninvasive technology, such as SpHb, could address important clinical requirements.

Airway Scope for Tracheal Intubation in the Lateral Position
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BACKGROUND: Tracheal intubation in the lateral position is difficult because the laryngeal view is compromised during direct laryngoscopy. The Airway Scope facilitates intubation even when laryngeal views are poor with direct laryngoscopy, as they often are in the lateral position. We thus compared the efficacy of the Airway Scope in supine patients with those in the left- and right-lateral positions.

METHODS: Anesthetized adults were randomly assigned to supine, left-lateral, or right-lateral position (n = 43 for each group). Laryngeal views were obtained in the designated position with a Macintosh laryngoscope, and patients' tracheas were subsequently intubated with the Airway Scope. Specifically, we tested the hypothesis that the time required for intubation in the left- and right-lateral positions is not increased by >10 seconds compared with tracheal intubation in the supine position.

RESULTS: Overall intubation success was 100% in the 2 lateral positions, and 98% in the supine position. Intubation times were similar in the left-lateral (24 [5] seconds, mean [SD]), right-lateral (24 [6] seconds), and supine (22 [7] seconds) positions. The numbers of required intubation attempts were similar in the 2 lateral positions and in the supine and left-lateral positions. However, more intubation attempts were required in the supine
position than in the right-lateral position (*P = 0.004*). The incidences of airway complications were similar in each position; no hypoxia, dental injury, or esophageal intubation was observed. Modified Cormack-Lehane and the percentage of glottic opening scores obtained with the Macintosh laryngoscope did not differ between the 2 lateral positions, but the modified Cormack-Lehane and percentage of glottic opening scores were superior in the supine position (*all P < 0.001*) compared with either of the lateral positions.

**CONCLUSIONS:** Despite worse laryngoscopic views in either lateral position than when patients were supine, intubation with the Airway Scope offered high success rates. Furthermore, intubation time using the Airway Scope in either lateral position was not longer by >10 seconds than in the supine position. The Airway Scope thus seems to be a useful tool when tracheal intubation is required in a laterally positioned patient.

**Early Determinants of Death Due to Multiple Organ Failure After Noncardiac Surgery in High-Risk Patients**

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**Background:** In noncardiac surgery patients, it is important to predict perioperative cardiac complications. These patients usually die as a result of sepsis-related or secondary multiple organ failure (MOF). This study aimed to identify early risk factors for MOF-related death in high-risk surgery patients. We conducted a prospective, multicenter, observational cohort study with 21 Brazilian intensive care units (ICUs) participating. The study population comprised patients who underwent noncardiac surgery and were transferred to an ICU within 24 hours of surgery. MOF was defined as the presence of at least two organ failures. The relative risk of MOF-related death was calculated using a multivariable logistic regression analysis.

**Results:** A total of 587 patients were enrolled (mean age: 62.4±17 years). ICU and hospital mortality rates were 15% and 20.6%, respectively. The main cause of death was MOF (53%). Independent risk factors included abdominal sepsis (relative risk 4.17, 95% confidence interval 1.38–12.6), diabetes (relative risk 3.63, 95% confidence interval 1.17–11.2), emergency surgery (relative risk 3.62, 95% confidence interval 1.18–11.0), age (relative risk 1.04, 95% confidence interval 1.01–1.08), lactate elevation (relative risk 1.52, 95% confidence interval 1.14–2.02), and pH value (relative risk 0.04, 95% confidence interval 0.0005–0.38) were independent risk factors for death.

**Conclusion:** MOF is a major cause of death in high-risk surgery patients. Identifying risk factors for MOF is important for risk stratification and guiding clinical management.
BACKGROUND: Prediction of perioperative cardiac complications is important in the medical management of patients undergoing noncardiac surgery. However, these patients frequently die as a consequence of primary or secondary multiple organ failure (MOF), often as a result of sepsis. We investigated the early perioperative risk factors for in-hospital death due to MOF in surgical patients.

METHODS: This was a prospective, multicenter, observational cohort study performed in 21 Brazilian intensive care units (ICUs). Adult patients undergoing noncardiac surgery who were admitted to the ICU within 24 hours after operation were evaluated. MOF was characterized by the presence of at least 2 organ failures. To determine the relative risk (RR) of in-hospital death due to MOF, we performed a logistic regression multivariate analysis.

RESULTS: A total of 587 patients were included (mean age, 62.4 ± 17 years). ICU and hospital mortality rates were 15% and 20.6%, respectively. The main cause of death was MOF (53%). Peritonitis (RR 4.17, 95% confidence interval [CI] 1.38–12.6), diabetes (RR 3.63, 95% CI 1.17–11.2), unplanned surgery (RR 3.62, 95% CI 1.18–11.0), age (RR 1.04, 95% CI 1.01–1.08), and elevated serum lactate concentrations (RR 1.52, 95% CI 1.14–2.02), a high central venous pressure (RR 1.12, 95% CI 1.04–1.22), a fast heart rate (RR 3.63, 95% CI 1.17–11.2) and pH (RR 0.04, 95% CI 0.0005–0.38) on the day of admission were independent predictors of death due to MOF.

CONCLUSIONS: MOF is the main cause of death after surgery in high-risk patients. Awareness of the risk factors for death due to MOF may be important in risk stratification and can suggest routes for therapy.
Surgical morbidity is a significant public health issue worldwide. It is estimated that >230 million surgical procedures are performed each year, with an estimated mortality of at least 0.4% and morbidity of between 3% and 17%. Furthermore, there are potentially far-reaching consequences of a complicated perioperative course, because perioperative morbidity is associated with reduced long-term survival. In this review, we examine the factors that are associated with surgical outcomes. Issues related to the delivery of health care, such as structure, process, and resource utilization, have been shown to vary within and between institutions, leading to differences in both morbidity and mortality after surgery. Patient-related factors, in particular comorbid illness, functional capacity, and cardiovascular health, are also related to perioperative risk, and may be assessed using risk stratification models, exercise testing, and biomarker assays. The strengths and weaknesses of each of these techniques are discussed. We also review the strengths and limitations of the measures used to assess outcome after surgery, including patient-centered variables such as mortality and morbidity scores, and patient-related outcome measures. Finally, we suggest the direction of future work, which should be aimed at improving the precision of tools for describing perioperative risk, and of the measures used to assess the outcomes and quality of surgical health care. These tools are the building blocks of high-quality clinical trials, epidemiological studies, and quality improvement programs.

A Comparison of the Effects of Preanesthetic Administration of Crystalloid Versus Colloid on Intrathecal Spread of Isobaric Spinal Anesthetics and Cerebrospinal Fluid Movement

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背景：等比重液脊麻時腦脊液（CSF）流動是影響麻醉藥擴散的最重要因素之一。由於不同的物理特性，麻醉前快速輸注膠體液或晶體液可導致腦脊液不同流向。作者研究了麻醉前預注晶體液或膠體液是否導致不同的腦脊液流向，是否影響麻醉藥的擴散。

方法：在一項等比重液脊麻的臨床研究中，患者隨機分為 2 組：分別在 0.5%等比重丁卡因液行脊麻前根據隨機分組預注晶體液（n=30）或膠體液（n=30）。另外，23 名健康志願者在預輸晶體液或膠體液後 0，30，60min 行 L2 – 3 間隙及大腦導水管中部磁共振顯像檢查以研究腦脊液流動性。
BACKGROUND: Movement of the cerebrospinal fluid (CSF) is one of the most important factors in determining the intrathecal spread of isobaric spinal anesthetics. Preanesthetic administration of either crystalloid or colloid immediately before spinal anesthesia (preload) may result in different CSF pulsatile movement because of their different physical properties. We examined whether preload of crystalloid versus colloid may have different effects on the intrathecal spread of isobaric spinal anesthetics as a result of their different CSF dynamics regarding its pulsatile movement.

METHODS: In a clinical study of isobaric spinal anesthesia, patients were allocated into 1 of 2 groups according to preload with either crystalloid (n = 30) or colloid (n = 30) before spinal anesthesia with 0.5 isobaric tetracaine. The pulsatile movements of CSF at the L2-3 intervertebral space and midportion of the aqueduct of Sylvius were also examined by magnetic resonance images in healthy volunteers (n = 23) at 0, 30, and 60 minutes after administering either crystalloid or colloid.

RESULTS: In the clinical study, the time to reach the peak sensory block level was delayed significantly in the crystalloid preload group (27.2 ± 17.8 minutes; P < 0.01) compared with the colloid preload group (13.9 ± 7.0 minutes). The median sensory block levels of the crystalloid preload group at 15 minutes (T10, P < 0.05) and 20 minutes (T9.5, P < 0.05) were significantly lower than those (T8, T7, respectively) of the colloid preload group. In the magnetic resonance imaging study, cranially directed CSF pulsatile movement decreased significantly at the L2-3 intervertebral intrathecal space at 30 minutes after crystalloid administration, but not after colloid administration. The CSF production rate significantly increased at 30 minutes (637 μL/min, P < 0.05) after crystalloid preload compared with the baseline measurement (448 μL/min), and then slightly decreased (609 μL/min) at 60 minutes. In the colloid preload group, the CSF production rate was not statistically significant compared with the baseline measurement (464, 512, and 542 μL/min at baseline, 30, and 60 minutes, respectively).

CONCLUSIONS: Compared with a colloid preload, which may be comparable to the no-preload condition, crystalloid preload prolonged the time to reach the peak sensory block level in isobaric spinal anesthesia, which might have been caused by a significant decrease in CSF pulsatile movement. This attenuated CSF pulsatile movement in the crystalloid preload group might have resulted from significant increases of CSF production.
利多卡因抑制小鼠培養皮層神經元酸敏感離子通道電流
Inhibition of Acid Sensing Ion Channel Currents by Lidocaine in Cultured Mouse Cortical Neurons
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背景：利多卡因是一種局部麻醉藥，有多種藥理作用包括抗心律失常，抗傷害作用以及神經保護。酸敏感離子通道（ASIC）是質子-門控離子通道，屬於上皮鈉通道/退化蛋白超（ENaC/DEG）家族成員。質子啓動ASIC使鈉和鈣離子內流。ASICs參與各種生理過程包括學習/記憶，傷害和酸中毒介導的神經元損傷。在這項研究中，作者研究了利多卡因對培養小鼠皮層神經元ASICs的影響。

方法：應用全細胞膜片鉗技術啓動培養的小鼠皮層神經元ASIC電流並記錄。使用不同濃度的利多卡因進行實驗。為確定利多卡因阻斷ASIC電流是否有亞基特異性，作者研究了利多卡因對中國倉鼠卵巢細胞中ASIC1a和ASIC2a表達的影響。

結果：利多卡因顯著抑制小鼠皮層神經元的ASIC電流。抑制作用是可逆的，並呈劑量依賴性。利多卡因濃度為0.3 mM時檢測出抑制作用。在30 mM時ASIC電流約90%被抑制。劑量-反應關係得出半數抑制濃度為11.79 ± 1.74 mM，最大抑制濃度為2.7 ± 0.5 mM（n = 10）。抑制效果迅速，且不依賴於pH值。在中國倉鼠卵巢細胞表達不同的ASIC亞基，利多卡因抑制ASIC1a而不影響ASIC2a電流。

結論：利多卡因能顯著抑制ASIC電流。本研究發現了利多卡因對神經元的一種新的藥理作用。

（陳毓雯 譯 陳傑 校）

BACKGROUND: Lidocaine is a local anesthetic that has multiple pharmacological effects including antiarrhythmia, antinociception, and neuroprotection. Acid sensing ion channels (ASICs) are proton-gated cation channels that belong to the epithelial sodium channel/degenerin superfamily. Activation of ASICs by protons results in sodium and calcium influx. ASICs have been implicated in various physiological processes including learning/memory, nociception, and in acidosis-mediated neuron injury. In this study, we examined the effect of lidocaine on ASICs in cultured mouse cortical neurons.

METHODS: ASIC currents were activated and recorded using a whole-cell patch-clamp technique in cultured mouse cortical neurons. The effects of lidocaine at different concentrations were examined. To determine whether the inhibition of lidocaine on ASIC currents is subunit specific, we examined the effect of lidocaine on homomeric ASIC1a and ASIC2a currents expressed in Chinese hamster ovary cells.

RESULTS: Lidocaine significantly inhibits the ASIC currents in mouse cortical neurons. The inhibition was reversible and dose dependent. A detectable effect was noticed at a concentration of 0.3 mM lidocaine. At 30 mM, ASIC current was inhibited by approximately 90%. Analysis of the complete dose-response relationship yielded a half-
maximal inhibitory concentration of 11.79 ± 1.74 mM and a Hill coefficient of 2.7 ± 0.5 (n = 10). The effect is rapid and does not depend on pH. In Chinese hamster ovary cells expressing different ASIC subunits, lidocaine inhibits the ASIC1a current without affecting the ASIC2a current.

CONCLUSION: ASIC currents are significantly inhibited by lidocaine. Our finding reveals a new pharmacological effect of lidocaine in neurons.

Patients with acute coronary syndromes who require emergency cardiac surgery present complex management challenges. The early administration of antiplatelet and antithrombotic drugs has improved overall survival for patients with acute myocardial infarction, but to achieve maximal benefit, these drugs are given before coronary anatomy is known and before the decision to perform percutaneous coronary interventions or surgical revascularization has been made. A major bleeding event secondary to these drugs is associated with a high rate of death in medically treated patients with acute coronary syndrome possibly because of subsequent withholding of
antiplatelet and antithrombotic therapies that otherwise reduce the rate of death, stroke, or recurrent myocardial infarction. Whether the added risk of bleeding and blood transfusion in cardiac surgical patients receiving such potent antiplatelet or antithrombotic therapy before surgery specifically for acute coronary syndromes affects long-term mortality has not been clearly established. For patients who do proceed to surgery, strategies to minimize bleeding include stopping the anticoagulation therapy and considering platelet and/or coagulation factor transfusion and possibly recombinant-activated factor VIIa administration for refractory bleeding. Mechanical hemodynamic support has emerged as an important option for patients with acute coronary syndromes in cardiogenic shock. For these patients, perioperative considerations include maintaining appropriate anticoagulation, ensuring suitable device flow, and periodically verifying correct device placement. Data supporting the use of these devices are derived from small trials that did not address long-term postoperative outcomes. Future directions of research will seek to optimize the balance between reducing myocardial ischemic risk with antiplatelet and antithrombotics versus the higher rate perioperative bleeding by better risk stratifying surgical candidates and by assessing the effectiveness of newer reversible drugs. The effects of mechanical hemodynamic support on long-term patient outcomes need more stringent analysis.

The Efficacy of Several Neuromuscular Monitoring Modes at the P6 Acupuncture Point in Preventing Postoperative Nausea and Vomiting
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背景：在本研究中，我們測試了對 P6 穴位的幾種神經肌肉監測模式對於預防術後噁心嘔吐（PONV）的作用。
方法：在本次前瞻性、雙盲隨機、安慰劑對照的試驗中，我們評估了 264 名行腹腔鏡下子宮切除術的婦女 PONV 的情況。用加速度法在尺神經處 1Hz 的單次刺激（ST）（n=54，對照組）和對正中神經上 P6 穴位的單次刺激（n=52）、四個成串刺激（n=53）、雙重爆發刺激（n=53）或強直刺激（n=52）來監測神經肌肉阻滯情況。
結果：在強直刺激 6 小時後，干預組較對照組病人的 PONV 的發生率（P=0.022）、病人自控鎮痛要求的次數（P=0.009）和病人自控鎮痛的總藥量（P=0.042）均顯著減少。總之，行強直刺激的干預組較對照組的病人對於 PONV 處理的滿意度更高。
BACKGROUND: In this study, we tested the efficacy of several neuromuscular monitoring modes at the P6 acupuncture point for preventing postoperative nausea and vomiting (PONV).

METHODS: In this prospective, double-blind, randomized, placebo-controlled trial, 264 women undergoing laparoscopic hysterectomy were evaluated for PONV. Neuromuscular blockade was monitored by acceleromyography with 1-Hz single twitch (ST) over the ulnar nerve (n = 54, control), and ST (n = 52), train-of-four (n = 53), double-burst stimulation (n = 53), or tetanus (n = 52) over the median nerve stimulating at the P6 acupuncture point.

RESULTS: The incidence of PONV (P = 0.022), the number of requests for patient-controlled analgesia (P = 0.009), and total patient-controlled analgesia volume (P = 0.042) 6 hours after tetanic stimulation were significantly reduced in the treatment group compared with the control group. Overall, patients in the tetanus group were more satisfied with the management of PONV compared with patients in the control group.

CONCLUSION: Tetanic stimulation applied to the P6 acupuncture point can reduce PONV after laparoscopic hysterectomy compared with ST stimulation of the ulnar nerve, resulting in a greater degree of patient satisfaction. None of the stimulations, ST, train-of-four, or double-burst, applied to the P6 acupuncture point significantly affected PONV.
BACKGROUND: Sedative drugs modify immune cell functions via several mechanisms. However, the effects of sedatives on immune function have been primarily investigated in neutrophils and macrophages, and to the lesser extent lymphocytes. Lymphocyte function-associated antigen-1 (LFA-1) is an adhesion molecule that has a central role in regulating immune function of lymphocytes including interleukin-2 (IL-2) production and lymphocyte proliferation. Previous clinical studies reported that propofol and isoflurane reduced IL-2 level in patients, but midazolam did not. We previously demonstrated that isoflurane inhibited LFA-1 binding to its counter ligand, intercellular adhesion molecule-1 (ICAM-1), which might contribute to the reduction of IL-2 levels. In the current study, we examined the effect of propofol, midazolam, and dexmedetomidine on LFA-1/ICAM-1 binding, and the subsequent biological effects.

METHODS: The effect of sedative drugs on T-cell proliferation and IL-2 production was measured by calorimetric assays on human peripheral blood mononuclear cells. Because LFA-1/ICAM-1 binding has an important role in T-cell proliferation and IL-2 production, we measured the effect of sedative drugs on ICAM-1 binding to LFA-1 protein (cell-free assay). This analysis was followed by flow cytometric analysis of LFA-1 expressing T-cell binding to ICAM-1 (cell-based assay). To determine whether the drug/LFA-1 interaction is caused by competitive or allosteric inhibition, we analyzed the sedative drug effect on wild-type and high-affinity LFA-1 and a panel of monoclonal antibodies that bind to different regions of LFA-1.

RESULTS: Propofol at 10 to 100 μM inhibited ICAM-1 binding to LFA-1 in cell-free assays and cell-based assays (P < 0.05). However, dexmedetomidine and midazolam did not affect LFA-1/ICAM-1 binding. Propofol directly inhibits LFA-1 binding to ICAM-1 by binding near the ICAM-1 contact area in a competitive manner. At clinically relevant concentrations, propofol, but not dexmedetomidine or midazolam, inhibited IL-2 production (P < 0.05). Additionally, propofol inhibited lymphocyte proliferation (P < 0.05).

CONCLUSIONS: Our study suggests that propofol competitively inhibits LFA-1 binding to ICAM-1 on T-cells and suppresses T-cell proliferation and IL-2 production,
whereas dexmedetomidine and midazolam do not significantly influence these immunological assays.

**The Effects of Neuropeptide S on General Anesthesia in Rats**

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**BACKGROUND:** Neuropeptide S (NPS) and its receptor (NPSR) is a novel neuropeptide system that regulates arousal and anxiety. A link between natural sleep and general anesthesia has been suggested. Therefore, we hypothesized that NPS neuronal system may also participate in modulating general anesthesia.

**METHODS:** The effects of intracerebroventricular NPS and [D-Cys(tBu)5]NPS, a peptide NPSR antagonist, on ketamine and thiopental anesthesia time were measured in rats. Anesthesia time was defined as the interval between the loss of righting reflex and its recovery.

**RESULTS:** Intracerebroventricular NPS 1 to 30 nmol significantly reduced ketamine anesthesia time, showing a bell-shaped dose-response curve. [D-Cys(tBu)5]NPS 20 nmol antagonized NPS 1 nmol effects and was per se able to increase ketamine anesthesia time. Similar results were obtained investigating thiopental anesthesia time that was significantly reduced by NPS and prolonged by [D-Cys(tBu)5]NPS.

**CONCLUSION:** NPS via selective NPSR activation stimulates the wakefulness-promoting pathway, thus reducing anesthesia duration. The endogenous NPS/NPSR system appears to tonically control these pathways.
分娩硬膜外鎮痛時控制計劃性間斷給藥的時間間隔和給藥劑量對總藥物用量的影響：一個隨機對照試驗

The Effect of Manipulation of the Programmed Intermittent Bolus Time Interval and Injection Volume on Total Drug Use for Labor Epidural Analgesia: A Randomized Controlled Trial

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Anesth Analg 2011; 112(4): 904-911

背景：硬膜外計劃性地間斷給麻醉藥溶液與持續輸注給藥相比，能減少麻醉藥的用量，提高患者滿意度。本研究為隨機雙盲試驗，在硬膜外分娩鎮痛維持過程中控制計劃性間斷給藥的間隔時間和單次給藥劑量，我們評估了布比卡因及其他鎮痛藥的消耗量。

方法：入選健康、足月並要求自然分娩的初產婦，實施腰硬聯合鎮痛，先予鞘內注射布比卡因 1.25mg+芬太尼 15μg，然後給予硬膜外試驗劑量（利多卡因 45mg+腎上腺素 15μg）。將受試者隨機分入 3 組，每組採用不同的間斷給藥方案：每 15min 給予 2.5mL 組（2.5/15），每 30min 給予 5mL 組（5/30），或每 60min 給予 10mL 組（10/60）。硬膜外維持溶液包含有布比卡因 0.625mg/mL 和芬太尼 1.95μg/mL。對於突破性疼痛的處理，首先由產婦自控硬膜外給藥，隨後如有必要可由麻醉醫生手動給藥。主要觀察指標為產程中每小時布比卡因的總用量。用線性混合效應模型來擬合每位元產婦每小時布比卡因的總用量；混合效應為基礎布比卡因使用率，隨機效應為疼痛評分-時間曲線下的面積。

結果：本實驗有 190 位產婦入選。10/60 組產程中每小時布比卡因修正用量中位數（四分位數間距）為 8.8mg（8.0-9.7mg），5/30 組為 10.0mg（9.3-10.8mg），2.5/15 組為 10.4mg（9.6-11.2mg）（P=0.005）。疼痛評分-時間曲線下的面積、分娩時的疼痛評分、產婦自控硬膜外鎮痛的需求或給予、手動給藥以緩解突破性疼痛的次數、距第一次產婦自控硬膜外鎮痛或手動給藥的時間、以及產婦對分娩鎮痛的滿意度 3 組間沒有顯著性差異。

結論：將計劃性間斷給藥的時間間隔從 15min 延長到 60min，給藥劑量從 2.5mL 增加到 10mL，可以減少布比卡因的用量，而不影響產婦的舒適度和滿意度。

（徐妍君譯，馬皓琳 李士通校）

BACKGROUND: Programmed intermittent bolus administration of epidural anesthetic solution compared with continuous infusion results in decreased anesthetic consumption and increased patient satisfaction. In this randomized and blinded study, we evaluated bupivacaine consumption and other analgesic outcomes when the programmed intermittent bolus time interval and volume were manipulated during the maintenance of epidural labor analgesia.

METHODS: Healthy, term, nulliparous women in spontaneous labor had combined spinal-epidural labor analgesia initiated with intrathecal bupivacaine 1.25 mg and fentanyl 15 μg, followed by an epidural test dose (lidocaine 45 mg with epinephrine 15 μg). Subjects were randomized to 1 of 3 programmed intermittent bolus dose regimens
for maintenance of analgesia: 2.5 mL every 15 minutes (2.5/15), 5 mL every 30 minutes (5/30), or 10 mL every 60 minutes (10/60). The maintenance epidural solution consisted of bupivacaine 0.625 mg/mL with fentanyl 1.95 μg/mL. Breakthrough pain was treated initially with patient-administered epidural bolus doses, followed by manual boluses administered by the anesthesiologist if necessary. The primary outcome was total bupivacaine consumption per hour of labor. A linear mixed-effects model was used to model each patient's overall bupivacaine consumption per hour; the fixed effect was basal bupivacaine administration rate and the random effect was the area under the pain score versus time curve.

RESULTS: One hundred ninety women were studied. The median (interquartile range) adjusted bupivacaine consumption per hour of labor was 8.8 mg (8.0–9.7 mg) in group 10/60 compared with 10.0 mg (9.3–10.8 mg) in group 5/30 and 10.4 mg (9.6–11.2 mg) in group 2.5/15 (P = 0.005). There were no differences in area under the pain score versus time curve, pain scores at delivery, patient-controlled epidural analgesia requests or administrations, number of manual bolus doses for breakthrough pain, time to first patient-controlled epidural analgesia or manual bolus dose, or patient satisfaction with labor analgesia.

CONCLUSIONS: Extending the programmed intermittent bolus interval and volume from 15 minutes to 60 minutes, and 2.5 mL to 10 mL, respectively, decreased bupivacaine consumption without decreasing patient comfort or satisfaction.
maternal satisfaction. Successful navigation of the consent process requires knowledge of the guidelines and laws that govern each provider's individual jurisdiction.

**Sevoflurane Preconditioning Induces Neuroprotection Through Reactive Oxygen Species-Mediated Up-Regulation of Antioxidant Enzymes in Rats**

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**BACKGROUND:** It has been reported that sevoflurane preconditioning can induce neuroprotection, the mechanisms of which, however, are poorly elucidated. We designed the present study to examine the hypothesis that sevoflurane preconditioning could reduce cerebral ischemia–reperfusion injury through up-regulating antioxidant enzyme activities before ischemic injury by generating reactive oxygen species (ROS).

**METHODS:** In preconditioning groups, adult male Sprague–Dawley rats were pretreated with 1 hour sevoflurane exposure at a dose of 1%, 2%, or 4% for 5 consecutive days. At 24 hours after the last exposure, all rats were subjected to focal brain ischemia induced by middle cerebral artery occlusion for 120 minutes followed by 72-hour reperfusion. The role of ROS in ischemic tolerance was assessed by administration of the free radical scavenger dimethylthiourea and antioxidant N-acetylcysteine before each preconditioning. Brain ischemic injury was evaluated by neurologic behavior scores and brain infarct volume calculation. Antioxidant enzyme activities (superoxide dismutase,
catalase, and glutathione peroxidase (GSH-px)) of brain tissue and blood serum were tested at 24 hours after the last sevoflurane preconditioning.

RESULTS: Sevoflurane preconditioning reduced infarct size and improved neurobehavioral outcome in a dose-dependent manner. The neuroprotective effects of sevoflurane preconditioning were abolished by dimethylthiourea and N-acetylcysteine. The activities of catalase and glutathione peroxidase (GSH-px) in the brain tissue were elevated by sevoflurane preconditioning before ischemic injury. The up-regulated activity of GSH-px in serum negatively correlated with brain infarct volume percentage.

CONCLUSION: Sevoflurane preconditioning induces cerebral ischemic tolerance in a dose–response manner through ROS release and consequent up-regulation of antioxidant enzyme activity before ischemic injury in rats. Serum GSH-px activity could be developed as a marker to assess the effectiveness of sevoflurane preconditioning before ischemia.
BACKGROUND: Successful continuous femoral nerve blockade (CFNB) has been associated with the elicitation of a patella motor response during needle and catheter insertion. We evaluated whether a patella motor response is necessary when CFNB is performed in conjunction with ultrasound (US) guidance.

METHODS: Ninety-eight patients undergoing CFNB (along with sciatic nerve block and spinal anesthetic) for total knee arthroplasty participated in this cohort observational study. Using out-of-plane US guidance alone, the tip of an insulated Tuohy needle was positioned superficial to the midpoint of the femoral nerve visualized in short axis. A nerve stimulator was turned on and the type of motor response (patella versus medial muscle) and minimum stimulating current from the needle were recorded. A stimulating catheter was then inserted and the type of motor response and minimum current from the catheter were recorded. Ten milliliters mepivacaine 2% was injected through the catheter. The primary outcome was sensory block defined as loss of sensation to pinprick on the anterior surface of the distal thigh measured 20 minutes after mepivacaine injection.

RESULTS: Forty-three patients demonstrated a patella motor response, 43 demonstrated a medial motor response, and 12 demonstrated no motor response from the catheter. The proportion of patients with sensory block differed according to motor response from the catheter (patella [98%], medial [91%], and no motor response [75%]; \( P = 0.02 \)), but there was no significant difference between a patella (98%) and medial (91%) motor response from the catheter \( (P = 0.58) \). The proportion of patients with motor block 20 minutes after local anesthetic injection also differed according to motor response from the catheter (patella [95%], medial [77%], and no motor response [67%]; \( P = 0.03 \)). In addition, there was a significant difference between a patella (95%) and medial (77%) motor response from the catheter \( (P = 0.01) \). The mean minimum stimulating currents did not differ between patella and medial motor responses elicited from the catheter \( (P = 0.06) \).

CONCLUSION: Based on observational data, a patella or medial motor response from the catheter similarly results in sensory block of the anterior thigh when CFNB is performed in conjunction with out-of-plane US guidance.

A Double-Blind, Randomized, Multicenter Study of MP4OX for Treatment of Perioperative Hypotension in Patients Undergoing Primary Hip Arthroplasty Under Spinal Anesthesia.

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Background: MP4OX (oxygenated polyethylene glycol-modified hemoglobin) is a novel oxygen therapeutic agent specifically developed to perfuse and oxygenate tissue at risk for ischemia and hypoxia. In this study, we investigated the ability of MP4OX to treat hypotensive episodes. In addition, the tolerability profile of MP4OX in a large surgical population was established.

Methods: Patients from 21 study sites in 5 countries, scheduled to undergo primary hip arthroplasty under spinal anesthesia, were randomized in a double-blind manner to receive MP4OX or hydroxyethyl starch (HES) solution (Voluven®; HES 130/0.4). Patients received the first 250-mL dose of investigational product when systolic blood pressure decreased to the predefined dosing trigger. A second 250-mL dose was given only if the systolic blood pressure decreased to the same trigger level after administration of the first dose. The primary efficacy outcome was total duration of all hypotensive episodes during surgery and the first 6 hours after skin closure.

Results: Of the 474 patients randomized, 405 reached the dosing trigger and received at least 1 dose. The mean total duration of all hypotensive episodes was significantly shorter (P < 0.0001) in the MP4OX group (52.4 ± 71.50 minutes; range, 3-442 minutes)
compared with the HES group (137.6 ± 120.21 minutes; range, 5-435 minutes). The overall incidence of adverse events (AEs) in the intent-to-treat population was similar between the MP4OX and HES groups (75.2% vs 73.4%; P = 0.733). Transient increases in laboratory values were reported in more patients in the MP4OX group versus HES controls for aspartate aminotransferase (13.4% vs 7.4%; P = 0.052), alanine aminotransferase (6.9% vs 4.9%; P = 0.409), lipase (9.7% vs 3.6%; P = 0.015), and troponin (8.1% vs 2.0%; P = 0.006). There was no significant difference in the incidence of serious AEs reported (6.4% in MP4OX group vs 3.0% in HES controls; P = 0.106). Certain AEs did occur more frequently in the MP4OX group, including nausea (23.8% vs 14.3%; P = 0.016), bradycardia (14.9% vs 5.9%; P = 0.003), hypertension (8.4% vs 2.5%; P = 0.009), and oliguria (5.9% vs 1.5%; P = 0.019). The composite morbidity and ischemia end points did not reveal any differences between the 2 treatment groups.

Conclusions: Administration of MP4OX achieved the end point of treating perioperative hypotension in patients undergoing primary hip arthroplasty under spinal anesthesia. The study was not powered to demonstrate clinical benefit based on the composite morbidity or ischemia outcomes. Although efficacy end points with sufficient power were met, MP4OX is not being proposed for use in routine surgery where the risk-benefit profile would not be favorable based on the safety profile demonstrated in this study.

Rolapitant用於預防術後噁心嘔吐:一項前瞻性、雙盲、安慰劑對照、隨機試驗

Rolapitant for the Prevention of Postoperative Nausea and Vomiting: A Prospective, Double-Blinded, Placebo-Controlled Randomized Trial.

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背景：術後噁心嘔吐(PONV)為一種常見的術後併發症。神經激肽-1（NK1）受體拮抗劑已被證實用於預防和治療人類PONV安全有效。Rolapitant為一種吸收迅速、半衰期相當長（達180 h）的強效選擇性NK1受體拮抗劑，潛在的藥物相互作用低。本項研究評價了Rolapitant在PONV高危人群中預防作用的量效關係，以後對於術後5天內發生的遲發性PONV的預防作用。
BACKGROUND: Postoperative nausea and vomiting (PONV) are common complications after surgery. Neurokinin-1 (NK1) receptor antagonists have been shown to be safe and effective for the prevention and treatment of PONV in humans. Rolapitant is a potent, selective NK1 receptor antagonist that is rapidly absorbed, has a remarkably long half-life (up to 180 hours), and appears to have a low potential for drug-drug interactions. We evaluated the dose response for rolapitant for the prevention of PONV in subjects at high risk for this condition, and rolapitant’s effects on preventing delayed PONV were explored up to 5 days after surgery.

METHODS: A randomized, multicenter, double-blind, dose-ranging study of rolapitant was conducted with placebo and active control groups. Six hundred nineteen adult women undergoing open abdominal surgery were randomly assigned in equal ratios to 1 of 6 study arms: oral rolapitant in 5-mg, 20-mg, 70-mg, or 200-mg doses; IV ondansetron 4 mg; or placebo, stratified by history of PONV or motion sickness. The primary study endpoint was absence of emetic episodes, regardless of use of rescue medication, at 24 hours after extubation.

RESULTS: Groups assigned to rolapitant 20-mg, 70-mg, and 200-mg had a higher incidence of no emesis in comparison with placebo at 24 hours after surgery. A linear relationship between rolapitant dose and primary outcome was seen. The probability of an emetic episode was significantly lower in the rolapitant 70-mg and 200-mg groups in comparison with placebo (P ≤ 0.001 based on the log-rank test). No significant differences were noted between rolapitant and the active control (ondansetron) at 24 hours after surgery, but there was a higher incidence of no emesis (regardless of rescue medication use) in the rolapitant 200- and 70-mg groups at 72 and 120 hours, respectively.

CONCLUSION: Rolapitant is superior to placebo in reducing emetic episodes after surgery and reduces the incidence of vomiting in a dose-dependent manner. No differences in side effect profile were observed between rolapitant and placebo.

Brief Report: Preoperative Abnormal P and QTc Dispersion Intervals in Patients with Metabolic Syndrome
We evaluated P wave dispersion (PwD), QT, corrected QT (QTc), QT dispersion, and corrected QT dispersion (QTcd) intervals in patients with metabolic syndrome (MetS). Patients scheduled to undergo elective noncardiac surgery were included in the study. The main diagnoses, anthropometric measurements, waist circumferences, body mass index, electrocardiograms, serum levels of electrolytes, glucose, and lipids were recorded for all patients. QTc, QTcd intervals were determined with the Bazett formula. MetS (group M, n = 36) was diagnosed using the Adult Treatment Panel III. Controls (group C, n = 40) were chosen on the basis of patients with no MetS and matched for age and gender. There were no differences between groups in terms of age, sex, or serum electrolyte levels (P > 0.05). Waist circumferences, body mass index, serum glucose, and triglyceride values in group M were significantly higher than those in group C (P < 0.001). In group M, PwD, QTc, QTc times were significantly longer than those in group C (P < 0.001). This finding and our retrospective analysis suggest that these patients may be at greater risk of perioperative arrhythmias.
BACKGROUND: High mobility group box 1 (HMGB1), a key mediator of inflammation, has been shown to inhibit phagocytosis of apoptotic cells in sepsis. Lidocaine has been proven to protect macrophages in mice with septic peritonitis by attenuating the production of cytokines. However, it is currently unknown whether lidocaine also affects HMGB1. In this study, we sought to detect the effect of lidocaine on the release of HMGB1 from RAW264.7 macrophages after lipopolysaccharide (LPS) stimulation.

METHODS: The levels of HMGB1 in the supernatant of RAW264.7 cells incubated with LPS and different concentrations of lidocaine were measured by enzyme-linked immunosorbent assays. HMGB1 mRNA expression was assessed by real-time polymerase chain reaction. The immunocytochemistry was used to detect the release and translocation of HMGB1 from the nucleus to cytoplasm. Nuclear factor (NF)-κB levels in the nuclear fraction of RAW264.7 cells were measured with the Active Motif NF-κB family kit.

RESULTS: We found that lidocaine suppressed the translocation of HMGB1 from the nucleus to cytoplasm and decreased the expression of HMGB1 mRNA in RAW264.7 cells induced by LPS. Furthermore, the LPS-stimulated translocation of NF-κB from the cytoplasm to nucleus was inhibited by lidocaine in a dose-dependent manner.

CONCLUSIONS: Our data suggest that lidocaine functions as an antiinflammatory by inhibiting expression of HMGB1 mRNA, and translocating both HMGB1 and NF-κB from the nucleus to cytoplasm. The mechanism of these effects might be involved, at least partly, in the inhibition of the NF-κB signal pathway.
BACKGROUND: We developed a Doppler-equipped pulmonary artery catheter that provides continuous measurement of the true main pulmonary blood flow velocity independent of the angle of incidence formed by the pulmonary artery catheter and the main pulmonary artery blood flow. This device uses 2 orthogonally positioned Doppler transducers that allow trigonometric correction for differences in the angle of blood flow between each transducer. We tested the accuracy of the Doppler-equipped pulmonary artery catheter by comparing its cardiac output measurements with those done by conventional techniques in animals.

METHODS: The Doppler-equipped pulmonary artery catheter was evaluated in dogs. A pair of ultrasound Doppler transducers positioned at a fixed angle (90°) was mounted on the distal part of the thermodilution pulmonary artery catheter. The Doppler shifts ($\Delta f_1$, $\Delta f_2$) were detected by the 2 transducers sampling at 2 closely spaced points in the main pulmonary artery. The values of $\Delta f_1$ and $\Delta f_2$ were used to compute 2 velocity measurements. The true flow velocity of the main pulmonary artery was calculated with
the following equation: \( V_{\text{pulm}} = \{(V_{\text{transducer1}})^2 + (V_{\text{transducer2}})^2\}^{1/2} \) (\( V_{\text{pulm}} \) = true main pulmonary artery velocity; \( V_{\text{transducer1}} \) and \( V_{\text{transducer2}} \) = velocity detected by transducers 1 and 2, respectively). The flow velocities were calculated by using a phase differential technique. Cardiac output was calculated as \( V_{\text{pulm}} \) multiplied by a coefficient value. The coefficient value was calculated by dividing cardiac output, derived from conventional techniques, by \( V_{\text{pulm}} \) at the beginning of each experiment. After thoracotomy, an electromagnetic flowprobe was placed around the main pulmonary artery in dogs. Cardiac output was simultaneously measured by the Doppler-equipped pulmonary artery catheter (CO-Doppler), and the electromagnetic flowmeter (CO-EMF) or the thermodilution technique (CO-Thermo). Cardiac output was manipulated by dobutamine and propranolol.

**RESULTS:** CO-Doppler was highly correlated with CO-EMF (y = 1.16 × −0.26, \( r^2 = 0.99, P < 0.001 \)) and CO-Thermo (y = 1.24 × −0.90, \( r^2 = 0.85, n = 48, P < 0.001 \)). The bias between CO-EMF and CO-Doppler was −0.02 L/min; 95% limits of agreement were −0.32 to 0.28 L/min. The percentage error was 16%. The bias between CO-Thermo and CO-Doppler was 0.18 L/min; 95% limits of agreement were −0.62 to 0.98 L/min.

**CONCLUSIONS:** The newly developed Doppler-equipped pulmonary artery catheter with 2 orthogonally positioned Doppler transducers allowed accurate and continuous measurements of cardiac output independent of the angle of incidence formed by the pulmonary artery catheter and the main pulmonary artery blood flow.

**腎上腺素能提高持續室顫豬模型的 24 小時生存率且早期骨內注射優於延遲靜脈注射**

Epinephrine Improves 24-Hour Survival in a Swine Model of Prolonged Ventricular Fibrillation Demonstrating that Early Intraosseous Is Superior to Delayed Intravenous Administration

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**背景：**在行心肺復蘇時，不能及時靜脈輸注 (IV) 升壓藥就不能提高生存率。骨內注射 (IO) 能提供更早的輸注途徑。我們假設在未經治療長達 10 min 的室顫 (VF) 致心臟停搏行心肺復蘇 (CPR) 1 min 後 IO 腎上腺素 (一種 “最佳的” IO 方案)，與 CPR8 min 後 IV 腎上腺素 (一種 “現實存在的” 方案) 或 IV 不含腎上腺素的安慰劑相比，能改善結局。

**方法：**30 只豬隨機分為 IO 腎上腺素組、IV 腎上腺素組或安慰劑組。重要的結局包括恢復自主迴圈 (ROSC) 情況、24 h 生存率和獲得良好神經學結局（大腦表現分類為 1 級）的 24 h 生存率。
結果：10 min 仍未處理 VF 且未注射腎上腺素，則獲得 ROSC 的概率很低（1/10），而無論是 IO 腎上腺素還是延遲 IV 腎上腺素，其 ROSC 的幾率相似（分別為 10/10 和 9/10，兩組和安慰劑組比較，P = 0.001）。IO 腎上腺素的 24 h 生存率明顯高於 IV 腎上腺素（10/10 vs. 4/10，P = 0.001），而安慰劑組 24 h 生存率為 0。IO 腎上腺素組獲得良好神經學結局的生存率明顯高於安慰劑組（6/10 vs. 0/10，P = 0.011），而延遲 IV 腎上腺素組中只有 3/10 獲得良好神經學結局（與 IO 組和安慰劑組相比無顯著差異）。

結論：在持續性 VF 致心臟停搏的豬模型中，CPR 時注射腎上腺素能改善結局。此外，與延遲 IV 腎上腺素相比，早期骨內注射 (IO) 腎上腺素能改善結局。

（吳少勇譯 薛張綱校）

BACKGROUND: Vasopressors administered IV late during resuscitation efforts fail to improve survival. Intraosseous (IO) access can provide a route for earlier administration. We hypothesized that IO epinephrine after 1 minute of cardiopulmonary resuscitation (CPR) (an “optimal” IO scenario) after 10 minutes of untreated ventricular fibrillation (VF) cardiac arrest would improve outcome in comparison with either IV epinephrine after 8 minutes of CPR (a “realistic” IV scenario) or placebo controls with no epinephrine.

METHODS: Thirty swine were randomized to IO epinephrine, IV epinephrine, or placebo. Important outcomes included return of spontaneous circulation (ROSC), 24-hour survival, and 24-hour survival with good neurological outcome (cerebral performance category 1).

RESULTS: ROSC after 10 minutes of untreated VF was uncommon without administration of epinephrine (1 of 10), whereas ROSC was nearly universal with IO epinephrine or delayed IV epinephrine (10 of 10 and 9 of 10, respectively; P = 0.001 for either versus placebo). Twenty-four hour survival was substantially more likely after IO epinephrine than after delayed IV epinephrine (10 of 10 vs. 4 of 10, P = 0.001). None of the placebo group survived at 24 hours. Survival with good neurological outcome was more likely after IO epinephrine than after placebo (6 of 10 vs. 0 of 10, P = 0.011), and only 3 of 10 survived with good neurological outcome in the delayed IV epinephrine group (not significant versus either IO or placebo).

CONCLUSION: In this swine model of prolonged VF cardiac arrest, epinephrine administration during CPR improved outcomes. In addition, early IO epinephrine improved outcomes in comparison with delayed IV epinephrine.
BACKGROUND: Informed consent is a process of sharing information that facilitates the individual patient’s right to self-determination. Despite its importance in anesthesia practice, the process of informed consent is rarely audited or examined. As such, there are only limited data with respect to anesthesia consent practices, particularly within the pediatric setting. We designed this study, therefore, to examine the information that parents seek regarding their child’s anesthesia, what they are told, who told them, and how much of the information they recall.

METHODS: Parents of children undergoing a variety of elective surgical procedures were recruited while their child was in surgery. Parents were interviewed to determine their recall of their child’s anesthetic plan, postoperative pain management, and attendant risks and benefits; and then surveyed regarding what information was sought and received, and how satisfied they were with the information.

RESULTS: Two hundred sixty-three parents were included. Although the majority (96.2%) recalled receiving information about how their child’s anesthesia would be administered, only 51.1% recalled being given information about the risks of anesthesia and 42.4% recalled how side effects would be managed. Composite scores for parental recall of anesthesia information were generally poor (4.9 ± 2.5 of 10). Furthermore, 50% and 55.7% of parents had no recall of the risks or benefits of anesthesia, respectively, and 82.9% could not recall pain medication side effects. Recall of consent information provided by anesthesia providers was significantly better than when provided by surgical personnel (P < 0.01).

CONCLUSIONS: Results showed that disclosure of anesthesia information to parents was often incomplete, and their recall thereof, was poor. The finding that recall of consent information provided by anesthesia providers was better than when provided by surgical personnel may serve to further the debate regarding the appropriate vehicles for anesthesia consent.

加巴噴丁的鞘內注射和全身用藥對脊髓 P 物質釋放的影響
The Effects of Intrathecal and Systemic Gabapentin on Spinal Substance P Release
Toshifumi Takasusuki, MD, PhD* and Tony L. Yaksh, PhD†
BACKGROUND: Gabapentin binds at the extracellular 2 1 subunit of voltage-sensitive calcium channels. Some voltage-sensitive calcium channels regulate substance P release from small primary afferents. We sought to determine in vivo whether spinal and systemic gabapentin at antihyperalgesic doses will attenuate substance P release.

METHODS: Rats prepared with chronic intrathecal (IT) catheters received IT vehicle or gabapentin 10 minutes before intraplantar formalin (5%, 50 L) injection. For systemic studies, vehicle or gabapentin was delivered intraperitoneally (IP) 15 minutes before formalin injection. In separate groups of rats, to assess the effect of IT or IP gabapentin upon formalin-evoked substance P release, animals received similar treatment for assessment of flinching, but underwent transcardial perfusion with 4% paraformaldehyde 10 minutes after the formalin injection. Substance P release was determined by the incidence of neurokinin 1 receptor (NK1r) internalization in the ipsilateral and contralateral superficial dorsal horn in immunofluorescent stained tissues.

RESULTS: Unilateral intraplantar formalin evoked biphasic hindpaw flinching. IT gabapentin (100 and 200 g) and IP gabapentin (100 and 200 mg/kg) resulted in a dose-dependent reduction in phase 2, but not phase 1, flinching in comparison with vehicle-treated rats. Intraplantator formalin resulted in NK1r internalization in the ipsilateral, but not contralateral, superficial dorsal horn. IT gabapentin (200 g, but not 100 g) and IP gabapentin (200 mg/kg, but not 100 mg/kg) significantly reduced ipsilateral NK1r internalization in comparison with vehicle-treated control. Importantly, internalization evoked by IT substance P was not blocked by IT gabapentin.
CONCLUSION: Systemic and spinal gabapentin have an acute inhibitory effect on the release of substance P from small primary afferents and a concurrent effect upon the initiation of facilitated pain states.

Brief Report: A Low Approach to Interscalene Brachial Plexus Block Results in More Distal Spread of Sensory-Motor Coverage Compared to the Conventional Approach
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低位肌間溝阻滯與傳統肌間溝阻滯相比能使局麻藥延臂叢向尾端擴散得更遠。我們比較了 254 例行上肢手術的患者低位肌間溝阻滯與傳統肌間溝阻滯遠端肢體麻醉的效果。傳統肌間溝阻滯最常引起運動反應的是三角肌，而低位肌間溝阻滯是腕部。與傳統肌間溝阻滯相比低位肌間溝阻滯能產生更大的肘以下區域的感覺運動阻滯（P < 0.001）。我們的資料表明低位元肌間溝阻滯引起更高機率的遠端運動反應和更好的腕和手的感覺運
（朱蘭芳譯，薛張綱校）

A low approach to the interscalene block (LISB) deposits local anesthetic farther caudad on the brachial plexus compared with the conventional interscalene block (ISB). We compared the efficacy of LISB and ISB in achieving anesthesia of the distal extremity in 254 patients having upper extremity surgery. The most frequent elicited motor response was the deltoid for ISB and wrist for LISB. There was significantly greater sensory-motor block of regions below the elbow with the LISB compared with ISB (P < 0.001 for both sensory and motor coverage). Our data indicate that LISB results in a higher incidence of distal elicited motor response and greater sensory-motor blockage of the wrist and hand.