Table of Contents

November 2010

Cardiovascular Anesthesiology

Brief Report: Opioid-Induced Preconditioning Is Dependent on Caveolin-3 Expression

- Yasuo M. Tsutsumi,
- Yoshitaka Kawaraguchi,
- Ingrid R. Niesman,
- Hemal H. Patel,
- and David M. Roth

Anesth Analg November 2010 111:1117-1121; published ahead of print August 24, 2010

Ambulatory Anesthesiology

受控的氣管內導管套囊壓力與術後併發症的相關性：一項多中心研究

(毛祖旻譯 馬皓琳 李士通校)

Correlations Between Controlled Endotracheal Tube Cuff Pressure and Postprocedural Complications: A Multicenter Study

- Jianhui Liu,
- Xiaoqing Zhang,
- Wei Gong,
- Shitong Li,
- Fen Wang,
- Shukun Fu,
- Mazhong Zhang,
- and Yannan Hang

Anesth Analg November 2010 111:1133-1137; published ahead of print August 24, 2010

Anesthetic Pharmacology

滴注法或噴霧法腹膜內給予羅呱卡因的藥代動力學

(張婷譯　陳傑校)

The Pharmacokinetics of Ropivacaine After Intraperitoneal Administration: Instillation Versus Nebulization

- Delphine Betton,
- Nicolas Greib,
- Herve Schlotterbeck,

- Girish P. Joshi,
- Genevieve Ubeaud-Sequier,
- and Pierre Diemunsch

Anesth Analg November 2010 111:1140-1145; published ahead of print September 14, 2010

奈福泮在終末期腎病患者中的藥代動力學

(黃劍譯 薛張綱校)

Nefopam Pharmacokinetics in Patients with End-Stage Renal Disease

- Olivier Mimoz,
- Stéphane Chauvet,
- Nicolas Grégoire,
- Sandrine Marchand,
- Marie-Emmanuelle Le Guern,
- Ashraf Saleh,
- William Couet,
- Bertrand Debaene,
- and René H. Levy

Anesth Analg November 2010 111:1146-1153

Technology, Computing, and Simulation

缺氧時利用脈搏 CO-血氧測量儀提高高鐵血紅蛋白測量的精確性

(瞿亦楓譯 馬皓琳 李士通校)

Improved Accuracy of Methemoglobin Detection by Pulse CO-Oximetry During Hypoxia

- John R. Feiner and
- Philip E. Bickler

Anesth Analg November 2010 111:1160-1167; published ahead of print September 14, 2010

一種全麻下安全、無創監測噴射通氣的方法——呼吸感應體積描記系統的初步研究

(曹強譯　陳傑校)

A Pilot Study of Respiratory Inductance Plethysmography as a Safe, Noninvasive Detector of Jet Ventilation Under General Anesthesia

- Joshua H. Atkins,
- Jeff E. Mandel,
- Gregory S. Weinstein,
- and Natasha Mirza

Anesth Analg November 2010 111:1168-1175; published ahead of print August 24, 2010, doi:10.1213/ANE.0b013e3181f10982

麻醉保護裝置(Anaconda©)替代經典汽化設備的準確性

(毛慧譯 薛張剛校)

The Accuracy of the Anesthetic Conserving Device (Anaconda©) as an Alternative to the Classical Vaporizer in Anesthesia

- Marina Soro,
- Rafael Badenes,
- Maria Luisa Garcia-Perez,
- Lucia Gallego-Ligorit,
- Francisco J. Martí,
- Gerardo Aguilar,
- and F. Javier Belda

Anesth Analg November 2010 111:1176-1179; published ahead of print September 14, 2010

一個關鍵性回顧：連續性心輸出量監護儀測量心輸出量動態變化的能力

(周潔譯 馬皓琳 李士通校)

Review Article: A Critical Review of the Ability of Continuous Cardiac Output Monitors to Measure Trends in Cardiac Output

- Lester A. Critchley,
- Anna Lee,
- and Anthony M.-H. Ho

Anesth Analg November 2010 111:1180-1192; published ahead of print August 24, 2010

Patient Safety

3951 例超聲引導下中心靜脈長期埋管：操作情況、風險分析以及患者舒適度

(黃丹譯　陳傑校)

Implantation of 3951 Long-Term Central Venous Catheters: Performances, Risk Analysis, and Patient Comfort After Ultrasound-Guidance Introduction

- Adriano Peris,
- Giovanni Zagli,
- Manuela Bonizzoli,
- Giovanni Cianchi,
- Marco Ciapetti,
- Rosario Spina,
- Valentina Anichini,
- Francesco Lapi,
- and Stefano Batacchi

Anesth Analg November 2010 111:1194-1201; published ahead of print September 9, 2010

Critical Care, Trauma, and Resuscitation

卡維地洛在氣道阻塞致心搏驟停大鼠模型的心肺復蘇中的作用

(任雲譯 薛張剛校)

The Effects of Carvedilol Administration on Cardiopulmonary Resuscitation in a Rat Model of Cardiac Arrest Induced by Airway Obstruction

- Akihide Kurita,
- Takumi Taniguchi,
- and Ken Yamamoto

Anesth Analg November 2010 111:1207-1210; published ahead of print August 12, 2010

決策樹模型用於預測老年患者自主呼吸試驗成功後拔管的預後

(徐妍君譯， 馬皓琳 李士通校)

A Decision-Tree Model for Predicting Extubation Outcome in Elderly Patients After a Successful Spontaneous Breathing Trial

- Yang Liu,
- Lu-Qing Wei,
- Guo-Qiang Li,
- Fu-Yun Lv,
- Huo Wang,
- Yu-Hua Zhang,
- and Wen-Li Cao

Anesth Analg November 2010 111:1211-1218; published ahead of print September 14, 2010

Obstetric Anesthesiology

腰麻下剖腹產術期間四個固定速率苯腎上腺素輸注方案維持血流動力學穩定的雙盲、安慰劑、對照研究

(唐穎譯　陳傑校)

A Double-Blind, Placebo-Controlled Trial of Four Fixed Rate Infusion Regimens of Phenylephrine for Hemodynamic Support During Spinal Anesthesia for Cesarean Delivery

- Terrence K. Allen,
- Ronald B. George,
- William D. White,
- Holly A. Muir,
- and Ashraf S. Habib

Anesth Analg November 2010 111:1221-1229; published ahead of print May 21, 2010

在實行蛛網膜下腔阻滯的剖宮產手術中新福林的劑量依賴作用。

(翁梅琳譯 薛張剛校)

The Dose-Dependent Effects of Phenylephrine for Elective Cesarean Delivery Under Spinal Anesthesia

- Adrienne Stewart,
- Roshan Fernando,
- Sarah McDonald,
- Rachel Hignett,
- Tanya Jones,
- and Malachy Columb

Anesth Analg November 2010 111:1230-1237; published ahead of print September 14, 2010

產科病人椎管內嗎啡鎮痛和口腔皰疹病毒復發

(劉伍譯　馬皓琳 李士通校)

Focused Review: Neuraxial Morphine and Oral Herpes Reactivation in the Obstetric Population

- Jeanette R. Bauchat

Anesth Analg November 2010 111:1238-1241; published ahead of print September 29, 2010

Pediatric Anesthesiology

嬰幼兒行體外迴圈後其炎症反應與臨床預後的關係

(鄒巧群譯　陳傑校)

The Relationship Between Inflammatory Activation and Clinical Outcome After Infant Cardiopulmonary Bypass

- Catherine K. Allan,
- Jane W. Newburger,
- Ellen McGrath,
- Jodi Elder,
- Charles Psoinos,
- Peter C. Laussen,
- Pedro J. del Nido,
- David Wypij,
- and Francis X. McGowan, Jr.

Anesth Analg November 2010 111:1244-1251; published ahead of print September 9, 2010

口服造影劑對腹部 CT 檢查兒童胃液容量的影響

(吳少勇譯 薛張綱校)

Oral Contrast for Abdominal Computed Tomography in Children: The Effects on Gastric Fluid Volume

- Mohamed Mahmoud,
- John McAuliffe,
- Hwa-Young Kim,
- Pragnyadipta Mishra,
- Shelia Salisbury,
- Beverly Schnell,
- Patricia Hirsch,
- Shahriar Arbabi,
- and Lane F. Donnelly

Anesth Analg November 2010 111:1252-1258; published ahead of print August 24, 2010

唐氏綜合征患兒使用七氟醚麻醉誘導過程中發生的心動過緩

(滕淩雅譯 馬皓琳 李士通校)

Bradycardia During Induction of Anesthesia with Sevoflurane in Children with Down Syndrome

- F. Wickham Kraemer,
- Paul A. Stricker,
- Harshad G. Gurnaney,
- Heather McClung,
- Marcie R. Meador,
- Emily Sussman,
- Beverly J. Burgess,
- Brian Ciampa,
- Jared Mendelsohn,
- Mohamed A. Rehman,
- and Mehernoor F. Watcha

Anesth Analg November 2010 111:1259-1263; published ahead of print August 24, 2010

綜述：遺傳學對小兒麻醉醫師意義：先天畸形、遺傳藥理學、蛋白質組學的基礎

(楊秋娟譯　陳傑校)

Review Article: Genetics for the Pediatric Anesthesiologist: A Primer on Congenital Malformations, Pharmacogenetics, and Proteomics

- Jeffrey L. Galinkin,
- Laurie Demmer,
- and Myron Yaster

Anesth Analg November 2010 111:1264-1274; published ahead of print September 14, 2010

Neuroscience in Anesthesiology and Perioperative Medicine

咪達唑侖和異丙酚鎮靜對於大腦動態自動調節的不同效應

(姚敏敏譯 薛張綱校)

The Different Effects of Midazolam and Propofol Sedation on Dynamic Cerebral Autoregulation

- Yojiro Ogawa,
- Ken-ichi Iwasaki,
- Ken Aoki,
- Dai Gokan,

- Noriya Hirose,
- Jitsu Kato,
- and Setsuro Ogawa

Anesth Analg November 2010 111:1279-1284; published ahead of print September 29, 2010

丙泊酚能減少帕金森氏症患者丘腦下核神經元群峰電位活動

(楊秀娟譯 馬皓琳 李士通校)

Propofol Decreases Neuronal Population Spiking Activity in the Subthalamic Nucleus of Parkinsonian Patients

- Aeyal Raz,
- Dan Eimerl,
- Adam Zaidel,
- Hagai Bergman,
- and Zvi Israel

Anesth Analg November 2010 111:1285-1289; published ahead of print September 14, 2010

Analgesia

Pain Medicine

聯合應用直流和交流經顱電刺激對健康志願者的鎮痛和抗痛覺過敏作用

(陳靈科譯　陳傑校)

The Analgesic and Antihyperalgesic Effects of Transcranial Electrostimulation with Combined Direct and Alternating Current in Healthy Volunteers

- V. Nekhendzy,
- H. J. Lemmens,
- M. Tingle,
- M. Nekhendzy,
- and M. S. Angst

Anesth Analg November 2010 111:1301-1307; published ahead of print June 8, 2010

低位肢端截肢術後使用長期外周神經阻滯：對幻肢綜合征相關症狀的效果

(張玥琪譯，薛張綱校)

The Use of Prolonged Peripheral Neural Blockade After Lower Extremity Amputation: The Effect on Symptoms Associated with Phantom Limb Syndrome

- Battista Borghi,
- Marco D'Addabbo,
- Paul F. White,
- Pina Gallerani,
- Letizia Toccaceli,
- William Raffaeli,
- Andrea Tognù,
- Nicola Fabbri,
- and Mario Mercuri

Anesth Analg November 2010 111:1308-1315; published ahead of print September 29, 2010

Pain Mechanisms

8-OH-DPAT 阻止嗎啡導致的大鼠背縫神經核的凋亡：減少嗎啡耐受的一個可能機制

(王海濤譯 馬皓琳 李士通校)

8-OH-DPAT Prevents Morphine-Induced Apoptosis in Rat Dorsal Raphe Nucleus: A Possible Mechanism for Attenuating Morphine Tolerance

- Mohammad Charkhpour,
- Ali Reza Mohajjel Nayebi,
- Yousef Doustar,
- and Kambiz Hassanzadeh

Anesth Analg November 2010 111:1316-1321; published ahead of print August 24, 2010

Regional Anesthesia

簡要報告：椎管內阻滯後硬膜外血腫：來自中國的回顧性報告

(張蕾譯　陳傑校)

Brief Reports: Epidural Hematoma After Neuraxial Blockade: A Retrospective Report from China

- Shuang-Ling Li,
- Dong-Xin Wang,
- and Daqing Ma

Anesth Analg November 2010 111:1322-1324; published ahead of print August 12, 2010

單點對比三點注射行超聲引導鎖骨下阻滯：單點注射技術效果的確認

(朱蘭芳譯，薛張綱校)

Brief Reports: Single Versus Triple Injection Ultrasound-Guided Infraclavicular Block: Confirmation of the Effectiveness of the Single Injection Technique

- Michael J. Fredrickson,
- Philip Wolstencroft,
- Ritwik Kejriwal,
- Albert Yoon,
- Michael R. Boland,
- and Simon Chinchanwala

Anesth Analg November 2010 111:1325-1327; published ahead of print August 12, 2010

肺動脈高壓患者接受大關節置換術的圍手術期死亡率

Perioperative Mortality in Patients with Pulmonary Hypertension Undergoing Major Joint Replacement

Stavros G. Memtsoudis, MD, PhD*, Yan Ma, PhD†, Ya Lin Chiu, MS†, J. Matthias Walz, MD‡, Robert Voswinckel, MD§ and Madhu Mazumdar, PhD†
Authors' affiliations are listed at the end of the article
Address correspondence and reprint requests to Stavros G. Memtsoudis, MD, PhD, Department of Anesthesiology, Hospital for Special Surgery, 535 East 70th St., New York, NY 10021. Address e-mail to **memtsoudiss@hss.edu**.
Anesth Analg November 2010 111:1110-1116;

背景：目前缺乏慢性肺動脈高壓患者（PHTN）接受非心臟手術的圍手術期的數據。因此，臨床醫生沒有資料來評估這類患者的併發症發病率和死亡率的風險。在這項研究中，作者評估了慢性肺動脈高壓患者，首次接受全髖關節置換術（THA）或全膝關節置換術（TKA）的圍手術期併發症的發生率及死亡率。
方法：根據美國最大的住院患者資料庫，作者收集了 1998 年和 2006 年之間行 THA 及 TKA 的患者資訊。將明確了 PHTN 的患者與健康人群資料中的非 PHTN 對照組配對。主要的結果是圍手術期死亡率。應用多因素 logistic 回歸模型評估 PHTN 對住院死亡率的影響。
結果：共收集 670，516 例 TKA 及 360，119 例 TKA。這些患者中，確診爲 PHTN 的分別有 2184 例（0.3％）及 1359 例（0.4％）（TKA 中 PHTN 年平均確診率爲 1180[507-2073]和 THA 中 PHTN 年平均確診率 爲 739 [467-1054]）。經校正後，相對於配對的對照組，接受 THA 手術的 PHTN 患者增加大約 4 倍死亡風險（2.4％vs 0.6％），接受 TKA 手術的 PHTN 患者則增加大約 4.5 倍死亡風險（0.9％vs 0.2％），每次比較 P<0.001。原發性慢性肺動脈高壓患者接受 THA 術的死亡率最高 (5% [95% CI, 2.3% – 7.7%])。
結論：這一分析表明，PHTN 患者在接受 THA 和 TKA 手術後圍手術期死亡率風險增加。

（陳毓雯　譯　陳傑　校）

BACKGROUND: There is a paucity of perioperative outcomes data for patients with chronic pulmonary hypertension (PHTN) undergoing noncardiac surgery. Clinicians, therefore, have little information on which to evaluate the risk for morbidity and mortality in this patient population. In this study, we evaluated the incidence and risks of perioperative morbidity and mortality in patients with PHTN undergoing primary total hip arthroplasty (THA) and total knee arthroplasty (TKA).
METHODS: Using the largest inpatient database in the United States (National Inpatient Sample), we identified entries for THA and TKA between the years of 1998 and 2006. Patients with the diagnosis of PHTN were identified and matched to those without the disease based on health-related demographic variables. Perioperative mortality was considered the primary outcome. Multivariate logistic regression models were fitted to assess the impact of PHTN on in-hospital mortality.
RESULTS: We identified 670,516 entries for TKA and 360,119 for THA. Of those patients, 2184 (0.3%) and 1359 (0.4%), respectively, had the diagnosis of PHTN (average annual rate of 1180 for TKA [range, 507–2073] and 739 for THA [range, 467–1054]). Patients with PHTN undergoing THA experienced an approximately 4-fold increased adjusted risk of mortality (2.4% vs 0.6%), and those undergoing TKA a 4.5-fold increased adjusted risk of mortality (0.9% vs 0.2%) compared with patients without PHTN in the matched sample ($P < 0.001$ for each comparison). Patients with primary PHTN undergoing THA experienced the highest mortality rate (5% [95% CI, 2.3%–7.7%]).
CONCLUSIONS: This analysis demonstrates that patients with PHTN are at increased risk for perioperative mortality after THA and TKA.

滴注法或噴霧法腹膜內給予羅呱卡因的藥代動力學

The Pharmacokinetics of Ropivacaine After Intraperitoneal Administration: Instillation Versus Nebulization

Delphine Betton, PharmD*, Nicolas Greib, MD†‡, Herve Schlotterbeck, MD, PhD†, Girish P. Joshi, MBBS, MD, FFARCSI§, Genevieve Ubeaud-Sequier, PharmD, PhD*‖ and Pierre Diemunsch, MD, PhD†
From the Departments of *Pharmacy and †Anesthesiology, Hautepierre University Hospital, Strasbourg; ‡Clinique des Diaconesses, Strasbourg, France; §Department of Anesthesiology and Pain Management, University of Texas Southwestern Medical Center, Dallas, Texas; and ‖UMR CNRS 7200, Laboratoire d'Innovation Thérapeutique, Département de Pharmacocinétique, University of Strasbourg, Illkirch, France.
Anesth Analg November 2010 111:1140-1145;

背景：腹腔鏡手術中，在腹膜內給予局麻藥可以起到圍手術期鎮痛的效果。本研究比較了兩種不同的腹膜內羅呱卡因給藥途徑，即滴注法和噴霧法的藥代動力學。
方法：本研究用 5 只豬進行病例交叉試驗，這 5 只豬都給予標準的麻醉方法，其 CO2 氣腹壓爲 12mmHg，各維持 1 小時。每只豬都以其本身爲對照組，間隔 8 天分別進行兩次試驗，試驗順序隨機。即按 3mg/kg 羅呱卡因的劑量在氣腹排氣的時候以滴注法給藥或在氣腹時連續噴霧給藥。每隔 10min 採取動脈血樣直到給藥後 120min，然後每隔 1h 直到 6h。用高效液相色譜儀和紫外可見光檢測儀測量羅呱卡

因的濃度。血漿超速離心後檢測游離血漿藥物濃度。分別用房室和非房室模型分析計算藥代動力學參數。本研究用 t 檢驗比較均數，wilcoxon 檢驗比較成組設計的樣本均數。

結果：兩種羅呱卡因的給藥途徑均以單室模型描述資料，噴霧組的起效時間延遲了 10min。噴霧組和滴注組的最大藥物濃度分別爲 0.96ug/ml 和 0.92ug/ml（P=0.66）。噴霧組羅呱卡因的吸收常數較低（0.043 vs 0.083/min,P=0.02）。藥物的消除半衰期，消除常數，平均清除率，分佈容積，曲線下面積和平均駐留時間在兩組中沒有差異。兩組的血漿游離羅呱卡因濃度也無差異。

結論：噴霧法給予羅呱卡因與直接在腹膜內滴注羅呱卡因，其藥代動力學相似，但是噴霧法的吸收率比滴注法低。

（張婷　譯　陳傑　校）

BACKGROUND: Intraperitoneal local anesthetic administration provides perioperative analgesia during laparoscopic procedures. We compared the pharmacokinetics of intraperitoneal ropivacaine administered by instillation or nebulization.

METHODS: A crossover study was performed on 5 pigs under standardized general anesthesia with a carbon dioxide pneumoperitoneum of 12 mm Hg for 1 hour. Each animal, acting as its own control, was studied twice with an 8-day interval and received, in a randomized sequence, 3 mg/kg ropivacaine either by intraperitoneal instillation at the time of pneumoperitoneum exsufflation or by continuous nebulization in the carbon dioxide insufflation tubing. Arterial blood samples were taken every 10 minutes up to 120 minutes, and then hourly up to 6 hours. Ropivacaine concentrations were measured using high-performance liquid chromatography with ultraviolet-visible detection. The plasma-free fraction was evaluated after plasma ultracentrifugation. Pharmacokinetic parameters were calculated using both noncompartmental and compartmental analysis. The mean values were compared using the Student *t* test, or Wilcoxon test for paired series.

RESULTS: The data were described by a 1-compartment model for both ropivacaine administration techniques, with a delay of 10 minutes for the nebulization group. The maximal ropivacaine concentrations were 0.96 μg/mL for the nebulization group and 0.92 μg/mL for the instillation group ($P = 0.66$). The ropivacaine absorption constant was lower in the nebulization group (0.043 vs 0.083 min^{-1}, $P = 0.02$). There were no differences in the elimination half-life, elimination constant, mean total body clearance, distribution volume, mean area under the curve, and mean residence time. The free fraction of ropivacaine was also similar in the 2 groups.

CONCLUSIONS: The pharmacokinetic profile of ropivacaine nebulization is similar to direct intraperitoneal instillation, but with a lower absorption rate.

一種全麻下安全、無創監測噴射通氣的方法——呼吸感應體積描記系統的初步研究

A Pilot Study of Respiratory Inductance Plethysmography as a Safe, Noninvasive Detector of Jet Ventilation Under General Anesthesia

Joshua H. Atkins, MD, PhD*, Jeff E. Mandel, MD, MS*, Gregory S. Weinstein, MD† and Natasha Mirza, MD†

From the Departments of *Anesthesiology and Critical Care, and †Otorhinolaryngology, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania.

Anesth Analg November 2010 111:1168-1175

背景：高頻噴射通氣對於氣管和喉部的許多外科手術來說是最佳的通氣模式，但也缺乏評估氧合或通氣量是否充足的監測模式。呼吸感應體積描記系統是一種在睡眠實驗室中運用的設備，其對胸部和腹部運動進行無創監測。作者應用通氣感應體積描記系統作爲噴射通氣監測器作了初步觀察研究。
方法：25 名患者在全憑靜脈高頻通氣的全身麻醉下進行顯微支撐喉鏡檢查。感應帶被固定在患者的胸部和腹部，並以 50 赫茲的採樣頻率運用 12 位元 A-D 轉換器和自定義 LabVIEW 埠的 DC 模式收集採樣口的氧供資料。對原始資料進行過濾，在 I，IIR 型峰梳狀濾波器的基礎上建立監測器以區別呼吸暫停、心源性振盪和噴射通氣相關的呼吸運動。其主要目的是監測器對噴射通氣存在的識別能力。所有病人的資料匯總生成受試者特徵性曲線。
結果：呼吸感應體積描記系統能可靠地監測噴射呼吸。資料分析程式能有效得從心源性雜音產生的基礎信號中提取波幅相對較小的呼吸噴射信號。用帶寬 0.055 赫茲的濾波器過濾，敏感度在 85%左右。濾波器帶寬增加而引起的敏感度的增高被 12.5 秒的監測延遲所抵消。
結論：呼吸感應體積描記系統能成功地應用在喉氣管手術患者以檢測高頻噴射通氣。此次初步研究證實了呼吸感應體積描記系統在噴射通氣中作爲監測器應用的可行性。
（曹強　譯　陳傑　校）

BACKGROUND: High-frequency jet ventilation is an optimal mode of ventilation for many surgical procedures of the trachea and larynx but has limited monitoring modalities to assess adequacy of oxygenation and/or ventilation. Respiratory inductance plethysmography is a noninvasive monitor of chest and abdominal wall movement with well-established applications in the sleep laboratory. We performed an observational pilot study of respiratory inductance plethysmography as a detector of jet ventilation.
METHODS: Twenty-five patients underwent microdirect suspension laryngoscopy with high-frequency jet ventilation under general anesthesia with total IV anesthesia. Inductotrace® bands (Ambulatory Monitoring Inc., Ardsley, NY) were applied to the chest and abdomen in all patients and data collected from oxygen administration through emergence at 50-Hz sampling frequency in the DC mode using a 12-bit A-D converter and custom programmed LabVIEW interface. The raw data were filtered and a detector was developed based on a type I, IIR peak comb filter to differentiate apnea, cardiogenic oscillations, and jet ventilation– associated respiratory excursion. The primary end point was the ability of the detector to identify the presence of jet ventilation. Receiver operating characteristic curves were generated for the aggregate data of all patients.
RESULTS: Respiratory inductance plethysmography reliably detected jet ventilation. The data analysis program effectively extracted a relatively small amplitude jet ventilation signal from a baseline signal contaminated by cardiogenic noise. Sensitivity was in the range of 85%, with a filter bandwidth of 0.055 Hz. Increased sensitivity with increasing filter bandwidth was offset by a detection delay of 12.5 seconds.
CONCLUSIONS: Respiratory inductance plethysmography was successfully used to detect high-frequency jet ventilation in patients undergoing laryngotracheal surgery. This

pilot study demonstrates the feasibility of respiratory inductance plethysmography as a monitor for use during jet ventilation.

3951 例超聲引導下中心靜脈長期埋管：操作情況、風險分析以及患者舒適度

Implantation of 3951 Long-Term Central Venous Catheters: Performances, Risk Analysis, and Patient Comfort After Ultrasound-Guidance Introduction

Adriano Peris, MD*, Giovanni Zagli, MD*, Manuela Bonizzoli, MD*, Giovanni Cianchi, MD*, Marco Ciapetti, MD*, Rosario Spina, MD*, Valentina Anichini, MD*, Francesco Lapi, PharmD, PhD† and Stefano Batacchi, MD*

±From the *Anesthesia and Intensive Care Unit of Emergency Department, Careggi Teaching Hospital, Florence, Italy, and the †Department of Preclinical and Clinical Pharmacology, University of Florence, and the Regional Agency for Health Care Services of Tuscany, Epidemiology Unit, Florence, Italy.

Anesth Analg November 2010 111:1194-1201;

背景：儘管已有足夠的證據表明與解剖標誌定位相比，超聲引導下中心靜脈穿刺置管安全性大大提高，但仍然不是所有醫生在進行中心靜脈穿刺置管時常規使用超聲引導。

方法：作者收集超聲引導技術應用中心靜脈長期置管前後 7 年的病例資料。共 3951 個病例，放置導管的總天數爲 1642402。其中 1584 例採用解剖標誌定位（定位組，2000 年 1 月至 2003 年 5 月），2367 例採用超聲引導（超聲組，2003 年 6 月至 2007 年 5 月），所有操作都由監護室同一組人員進行。比較的標準包括：操作情況、併發症、病人的舒適度及看法。通過 t 核對總和 χ^2 檢驗進行變數分析，多變數分析採用 COX 風險比率回歸模型。

結果：超聲引導下穿刺置入 PORT 式（平均差 4.9 ± 0.4 分鐘，置信區間 CI 爲 4.1 - 5.7）和隧道式導管（平均差 2.4 ± 0.8 分鐘，CI 爲 0.9-3.8）的時間均明顯減少。解剖標誌定位方法使整個圍手術期併發症的風險增加（4.5，CI 爲 3.6-5.6）。在所有的疾病中，急性白血病患者中心靜脈相關性感染的風險顯著增加（2.6，CI 爲 2.1-3.8）。從兩組病人遞交的調查問卷看，超聲引導下中心靜脈穿刺置管可以提高患者的舒適度和滿意度。

結論：超聲引導可以減少患者的併發症，並提高舒適度。考慮到急性白血病患者感染的發生率較高，需要進一步研究來確定是否需要單獨分類。

（黃丹　譯　陳傑　校）

BACKGROUND: Despite evidence demonstrating improved safety with ultrasound-guided placement of central venous catheters (CVC) in comparison with the use of anatomical landmarks, ultrasound guidance is still not routinely used by all physicians when obtaining central venous access.

METHODS: We report data pertaining to the placement of long-term CVCs in a 7-year period before and after ultrasound guidance was introduced. We included 3951 procedures (total of 1,642,402 catheter days) in our study: 1584 using the anatomical landmark method (landmark group, January 2000 to May 2003), and 2367 with ultrasound guidance (ultrasound group, June 2003 to May 2007). All procedures were performed by the same team of intensivists. Comparison criteria included procedural data, complications, patient's comfort, and perceptions. Variables were analyzed with Student's

t test and χ^2 test. Multivariate analysis was performed according to the Cox proportional hazards regression model.
RESULTS: Using ultrasound guidance, we noted a significant reduction in procedure time in both port (mean difference 4.9 ± 0.4 minutes, confidence interval [CI] 4.1 to 5.7) and tunneled catheter (mean difference 2.4 ± 0.8 minutes, CI 0.9 to 3.8) placement. The landmark method was associated with an increased risk of overall perioperative complications (4.5, CI 3.6 to 5.6). Among disease entities, acute leukemia patients had a significantly higher risk of CVC-related infections (2.6, CI 2.1 to 3.8). On the basis of questionnaires submitted to patients from both groups, ultrasound guidance was associated with improved patient comfort and satisfaction.
CONCLUSIONS: Ultrasound guidance reduces complications and improves patient comfort. Further studies are needed to define whether acute leukemia patients should be considered a separate category with regard to the higher incidence of infections.

腰麻下剖腹產術期間四個固定速率苯腎上腺素輸注方案維持血流動力學穩定的雙盲、安慰劑、對照研究

A Double-Blind, Placebo-Controlled Trial of Four Fixed Rate Infusion Regimens of Phenylephrine for Hemodynamic Support During Spinal Anesthesia for Cesarean Delivery

Terrence K. Allen, MBBS, FRCA*, Ronald B. George, MD, FRCPC†, William D. White, MPH*, Holly A. Muir, MD, FRCPC* and Ashraf S. Habib, MBBCh, MSc, FRCA*
From the *Department of Anesthesiology, Duke University Medical Center, Durham, North Carolina; and †Department of Women's & Obstetric Anesthesia, IWK Health Centre, Dalhousie University, Halifax, Nova Scotia, Canada.
This study was presented in part at the Annual Scientific Meeting of the Society for Obstetric Anesthesia and Perinatology, Chicago, IL, May 2008.
Anesth Analg November 2010 111:1221-1229;

背景：預防性輸注苯腎上腺素聯合擴容可有效地減少腰麻下剖腹產術期間產婦低血壓。但還沒有一個理想的給藥劑量方案。本研究中，作者探討了維持不低於產婦收縮壓 20%的預防性苯腎上腺素的固定輸注的合適速率。
方法：行擇期剖腹產的待產婦隨機分組，腰麻後給予安慰劑或不同速率的預防性苯腎上腺素輸注（每分鐘 25，50，75 或 100ug 組），每組給藥同時給予 2L 的液體負荷。使用預定方法來維持產婦收縮壓在特定的範圍內。比較各組的醫生干預次數、血流動力學表現、手術操作引起的噁心嘔吐及臍帶血氣。
結果：共分析了 101 例病人。安慰組和苯腎上腺素組在維持產婦收縮壓在預定範圍內的醫生干預次數上沒有差別。苯腎上腺素 25μg/min 組和 50μg/min 組 相對與 100μg/min 組，干預次數有顯著差異(P = 0.004 vs 50 μg/min, P = 0.02 vs 25 μg/min)。對照組的產前低血壓發生率比所有苯腎上腺素組高。苯腎上腺素 75μg/min 組和 100μg/min 的產前高血壓發生率比對照組顯著增高(P < 0.001 vs 75 μg/min and 100 μg/min)。隨著苯腎上腺素輸注速率提高，收縮壓相對於基線的波動有增加趨勢（P=0.06）且越來越高於基線值（P<0.001）。各組間手術操作引起的噁心嘔吐發生率、嚴重程度和臍帶血氣沒有差別。

結論：預防性給予苯腎上腺素不能顯著地減少維持產婦收縮壓 20%以內的醫生干預次數。儘管如此，預防性給與苯腎上腺素減少了產前低血壓的發生率。苯腎上腺素 25μg/min 和 50μg/min 比 75μg/min 和 100μg/min 更好地維持產婦血流動力學穩定。預防性固定速率苯腎上腺素輸注的臨床應用比較局限，需要進一步評估不同速率苯腎上腺素輸注的血流動力學。

（唐穎　譯　陳傑　校）

BACKGROUND: The administration of prophylactic phenylephrine infusions in combination with fluid cohydration significantly reduces the incidence of hypotension in women having cesarean delivery under spinal anesthesia. The ideal dosing regimen for this purpose is not known. In this study, we investigated the dose of phenylephrine that, when administered as a prophylactic fixed rate infusion, is associated with the least interventions needed to maintain maternal systolic blood pressure (SBP) within 20% of baseline.

METHODS: Women undergoing elective cesarean delivery were randomly allocated to receive placebo or prophylactic phenylephrine infusion at 25, 50, 75, or 100 μg/min immediately after spinal anesthesia in combination with a 2-L fluid coload. Maternal SBP was maintained within the target range using a predetermined algorithm. The number of physician interventions, hemodynamic performance, intraoperative nausea and vomiting, and umbilical cord blood gases were compared among the groups.

RESULTS: One hundred one patients were included in the analysis. There were no differences between the placebo and phenylephrine groups in the number of interventions needed to maintain maternal SBP within the target range. Doses of phenylephrine of 25 and 50 μg/min were associated with significantly fewer interventions when compared with 100 μg/min ($P = 0.004$ vs 50 μg/min, $P = 0.02$ vs 25 μg/min). Predelivery hypotension was more frequent in the control group compared with all phenylephrine groups. Phenylephrine 75 and 100 μg/min groups were associated with a significantly higher incidence of predelivery hypertension compared with control ($P < 0.001$ vs 75 μg/min and 100 μg/min). There was a trend toward an increase in median magnitude of deviations of SBP above or below baseline ($P = 0.006$), and the bias of SBP to be above baseline ($P < 0.001$) with increasing rates of phenylephrine infusion. There were no differences in the incidence and severity of intraoperative nausea and vomiting and umbilical cord blood gases among the groups.

CONCLUSIONS: The use of prophylactic fixed rate phenylephrine infusions did not significantly reduce the number of physician interventions needed to maintain maternal predelivery SBP within 20% of baseline compared with placebo. However, prophylactic phenylephrine infusions reduced the incidence and severity of maternal predelivery hypotension. Phenylephrine 25 and 50 μg/min administered as a prophylactic fixed rate infusion provided greater maternal hemodynamic stability than phenylephrine 75 and 100 μg/min. Prophylactic fixed rate infusions may have limited application in clinical practice, and future studies assessing the accuracy of hemodynamic control with variable rate phenylephrine infusions are needed.

嬰幼兒行體外迴圈後其炎症反應與臨床預後的關係

The Relationship Between Inflammatory Activation and Clinical Outcome After Infant Cardiopulmonary Bypass

Catherine K. Allan, MD*§, Jane W. Newburger, MD, MPH*§, Ellen McGrath, RN*, Jodi Elder, RN*, Charles Psoinos, BS‡, Peter C. Laussen, MBBS*‡, Pedro J. del Nido, MD†‖, David Wypij, PhD*§# and Francis X. McGowan Jr., MD‡¶
From the *Department of Cardiology, †Department of Cardiac Surgery, and ‡Department of Anesthesiology, Perioperative and Pain Medicine, Children's Hospital Boston, Massachusetts; the §Department of Pediatrics, ‖Department of Surgery, and ¶Department of Anaesthesia, Harvard Medical School, Boston, Massachusetts; and the #Department of Biostatistics, Harvard School of Public Health7, Boston, Massachusetts.
Anesth Analg November 2010 111:1244-1251;
背景：體外迴圈（CPB）可誘導全身性炎症反應。這種反應對嬰幼兒的重要性和後果仍不清楚。作者評估了接受體外迴圈的嬰幼兒其炎症狀態與臨床預後的關係。
方法：測定≤9 個月的嬰幼兒血漿白介素(IL）-6 的和 IL-8 和 IL-10，腫瘤壞死因數α(TNF-α)和 IL -1β 和 C -反應蛋白（CRP）的濃度變化,時間點分別爲 CPB 前,CPB 後即刻,以及 CPB 後 6h，12h 和 24h,並對圍術期臨床資料進行前瞻性研究。
結果：入組的 93 例患兒其臨床診斷包括大動脈轉位（40 例），法洛四聯症（28 例），室間隔缺損（21 例），動脈幹(2 例)，完全性房室通道（2 例）。其平均年齡爲 37 天（範圍爲 2- 264 天）。低齡嬰幼兒 CPB 前 IL-6 和 CRP 水準相對高，但與術後炎症介質的濃度或臨床預後並無相關性。CPB 後 IL-6 濃度升高（CPB 前中位數爲 3.2 pg/mL, CPB 後即刻爲 24.2, 6h 爲 95.4, 24h 爲 90.3; 所有 P < 0.001）。CPB 後 C 反應蛋白濃度增加，峰值出現在 24h（CPB 後 24h 中位數爲 27.5，CPB 前爲 0.3; P < 0.001）。 IL-10 和 IL-8 在 CPB 後即升高。在對年齡和診斷因素進行校正後，術後 IL - 6 和 IL - 8 的水準與監護室停留時間長短以及術後血液製品輸注相關,其中,對 IL-8 而言,還與術後 24h 乳酸水準相關。
結論：低齡嬰幼兒術前高濃度的細胞因數和 C 反應蛋白的產生與其臨床預後沒有相關性;術後炎症介質的產生和臨床預後的相關性有統計學意義，但無臨床意義。綜上,作者認爲，對在一個高工作量心臟中心接受低等至中等難度心臟手術的嬰幼兒而言,炎症介質的產生對術後生存率的影響有限.
（鄒巧群　譯　陳傑　校）
BACKGROUND: Cardiopulmonary bypass (CPB) induces a systemic inflammatory response. The magnitude and consequences in infants remain unclear. We assessed the relationship between inflammatory state and clinical outcomes in infants undergoing CPB.
METHODS: Plasma concentrations of interleukin (IL)-6, IL-8, IL-10, tumor necrosis factor α, IL-1β, and C-reactive protein (CRP) were measured pre-CPB and immediately post-CPB, and at 6, 12, and 24 hours post-CPB in infants ≤9 months old. Perioperative clinical data were collected prospectively.
RESULTS: Diagnoses of 93 patients included transposition of the great arteries (40), tetralogy of Fallot (28), ventricular septal defect (21), truncus arteriosus (2), and complete atrioventricular canal (2). The median age was 37 days (range = 2 to 264). Pre-CPB IL-6 and CRP were higher in younger infants but were not associated with postoperative inflammatory mediator concentrations or measured clinical outcomes. IL-6 increased post-CPB (median 3.2 pg/mL pre-CPB, 24.2 post-CPB, 95.4 at 6 hours, and 90.3 at 24 hours; all $P < 0.001$). CRP increased post-CPB, peaking at 24 hours (median 27.5 at 24 hours, 0.3 pre-CPB; $P < 0.001$). IL-10 and IL-8 increased immediately post-CPB. After adjusting for age and diagnosis, postoperative IL-6 and IL-8 correlated with

intensive care unit length of stay and postoperative blood product administration and, for IL-8, 24-hour lactate.
CONCLUSIONS: Greater preoperative cytokine and CRP production in younger infants did not correlate with postoperative outcomes; correlation between postoperative inflammatory mediator production and clinical course was statistically significant but clinically modest. We conclude that in infants undergoing low-to-moderate-complexity cardiac surgery in a single high-volume center, the contribution of inflammatory mediator production to postoperative morbidity is relatively limited.

綜述：遺傳學對小兒麻醉醫師意義：先天畸形、遺傳藥理學、蛋白質組學的基礎

Review Article: Genetics for the Pediatric Anesthesiologist: A Primer on Congenital Malformations, Pharmacogenetics, and Proteomics

Jeffrey L. Galinkin, MD, FAAP*, Laurie Demmer, MD† and Myron Yaster, MD‡
From the *Department of Anesthesiology and Pediatrics, The Children's Hospital, University of Colorado Denver, Aurora, Colorado; †Tufts Medical Center and the Floating Hospital for Children, Tufts University School of Medicine, Boston, Massachusetts; and ‡Departments of Anesthesiology, Critical Care Medicine, and Pediatrics, The Johns Hopkins University, Baltimore, Maryland.
Anesth Analg November 2010 111:1264-1274;

分子遺傳學主要是一個在分子水準研究遺傳信息如何儲存，繼承和表達，以及在健康和疾病中如何影響細胞的結構和功能的學科。雖然分子學方法是現代醫學教育的核心，且在實驗室中已經被應用了數十年，但是在臨床的應用才剛剛開始。各種各樣的高端技術可以快速而經濟地實現 DNA 基因測序，基因表達圖譜建立，基因克隆，基因操控基因轉錄，組蛋白生產和其他重要的生物醫學科學。基因組學上的成功孕育了其他更巨大的科學工程，包括蛋白質組學，藥物基因組學和生物資訊學。這些技術提供醫學所有領域包括麻醉學的新的診斷標準、預後、治療機會。通過分子診斷和日趨便宜的分析技術，臨床麻醉將越來越個體化，其重點將聚焦于患者遺傳學組成。基於分子資料的手術和非手術決策對圍術期麻醉管理越來越重要。這篇文章作者總結了在第 22 屆兒科麻醉學會年會中的 3 個關於先天畸形、遺傳藥理學和蛋白質組學的演講。
（楊秋娟　譯　陳傑　校）

Molecular genetics is the study, at the molecular level, of how genetic information is stored, inherited, and expressed and of how it influences the structure and function of cells in health and in disease. Although molecular approaches have been used for decades in the laboratory and are at the core of modern medical education, they are only now beginning to influence clinical practice. A variety of sophisticated techniques permit rapid and affordable DNA sequencing, gene expression profiling, gene cloning, gene manipulation, gene transfer, recombinant protein production, and other technologies of enormous biomedical importance. Success in genomics has spawned additional ambitious endeavors, including proteomics, pharmacogenomics, and bioinformatics. These techniques are providing new diagnostic, prognostic, and therapeutic opportunities in all areas of medicine, including anesthesiology. With the use of molecular criteria and the diminishing cost of analytic technologies, anesthetic practice will become more individualized, and greater emphasis will be placed on the patient's genetic makeup. Both

surgical and nonsurgical decisions will increasingly accommodate molecular data crucial to perioperative anesthetic management. In this article we have summarized three lectures on congenital malformations, pharmacogenetics, and proteomics presented at the 22nd Annual Meeting of the Society for Pediatric Anesthesia.

聯合應用直流和交流經顱電刺激對健康志願者的鎮痛和抗痛覺過敏作用

The Analgesic and Antihyperalgesic Effects of Transcranial Electrostimulation with Combined Direct and Alternating Current in Healthy Volunteers

V. Nekhendzy, MD*, H. J. Lemmens*, M. Tingle*, M. Nekhendzy* and M. S. Angst*
From the *Department of Anesthesia, Stanford University, Stanford, California.
Anesth Analg November 2010 111:1301-1307

背景：有報導顯示經顱電刺激能產生顯著的臨床鎮痛作用，但缺乏隨機和雙盲的試驗。本文作者研究了經顱電刺激在人類實驗性疼痛模型中的鎮痛和抗痛覺過敏的作用。
方法：選擇 20 名健康男性志願者用 60Hz 和 100Hz 經顱電刺激對紫外線 B 灼傷皮膚和正常皮膚對實驗性熱和機械性痛的鎮痛和抗痛覺過敏的作用。作者實驗室先前的動物研究顯示 60Hz 經顱電刺激有顯著的鎮痛作用，而 100Hz 經顱電刺激有合適的鎮痛作用。該試驗應用雙盲，隨機，兩種方法交叉的方法。應用經顱電刺激 35 分鐘，在經顱電刺激之前，之中，和 45 分鐘之後定量感覺測試評估熱和機械痛閾。
結果：經顱電刺激 TES (TES_{60Hz} > TES_{100Hz})能誘發紫外線 B 病灶顯著的熱和機械的抗痛覺過敏作用，而不影響沒有受損皮膚的熱痛覺。在本研究中並未顯示單一的經顱電刺激產生長久的鎮痛和抗痛覺過敏作用。
結論：經顱電刺激能產生顯著的、頻率相關的抗痛覺過敏和鎮痛作用。經顱電刺激作用的特點很可能是由於它共同調節傷害的外周感受器和中樞過度興奮。
（陳靈科　譯　陳傑　校）

BACKGROUND: Transcranial electrostimulation (TES) has been reported to produce clinically significant analgesia, but randomized and double-blind studies are lacking. We investigated the analgesic and antihyperalgesic effects of TES in validated human experimental pain models.
METHODS: In 20 healthy male subjects we evaluated the analgesic and antihyperalgesic effects of TES_{60Hz} and TES_{100Hz} to heat and mechanical pain in experimentally induced ultraviolet B skin sunburns and in normal skin. Previous animal studies in our laboratory predicted that TES_{60Hz} would provide significant analgesia, and TES_{100Hz} was a suitable active control. The study was conducted in a double-blind, randomized, 2-way cross-over fashion. TES was administered for 35 minutes. Quantitative sensory testing evaluating heat and mechanical pain thresholds was conducted before TES, during TES, and 45 minutes after TES.
RESULTS: TES (TES_{60Hz} > TES_{100Hz}) evoked rapidly developing, significant thermal and mechanical antihyperalgesic effects in the ultraviolet B lesion, and attenuated thermal pain in unimpaired skin. No long-lasting analgesic and antihyperalgesic effects of a single TES treatment were demonstrated in this study.

CONCLUSIONS: TES produces significant, frequency-dependent antihyperalgesic and analgesic effects in humans. The characteristics of the TES effects indicate a high likelihood of its ability to modulate both peripheral sensitization of nociceptors and central hyperexcitability.

簡要報告：椎管內阻滯後硬膜外血腫：來自中國的回顧性報告

Brief Reports: Epidural Hematoma After Neuraxial Blockade: A Retrospective Report from China

Shuang-Ling Li, MD, PhD*, Dong-Xin Wang, MD, PhD* and Daqing Ma, MD, PhD†
From the *Department of Anesthesiology and Surgical Intensive Care, Peking University First Hospital, Beijing, China; and the †Department of Anaesthetics, Pain Medicine and Intensive Care, Imperial College London, London, United Kingdom.

Abstract

Anesth Analg November 2010 111:1322-1324

作者對過去 54 年間在整個中國大學醫學院行椎管內阻滯後發生硬膜外血腫的病例進行了詳細的回顧性研究。統計中國人口硬膜外血腫的發生率，危險因素及結果處理。椎管內麻醉後硬膜外血腫的發生率爲 2.14:100000（95%置信區間：0.44-6.25:100000）。細菌感染和急診手術可以增加發生硬膜外血腫的風險。硬膜外血腫的病人及時的減壓手術與良好的神經功能恢復有顯著的相關性。
（張蕾　譯　陳傑　校）

We conducted a detailed 54-year retrospective review of patients who developed epidural hematoma after neuraxial blockade in a university hospital and throughout Mainland China. Incidence, risk factors, and outcomes in the Chinese population were identified. The incidence of epidural hematoma after neuraxial blockade was 2.14 of 100,000 (95% confidence interval: 0.44–6.25 of 100,000). Patients who had a bacterial infection and required emergency surgery were at increased risk of developing epidural hematoma. There is a significant correlation between good neurologic recovery and short interval to decompressive surgery.

心型脂肪酸結合蛋白是冠脈搭橋手術後發生死亡和心室功能障礙的獨立預示因數

Heart-Type Fatty Acid Binding Protein Is an Independent Predictor of Death and Ventricular Dysfunction After Coronary Artery Bypass Graft Surgery

Jochen D. Muehlschlegel, MD*, Tjörvi E. Perry, MD*, Kuang-Yu Liu, PhD*, Amanda A. Fox, MD*, Charles D. Collard, MD†, Stanton K. Shernan, MD* and Simon C. Body, MD*
From the *Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Boston, Massachusetts; and †Division of Cardiovascular Anesthesia, Baylor College of Medicine, Texas Heart Institute, Saint Luke's Episcopal Hospital, Houston, Texas.

Anesth Analg 2010; 111(11):1101-1109

背景：心型脂肪酸結合蛋白(hFABP)充當了心肌脂肪酸的轉運蛋白，在心肌損傷的早期被釋放進入迴圈。我們假設 hFABP 在冠脈搭橋(CABG)手術後優於常規的心臟生物標記物來預示圍手術早期的心肌損傷。

方法：我們在 2 個醫院對 1298 例進行在體外迴圈下的初次 CABG 患者進行了前瞻性佇列研究。在圍手術期的 7 個時間點檢測四種血漿心肌損傷生物標記物（hFABP; 心肌肌鈣蛋白 I [cTnI]; 肌酸激酶 MB [CK-MB]部分和肌紅蛋白）。用 Cox 比例風險模型分析圍手術期心臟生物標記物和心室功能障礙、住院時間(HLOS)以及術年 5 年死亡率（中位數 3.3 年）之間的聯繫。我們定義院內心室功能障礙爲在脫離 CPB 後的手術階段或者在術後重症監護室內新需要 2 種或 2 種以上正性肌力藥物、或者新置入主動脈內球囊搏動、或者心室輔助裝置。

結果：對於 hFABP 死亡率的陽性和陰性預示價值分別是 13%（95%可信區間[CI], 9%–19%）和 95% (95% CI, 94%–96%)，都高於 cTnI 和 CK-MB。調節臨床預示因數之後，術後（POD）1 天和 hFABP 峰值水準都是 CABG 術後心室功能障礙($P < 0.0001$)、HLOS ($P < 0.05$)和 5 年死亡率($P < 0.0001$)的獨立預示因數。此外，POD1 和 hFABP 峰值水準顯著優於其他被評估的預示死亡率的生物標記物。在一個重複檢測分析中，hFABP 超越其他所有適合 HLOS 的模型。POD2 的 hFABP 水準高於 CPB 後 hFABP 水準的患者，較那些 POD2 的 hFABP 水準低於 CPB 後水準的患者死亡率增加(危害比, 10.9; 95% CI, 5.0–23.7; $P = 7.2 \times 10^{-10}$)。120 例（10%）有 hFABP 峰值延遲的患者的死亡率是 18.3%，而峰值無延遲的患者死亡率是 4.7%。無論是 cTnI 還是 CK-MB，兩者均未檢測出死亡率的差異。

結論：與 CABG 術後傳統的心肌損傷標記物比較，hFABP 峰值較早並且是一個較好的術後死亡率和心室功能障礙的獨立預示因數。

（唐亮 譯 馬皓琳 李士通 校）

BACKGROUND: Heart-type fatty acid binding protein (hFABP) functions as a myocardial fatty acid transporter and is released into the circulation early after myocardial injury. We hypothesized that hFABP is superior to conventional cardiac biomarkers for predicting early perioperative myocardial injury after coronary artery bypass graft (CABG) surgery.

METHODS: A prospective cohort study of 1298 patients undergoing primary CABG with cardiopulmonary bypass (CPB) was performed at 2 institutions. Four plasma myocardial injury biomarkers (hFABP; cardiac troponin I [cTnI]; creatine kinase, MB [CK-MB] fraction; and myoglobin) were measured at 7 perioperative time points. The association among perioperative cardiac biomarkers and ventricular dysfunction, hospital length of stay (HLOS), and up to 5-year postoperative mortality (median 3.3 years) was assessed using Cox proportional hazard models. We defined in-hospital ventricular dysfunction as a new requirement for 2 or more inotropes, or new placement of an intraaortic balloon pump, or ventricular assist device either during the intraoperative period after the patient separated from CPB or postoperatively in the intensive care unit.

RESULTS: The positive and negative predictive values of mortality for hFABP are 13% (95% confidence interval [CI], 9%–19%) and 95% (95% CI, 94%–96%), respectively, which is higher than for cTnI and CK-MB. After adjusting for clinical predictors, both postoperative day (POD) 1 and peak hFABP levels were independent predictors of ventricular dysfunction ($P < 0.0001$), HLOS ($P < 0.05$), and 5-year mortality ($P < 0.0001$) after CABG surgery. Furthermore, POD1 and peak hFABP levels were significantly superior to other evaluated biomarkers for predicting mortality. In a repeated-measures analysis, hFABP outperformed all other models of fit for HLOS. Patients with POD2 hFABP levels higher than post-CPB hFABP levels had an increased mortality compared

with those patients whose POD2 hFABP levels decreased from their post-CPB level (hazard ratio, 10.9; 95% CI, 5.0–23.7; $P = 7.2 \times 10^{-10}$). Mortality in the 120 patients (10%) with a later hFABP peak was 18.3%, compared with 4.7% in those who did not peak later. Alternatively, for cTnI or CK-MB, no difference in mortality was detected. **CONCLUSION:** Compared with traditional markers of myocardial injury after CABG surgery, hFABP peaks earlier and is a superior independent predictor of postoperative mortality and ventricular dysfunction.

受控的氣管內導管套囊壓力與術後併發症的相關性：一項多中心研究

Correlations Between Controlled Endotracheal Tube Cuff Pressure and Postprocedural Complications: A Multicenter Study

Jianhui Liu, MD*, Xiaoqing Zhang, MD*, Wei Gong, MD†, Shitong Li, PhD†, Fen Wang, MD‡, Shukun Fu, MD‡, Mazhong Zhang, PhD§ and Yannan Hang, MD§
From the *Department of Anesthesiology, Tongji Hospital, Tongji University School of Medicine; †Department of Anesthesiology, First People's Hospital, Jiaotong University School of Medicine; ‡Department of Anesthesiology, Shanghai 10th People's Hospital, Tongji University School of Medicine; and §Department of Anesthesiology, Renji Hospital, Jiaotong University School of Medicine, Shanghai China.
Anesth Analg 2010; 111(11):1133-1137

背景：氣管內插管相關的術後呼吸系統併發症通常表現爲咳嗽、咽喉痛、聲嘶以及痰中帶血絲。在本研究中，我們研究了測量和控制氣管內導管套囊（ETTc）壓力對術後併發症的短期（小時計）影響。
方法：我們招募了 509 名在中國上海的 4 家大學附屬的三級醫院在全身麻醉下行擇期手術的病人。他們被分成了 2 組，對照組不進行 ETTc 壓力的測量，而試驗組測量 ETTc 壓力後予以調整。我們記錄了手術操作和氣管內導管放置的持續時間。我們在兩組中選擇了 20 名氣管內導管放置持續時間在 120 到 180 分鐘的病人，並且在拔出病人的氣管導管後立即進行纖支鏡檢查。我們記錄了在拔管後的 24 小時內包括咳嗽、咽喉痛、聲嘶以及痰中帶血絲在內的氣管內插管相關併發症的情況。
結果：兩組病人的性別、年齡、身高、體重、手術操作持續時間以及氣管導管放置持續時間均無明顯差異。在試驗組中通過指示氣囊的觸診估計出的 ETTc 平均壓力在調整前爲 43 ± 23.3 mmHg（最高者爲 210mmHg），而調整後爲 20 ± 3.1mm Hg ($P < 0.001$)。對照組術後的咽喉痛、聲嘶和痰中帶血絲的發生率顯著高於試驗組。在對照組中，隨著氣管內導管放置時間的延長，咽喉痛和痰中帶血絲的發生率顯著升高。在試驗組中，隨著氣管內導管放置時間的延長，咽喉痛的發生率也明顯增加。20 名病人的纖支鏡檢查表明兩組病人的氣道粘膜均受到了不同程度的損傷，但是對照組比試驗組更爲嚴重。
結論：通過個人經驗的觸診以估計得到的 ETTc 壓力常常顯著高於測量值或者可能是最恰當的值。由測壓計準確控制 ETTc 壓力有助於減少即使在短小手術（1-3 小時）中發生的包括咳嗽、咽喉痛、聲嘶以及痰中帶血絲在內的 ETT 相關的術後呼吸系統併發症。
（毛祖旻 譯 馬皓琳 李士通 校）

BACKGROUND: Postoperative respiratory complications related to endotracheal intubation usually present as cough, sore throat, hoarseness, and blood-streaked expectorant. In this study, we investigated the short-term (hours) impact of measuring and controlling endotracheal tube cuff (ETTc) pressure on postprocedural complications.
METHODS: Five hundred nine patients from 4 tertiary care university hospitals in Shanghai, China scheduled for elective surgery under general anesthesia were assigned to a control group without measuring ETTc pressure, and a study group with ETTc pressure measured and adjusted. The duration of the procedure and duration of endotracheal intubation were recorded. Twenty patients whose duration of endotracheal intubation was between 120 and 180 minutes were selected from each group and examined by fiberoptic bronchoscopy immediately after removing the endotracheal tube. Endotracheal intubation–related complications including cough, sore throat, hoarseness, and blood-streaked expectorant were recorded at 24 hours postextubation.
RESULTS: There was no significant difference in sex, age, height, weight, procedure duration, and duration of endotracheal intubation between the 2 groups. The mean ETTc pressure measured after estimation by palpation of the pilot balloon of the study group was 43 ± 23.3 mm Hg before adjustment (the highest was 210 mm Hg), and 20 ± 3.1 mm Hg after adjustment ($P < 0.001$). The incidence of postprocedural sore throat, hoarseness, and blood-streaked expectoration in the control group was significantly higher than in the study group. As the duration of endotracheal intubation increased, the incidence of sore throat and blood-streaked expectoration in the control group increased. The incidence of sore throat in the study group also increased with increasing duration of endotracheal intubation. Fiberoptic bronchoscopy in the 20 patients showed that the tracheal mucosa was injured in varying degrees in both groups, but the injury was more severe in the control group than in the study group.
CONCLUSIONS: ETTc pressure estimated by palpation with personal experience is often much higher than measured or what may be optimal. Proper control of ETTc pressure by a manometer helped reduce ETT-related postprocedural respiratory complications such as cough, sore throat, hoarseness, and blood-streaked expectoration even in procedures of short duration (1–3 hours).

缺氧時利用脈搏 CO-血氧測量儀提高高鐵血紅蛋白測量的精確性

Improved Accuracy of Methemoglobin Detection by Pulse CO-Oximetry During Hypoxia

John R. Feiner, MD and Philip E. Bickler, MD, PhD
From the Department of Anesthesia and Perioperative Care, University of California at San Francisco, San Francisco, California.
Anesth Analg 2010; 111(11):1160-1167

背景：血液中的高鐵血紅蛋白無法用傳統血氧測定法檢測，並可能使血氧測量儀對真實的動脈功能血氧含量（SaO_2）的估計值（SpO_2）產生偏倚。最近引進的“脈搏 CO-血氧測量儀”(Masimo Rainbow SET® Radical-7)可測量 SpMet，是一種無創的測量動脈血中高鐵血紅蛋白比率(%MetHb)的方法，研究顯示這種方法在缺氧時測量值呈假性升高。我們通過本實驗試圖確定製造商的修正是否改善了設備同時發現並精確測量高鐵血紅蛋白及去氧血紅蛋白的能力。

方法：12 個健康成年志願受試者在每個手的中指接上感測器，並置入橈動脈導管採集血樣。靜脈給予~300mg 亞硝酸鈉使受試者高鐵血紅蛋白提高到 7%-11%的目標水準，通過不同的吸入氧濃度來引起缺氧到不同的 SaO_2 水準(70% -100%)。將脈搏 CO 血氧測量儀讀數與 Radiometer ABL800 FLEX 多波長血氧測量儀的測量值相比較。通過偏倚（SpMet-%MetHb）以及在不同缺氧程度時發現有意義的讀數錯誤的發生率和預測價值來分析脈搏 CO 血氧測量儀測量高鐵血紅蛋白的性能。在高鐵血紅蛋白升高的情況過程中評價 SpO_2 偏倚（$SpO_2 – SaO_2$）、精確性和標準誤差。
結果：觀察跨度 74% -100% SaO_2 以及 0.4% -14.4%高鐵血紅蛋白，包括 307 個血樣和從 2 台血氧測量儀得到的 602 個數值。在整個 SaO_2 跨度中，Masimo 高鐵血紅蛋白讀數偏倚及精確度分別是 0.16% 和 0.83%，且在此範圍內結果相似。Masimo SpO_2 讀數在 70%-100% 的 SaO_2 範圍內偏倚−1.93%。
結論：在 74%–100%的血氧飽和度範圍以及 0%–14%的高鐵血紅蛋白範圍內，Rainbow 高鐵血紅蛋白讀數的準確性是可接受的。
（瞿亦楓 譯 馬皓琳 李士通校）

BACKGROUND: Methemoglobin in the blood cannot be detected by conventional pulse oximetry and may bias the oximeter's estimate (SpO_2) of the true arterial functional oxygen saturation (SaO_2). A recently introduced “pulse CO-oximeter” (Masimo Rainbow SET® Radical-7) that measures SpMet, a noninvasive measurement of the percentage of methemoglobin in arterial blood (%MetHb), was shown to read spuriously high values during hypoxia. In this study we sought to determine whether the manufacturer's modifications have improved the device's ability to detect and accurately measure methemoglobin and deoxyhemoglobin simultaneously.
METHODS: Twelve healthy adult volunteer subjects were fitted with sensors on the middle finger of each hand, and a radial arterial catheter was placed for blood sampling.

Intravenous administration of ~300 mg of sodium nitrite elevated subjects' methemoglobin levels to a 7% to 11% target level, and hypoxia was induced to different levels of SaO_2 (70% to 100%) by varying fractional inspired oxygen. Pulse CO-oximeter readings were compared with arterial blood values measured with a Radiometer ABL800 FLEX multi-wavelength oximeter. Pulse CO-oximeter methemoglobin reading performance was analyzed by the bias (SpMet-%MetHb), and by observing the incidence of meaningful reading errors and predictive value at the various hypoxia levels. SpO_2 bias ($SpO_2 – SaO_2$), precision, and root-mean-square error were evaluated during conditions of elevated methemoglobin.
RESULTS: Observations spanned 74% to 100% SaO_2 and 0.4% to 14.4% methemoglobin with 307 blood draws and 602 values from the 2 oximeters. Masimo methemoglobin reading bias and precision over the full SaO_2 span was 0.16% and 0.83%, respectively, and was similar across the span. Masimo SpO_2 readings were biased −1.93% across the 70% to 100% SaO_2 range.
CONCLUSIONS: The Rainbow's methemoglobin readings are acceptably accurate over an oxygen saturation range of 74%–100% and a methemoglobin range of 0%–14%.

一個關鍵性回顧：連續性心輸出量監護儀測量心輸出量動態變化的能力

A Critical Review of the Ability of Continuous Cardiac Output Monitors to Measure Trends in Cardiac Output

Lester A. Critchley, MD, FFARCSI, FHKAM, Anna Lee, PhD, MPH and Anthony M.-H. Ho, MD, FCCP, FHKAM
From the Department of Anaesthesia & Intensive Care, The Chinese University of Hong Kong, Prince of Wales Hospital, Hong Kong, China.
Anesth Analg 2010; 111(11):1180-1192

已生產出很多能提供連續讀數而非間斷讀數的心輸出量（CO）監護儀。Bland 和 Altman 已經變成了確認它們性能的並與較老的標準不同的標準方法。然而，Bland 和 Altman 方法只能評估精確度而不能評估儀器檢測心輸出量的連續變化（趨勢能力）有多好。現在，對於該如何完成趨勢能力或趨勢分析尚沒有一致意見。所以，我們對 1997 年到 2009 年之間發表的比較連續性心輸出量測量方法的文章進行了一份文獻綜述。將被鑒定的文獻根據測量方法和統計學方法進行分組。我們以發現一個可接受的統計學方法爲目的對分析趨勢能力的文獻進行回顧。共鑒定 220 篇文獻。最受歡迎的方法是脈搏輪廓線（69 篇文獻）、多普勒（54）、生物阻抗（38）和經肺或連續性熱稀釋法（27）。41 篇文獻涉及到趨勢，其中只有 23 篇提供了深入分析。鑒定了若干個共同的統計專案：時距曲線、回歸分析、使用 CO 變化（ΔCO）的 Bland 和 Altman 和使用 ΔCO 的變化方向來確定一致性的 4 象限曲線。該曲線通過排除小值資料被進一步精煉。用接收機操作特徵曲線來定義排除區帶。在動物實驗中，經常使用一個可靠的參照標準如主動脈流量探測器，且可用回歸曲線或時間曲線來顯示趨勢。臨床實驗有更多的問題，因爲資料收集點較少（每個受試者 8-10 點）。一致意見是使用有排除區帶的 4 象限曲線，並應用一致性分析。使用 15%區帶時一致率〉92%表明趨勢好。提出了一個在極化曲線上顯示趨勢資料 (ΔCO) 的新方法。通過與水準軸線所成的角度表示一致性，到中心的距離表示 ΔCO。用資料的垂直界限來評估趨勢，與 Bland 和 Altman 方法類似。
（周潔 譯 馬皓琳 李士通 校）

Numerous cardiac output (CO) monitors have been produced that provide continuous rather than intermittent readings. Bland and Altman has become the standard method for validating their performance against older standards. However, the Bland and Altman method only assesses precision and does not assess how well a device detects serial changes in CO (trending ability). Currently, there is no consensus on how trending ability, or trend analysis, should be performed. Therefore, we performed a literature review to identify articles published between 1997 and 2009 that compared methods of continuous CO measurement. Identified articles were grouped according to measurement technique and statistical methodology. Articles that analyzed trending ability were reviewed with the aim of finding an acceptable statistical method. Two hundred two articles were identified. The most popular methods were pulse contour (69 articles), Doppler (54), bioimpedance (38), and transpulmonary or continuous thermodilution (27). Forty-one articles addressed trending, and of these only 23 provided an in-depth analysis. Several common statistical themes were identified: time plots, regression analysis, Bland and Altman using change in CO (ΔCO), and the 4-quadrant plot, which used direction of change of ΔCO to determine the concordance. This plot was further refined by exclusion of data when values were small. Receiver operating characteristic curves were used to

define the exclusion zone. In animal studies, a reliable reference standard such as an aortic flowprobe was frequently used, and regression or time plots could be used to show trending. Clinical studies were more problematic because data collection points were fewer (8–10 per subject). The consensus was to use the 4-quadrant plot with exclusion zones and apply concordance analysis. A concordance rate of >92% when using a 15% zone indicated good trending. A new method of presenting trend data (ΔCO) on a polar plot is proposed. Agreement was shown by the angle with the horizontal axis and ΔCO by the distance from the center. Trending can be assessed by the vertical limits of the data, similar to the Bland and Altman method.

決策樹模型用於預測老年患者自主呼吸試驗成功後拔管的預後

A Decision-Tree Model for Predicting Extubation Outcome in Elderly Patients After a Successful Spontaneous Breathing Trial

Yang Liu, MD*, Lu-Qing Wei, MD, PhD*, Guo-Qiang Li, MD*, Fu-Yun Lv, MD*, Huo Wang, MD†, Yu-Hua Zhang, MD* and Wen-Li Cao, MD*
From the *Department of Intensive Care Medicine and the †Department of Pulmonary Medicine, Affiliated Hospital of the Medical College of the Chinese People's Armed Police Forces, Tianjin, People's Republic of China.
Anesth Analg 2010; 111(11):1211-1218

背景：常用的單一測試是基於對某一生理變數的單次測量，其對於拔管預後的預測是很差的，因爲它只檢測了影響拔管預後的生理功能的某個單一的方面。我們假設建立一個決策樹模型（它包含了多個變數，並考慮到這些變數的變化）可以更精確地預測拔管的成功率。
方法：這是一個前瞻性觀察性研究。入選了 2007-2008 年在重症監護室輔助通氣超過 48 小時的 113 例老年患者。所有患者進行持續 60 分鐘的自主呼吸試驗（SBT）【呼氣末正壓爲 5cm H_2O，自動管路補償，100%】。能夠耐受該試驗的患者立即拔管。記錄患者自主呼吸試驗 1 分鐘、30 分鐘和 60 分鐘時的口腔阻斷壓（$P_{0.1}$）、淺快呼吸指數（RSBI）及兩者的乘積（$P_{0.1}$ × RSBI）。SBT 的 30 分鐘和 60 分鐘時測定的 RSBI 變化（ΔRSBI30, ΔRSBI60）被評估爲 RSBI30 或 RSBI60 與 SBT 第 1 分鐘時 RSBI 的比率。
結果：22 例（19.5%）患者未通過自主呼吸試驗，從本研究中剔除；91 例患者能夠耐受試驗，予以拔管。48 小時後，18 例（19.8%）患者需要重新插管（拔管失敗），73 例（80.2%）患者拔管成功，不需再次插管。雖然拔管失敗的患者（118% ± 34%）$\Delta RSBI_{30}$較拔管成功的患者（93% ± 35%, P = 0.01）高，但是受試者作用特性（ROC）分析顯示，該指數在閾值<98%時對於拔管成功的預測能力很差，它在 ROC 曲線以下的面積（AUC）只有 0.76。分類回歸樹分析選擇 3 個變數（$P_{0.1}$ × $RSBI_{30}$，$RSBI_1$，$\Delta RSBI_{30}$），並從 $P_{0.1}$ × $RSBI_{30}$開始。對於 $P_{0.1}$ × $RSBI_{-30}$ >474 cmH_2O*次/min/L 的患者，$\Delta RSBI_{30}$ >98%定義爲包含了所有失敗的患者而非成功的患者的一個組，而 $\Delta RSBI_{30}$ ≤98%包含了所有成功的患者而非失敗的患者。對於 $P_{0.1}$ × $RSBI_{30}$ ≤474 cm H_2O*次/min/L 的患者，$P_{0.1}$ × $RSBI_{30}$ >328 cm H_2O*次/min/L 和 $RSBI_1$ >112 次/min/L 也合併定義了包含了所有成功的患者而非失敗的患

者的一個組。事實上，當只包括 $P_{0.1} \times RSBI_{30}$時，樹模型的診斷準確性爲 89.1%，當包含 $P_{0.1} \times RSBI_{30}$和 $\Delta RSBI_{30}$兩個參數時，其準確性增至 94.5%。最終的樹模型包含了所有這 3 個變數，預測拔管成功的準確率達到 96.7%，AUC 爲 0.94（95%可信區間[CI]，0.87-0.98）。

結論：如果通過大樣本量的前瞻性研究能進一步確認現有的樹模型，那麼它將有助於指導醫生爲重症監護病房的老年患者做出拔管決策。

（徐妍君 譯， 馬皓琳 李士通 校）

BACKGROUND: The commonly used single tests, based on a 1-time measurement of a physiologic variable, are often poorly predictive of tracheal extubation outcome because they examine only a single aspect of physiological function that affects the extubation outcome. We hypothesized that the construction of a decision-tree model, which includes multiple variables and considers the changes of these variables, may more accurately predict successful extubation.

METHODS: This was a prospective observational study. From 2007 to 2008, 113 elderly patients in the medical intensive care unit on ventilation for >48 hours were enrolled. All patients underwent a 60-minute spontaneous breathing trial (SBT) [positive end-expiratory pressure of 5 cm H_2O; automatic tube compensation, 100%]. Patients tolerating the trial were extubated immediately. The mouth occlusion pressure ($P_{0.1}$), rapid shallow breathing index (RSBI,) and their combination ($P_{0.1} \times RSBI$) were recorded at the first, 30th, and 60th minute of the SBT. The changes in RSBI, which were determined at the 30th and 60th minute of the SBT (ΔRSBI30, ΔRSBI60), were assessed as the ratio (of RSBI30 or RSBI60) to RSBI at the first minute of the SBT.

RESULTS: Twenty-two patients (19.5%) failed the SBT and were not included in the analysis, and 91 tolerated the trial and were extubated. At 48 hours, 73 (80.2%) remained extubated (successful extubation), and 18 (19.8%) required reintubation (extubation failure). Although the$\Delta RSBI_{30}$ was significantly higher in the extubation failure patients (118% ± 34%) than that in the successful extubation patients (93% ± 35%, P = 0.01), the receiver operating characteristic (ROC) analysis demonstrated that this index, with the threshold of <98%, presented poor performance in predicting successful extubation with area under the ROC curve (AUC) of only 0.76. The classification and regression-tree analysis selected 3 variables ($P_{0.1} \times RSBI_{30}$, $RSBI_1$, $\Delta RSBI_{30}$) and began with $P_{0.1} \times RSBI_{30}$. For patients with $P_{0.1} \times RSBI\text{-}_{30}$ >474 cmH_2O*breaths/min/L, $\Delta RSBI_{30}$ >98% defined a group including all failure patients but no success patients, whereas $\Delta RSBI_{30}$ ≤98% included all success patients with no failure patients. For patients with $P_{0.1} \times RSBI_{30}$ ≤474 cm H_2O*breaths/min/L, the combination of both a $P_{0.1} \times RSBI_{30}$ >328 cm H_2O*breaths/min/L and $RSBI_1$ >112 breaths/min/L also defined a group including all success patients but no failure patients. Indeed, the diagnostic accuracy (DA) of the tree model, which was 89.1% with only the $P_{0.1} \times RSBI_{30}$ included, increased to 94.5% when both the $P_{0.1} \times RSBI_{30}$ and $\Delta RSBI_{30}$ were included. The final tree model with the inclusion of all 3 discriminators could capture the successful extubation with diagnostic accuracy of 96.7%, AUC of 0.94 (95% confidence interval [CI], 0.87 to 0.98).

CONCLUSION: If the current tree model is confirmed by a prospective study with a larger sample size, it would be useful in guiding physicians making extubation decisions in elderly medical intensive care unit patients.

產科病人椎管內嗎啡鎮痛和口腔皰疹病毒復發

Neuraxial Morphine and Oral Herpes Reactivation in the Obstetric Population

Jeanette R. Bauchat, MD
From the Department of Anesthesiology, Northwestern University Feinberg School of Medicine, Chicago, Illinois.

Anesth Analg 2010; 111(11):1238-1241

椎管內注射嗎啡鎮痛是剖宮產後鎮痛的常規策略。嗎啡通過此途徑增加了分娩期婦女的一個常見疾病——唇皰疹（口腔皰疹）的復發。人們最主要關注的問題是病毒再活化後由母體傳染給新生兒的風險。並沒有研究顯示復發性皰疹可導致嚴重的新生兒發病率，因此，母親接受此種方法鎮痛的益處大於母體皰疹復發導致的產後獲得性新生兒皰疹的風險。
（劉伍 譯 馬皓琳 李士通 校）

Neuraxial morphine administration is a common strategy for providing postcesarean delivery analgesia. Morphine delivered via this route increases the risk of herpes labialis (oral herpes) reactivation, a disease common in women of childbearing age. A primary concern is risk of transmission to the neonate from maternal reactivation. The benefits to the mother of this form of analgesia outweigh the risk of neonatal herpes acquired postpartum from maternal recurrence because serious neonatal morbidity from recurrent herpes has not been described.

唐氏綜合征患兒使用七氟醚麻醉誘導過程中發生的心動過緩

Bradycardia During Induction of Anesthesia with Sevoflurane in Children with Down Syndrome

F. Wickham Kraemer, MD*, Paul A. Stricker, MD*, Harshad G. Gurnaney, MBBS*, Heather McClung, MD†, Marcie R. Meador, MS, BSN‡, Emily Sussman, BA*, Beverly J. Burgess, BA*, Brian Ciampa, BA*, Jared Mendelsohn, BA*, Mohamed A. Rehman, MD, CBMI* and Mehernoor F. Watcha, MD‡§
From the *Department of Anesthesiology and Critical Care Medicine, The Children's Hospital of Philadelphia, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania; †St. Christopher's Hospital for Children, Philadelphia, Pennsylvania; ‡Baylor College of Medicine, Houston, Texas; and §Texas Children's Hospital, Houston, Texas.

Anesth Analg 2010; 111(11):1259-1263

背景：心動過緩是唐氏綜合征患兒中與使用氟烷吸入麻醉誘導相關的併發症。雖然有報導這些兒童使用七氟醚麻醉誘導後發生了心動過緩，但其發生率是未知的。
目的：在這項研究中我們比較了健康對照兒童和唐氏綜合征患兒使用七氟醚誘導後發生心動過緩的發生率和特徵。
方法：我們回顧了八年間使用七氟醚吸入麻醉誘導的 209 例唐氏綜合征患兒和 268 例健康對照組兒童的電子麻醉記錄。從醫療記錄中提取以下資訊：一般資料、有無先心病史、心率、氧合血紅蛋白濃度、呼氣末七氟醚濃度、動脈血壓和麻醉誘導開始後 360 秒內對心動過緩的所有處理。心動過緩和低血壓被定義爲建議啓動兒科快

速反應團隊對住院兒童床旁快速干預的低於臨界值的心率和動脈血壓。在單因素分析中識別與心動過緩相關的因素。用分步反向多因素邏輯回歸模型分析來識別獨立因素。採用 Fisher's 精確檢驗或卡方檢驗（用於分類資料）及 t 檢驗（用於連續資料）計算兩組之間的差異。
結果：單因素分析表明，唐氏綜合症、低 ASA 分級、先天性心臟病和平均七氟醚濃度都是心動過緩的相關因素。然而，多因素分析表明，只有唐氏綜合征和低 ASA 分級仍是心動過緩的獨立因素。
結論：使用七氟醚麻醉誘導過程中的心動過緩常見於伴或不伴有先天性心臟病的唐氏綜合征患兒。
（滕淩雅 譯 馬皓琳 李士通 校）

BACKGROUND: Bradycardia is a complication associated with inhaled induction of anesthesia with halothane in children with Down syndrome. Although bradycardia has been reported after anesthetic induction with sevoflurane in these children, the incidence is unknown.
OBJECTIVES: In this study we compared the incidence and characteristics of bradycardia after induction of anesthesia with sevoflurane in children with Down syndrome to healthy controls.
METHODS: We reviewed electronic anesthetic records of 209 children with Down syndrome and 268 healthy control patients who had inhaled induction of anesthesia with sevoflurane over an 8-year period. Data extracted from the medical record included demographics, history of congenital heart disease, heart rate, oxyhemoglobin saturation, expired sevoflurane concentrations, arterial blood pressure, and any treatment of bradycardia during the first 360 seconds after the start of induction of anesthesia. Bradycardia and hypotension were defined as heart rate and arterial blood pressure below the critical limits recommended for activating a pediatric rapid response team to the bedside of a hospitalized child for quick intervention. Factors associated with bradycardia were identified in a univariate analysis. A step-wise backward multiple logistic regression model was used to identify independent factors. Differences between the 2 groups were computed using Fisher's exact test or χ^2 tests for categorical data and t tests for continuous data.
RESULTS: Univariate analysis demonstrated that Down syndrome, low ASA physical status, congenital heart disease, and mean sevoflurane concentrations were factors associated with bradycardia. However, multivariate analysis showed that only Down syndrome and low ASA physical status remained as independent factors associated with bradycardia.
CONCLUSION: Bradycardia during anesthetic induction with sevoflurane was common in children with Down syndrome, with and without a history of congenital heart disease.

丙泊酚能減少帕金森氏症患者丘腦下核神經元群峰電位活動

Propofol Decreases Neuronal Population Spiking Activity in the Subthalamic Nucleus of Parkinsonian Patients

Aeyal Raz, MD, PhD*, Dan Eimerl, MD†, Adam Zaidel, MSc‡, Hagai Bergman, MD, PhD‡ and Zvi Israel, MD†

From the *Rabin Medical Center, Beilinson Hospital, Petah Tikva; †Hadassah Hebrew University Medical Center, Jerusalem; and ‡Hebrew University, Hadassah Medical School, Jerusalem, Israel.
Anesth Analg 2010; 111(11):1285-1289

背景：在治療帕金森氏症時，通常通過微電極記錄儀（MER）記錄丘腦下核（STN）神經元群峰電位活動來實施在 STN 植入腦深部刺激（DBS）電極。鎮靜藥對 MER 具有何種程度的干擾還未知。我們記錄了丙泊酚鎮靜期間 STN 神經元的群峰電位活動，並檢測其對神經元活動的影響。
方法：在治療帕金森氏症患者的 DBS 手術中實施此操作。在 STN 一個固定的電極部位，我們以丙泊酚 50μg/kg/min 輸注，直到達到穩定的鎮靜深度。我們記錄了在丙泊酚輸注前、中和後的電活動，並計算出其均方根（RMS）。
結果：記錄了 16 名患者的 24 個電極軌跡的活動。在 24 個軌跡中有 18 個 STN 電活動的 RMS 在給予丙泊酚後顯著降低。在丙泊酚輸注期間標準化的 RMS 平均值下降了 23.2%± 9.1%（均值±標準差）(P < 0.001)，而在停用後 9.3 ± 4.0 分鐘恢復到基礎值。
結論：使用丙泊酚會導致 STN 神經元活動的明顯減少。因此，這可能干擾了 MER 對 STN 邊界的鑒定。然而，電活動在停用丙泊酚後很快恢復到基礎水準。因此，可以安全地使用丙泊酚直到使用 MER 做 DBS 前即刻。
（楊秀娟譯 馬皓琳 李士通 校）

BACKGROUND: Implantation of deep brain stimulation (DBS) electrodes in the subthalamic nucleus (STN) for the treatment of Parkinson disease is often performed using microelectrode recording (MER) of STN population spike activity. The extent to which sedative drugs interfere with MER is unknown. We recorded the population activity of STN neurons during propofol sedation and examined its effect on neuronal activity.
METHODS: The procedure was performed during DBS surgery for Parkinson disease. We administered propofol (50 μg/kg/min) at a constant electrode location in the STN until stable sedation was achieved. We recorded the electrical activity, and calculated its root mean square (RMS) before, during, and after the propofol infusions.
RESULTS: The activity of 24 electrode trajectories was recorded in 16 patients. The RMS of STN activity decreased significantly after propofol administration in 18 of the 24 trajectories. The average normalized RMS decreased by 23.2%± 9.1% (mean ± SD) during propofol administration (P < 0.001), and returned to baseline 9.3 ± 4.0 minutes after it was stopped.
CONCLUSIONS: Propofol administration leads to a significant decrease of STN neuronal activity. Thus, it may interfere with MER identification of the STN borders. However, activity returns to baseline shortly after administration stops. Therefore, propofol can be safely used until shortly before MER for DBS.

8-OH-DPAT 阻止嗎啡導致的大鼠背縫神經核的凋亡：減少嗎啡耐受的一個可能機制

8-OH-DPAT Prevents Morphine-Induced Apoptosis in Rat Dorsal Raphe Nucleus: A Possible Mechanism for Attenuating Morphine Tolerance

Mohammad Charkhpour*, Ali Reza Mohajjel Nayebi*, Yousef Doustar† and Kambiz Hassanzadeh‡
From the *Department of Pharmacology and Toxicology, Faculty of Pharmacy, Tabriz University of Medical Sciences, Tabriz, Iran; †Department of Pathobiology, Faculty of Veterinary, Islamic Azad University of Tabriz, Tabriz, Iran; and ‡Department of Physiology and Pharmacology, Faculty of Medicine, Kurdistan University of Medical Sciences, Sanandaj, Iran.
Anesth Analg 2010; 111(11):1316-1321

背景：以前，我們發現背縫神經核（DRN）中血清素-1A(5-HT1A)受體的活化減少了對嗎啡鎮痛作用耐受的發生。已表明對嗎啡鎮痛作用的耐受與中樞神經系統中的凋亡相關。在本實驗中，我們欲評估 8-OH-DPAT（8-羥-2-[di-n-丙胺基]四氫萘，一種特殊的 5-HT1A 受體激動劑）對嗎啡導致耐受及大鼠 DRN 中凋亡的影響。
方法：使用熱板儀器評定傷害性感受。使用末梢去氧核轉移酶介導的 dUTP 缺口末標記（TUNEL）法分析凋亡。
結果：通過服用嗎啡(5 mg/kg/d, i.p.)十天完成對嗎啡鎮痛作用的耐受，然而， 8-OH-DPAT 處理的動物在第十天仍有明顯的鎮痛作用。此外，結果顯示與生理鹽水處理組相比，嗎啡耐受組大鼠（對照組：嗎啡 i.p. + DRN 內生理鹽水）中 TUNEL 陽性細胞的數量增加。結果還表明：與對照組相比，8-OH-DPAT (2、4 和 8 μg/大鼠/d)減少了 DRN 內凋亡細胞的數量。不過，使用 5-HT1A 受體拮抗劑 NAN-190 (6 μg/大鼠/d, DRN 內)時，8-OH-DPAT (8 μg/大鼠/d, DRN 內)不能減少嗎啡導致的凋亡。
結論：我們發現：背縫神經核內注射一種特異 5-HT1A 受體激動劑減少了嗎啡導致的大鼠 DRN 內的凋亡，這可能在嗎啡耐受中起到一個關鍵作用。
（王海濤 譯 馬皓琳 李士通 校）

BACKGROUND: Previously, we found that activation of serotonin 1A (5-HT1A) receptors in the dorsal raphe nucleus (DRN) decreased the development of tolerance to the analgesic effect of morphine. It has been indicated that tolerance to the analgesic effect of morphine is associated with apoptosis in the central nervous system. In this investigation we attempted to evaluate the effect of 8-OH-DPAT (8-hydroxy-2-[di-n-propylamino]tetralin), a specific 5-HT1A receptor agonist, on morphine-induced tolerance and apoptosis in rat DRN.
METHODS: Nociception was assessed using a hotplate apparatus. The terminal deoxynucleotidyl transferase-mediated dUTP nick-end labeling (TUNEL) method was used to analyze apoptosis.
RESULTS: Tolerance to the analgesic effect of morphine was complete by 10 days after morphine administration (5 mg/kg/d, i.p.), whereas a significant analgesic effect was observed through the 10th day in 8-OH-DPAT–treated animals. Furthermore, the results showed that the number of TUNEL positive cells had been increased in morphine-tolerant rats (control group: morphine, i.p. + saline, intra-DRN) in comparison with the saline-treated animals. The results also indicated that 8-OH-DPAT (2, 4, and 8 μg/rat/d) attenuated the number of apoptotic cells in the DRN in comparison with the control group.

However, 8-OH-DPAT (8 μg/rat/d, intra-DRN) failed to reduce morphine-induced apoptosis in the presence of the 5-HT1A receptor antagonist, NAN-190 (6 μg/rat/d, intra-DRN).
CONCLUSION: We found that intra-DRN injection of a specific 5-HT1A receptor agonist attenuated morphine-induced apoptosis in rat DRN, which may have a key role in morphine tolerance.

阿片類藥物介導的預處理效應需依賴小窩蛋白-3 的生物表達

Opioid-Induced Preconditioning Is Dependent on Caveolin-3 Expression.
Tsutsumi YM, Kawaraguchi Y, Niesman IR, Patel HH, Roth DM
Department of Anesthesiology, Institute of Health Biosciences, The University of Tokushima Graduate School, Tokushima, Japan; and Department of Anesthesiology, University of California, San Diego, and VAMC San Diego, San Diego, California.
Anesth Analg. 2010 Nov; 111(5):1117-21.

此次研究驗證了該假說，即小窩蛋白-3（Cav-3）對於體內阿片類藥物介導的預處理效應至關重要。將 Cav-3 過度表達小鼠、Cav-3 基因敲除小鼠及對照組小鼠分別暴露於載有 SNC-121（SNC）（選擇性 δ 阿片受體激動劑）或納絡酮（非選擇性阿片受體拮抗劑）的心肌缺血/再灌注（I/R）損傷模型。其中，對照組小鼠因接受 SNC 減少了 I/R 損傷。而接受 SNC 的 Cav-3 基因敲除小鼠並未產生保護作用。與應用納絡酮拮抗的對照組小鼠相比，Cav-3 過度表達小鼠表現出對於 I/R 損傷的固有保護作用。此次研究結果證實，阿片類藥物介導的預處理效應需依賴小窩蛋白-3 的生物表達，而 Cav-3 過度表達小鼠產生的內源性保護作用也需依賴阿片類藥物實現。
（范羽譯 薛張綱校）
We tested the hypothesis that caveolin-3 (Cav-3) is essential for opioid-induced preconditioning in vivo. Cav-3 overexpressing mice, Cav-3 knockout mice, and controls were exposed to myocardial ischemia/reperfusion (I/R) in the presence of SNC-121 (SNC), a delta-selective opioid agonist, or naloxone, a nonselective opioid antagonist. Controls were protected from I/R injury by SNC. No protection was produced by SNC in Cav-3 knockout mice. Cav-3 overexpressing mice showed innate protection from I/R compared with controls that was abolished by naloxone. Our results show that opioid-induced preconditioning is dependent on Cav-3 expression and that endogenous protection in Cav-3 overexpressing mice is opioid dependent.

奈福泮在終末期腎病患者中的藥代動力學

Nefopam Pharmacokinetics in Patients with End-Stage Renal Disease
Olivier Mimoz, PhD*†‡, Stéphane Chauvet, MD*, Nicolas Grégoire, PhD†‡, Sandrine Marchand, PhD*†‡, Marie-Emmanuelle Le Guern, MD§, Ashraf Saleh, MD§, William Couet, PhD*†‡, Bertrand Debaene, MD*†‡ and René H. Levy, PhD ‖
From *CHU de Poitiers, Poitiers, France; †INSERM ERI 23, Poitiers, France; ‡Université de Poitiers, Poitiers, France; §Centre de Recherche Biocodex, Compiègne, France; and ‖ University of Washington, Seattle, Washington.

Anesth Analg. 2010 Nov;111(5):1146-53.

背景：終末期腎病患者的術後嚴重疼痛的治療一直是麻醉醫生所面臨的問題。因爲這些患者中存在著大量的藥物蓄積和代謝轉化的風險。奈福泮是一種具有潛在鎮痛作用而不引起呼吸抑制的藥物。它由肝臟代謝並且少量以原型從腎臟排出。這使得它在用於終末期腎病患者中具有一定的優勢。然而腎功能衰竭對於奈福泮的藥物分佈的影響卻從未有過研究。
方法：我們研究了12名終末期腎病患者(肌酐清除率<20ml/min, 平均年齡57±13歲)。他們在全身麻醉下接受了動靜脈造瘺手術。術後從全身麻醉中蘇醒30分鐘以後，每位患者均接受一次20mg的奈福泮靜脈注射。48小時後採集血樣，通過液相色譜-串聯質譜法測量血漿中奈福泮和雙甲基奈福泮的藥物濃度。與此同時，12名50至60歲的健康志願者在30分鐘內接受一次20mg奈福泮靜脈注射，使用的是普通人群的藥代動力學參數。比較兩者所得到的藥代動力學參數的數值。
結果：健康志願者和終末期腎病患者的一般情況具有可比性。與健康志願者相比，終末期患者的中央室容積比較小(健康志願者的中央室容積爲264L，尚未接受血液透析的患者中央室容積爲115L，長期血液透析患者中央室容積爲53L，差異均具有統計學意義)；奈福泮的平均清除速率比較慢(在健康志願者，尚未接受血液透析和長期血液透析患者中分別爲52.9L/h, 37.0L/h和27.3L/h，差異顯著)，並且因此使得終末期腎病患者中奈福泮的藥物峰濃度較高(在健康志願者，尚未接受血液透析和長期血液透析患者中分別爲61ng/ml, 121ng/ml和223ng/ml，差異顯著)。
結論：奈福泮在終末期腎病患者中的分佈和消除與普通人群不同。在終末期腎病患者中奈福泮的有效作用濃度增加。爲了避免藥物過量，建議將終末期腎病患者的奈福泮用量減少50%。
（黃劍譯 薛張綱校）

BACKGROUND: Treatment of intense postoperative pain in patients with end-stage renal disease (ESRD) is a recurrent problem for anesthesiologists because of the risk of accumulation of numerous molecules and their metabolites. Nefopam is a potent analgesic metabolized by the liver and weakly eliminated intact in urine that may offer advantages for use in patients with ESRD because it lacks respiratory-depressive effects. However, the effects of renal failure on nefopam disposition have never been investigated.
METHODS: We studied 12 ESRD patients (creatinine clearance < 20 mL/min, mean age 57 ± 13 years) having surgery under general anesthesia to create or repair an arteriovenous fistula. Postoperatively, after complete recovery from anesthesia, each patient received a single 20-mg dose of nefopam IV over 30 minutes. Nefopam and desmethyl-nefopam concentrations in plasma samples obtained over 48 hours were determined by liquid chromatography-tandem mass spectrometry. The pharmacokinetic parameter values obtained were compared with those of 12 healthy 50- to 60-year-old volunteers who also received a single 20-mg nefopam infusion over 30 minutes using a population pharmacokinetic approach.
RESULTS: Healthy volunteers and ESRD patients had comparable demographic characteristics. In comparison with those volunteers, ESRD patients had a lower volume of central compartment (115 and 53 L vs. 264 L for patients not yet hemodialyzed and on chronic hemodialysis, respectively; $P < 0.001$) and lower mean nefopam clearance (37.0

and 27.3 L/h vs. 52.9 L/h, P < 0.001), resulting in higher mean nefopam peak concentration (121 and 223 ng/mL vs. 61 ng/mL, P < 0.001).
CONCLUSIONS: Nefopam distribution and elimination are altered in patients with ESRD, resulting in heightened exposure. To avoid too-high concentration peaks, it is suggested that the daily nefopam dose be reduced by 50%.

麻醉保護裝置(Anaconda©)替代經典汽化設備的準確性

The Accuracy of the Anesthetic Conserving Device(Anaconda©) as an Alternative to the Classical Vaporizer in Anesthesia

Marina Soro, MD, PhD, DEA, Rafael Badenes, MD, Maria Luisa Garcia-Perez, MD,Lucia Gallego-Ligorit, MD, Francisco J. Martí, MD, PhD, Gerardo Aguilar, MD, PhD,and F. Javier Belda, MD, PhD
From the Department of Anesthesiology and Resuscitation, Hospital Clinico Universitario, Valencia, Spain.
Anesth Analg 2010;111:1176–9

背景：麻醉保護裝置ACD和傳統汽化設備做過對比。然而，揮發性麻醉劑給藥濃度的精度尚未驗證。現研究ACD用作攜帶式蒸發器的精准度。
方法：此項前瞻性研究包括 30 名 ASAI–III 級的全麻擇期手術病人，隨機分爲 3 組，每組十人。每組七氟醚分別爲 1.0 vol%, 1.5 vol%和 2.0 vol%肺泡濃度。每兩分鐘記錄一次血流動力學資料，雙頻指數，呼氣末七氟醚濃度。
結果：分析來自30名病人的801份資料顯示，當靶濃度爲1.0 vol%,時候，呼氣末七氟醚濃度和靶濃度的平均差異是靶濃度的- 11.0±9.3%。當靶濃度爲1.5 vol%時是-5.4±6.4%。當靶濃度爲2.0 vol%是- 4.0 ±7.4%。在目標濃度誤差裏無顯著性差異。
結論：證明 ACD 比傳統汽化器更有效。使用方便，只需每小時調節一次給藥速度。麻醉藥儲備不依賴回路和新鮮氣體流速。
（毛慧譯 薛張剛校）

BACKGROUND: The Anesthetic Conserving Device—AnaConDa_ (ACD)—has been compared with a conventional vaporizer. However, the accuracy of the administered concentration of volatile anesthetics was not examined. In the present study we measured the accuracy of the ACD when used as a portable vaporizer.
METHODS: This prospective study included 30 ASA I–III patients scheduled for elective surgery
under general anesthesia. The patients were randomly organized into 3 groups of 10 patients pergroup. In each group, the sevoflurane infusion rate was adjusted to deliver 1.0 vol%, 1.5 vol%,and 2.0 vol% alveolar concentration. Hemodynamic data, bispectral index, and end-tidal sevoflurane concentrations were recorded every 2 minutes.
RESULTS: We analyzed 801 data points from 30 patients. The mean difference between the end-tidal sevoflurane concentration and the target concentration was- 11.0±9.3%of the target when the target was 1.0 vol%, -5.4±6.4% when the target was 1.5 vol%, and - 4.0 ±7.4% when the target was 2.0 vol%. No significant differences were found in the error at the different target concentrations.
CONCLUSIONS: We found that the ACD may be a valid alternative to the conventional vaporizer.The ACD is very simple to use, delivery rate needs to be adjusted only once per

hour, and the anesthetic savings are independent of the circuit characteristics and fresh gas flow rate.

卡維地洛在氣道阻塞致心搏驟停大鼠模型的心肺復蘇中的作用

The Effects of Carvedilol Administration on Cardiopulmonary Resuscitation in a Rat Model of Cardiac Arrest Induced by Airway Obstruction

Kurita A, Taniguchi T, Yamamoto K.
Department of Anesthesiology and Intensive Care Medicine, Graduate School of Medical Science, Kanazawa University, Kanazawa, Japan.
Anesth Analg November 2010 111:1207-1210

背景：卡維地洛是一種非選擇性的β受體和選擇性的α_1受體阻滯劑。與其他傳統β受體阻滯劑相比，卡維地洛具有內皮依賴的血管舒張作用，所以它被廣泛應用在高血壓和/或慢性心功能不全的病人。我們觀察了卡維地洛口服給藥在氣道阻塞致心搏驟停大鼠模型的心肺復蘇中的作用。
方法：24 只大鼠被隨機分爲 2 組：對照組（不給藥）和治療組（口服卡維地洛每天 10mg/kg 持續 5 天）。大鼠被麻醉後，心搏驟停由氣道阻塞誘發，並在心搏驟停後 3 分鐘開始進行心肺復蘇。胸外按壓頻率爲每分鐘 240-260 次，並調整按壓深度以保持動脈舒張壓在 25-30mmHg。在心肺復蘇開始 5 分鐘後給予腎上腺素 0.02mg/kg。在心搏驟停前、中、後均未給予其他治療。
結果：治療組氣道阻塞致心搏驟停所需時間明顯長於對照組（230±27 秒對比 203±24 秒； $P < 0.05$）。心肺復蘇後大鼠恢復持續迴圈的比例明顯高於對照組（92%對比 50%；$P < 0.05$）。酸中毒、血糖升高程度以及腫瘤壞死因數α濃度治療組均低於對照組。
結論：本研究顯示口服卡維地洛數日後，大鼠在氣道阻塞後更能抵抗心搏驟停的發生，且在發生心搏驟停後更有可能被復蘇。這些結果顯示卡維地洛可能延長了呼吸衰竭時的安全缺血時間。
（任雲譯 薛張剛校）

BACKGROUND: Carvedilol is a nonselective β-adrenoceptor and selective α(1)-adrenoceptor blocker and is widely used in the treatment of patients with hypertensive and/or chronic heart failure because, unlike classic β-blockers, this drug has additional endothelium-dependent vasodilatory effects. We evaluated the effects of oral administration of carvedilol on cardiopulmonary resuscitation (CPR) in a rat model of cardiac arrest (CA) induced by airway obstruction.
METHODS: Twenty-four rats were randomly assigned to 2 groups: control group (no medication) and treatment group (oral administration of carvedilol [10 mg/kg/d] for 5 days) (n = 12 per group). All the animals were anesthetized, and CA was induced by obstructing the airway. Three minutes after CA, the animals were revived by administering CPR. The rate of chest compressions (CCs) was 240 to 260 CCs/min and the depth of CCs was adjusted to maintain the diastolic arterial blood pressure between 25 to 30 mm Hg in both groups. Epinephrine (0.02 mg/kg) was administered after 5 minutes of CPR. No other therapy was administered before, during, or after CA.
RESULTS: The time interval between airway obstruction and CA in the treatment group was significantly longer than in the control group (230 ± 27 vs 203 ± 24 seconds; P <

0.05). The rate of return of spontaneous circulation in the treatment group was significantly higher than in the control group (92% vs 50%; P < 0.05). Acidosis and increased glucose and tumor necrosis factor-α concentrations in the treatment group were significantly lower than in the control group.
CONCLUSIONS: The results of our study showed that rats that had been administered oral carvedilol for several days were more resistant to CA induced by airway obstruction, and when CA did occur, were more likely to be resuscitated. These findings suggest that carvedilol may prolong the safe ischemic time induced by respiratory failure.

在實行蛛網膜下腔阻滯的剖宮產手術中新福林的劑量依賴作用。

The dose-dependent effects of phenylephrine for elective cesarean delivery under spinal anesthesia.

Stewart A, Fernando R, McDonald S, Hignett R, Jones T, Columb M.
Department of Anesthesia, University College London Hospitals NHS Foundation Trust, London, UK.
Anesth Analg. 2010 Nov;111(5):1093-5.

背景：低血壓是採用蛛網膜下腔阻行剖宮產手術時最常見的嚴重副作用。最近越來越多的醫生採用新福林作爲血管加壓素，來提高孕婦心血管的穩定性和嬰兒的安全產出。雖然在擇期手術中新福林是安全的，但是仍然有很多人關注它所引起的母親後負荷的增加和壓力感受器介導的心動過緩，進而引起母親的心輸出量減少。爲了能瞭解新福林對母親心血管穩定性的劑量依賴作用，我們採用無創的方法來檢測母親的心輸出量。如果有影響，那麼它對嬰兒的出生是否有影響。
方法：我們採用隨機分組雙盲的研究方法，75 名擇期行剖宮產的孕婦分別給予新福林 25ug/min,50ug/min,100ug/min。我們從蛛網膜下腔阻滯開始至嬰兒產出，用新福林滴定的方式來維持母親的基礎收縮壓。我們記錄母親的心血管變化，包括心率和收縮壓。我們分別在術前，蛛網膜阻滯開始後 20 分鐘內每隔 5 分鐘，在胸骨上用多普勒超聲監測母親的心輸出量，每搏輸出量，靜脈回流和心肌收縮力。同時我們記錄嬰兒的 Apgar 評分和臍帶血的血氣。
結果：各組的收縮壓都比較理想，但是和其他低劑量組相比，新福林 100ug/min 組卻需要更大的劑量才能使血壓維持好。各組在收縮壓低於基礎值的 80%出現的次數，和在使用麻黃素或者新福林使收縮壓高於基礎值的 80%的次數方面都沒有顯著性差異。各組中新福林引起的心率減慢和心輸出量減少都與時間和劑量依賴都有顯著性差異，如果各組中心率和心輸出量隨新福林使用的時間越長而越低，隨其使用的濃度越高而越低。整個過程中每搏輸出量都是穩定的。各組中的 Apgar 評分和臍帶血血氣都是相似的。
結論：給予高濃度的新福林（100ug/min）,我們會使母親與嬰兒需要更大劑量的新福林來維持血壓，同時會引起心率和心輸出量明顯的下降（達 20%的下降）。仍有待更多的研究來決定是否在急診剖宮產蛛網膜下腔阻滯時使用新福林母親心輸量的減少是不利的。
（翁梅琳譯 薛張剛校）

BACKGROUND: Hypotension is the most common serious side effect of spinal anesthesia for cesarean delivery. There has been a move recently toward the use of

phenylephrine as a vasopressor infusion to improve maternal cardiovascular stability and fetal outcome. Although it seems safe in the elective setting, there have been concerns about its propensity for causing an increase in afterload and a baroreceptor-mediated bradycardia in the mother, with a consequent reduction in maternal cardiac output (CO). Using a noninvasive measure of CO, our aim was to investigate whether there were any dose-dependent effects of phenylephrine on maternal cardiovascular stability and, if so, any impact on fetal outcome.

METHODS: In this randomized, double-blind study, 75 women scheduled for elective cesarean delivery were allocated to receive a phenylephrine infusion at 25 μg/min, 50 μg/min, or 100 μg/min. This infusion was titrated to maintain maternal baseline systolic blood pressure (SBP), from induction of spinal anesthesia until delivery. The maternal cardiovascular variables recorded included heart rate (HR) and SBP. A suprasternal Doppler monitor measured CO and stroke volume, as well as measures of venous return (corrected flow time) and contractility, at baseline, and then every 5 minutes for 20 minutes after initiation of spinal anesthesia. Apgar scores and umbilical cord blood gases were recorded.

RESULTS: SBP control was satisfactory in all groups; however, the group receiving phenylephrine 100 μg/min required significantly higher doses to achieve arterial blood pressure control compared with the lower infusion rates. There were no significant differences in the number of times SBP decreased below 80% of baseline, or the numbers of boluses of ephedrine or phenylephrine required to maintain SBP above 80% of baseline. There were significant time and dose-dependent reductions in HR and CO with phenylephrine, such that HR and CO were seen to decrease with time in each group, and also with increasing concentrations of phenylephrine. Stroke volume remained stable throughout. Apgar scores and umbilical cord blood gases were similar among groups.

CONCLUSION: By infusing a higher concentration (100 μg/min), we subject the mother and fetus to a much higher dose of phenylephrine, with significant effects on maternal HR and CO (up to a 20% reduction). Future investigation is required to determine whether this reduction in maternal CO has detrimental effects when providing anesthesia for an emergency cesarean delivery for a compromised fetus.

口服造影劑對腹部 CT 檢查兒童胃液容量的影響

Oral contrast for abdominal computed tomography in children: the effects on gastric fluid volume.

Mahmoud M, McAuliffe J, Kim HY, Mishra P, Salisbury S, Schnell B, Hirsch P, Arbabi S, Donnelly LF.

Department of Anesthesiology, Tehran University Children's Hospital Medical Center, Tehran, Iran.

Anesth Analg November 2010 111:1252-1258

背景：口服腸道造影劑（ECM）應用 CT 掃描腹部時通常需要口服腸道造影劑來分辨胃腸道。但在鎮靜/麻醉前 2h 內給予口服 ECM 違背禁食指南，而且理論上會增加吸入性肺炎的風險。在這項研究中，我們在麻醉/鎮靜前 1h 給予 ECM，並測量殘餘胃內容量。我們假定患者在麻醉/鎮靜前 1h 口服 ECM，其殘餘胃液容量（GFV）將>0.4 mL/kg。

方法：回顧分析 2005 年 1 月至 2009 年 6 月期間所有接受過鎮靜/麻醉下腹部 CT 掃描患者的麻醉和放射學報告，CT 片和部門事故報告。通過對感興趣的包含有高弱化液體和低弱化的其他胃內容物的胃部分區域的輪廓描記來計算造影劑或胃液的容量。從患者的麻醉/鎮靜記錄單上得出患者的人口學特徵、當前病理學報告、麻醉/鎮靜誘導和維持的藥物、氣道干預措施、氣管插管的途徑和與口服 ECM 相關的併發症（包括氧飽和度下降、嘔吐、咳嗽、支氣管痙攣、喉痙攣和誤吸）。

結果：我們確定了 365 例行腹部 CT 掃描患者（平均年齡 32 個月，年齡範圍在 0.66 至 211.10 個月之間）在麻醉/鎮靜之前接受口服/靜脈造影劑，47 例患者（平均年齡 52 個月，年齡範圍在 0.63 至 215.84 個月之間）僅接受靜脈造影劑隨後常規禁食禁飲。對於口服造影劑患者，平均造影劑容量爲 18.10ml/kg（範圍在 1.5 至 82.76ml/kg 之間）。完成口服造影劑患者 1h 後的中位 GFV 明顯高於僅僅接受靜脈造影劑患者（0.38 mL/kg VS. 0.15 mL/kg，P = 0.0049）。有 189 位患者 GFV＞0.4ml/kg，其中口服造影劑組中占 49%（178/365），靜脈造影劑組占 23%（11/47）（χ^2= 10.7874，P = 0.0010）。在接受口服造影劑的患者中，207 例行全身麻醉，158 例行深度鎮靜。全麻患者中據報導有 2 例發生嘔吐，但沒有吸入性肺炎的確切證據。

結論：對於行腹部 CT 掃描的兒童，發生殘餘 GFV＞0.4ml/kg 的患者，在麻醉/鎮靜 1h 前接受口服 ECM 患者中所占的比例爲 49%（178//365），而在僅僅接受靜脈造影劑的患者中所占比例爲 23%（11//47）。

（吳少勇譯 薛張綱校）

Background: Oral enteric contrast medium (ECM) is frequently administered to achieve visualization of the gastrointestinal tract during abdominal evaluation with computed tomography (CT). Administering oral ECM less than 2 hours before sedation/anesthesia violates the nothing-by-mouth guidelines and in theory may increase the risk of aspiration pneumonia. In this study we measured the residual gastric fluid when using a protocol in which ECM is administered up to 1 hour before anesthesia/sedation. We hypothesized that patients receiving ECM 1 hour before anesthesia/sedation would have residual gastric fluid volume (GFV) >0.4 mL/kg.

Methods: Anesthesia and radiology reports, CT images, and department incident reports were reviewed between January 2005 and June 2009 for all patients who required sedation/anesthesia for abdominal CT. For each patient, the volume of contrast or stomach fluid was calculated using a region of interest outlining the stomach portion containing high-attenuation fluid and low-attenuation of other gastric contents. Information obtained from anesthesia/sedation reports included demographic characteristics, presenting pathology, drugs used for anesthesia/sedation induction and maintenance, airway interventions, method for securing endotracheal tube, and complications related to ECM administration, including oxygen desaturation, vomiting, coughing, bronchospasm, laryngospasm, and aspiration.

Results: We identified 365 patients (mean age = 32 months; range = 0.66 to 211.10 months) who received oral/IV contrast material before anesthesia/sedation for abdominal CT and 47 patients (mean age = 52 months; range = 0.63 to 215.84 months) who received only IV contrast material and followed the traditional fast. For those who received oral contrast, the mean contrast volume administered was 18.10 mL/kg (range = 1.5 to 82.76 mL/kg). The median GVF 1 hour after completing the oral contrast was significantly

higher than that in patients who received only IV contrast (0.38 mL/kg vs. 0.15 mL/kg, P = 0.0049). GFV exceeded 0.4 mL/kg in 189 patients (178 of 365 [49%] in the oral contrast group vs. 11 of 47 [23%] in the IV contrast group) ($\chi 2 = 10.7874$, P = 0.0010). Among those who received oral contrast, 207 patients had general anesthesia and 158 patients had deep sedation. Two cases of vomiting were reported in the general anesthesia group with no evidence of pulmonary aspiration identified.
Conclusion: For children receiving an abdominal CT, the residual GFV exceeded 0.4 mL/kg in 49% (178/365) of those who received oral ECM up to 1 hour before anesthesia/sedation in comparison with 23% (11/47) of those who received IV-only contrast.

咪達唑侖和異丙酚鎮靜對於大腦動態自動調節的不同效應

The Different Effects of Midazolam and Propofol Sedation on Dynamic Cerebral Autoregulation

Yojiro Ogawa, DDS, PhD, Ken-ichi Iwasaki, MD, PhD, Ken Aoki, PhD, Dai Gokan, MD, PhD, Noriya Hirose, DDS, PhD, Jitsu Kato, MD, PhD and Setsuro Ogawa, MD, PhD
From the Department of Social Medicine, Division of Hygiene; and Department of Anesthesiology, Division of Anesthesiology, Nihon University School of Medicine, Tokyo, Japan.
Anesth Analg November 2010 111:1279-1284

背景:雖然咪達唑侖和異丙酚都通過作用於自主神經系統和內皮細胞介導的鬆弛作用降低腦血流。咪達唑侖介導的以交感神經爲主，而異丙酚以副交感爲主。咪達唑侖沒有內皮細胞介導的鬆弛作用，然而異丙酚抑制內皮細胞依賴的鬆弛作用。而且，咪達唑侖明顯使腦動脈收縮。因此我們假設咪達唑侖和異丙酚對於大腦動態自動調節具有不同效應。
方法：十名健康男性受試者接受了咪達唑侖、異丙酚和安慰劑的注射，這是一個隨機、單盲、交叉的臨床試驗。修改的 評分評價鎮靜深度。在達到目標鎮靜深度或普通生理鹽水作爲安慰劑注射 15 分鐘後，用經張力測量法測橈動脈平均動脈壓變異、經顱多普勒超聲測得大腦中動脈血流變異的分析來評估大腦動態自動調節。
結果:咪達唑侖和異丙酚能顯著降低穩態腦血流(顯著的相互作用,p=0.024)。然 2 而低頻狀態下轉移函數斜率的顯著下降只在咪達唑侖注射時發生（顯著的相互作用，p=0.015），提示咪達唑侖鎮靜期間平均動脈壓變化引起的腦血流波動減小。
結論：我們的研究結果顯示咪達唑侖和異丙酚在腦血流的自動調節方面具有不同的效應，雖然在降低穩態腦血流方面具相同效應。只有咪達唑侖可能改善腦血流自動調節功能。
（姚敏敏譯 薛張綱校）
BACKGROUND: Although midazolam and propofol reduce cerebral blood flow (CBF) similarly, they generate different effects on the autonomic nervous system and endothelium-induced relaxation. Midazolam induces sympathetic dominance, whereas propofol induces parasympathetic dominance. Midazolam has no effect on endothelium-dependent relaxation, whereas propofol suppresses endothelium-dependent relaxation. Moreover, midazolam apparently constricts cerebral arterioles. We therefore

hypothesized that midazolam and propofol have different effects on dynamic cerebral autoregulation.
METHODS: Ten healthy male subjects received midazolam, propofol, and placebo administrations in a randomized, single-blind, crossover study. The modified Observer's Assessment of Alertness/Sedation scale was used to assess sedation depth. After reaching a target depth of sedation (Observer's Assessment of Alertness/Sedation scale score 3, responds only after name is called loudly and/or repeatedly) or after 15 minutes of normal saline administration as placebo, dynamic cerebral autoregulation was evaluated by spectral and transfer function analyses between mean arterial blood pressure variability in the radial artery measured by tonometry, and CBF velocity variability in the middle cerebral artery measured by transcranial Doppler ultrasonography.
RESULTS: Steady-state CBF velocity decreased significantly with midazolam and propofol administration (significant interaction effects, P = 0.024). However, transfer function gain in the low-frequency range decreased significantly only with midazolam administration (significant interaction effects, P = 0.015), suggesting a reduced magnitude of transfer from mean arterial blood pressure oscillations to CBF fluctuations during midazolam sedation.
CONCLUSION: Our results suggest that midazolam and propofol sedation have different effects on dynamic cerebral autoregulation despite causing equivalent decreases in steady-state CBF velocity. Only midazolam sedation is likely to improve dynamic cerebral autoregulation.

低位肢端截肢術後使用長期外周神經阻滯：對幻肢綜合征相關症狀的效果

The Use of Prolonged Peripheral Neural Blockade After Lower Extremity Amputation: The Effect on Symptoms Associated with Phantom Limb Syndrome .

Battista Borghi, MD, Marco D'Addabbo, MD, Paul F. White, MD, PhD, Pina Gallerani, RN, Letizia Toccaceli, MD, William Raffaeli, MD, Andrea Tognù, MD, Nicola Fabbri, MD and Mario Mercuri, MD
Authors' affiliations are listed at the end of the article.
Address correspondence and reprint requests to Paul F. White, MD, PhD, 144 Ashby Lane, Los Altos, CA 94022.
Anesth Analg November 2010 111:1308-1315

背景：幻肢綜合征（PLS）在截肢術後常見，出現於 90%截肢者中。儘管有各種不同的療法，但沒有一種是高度有效的。基於此，我們評價長期對外周神經注射高濃度局部麻醉劑來預防 PLS 的效果。
方法：在術前即刻或術中給 71 名將接受低位肢端截肢術的患者在外周神經處放置導管。術中以 5mL/h 的速度用一個可調控（非電子）的泵持續輸注 0.5%羅呱卡因，並持續至術後 4 至 83 天。術後第一天和此後的第 1、2、3、4 周，第 3、6、9、12 月評估 PLS。評估患者在接受羅呱卡因輸注期間停止輸注 6 至 12 小時後（幻肢感覺恢復）PLS 是否出現及嚴重程度。幻肢嚴重程度和殘肢痛用 5 度口述評級量表（VRS）評估，0 級無痛，至 4 級無法忍受，幻肢感用存在或不存在評估。如果 VRS>1 分，或有顯著的幻肢感，立即恢復以 5mL/h 的速度輸注羅呱卡因。如果 VRS 保持 0 到 1 且患者 48 小時無幻肢感，羅呱卡因停止輸注並拔除導管。

結果：輸注局部麻醉劑時間的中位數爲 30 天（置信區間 95%，25 到 30 天）。術後第一天 73%患者主訴從嚴重到無法忍受的程度的疼痛（視覺類比量表>2）。但這一評價在第 12 個月的尾期僅出現在 3%的患者中，患者 VRS 疼痛評分結果：84%=0，10%=1,3%=2,3%=3,4%=無。但是幻肢感在第 12 個月的尾期出現在 39%的患者中。每個病人都會使用可調控輸注系統。
結論：長期外周神經輸注 0.5%羅呱卡因似乎是低位截肢術後治療幻肢痛和幻肢感的有效方法。
（張玥琪譯，薛張綱校）

BACKGROUND: Phantom limb syndrome (PLS) is common after limb amputations, involving up to 90% of amputees. Although many different therapies have been evaluated, none has been found to be highly effective. Therefore, we evaluated the efficacy of a prolonged perineural infusion of a high concentration of local anesthetic solution in preventing PLS.
METHODS: A perineural catheter was placed immediately before or during surgery in 71 patients undergoing lower extremity amputation. A continuous infusion of 0.5% ropivacaine was started intraoperatively at 5 mL/h using an elastomeric (nonelectronic) pump, and continued for 4 to 83 days after surgery. PLS was evaluated on the first postoperative day and then 1, 2, 3, and 4 weeks, and 3, 6, 9, and 12 months after surgery. To evaluate the presence and severity of PLS while the patient was receiving the ropivacaine infusion, it was discontinued for 6 to 12 hours before each assessment period (i.e., until the sensation in the extremity returned). The severity of phantom limb and stump pain was assessed using a 5-point verbal rating scale (VRS), with 0 = no pain to 4 = intolerable pain, and "phantom" sensations were recorded as present or absent. If the VRS score was >1 or significant phantom sensations were present, the ropivacaine infusion was immediately restarted at 5 mL/h. If the VRS score remained at 0 to 1 and the patient had not experienced phantom sensations for 48 hours, the infusion was permanently discontinued and the catheter was removed.
RESULTS: Median duration of the local anesthetic infusion was 30 days (95% confidence interval, 25–30 days). On postoperative day 1, 73% of the patients complained of severe-to-intolerable pain (visual analog scale >2). However, the incidence of severe-to-intolerable phantom limb pain was only 3% at the end of the 12-month evaluation period. At the end of the 12-month period, the percentage of patients with VRS pain scores were 0 = 84%, 1 = 10%, 2 = 3%, 3 = 3%, and 4 = none. However, phantom limb sensations were present in 39% of patients at the end of the 12-month evaluation period. All patients were able to manage the elastomeric catheter infusion system at home.
CONCLUSION: Use of a prolonged postoperative perineural infusion of ropivacaine 0.5% seems to be an effective therapy for the treatment of phantom limb pain and sensations after lower extremity amputation.

單點對比三點注射行超聲引導鎖骨下阻滯：單點注射技術效果的確認

Single Versus Triple Injection Ultrasound-Guided Infraclavicular Block: Confirmation of the Effectiveness of the Single Injection Technique

Michael J. Fredrickson, FANZCA*‡, Philip Wolstencroft, FANZCA‡, Ritwik Kejriwal, MBChB§, Albert Yoon, MBChB§, Michael R. Boland, FRACS†‡ and Simon Chinchanwala, FRACS‡§
From the Departments of *Anaesthesiology and †Orthopaedic Surgery, Faculty of Medical and Health Sciences, University of Auckland; ‡Southern Cross Hospital North Harbour; and §Department of Orthopaedic Surgery, North Shore Hospital, Auckland, New Zealand.
Anesth Analg November 2010 111:1325-1327

背景：超聲引導鎖骨下阻滯時局麻藥注射的最佳位點仍存在爭議。
方法：患者隨機分入接受 2%利多卡因 30mL 腋動脈後單點注射組（n=51）或理想的接近臂叢每個分支注射的三點注射組（n=49）。20 分鐘後評估遠端 4 個神經阻滯區域的針刺感和運動阻滯（3=未阻滯，0=完全阻滯）。
結果：單點注射沒有顯著的劣勢（單點對比三點 20 分鐘總阻滯分值均數[四分位間距]：5[2-9]對 7[3.5-11]），但是卻有明顯的優勢（2-tailed test, P = 0.043)。單點注射技術與操作時間少量縮短相關。
結論：超聲引導鎖骨下阻滯局麻藥注射最佳位置是腋動脈後方單點注射。
（朱蘭芳譯，薛張綱校）

BACKGROUND: The optimal site for local anesthetic placement during ultrasound-guided infraclavicular block remains controversial.
METHODS: Patients were randomized to receive lidocaine 2% 30 mL as a single injection posterior to the axillary artery (n = 51) or a triple injection ideally adjacent to each brachial plexus cord (n = 49). Pinprick sensory and motor block (3 = no block, 0 = complete block) were assessed to 20 minutes in the 4 distal nerve territories.
RESULTS: The single injection group was not significantly inferior (single versus triple injection median [interquartile range] 20-minute aggregate block score: 5 [2–9] vs 7 [3.5–11]) but also demonstrated superiority (2-tailed test, P = 0.043). The single injection technique was associated with a small reduction in procedural time.
CONCLUSIONS: The optimal site for local anesthetic placement during ultrasound-guided infraclavicular block is a single point injection posterior to the axillary artery.