Table of Contents

March 2012

Cardiovascular Anesthesiology

- Mark R. Looney,
- Clifford A. Lowell,
- and Michael A. Gropper

Anesth Analg March 2012 114:511-519; published ahead of print January 19, 2012

斑布里奇和"反向"斑布里奇反射：歷史、生理和臨床意義
（劉朝輝譯，李士通，馬皓琳校）

Review Article: The Bainbridge and the "Reverse" Bainbridge Reflexes: History, Physiology, and Clinical Relevance

- George J. Crystal and
- M. Ramez Salem

Anesth Analg March 2012 114:520-532; published ahead of print September 29, 2011

綜述 :心臟手術中利用腦電描記技術和腦電雙頻譜指數進行腦監測
(俞芳譯　陳傑校)

Review Article: Brain Monitoring with Electroencephalography and the Electroencephalogram-Derived Bispectral Index During Cardiac Surgery

- Miklos D. Kertai,
- Elizabeth L. Whitlock,
- and Michael S. Avidan

Anesth Analg March 2012 114:533-546; published ahead of print January 17, 2012

Anesthetic Pharmacology

血管緊張素轉化酶抑制劑不與非心臟手術術後的呼吸道併發症和死亡率相關
(方昕譯 薛張綱校)

Angiotensin Converting Enzyme Inhibitors Are Not Associated with Respiratory Complications or Mortality After Noncardiac Surgery

- Alparslan Turan,
- Jing You,
- Ayako Shiba,
- Andrea Kurz,

- Leif Saager,
- and Daniel I. Sessler

Anesth Analg March 2012 114:552-560; published ahead of print January 17, 2012

兔子肝纖維化對七氟烷最小肺泡濃度的影響
(許辛 譯 馬皓琳 李士通 校)

Minimum Alveolar Concentration of Sevoflurane in Rabbits with Liver Fibrosis

- Yan Yin,
- Ming Yan,
- and Tao Zhu

Anesth Analg March 2012 114:561-565; published ahead of print December 20, 2011

全身性應用利多卡因並不減少大鼠肝臟手術後的肝功能不全
(龔寅譯　陳傑校)

Systemic Lidocaine Does Not Attenuate Hepatic Dysfunction After Liver Surgery in Rats

- Wilmar de Graaf,
- Gwen M. P. Diepenhorst,
- Susanne Herroeder,
- Deha Erdogan,
- Markus W. Hollmann,
- and Thomas M. van Gulik

Anesth Analg March 2012 114:566-573; published ahead of print January 17, 2012

Technology, Computing, and Simulation

PT-SAFE：一款運行和顯示醫療音訊警報的軟體
(郭晨躍譯 薛張綱校)

PT-SAFE: A Software Tool for Development and Annunciation of Medical Audible Alarms

- Christopher L. Bennett and
- Richard R. McNeer

Anesth Analg March 2012 114:576-583; published ahead of print February 6, 2012

昆士蘭大學生命體征資料集：一個可獲取的用於麻醉病人監護資料研究的資源檔案庫的發展

(張怡譯 馬皓琳 李士通校)

Technical Communication: University of Queensland Vital Signs Dataset: Development of an Accessible Repository of Anesthesia Patient Monitoring Data for Research

- David Liu,
- Matthias Görges,
- and Simon A. Jenkins

Anesth Analg March 2012 114:584-589; published ahead of print December 20, 2011

技術交流：開普勒插管系統

(滕淩雅譯　陳傑校)

Technical Communication: The Kepler Intubation System

- Thomas M. Hemmerling,
- Mohamad Wehbe,
- Cedrick Zaouter,
- Riccardo Taddei,
- and Joshua Morse

Anesth Analg March 2012 114:590-594; published ahead of print December 20, 2011

Patient Safety

圍術期失誤對麻醉醫生的影響：國家調查的結果

(孫莉萍譯 薛張綱校)

The Impact of Perioperative Catastrophes on Anesthesiologists: Results of a National Survey

- Farnaz M. Gazoni,
- Peter E. Amato,
- Zahra M. Malik,
- and Marcel E. Durieux

Anesth Analg March 2012 114:596-603; published ahead of print July 7, 2011

報告麻醉不良事件和錯誤的障礙
(陳彬彬譯 馬皓琳 李士通校)

Barriers to Adverse Event and Error Reporting in Anesthesia

- Gaylene C. Heard,
- Penelope M. Sanderson,
- and Rowan D. Thomas

Anesth Analg March 2012 114:604-614; published ahead of print August 4, 2011

綜述：醫療過失意外後果的告知－對麻醉醫生意味著什麼？
(范逸辰譯　陳傑校)

Review Article: The Disclosure of Unanticipated Outcomes of Care and Medical Errors: What Does This Mean for Anesthesiologists?

- Karen J. Souter and
- Thomas H. Gallagher

Anesth Analg March 2012 114:615-621; published ahead of print June 3, 2011

放置中心靜脈導管前使用單純酒精消毒是否具有與外科消毒液等同的消毒效果
(楊琰譯 薛張綱校)

Is Alcohol-Based Hand Disinfection Equivalent to Surgical Scrub Before Placing a Central Venous Catheter?

- Thomas Michael Burch,
- Brett Stanger,
- K. Annette Mizuguchi,
- David Zurakowski,
- and Sean D. Reid

Anesth Analg March 2012 114:622-625; published ahead of print December 20, 2011

超聲引導下中心靜脈無菌穿刺技術教學：比較單獨教學訓練與複合模擬的教學訓練的隨機試驗
(江繼宏 譯 馬皓琳 李士通 校)

Teaching Aseptic Technique for Central Venous Access Under Ultrasound Guidance: A Randomized Trial Comparing Didactic Training Alone to Didactic Plus Simulation-Based Training

- Rana K. Latif,
- Alexander F. Bautista,
- Saima B. Memon,
- Elizabeth A. Smith,
- Chenxi Wang,
- Anupama Wadhwa,
- Mary B. Carter,
- and Ozan Akca

Anesth Analg March 2012 114:626-633; published ahead of print December 20, 2011

Critical Care, Trauma, and Resuscitation

外科大手術圍術期液體管理策略：分層薈萃分析
(俞劼晶譯　陳傑校)

Perioperative Fluid Management Strategies in Major Surgery: A Stratified Meta-Analysis

- Tomas Corcoran,
- Julia Emma Joy Rhodes,
- Sarah Clarke,
- Paul S. Myles,
- and Kwok M. Ho

Anesth Analg March 2012 114:640-651; published ahead of print January 16, 2012

Obstetric Anesthesiology

硬膜外分娩鎮痛開始時丈夫陪伴不能減輕產婦壓力：一項前瞻性隨機對照試驗
(郁玲玲譯 薛張綱校)

Partner's Presence During Initiation of Epidural Labor Analgesia Does Not Decrease Maternal Stress: A Prospective Randomized Controlled Trial

- Sharon Orbach-Zinger,
- Yehuda Ginosar,
- Julia Sverdlik,
- Claudio Treitel,
- Kiri MacKersey,
- Ron Bardin,
- Dan Peleg,
- and Leonid A. Eidelman

Anesth Analg March 2012 114:654-660; published ahead of print January 16, 2012

Neuroscience in Anesthesiology and Perioperative Medicine

異丙酚和依託咪酯在麻醉誘導的意識喪失過程中抑制皮層、丘腦以及網狀結構的神經元
(瞿亦楓 譯 馬皓琳 李士通 校)

Propofol and Etomidate Depress Cortical, Thalamic, and Reticular Formation Neurons During Anesthetic-Induced Unconsciousness

- Jason Andrada,
- Preetha Livingston,
- Bong Jae Lee,
- and Joseph Antognini

Anesth Analg March 2012 114:661-669; published ahead of print December 20, 2011

Analgesia

Pain Mechanisms

背根神經節水平給予蠅蕈醇應用於坐骨神經損傷大鼠可防止發生痛覺過敏並刺激髓磷脂蛋白表達
(張婷譯 陳傑校)

Dorsal Root Ganglion Application of Muscimol Prevents Hyperalgesia and Stimulates Myelin Protein Expression After Sciatic Nerve Injury in Rats

- Ajit K. Naik,

- Janelle R. Latham,
- Aleksandar Obradovic,
- and Vesna Jevtovic-Todorovic

Anesth Analg March 2012 114:674-682; published ahead of print December 20, 2011

鞘內注射非典型抗抑鬱藥噻奈普汀對炎性疼痛大鼠模型的鎮痛活性
(周玲譯 薛張綱校)

The Analgesic Activity of Intrathecal Tianeptine, an Atypical Antidepressant, in a Rat Model of Inflammatory Pain

- Woong Mo Kim,
- Seong Heon Lee,
- Hye Jin Jeong,
- Hyung Gon Lee,
- Jeong Il Choi,
- and Myung Ha Yoon

Anesth Analg March 2012 114:683-689; published ahead of print January 17, 2012

鞘內導管置入影響大鼠對長期嗎啡鎮痛的耐受性
(毛祖旻譯 馬皓琳 李士通校)

Brief Report: Intrathecal Catheterization Influences Tolerance to Chronic Morphine in Rats

- Theresa-Alexandra Mattioli,
- Maaja Sutak,
- Brian Milne,
- Khem Jhamandas,
- and Catherine M. Cahill

Anesth Analg March 2012 114:690-693; published ahead of print December 20, 2011

輸注新鮮和儲存的紅細胞均可以導致亞臨床的肺部氣體交換功能缺陷，兩者沒有顯著差異
Fresh and Stored Red Blood Cell Transfusion Equivalently Induce Subclinical Pulmonary Gas Exchange Deficit in Normal Humans

Richard B. Weiskopf, MD*, John Feiner, MD*, Pearl Toy, MD*, Jenifer Twiford, BSN*, David Shimabukuro, MD*, Jeremy Lieberman, MD*, Mark R. Looney, MD†, Clifford A. Lowell, MD, PhD‡ and Michael A. Gropper, MD, PhD*
From the Departments of *Anesthesia & Perioperative Care, †Medicine, and ‡Laboratory Medicine, University of California, San Francisco, San Francisco, California.
Anesth Analg March 2012 114:511-519

背景：輸血可以導致嚴重的急性肺損傷，儘管大多數輸血看似並沒有導致該種併發症。我們驗證該假定，即輸血可以導致輕度肺功能受損，這種肺功能受損在臨床上沒有顯著症狀，並且並沒有達到輸血相關肺損傷的診斷標準。
方法：我們研究了 35 名健康的正常志願者，他們在研究前 4 周獻血 1u 血，間隔一周後在第二次研究前 3 周再獻血 1u。在研究的日子裡，2U 的血分開保存，志願者隨機輸注保存時間小於 2 小時的自體血或者是儲存的自體血。在隨後的一周內，每一名志願者再次接受試驗，輸注另一儲存的 RBCs。主要結論是是研究肺泡－動脈血氧分壓差(AaDo(2))的變化，從開始輸注前 60min 直至輸血結束後。
結果：新鮮 RBCs 和儲存了 24.5 天的 RBCs 均可以增加 AaDo(2) (新鮮組：2.8 mm Hg [95% 置信區間爲 0.8-4.8；P = 0.007]； 儲存組：3.0 mm Hg [95%置信區間爲 1.4-4.7; P = 0.0006])，兩者間沒有顯著差異。除了 IL－10 以外，所有測得的細胞因數的濃度在儲存的去白 RBCs 組比非去白組少(P = 0.15)。然而血管內皮生長因數是在體唯一測得的在輸注去白或非去白保存 RBCs 後會增加的細胞因數。血管內皮生長因數是唯一在在體測得的與 AaDo(2)相關的細胞因數。
結論：輸注 RBC 可以導致細微的肺功能障礙，可以導致氧氣的氣體交換功能受損，支援我們提出的假設，即輸血可以導致非損傷。這些資料並不支援該假設即相比於新鮮 RBCs，儲存時間大於 21 天的 RBCs 更易出現肺損傷。
（鄧利兵譯 薛張綱校）

BACKGROUND: Transfusion can cause severe acute lung injury, although most transfusions do not seem to induce complications. We tested the hypothesis that transfusion can cause mild pulmonary dysfunction that has not been noticed clinically and is not sufficiently severe to fit the definition of transfusion-related acute lung injury.
METHODS: We studied 35 healthy, normal volunteers who donated 1 U of blood 4 weeks and another 3 weeks before 2 study days separated by 1 week. On study days, 2 U of blood were withdrawn while maintaining isovolemia, followed by transfusion with either the volunteer's autologous fresh red blood cells (RBCs) removed 2 hours earlier or their autologous stored RBCs (random order). The following week, each volunteer was studied again, transfused with the RBCs of the other storage duration. The primary outcome variable was the change in alveolar to arterial difference in oxygen partial pressure (AaDo(2)) from before to 60 minutes after transfusion with fresh or older RBCs.
RESULTS: Fresh RBCs and RBCs stored for 24.5 days equally (P = 0.85) caused an increase of AaDo(2) (fresh: 2.8 mm Hg [95% confidence interval: 0.8-4.8; P = 0.007]; stored: 3.0 mm Hg [1.4-4.7; P = 0.0006]). Concentrations of all measured cytokines, except for interleukin-10 (P = 0.15), were less in stored leukoreduced (LR) than stored non-LR packed RBCs; however, vascular endothelial growth factor was the only measured in vivo cytokine that increased more after transfusion with LR than non-LR stored packed RBCs. Vascular endothelial growth factor was the only cytokine tested with in vivo concentrations that correlated with AaDo(2).

CONCLUSION: RBC transfusion causes subtle pulmonary dysfunction, as evidenced by impaired gas exchange for oxygen, supporting our hypothesis that lung impairment after transfusion includes a wide spectrum of physiologic derangements and may not require an existing state of altered physiology. These data do not support the hypothesis that transfusion of RBCs stored for >21 days is more injurious than that of fresh RBCs.

血管緊張素轉化酶抑制劑不與非心臟手術術後的呼吸道併發症和死亡率相關

Angiotensin Converting Enzyme Inhibitors Are Not Associated with Respiratory Complications or Mortality After Noncardiac Surgery

Alparslan Turan, MD*, Jing You, MS*†, Ayako Shiba, MD*, Andrea Kurz, MD*, Leif Saager, MD* and Daniel I. Sessler, MD*
From the *Department of Outcomes Research and †Department of Quantitative Health Sciences, Cleveland Clinic, Cleveland, Ohio.
Anesth Analg March 2012 114:552-560

背景：一般認爲採用血管緊張素轉化酶抑制劑（ACEIs）與下呼吸道的併發症如咳嗽，血管神經源性水腫和支氣管痙攣相關；此外，術前使用與已增加的併發症和死亡率相關。這個研究的首要目標是評價在非心臟手術的成年病人中圍術期呼吸道併發症與 ACEI 治療的關係。我們的第二目標是評價在非心臟手術全身麻醉的成年病人中，圍術期使用 ACEI 和 30 天死亡率的關係，同時評價院內併發症和死亡率的一個綜合結果。
方法：我們評價了 2005 年到 2009 年間在 Cleveland 醫學中心就診的 79,228 名非心臟手術病人（9905 名使用 ACEI 的患者[13%]和 66,620[87%]不使用 ACEI 的患者）。傾向匹配成功地配對了 9028 名 ACEI 使用者（9905 名患者中的 91%）和 9028 名對照者。配對了術中 ACEI 使用者和非 ACEI 使用者在術中和術後的呼吸道併發症以及特有併發症，30 天死亡率，院內併發症和死亡率綜合結果這些方面加以對照。
結果：使用 ACEI 和呼吸道併發症在術中（OR: 1.09 [97.5% CI: 0.91, 1.31], ACEI 相對非 ACEI; P = 0.28）和術後（OR: 0.97 [97.5% CI: 0.81, 1.16], ACEI 相對非 ACEI; P = 0.69）沒有明顯的統計學意義上的聯繫。在傾向匹配下，ACEI 的使用與 30 天死亡率(OR: 0.93 [95% CI: 0.73, 1.19], ACEI 相對非 ACEI; P = 0.56)和院內併發症和死亡率的綜合結果(OR: 1.06 [95% CI: 0.97, 1.15], ACEI 相對非 ACEI; P = 0.22)不相關。我們同時也觀察到，在多個時期內 ACEI 組和非 ACEI 組的術中血流動力學特徵，血管加壓素的使用，以及膠體和晶體的輸注是相似的（標準化差異<0.03）。
結論：我們沒有發現 ACEIs 的使用與術中或術後的下呼吸道併發症有任何聯繫。此外，ACEI 的使用與院內併發症及已增長的 30 天死亡率不相關聯。
(方昕譯 薛張綱校)

BACKGROUND: General use of angiotensin-converting enzyme inhibitors (ACEIs) is associated with upper-airway complications such as cough, angioedema, and bronchospasm; furthermore, preoperative use is associated with increased morbidity or mortality. Our primary goal in this study was thus to evaluate the association of ACEI therapy with perioperative respiratory morbidity in adult noncardiac surgical patients. Our secondary goals were to evaluate the association between preoperative use of ACEI and 30-day mortality, as well as to a composite outcome of in-hospital morbidity and mortality in adult noncardiac surgical patients having general anesthesia.

METHODS: We evaluated 79,228 patients (9905 ACEI users [13] and 66,620 [87%] non-ACEI users) who had noncardiac surgery at the Cleveland Clinic between 2005 and 2009. Propensity matching successfully paired 9028 ACEI users (91% of 9905 patients) with 9028 controls. Matched intraoperative ACEI users and non-ACEI users were compared on intraoperative and postoperative respiratory morbidity composites as well as individual complications, 30-day mortality, and a composite of in-hospital morbidity and mortality.
RESULTS: The association between ACEI use and respiratory morbidity composites was not statistically significant intraoperatively (OR: 1.09 [97.5% CI: 0.91, 1.31], ACEI versus non-ACEI; P = 0.28) or postoperatively (OR: 0.97 [97.5% CI: 0.81, 1.16], ACEI versus non-ACEI; P = 0.69). Within the propensity-matched subset, ACEI usage was not associated with either 30-day mortality (OR: 0.93 [95% CI: 0.73, 1.19], ACEI versus non-ACEI; P = 0.56) or the composite of in-hospital morbidity and mortality (OR: 1.06 [95% CI: 0.97, 1.15], ACEI versus non-ACEI; P = 0.22). We also observed that the ACEI and the non-ACEI groups were descriptively similar (standardized differences <0.03) on multiple time periods of intraoperative hemodynamic characteristics, vasopressor use, and colloid and crystalloid infusions.
CONCLUSIONS: We did not find any association between use of ACEIs and intraoperative or postoperative upper-airway complications. Furthermore, ACEI use was not associated with in-hospital complications or increased 30-day mortality.

PT-SAFE：一款運行和顯示醫療音訊警報的軟體

PT-SAFE: Software Tool for Development and Annunciation of Medical Audible Alarms.
Christopher L. Bennett, PhD* and Richard R. McNeer, MD, PhD*†
From the *Department of Anesthesiology, Perioperative Medicine and Pain Management, University of Miami Leonard M. Miller School of Medicine, Miami, Florida; and †Department of Biomedical Engineering, University of Miami College of Engineering, Coral Gables, Florida.
Anesth Analg March 2012 114:576-583

背景：不久前麻醉患者安全基金會和聯合委員會的研究報告顯示醫療音訊警報的效果值得改進。最近的幾項研究探索了改進音訊警報的多種方式，這激發了筆者開發一款能比較這些警報的即時軟體的興趣。我們試著設計了一款軟體既能相容不同設計的音訊警報，同時也能融入已有的手術室設備中。該軟體是用來作爲讓警報研究者們快速評估各項新穎警報系統設計的工具。
方法：該軟體用於製造並發出音訊警報，警報是由患者身上的監護儀發出的信號資料作爲信號源映射形成的。這些資料由這個運行時非常靈活且模組化的目標指向軟體轉化爲磁片中的波形檔，由使用者用 MATLAB 程式設計來自訂報警演算法。該軟體在一個類比的手術室中進行了試驗，測試了它的性能，並與現有報警設備比較報警延時證實了它發出警報的準確性。
結果：該軟體在一個類比手術室中進行，對一個模擬患者的監護儀及呼吸機信號作出反應發出警報，結果顯示它比現有的手術室警報設備平均快 6.2 秒發出警報，效果非常明顯。分析顯示該軟體在信號丟失前能在一個中等性能的筆記本上持續發出 15 聲音訊警報。
結論：這些結果顯示這款設計目的是評估各項報警設計的軟體在無論是實驗室還是模擬環境下都能提供快速多次報警，因此對於醫療音訊報警的標準化有非常大的價值。
（郭晨躍譯 薛張綱校）

BACKGROUND:Recent reports by The Joint Commission as well as the Anesthesia Patient Safety Foundation have indicated that medical audible alarm effectiveness needs to be improved. Several recent studies have explored various approaches to improving the audible alarms, motivating the authors to develop real-time software capable of comparing such alarms. We sought to devise software that would allow for the development of a variety of audible alarm designs that could also integrate into existing operating room equipment configurations.
The software is meant to be used as a tool for alarm researchers to quickly evaluate novel alarm designs.
METHODS:A software tool was developed for the purpose of creating and annunciating audible alarms. The alarms consisted of annunciators that were mapped to vital sign data received from a patient monitor. An object-oriented approach to software design was used to create a tool that is flexible and modular at run-time, can annunciate wave-files from disk, and can be programmed with MATLAB by the user to create custom alarm algorithms. The software was tested in a simulated operating room to measure technical performance and to validate the time-to-annunciation against existing equipment alarms.
RESULTS:The software tool showed efficacy in a simulated operating room environment by providing alarm annunciation in response to physiologic and ventilator signals generated by a human patient simulator, on average 6.2 seconds faster than existing equipment alarms. Performance analysis showed that the software was capable of supporting up to 15 audible alarms on a mid-grade laptop computer before audio dropouts occurred.
CONCLUSIONS:These results suggest that this software tool provides a foundation for rapidly staging multiple audible alarm sets from the laboratory to a simulation environment for the purpose of evaluating novel alarm designs, thus producing valuable findings for medical audible alarm standardization.

圍術期失誤對麻醉醫生的影響：國家調查的結果

The Impact of Perioperative Catastrophes on Anesthesiologists: Results of a National Survey

Farnaz M. Gazoni, MD, Peter E. Amato, MD, Zahra M. Malik, MD and Marcel E. Durieux, MD, PhD
From the Department of Anesthesiology, University of Virginia Health System, Charlottesville, Virginia.
Anesth Analg March 2012 114:596-603

背景：多數麻醉醫生在他們的職業生涯中都至少經歷過一次圍術期失誤。非常少見，然而，要知道這種事件的情緒影響，他們的作用是立即出現的且會產生長久的影響。在這次研究中，我們調查了圍術期失誤的影響和這些影響對美國麻醉醫生產生的後果。
方法：我們隨機地給 1200 位 ASA 成員寄出了問卷調查。提前寄給參與者一封信，共兩份調查，兩份人物明信片和一小筆薪酬。659 名醫生（56%）完成了這項調查。
結果：84%的調查對象在他們的職業生涯中已經涉及到至少一例意外死亡或者嚴重損傷的圍術期病人。詢問這種最難忘的圍術期失誤情緒的影響，大於 70%的人感覺到愧疚，焦慮，消除這些影響有 88%的人是需要時間從中恢復，19%的人確認從沒有完全恢復。12%的人考慮轉行。67%的調查對象認爲他們在此事件的前 4 個小時內對病人的監護能力受到影響，僅有 7%不需要時間。

結論：一次圍術期的困難對麻醉醫生或許產生深刻且持續的情緒影響，而且或許會影響到他們在此事件隨後對病人的監測。
（孫莉萍譯 薛張綱校）
BACKGROUND: Most anesthesiologists will experience at least one perioperative catastrophe over the course of their careers. Very little, however, is known about the emotional impact of these events and their effects on both immediate and long-term ability to provide care. In this study, we examined the incidence of perioperative catastrophes and the impact of these outcomes on American anesthesiologists.
METHODS: We sent a self-administered postal survey to 1200 randomly selected members of the American Society of Anesthesiologists. Participants were sent an advance letter, up to 2 copies of the survey, up to 2 reminder postcards, and a small cash incentive. Six hundred fifty-nine physicians (56%) completed the survey.
RESULTS: Eighty-four percent of respondents had been involved in at least one unanticipated death or serious injury of a perioperative patient over the course of his/her career. Queried about the emotional impact of a "most memorable" perioperative catastrophe, >70% experienced guilt, anxiety, and reliving of the event with 88% requiring time to recover emotionally from the event and 19% acknowledging having never fully recovered. Twelve percent considered a career change. Sixty-seven percent of respondents believed that their ability to provide patient care was compromised in the first 4 hours subsequent to the event, but only 7% were given time off.
CONCLUSION: A perioperative catastrophe may have a profound and lasting emotional impact on the anesthesiologist involved and may affect his or her ability to provide patient care in the aftermath of such events.

放置中心靜脈導管前使用單純酒精消毒是否具有與外科消毒液等同的消毒效果

Is alcohol-based hand disinfection equivalent to surgical scrub before placing a central venous catheter?

Thomas Michael Burch, MD*, Brett Stanger, MD*, K. Annette Mizuguchi, MD, PhD‡, David Zurakowski, PhD§ ‖ ¶ and Sean D. Reid, PhD†
From the Departments of *Cardiothoracic Anesthesiology and †Microbiology, Wake Forest University School of Medicine, Winston-Salem, North Carolina; ‡Department of Anesthesiology, Brigham and Women's Hospital, Boston; Departments of §Anesthesia and ‖Surgery, Children's Hospital Boston; and ¶Department of Anesthesia, Harvard Medical School, Boston, Massachusetts.
Anesth Analg March 2012 114:622-625

背景：手部清潔與消毒有下列方法可使用：無水抗菌外科消毒液（1%葡萄糖洗必泰和61%乙醇，Avagard™; 3M 醫療保健，聖保羅，明尼蘇達），純酒精消毒液（62%乙醇）和傳統外科消毒液（用 4%洗必泰肥皂清洗並使用無菌刷子刷手 5 分鐘）。我們假設在置中心靜脈導管前手部消毒時使用純酒精消毒液和無水抗菌消毒液（Avagard）與傳統外科消毒有相當的消毒效果。
方法：按手部消毒方法共分 5 組，消毒後對手指主體進行 24 小時平板培養：方法 1：傳統外科消毒法（n=49，14 個主體的平板）；方法 2：傳統外科消毒（用 4%洗必泰肥皂刷手 5 分鐘並用水沖洗）後 15 分鐘使用純酒精消毒液（62%酒精）（n=49,14 感染主體的平板）；方法 3：單獨純酒精消毒液（n=49,14 個主體的平板）；方法 4：純酒精消毒液

（62%乙醇）15 分鐘後使用傳統消毒法（用 4%洗必泰肥皂刷手 5 分鐘並用水沖洗）（n=49,14 個主體的平板）方法 5：單獨使用無水外科消毒液（Avagard）（n=116,38 個主體的平板）。15 分鐘的間隔可重新沾染細菌病可監測前一消毒液的殘留效果。
結果：單獨酒精消毒液（方法 3）的消毒效果遠遠小於傳統外科消毒法（方法 1）(P < 0.001; 82% 平板生長)。無水外科消毒液(Avagard) (方法 5)與傳統 5 分鐘消毒方法（方法 1）未觀察到區別（95%可信區間[CI] ：-14% ~ 11%）(P = 0.99; 16% 平板生長)。在方法 2 中若先使用傳統外科消毒方法消毒，再等待 15 分鐘重新沾染細菌，可觀察到與方法 1 有 6%的差異。（95% CI: -10% to 22%）與方法 4 無差異(95% CI: -15% to 15%)
結論：與傳統外科消毒方法（方法 1）相比，單獨酒精消毒液（方法 3）的消毒效果遠遠不足(P < 0.001).
（楊琰譯 薛張綱校）

BACKGROUND: Waterless antiseptic surgical hand scrub (1% chlorhexidine gluconate and 61% ethyl alcohol, Avagard™; 3M Health Care, St. Paul, MN), alcohol-only cleanser (62% ethyl alcohol), and traditional surgical scrub (5-minute scrub with 4% chlorhexidine soap using a sterile scrub brush with water) are techniques used for hand cleansing and disinfection. We hypothesized that alcohol-only cleanser and waterless antiseptic scrub (Avagard) would be as effective as a traditional surgical scrub for hand cleansing before placement of central venous catheters.
METHODS: Fingers of subjects were plate-cultured for 24 hours after 5 methods of hand cleansing: method 1: traditional surgical scrub (n = 49 plates produced by 14 subjects); method 2: traditional surgical scrub (5-minute scrub with water, brush, and 4% chlorhexidine soap) followed by a 15-minute break, then alcohol-only cleanser (62% alcohol) (n = 49 plates produced by 14 subjects); method 3: alcohol-only cleanser alone (n = 49 plates produced by 14 subjects); method 4: alcohol-only cleanser (62% alcohol), followed by a 15-minute break, then traditional surgical scrub (5-minute scrub with brush, and 4% chlorhexidine soap with water) (n = 49 plates produced by 14 subjects); and method 5: waterless surgical scrub (Avagard) alone (n = 116 plates produced by 38 subjects). The 15-minute break was introduced to allow a short period of recontamination, and to test for residual effects from prior cleansing.
RESULTS: Alcohol-only cleanser alone (method 3) was significantly less effective than the traditional surgical scrub (method 1) (P < 0.001; 82% plate growth). Waterless surgical scrub (Avagard) (method 5) had a 0% observed difference (95% confidence interval [CI]: -14% to 11%) compared with the traditional 5-minute scrub (method 1) (P = 0.99; 16% plate growth). When a traditional surgical scrub was used first followed by a 15-minute period of recontamination, there was a 6% observed difference in method 2 from reference (method 1) (95% CI: -10% to 22%), and 0% observed difference in method 4 from reference (95% CI: -15% to 15%).
CONCLUSION: As the initial cleansing method, the alcohol-only cleanser (method 3) was significantly less effective than the traditional surgical scrub (method 1) (P < 0.001).

硬膜外分娩鎮痛開始時丈夫陪伴不能減輕產婦壓力：一項前瞻性隨機對照試驗

Partner's Presence During Initiation of Epidural Labor Analgesia Does Not Decrease Maternal Stress: A Prospective Randomized Controlled Trial

Sharon Orbach-Zinger, MD*, Yehuda Ginosar, BSc, MBBS‡, Julia Sverdlik, MD*, Claudio Treitel, MD*, Kiri MacKersey, MD*, Ron Bardin, MD†, Dan Peleg, MD† and Leonid A. Eidelman, MD*

From the *Department of Anesthesiology and †Department of Obstetrics and Gynecology, Rabin Medical Center-Beilinson Campus, Petach Tikva, Israel, affiliated with Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel; and ‡Department of Anesthesiology, Hadassah Hebrew University Medical Center, Jerusalem, Israel.
Anesth Analg March 2012 114:654-660
背景：硬膜外鎮痛可以減輕分娩時的疼痛和焦慮。在這個隨機對照試驗中，我們試圖明確，在硬膜外鎮痛開始時，有丈夫陪伴是否可以減輕產婦和丈夫的壓力以及他們對產婦疼痛的主觀感覺。
方法：將有陪伴、要求硬膜外鎮痛的健康初產婦納入研究。此研究在以色列一家大型三級醫院的產科進行。根據硬膜外鎮痛的要求，對產婦及丈夫進行評估，包括基礎焦慮值（數值評定量表，從 0 至 10），收縮壓，心率，預計的宮縮痛（疼痛口頭評定量表，從 0 至 10）和唾液澱粉酶含量。夫妻在測量後被隨機分組，進入“有陪伴組”或“無陪伴組”。在硬膜外導管置入後，焦慮值，收縮壓，心率和唾液澱粉酶含量將再次測定。每對夫妻都須完成焦慮狀態量表問卷以評估目前的焦慮狀態。評估產婦硬膜外導管置入引起的疼痛。主要的測量結果是用數值評定量表評定的產婦及丈夫的焦慮值。
結果：84 對夫妻被隨機分組（41 對進入有陪伴組，42 對進入無陪伴組，1 對因違反協議而剔除）。在基線水準，有陪伴組和無陪伴組產婦自我評估的焦慮值無差異（四分位數中位數爲 7.5[6.0 至 9.0]和 7.0[3.5 至 8.5]；P= 0.26，中位數差異=-1.0；95%可信區間[CI]範圍 -2.0 至 1.0）。硬膜外導管置入後，有陪伴組的產婦焦慮程度高於無陪伴組的產婦（8.0[7.0 至 10.0]和 7.0[5.0 至 9.0]；P= 0.03，中位數差異=-1.0；95%可信區間範圍-2.0 至 0.0）。硬膜外導管置入過程中，有陪伴組的產婦疼痛評分高於無陪伴組的產婦（7.0[4.0 至 8.0]和 4.0[3.0 至 6.0]；P= 0.004，中位數差異=-2.0；95%可信區間範圍-3.0 至-1.0）。
結論：分娩鎮痛置入硬膜外導管時有丈夫陪伴並不能減輕焦慮。相反，硬膜外導管置入過程中如果丈夫在場，產婦的焦慮和疼痛會更嚴重。
（郁玲玲譯 薛張綱校）
BACKGROUND: Epidural analgesia reduces pain and anxiety during childbirth. In this randomized controlled trial, we sought to determine whether partner presence during the initiation of epidural analgesia reduces stress of both the mother and her partner and their perception of maternal pain.
METHODS: Healthy, nulliparous women who were accompanied by their partners and requested neuraxial analgesia were enrolled into the study. The study took place in the Labor and Delivery Unit of a large tertiary hospital in Israel. Upon request for epidural analgesia, both partners were assessed for baseline anxiety (numerical rating scale, 0 to 10), systolic blood pressure, heart rate, estimated contraction pain of parturient (verbal rating scale for pain, 0 to 10), and salivary amylase. After measurements, couples were randomized into 1 of 2 groups: “partner in” and “partner out.” Immediately after epidural catheter insertion, anxiety, arterial blood pressure, heart rate, and salivary amylase were measured again in both partners. Both partners were asked to complete the State Anxiety Inventory questionnaire measuring current anxiety. The parturient was asked to rate the pain of epidural catheter insertion. The primary outcome measurement was parturient and partner anxiety as assessed by the numerical rating scale.
RESULTS: Eighty-four couples were randomized (partner in 41, partner out 42, protocol violation1). At baseline there was no difference in self-reported anxiety of parturients between the partner-in and partner-out groups (median interquartile range 7.5 [6.0 to 9.0] versus 7.0 [3.5 to 8.5]; P= 0.26, difference in medians =-1.0; 95% confidence interval [CI] of difference -2.0 to

1.0). After epidural catheter insertion, parturients in the partner-in group had a higher level of anxiety than those in the partner-out group (8.0 [7.0 to 10.0] versus 7.0 [5.0 to 9.0]; P = 0.03, difference in medians-1.0; 95% CI of difference-2.0 to 0.0). Pain scores during epidural catheter placement were higher in partner-in than in partner-out groups (7.0 [4.0 to 8.0] versus 4.0 [3.0 to 6.0]; P= 0.004, difference in medians-2.0; 95% CI of difference -3.0 to -1.0).
CONCLUSION: Partner presence during epidural catheter insertion for labor analgesia did not decrease anxiety levels. To the contrary, anxiety and pain of epidural catheter placement were greater if the partner remained in the room.

鞘內注射非典型抗抑鬱藥噻奈普汀對炎性疼痛大鼠模型的鎮痛活性

The analgesic activity of intrathecal tianeptine, an atypical antidepressant, in a rat model of inflammatory pain.

Woong Mo Kim, MD, PhD, Seong Heon Lee, MD, Hye Jin Jeong, MD, Hyung Gon Lee, MD, PhD, Jeong Il Choi, MD, PhD and Myung Ha Yoon, MD, PhD
From the Department of Anesthesiology and Pain Medicine, Chonnam National University, Medical School, Gwangju, Korea.
Anesth Analg March 2012 114:683-689

背景：噻奈普汀是一種非典型抗抑鬱藥，它與三環類抗抑鬱藥有相似的結構，但卻有著不同的神經化學特性。我們評估噻奈普汀的鎮痛活性及其在脊髓水準上與 5-羥色胺能和腎上腺素能神經遞質系統相關的作用機制。
方法：通過研究在大鼠腳掌內注射福馬林後誘發出的退縮行爲，從而判斷鞘內注射噻奈普汀和 DUP-697（一種 COX-2 抑制劑）的療效，並使用等輻射分析瞭解兩者之間的相互作用。雙氫麥角汀、呱唑嗪和育亨賓分別是 5-羥色胺能、α-1 和 α-2 腎上腺素能受體拮抗劑，通過在使用噻奈普汀前 10 分鐘鞘內注射這三種藥物來探索其作用機制。
結果：在第一和第二階段中，在鞘內注射噻奈普汀和 DUP-697 能夠減少由注射福馬林後誘發的退縮反應。在福馬林試驗的兩個階段中，呱唑嗪和育亨賓減輕由鞘內注射噻奈普汀而產生的鎮痛效果。雙氫麥角汀能夠在第二階段中翻轉噻奈普汀的鎮痛作用，但在第一階段卻沒有作用。
結論：鞘內注射噻奈普汀能夠有效地緩解大鼠的炎性疼痛。5-羥色胺能神經遞質系統與噻奈普汀在脊髓水準上的易化疼痛有關。腎上腺素能神經遞質系統也參與噻奈普汀對疼痛易化和急性疼痛的鎮痛作用。聯合應用噻奈普汀和 COX-2 抑制劑對控制炎性疼痛有較好的益處。
（周玲譯 薛張綱校）

BACKGROUND:Tianeptine is an atypical antidepressant that exhibits structural similarities to the tricyclic antidepressants but has distinct neurochemical properties. We evaluated the antinociceptive activity of tianeptine and its mechanism of action regarding serotonergic and adrenergic transmission at the spinal level.
METHODS:The effects of intrathecally administered tianeptine and DUP-697 (a cyclooxygenase-2 inhibitor) were examined on flinching behavior evoked by intraplantar formalin injection, and their interaction was characterized using isobolographic analysis. Dihydroergocristine, prazosin, or yohimbine-which are serotonergic, α-1, and α-2 adrenergic receptor antagonists, respectively-were intrathecally administered 10 minutes before tianeptine to investigate its mechanism of action.

RESULTS:Intrathecally administered tianeptine and DUP-697 reduced the flinching response evoked by formalin injection during phases 1 and 2 in an additive fashion. Prazosin and yohimbine attenuated the antinociceptive effect of intrathecal tianeptine during both phases of the formalin test. Dihydroergocristine reversed the antinociception of tianeptine during phase 2, but not during phase 1.
CONCLUSIONS:Intrathecally administered tianeptine effectively relieved inflammatory pain in rats. The serotonergic system is related to the activity of tianeptine for facilitated pain at the spinal level. Adrenergic transmission is also involved in tianeptine-induced analgesia for both facilitated and acute pain. The combination of tianeptine and cyclooxygenase-2 inhibitor may provide additional benefits for the management of inflammatory pain.

體外迴圈期間腦血流自身調節限度的預測

Predicting the Limits of Cerebral Autoregulation During Cardiopulmonary Bypass

Brijen Joshi, MD*, Masahiro Ono, MD†, Charles Brown, MD*, Kenneth Brady, MD‡, R. Blaine Easley, MD§, Gayane Yenokyan, PhD‖, Rebecca F. Gottesman, MD, PhD¶ and Charles W. Hogue, MD*
From the *Department of Anesthesiology and Critical Care Medicine and †Division of Cardiac Surgery, Department of Surgery, Johns Hopkins University School of Medicine, Baltimore, MD; ‡The Texas Children's Hospital, Houston, TX; §Division of Pediatric Cardiovascular Anesthesiology, Texas Children's Hospital; ‖Biostatistics Center, Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD; and ¶Department of Neurology, Johns Hopkins University School of Medicine.
Anesth Analg March 2012 114:503-510

背景 體外迴圈（CPB）期間對平均動脈壓（MAP）的控制目標往往憑經驗確定。已經證明近紅外光譜（NIRS）可用於臨床監測腦血流的自動調節。本研究假設體外迴圈期間使用基於近紅外光譜的方法即時監測腦血流的自動調節, 較根據年齡、術前病史、術前血壓的經驗性判斷,能更爲準確地判定腦自動調節下限（LLA）時的平均動脈壓值。
方法 對 232 名接受體外迴圈下冠狀動脈搭橋和/或瓣膜手術患者進行經顱的大腦中動脈多普勒監測及 NIRS 監測。持續動態地計算 MAP 和大腦血流速度以及 MAP 和 NIRS 之間的皮爾遜相關係數，得出平均流速指數和腦血氧飽和度指數。大腦能夠自動調節時，腦血流量和 MAP 之間不存在相關性（即平均流速指數和大腦血氧飽和指數接近 0）；當 MAP 低於 LLA 水準時，平均流速指數和大腦血氧飽和指數接近 1。LLA 是指在 MAP 下降同時平均流速指數增加≥0.4 時的 MAP 水準。作者還分別將術前收縮壓、MAP、MAP 比基線降低 10%的值和平均大腦血氧飽和指數與 LLA 時的 MAP 進行了線性回歸分析。
結果 在 225 名患者中觀察到腦血流自動調節下限的 MAP 值是 66mmHg（95%的可信區間爲 43 到 90mmHg）。在處理了年齡、性別、中風史和高血壓造成的偏倚後，得出術前 MAP 與 LLA 之間無相關性（$P = 0.829$）；而大腦血氧飽和指數>0.5 時與 LLA 相關（p=0.022）。在 219 名患者（94.4%）中，可以根據大腦血氧飽和指數確定 LLA。平均流速指數與大腦血氧飽和指數得到的 LLA 進行對比，平均相差−0.2 ± 10.2 mm Hg (95% 可信區間是 −1.5 to 1.2 mm Hg)。在收縮壓≤160 mm Hg 的患者中，術前收縮壓水準與 LLA 升高相關。

結論 在體外迴圈病人中，腦血流調節下限時的 MAP 個體差異很大，評估也十分困難。根據腦血氧飽和指數即時監測腦血流的自動調節可能爲在 CPB 時個體化評估 MAP 水準提供了合理的方法。
（夏蘇雲　譯　陳傑　校）

BACKGROUND: Mean arterial blood pressure (MAP) targets are empirically chosen during cardiopulmonary bypass (CPB). We have previously shown that near-infrared spectroscopy (NIRS) can be used clinically for monitoring cerebral blood flow autoregulation. The hypothesis of this study was that real-time autoregulation monitoring using NIRS-based methods is more accurate for delineating the MAP at the lower limit of autoregulation (LLA) during CPB than empiric determinations based on age, preoperative history, and preoperative blood pressure.
METHODS: Two hundred thirty-two patients undergoing coronary artery bypass graft and/or valve surgery with CPB underwent transcranial Doppler monitoring of the middle cerebral arteries and NIRS monitoring. A continuous, moving Pearson correlation coefficient was calculated between MAP and cerebral blood flow velocity and between MAP and NIRS data to generate mean velocity index and cerebral oximeter index. When autoregulated, there is no correlation between cerebral blood flow and MAP (i.e., mean velocity and cerebral oximetry indices approach 0); when MAP is below the LLA, mean velocity and cerebral oximetry indices approach 1. The LLA was defined as the MAP at which mean velocity index increased with declining MAP to ≥0.4. Linear regression was performed to assess the relation between preoperative systolic blood pressure, MAP, MAP in 10% decrements from baseline, and average cerebral oximetry index with MAP at the LLA.
RESULTS: The MAP at the LLA was 66 mm Hg (95% prediction interval, 43 to 90 mm Hg) for the 225 patients in which this limit was observed. There was no relationship between preoperative MAP and the LLA ($P = 0.829$) after adjusting for age, gender, prior stroke, diabetes, and hypertension, but a cerebral oximetry index value of >0.5 was associated with the LLA ($P = 0.022$). The LLA could be identified with cerebral oximetry index in 219 (94.4%) patients. The mean difference in the LLA for mean velocity index versus cerebral oximetry index was −0.2 ± 10.2 mm Hg (95% CI, −1.5 to 1.2 mm Hg). Preoperative systolic blood pressure was associated with a higher LLA ($P = 0.046$) but only for those with systolic blood pressure ≤160 mm Hg.
CONCLUSIONS: There is a wide range of MAP at the LLA in patients during CPB, making estimation of this target difficult. Real-time monitoring of autoregulation with cerebral oximetry index may provide a more rational means for individualizing MAP during CPB.

綜述 :心臟手術中利用腦電描記技術和腦電雙頻譜指數進行腦監測

Review Article: Brain Monitoring with Electroencephalography and the Electroencephalogram-Derived Bispectral Index During Cardiac Surgery

Miklos D. Kertai, MD, PhD*, Elizabeth L. Whitlock, MD, MSc† and Michael S. Avidan, MBBCh†
From the *Duke University Medical Center, Durham, North Carolina and Semmelweis University, Budapest, Hungary; and †Washington University School of Medicine, St. Louis, Missouri.

Anesth Analg March 2012 114:533-546

心臟手術會給麻醉醫生帶來許多特別挑戰。術中除了常規和其他特殊的監護外，麻醉醫生可能還需要考慮使用原始或者經處理的腦電圖進行腦監測。有力證據表明，和常規監護相

比，當監護方案加用經處理的腦電雙頻譜指數技術可減少術中知曉發生率。然而，心臟麻醉中引入腦電雙頻指數是否能促進“快通道麻醉”，減少麻醉藥物用量以及發現腦缺血，其證據尚存爭議。近期一項包括許多心臟手術的研究顯示：在預防術中知曉方面，基於腦電雙頻譜技術的監控並不優於呼末麻醉藥濃度的監控。較多文獻反映出目前研究者對原始腦電圖監測有越來越多的興趣，包括了一些無專利經處理的監測指標。研究還顯示，麻醉醫生在經過正規訓練之後可以從原始的腦電圖波形中獲得有用的資訊。本篇綜述將討論腦電雙頻譜指數以及額部通道 EEG 監測在心臟手術中的優勢以及不足。
（俞芳 譯　陳傑　校）

Cardiac surgery presents particular challenges for the anesthesiologist. In addition to standard and advanced monitors typically used during cardiac surgery, anesthesiologists may consider monitoring the brain with raw or processed electroencephalography (EEG). There is strong evidence that a protocol incorporating the processed EEG bispectral index (BIS) decreases the incidence intraoperative awareness in comparison with standard practice. However, there is conflicting evidence that incorporating the BIS into cardiac anesthesia practice improves “fast-tracking,” decreases anesthetic drug use, or detects cerebral ischemia. Recent research, including many cardiac surgical patients, shows that a protocol based on BIS monitoring is not superior to a protocol based on end-tidal anesthetic concentration monitoring in preventing awareness. There has been a resurgence of interest in the anesthesia literature in limited montage EEG monitoring, including nonproprietary processed indices. This has been accompanied by research showing that with structured training, anesthesiologists can glean useful information from the raw EEG trace. In this review, we discuss both the hypothesized benefits and limitations of BIS and frontal channel EEG monitoring in the cardiac surgical population.

全身性應用利多卡因並不減少大鼠肝臟手術後的肝功能不全

Systemic Lidocaine Does Not Attenuate Hepatic Dysfunction After Liver Surgery in Rats

Wilmar de Graaf, MD, PhD*, Gwen M. P. Diepenhorst, MD*, Susanne Herroeder, MD†‡, Deha Erdogan, MD, PhD*, Markus W. Hollmann, MD, PhD, DEAA† and Thomas M. van Gulik, MD, PhD*

From the *Department of Surgery (Surgical Laboratory), and †Department of Anesthesiology, Academic Medical Center, Amsterdam, Amsterdam, The Netherlands; and ‡Department of Anesthesiology, University of Heidelberg, Heidelberg, Germany.

Anesth Analg March 2012 114:566-573

背景：可能由於對炎症反應和凋亡信號傳導通路的調節,利多卡因已證明能減輕心、肺和腦的缺血再灌注(I/R)損傷。由於肝臟手術後的肝缺血/再灌注損傷對術後肝功能不全或甚至衰竭仍構成重大風險，本實驗調查全身性應用利多卡因是否將對肝細胞損傷和肝功能的肝缺血/再灌注損傷產生積極的影響。此外，對潛在的作用機制進行了研究。

方法：一個 70% I/R 損傷的標準化大鼠模型被用於評估全身性應用利多卡因對缺血 60 分鐘並再灌注情況下肝細胞損傷的影響。爲了更好地類比臨床情況，本實驗在對第二個模型處理中將缺血 45 分鐘與肝部分切除相結合。從缺血開始前 30 分鐘至再灌注後 20 分鐘全身性持續應用利多卡因。使用代表肝臟合成、細胞完整性和代謝的不同參數來評估肝功能。監測白細胞流入和通過 TUNEL 染色和 Caspase - 3 檢測的細胞凋亡情況來評價炎症反應。

結果：兩個模型顯示，在對照組和利多卡因治療動物組中同時發現了 I/R 造成的生化和組織學上的肝細胞損傷。術後發生了繼發於缺血的肝功能明顯受損，但對照組和利多卡因組沒有觀察到顯著性差異。同樣作爲炎症反應的一項標誌，在 I/R 損傷導致的白細胞流入方面，對照組和利多卡因治療組之間也沒有顯著差異。
結論：全身性應用利多卡因的治療濃度並不減少肝缺血/再灌注損傷後肝細胞損傷也不改善術後肝功能。
（龔寅　譯　陳傑　校）
BACKGROUND: Lidocaine has been shown to attenuate ischemia–reperfusion (I/R) injury in the heart, lung, and brain, potentially due to modulation of inflammatory responses and apoptotic signaling pathways. Because hepatic I/R injury after liver surgery still poses a significant risk for postoperative liver dysfunction or even failure, we investigated whether systemic lidocaine would also positively affect hepatocellular damage and overall liver function after hepatic I/R injury. In addition the potential underlying mechanisms of action were studied.
METHODS: A standardized rat model of 70% I/R injury was used to assess the effects of systemic lidocaine on hepatocellular damage after 60 minutes of ischemia and subsequent reperfusion. To better mimic the clinical situation, we combined 45 minutes of ischemia with partial hepatectomy in a second model. Systemic lidocaine was administered continuously, starting 30 minutes before the ischemic insult until 20 minutes of reperfusion. Hepatocellular function was assessed using different variables of liver synthesis, cellular integrity, and metabolism. Inflammation was evaluated by measuring leukocyte influx and apopotosis detected using TUNEL staining and a caspase-3 assay.
RESULTS: In both models, I/R injury resulted in a significant increase in biochemical and histological hepatocellular damage with comparable values in control and lidocaine-treated animals. Postoperative liver function was significantly impaired secondary to ischemia, yet no significant differences between control and lidocaine groups could be observed. Likewise, there was no significant difference between control and lidocaine-treated animals with respect to I/R injury–induced leukocyte influx, as a marker for inflammatory response.
CONCLUSION: Systemic lidocaine in therapeutic concentrations neither attenuated hepatocellular damage nor improved postoperative liver function after hepatic I/R injury.

技術交流：開普勒插管系統

Technical Communication: The Kepler Intubation System
Thomas M. Hemmerling, MSc, MD, DEAA, Mohamad Wehbe, MASc, Cedrick Zaouter, MD, Riccardo Taddei, MD and Joshua Morse
From the Department of Anaesthesiology, McGill University, Montreal, Quebec, Canada.
Anesth Analg March 2012 114:590-594

此項實驗目標是開發一個機器人插管系統，並進行一項關於使用機器人插管系統實施氣管插管的可行性試驗性研究。開普勒插管系統的開發包括一個通過機械臂與標準的可視喉鏡相連的遠程控制中心（操縱杆和插管駕駛艙）。一個操作者獨立使用開普勒插管系統在人體氣管插管訓練模型上完成 90 例插管操作。第一組 30 例氣管插管是在對人體模型直視下完成（直視組）。第二組 30 例氣管插管是在無法看到人體模型的視野下完成（間接視野組）。30 例半自動插管是在機器人系統重複之前的人體模型插管記錄時完成的（半自動組）。記錄氣管插管的首次嘗試成功率和插管時間。採用線性回歸分析趨勢。資料以平均

值(標準差)表示。所有插管首次嘗試都是成功的。平均插管時間直視組、間接視野組和半自動組分別爲 46（18）秒，51（19）秒和 41（1）秒。直視和間接視野組顯示爲負斜率，這表明每次插管較前次需要更少的時間。半自動組斜率爲 0，且標準差低爲 1 秒，這表明自動插管組的高重複性。作者認爲機器人氣管插管系統可行 40 至 60 秒內的遠端插管。（滕淩雅　譯　陳傑　校）

Our goal in this study was to develop a robotic intubation system and to conduct a feasibility pilot study on the use of a robotic intubation system for endotracheal intubations. The Kepler Intubation System was developed, consisting of a remote control center (joystick and intubation cockpit) linked to a standard videolaryngoscope via a robotic arm. Ninety intubations were performed by the Kepler Intubation System on an airway trainer mannequin by a single operator. The first group of 30 intubations was performed with the operator in direct view of the mannequin (direct view group). The second group of 30 intubations was performed with the operator unable to see the mannequin (indirect view group). Thirty semiautomated intubations were also performed during which the robotic system replayed a trace of a previously recorded intubation maneuver (semiautomated group). First-attempt success rates and intubation times for each trial were recorded. Trends were analyzed using linear regression. Data are presented as mean (SD). All intubations were successful at first attempt. The mean intubation times were 46 (18) seconds, 51 (19) seconds, and 41 (1) seconds for the direct view, indirect view, and semiautomated group, respectively. Both the direct and indirect view groups had a negative slope, denoting that each successive trial required less time. The semiautomated group had a slope of 0 and a low SD of 1 second, illustrating the high reproducibility of automated intubations. We concluded that a robotic intubation system has been developed that can allow remote intubations within 40 to 60 seconds.

綜述：醫療過失意外後果的告知－對麻醉醫生意味著什麼？

Review Article: The Disclosure of Unanticipated Outcomes of Care and Medical Errors: What Does This Mean for Anesthesiologists?

Karen J. Souter, MB, BS, FRCA* and Thomas H. Gallagher, MD†
From the *Department of Anesthesiology and Pain Medicine, and †Departments of Medicine, Bioethics, and Humanities, University of Washington Medical Center, Seattle, Washington.
Anesth Analg March 2012 114:615-621

向病人告知意外風險，包括醫療過失，最近已經受到廣泛的關注。麻醉規範在保護患者安全方面占主導地位，因爲充分告知獲得廣泛支持。麻醉醫生需要具備這些思維和技巧。有效的告知有助於提高病患-醫生之間的關係，促進對於醫療系統的認識，同時可以減少醫療不當所帶來的額外費用。但是由於考慮到可能的訴訟、交流的挑戰和自尊心的喪失很多臨床醫生仍然對於和病患討論醫療過失保持高度警惕。結果，很多嚴重有害的錯誤並沒有向家屬告知。告知對於麻醉醫生來說有特殊的挑戰。在麻醉以前只有非常有限的時間來建立于醫生與患者之間的關係。而且麻醉醫生通常作爲綜合醫療團隊的組成成員。其他成員，比如外科醫生，可能對是否應向患者告知手術室過失存在異議。當外科醫生就事件和家屬進行初步討論時，麻醉醫生可能仍在照顧患者。結果麻醉醫生可能被排除於重要的最初告知交流和計畫之外。告知策略需要麻醉醫生作爲積極的參與者向患者告知意外情況。麻醉醫生需要瞭解最好的告知的環境。同時日益增加的訓練機會和告知材料。應該發展創新的模型來促進在告知過程中的圍術期各科室成員的合作。發生意外情況和醫療事故之

後，在確定特殊-具體的告知方法以及更有效地滿足家屬的需求方面起主導作用對麻醉醫師來說是非常重要的。
（範逸辰　譯　陳傑　校）
The disclosure of unanticipated outcomes to patients, including medical errors, has received considerable attention of late. The discipline of anesthesiology is a leader in patient safety, and as the doctrine of full disclosure gains momentum, anesthesiologists must become acquainted with these philosophies and practices. Effective disclosure can improve doctor–patient relations, facilitate better understanding of systems, and potentially decrease medical malpractice costs. However, many physicians remain wary of discussing errors with patients due to concern about litigation, the communication challenges of disclosure, and loss of self-esteem. As a result, harmful errors are often not disclosed to patients. Disclosure poses special challenges for anesthesiologists. There is often very limited time before the anesthetic in which to build the patient–physician relationship, and anesthesiologists usually function within complex health care teams. Other team members such as the surgeon may have different perspectives on what the patient should be told about operating room errors. The anesthesiologist may still be physically caring for the patient while the surgeon has the initial discussion with the family about the event. As a result the anesthesiologist may be excluded from the planning or conduct of the important initial disclosure conversations. New disclosure strategies are needed to engage anesthesiologists as active participants in the disclosure of unanticipated outcomes. Anesthesiologists should be aware of the emerging best practices surrounding disclosure, as well as the training opportunities and disclosure support resources that are increasingly available. Innovative models should be developed that promote collaboration between all perioperative team members in the disclosure process. There are important opportunities for anesthesiologists to play a leading role in defining specialty-specific disclosure practices and to more effectively meet patients' needs for disclosure after unanticipated outcomes and medical errors.

外科大手術圍術期液體管理策略：分層薈萃分析

Perioperative Fluid Management Strategies in Major Surgery: A Stratified Meta-Analysis

Tomas Corcoran, MB, BCh, BAO, MRCPI, FCARCSCI, MD, FCICM*, Julia Emma Joy Rhodes, MBBS (Hons)*, Sarah Clarke, MBBS (Hons)†, Paul S. Myles, MB, BS, MPH, MD, FCARCSCI, FANZCA, FRCA‡ and Kwok M. Ho, MPH, PhD, FRCP, FCICM§
From the *Department of Anaesthesia and Pain Medicine and; †Department of Emergency Medicine, Royal Perth Hospital, Perth, Western Australia; ‡Department of Anaesthesia and Perioperative Medicine, Alfred Hospital and Monash University, Melbourne, Victoria, Australia; and §Department of Intensive Care Medicine, Royal Perth Hospital, and School of Population Health, University of Western Australia, Perth, Western Australia.
Anesth Analg March 2012 114:640-651

背景: 大量液體治療（LVR）以及目標定向性液體治療（GD）這兩項策略其共同點都在術中應用大量液體，但其後的結果卻截然不同。本研究目的，即確定這兩項策略孰優孰劣。
方法:從 MEDLINE, EMBASE, PubMed 和 Cochrane 無語言限制登記在冊的試驗 (1951 至 2011 年 4 月)中選擇應用于成人外科手術中目標定向性液體治療或限制液體治療與大量液體治療之間的隨機對照試驗 (RCTs)。進行了 GD 和 LVR 的分層間接比較。

結果: 23 個 GD 隨機對照試驗中的 3861 名患者(樣本量中位數=90, 四分位間距爲 57 至 09)和 12 個 LVR 隨機對照試驗中的 1160 名患者(樣本量中位數=80, 四分位間距爲 36 至 151)列入研究範圍。LVR 和 GD 治療相比各自對照組，都使用了更多的液體，但預後卻截然不同。大量液體治療組的患者有較高的肺炎(危險比率[RR]爲 2.2, 95%置信區間[CI]爲 1.0 至 4.5), 肺水腫（RR 爲 3.8, 95%CI 爲 1.1 至 13)發生率，以及相對於限制液體組的患者其住院時間延長(平均差[MD]爲 2 天，95%CI 爲 0.5 至 3.4)。同樣目標定向性液體治療組的患者肺炎(RR 爲 0.7,95%CI 爲 0.6 至 0.9)和腎臟併發症(0.7, 95% CI 爲 0.5 至 0.9)的風險也更低,住院時間相對於非目標定向性液體治療的患者也較短(MD 爲 2 天,95%CI 爲 1 至 3) 。與目標定向性液體治療相比，大量液體治療與住院時間延長(4 天,95%CI 爲 3.4 至 4.4)、首次腸蠕動時間延長(2 天,95%CI 爲 1.3 至 2.3)和肺炎發生率(RR 危險率爲 3, 95%CI 爲 1.8 至 4.8)增加有關。

結論: 各種結果表明除去血流動力學的考慮，目標定向性液體治療要優於大量液體治療。而目標定向性治療是否優於限制液體治療尚待研究。

（俞劼晶　譯　陳傑　校）

BACKGROUND: Both “liberal” and “goal-directed” (GD) therapy use a large amount of perioperative fluid, but they appear to have very different effects on perioperative outcomes. We sought to determine whether one fluid management strategy was superior to the others.

METHODS: We selected randomized controlled trials (RCTs) on the use of GD or restrictive versus liberal fluid therapy (LVR) in major adult surgery from MEDLINE, EMBASE, PubMed (1951 to April 2011), and Cochrane controlled trials register without language restrictions.

RESULTS: A total of 3861 patients from 23 GD RCTs (median sample size = 90, interquartile range [IQR] 57 to 109) and 1160 patients from 12 LVR RCTs (median sample size = 80, IQR36 to 151) were considered. Both liberal and GD therapy used more fluid compared to their respective comparative arm, but their effects on outcomes were very different. Patients in the liberal group of the LVR stratum had a higher risk of pneumonia (risk ratio [RR] 2.2, 95% confidence interval [CI] 1.0 to 4.5), pulmonary edema (RR 3.8, 95% CI 1.1 to 13), and a longer hospital stay than those in the restrictive group (mean difference [MD] 2 days, 95% CI 0.5 to 3.4). Using GD therapy also resulted in a lower risk of pneumonia (RR 0.7, 95% CI 0.6 to 0.9) and renal complications (0.7, 95% CI 0.5 to 0.9), and a shorter length of hospital stay (MD 2 days, 95% CI 1 to 3) compared to not using GD therapy. Liberal fluid therapy was associated with an increased length of hospital stay (4 days, 95% CI 3.4 to 4.4), time to first bowel movement (2 days, 95% CI 1.3 to 2.3), and risk of pneumonia (RR ratio 3, 95% CI 1.8 to 4.8) compared to GD therapy.

CONCLUSION: Perioperative outcomes favored a GD therapy rather than liberal fluid therapy without hemodynamic goals. Whether GD therapy is superior to a restrictive fluid strategy remains uncertain.

背根神經節水平給予蝿蕈醇應用於坐骨神經損傷大鼠可防止發生痛覺過敏並刺激髓磷脂蛋白表達

Dorsal Root Ganglion Application of Muscimol Prevents Hyperalgesia and Stimulates Myelin Protein Expression After Sciatic Nerve Injury in Rats

Ajit K. Naik, PhD, Janelle R. Latham, BS, Aleksandar Obradovic, MD and Vesna Jevtovic-Todorovic, MD, PhD, MBA

From the Department of Anesthesiology, University of Virginia Health System, Charlottesville, Virginia.
Ajit K. Naik, PhD, is currently affiliated with the Department of Anesthesiology, University of Texas, San Antonio, TX.
Anesth Analg March 2012 114:674-682

背景：外周神經損傷可產生慢性疼痛，後者對傳統治療不敏感。外周神經損傷會引起神經病理性疼痛，部分原因是由於損傷部位或背根神經節(DRG)的異位放電導致中樞傳入增強和中樞系統興奮過度。不同家族的γ氨基丁酸（GABA）通道對於穩定神經元的興奮性至關重要。近期活體研究發現於背根神經節處調節 GABA 神經元後，可以改變外周神經元損傷後神經病理性疼痛發展過程。似乎在同側背根神經節應用有效的 GABA 拮抗劑-蝿蕈醇，可防止坐骨神經損傷的大鼠發生痛覺過敏。除了可以減少興奮過度的發生，氨基丁酸興奮後還可上調髓磷脂蛋白 22（PMP22）的表達，PMP22 是基膜的一個主要成分，它與外周髓磷脂的形成和神經再生有關。
方法：由於 PMP22 對髓磷脂的形成和穩定密切相關，而刺激氨基丁酸後可調節 PMP22 表達，故本試驗主要觀察坐骨神經損傷後，直接在背根神經節應用蝿蕈醇是否可恢復 PMP22 蛋白的表達和神經纖維完整性。
結果：使用成年雌性大鼠的坐骨神經損傷模型作爲研究物件發現同側背根神經節處的氨基丁酸的調節可恢復坐骨神經遠端的 PMP22 蛋白的表達，同時能穩定神經纖維基膜，因而從形態學上可減少神經損傷或加快神經纖維再生。增加 PMP22 蛋白的表達和神經原形態學上的改變與熱超敏及機械性超敏的消除是一致的。
結論：對於外周髓鞘神經損傷後的神經再生以及疼痛緩解，背根神經節可能是個有前景的治療靶點。
（張婷　譯 陳傑　校）

BACKGROUND: Peripheral nerve injuries may result in debilitating pain that is poorly responsive to conventional treatment. Neuropathic pain induced by peripheral nerve injury is caused, in part, by ectopic discharges from the injury site or the dorsal root ganglia (DRG) resulting in enhanced central input and central hyperexcitability. A heterogeneous family of γ-aminobutyric acid $(GABA)_A$ channels is important in quieting neuronal excitability. We have recently reported that in vivo modulation of GABAergic neurons in DRG can alter the course of neuropathic pain development after peripheral nerve injury. It seems that direct application of a potent $GABA_A$ agonist, muscimol, to the ipsilateral DRG prevents the development of hyperalgesia in rats subjected to a sciatic nerve crush injury. In addition to potentially curtailing hyperexcitability, GABAergic stimulation upregulated expression of peripheral myelin protein 22 (PMP22), a key component of the basal lamina. PMP22 expression correlates with peripheral myelin formation and nerve regeneration.
METHODS: Because of the importance of PMP22 for the formation and stability of myelin, and the fact that PMP22 expression could be GABAergically modulated, we examined whether direct DRG application of muscimol can restore PMP22 protein expression and the integrity of nerve fibers after crush injury of a sciatic nerve.
RESULTS: Using adult female rats and a crush injury model, we found that GABAergic modulation in the ipsilateral DRG restores PMP22 protein expression in the distal segment of the sciatic nerve and improves myelin stability in the basal membrane of nerve fibers, thus giving the morphological appearance of lessened nerve injury or faster nerve fiber regeneration. Both the

enhanced PMP22 protein expression and morphological improvements coincide with the abolishment of thermal and mechanical hypersensitivity.
CONCLUSIONS: The DRG could be a promising therapeutic target in nerve regeneration and pain alleviation after crush injury of a myelinated peripheral nerve.

斑布里奇和“反向”斑布里奇反射：歷史、生理和臨床意義

The Bainbridge and the “Reverse” Bainbridge Reflexes: History, Physiology, and Clinical Relevance

George J. Crystal, PhD, FAHA and M. Ramez Salem, MD
From the Department of Anesthesiology, Advocate Illinois Masonic Medical Center, Chicago, Illinois.
Anesth Analg March 2012 114:520-532

法蘭西斯 A.斑布里奇在 1915 年證實輸注鹽水或血到麻醉的狗頸靜脈內產生心動過速。他發現離斷心臟自主神經供應和注射膽鹼能阻斷藥阿托品證實心動過速起源於反射，迷走神經組成傳入纖維和迷走神經張力降低組成傳出纖維。隨後調查者證實靜脈回流增加被左右心房中的牽張感受器檢測到。在 80 年代人們充分證明斑布里奇反射存在於包括人類的靈長類動物，但這個反射遠遠不如在狗身上顯著。這種差異可能是由於在人類存在更加重要的動脈壓力感受器反射。“反向”斑布里奇反射被提出用來解釋靜脈回流減少情況下的心率降低，例如在脊麻和硬膜外麻醉、控制性降壓和嚴重出血。在外科和危重監護背景下被用來描述患者靜脈回流改變對心率的影響的斑布里奇反射在整個麻醉文獻中調用。但實驗和臨床證據的重要分析是缺乏的。在這篇綜述中我們的主要目的是總結斑布里奇反射的歷史，描述它的解剖和生理，並討論支持和反對它對在臨床上觀察到的心率變化有影響的證據。討論了斑布里奇反射和動脈壓力感受器反射、貝-亞反射（抑制性心室感受器反射）的相互作用。
（劉朝輝譯，李士通，馬皓琳校）
Francis A. Bainbridge demonstrated in 1915 that an infusion of saline or blood into the jugular vein of the anesthetized dog produced tachycardia. His findings after transection of the cardiac autonomic nerve supply and injection of the cholinergic blocking drug atropine demonstrated that the tachycardia was reflex in origin, with the vagus nerves constituting the afferent limb and a withdrawal of vagal tone the primary efferent limb. Subsequent investigators demonstrated that the increase in venous return was detected by stretch receptors in the right and left atria. In the 1980s, it was shown convincingly that the Bainbridge reflex was present in primates, including humans, but that the reflex was much less prominent than in the dog. This difference may be due to a more dominant arterial baroreceptor reflex in humans. A “reverse” Bainbridge reflex has been proposed to explain the decreases in heart rate observed under conditions in which venous return is reduced, such as during spinal and epidural anesthesia, controlled hypotension, and severe hemorrhage. The Bainbridge reflex is invoked throughout the anesthesia literature to describe the effect of changes in venous return on heart rate in patients in the surgical and critical care settings, but a critical analysis of the experimental and clinical evidence is lacking. Our main objectives in this review are to summarize the history of the Bainbridge reflex, to describe its anatomy and physiology, and to discuss the evidence for and against it having an influence on heart rate changes observed clinically. The interaction of the Bainbridge reflex with the arterial baroreceptor and Bezold–Jarisch reflexes is discussed.

兔子肝纖維化對七氟烷最小肺泡濃度的影響

Minimum Alveolar Concentration of Sevoflurane in Rabbits with Liver Fibrosis

Yan Yin, MD, Ming Yan, MD and Tao Zhu, MD
From the Department of Anesthesiology, West China Hospital, Sichuan University, Sichuan, China.

Anesth Analg March 2012 114:561-565

背景：術中被廣泛使用的七氟烷能夠同時影響肝臟功能和肝臟血流量。然而，肝臟纖維化對七氟烷最小肺泡濃度（MAC）的影響仍不清楚。因此，本研究旨在探究兔子肝臟纖維化對七氟烷最小肺泡濃度的影響。

方法：30 只體重約爲 2.5Kg 的雄性新西蘭白兔隨機分爲 2 組：纖維化組（*n*=20）和正常對照組（*n*=10）。纖維化組兔子通過 50%四氯化碳處理 12 個月來建立兔子肝纖維化模型。麻醉前檢測血清總蛋白、白蛋白、球蛋白、總膽汁酸、丙氨酸氨基轉移酶、總膽紅素、天冬氨酸氨基轉移酶、鹼性磷酸酶、γ 穀氨醯胺轉肽酶、總膽紅素、直接膽紅素和間接膽紅素。使用七氟烷對兩組中存活的動物進行麻醉誘導和麻醉維持。使用標準的尾鉗技術來確定自主呼吸兔子的七氟烷 MAC。麻醉後,處死動物進行肝的病理檢查。

結果:使用 50%四氯化碳管理後 12 周，纖維化組 20 只兔子中的 14 只存活，對照組 10 只兔子中的 9 只存活。纖維化組中所有存活的動物出現了中度至重度的肝纖維化。經過纖維化挑戰後存活的 3 只存活的兔子因其他疾病或對疼痛刺激沒有反應而被排除。與對照組比較，肝纖維化動物的球蛋白、天冬氨酸氨基轉移酶、γ -穀氨醯胺轉肽酶水準顯著增加。然而，纖維化組的白蛋白及鹼性磷酸酶水準顯著低於對照組。七氟烷麻醉期間，兩組平均動脈壓、心率、呼末 CO_2 以及體溫均較穩定。纖維化組的七氟烷 MAC 顯著低於對照組 (3.52%比 4.10%,*P* = 0.018)。

結論: 兔肝纖維化的七氟烷 MAC 顯著降低。

（許辛 譯 馬皓琳 李士通 校）

BACKGROUND: Sevoflurane is widely used in patients undergoing surgical procedures, which could affect both the liver function and hepatic blood flow. However, the effects of liver fibrosis on minimum alveolar concentration (MAC) of sevoflurane are still unclear. Therefore, we designed this study to determine the MAC of sevoflurane in rabbits with liver fibrosis.

METHODS: Thirty male New Zealand white rabbits weighing approximately 2.5 kg were divided randomly into 2 groups: fibrosis (*n* = 20) and normal control group (*n* = 10). The rabbits in the fibrosis group were treated with 50% carbon tetrachloride for 12 weeks to induce liver fibrosis. The serum concentration of total protein, albumin, globulin, total bile acids, alanine aminotransferase, aspartame aminotransferase, alkaline phosphatase, γ-glutamyl transpeptidase, total bilirubin, direct bilirubin, and indirect bilirubin were measured before anesthesia. The anesthesia for animals that survived in both groups was induced and maintained with sevoflurane. A standard tail-clamp technique was used to determine the MAC of sevoflurane in spontaneously breathing rabbits. After anesthesia, animals were killed for liver pathologic examination.

RESULTS: Twelve weeks after 50% carbon tetrachloride administration, 14 of 20 rabbits survived in the fibrosis group, and 9 of 10 survived in the control group. All surviving animals in the fibrosis group had developed moderate to severe liver fibrosis. Three rabbits that survived after the fibrosis challenge were excluded for other diseases or no response to pain stimulation. The levels of globulin, aspartame aminotransferase, and γ-glutamyl transpeptidase significantly

increased in fibrosis animals compared with controls. However, the albumin and alkaline phosphatase levels were significantly lower in the fibrosis group than in the control group. Mean arterial blood pressure, heart rate, end-tidal CO_2, and temperature were stable in both groups during sevoflurane anesthesia. The MAC of sevoflurane was significantly less in the fibrosis group than in the control group (3.52% vs 4.10%, $P = 0.018$).
CONCLUSION: The MAC of sevoflurane decreased significantly in rabbits with liver fibrosis.

昆士蘭大學生命體征資料集：一個可獲取的用於麻醉病人監護資料研究的資源檔案庫的發展

University of Queensland Vital Signs Dataset: Development of an Accessible Repository of Anesthesia Patient Monitoring Data for Research

David Liu, PhD*†, Matthias Görges, PhD†‡ and Simon A. Jenkins, BMBS, FANZCA§ ‖ ¶
From the *School of Information Technology and Electrical Engineering, The University of Queensland, Brisbane, Australia; †Department of Anesthesiology, University of Utah, Salt Lake City, UT; ‡Electrical and Computer Engineering Department, University of British Columbia, Vancouver, Canada; §Department of Anaesthesia, Pain Medicine and Hyperbaric Medicine, Royal Adelaide Hospital, Adelaide, Australia; ‖ School of Medicine, University of Adelaide, Adelaide, Australia; and the ¶Department of Anaesthesia, Lyell McEwin Hospital, Adelaide, Australia.
Anesth Analg March 2012 114:584-589

背景:，從監測病人生命體征的設備記錄的資料常常用於監護儀、報警器和資訊系統的發展，但是麻醉期間病人麻醉監測資料的高解析度、多參數資料集常難以獲取。現存的資料集典型地是從重症監護室中患者收集而來。然而，重症監護患者的身體狀況與術中患者有一定差異，手術室患者的迴圈和呼吸參數變化更頻繁更明顯，並且從這些重症監護資料集中忽略了與麻醉高度相關的額外資訊（例如呼氣末氣體監測等）。我們收集了一系列適合於麻醉監測研究的高品質、高解析度、多參數監護資料。
方法：我們收集了阿德萊德皇家醫院麻醉中病人的生命體征資料。我們開發了可以從 Philips IntelliVue MP70 和 MP30 病人監護儀以及 Datex-Ohmeda Aestiva/5 麻醉機中獲取、同步化、修改生命體征資料的軟體，並且精確到 10 毫秒解析度的樣本。將記錄的資料儲存到多種可打開的檔案格式。
結果：我們記錄了 32 例患者的監護資料（25 例全麻，3 例腰麻，4 例鎮靜患者），監護時間從 13 分鐘到 5 小時（平均 105 分鐘）。多數病例包括來自於心電圖儀、脈搏氧飽和度儀、二氧化碳分析儀、無創動脈血壓監測儀、氣道流量和壓力監測儀的資料，少數病例監測包括來自於 Y 形肺活量計、腦電圖監測儀和連續動脈血壓監測儀的資料。記錄的資料經過處理，並被保存爲四種檔案格式：（1）全部數值和波形資料的逗號分隔數值（CSV）格式文本文檔、（2）一秒間隔的數值參數資料的 CSV 格式文檔、（3）所有波形圖像資料的 PNG 格式的圖片和（4）整個病例數值資料的圖形表格顯示以 PNG 和可變向量圖形學（SVG）格式儲存的檔。完整的資料資料可在網上免費獲取，網址：102.100.100/6914，並且已經列入澳大利亞國家資料服務收集註冊處。
討論：本資料集提供了進行麻醉的患者的整個手術病例的臨床麻醉監護資料，包括了術中常規監測的大量程的生命體征變數，並且以方便使用者查看的檔形式公佈。文字和圖像的檔案格式使得研究者即使沒有工程或電腦科學背景也能夠使用標準的試算表和圖形流覽

軟體方便地打開資料。在將來的工作中，應當從更廣範圍且更多病例收集監護資料，並且需要支援搜索和導航資料庫的軟體工具。
（張怡譯 馬皓琳 李士通校）

BACKGROUND: Data recorded from the devices used to monitor a patient's vital signs are often used in the development of displays, alarms, and information systems, but high-resolution, multiple-parameter datasets of anesthesia monitoring data from patients during anesthesia are often difficult to obtain. Existing databases have typically been collected from patients in intensive care units. However, the physical state of intensive care patients is dissimilar to those undergoing surgery, more frequent and marked changes to cardiovascular and respiratory variables are seen in operating room patients, and additional and highly relevant information to anesthesia (e.g., end-tidal agent monitoring, etc.) is omitted from these intensive care databases. We collected a set of high-quality, high-resolution, multiple-parameter monitoring data suitable for anesthesia monitoring research.
METHODS: Vital signs data were recorded from patients undergoing anesthesia at the Royal Adelaide Hospital. Software was developed to capture, time synchronize, and interpolate vital signs data from Philips IntelliVue MP70 and MP30 patient monitors and Datex-Ohmeda Aestiva/5 anesthesia machines into 10 millisecond resolution samples. The recorded data were saved in a variety of accessible file formats.
RESULTS: Monitoring data were recorded from 32 cases (25 general anesthetics, 3 spinal anesthetics, 4 sedations) ranging in duration from 13 minutes to 5 hours (median 105 min). Most cases included data from the electrocardiograph, pulse oximeter, capnograph, noninvasive arterial blood pressure monitor, airway flow, and pressure monitor and, in a few cases, the Y-piece spirometer, electroencephalogram monitor, and arterial blood pressure monitor. Recorded data were processed and saved into 4 file formats: (1) comma-separated values text files with full numerical and waveform data, (2) numerical parameters recorded in comma-separated values files at 1-second intervals, (3) graphical plots of all waveform data in a range of resolutions as Portable Network Graphics image files, and (4) graphical overview plots of numerical data for entire cases as Portable Network Graphics and Scalable Vector Graphics files. The complete dataset is freely available online via doi:102.100.100/6914 and has been listed in the Australian National Data Service Collections Registry.
DISCUSSION: The present dataset provides clinical anesthesia monitoring data from entire surgical cases where patients underwent anesthesia, includes a wide range of vital signs variables that are commonly monitored during surgery, and is published in accessible, user-friendly file formats. The text and image file formats let researchers without engineering or computer science backgrounds easily access the data using standard spreadsheet and image browsing software. In future work, monitoring data should be collected from a wider range and larger number of cases, and software tools are needed to support searching and navigating the database.

報告麻醉不良事件和錯誤的障礙

Barriers to Adverse Event and Error Reporting in Anesthesia

Gaylene C. Heard, MBBS, FANZCA, MHumanFact*, Penelope M. Sanderson, PhD, FASSA† and Rowan D. Thomas, MBBS, FANZCA, MPH*
From the *Department of Anaesthesia, St. Vincent's Hospital, Melbourne, Victoria; and †Schools of Psychology, Information Technology and Electrical Engineering, and Medicine, The University of Queensland, Brisbane, Australia.

Anesth Analg March 2012 114:604-614

背景：雖然麻醉醫師對患者的安全負主要責任，但對於他們報告不良事件和錯誤的影響因素，目前相關研究甚少。首先，我們研究了態度和情感因素對報告因錯誤導致的非特定不良事件的影響。其次，我們設計了一項組間研究，探討在報告由錯誤導致的與非錯誤導致的過敏反應中，是否存在不同的認知上的障礙。最後，我們檢驗了麻醉醫師認爲有助於促進報告的措施。如有可能，我們將把我們的研究結果與出版的其他醫師組的結果進行對照。

方法：本項匿名、自我管理的郵件調查在澳大利亞維多利亞的澳大利亞和新西蘭大學麻醉醫師學院的郵寄清單中的 629 名麻醉主治醫師和 263 名麻醉住院醫師中進行。參與者被隨機分配到特定過敏反應不良事件調查區的“錯誤”組或“非錯誤”組。資料分析採用非參數性描述和推理檢驗。

結果：共回收 433 份有用的調查問卷，有用應答率爲 49%。首先，13 項有關影響錯誤導致非特定不良事件報告的態度或情感因素的報告書中，僅有一項被更多麻醉醫師同意或強烈同意，即“犯錯的醫生會被他們的同事譴責。”其次，當過敏反應由錯誤導致時，參與者更傾向於同意或強烈同意以下 6 項——訴訟、陷入困境、懲罰行爲、受到譴責、同事不支持、不希望在會議上討論此事——被認爲是報告的障礙。最後，最受青睞的報告保障措施，是對不良事件和錯誤報告採用全面匿名回饋、建立角色模型（比如公開鼓勵報告的高年資同事）和立法保護報告者免受法律上的曝光。

結論：我們研究中的大部分麻醉醫師不認同調查的態度和情感障礙影響錯誤導致的非特定不良事件的報告，除了關心同事譴責的障礙。6 項對報告特定過敏不良事件的障礙可能產生的影響，與是否存在錯誤有關。本研究中的麻醉醫師支持報告的保障措施。我們的研究結果似乎與先前出版的其他醫師組的研究存在一些差別。

（陳彬彬譯 馬皓琳 李士通校）

BACKGROUND: Although anesthesiologists are leaders in patient safety, there has been little research on factors affecting their reporting of adverse events and errors. First, we explored the attitudinal/emotional factors influencing reporting of an unspecified adverse event caused by error. Second, we used a between-groups study design to ask whether there are different perceived barriers to reporting a case of anaphylaxis caused by an error compared with anaphylaxis not caused by error. Finally, we examined strategies that anesthesiologists believe would facilitate reporting. Where possible, we contrasted our results with published findings from other physician groups.

METHODS: An anonymous, self-administered, mailed survey was conducted of 629 consultant anesthesiologists and 263 anesthesiology residents on the mailing list of the Australian and New Zealand College of Anaesthetists in Victoria, Australia. Participants were randomized into “Error” versus “No Error” groups for the specified anaphylaxis adverse event section of the survey. Data were analyzed using nonparametric descriptive and inferential tests.

RESULTS: There were 433 usable returned surveys, a usable response rate of 49%. First, there was only 1 of 13 statements on attitudinal/emotional factors that influenced reporting of an unspecified adverse event caused by error with which more anesthesiologists agreed/strongly agreed than disagreed/strongly disagreed: “Doctors who make errors are blamed by their colleagues.” Second, when an error rather than no error had caused anaphylaxis, participants were more likely to agree/strongly agree that 6 statements about litigation, getting into trouble, disciplinary action, being blamed, unsupportive colleagues, and not wanting the case discussed in meetings, were perceived as reporting barriers. Finally, the most favored assistive strategies

for reporting were generalized deidentified feedback about adverse event and error reports, role models such as senior colleagues who openly encourage reporting, and legislated protection of reports from legal discoverability.
CONCLUSION: The majority of anesthesiologists in our study did not agree that the attitudinal/emotional barriers surveyed would influence reporting of an unspecified adverse event caused by error, with the exception of the barrier of being concerned about blame by colleagues. The probable influence of 6 perceived barriers to reporting a specified adverse event of anaphylaxis differed with the presence or absence of error. Anesthesiologists in our study supported assistive reporting strategies. There seem to be some differences between our results and previously published research for other physician groups.

超聲引導下中心靜脈無菌穿刺技術教學：比較單獨教學訓練與複合模擬的教學訓練的隨機試驗

Teaching Aseptic Technique for Central Venous Access Under Ultrasound Guidance: A Randomized Trial Comparing Didactic Training Alone to Didactic Plus Simulation-Based Training

Rana K. Latif, MD, Alexander F. Bautista, MD, Saima B. Memon, MD, Elizabeth A. Smith, MD, Chenxi Wang, MD, PhD, Anupama Wadhwa, MD, Mary B. Carter, MD, PhD and Ozan Akca, MD
From the Department of Anesthesiology and Perioperative Medicine, University of Louisville, Louisville, Kentucky.
Anesth Analg March 2012 114:626-633

背景：我們的目的是評定超聲（US）引導中心靜脈（CVC）置管過程中，複合模擬的教學訓練與單獨教學訓練相比，是否能提高初學者無菌操作水準。我們假設，接受複合模擬教學訓練的初學者，在模擬器上進行 US 引導 CVC 置入操作時，能夠獲得同富有經驗的住院醫生類似的無菌操作評分、知識的掌握度以及舒適度的感覺。
方法：72 位受試者參加隨機、對照的教學訓練實驗。54 位初學者隨機納入教學組和複合模擬教學組。每組受試者均接受教學訓練，但複合模擬教學組同時接受基於模擬的 CVC 置入訓練。兩組均在模擬器上進行超聲引導下 CVC 置入操作的示範測試。不知道受試者隨機分組的評定者對 8 步無菌操作技術分別按“是/否”和利克特七分量表（七分爲“優秀操作”）進行評分。初次測試後，教學組接受基於模擬的訓練並進行再測試。每組受試者均在訓練前後進行知識測驗，並採用利克特五分量表評定他們訓練前後使用超聲和 CVC 置入的舒適度。18 位熟練的住院醫生隨後也參加知識測驗，評定他們的舒適度，並在模擬器上進行超聲引導下無菌 CVC 置入時對他們進行評分。
結果：相比初學者教學組，複合模擬方法的教學組“是/否”評分和利克特量表評分分別增加 167% (95%可信區間[CI] 133%–167%) 和 115% (CI 112%–127%)。與富有經驗的住院醫生相比，複合模擬方法的教學訓練出的初學者無菌操作的“是/否”評分和利克特量表評分分別增加 33.3% (CI 16.7%–50%) 和 20% (CI 13.3%–40%)，同時其知識測驗分數高出 2.5 倍。對於所有初學者，接受複合模擬訓練的教學後，其知識測試分數增加 3 倍，舒適度增加 2 倍。

結論：在諸如超聲引導 CVC 置入的臨床技能訓練中，複合模擬的教學訓練優於單獨教學訓練。接受複合模擬的教學訓練後，初學者能夠在無菌操作和知識掌握上超越富有經驗的住院醫生。

（江繼宏 譯 馬皓琳 李士通 校）

BACKGROUND: Our goal was to determine whether simulation combined with didactic training improves sterile technique during ultrasound (US)-guided central venous catheter (CVC) insertion compared with didactic training alone among novices. We hypothesized that novices who receive combined didactic and simulation-based training would perform similarly to experienced residents in aseptic technique, knowledge, and perception of comfort during US-guided CVC insertion on a simulator.

METHODS: Seventy-two subjects were enrolled in a randomized, controlled trial of an educational intervention. Fifty-four novices were randomized into either the didactic group or the simulation combined with didactic group. Both groups received didactic training but the simulation combined with didactic group also received simulation-based CVC insertion training. Both groups were tested by demonstrating US-guided CVC insertion on a simulator. Aseptic technique was scored on 8 steps as "yes/no" and also using a 7-point Likert scale with 7 being "excellent technique" by a rater blinded to subject randomization. After initial testing, the didactic group was offered simulation-based training and retesting. Both groups also took a pre- and posttraining test of knowledge and rated their comfort with US and CVC insertion pre- and posttraining on a 5-point Likert scale. Subsequently, 18 experienced residents also took the test of knowledge, rated their comfort level, and were scored while performing aseptic US-guided CVC insertion using a simulator.

RESULTS: The simulation combined with didactic group achieved a 167% (95% confidence interval [CI] 133%–167%) incremental increase in yes/no scores and 115% (CI 112%–127%) incremental increase in Likert scale ratings on aseptic technique compared with novices in the didactic group. Compared with experienced residents, simulation combined with didactic trained novices achieved an increase in aseptic scores with a 33.3% (CI 16.7%–50%) increase in yes/no ratings and a 20% (CI 13.3%–40%) increase in Likert scaled ratings, and scored 2.5-fold higher on the test of knowledge. There was a 3-fold increase in knowledge and 2-fold increase in comfort level among all novices ($P < 0.001$) after combined didactic and simulation-based training.

CONCLUSION: Simulation combined with didactic training is superior to didactic training alone for acquisition of clinical skills such as US-guided CVC insertion. After combined didactic and simulation-based training, novices can outperform experienced residents in aseptic technique as well as in measurements of knowledge.

異丙酚和依託咪酯在麻醉誘導的意識喪失過程中抑制皮層、丘腦以及網狀結構的神經元

Propofol and Etomidate Depress Cortical, Thalamic, and Reticular Formation Neurons During Anesthetic-Induced Unconsciousness

Jason Andrada, MS*, Preetha Livingston, BS*, Bong Jae Lee, MD, PhD† and Joseph Antognini, MD, MBA*

From the *Department of Anesthesiology and Pain Medicine, University of California, Davis, Davis, California; and †Department of Anesthesiology, Kyung Hee University Hospital at Gangdong, Seoul, Korea.

Anesth Analg March 2012 114:661-669

背景：麻醉藥物產生意識喪失的作用位點尚未完全明確。可能的位點包括大腦皮質、丘腦以及網狀結構。我們在完整動物體內檢測了異丙酚和依託咪酯對於皮質、丘腦以及網狀結構的神經元功能的影響。
方法：對五隻貓在麻醉狀態下放置記錄套管和腦電波螺絲釘電極。經過 5 天恢復期後，每週重複研究貓 3-4 次。在丙泊酚或依託咪酯注射前、注射時和注射後記錄腦皮質（7、18 和 19 區）、丘腦（腹後外側核，腹後內側核和內側膝狀體）以及網狀結構（中腦網狀核和中央被蓋區域）的神經元（單一單元）活動。皮層神經元動作電位被單獨分爲規則尖峰神經元或快速尖峰形成神經元進行分析。
結果：異丙酚和依託咪酯使皮層神經元自發性激發率減少了 37%~41%；快速尖峰形成神經元以及規則尖峰神經元受到麻醉藥物的影響相似。丘腦和網狀結構神經元激發率被異丙酚和依託咪酯減少了 30%~49%。在注射藥物時，腦電波圖形從低幅、高頻模式轉變爲高幅、低頻模式，提示此爲麻醉藥物的效應；在注射異丙酚時出現峰值的頻率爲 12-13 Hz。在依託咪酯麻醉時有兩個主要峰值：一個在 12-14 Hz，另一個在 7-8 Hz。貓被深度鎮靜，角膜及鬍鬚反射被抑制；對傷害性刺激的回縮反應保持完整。
結論：這些資料顯示皮層、丘腦以及網狀結構中的神經元被異丙酚和依託咪酯相似地抑制。儘管麻醉對神經元活動的抑制可能促使麻醉誘導的意識喪失，但仍需進一步研究以確定麻醉藥在這些位點的效應如何相互作用來產生意識喪失。
（瞿亦楓 譯 馬皓琳 李士通 校）
BACKGROUND: The sites where anesthetics produce unconsciousness are not well understood. Likely sites include the cerebral cortex, thalamus, and reticular formation. We examined the effects of propofol and etomidate on neuronal function in the cortex, thalamus, and reticular formation in intact animals.
METHODS: Five cats had a recording well and electroencephalogram screws placed under anesthesia. After a 5-day recovery period, the cats were repeatedly studied 3 to 4 times per week. Neuronal (single-unit) activity in the cerebral cortex (areas 7, 18 and 19), thalamus (ventral posterolateral and ventral posteromedial nuclei and medial geniculate body), and reticular formation (mesencephalic reticular nucleus and central tegmental field) was recorded before, during, and after infusion of either propofol or etomidate. Cortical neuronal action potentials were analyzed separately as either regular spiking neurons or fast spiking neurons.
RESULTS: Propofol and etomidate decreased the spontaneous firing rate of cortical neurons by 37% to 41%; fast spiking neurons and regular spiking neurons were similarly affected by the anesthetics. The neuronal firing rate in the thalamus and reticular formation decreased 30% to 49% by propofol and etomidate. The electroencephalogram shifted from a low-amplitude, high-frequency pattern to a high-amplitude, low-frequency pattern during drug infusion suggesting an anesthetic effect; peak power occurred at 12 to 13 Hz during propofol infusion. There were 2 major peaks during etomidate anesthesia: one at 12 to 14 Hz and another at 7 to 8 Hz. The cats were heavily sedated, with depressed corneal and whisker reflexes; withdrawal to noxious stimulation remained intact.
CONCLUSION: These data show that neurons in the cortex, thalamus, and reticular formation are similarly depressed by propofol and etomidate. Although anesthetic depression of neuronal activity likely contributes to anesthetic-induced unconsciousness, further work is needed to determine how anesthetic effects at these sites interact to produce unconsciousness.

鞘內導管置入影響大鼠對長期嗎啡鎮痛的耐受性

Intrathecal Catheterization Influences Tolerance to Chronic Morphine in Rats

Theresa-Alexandra Mattioli, BSc*, Maaja Sutak*, Brian Milne, MSc, MD*†, Khem Jhamandas, PhD*† and Catherine M. Cahill, PhD*†
From the Departments of *Biomedical and Molecular Sciences and †Anesthesiology, Queen's University, Kingston, Ontario, Canada.
Anesth Analg March 2012 114:690-693

我們評估了行腰椎穿刺置入導管和假手術的大鼠給予短期和長期嗎啡鞘內注射的鎮痛作用。嗎啡的短期作用組間無差異。導管置入的大鼠較假試驗的大鼠更早出現對長期嗎啡作用的耐受性。因此，導管的存在促進了對阿片類藥物鎮痛效果的耐受性。用測定三維細胞體積來檢測脊髓星形膠質化，我們在導管置入的大鼠觀察到脊髓星形膠質化，其較假試驗組大鼠的細胞體積顯著增加。長期給首次手術的動物鞘內注射嗎啡引起的神經膠質增生與在注射生理鹽水的置入導管動物上觀察到的相近似。
（毛祖旻 譯 馬皓琳 李士通 校）
We evaluated the antinociceptive effects of acute and chronic morphine administered spinally via lumbar puncture in intrathecally catheterized and sham-surgery rats. The effects of acute morphine did not differ between groups. Catheterized rats developed tolerance to chronic morphine more rapidly, compared with sham and naive rats. Therefore, catheter presence facilitated development of opioid antinociceptive tolerance. Spinal astrogliosis, determined by measurement of 3-dimensional cell volumes, was observed in catheterized rats as indicated by significantly larger cell volumes compared with surgery-naive controls. Gliosis induced by chronic intrathecal morphine administered to surgery-naive animals was comparable to that observed in saline-treated catheterized rats.