Table of Contents

June 2013

Cardiovascular Anesthesiology

Ambulatory Anesthesia

- Jing Jing,
- Darrell Schroeder,
- Ailun Luo,
- and David O. Warner

Anesth Analg June 2013 116:1238-1246; published ahead of print April 4, 2013

Anesthetic Pharmacology

碳基依託咪酯:與 11β-羥化酶相互作用減弱的一種依託咪酯類似物

(王苑譯　陳傑校)

Carboetomidate: An Analog of Etomidate That Interacts Weakly with 11β-Hydroxylase

- Sivananthaperumal Shanmugasundararaj,
- Xiaojuan Zhou,
- Jens Neunzig,
- Rita Bernhardt,
- Joseph F. Cotten,
- Rile Ge,
- Keith W. Miller,
- and Douglas E. Raines

Anesth Analg June 2013 116:1249-1256; published ahead of print March 14, 2013

揮發性麻醉藥對致敏幼兔過敏反應誘導的支氣管痙攣的保護作用

(方昕譯 薛張綱校)

The Protective Effects of Volatile Anesthestics Against the Bronchoconstriction Induced by an Allergic Reaction in Sensitized Rabbit Pups

- Eniko Lele,
- Ferenc Petak,
- Stephanie Carnesecchi,
- Katalin Virag,
- Constance Barazzone Argiroffo,
- and Walid Habre

Anesth Analg June 2013 116:1257-1264; published ahead of print April 16, 2013

Technology, Computing, and Simulation

一個集群隨機臨床試驗：近紅外血管成像裝置用於深膚色兒童靜脈置管的效果

(王慧娟譯 馬皓琳 李士通校)

The Effectiveness of a Near-Infrared Vascular Imaging Device to Support Intravenous Cannulation in Children with Dark Skin Color: A Cluster Randomized Clinical Trial

- Olga C. P. van der Woude,
- Natascha J. Cuper,
- Chavalleh Getrouw,
- Cor J. Kalkman,
- and Jurgen C. de Graaff

Anesth Analg June 2013 116:1266-1271; published ahead of print May 6, 2013

Obstetric Anesthesiology

綜述：麻醉醫師對胎兒的評估：你是否評估另一位病人？

(詹愷誕譯　陳傑校)

Review Article: Fetal Assessment for Anesthesiologists: Are You Evaluating the Other Patient?

- Daria M. Moaveni,
- David J. Birnbach,
- J. Sudharma Ranasinghe,
- and Salih Y. Yasin

Anesth Analg June 2013 116:1278-1292; published ahead of print April 4, 2013

Pediatric Anesthesiology

增加紅細胞輸注量與小兒心臟移植患者預後不良相關。

(郭晨躍譯 薛張綱校)

Increased Red Blood Cell Transfusions Are Associated with Worsening Outcomes in Pediatric Heart Transplant Patients

- Kimberly Howard-Quijano,
- Johanna C. Schwarzenberger,
- Jennifer C. Scovotti,

- Alexandra Alejos,
- Jason Ngo,
- Jeffrey Gornbein,
- and Aman Mahajan

Anesth Analg June 2013 116:1295-1308; published ahead of print April 4, 2013

兒科患者俯臥位手術期間的眼壓監測

(諸琳婕譯　陳傑校)

Intraocular Pressure in Pediatric Patients During Prone Surgery

- Peter Szmuk,
- Jeffrey W. Steiner,
- Radu B. Pop,
- Jing You,
- David R. Weakley, Jr,
- Dale M. Swift,
- and Daniel I. Sessler

Anesth Analg June 2013 116:1309-1313; published ahead of print April 4, 2013

Neuroscience in Anesthesiology and Perioperative Medicine

坐位或“沙灘椅”位時,5177 接受神經外科和骨科手術治療而無神經系統不良事件患者的血流動力學管理

(韓敘譯 薛張綱校)

The Hemodynamic Management of 5177 Neurosurgical and Orthopedic Patients Who Underwent Surgery in the Sitting or “Beach Chair” Position Without Incidence of Adverse Neurologic Events

- Pathomporn Pin-on,
- Darrell Schroeder,
- and James Munis

Anesth Analg June 2013 116:1317-1324; published ahead of print March 11, 2013

Economics, Education, and Policy

一項關於病人對日間麻醉護理投訴的風險因素分析

(王曉莉譯 馬皓琳 李士通校)

An Analysis of Risk Factors for Patient Complaints About Ambulatory Anesthesiology Care

- J. Matthew Kynes,
- Jonathan S. Schildcrout,
- Gerald B. Hickson,
- James W. Pichert,
- Xue Han,
- Jesse M. Ehrenfeld,
- Margaret W. Westlake,
- Tom Catron,
- and Paul St. Jacques

Anesth Analg June 2013 116:1325-1332; published ahead of print February 5, 2013

對日平均周轉時間以及白天首例開始延遲的行爲研究

(趙曉譯 馬皓琳 李士通校)

A Behavioral Study of Daily Mean Turnover Times and First Case of the Day Start Tardiness

- Jihan Wang,
- Franklin Dexter,
- and Kai Yang

Anesth Analg June 2013 116:1333-1341; published ahead of print March 14, 2013

居民評定在麻醉師手術室監督的決定因素，內在聯繫和心理屬性

(胡曉清譯 薛張綱校)

Determinants, Associations, and Psychometric Properties of Resident Assessments of Anesthesiologist Operating Room Supervision

- Bradley J. Hindman,
- Franklin Dexter,
- Clarence D. Kreiter,
- and Ruth E. Wachtel

Anesth Analg June 2013 116:1342-1351; published ahead of print April 4, 2013

麻醉科住院醫師和麻醉護士對於專業麻醉醫師的有效臨床監督的看法

(張怡譯 馬皓琳 李士通校)

Anesthesiology Residents' and Nurse Anesthetists' Perceptions of Effective Clinical Faculty Supervision by Anesthesiologists

- Franklin Dexter,
- Ilana I. Logvinov,
- and Sorin J. Brull

Anesth Analg June 2013 116:1352-1355; published ahead of print March 11, 2013

Analgesia

Pain Medicine

難治性癌痛的鞘內鎮痛泵輸注治療：一個避免椎管內試驗的運算法則

(瞿亦楓譯　陳傑校)

Intrathecal Pain Pump Infusions for Intractable Cancer Pain: An Algorithm for Dosing Without a Neuraxial Trial

- Vivek Tim Malhotra,
- James Root,
- Joseph Kesselbrenner,
- Innocent Njoku,
- Kenneth Cubert,
- Amitabh Gulati,
- Vinay Puttanniah,
- Mark Bilsky,
- and Michael Kaplitt

Anesth Analg June 2013 116:1364-1370; published ahead of print April 4, 2013

簡要報告：胸外科手術圍手術期連續硬膜外輸注 s(+)-氯胺酮的鎮痛療效和血藥濃度。

(賀盼譯 薛張綱校)

Brief Report: Perioperative Analgesic Efficacy and Plasma Concentrations of S(+)-Ketamine in Continuous Epidural Infusion During Thoracic Surgery

- Paolo Feltracco,
- Stefania Barbieri,
- Stefano Rizzi,
- Carlo Ori,
- Francesca Groppa,
- Giovanni De Rosa,
- Anna Chiara Frigo,

- and Roberto Padrini

Anesth Analg June 2013 116:1371-1375; published ahead of print April 4, 2013

Regional Anesthesia

彩色流動多普勒超聲檢查可區別骶尾部硬膜外注射與鞘內注射

(王贇譯 馬皓琳 李士通校)

Color Flow Doppler Ultrasonography Can Distinguish Caudal Epidural Injection from Intrathecal Injection

- Ban Tsui,
- Carl Leipoldt,
- and Sunil Desai

Anesth Analg June 2013 116:1376-1379; published ahead of print April 4, 2013

簡報：圍術期和產科硬膜外導管置入後硬膜外血腫發生的風險和預後：來自多中心圍手術期預後研究協會的一項報告

(鄭華容譯　陳傑校)

Brief Report: The Risk and Outcomes of Epidural Hematomas After Perioperative and Obstetric Epidural Catheterization: A Report from the Multicenter Perioperative Outcomes Group Research Consortium

- Brian T. Bateman,
- Jill M. Mhyre,
- Jesse Ehrenfeld,
- Sachin Kheterpal,
- Kenneth R. Abbey,
- Maged Argalious,
- Mitchell F. Berman,
- Paul St. Jacques,
- Warren Levy,
- Robert G. Loeb,
- William Paganelli,
- Kelly W. Smith,
- Kevin L. Wethington,
- David Wax,
- Nathan L. Pace,
- Kevin Tremper,

- and Warren S. Sandberg

Anesth Analg June 2013 116:1380-1385; published ahead of print April 13, 2012

綜述：在體外迴圈管理中肝素的敏感性和耐藥性

Review Article: Heparin Sensitivity and Resistance: Management During Cardiopulmonary Bypass

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Anesth Analg June 2013 116:1210-1222;

在心臟手術中肝素抵抗爲一個適當的肝素劑量達不到增加活化凝血時間（ACT）所需的水準。無法達到預定的 ACT 增幅意味著患者在未充分抗凝狀態下開始心肺轉流，導致止血系統的過度啓動。雖然抗凝血酶缺乏通常被認爲是肝素抵抗的主要機制，但肝素抵抗的原因是複雜的、多因素的。此外，ACT 並非肝素抗凝作用的特徵性反映，在心臟手術中多種常見變數可影響其結果。由於這些變數的存在，目前尚不清楚 ACT 測得的肝素反應性降低的結果是否表示抗凝不足。然而，許多臨床醫生選擇一個預定的 ACT 值作爲評估抗凝的依據，且在肝素抵抗情況下也常規採取一定措施使 ACT 達到預定值。對肝素反應性的治療，即肝素抵抗/肝素反應異常，包括了額外劑量肝素或抗凝血酶的補充。本篇綜述討論了肝素效能的變異性、ACT 測量得出的肝素反應性和對肝素抵抗的處理。
（孫莉荔　譯　陳傑　校）

Heparin resistance during cardiac surgery is defined as the inability of an adequate heparin dose to increase the activated clotting time (ACT) to the desired level. Failure to attain the target ACT raises concerns that the patient is not fully anticoagulated and initiating cardiopulmonary bypass may result in excessive activation of the hemostatic system. Although antithrombin deficiency has generally been thought to be the primary mechanism of heparin resistance, the reasons for heparin resistance are both complex and multifactorial. Furthermore, the ACT is not specific to heparin's anticoagulant effect and is affected by multiple variables that are commonly present during cardiac surgery. Due to these many variables, it remains unclear whether decreased heparin responsiveness as measured by the ACT represents inadequate anticoagulation. Nevertheless, many clinicians choose a target ACT to assess anticoagulation, and interventions aimed at achieving the target ACT are routinely performed in the setting of heparin resistance. Treatments for heparin resistance/alterations in heparin responsiveness include additional heparin or antithrombin supplementation. In this review, we discuss the variability of heparin potency, heparin responsiveness as measured by the ACT, and the current management of heparin resistance.

碳基依託咪酯:與 11β-羥化酶相互作用減弱的一種依託咪酯類似物

Carboetomidate: An Analog of Etomidate That Interacts Weakly with 11β-Hydroxylase

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Anesth Analg June 2013 116:1249-1256

背景：碳基依託咪酯是一種吡咯依託咪酯類似物；與依託咪酯（咪唑）相比，對體外皮質醇合成的抑制作用存在三個數量級幅度的減弱；並不抑制體內類固醇的產生。雖然碳基依託咪酯對類固醇合成功能影響的減弱被認爲是對 11β-羥化酶低結合親和力的結果，但到目前爲止，對 11β-羥化酶這種結合能力的差別並未被任何的實驗證明過。本實驗通過一種光可活化的依託咪酯類似物來比較碳基依託咪酯與依託咪酯抑制光親和力標記純化酶的能力，以及改變酶吸收光譜來反應兩者的配體結合情況，測試以下假設：碳基依託咪酯與依託咪酯對 11β-羥化酶具有不同的親和力。另外通過光譜方法初步探索了依託咪酯、碳基依託咪酯與 11β-羥化酶相互作用的方式差異；以及通過分子建模技術去更好地理解它們選擇性的結構基礎。

方法：在 H295R 細胞上，評估測試[^{3}H] azi-依託咪酯抑制皮質醇合成的能力。碳基依託咪酯與依託咪酯對 11β-羥化酶的親和力通過以下評估比較：兩者（1）抑制光敏依託咪酯類似物[^{3}H] azi-依託咪酯進行光融合入酶的能力；（2）改變酶血紅素組吸收光譜的能力。在矽片對接的研究中，使用電腦軟體 GOLD 分析依託咪酯、碳基依託咪酯和 azi-依託咪酯與 11β-羥化酶的結合情況。

結果：與依託咪酯相似，[^{3}H] azi-依託咪酯有效地抑制了體外皮質醇的合成。依託咪酯以濃度依賴方式抑制[^{3}H]azi-依託咪酯對 11β-羥化酶的光標記。40μM 濃度的依託咪酯減少了[^{3}H] azi-依託咪酯 96%±1%的光融合，而沒有通過實驗方法檢測到碳基依託咪酯的效應。此外，產生了代表依託咪酯與酶血紅素鐵絡合作用的 2 型差異光譜；碳基依託咪酯無此效果，而 azi-依託咪酯則產生反向 1 型光譜。電腦模擬研究預測：依託咪酯，碳基依託咪酯，以及 azi-依託咪酯都能嵌入形成 11β-羥化酶活性部位，含有血紅素的口袋空間並使它們的羰基氧與血紅素鐵相互作用，使它們的苯環與苯丙氨酸-80 相疊加。然而，更多依託咪酯和 azi-依託咪酯的獨特結合位點被確認，可能解釋他們具有更高親合力的原因。

結論：與依託咪酯相比，碳基依託咪酯抑制體外、體內類固醇合成較弱的能力反映了它與 11β-羥化酶更低的親合力；並且可能是由於碳基依託咪酯無法與位於酶活性部分的血紅素鐵形成配位鍵所導致的。

（王苑　譯　陳傑　校）

BACKGROUND: Carboetomidate is a pyrrole etomidate analog that is 3 orders of magnitude less potent an inhibitor of in vitro cortisol synthesis than etomidate (an imidazole) and does not inhibit in vivo steroid production. Although carboetomidate's reduced functional effect on steroid synthesis is thought to reflect lower binding affinity to 11β-hydroxylase, differential binding to this enzyme has never been experimentally demonstrated. In the current study, we tested the hypothesis that carboetomidate and etomidate bind with differential affinity to 11β-hydroxylase by comparing their abilities to inhibit photoaffinity labeling of purified enzyme by a photoactivatable etomidate analog and to modify the enzyme's absorption spectrum in a way that is indicative of ligand binding. In addition, we made a preliminary exploration of the manner in which etomidate and carboetomidate might differentially interact with this site using spectroscopic methods as well as molecular modeling techniques to better understand the structural basis for their selectivity.

METHODS: The ability of azi-etomidate to inhibit cortisol synthesis was tested by assessing its ability to inhibit cortisol synthesis by H295R cells. The binding affinities of etomidate and carboetomidate to 11β-hydroxylase were compared by assessing their abilities to (1) inhibit photoincorporation of the photolabile etomidate analog [^{3}H]azi-etomidate into the enzyme and (2) modify the absorption spectrum of the enzyme's heme group. In silico docking studies of etomidate, carboetomidate, and azi-etomidate binding to 11β-hydroxylase were performed using the computer software GOLD.
RESULTS: Similar to etomidate, azi-etomidate potently inhibits in vitro cortisol synthesis. Etomidate inhibited [^{3}H]azi-etomidate photolabeling of 11β-hydroxylase in a concentration-dependent manner. At a concentration of 40 μM, etomidate reduced photoincorporation of [^{3}H]azi-etomidate by 96% ± 1% whereas carboetomidate had no experimentally detectable effect. On addition of etomidate to 11β-hydroxylase, a type 2 difference spectrum was produced indicative of etomidate complexation with the enzyme's heme iron; carboetomidate had no effect whereas azi-etomidate produced a reverse type 1 spectrum. Computer modeling studies predicted that etomidate, carboetomidate, and azi-etomidate can fit into the heme-containing pocket that forms 11β-hydroxylase's active site and pose with their carbonyl oxygens interacting with the heme iron and their phenyl rings stacking with phenylalanine-80. However, additional unique poses were identified for etomidate and azi-etomidate that likely account for their higher affinities.
CONCLUSIONS: Carboetomidate's reduced ability to suppress in vitro and in vivo steroid synthesis as compared with etomidate reflects its lower binding affinity to 11β-hydroxylase and may be attributed to carboetomidate's inability to form a coordination bond with the heme iron located at the enzyme's active site.

綜述：麻醉醫師對胎兒的評估：你是否評估另一位病人？

Review Article: Fetal Assessment for Anesthesiologists: Are You Evaluating the Other Patient?

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Anesth Analg June 2013 116:1278-1292

麻醉醫生和產科醫生之間非理想的交流與母親和新生兒意外的不良預後相關，尤其是急診剖宮產時。產科醫生用產前和分娩期的胎兒評估結果來評估胎兒的健康狀態和決定分娩的時間與方式。由於異常的結果可能導致需要緊急或急診剖宮產，這些決定可能直接影響麻醉管理。缺乏對胎兒評估及其重要性的瞭解可能會阻礙實現理想治療所需的交流。本文討論了現今產前和分娩期的胎兒評估方法，包括無應激實驗，生理評分，Doppler 速度測量，電子胎心監護，胎兒心電圖（STAN-ST 波形分析）及胎兒脈氧。回顧了這些模式背後的生理學基礎和關於其在臨床實踐中作用的現有證據。對 2008 年國立兒童健康與人類發育研究工作組關於電子胎兒監護種類，被納入美國婦產科醫師學會的分娩期管理指南的報告進行審閱。同時討論了這些測試的含義和產科麻醉實踐。麻醉者對於胎兒評估模式的理解是改善和產科醫生交流和改善高危產科病人剖宮產分娩計畫所必須。
（詹愷誕　譯　陳傑　校）

Suboptimal communication between anesthesiologists and obstetricians can be associated with unintended poor maternal and neonatal outcomes, especially for emergency cesarean deliveries. Obstetricians use the results of antepartum and intrapartum fetal assessments to assess fetal well-being and to make decisions about the timing and method of delivery. Because abnormal results may lead to the need for urgent or emergency cesarean deliveries, these decisions may directly impact anesthetic care. Lack of familiarity with fetal assessments and the significance of the results may thus hinder the communication necessary for optimal patient care. In this review article, we discuss the current antepartum and intrapartum fetal assessment modalities, including the nonstress test, biophysical profile, Doppler velocimetry, electronic fetal heart rate monitoring, fetal electrocardiogram (STAN-ST waveform analysis), and fetal pulse oximetry. The physiologic basis behind these modalities and the available evidence regarding their utility in clinical practice are also reviewed. The 2008 National Institute of Child Health and Human Development workshop report on electronic fetal monitoring categories, which are incorporated into the American College of Obstetricians and Gynecologists guidelines for intrapartum care, is examined. The implications of test interpretation to the practice of obstetric anesthesiology is also discussed. Anesthesia provider understanding of fetal assessment modalities is essential in improving communication with obstetricians and improving the planning of cesarean deliveries for high-risk obstetric patients.

兒科患者俯臥位手術期間的眼壓監測

Intraocular Pressure in Pediatric Patients During Prone Surgery

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Anesth Analg June 2013 116:1309-1313

背景：小兒外科手術患者手術期間俯臥位時的眼壓(IOP)及其隨時間的變化尚未得到評估。本研究試圖確定兒科患者在俯臥位手術中眼壓隨時間變化的情況。
方法： 選擇 30 例接受俯臥位下神經外科手術的小兒患者。使用脈衝模式的氣動眼壓計，分別在仰臥位元狀態下麻醉實施前和麻醉誘導後，及俯臥位元狀態下手術開始和手術結束時測量眼壓。採用經患者間相關性校正的線型混合模型（即隨機斜率和截距模型）對俯臥位元時隨著時間變化的眼壓進行評估。
結果：俯臥位時眼壓平均每小時增加 2.2 mmHg(P < 0.001)。俯臥位時 63%的患者（95%可信區間[CI]爲 46%–81%）至少有一次眼壓值超過 30 mmHg，13%的患者（95%可信區間[CI]爲 1%–25%）至少有一次眼壓值超過了 40mmHg。從仰臥位變爲俯臥位後平均眼壓增加了 7mmHg（95%可信區間[CI]爲 6%–9%）(P < 0.001) ，而從俯臥位變回仰臥位時平均眼壓減少了 10 mmHg（95%可信區間[CI]爲 9%–12%）(P < 0.001)。

結論：從仰臥位到俯臥位的體位改變顯著增加麻醉後兒科患者的眼壓。此外，尤其是在常見平均動脈血壓較低的大型手術中，可發生眼壓持續增加並可產生潛在危害。
（諸琳婕　譯　陳傑　校）

BACKGROUND: Intraoperative intraocular pressure (IOP) in the prone position and IOP changes over time have not been evaluated in pediatric surgical patients. We sought to determine time-dependent changes in IOP in children undergoing surgery in prone position.
METHODS: Thirty patients undergoing neurosurgical procedures in prone position were included. Using a pulse-mode pneumatonometer, IOP was measured in supine position after induction and before emergence of anesthesia and in prone position before the start and after the end of surgery. IOP changes over time in the prone position were assessed with a linear mixed model (i.e., random slope and intercept model) to adjust for the within-patient correlation.
RESULTS: IOP in prone position increased by an average of 2.2 mm Hg per hour ($P < 0.001$). Sixty-three percent of patients (95% confidence interval [CI], 46%–81%) had at least 1 IOP value exceeding 30 mm Hg, and 13% (95% CI, 1%–25%) had at least 1 IOP value exceeding 40 mm Hg while prone. Mean IOP increased 7 mm Hg (95% CI, 6–9) during the position change from supine to prone ($P < 0.001$) and decreased 10 mm Hg (95% CI, 9–12) after changing the position from prone back to supine ($P < 0.001$).
CONCLUSIONS: Changing position from supine to prone significantly increases IOP in anesthetized pediatric patients. Moreover, the IOP continued to increase during surgery and reached potentially harmful values, especially when combined with low mean arterial blood pressures that are common during major surgery.

難治性癌痛的鞘內鎮痛泵輸注治療：一個避免椎管內試驗的運算法則

Intrathecal Pain Pump Infusions for Intractable Cancer Pain: An Algorithm for Dosing Without a Neuraxial Trial

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Anesth Analg June 2013 116:1364-1370

背景:晚期癌症伴有疼痛的患者往往生存期有限。在這些患者中爲了放置鞘內泵而接受硬膜外試驗可能耗費其有限的生存時間。本研究試圖分析該癌症中心既往資料得出一種基於操作前全身給予阿片類藥物方法，可預測初始鞘內泵注劑量的運算法則，如此可避免硬膜外試驗並將住院時間最少化。
方法:分析 46 例使用全身性阿片類藥物並在最後 6 年使用鞘內鎮痛泵置入的癌症病人鎮痛泵使用前以及使用後的資料，所有物件在使用鎮痛泵前均接受了硬膜外穿刺試驗。
結果:通過使用多元回歸分析出院時鞘內阿片類藥物劑量（靜脈嗎啡等效量）與年齡、疼痛類型、癌症類型、置管前阿片類藥物劑量和置管前疼痛評分的關係，創造了一種基於鎮痛泵使用前全身阿片類藥物劑量，可預測癌症病人鞘內鎮痛泵起始劑量的運算法則，由此

避免了硬膜外試驗。當所指向的試驗可行時，這個預計值有很寬的 95%可信區間 (−122.7% 到 147.6%) 。

結論: 當癌痛患者的硬膜外試驗不可行且需要鞘內鎮痛泵時，通過基於全身使用阿片類藥物的劑量來預計鞘內鎮痛泵的初始劑量是可能的。這樣可以縮短達到滿意鎮痛效果的時間，早日出院。

（瞿亦楓　譯　陳傑　校）

BACKGROUND: Patients with pain from advanced cancer often have limited life expectancy. Undergoing an epidural trial for placement of an intrathecal pump in these selected patients can exhaust limited days of life. We sought to analyze historical data at our cancer center to develop an algorithm to predict initial intrathecal pump dosing based on the starting preimplant systemic opioid regimen, thus averting an epidural trial and minimizing hospital stay.

METHODS: We used data pre- and postpump from 46 cancer patients receiving systemic opioids undergoing intrathecal pump placement in the last 6 years, all of whom had undergone an epidural trial before pump placement.

RESULTS: By analyzing intrathecal opioid dosage on discharge (in IV morphine equivalents) to age, type of pain, cancer type, preimplant opioid dose, and preimplant pain score using multiple regression, we created an algorithm that predicts, for cancer patients, an appropriate initial dose for an intrathecal pump based on the prepump systemic opioid dose, thus avoiding an epidural trial. The predicted value does have a broad 95% prediction interval (−122.7% to 147.6%) pointing to the value of a trial when feasible.

CONCLUSIONS: When an epidural trial is not feasible and an intrathecal pump is required in a cancer patient, it is possible to predict an initial dose for the intrathecal pump based on the systemic opioid usage. This minimizes delays in achieving satisfactory analgesia and discharge to home.

簡報：圍術期和產科硬膜外導管置入後硬膜外血腫發生的風險和預後：來自多中心圍手術期預後研究協會的一項報告

Brief Report: The Risk and Outcomes of Epidural Hematomas After Perioperative and Obstetric Epidural Catheterization: A Report from the Multicenter Perioperative Outcomes Group Research Consortium

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Anesth Analg June 2013 116:1380-1385

背景：此項研究試圖確定硬膜外導管置入後硬膜外血腫發生的頻率和預後。
方法：11 個參與多中心圍手術期預後研究組的中心採用電子麻醉資訊系統和質控資料庫來確認因產科或外科手術而接受硬膜外導管置入的患者。在此佇列中確認硬膜外置管後六周內接受椎板切除血腫清除術的患者。
結果：62450 例接受圍術期硬膜外導管置入的患者中有 7 例發生了需要進行手術清除的硬膜外血腫。事件發生率爲 11.2×10^{-5}（95%信心區間[CI]，4.5×10^{-5}到 23.1×10^{-5}）。其中 4 例接受過抗凝/抗血小板治療，而此種情況違背美國局麻學會的指南。79837 名接受硬膜外導管置入的產科病人中未發生硬膜外血腫(超過 95%可信區間上限，4.6×10^{-5})。產科硬膜外置管後硬膜外血腫的發生率明顯小於圍術期硬膜外置管後的發生率。
結論：在一系列病例中，以圍術期麻醉/鎮痛爲目的的硬膜外置管後發生需要進行椎板切除手術的硬膜外血腫頻率的 95%可信區間爲每 22189 次置管發生 1 例至每 4330 次置管發生 1 例。產科硬膜外置管的風險明顯更小。
（鄭華容　譯　陳傑　校）
BACKGROUND: In this study, we sought to determine the frequency and outcomes of epidural hematomas after epidural catheterization.
METHODS: Eleven centers participating in the Multicenter Perioperative Outcomes Group used electronic anesthesia information systems and quality assurance databases to identify patients who had epidural catheters inserted for either obstetrical or surgical indications. From this cohort, patients undergoing laminectomy for the evacuation of hematoma within 6 weeks of epidural placement were identified.
RESULTS: Seven of 62,450 patients undergoing perioperative epidural catheterizations developed hematoma requiring surgical evacuation. The event rate was 11.2×10^{-5} (95% confidence interval [CI], 4.5×10^{-5} to 23.1×10^{-5}). Four of the 7 had anticoagulation/antiplatelet therapy that deviated from American Society of Regional Anesthesia guidelines. None of 79,837 obstetric patients with epidural catheterizations developed hematoma (upper limit of the 95% CI, 4.6×10^{-5}). The hematoma rate in obstetric epidural catheterizations was significantly lower than in perioperative epidural catheterizations ($P = 0.003$).
CONCLUSIONS: In this series, the 95% CI for the frequency of epidural hematoma requiring laminectomy after epidural catheter placement for perioperative anesthesia/analgesia was 1 event per 22,189 placements to 1 event per 4330 placements. Risk was significantly lower in obstetric epidurals.

中國外科手術患者圍術期吸煙行爲調查

Perioperative Smoking Behavior of Chinese Surgical Patients

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Anesth Analg June 2013 116:1238-1246

背景：調查顯示，與高吸煙率相符，大樣本中的中國吸煙者不願意戒煙。在其他文化中，手術治療具有強有力的教育意義，是戒煙的動力，使得自發戒煙率上升。我們測定了中國擇期手術的吸煙患者圍手術期煙草的使用行爲和與術前戒煙意願及術後 30 天裡主動上報的吸煙行爲有關的因素。確切的說，我們驗證了術前戒煙意願和術後 30 天內自動上報禁煙行爲與對吸煙增加健康風險的認知程度獨立有關這一假設。
方法：在中國北京協和醫院，≥18 周歲擇期非心臟手術的患者接受了術前及術後 30 天內與吸煙行爲有關的因素評估，包括吸煙相關健康風險的知識檢測。
結果：在 227 名被調查患者中，大多數患者（164 名，72%）在出院後保持禁煙。204 名術後 30 天保持聯繫的患者中，有 126 名（62%）仍處於禁煙狀態。多變數分析中，與術後維持術前禁煙意願有關的因素有高齡、戒煙的自我效驗和接受大型手術治療；與戒煙有關的因素包括：高齡、自我效驗、大手術和術前戒煙意願。對戒煙好處的較高認知度與意願有關，但與戒煙無關。關於吸煙引起健康風險的知識與戒煙意向或戒煙行爲均無關，所以，不支持這一假設。
結論：在中國外科手術患者中的戒煙意向和保持戒煙的自我效驗看來較以往的中國總吸煙人群調查要高得多。並且大多數外科手術患者在術後至少 30 天保持戒煙。這些發現顯示在中國，外科手術治療具有強有力的教育意義，是戒煙行爲的動力。
（盛嘉君 譯 馬皓琳 李士通校）

BACKGROUND: Surveys suggest that, consistent with a high smoking prevalence, Chinese smokers in the general population report little interest in quitting. In other cultures, surgery is a powerful teachable moment for smoking cessation, increasing the rate of spontaneous quitting. We determined the perioperative tobacco use behavior of Chinese patients scheduled for elective surgery who smoke cigarettes and factors associated with both preoperative intent to abstain and self-reported smoking behavior at 30 days postoperatively. Specifically, we tested the hypothesis that perception of the health risks of smoking would be independently associated with both preoperative intent to abstain and self-reported abstinence at 30 days postoperatively.
METHODS: Patients ≥18 years of age scheduled for elective noncardiovascular surgery at Peking Union Medical College Hospital in Beijing, China, were assessed preoperatively and up to 30 days postoperatively for factors associated with smoking behavior, including indices measuring knowledge of smoking-related health risks.
RESULTS: Of the 227 patients surveyed at baseline, most (164, 72%) intended to remain abstinent after hospital discharge. For the 204 patients contacted at 30 days postoperatively, 126 (62%) self-reported abstinence. In multivariate analysis, factors associated with preoperative intent to abstain after surgery included older age, self-efficacy for abstaining, and undergoing major surgery; factors associated with abstinence included older age, self-efficacy, major surgery, and preoperative intent to abstain. Higher perception of benefits from quitting was associated with intent, but not abstinence. Knowledge of the health risks caused by smoking was not found to be associated with either intent or abstinence, so that the hypothesis was not supported.

CONCLUSIONS: Both intent to quit and self-efficacy for maintaining abstinence appear to be much higher in Chinese surgical patients than in prior surveys of the general Chinese population, and the majority of surgical patients maintained abstinence for at least 30 days. These findings suggest that surgery can serve as a powerful teachable moment for smoking cessation in China.

一個集群隨機臨床試驗：近紅外血管成像裝置用於深膚色兒童靜脈置管的效果

The Effectiveness of a Near-Infrared Vascular Imaging Device to Support Intravenous Cannulation in Children with Dark Skin Color: A Cluster Randomized Clinical Trial

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Anesth Analg June 2013 116:1266-1271

背景：膚色深的兒童靜脈能見度低，這給靜脈置管帶來了挑戰。我們研究近紅外血管成像裝置（VascuLuminator，血管發光體）便於手術室中深膚色兒童靜脈置管的有效性。
方法：在庫拉索島一個綜合醫院的手術室裡，所有需要靜脈置管的連續兒童（年齡 0-15 歲）都被納入一個集群隨機臨床試驗中。在爲期一周的隨機化集群中的手術室裡，麻醉醫生隨時可以用到 VascuLuminator。
結果：在血管成像儀組一次成功率爲 63% (27/43, 95%可信區間[CI], 47%-77%) 而對照組爲 51% (45 人中有 23 人, 95% CI, 36%-66%)(P = 0.27)。在血管成像儀組成功置管所用時間的中位數是 53 秒（四分位距：34-154）；而對照組是 68 秒（四分位距：40-159）(P = 0.54)。且危險比爲 1.12 (95% CI, 0.73-1.71)。
結論：血管成像儀的使用對提高深膚色兒童靜脈置管一次成功率的價值有限。
（王慧娟 譯 馬皓琳 李士通 校）

BACKGROUND: Poor vein visibility can make IV cannulation challenging in children with dark skin color. In the operating room, we studied the effectiveness of a near-infrared vascular imaging device (VascuLuminator) to facilitate IV cannulation in children with dark skin color.
METHODS: In the operating room of a general hospital in Curacao, all consecutive children (0-15 years of age) requiring IV cannulation were included in a pragmatic cluster randomized clinical trial. The VascuLuminator was made available to anesthesiologists at the operating complex in randomized clusters of 1 week.
RESULTS: Success at first attempt was 63% (27/43, 95% confidence interval [CI], 47%-77%) in the VascuLuminator group vs 51% (23 of 45 patients, 95% CI, 36%-66%) in the control group (P = 0.27). Median time to successful cannulation was 53 seconds (interquartile range: 34-154) in the VascuLuminator group and 68 seconds (interquartile range: 40-159) in the control group (P = 0.54), and hazard ratio was 1.12 (95% CI, 0.73-1.71).
CONCLUSION: The VascuLuminator has limited value in improving success at first attempt of facilitating IV cannulation in children with dark skin color.

一項關於病人對日間麻醉護理投訴的風險因素分析

An Analysis of Risk Factors for Patient Complaints About Ambulatory Anesthesiology Care

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Anesth Analg June 2013 116:1325-1332

背景:麻醉組成員不斷爲前進的專業實踐評估、證書和其他的品質倡議而搜索資料資源和評估指標。一個關於病人對醫生的投訴分析在以前就成爲病人不滿的標誌和治療不當索賠的預測。另外，其他專業以前的研究已顯示出對專業人士抱怨的分佈不均一性。在這項研究中，我們描述麻醉提供者之間的抱怨分佈並且確認小兒和成人人群投訴風險的因素。
方法：我們爲一個學術醫學中心進行了投訴資料庫的一項分析。在術後電話隨訪日間外科病人關於麻醉護理的品質時記錄投訴作爲備註。電話隨訪從 2006.6.1 到 2010.6.30。危險因素分爲 3 種類別：病人特徵、操作和提供者特點。
結果：總共 22871 個電話代表 120 名麻醉師被評估，其中有 307 個投訴。在小兒組沒有證據證明提供者之間的異質性。在成人組，在混合效應模式中對隨機攔截方差分量未調整的測試，顯示明顯異質性（P=0.01）；然而，當調整了預先設定的危險因素，再也沒有觀察到提供者對提供者的異質性（P=0.20）。幾個危險因素展示了投訴風險的證據。在小兒組病人模式中，與投訴風險有關的危險因素包括年齡 10 歲的變化、全身麻醉的應用（比非全麻）和實際減去計畫開始時間的 1 個小時變動。比值比分別爲 1.47（95%可信區間，1.04-2.08）、0.22（95%可信區間，0,07-0.62）和 1.27（95%可信區間，1.10-1.47）。在成人病人模式中，與投訴風險有關的危險因素包括男性、全麻、提供者經驗 10 年的變化以及與病人交流（而不是與一個家屬）。比值比分別爲 0.66（95%可信區間，0.47-0.92）、0.67(95%可信區間，0.47-0.95)、1.18（95%可信區間，1.01-1.38）和 1.96（95%可信區間，1.17-3.29)。
結論：成人病人有明顯的證據表明病人投訴的提供者風險異質性。然而，一旦在分析中承認病人、操作和提供者因素，這樣異質性的證據會真正的減少。更深入的研究關於怎樣和爲什麼這些因素和較大的投訴風險有關聯可能揭示潛在的干預來減少投訴。
(王曉莉譯 馬皓琳 李士通校)

BACKGROUND: Anesthesiology groups continually seek data sources and evaluation metrics for ongoing professional practice evaluation, credentialing, and other quality initiatives. The analysis of patient complaints associated with physicians has been previously shown to be a marker for patient dissatisfaction and a predictor of malpractice claims. Additionally, previous studies in other specialties have revealed a nonuniform distribution of complaints among professionals. In this study, we describe the distribution of complaints among anesthesia providers and identify factors associated with complaint risk in pediatric and adult populations.
METHODS: We performed an analysis of a complaint database for an academic medical center. Complaints were recorded as comments during postoperative telephone calls to ambulatory surgery patients regarding the quality of their anesthesiology care. Calls between July 1, 2006

and June 30, 2010 were included. Risk factors were grouped into 3 categories: patient demographics, procedural, and provider characteristics.
RESULTS: A total of 22,871 calls placed on behalf of 120 anesthesiologists were evaluated, of which 307 yielded a complaint. There was no evidence of provider-to-provider heterogeneity in complaint risk in the pediatric population. In the adult population, an unadjusted test for the random intercept variance component in the mixed effects model pointed toward significant heterogeneity (P = 0.01); however, after adjusting for a prespecified set of risk factors, provider-to-provider heterogeneity was no longer observed (P = 0.20). Several risk factors exhibited evidence for complaint risk. In the pediatric patient model, risk factors associated with complaint risk included a 10-year change in age, the use of general anesthesia (versus not), and a 1-hour change in the actual minus scheduled start times. Odds ratios were 1.47 (95% confidence interval (CI), 1.04-2.08), 0.22 (95% CI, 0.07-0.62), and 1.27 (95% CI, 1.10-1.47), respectively. In the adult patient model, risk factors associated with complaint risk included male gender, general anesthesia, a 10-year change in provider experience, and speaking with the patient (rather than a family member). Odd ratios were 0.66 (95% CI, 0.47-0.92), 0.67 (95% CI, 0.47-0.95), 1.18 (95% CI, 1.01-1.38), and 1.96 (95% CI, 1.17-3.29), respectively.
CONCLUSIONS: There was apparent evidence in adult patients to suggest heterogeneity in provider risk for a patient complaint. However, once patient, procedural, and provider factors were acknowledged in analyses, such evidence for heterogeneity is diminished substantially. Further study into how and why these factors are associated with greater complaint risk may reveal potential interventions to decrease complaints.

對日平均周轉時間以及白天首例開始延遲的行爲研究

A Behavioral Study of Daily Mean Turnover Times and First Case of the Day Start Tardiness

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Anesth Analg June 2013 116:1333-1341;

背景：之前的研究表明在手術日的手術室裡的決定中存在有 2 個心理偏差：手術室控制台上決策者的風險態度和手術室工作人員所做的決定以提高單位時間內他們被分配的臨床工作。造成的決定比減少過度利用時間的隨機機會更加糟糕。爲了將第二種偏差從手術室控制台決定中分離出來，之前有關第二種偏差的研究分析了在非手術室環境下以及在夜間或者週末所作的決定。另外一種將第二種偏差從手術室控制台所產生的決定分離出來的方式是通過研究微乎其微的過度使用手術室時間的儀器設施。我們利用這些儀器得到的資料來檢查第二種偏差。
方法：收集來自於一家有 5 個手術室的醫院一年的資料。首先測定使手術室使用時間低效率最小化的分配手術室時間，以確定實際上沒有過度利用的手術室時間。同時建立一個結構方程模型用來評估控制其他相關性時變數之間的關係。我們驗證了這個假設，即非手術時間不再是與白天相當大的工作負荷成相對較低的關係。
結果：額外的手術室沒有消耗效率（即，不同天數之間其平均潛在改善變化範圍從 21.1% ± 0.2% [SE]到 38.9% ± 0.2%），導致非常低的過度使用手術室時間。然而，決策之前有條

件的運行額外的手術室，在研究期間分配手術室時間最小化了手術室使用時間低效率。正如前面的結果顯示，這類設施適合於這種行爲的研究，並且也使得研究得以完成，並且假設關係最終也得以確定。在日常估計的擇期病例（總）持續時間每減少一個小時將會給平均周轉時間帶來管理上不重要的減少(0.41 ± 0.21 分鐘, P = 0.053)。如果排除大於兩次周轉同時出現時的周轉，每日（總）持續時間每減少 1 小時，則平均周轉時間無明顯減少(0.17 ± 0.24 分鐘, P = 0.464)。同樣，在排除延長的周轉（>60 分鐘）後，每日（總）持續中每減少 1 小時，平均周轉時間也不會有明顯的減少(0.16 ± 0.16 分鐘, P = 0.315)。
結論：之前的實驗和觀測研究發現，許多臨床醫生在他們被分配的工作時間中單位時間內保持了較高的臨床工作量。我們測試和確定了這種偏差應用在整個外科手術組中有規律的安排手術室使用時間的預測。總之，在少量或者幾個小時中工作人員在白天工作速度是一樣的。手術室工作人員沒有減慢，從而彌補了時間間隙。這些結論對資訊技術成本運用具有重要的影響，便於對手術日做出管理性決策。
（趙曉 譯 馬皓琳 李士通 校）
BACKGROUND: Previous research has identified 2 psychological biases in operating room (OR) decisions on the day of surgery: risk attitude of the decision-maker at the OR control desk and decisions made by OR staff to increase clinical work per unit time during the hours they are assigned. Resulting decisions are worse than random chance at reducing overutilized time. To isolate the second bias from decisions at the OR control desk, previous studies of the second bias have analyzed decisions made in non-OR locations and on nights/weekends. Another way to isolate the second bias from decisions at the OR control desk is to study facilities with negligible overutilized OR time. We examined the second bias using data from such a facility.
METHODS: One year of data was collected from a 5-OR hospital. Allocated OR time that minimized the inefficiency of use of OR time was determined first to confirm there was virtually no overutilized OR time. A structural equation model was then built to evaluate the relations among variables while controlling for other correlations. We tested the hypothesis that nonoperative times were no longer on days with little versus relatively large workload.
RESULTS: The extra ORs were not cost efficient (i.e., the mean potential improvement varied among days from 21.1% ± 0.2% [SE] to 38.9% ± 0.2%), resulting in very little overutilized OR time. However, conditioned on the preceding tactical decision of running extra ORs, the allocated OR time during the studied period was that which minimized the inefficiency of use of OR time. As the preceding results showed that the facility was suitable for the behavioral study, the behavioral study was performed, and the hypothesized relation confirmed. Each 1-hour decrease in the daily estimated (total) duration of elective cases resulted in a managerially unimportant decrease in the mean turnover times (0.41 ± 0.21 minutes, P = 0.053). Excluding turnovers when there were >2 turnovers occurring simultaneously, there was no significant decrease (0.17 ± 0.24 minutes, P = 0.464) in the mean turnover times per each 1-hour decrease in the daily estimated (total) duration. Similarly, after excluding prolonged turnovers (>60 minutes), there was no significant decrease (0.16 ± 0.16 minutes, P = 0.315) in the mean turnover times per each 1-hour decrease in the daily estimated (total) duration.
CONCLUSIONS: Previous experimental and observational studies found many clinicians maintained high clinical work per unit time during the hours to which they were assigned. We tested and confirmed a prediction of this bias as was applied during regularly scheduled OR hours among an entire surgical team. Overall, the staff worked just as quickly on days with few or many hours of cases. The OR staff did not slow down, thus filling the time. These results have

important implications for the cost utility of information technologies to facilitate managerial decision-making on the day of surgery.

彩色流動多普勒超聲檢查可區別骶尾部硬膜外注射與鞘內注射

Color Flow Doppler Ultrasonography Can Distinguish Caudal Epidural Injection from Intrathecal Injection

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Anesth Analg June 2013 116:1376-1379

背景：彩色流動多普勒超聲檢查已被用於確定骶尾部硬膜外注射，但其發現意外鞘內注射的能力仍未知。我們假設：彩色多普勒超聲檢查時，將藥液注入硬膜外腔會引起湍流，而鞘內注射則沒有彩色流動多普勒信號。
方法：爲期 2 個月的前瞻性試驗共包括了兩組小兒患者（最大的爲 6 歲）。一組（E 組）爲適用於用骶尾部硬膜外鎮痛的擇期手術患兒，另一組（I 組）爲接受腰椎穿刺行鞘內注射化療藥物的患兒。全身麻醉誘導並將患兒至於側臥位後，使用 8 MHZ 的弧形陣列探頭（Sonosite TITAN, Bothell, 華盛頓州）在腰段（L1-L3）獲得一橫截面圖像。在兩次連貫的（間隔爲 20 秒）速度爲 0.5-1.0mL/s 的 0.1mL/kg 局麻藥（25%布比卡因）或化療藥（甲氨喋林、阿糖胞苷及氫化可的松的混合物）注射過程中，獲得並記錄彩色流動多普勒的即時影像。在獲得研究影像後，用標準方式注入剩餘藥物。之後由另一不知情的麻醉醫師記錄影像來測定陽性或陰性結果（陽性爲湍流出現時的一混合彩色信號；陰性爲沒有湍流或彩色信號）。從成功鎮痛（組 E）及鞘內（組 I）注射的病例中計算敏感性、特異性及陰性或陽性預測值。
結果：本研究共囊括了 41 例患兒的 40 個記錄影像（E 組，n=21;I 組，n=20）。觀察到的敏感性、特異性、陽性預測值和陰性預測值都是 100%。95%的置信低限是 0.832。
結論：在本研究的背景中，用 0.1mL/kg 的注射容量和 0.5-1.0mL/s 的注射速度，彩色流動多普勒超聲可以區分 6 歲以下兒童硬膜外注射及鞘內注射入骶尾腔。
（王贇 譯 馬皓琳 李士通 校）

BACKGROUND: Color flow Doppler ultrasonography has been used to confirm caudal epidural injection, but its ability to detect accidental intrathecal injection is unknown. We hypothesized that, when using color flow Doppler, the injection of fluid into the epidural space would result in turbulent flow which would appear as a burst of color while intrathecal injection would show an absence of a color flow Doppler signal.
METHODS: Two groups of pediatric patients (up to 6 years of age) were prospectively enrolled for this observational study during a 2-month period. One group (group E) consisted of patients suitable for elective surgery using caudal epidural analgesia, and the other (group I) included patients receiving lumbar puncture for intrathecal chemotherapeutic injection. After induction of general anesthesia and placement of the patient in the lateral position, an 8 MHz curved array probe (Sonosite TITAN, Bothell, WA) was applied to obtain a transverse image of the lumbar region (L1-L3). Real-time images using color flow Doppler were obtained and recorded during initial injections of 2 consecutive (20 seconds apart) aliquots of 0.1 mL/kg medication of local anesthetic (0.25% bupivacaine) or chemotherapy drugs (mixture of methotrexate, cytarabine, and hydrocortisone) at a rate of 0.5 to 1.0 mL/s. After obtaining the study images, the rest of the

medication was injected in standard fashion. A blinded anesthesiologist later evaluated the recorded images to determine a positive or negative result (positive = presence of turbulence as illustrated by a medley of color; negative = no turbulence or color). Sensitivity, specificity, and positive and negative predictive values were calculated for those patients who had successful analgesia (group E) and intrathecal (group I) injections.
RESULTS: Forty recorded images from 41 patients (group E, n = 21; group I, n = 20) were included in the analysis. The observed sensitivity, specificity, positive predictive value, and negative predictive values were all 100%. The lower 95% confidence limits were 0.832.
CONCLUSION: In the context of this study, color flow Doppler could differentiate epidural from intrathecal injection into the caudal space of children up to 6 years of age using a 0.1 mL/kg injection volume and injection rate of 0.5 to 1.0 mL/s.

麻醉科住院醫師和麻醉護士對於專業麻醉醫師的有效臨床監督的看法

Anesthesiology Residents' and Nurse Anesthetists' Perceptions of Effective Clinical Faculty Supervision by Anesthesiologists

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Anesth Analg June 2013 116:1352-1355

背景：通常麻醉中監護是由非專業人員的麻醉提供者（例如麻醉科住院醫師和登記註冊的麻醉科護士[CRNAs]）在專業麻醉醫師的指導下提供的。因此對專業麻醉醫師的績效評價應包括對這一指導能力的評定。
方法：來自 3 家教學醫院的麻醉科住院醫師和麻醉護士給出他們"對於 9 位假設的麻醉醫師的指導的印象，區分爲可以達到他們的期望或不能、超出他們的期望或能力低於期望。"分數基於同這些麻醉醫師一起工作的人的回饋而並非其他人。應用一項 4 點評分量表（例如，1=從不，2=很少，3=經常，4=總是），並計算出平均值。
結果：參與者比率爲 51%的麻醉護士（N=153）和 58%的住院醫師（N=47）。從事麻醉培訓的年限與達到麻醉護士（肯德爾係數 τb = 0.01; 95%可信區間[CI], ?0.13~+0.10; P = 0.90）和住院醫師（τb = 0.03; 95% CI, ?0.16~+0.23; P = 0.77）期望的指導評分之間沒有聯繫。大多數麻醉護士（67%）和住院醫師（94%）認爲達到期望的指導至少爲"經常"（評分≥3.0）（兩者 P < 0.0001）。達到期望的指導評分的均數± SD 對於麻醉護士和住院醫師分別爲 3.14 ± 0.42 與 3.40 ± 0.30。麻醉護士評分的均數較住院醫師的少 0.26（P < 0.0001; 95% CI, 少 0.15 到 0.37）。其中 30%的麻醉護士的分數較住院醫師的平均分數高。
結論：來自 3 家教學醫院的大多數麻醉護士和住院醫師認爲達到他們期望的專業指導至少爲"經常"，與實踐年限無關。
（張怡 譯 馬皓琳 李士通 校）

BACKGROUND: Often anesthesia care is provided by nonfaculty anesthesia providers (e.g., anesthesiology residents and certified registered nurse anesthetists [CRNAs]) under the guidance of faculty anesthesiologists. Performance appraisal of faculty anesthesiologists should therefore include evaluation of this guidance.

METHODS: Residents and CRNAs from 3 teaching hospitals gave their "impression of 9 attributes of the hypothetical supervising anesthesiologist who meets … expectations … not … who exceeds expectations or whose activity is below … expectations." Scores were based on the anesthesiologist working with the respondent, not others. A 4-point scale (e.g., 1 = never, 2 = rarely, 3 = frequently, and 4 = always) was used, and the mean was calculated.
RESULTS: The participation rate was 51% among CRNAs (N = 153) and 58% among resident physicians (N = 47). There was no association between years since the start of training and supervision scores that met expectations among CRNAs (Kendall τb = 0.01; 95% confidence interval [CI], ?0.13 to +0.10; P = 0.90) or residents (τb = 0.03; 95% CI, ?0.16 to +0.23; P = 0.77). Most CRNAs (67%) and residents (94%) perceived that supervision that met their expectations was at least "frequent" (score ≥3.0) (both P < 0.0001). The mean ± SD of supervision scores that met expectations was 3.14 ± 0.42 for CRNAs versus 3.40 ± 0.30 for residents. The CRNAs' score mean was 0.26 less than that of residents (P < 0.0001; 95% CI, 0.15 to 0.37 less). There were 30% of CRNAs with scores larger than the residents' mean.
CONCLUSIONS: Most CRNAs and residents at 3 teaching hospitals considered faculty guidance that meets expectations to be at least "frequent," regardless of years in practice.

冠狀動脈搭橋手術期間，有關抗凝血替代物質的劑量對肝素敏感及活性的相關研究
The Influence of Antithrombin Substitution on Heparin Sensitivity and Activation of Hemostasis During Coronary Artery Bypass Graft Surgery: A Dose-Finding Study
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Anesth Analg June 2013 116:1223-1230

背景：體外迴圈常伴有凝血系統啓動程度高。補充抗凝血酶（AT）可能會減弱這種啓動，並增加患者的肝素易感性。然而，AT 適當的劑量還沒明確。我們試圖確定在心臟手術結束時 AT 達到 100％活性時 AT 用量 和 AT 對肝素靈敏度的影響
方法：41 例患者加入研究。三十例行體外迴圈接受冠狀動脈搭橋手術的患者被分配到 3 個 AT 濃度增加的組中，11 個額外的患者作爲對照組。測定 AT 活性和凝血酶生成的分子標誌物，並且計算肝素靈敏度。
結果：在低，中，高組給藥時，AT 濃度中位數分別爲 36.5 U（19.0 42.8）47.0U（41.3，61.6）和 50.0 U（47.4，66.6）每公斤體重。在手術結束時，抗凝替代物質活性分別是 84％（77 111），110％（92 120），104％（97 120）（中位數[第 25 日，第 75 百分位），對照組爲 63 ％（49 ；79），（替換組與對照組相比 P <0.05）。肝素的敏感性從對照組 1.29 （1.17，1.66）S / U 每公斤，分別增加至 2.02（1.43，3.65），2.56（1.52，3.64），1.72（1.24，2.66）S / U 每公斤組（置換組與對照組相比 P 均<0.05）。 與術前值相比，在所有患者術後 AT 活性降低，並在術後第 3 天最低點（與基線相比 P <0.05，AT 中間組除外）。對應於這種減少，前凝血酶原片段 1 +2 及 D-二聚體術後均觀察到增加。

討論：冠狀動脈搭橋手術期間，給予高劑量的 AT 可保護生理 AT 活性 ，並顯著提高肝素的靈敏度分別。然而，術後 5 天將遇到 AT 活性顯著減少，伴隨凝血酶高水準的生成。
(鄧利兵譯 薛張綱校)

BACKGROUND: Cardiopulmonary bypass is associated with a high degree of hemostatic system activation. Supplementation of antithrombin (AT) may attenuate this activation and increase a patient's susceptibility to heparin. However, the appropriate dosage of AT has not been defined. We sought to determine the dosage of AT concentrate necessary to achieve >100% AT activity at the end of cardiac surgery and the influence of AT on heparin sensitivity.
METHODS: Forty-one patients were included. Thirty consecutive patients undergoing primary coronary artery bypass graft surgery with cardiopulmonary bypass were assigned to 3 groups of increasing dosages of AT concentrate. Eleven additional patients served as controls. AT activity and molecular markers of thrombin generation were determined, and heparin sensitivity was calculated.
RESULTS: A median amount of 36.5 U (19.0; 42.8), 47.0 U (41.3; 61.6), and 50.0 U (47.4; 66.6) AT concentrate/kilogram body weight in the low, medium, and high AT group, respectively, was administered. At the end of surgery, AT activity with substitution was 84% (77; 111), 110% (92; 120), and 104% (97; 120) (median [25th; 75th percentile]), respectively, compared with 63% (49; 79) in controls ($P < 0.05$ all substitution groups versus control). Heparin sensitivity increased from 1.29 (1.17; 1.66) s/U heparin/kg in the control group to 2.02 (1.43; 3.65), 2.56 (1.52; 3.64), 1.72 (1.24; 2.66) s/U heparin/kg in the groups with substitution ($P < 0.05$ all substitution groups versus control). Compared with preoperative values, AT activity decreased during the postoperative period in all patients with a nadir on postoperative day 3 ($P < 0.05$ compared with baseline except for the medium AT group). Corresponding to this decrease, an increase in prothrombin fragment 1+2 and D-dimer could be observed postoperatively.
DISCUSSION: High dosages of AT were required to preserve physiologic AT activity during coronary artery bypass graft surgery and to significantly enhance heparin sensitivity, respectively. However, a significant decrease in AT activity, accompanied by high levels of thrombin generation, was encountered up to 5 days postoperatively.

揮發性麻醉藥對致敏幼兔過敏反應誘導的支氣管痙攣的保護作用

The Protective Effects of Volatile Anesthestics Against the Bronchoconstriction Induced by an Allergic Reaction in Sensitized Rabbit Pups

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Anesth Analg June 2013 116:1257-1264

背景：在膽鹼能刺激後揮發性吸入麻醉藥能對支氣管痙攣發展產生一個特異的保護作用。然而，它們對接觸過敏原後的過敏反應對呼吸道不良影響的抑制能力尚未明確。因此，我們比較了異氟醚、七氟醚和地氟醚在小兒過敏反應模型中防止過敏反應引起肺不張的能力。

方法：測定 4 組分別以咪達唑侖（IV 組）和吸入異氟醚（ISO 組）、七氟醚（SEVO 組）、地氟醚（DES 組）麻醉的，用卵清蛋白（OVA）致敏的 5 周齡幼兔在 MAC 值爲 1 時的低頻呼吸的輸入阻抗（Zrs）。Zrs 在基準條件下，通過靜脈注射過敏原(OVA 1mg)激發肺的過敏反應後測得，在此期間 Zrs 導致的氣道阻力（Raw），組織阻尼（G），和彈性阻力的變化監測 15 分鐘。
結果：過敏原的激發立即產生嚴重的支氣管痙攣，在前 3 分鐘裡 Raw 的增加各組差異無統計學意義。相反，吸入揮發性麻醉藥加快由過敏原引起支氣管痙攣的恢復，尤其是在 SEVO 組在過敏原刺激後的 4 分鐘裡 Raw 顯著低於 IV 組。在各組 G 的變化是平行的明顯升高的，在 DES 組的動物更有顯著的惡化。注射 OVA 後麻醉方案對持續增加順應性的影響沒有統計學意義。
結論：我們的研究結果提示，常用的揮發性麻醉藥在過敏反應後，對中央氣道和周圍肺組織的平滑肌對過敏原最嚴重的急性期反應的抑制缺乏潛在的普遍性。吸入揮發性麻醉藥，尤其是七氟醚，能夠早期促進緩解支氣管痙攣；這個有利的一面可能對患有過敏性肺疾病的小兒是有利的。
（方昕譯 薛張綱校）

BACKGROUND: Volatile inhaled anesthetics exert a differential protective effect against bronchospasm development after cholinergic stimulation. However, their ability to inhibit the adverse respiratory consequences of an anaphylactic reaction after exposure to an allergen has not been characterized. We therefore compared the abilities of isoflurane, sevoflurane, and desflurane to prevent the lung constriction induced by an allergic reaction in a pediatric model of an anaphylactic reaction.
METHODS: Low-frequency respiratory input impedance (Zrs) was measured in 4 groups of ovalbumin (OVA)-sensitized 5-week-old rabbit pups anesthetized with midazolam (group IV) and with inhaled isoflurane (group ISO), sevoflurane (group SEVO), or desflurane (group DES) at 1 minimum alveolar concentration. Zrs was measured under baseline conditions and after an anaphylactic lung response provoked by IV allergen injection (OVA 1 mg), during which the changes in airway resistance (Raw), tissue damping (G), and elastance obtained from Zrs were followed for 15 minutes.
RESULTS: Allergen provocation generated immediate severe bronchoconstriction, with no statistically significant difference in Raw increase among the groups in the first 3 minutes. Conversely, the inhalation of volatile anesthetics accelerated the recovery from the allergen-induced bronchoconstriction, particularly in group SEVO where the Raw was significantly lower than that in group IV 4 minutes after the allergen challenge. These changes were paralleled by significant elevations in G in all groups, with a significantly more pronounced deterioration in the animals in group DES. The anesthetic regimen did not statistically significantly affect the sustained increases in elastance after OVA injections.
CONCLUSIONS: Our results reveal the lack of potential of the commonly used volatile anesthetics to inhibit the most severe acute phase of the constrictor response to allergen after anaphylaxis in both the central airway and peripheral lung compartments. Inhalation of volatile anesthetics, particularly sevoflurane, promotes an earlier easing of the bronchospasm; this beneficial profile may be advantageous in children with atopic lung diseases.

增加紅細胞輸注量與小兒心臟移植患者預後不良相關。

Increased red blood cell transfusions are associated with worsening outcomes in pediatric heart transplant patients.

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Anesth Analg June 2013 116:1295-1308

背景：由於其危險因素的獨特性，接受心臟移植手術的兒童患者構成了一個獨立的群體。紅細胞（RBC）的輸注於其死亡率呈正相關。儘管之前的對於非移植患者的研究焦點主要集中於術後輸血的影響，與一般心臟手術患者相比，接受心臟移植手術的患者在圍術期需要涉及更多的血液接觸與更大量的術中輸血。我們研究了心臟移植術中及術後輸血量與臨床預後之間的關係。假設在小兒心臟移植患者中輸注更大量的紅細胞與臨床預後不良相關。

方法：我們查詢並分析了資料庫中自 2004-2010 年間 108 名接受心臟移植手術的患者術前和術後的臨床風險因素以及術中和術後 48 小時輸血量。預後情況根據住院時間、氣管插管時間、心肺 IS 評分以及主要不良事件。通過二元及多元分析處理控制風險因素，確定輸血量是否是一個獨立的危險因素。

結果：49 例病例完成了包含最終結果的資料獲取。其中 88%患者接受了紅細胞輸注，輸注量的中位數是 38.7 毫升/公斤。通過多變數分析糾正其餘 8 個變數使得輸血量成爲與 ICU 入住時長正相關的獨立變數（MR=1.34；95%可信區間 1.03-1.76；P=0.03），8 個變數包括 IMPAC（心臟移植後死亡率預測值）、年齡、體重、移植器官的狀態、冷缺血和熱缺血時間、重複胸骨劈開以及移植前血細胞比容。並且輸血量與術後第一個 24 小時的 IS 評分（MR=1.25；95%可信區間 1.04-1.52；P=0.04）正相關。大量輸血患者的主要不良事件發生率也大大增加（p=0.002）。輸血〉60 毫升/公斤增加了術後相關主要不良事件的概率（76%）。包括術後敗血症、體外氧合、開胸以及移植失敗。

結論：大多數兒科心臟移植的患者行紅細胞輸注，大量的輸血是在手術室中進行的。輸血所產生的紅細胞數量的提升與 ICU 入室時長、IS 評分及主要不良事件呈正相關。由於移植用的心臟是有限的資源，切實提高輸血品質可以促進小兒心臟移植患者的手術預後。（郭晨躍譯 薛張綱校）

BACKGROUND: Red blood cell (RBC) transfusions are associated with increased morbidity. Children receiving heart transplants constitute a unique group of patients due to their risk factors. Although previous studies in nontransplant patients have focused primarily on the effects of postoperative blood transfusions, a significant exposure to blood occurs during the intraoperative period, and a larger percentage of heart transplant patients require intraoperative blood transfusions when compared with general cardiac surgery patients. We investigated the relationship between clinical outcomes and the amount of blood transfused both during and after heart transplantation. We hypothesized that largeramounts of RBC transfusions are associated with worsening clinical outcomes in pediatric heart transplant patients.

METHODS: A database comprising 108 pediatric patients undergoing heart transplantation from 2004 to 2010 was queried. Preoperative and postoperative clinical risk factors, including the amount of blood transfused intraoperatively and 48 hours postoperatively, were analyzed. The outcome measures were length of hospital stay, duration of tracheal intubation, inotrope score, and major adverse events. Bivariate and multivariate analyses were performed to control

for simultaneous risk factors and determine outcomes in which the amount of blood transfused was an independent risk factor.
RESULTS: Ninety-four patients with complete datasets were included in the final analysis. Eighty-eight percent received RBC transfusions, with a median transfusion amount of 38.7 mL/kg. A multivariate analysis correcting for 8 covariate risk factors, including the Index for Mortality Prediction After Cardiac Transplantation, age, weight, United Network for Organ Sharing status, warm and cold ischemia time, repeat sternotomy, and pretransplant hematocrit, showed RBC transfusions were independently associated with increased length of intensive care unit stay (means ratio = 1.34; 95% confidence interval, 1.03-1.76; P = 0.03), and increased inotrope score in the first postoperative 24 hour (mean ratio = 1.26; 95% confidence interval, 1.04-1.52; P = 0.04). Patients suffering major adverse events received significantly larger median amounts of blood RBC transfusions (P = 0.002). Transfusions >60 mL/kg were also associated with increased risk of major adverse events (accuracy 76%) including postoperative sepsis, extracorporeal membrane oxygenation, open chest, dialysis, and graft failure.
CONCLUSION: The majority of pediatric patients undergoing orthotropic heart transplantation receive RBC transfusions, with the largest amount transfused in the operating room. Escalating amounts of RBC transfusions are independently associated with increased length of intensive care unit stay, inotrope scores, and major adverse events. Since heart allografts are a limited resource, improvement in the blood transfusion and conservation practices can enhance clinical outcomes in pediatric heart transplant patients.

坐位或“沙灘椅”位時,5177 接受神經外科和骨科手術治療而無神經系統不良事件患者的血流動力學管理

The hemodynamic management of 5177 neurosurgical and orthopedic patients who underwent surgery in the sitting or "beach chair" position without incidence of adverse neurologic events.

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Anesth Analg June 2013 116:1317-1324

背景：少數報告提示，坐位或沙灘椅位術後出現缺血性腦脊髓損傷；因爲血流動力學細節未知，所以腦脊髓缺血性損傷的發生率以及動脈血壓和傷害的關係仍然未知。爲增加坐位麻醉資料，我們檢查眾多未發生此惡性事件的患者的血流動力學情況。
方法：2002 年 1 月 1 日和 2009 年 12 月 31 日之間，全面回顧了在羅切斯特梅奧診所對 5177 例在坐姿下行的肩部手術或神經外科的患者電子血流動力學記錄。
結果：5177 位坐位手術的患者術後沒有立即發生災難性的結果。肩部手術，術中動脈血壓在心臟水準，其收縮壓下降 14.4%±12.7%，絕對值下降 75±8 毫米汞柱，無創血壓下降 19.3%±12.6%，絕對值下降 74±7 毫米汞柱；神經外科的病人動脈血壓在心臟水準，其平均動脈壓下降 17.6%±11.5%，絕對值下降爲 78±7 毫米汞柱，無創血壓在頭部水準，其平均動脈壓下降 19.7%±10.7%，絕對值下降爲 75±7 毫米汞柱。整個手術過程中，52%的神經外科患者和 51%骨科患者通過 A 線監測，骨科 48%的患者出現血壓降低超過基礎值 40%時進行無創血壓監測。

結論：這項研究提供了一個描述性的總結，術中監測血壓，無論換能器或袖帶在心臟水準還是頭部水準（未低於心臟水準），無論是有創還是無創監測，患者在坐位行全麻手術未出現腦脊髓缺陷性損傷。
（韓敘譯 薛張綱校）

BACKGROUND: A small number of highly publicized case reports describe ischemic brain or spinal cord injury after surgery in the sitting ("beach chair") position. The incidence of such catastrophic outcomes remains unknown, as does the relationship between arterial blood pressure management and injury, because few hemodynamic details were included with those 4 cases. To add quantitative data to the discussion of anesthesia in the sitting position, we examined the detailed hemodynamics of a large number of patients managed at our institution who sustained no similar catastrophic outcomes.
METHODS: A comprehensive, retrospective, interrogation was performed of the electronic hemodynamic record for all 5177 patients who underwent either orthopedic shoulder surgery or neurological surgery in the sitting position at Mayo Clinic Rochester between January 1, 2002 and December 31, 2009.
RESULTS: No immediate postoperative catastrophic outcomes occurred in 5177 sitting patients undergoing surgery and general anesthesia in the sitting position. For orthopedic shoulder surgery patients, intraoperative systolic blood pressures obtained from an arterial line referenced to heart level decreased 14.4% ± 12.7% (mean ± SD), and those obtained from a noninvasive blood pressure (NIBP) cuff referenced to heart level decreased 19.3% ± 12.6%. For neurosurgical patients, the average reductions in intraoperative mean arterial blood pressures from baseline were 17.6% ± 11.5% and 19.7% ± 10.7% for patients with heart- and head-level transducer placement, respectively. The absolute intraoperative mean arterial blood pressures (mean ± SD) for orthopedic patients measured by NIBP referenced to heart level were 75 ± 8 mm Hg; for orthopedic patients measured from an arterial line referenced to heart level were 74 ± 7 mm Hg; for neurosurgical patients measured with an arterial line referenced to heart level were 78 ± 7 mm Hg; and for neurosurgical patients measured with an arterial line referenced to head level were 75 ± 7 mm Hg. Over the entire duration of surgery, 52% (95% confidence interval [CI], 49%-56%) of neurosurgical patients, 51% (95% CI, 47%-55%) of orthopedic patients monitored with an A-line, and 48% (95% CI, 46%-50%) of orthopedic patients monitored with NIBP experienced ≥1 episodes of systolic blood pressure reduction >40% below baseline.
CONCLUSION: This study provides a descriptive summary of intraoperative blood pressure changes, measured either invasively or noninvasively, and referenced to either head or heart level, but never lower than heart level, in patients under general anesthesia in the sitting position who sustained no catastrophic outcomes.

簡要報告：胸外科手術圍手術期連續硬膜外輸注 s(+)-氯胺酮的鎮痛療效和血藥濃度。

Brief report: perioperative analgesic efficacy and plasma concentrations of s(+)-ketamine in continuous epiduralinfusion during thoracic surgery.

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Anesth Analg June 2013 116:1371-137

背景：在開胸手術術後鎮痛治療研究中，我們評估了術中連續硬膜外輸注亞麻醉劑量的S(+)-氯胺酮的鎮痛效果和血藥濃度持續時間。
方法：將 140 名開胸手術病人隨機分配爲持續硬膜外輸注 S（+）氯胺酮或羅卡因。衡量結果如下：（一）術中芬太尼的需求量;（二）術後疼痛強度;及（三）術後鎮痛藥補救量。
結果：氯胺酮組患者術中芬太尼消耗量比羅呱卡因組患者顯著降低（中位數差異：-58.6 微克，95％可信區間[CI]，-97.2 至-19.6 微克，P=0.0032）。氯胺酮組術後視覺類比評分量表得分明顯低於對照組（魏氏採用 Mann-Whitney 賠率在 24 小時= 6.25，95％可信區間，4.07～1.97，P<0.0001）。控制組比氯胺酮組鎮痛藥補救更加頻繁（百分比差異：58.6％，95％可信區間，43.3％，69.6％，P<0.0001）。連續硬膜外輸注時氯胺酮平均血漿濃度迅速下降，停止輸注後慢慢消退。
結論：我們的資料顯示，開胸手術過程中硬膜外輸注亞麻醉劑量的 S（+）氯胺酮比輸注羅呱卡因能提供更好的術後鎮痛。
（賀盼譯 薛張綱校）
BACKGROUND: In our study, we evaluated the analgesic effect and plasma level time course of subanesthetic doses of intraoperative S(+)-ketamineadministered by continuous epidural infusion for postthoracotomic pain.
METHODS:A study population of 140 patients undergoing thoracic surgery was randomly assigned to either S(+)-ketamine or ropivacaine bycontinuous epidural infusion. The outcome measures were as follows: (a) intraoperative fentanyl requirements; (b) postoperative pain intensity; and (c) postoperative rescue analgesics.
RESULTS: Intraoperative fentanyl consumption was significantly lower (median of difference: -58.6 μg; 95% confidence interval [CI], -97.2 to -19.6 μg; P = 0.0032) in patients in the ketamine group than those in the ropivacaine group. Postoperative visual analog scale scores were significantly lower in the ketamine group than in controls (Wilcoxon-Mann-Whitney odds at 24 hours = 6.25; 95% CI, 4.07 to 1.97; P < 0.0001). Rescue analgesics were required more frequently in controls than in the ketamine group (percentage difference: 58.6%; 95% CI, 43.3% to 69.6%; P < 0.0001). The meanplasma level of ketamine declined rapidly during continuous epidural infusion and decayed slowly after it had stopped.
CONCLUSIONS: Our data show that epidural infusion of subanesthetic doses of S(+)-ketamine during thoracic surgery provides better postoperative analgesia than epidural ropivacaine.

居民評定在麻醉師手術室監督的決定因素，內在聯繫和心理屬性

Determinants, associations, and psychometric properties of resident assessments of anesthesiologist operating room supervision.
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Anesth Analg June 2013 116:1342-1351

背景：德奧利維拉略等進行的一項研究。報告驗證組闡述利用 9 個問題來對巴西麻醉人士在手術室中進行學院評估的監督。這項研究的目的是使用這個問題設置，以確定是否學院手術室監督分數是與居民一年的臨床麻醉培訓和/或特定居民-學院互動有關聯。我們同樣描述了學院手術室監督分數和居民評估之間的關聯：（1）在手術室以外的設置，學院的監督，（2）學院臨床能力（家庭選擇），及（3）學院的教學效果。最後，我們將德奧利維拉略等人的問題設置試用於美國麻醉住院醫師計畫。

方法：所有的 39 位在 lowa 大學麻醉專業接受麻醉訓練的人士，無論是在他們的第一年（n = 14），第二年（n = 13），或第三年（n = 12），將接受至少有 1/3 個臨床部門（[N = 49]，外科重症監護病房[N = 10]，疼痛門診[N = 6]）工作人員的監督。對於所有的居民-學院組，部門計費資料被用來定量居民-學院互動和最後的互動和評估之間的間隔數。一個普遍性研究來確定最低數量的居民評估的高可用性和可靠性。

結果：沒有顯著的關聯在學院平均手術室監管分數和：（1）居民-學院-病人接觸（KendallτB= 0.01，95％可信區間[CI]，-0.02 到 0.04，P = 0.71），（2）居民-學院長期的互動（τB= -0.01; 95％CI，-0.05 至+0.02，P = 0.46），和（3）上一個居民-學院互動時間（τB= 0.01，95％CI，-0.02 至 0.05，P = 0.49）。手術室和外科重症監護病房的監督分數呈高度相關（τB= 0.71，95％CI，0.63～0.78，P <0.0001）。手術室的監督分數與家人選擇分數高度相關（τB= 0.77，95％CI，0.70～0.84，P <0.0001），教學成績（τB= 0.87，95％CI，0.82～0.92，P <0.0001 ）。高可用性和可靠性（G-φ 係數> 0.80）發生在個別學院麻醉師獲得 15 個或更多種不同居民的評估。

結論：所有居民提供的監管分數與評價個別學院麻醉師的平均監管分數有同等分量。評估監督，教學和臨床護理品質是高度相關的。當德·奧利維拉略等人提出的的提問計畫被用在美國麻醉住院醫師程式中時，由至少 15 名居民參與評估所得的監督分數是高度可信和可靠的。

（胡曉清譯 薛張綱校）

BACKGROUND:A study by de Oliveira Filho et al. reported a validated set of 9 questions by which Brazilian anesthesia residents assessed faculty supervision in the operating room. The aim of this study was to use this question set to determine whether faculty operating room supervision scores were associated with residents' year of clinical anesthesia training and/or number of specific resident-faculty interactions. We also characterized associations between faculty operating room supervision scores and resident assessments of: (1) faculty supervision in settings other than operating rooms, (2) faculty clinical ability (family choice), and (3) faculty teaching effectiveness. Finally, we characterized the psychometric properties of the de Oliveira Filho etal. question set in an United States anesthesia residency program.

METHODS: All 39 residents in the Department of Anesthesia of the University of Iowa in their first (n = 14), second (n = 13), or third (n = 12) year of clinical anesthesia training evaluated the supervision provided by all anesthesia faculty who staffed in at least 1 of 3 clinical settings (operating room [n = 49], surgical intensive care unit [n = 10], pain clinic [n = 6]). For all resident-faculty pairs, departmental billing data were used to quantitate the number of resident-faculty interactions and the interval between the last interaction and the assessment. A generalizability study was performed to determine the minimum number of resident evaluations needed for high reliability and dependability.

RESULTS: There were no significant associations between faculty mean operating room supervision scores and: (1) resident-faculty patient encounters (Kendall τb = 0.01; 95% confidence interval [CI], -0.02 to +0.04; P = 0.71), (2) resident-faculty days of interaction (τb = -0.01; 95% CI, -0.05 to +0.02; P = 0.46), and (3) days since last resident-faculty interaction (τb = 0.01; 95% CI, -0.02 to 0.05; P = 0.49). Supervision scores for the operating room and surgical intensive care unit were highly correlated (τb = 0.71; 95% CI, 0.63 to 0.78; P < 0.0001). Supervision scores for the operating room also were highly correlated with family choice scores (τb = 0.77; 95% CI, 0.70 to 0.84; P < 0.0001) and teaching scores (τb = 0.87; 95% CI, 0.82 to 0.92; P < 0.0001). High reliability and dependability (both G- and ϕ-coefficients > 0.80) occurred when individual faculty anesthesiologists received assessments from 15 or more different residents.
CONCLUSION: Supervision scores provided by all residents can be given equal weight when calculating an individual faculty anesthesiologist's mean supervision score. Assessments of supervision, teaching, and quality of clinical care are highly correlated. When the de Oliveira Filho et al. question set is used in a United States anesthesia residency program, supervision scores are highly reliable and dependable when at least 15 residents assess each faculty.