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大鼠暴露在超重环境下14天增加丙泊酚的作用
Hypergravity Exposure for 14 Days Increases the Effects of Propofol in Rats
Iwata, Chihiro MD*; Abe, Chikara DDS, PhD*; Nakamura, Mitsuhiro PhD†; Morita, Hironobu MD, PhD*
Anesthesia & Analgesia 2014 118 125–131

BACKGROUND: It is thought that the gravitational environment of space exploration alters the effects of anesthetics; however, no evidence has as yet been reported. In the present study, we sought to provide direct evidence showing that hypergravity exposure for 14 days increases anesthetic effects and to examine the possible causes.

METHODS: Sprague-Dawley rats were raised in a 3g environment for 14 days. On the day of the experiment, rats were brought out of 3g and rested at 1g for 1 to 2 hours before IV propofol infusion (20 mg/kg, for 5 minutes). Control rats were continuously raised in a 1g environment. The effects of propofol were compared between rats raised in 1g and 3g environment by measuring time taken to induce the burst suppression in an electroencephalogram, nadir of arterial blood pressure, and time taken for the appearance of the righting response to noxious electrical stimulations. The time course of plasma propofol concentrations was also examined. Experiments were also conducted on rats with vestibular lesions to examine whether the vestibular system participated in the observed results. All values were expressed as mean ± SD.

RESULTS: In rats raised in 3g environment, the mean time to induce burst suppression in the electroencephalogram was earlier (195.7 ± 15.1 seconds, P = 0.00037), the nadir of mean arterial blood pressure was lower (75.0 ± 15.5 mmHg vs 100.6 ± 9.1 mm Hg, P = 0.019), and mean time for the righting response to appear was later (39.0 ± 8.4 minutes, P < 0.0001 vs sham-treated rats continuously raised in 1g environment (267.3 ± 29.4 seconds, 108.7 ± 14.6 mmHg and 20.8 ± 2.8 minutes, P = 0.95, 0.73, and 0.98 vs sham-treated rats continuously raised in 1g environment).
CONCLUSION: The results provide evidence that hypergravity exposure for 14 days increases the effects of propofol. It is suggested that the results were not caused by differences in plasma propofol concentrations but by increased sensitivity, which was mediated via the vestibular system.

腰硬聯合麻醉和單次腰麻技術用於病態肥胖患者剖宮產手術的麻醉開始時間：一項隨機對照比較研究

A Randomized Controlled Comparison Between Combined Spinal-Epidural and Single-Shot Spinal Techniques in Morbidly Obese Parturients Undergoing Cesarean Delivery: Time for Initiation of Anesthesia

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Anesthesia & Analgesia 2014 118 168–172

BACKGROUND: There is no current consensus on the optimal technique for subarachnoid anesthesia in morbidly obese parturients even though some providers prefer the combined spinal-epidural (CSE) over single-shot spinal (SSS) technique. In this randomized controlled study, we compared the time required for initiation of subarachnoid anesthesia between SSS and CSE techniques in morbidly obese parturients undergoing elective cesarean delivery.

METHODS: Morbidly obese parturients presenting for elective cesarean delivery were randomized to receive subarachnoid anesthesia performed either with a SSS or a CSE technique. The spinal procedure in the sitting position was attempted by an experienced resident for up to 10 minutes, and if unsuccessful, the attending obstetric anesthesiologist assumed control of the procedure. The primary outcome was the time it took from the insertion of the introducer needle...
(SSS group) or insertion of the epidural needle (CSE group) to the end of intrathecal injection of drugs (procedure time).

RESULTS: Forty-four patients were enrolled and completed the study. Three were excluded due to protocol violations. Of the remaining, 21 patients were in the SSS group and 20 in the CSE group. Demographic variables and mean (SD) body mass index (48.7 ± 7.6 kg/m² for SSS; 49.9 ± 8.6 kg/m² for CSE) were not different between groups. The median [interquartile range] for procedure time was 210 [116–692] seconds and 180 [75–450] seconds for SSS and CSE groups, respectively (P = 0.36), while the 95% confidence interval (CI) of the difference was −80 to +180 seconds. The first operator completed the procedure in <10 minutes in 71% of subjects in the SSS group and 95% of those in the CSE group (P = 0.09) and the 95% CI of the difference was −2% to +45%. There were more attempts to successful completion of the procedure in the SSS group (P = 0.007) with its 95% CI of the difference being +1 to +6.

CONCLUSION: Our results suggest that the CSE technique is noninferior to the SS technique in morbidly obese parturients for time of initiation of subarachnoid anesthesia and may be accomplished with fewer attempts than the SSS technique with experienced residents.

對美國學術型麻醉學教職員發表量的考察
Examination of Publications from Academic Anesthesiology Faculty in the United States
Hurley, Robert W. MD, PhD*; Zhao, Kevin MD†; Tighe, Patrick J. MD, MS*; Ko, Phebe S. MD*; Pronovost, Peter J. MD, PhD*; Wu, Christopher L. MD*
Anesthesia & Analgesia 2014 118 192–199

背景: 美國麻醉學學術協會的領導者發起了一項對麻醉科學歷情況的考察，同時也考察了美國國立衛生研究院對美國麻醉醫師的基金資助及出版刊物的品質。然而，與學術型麻醉醫師（被醫學院校定義為學術型）相關的出版物的發表量及人群特徵仍未知。我們通過對美國醫學院校協會的 2006 年-2008 年的一個兩年的資料庫的調研，瞭解相關的出版量及人群特徵。

方法: 檢索 Pubmed 出版物資料庫中的每個教職員，並將他們的個人資訊，包括工作單位、性別、學歷、學位、工作性質（半日制或全職）、任命狀態（集體或個人）、部門地位、專業認證狀態及研究生培訓情況記錄進一個新的資料庫。

結果: 來自任職于 108 項美國麻醉學術專案的 6143 名教職員在 2006 到 2008 年共發表了 8521 篇稿件。37%的教職員發表了稿件，而整體的平均發表率則為 0。至少有 1 篇發表文獻的教員在高級職稱（教授比講師的比值比（OR）=6.4；可信區間（CI），4.57–8.49；P < 0.0001），男性（OR 1.3；CI，0.14–1.47；P < 0.0001），擁有一個優遇的任用狀態（OR 2.1；CI，1.25–3.52；P = 0.0048），缺少碩士生培養及專業認證（OR（MD 比 MD w/培訓+認證）=1.3；CI，1.11–1.60；P = 0.0020）的教員中佔有更高比例。只有一個 MD 學位的教員比有 MD/PhD 或 PhD 的教員發表率低（分別是：OR 0.45；CI，0.32–0.65；P < 0.0001；OR 0.27；CI，0.20–0.37；P < 0.0001）。在至少發表一篇文獻的組內，全職教授發表量比講師多 3.8 倍（CI，2.99–4.88；P < 0.0001），缺少研究生培訓的教員比培訓並且認證過的教員發表量要低 1.4 倍（CI，1.16–1.78；P = 0.0009）。PhD 學位（P = 0.006）、男性（P = 0.013）及優遇的麻醉任用（P = 0.037）同樣有更高的發表率。

結論: 醫學院校相關麻醉醫師在這個時期的整體發表率較低。以上資料建立了美國學術型麻醉醫師為了將來的競爭發起的“呼籲行動”學術活動的基礎。增加結構化住院醫師和專業培訓醫師研究教育項目的利用將同招募更多的 MD/PhD 和 PhD 學位的科學家致力於此領域一起，有助於共同提高麻醉學術部門的出版生産力。

（王贇 譯 馬皓琳 李士通 校）
BACKGROUND: Leaders in academic anesthesiology in the United States have called for an examination of the state of scholarship within anesthesiology departments. National Institutes of Health funding and publication quality of subsets of U.S. anesthesiologists have been examined; however, the publication output of and the demographic characteristics that are associated with academic anesthesiologists, defined as faculty associated with a medical college, are unknown. A database from the American Association of Medical Colleges containing demographic information of all academic anesthesiologists in the United States was used to examine the publication output and demographic characteristics of anesthesiology faculty during a 2-year period from 2006 to 2008.

METHOD: All the publications found in the PubMed database for each faculty member were retrieved and included in a database containing their demographics including institution, gender, academic degree, academic rank, nature of appointment (part versus full-time), status of appointment (joint versus primary), departmental division, subspecialty certification status, and additional graduate medical education training.

RESULTS: Six thousand one hundred forty-three faculty who held positions at the 108 U.S. academic anesthesiology programs published 8521 manuscripts between 2006 and 2008. Thirty-seven percent of faculty published a manuscript, and the overall median publication rate was 0. The proportion of faculty with at least 1 publication was larger among faculty with higher rank (Odds Ratio [OR] for professors versus instructors = 6.4; confidence interval [CI], 4.57–8.49; P < 0.0001), male gender (OR 1.3; CI, 0.14–1.47; P < 0.0001), possessing a courtesy appointment status (OR 2.1; CI, 1.25–3.52; P = 0.0048) and lacking postgraduate training and subspecialty certification (OR for MD versus MD w/training + certification 1.3; CI, 1.11–1.60; P = 0.0020). Those faculty with an MD had lower probability of publishing when compared with MD/PhD or PhD faculty (OR 0.45; CI, 0.32–0.65; P < 0.0001; OR 0.27; CI, 0.20–0.37; P < 0.0001, respectively). Within the group of faculty who published at least 1 paper, full professor faculty had 3.8 times more publications than instructors (CI, 2.99–4.88; P < 0.0001), and those who lacked postgraduate training had 1.4 times more publications than those who were trained and certified (CI, 1.16–1.78; P = 0.0009). PhD degree (P = 0.006), male gender (P = 0.013), and courtesy anesthesia appointment (P = 0.037) also were associated with higher publication rates.

CONCLUSIONS: The overall publication rate of anesthesiologists associated with medical schools was low in this time period. These data establish the pre-“call to action” baseline of scholarly activity by U.S. academic anesthesiologists for future comparisons. Increased use of structured resident and fellow research education programs as well as recruiting more MD/PhD and PhD scientists to the field may help to improve the publication productivity of academic anesthesiology departments.

腰椎手術失敗與椎管內狹窄的硬膜外粘連松解：與預後相關的因素
Epidural Lysis of Adhesions for Failed Back Surgery and Spinal Stenosis: Factors Associated with Treatment Outcome
Hsu, Eugene MD, MBA*; Atanelov, Levan MD†; Plunkett, Anthony R. MD‡; Chai, Nu MD§; Chen, Yian BS ‖; Cohen, Steven P. MD¶
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背景: 腰椎手術失敗綜合征是一個具有挑戰性的問題。硬膜外粘連松解是被主張用於腰椎手術失敗綜合征的治療措施之一。關於硬膜外粘連松解用於腰椎手術失敗綜合征的研究結實有好有壞，但都因沒有找出與結果相關的因素而受到限制。
方法: 我們對2004年至2007年115例接受硬膜外粘連松解的患者進行了多中心、回顧性的研究。其中104例為腰椎手術失敗綜合征，11例為椎管內狹窄。從病歷中提取了27項人口統計學、臨床和手術變數，研究其與預後的相關性。預後定義為≥50%的疼痛緩解持續≥1個月。進行單變數分析，隨後進行多因素 logistic 回歸分析。

結果: 總體而言，48.7%的患者（95%可信區間為39.3%–58.1%）達到了良好的預後。在單因素分析中，達良好預後的人群包括年長的（平均年齡64.1歲，95%可信區間為59.7–68.6，對比57.2歲，95%可信區間為53.0–61.4，P=0.02），而較高的疼痛評分基礎數值與不良預後有關（平均6.7年，95%可信區間為6.0–7.3對比7.5年，95%可信區間為6.9–8.0，P = 0.07）。使用透明質酸酶並沒有在單因素分析中與預後呈現相關性（比值比1.2，95%可信區間為0.6–2.5，P = 0.65）。在多變數分析中，年齢≥81歲（比值比7.8，95%可信區間1.4–53.7），疼痛評分基礎值≤9（比值比4.4，95%可信區間1.4–16.3，P = 0.02），以及具有或正在尋求殘疾或勞工賠償的患者（比值比4.4，95%可信區間1.1–19.5，P = 0.04）顯著地更可能經歷積極的預後。

結論: 考慮到我們不太高的成功率，根據統計學和臨床因素來選擇進行硬膜外粘連松解手術的患者可有助於更好挑選治療的候選人。手術操作性因素例如透明質酸酶增加了風險和成本，並沒有改善預後，因此將其作爲標準療法前還需要進一步的研究。

BACKGROUND: Failed back surgery syndrome (FBSS) is a challenging problem. One treatment advocated to treat FBSS is epidural lysis of adhesions (LOA). The results of studies examining LOA for FBSS have been mixed, but are limited because no study has ever sought to identify factors associated with outcomes.

METHODS: We performed this multicenter, retrospective study in 115 patients who underwent LOA for FBSS (n = 104) or spinal stenosis (n = 11) between 2004 and 2007. Twenty-seven demographic, clinical, and procedural variables were extracted from medical records and correlated with the outcome, defined as ≥50% pain relief lasting ≥1 month. Univariable analysis was performed, followed by multivariable logistic regression.

RESULTS: Overall, 48.7% (95% confidence interval [CI], 39.3%–58.1%) of patients experienced a positive outcome. In univariable analysis, those who had a positive outcome were older (mean age 64.1 years; 95% CI, 59.7–68.6 vs 57.2 years; 95% CI, 53.0–61.4 years; P = 0.02), while higher baseline numerical rating scale pain scores were associated with a negative outcome (mean 6.7 years; 95% CI, 6.0–7.3 vs 7.5 years; 95% CI, 6.9–8.0; P = 0.07). Use of hyaluronidase did not correlate with outcomes in univariable analysis (odds ratio [OR], 1.2; 95% CI, 0.6–2.5; P = 0.65). In multivariable analysis, age ≥81 years (OR, 7.8; 95% CI, 1.4–53.7), baseline numerical rating scale score ≤9 (OR, 4.4; 95% CI, 1.4–16.3, P = 0.02), and patients on or seeking disability or worker’s compensation (OR, 4.4; 95% CI, 1.1–19.5, P = 0.04) were significantly more likely to experience a positive outcome.

CONCLUSIONS: Considering our modest success rate, selecting patients for epidural LOA based on demographic and clinical factors may help better select treatment candidates. Procedural factors such as the use of hyaluronidase that increase risks and costs did not improve outcomes, so further research is needed before these become standard practice.
BACKGROUND: Previous studies have shown that local anesthetics may induce apoptosis in some cell types. In this study, we investigated the apoptotic effects of local anesthetics in human breast tumor cells.

METHODS: Human breast cancer (MCF-7) and mammary epithelial (MCF-10A) cell lines were treated with lidocaine and/or bupivacaine. Cell viability, DNA fragmentation, and annexin V immunofluorescence staining were assessed. The effects on apoptosis-related protein expression were investigated by Western blot analysis. The findings were extended to studies in an in vivo xenograft model.

RESULTS: Treatment of breast tumor cells with lidocaine and bupivacaine resulted in inhibition of cell viability via induction of apoptosis. The effects were more prominent in MCF-7 cells than in MCF-10A cells. Treatment with local anesthetics induced caspase 7, 8, 9, and poly ADP-ribose polymerase cleavage. The cleavage of caspase 7 and poly ADP-ribose polymerase induced by local anesthetics were effectively blocked by caspase inhibitors. Furthermore, treatment of MCF-7 xenografts with local anesthetics resulted in higher expression of cleaved caspase 7 and an increase in terminal deoxynucleotidyl transferase dUTP nick-end labeling (TUNEL) staining.

CONCLUSION: Lidocaine and bupivacaine induce apoptosis of breast tumor cells at clinically relevant concentrations. Our results reveal previously unrecognized beneficial actions of local anesthetics and call for further studies to assess the oncologic advantages of their use during breast cancer surgery.
背景：我們系統性地回顧了笑氣對於分娩鎮痛的療效，對笑氣應用於產婦分娩鎮痛時的滿意度及其副作用的等進行了分析。

方法：我們檢索了 MEDLINE, EMBASE, 護理累積指數, CINAHL 等資料庫中的英文文獻。研究的物件包括經歷陰道分娩的產婦、暴露于笑氣的參與分娩過程的及新生兒護理的醫護人員。

結果：我們分析了一共 58 篇發表文獻，代表了 59 個不同研究人群，2 組研究品質高，11 組較合理，46 組品質不高。笑氣吸入麻醉對於減少疼痛的效果較硬膜外麻醉差，關於這方面的文章品質大都比較差。這些參差不齊的结果被用來評估婦女對於她們分娩經歷的滿意度，而且分娩疼痛管理導致這項綜合研究較難實現。很多文獻報告的對於母親的負面效果例如噁心，嘔吐，頭昏和昏睡都影響了笑氣的接受範圍。使用笑氣鎮痛出生的新生兒，相較於其他方式鎮痛或未上麻醉的新生兒的 apgar 評分並無明顯差異。對於職業危害以及職業暴露的證據是有限的。

結論：對於笑氣應用於分娩鎮痛的文獻報導較少，且良莠不齊。涵蓋鎮痛效應，滿意度，還有不利影響這些方面的研究還需繼續。

（蔣鑫梅譯 薛張綱校）
Brain Electrical Activity Obeys Benford’s Law

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BACKGROUND: Monitoring and automated online analysis of brain electrical activity are frequently used for verifying brain diseases and for estimating anesthetic depth in subjects undergoing surgery. However, false diagnosis with potentially catastrophic consequences for patients such as intraoperative awareness may result from unnoticed irregularities in the process of signal analysis. Here we ask whether Benford's Law can be applied to detect accidental or intended modulation of neurophysiologic signals. This law states that the first digits of many datasets such as atomic weights or river lengths are distributed logarithmically and not equally. In particular, we tested whether data obtained from electrophysiological recordings of human patients representing global activity and organotypic slice cultures representing pure cortical activity follow the predictions of Benford's Law in the absence and in the presence of an anesthetic drug.

METHODS: Electroencephalographic (EEG) recordings from human subjects and local field potential recordings from cultured cortical brain slices were obtained before and after administration of sevoflurane. The first digit distribution of the datasets was compared with the Benford distribution.

RESULTS: All datasets showed a Benford-like distribution. Nevertheless, distributions belonging to different anesthetic levels could be distinguished in vitro and in human EEGs. With sevoflurane, the first digit distribution of the in vitro data becomes steeper, while it flattens for EEG data. In the presence of high frequency noise, the Benford distribution falls apart.

CONCLUSIONS: In vitro and EEG data show a Benford-like distribution which is altered by sevoflurane or destroyed by noise used to simulate artefacts. These findings suggest that algorithms based on Benford's Law can be successfully used to detect sevoflurane-induced signal modulations in electrophysiological recordings.
Background: Intraoperative hypotension and hypertension are associated with adverse clinical outcomes and morbidity. Clinical decision support mediated through an anesthesia information management system (AIMS) has been shown to improve quality of care. We hypothesized that an AIMS-based clinical decision support system could be used to improve management of intraoperative hypotension and hypertension.

Methods: A near real-time AIMS-based decision support module, Smart Anesthesia Manager (SAM), was used to detect selected scenarios contributing to hypotension and hypertension. Specifically, hypotension (systolic blood pressure <80 mm Hg) with a concurrent high concentration (>1.25 minimum alveolar concentration [MAC]) of inhaled drug and hypertension (systolic blood pressure >160 mm Hg) with concurrent phenylephrine infusion were
detected, and anesthesia providers were notified via "pop-up" computer screen messages. AIMS data were retrospectively analyzed to evaluate the effect of SAM notification messages on hypotensive and hypertensive episodes.

RESULTS: For anesthetic cases 12 months before (N = 16913) and after (N = 17132) institution of SAM messages, the median duration of hypotensive episodes with concurrent high MAC decreased with notifications (Mann Whitney rank sum test, P = 0.031). However, the reduction in the median duration of hypertensive episodes with concurrent phenylephrine infusion was not significant (P = 0.47). The frequency of prolonged episodes that lasted >6 minutes (sampling period of SAM), represented in terms of the number of cases with episodes per 100 surgical cases (or percentage occurrence), declined with notifications for both hypotension with >1.25 MAC inhaled drug episodes (δ = -0.26% [confidence interval, -0.38% to -0.11%], P < 0.001) and hypertension with phenylephrine infusion episodes (δ = -0.92% [confidence interval, -1.79% to -0.04%], P = 0.035). For hypotensive events, the anesthesia providers reduced the inhaled drug concentrations to <1.25 MAC 81% of the time with notifications compared with 59% without notifications (P = 0.003). For hypertensive episodes, although the anesthesia providers' reduction or discontinuation of the phenylephrine infusion increased from 22% to 37% (P = 0.030) with notification messages, the overall response was less consistent than the response to hypotensive episodes.

CONCLUSIONS: With automatic acquisition of arterial blood pressure and inhaled drug concentration variables in an AIMS, near real-time notification was effective in reducing the duration and frequency of hypotension with concurrent >1.25 MAC inhaled drug episodes. However, since phenylephrine infusion is manually documented in an AIMS, the impact of notification messages was less pronounced in reducing episodes of hypertension with concurrent phenylephrine infusion. Automated data capture and a higher frequency of data acquisition in an AIMS can improve the effectiveness of an intraoperative clinical decision support system.

術後嘔吐管理的共識指南
Consensus Guidelines for the Management of Postoperative Nausea and Vomiting
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The present guidelines are the most recent data on postoperative nausea and vomiting (PONV) and an update on the 2 previous sets of guidelines published in 2003 and 2007. These guidelines were compiled by a multidisciplinary international panel of individuals with interest and expertise in PONV under the auspices of the Society for Ambulatory Anesthesia. The panel members critically and systematically evaluated the current medical literature on PONV to provide an evidence-based reference tool for the management of adults and children who are undergoing surgery and are at increased risk for PONV. These guidelines identify patients at risk for PONV in adults and children; recommend approaches for reducing baseline risks for PONV; identify the most effective antiemetic single therapy and combination therapy regimens for PONV prophylaxis, including nonpharmacologic approaches; recommend strategies for treatment of PONV when it occurs; provide an algorithm for the management of individuals at increased risk for PONV as well as steps to ensure PONV prevention and treatment are implemented in the clinical setting.

**Noninvasive Monitoring of Lung Recruitment Maneuvers in Morbidly Obese Patients: The Role of Pulse Oximetry and Volumetric Capnography**

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**BACKGROUND:** We conducted this study to determine whether pulse oximetry and volumetric capnography (VCap) can determine the opening and closing pressures of lungs of anesthetized morbidly obese patients.

**METHODS:** Twenty morbidly obese patients undergoing laparoscopic bariatric surgery with capnoperitoneum were studied. A lung recruitment maneuver was performed in pressure control ventilation as follows: (1) During an ascending limb, the lungs’ opening pressure was detected.
After increasing positive end-expiratory pressure (PEEP) from 8 to 16 cm H2O, fraction of inspired oxygen (FIO2) was decreased until pulse oximetric arterial saturation (SpO2) was <92%. Thereafter, end-inspiratory pressure was increased in steps of 2 cm H2O, from 36 to a maximum of 50 cm H2O. The opening pressure was attained when SpO2 exceeded 97% (2). During a subsequent decreasing limb, the lungs’ closing pressure was identified. PEEP was decreased from 22 to 10 cm H2O in steps of 2 cm H2O. The closing pressure was determined as the PEEP value at which respiratory compliance decreased from its maximum value. We continuously recorded lung mechanics, SpO2, and VCap.

RESULTS: The lungs’ opening pressures were detected at 44 (4) cm H2O (median and interquartile range) and the closing pressure at 14 (2) cm H2O. Therefore, the level of PEEP that kept the lungs without collapse was found to be 16 (3) cm H2O. Using respiratory compliance as a reference, receiver operating characteristic analysis showed that SpO2 (area under the curve [AUC] 0.80 [SE 0.07], sensitivity 0.65, and specificity 0.94), the elimination of CO2 per breath (AUC 0.91 [SE 0.05], sensitivity 0.85, and specificity 0.98), and Bohr’s dead space (AUC 0.83 [SE 0.06], sensitivity 0.70, and specificity 0.95) were relatively accurate for detecting lung collapse during the decreasing limb of a recruitment maneuver.

CONCLUSIONS: Lung recruitment in morbidly obese patients could be effectively monitored by combining noninvasive pulse oximetry and VCap. SpO2, the elimination of CO2, and Bohr’s dead space detected the individual’s opening and closing pressures.

The Frequency of Cardiac Arrests in Patients with Congenital Heart Disease Undergoing Cardiac Catheterization

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BACKGROUND: Cardiac catheterization for patients with congenital heart disease has shifted from diagnostic to predominantly interventional procedures because of advances in catheter-based technologies. Children undergoing therapeutic catheterization may be at higher risk of adverse events, and the purpose of our study was to determine the incidence of cardiac arrest
(CA) in patients with congenital heart disease undergoing cardiac catheterization at a large pediatric tertiary referral center.

METHODS: All CAs from January 2004 through December 2009 occurring in the cardiac catheterization laboratory were reviewed. A CA was defined as an event in which cessation of circulation required chest compressions. Procedure, patient, practitioner, and system-related factors were examined.

RESULTS: Over the study period, during 7289 catheterization procedures, 70 procedures were associated with a CA (0.96 [99% confidence interval, 0.7–1.3] per 100 procedures); 48 events (69%) were successfully resuscitated to a perfusing rhythm, 18 events (26%) resulted in need for extracorporeal membrane oxygenation, and 4 events (6%) resulted in unsuccessful resuscitation. Sudden onset of cardiac arrhythmia led to CA during 38 events (54%). The duration of resuscitation after CA was ≤11 minutes in 71%. Occurrence of CA was associated with interventional procedures (P < 0.001) and younger age (P < 0.001). A change in systems for scheduling and communication of cases was associated with a significant reduction in the incidence of CA (1.5% vs 0.7%; P = 0.002).

CONCLUSIONS: The incidence of CA in children undergoing cardiac catheterization is high compared with pediatric noncardiac surgery. Procedural and system factors were associated with occurrence of CA in this cohort. These issues highlight the need for close communication, anticipation, and preparation.
BACKGROUND: Scholarly activity is expected of program directors of Accreditation Council for Graduate Medical Education (ACGME)-accredited residency training programs. Anesthesiology residency programs are cited more often than surgical programs for deficiencies in academic productivity. We hypothesized that this may in part reflect differences in scholarly activity between program directors of anesthesiology and surgical trainings programs. To test the hypothesis, we examined the career track record of current program directors of ACGME-accredited anesthesiology and surgical residency programs at the same institutions using PubMed citations and funding from the National Institutes of Health (NIH) as metrics of scholarly activity.

METHODS: Between November 1, 2011 and December 31, 2011, we obtained data from publicly available Web sites on program directors at 127 institutions that had ACGME-accredited programs in both anesthesiology and surgery. Information gathered on each individual included year of board certification, year first appointed program director, academic rank, history of NIH grant funding, and number of PubMed citations. We also calculated the h-index for a randomly selected subset of 25 institution-matched program directors.

RESULTS: There were no differences between the groups in number of years since board certification (P = 0.42), academic rank (P = 0.38), or years as a program director (P = 0.22). However, program directors in anesthesiology had less prior or current NIH funding (P = 0.002), fewer total and education-related PubMed citations (both P < 0.001), and a lower h-index (P = 0.001) than surgery program directors. Multivariate analysis revealed that the publication rate for anesthesiology program directors was 43% (95% confidence interval, 0.31–0.58) that of the corresponding program directors of surgical residency programs, holding other variables constant.

CONCLUSIONS: Program directors of anesthesiology residency programs have considerably less scholarly activity in terms of peer-reviewed publications and federal research funding than directors of surgical residency programs. As such, this study provides further evidence for a systemic weakness in the scholarly fabric of academic anesthesiology.

Serum Free Ropivacaine Concentrations Among Patients Receiving Continuous Peripheral Nerve Block Catheters: Is It Safe for Long-Term Infusions?

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背景：羅呱卡因是一種用於持續外周神經阻滯導管輸注的長效藥物。導管可以長期原位留置。在本研究中，入組患者給予持續外周神經置管並測定游離血清羅呱卡因濃度。

方法：放置外周神經導管用於術後疼痛管理，對其輸注 0.2%的羅呱卡因或單次次給予 0.5%的劑量。取每個患者術後當天（預輸注）、第3、5、7、10和隔兩天至導管拔除的血液標本。使用高效液相色譜法測定游離血清羅呱卡因濃度並用 wilcoxon 符號秩檢驗對樣本進行統計分析。

結果：對 35 位元患者的 133 個血液樣本進行了分析：開始輸注後所有血清游離羅呱卡因的濃度（35 位元患者中的 99 個樣本）均低於 0.34 mg/L（先前設定的中毒閾值）。血液
樣本中最高濃度為 0.19 mg/L；所有其他樣本值都小於 0.09 mg/L。研究中藥物使用量在 1146~22320mg 範圍內（中位數為 3722mg）。導管留置的平均時間為 7 天（範圍：3~23 天）。從術後當天到第 3 天（預輸注），77%的患者血清游離羅呱卡因濃度有所增加。第 3 天的平均濃度為 0.025 mg/L（95%均值的置信上限為: 0.05, 範圍：<0.01–0.19；與預輸注水平相比，P < 0.001）。從術後第 3 天到第 5 天，68%的患者血清游離羅呱卡因濃度下降 (平均水準為 0.016 mg/L [95%均值の置信上限为: 0.021]，術後第 5 天與第 3 天相比，P = 0.007)。

結論：在本研究中，儘管戰傷患者大劑量使用羅呱卡因，但該藥物血清游離濃度一直低於中毒劑量。長時間持續羅呱卡因輸注以及聯合多種藥物單次劑量給藥，並不產生中毒或接近中毒的血清藥物濃度。

（邊文玉 譯 陳傑 校）

BACKGROUND: Ropivacaine is a long-acting local anesthetic used for continuous peripheral nerve catheter infusions. Catheters may remain in situ for prolonged time periods. In the present study, patients were enrolled to receive continuous peripheral nerve catheters with measurement of free serum ropivacaine concentrations.

METHODS: Peripheral nerve catheters were placed for postoperative pain management in trauma patients and infused with ropivacaine 0.2% or bolused with 0.5%. Blood samples were obtained from each subject on days 0 (preinfusion), 3, 5, 7, 10, and every third day until catheter removal. Serum free ropivacaine concentrations were measured via high-performance liquid chromatography and were compared using the Wilcoxon signed rank test.

RESULTS: One hundred thirty-three blood samples were analyzed in 35 patients; all serum free ropivacaine concentrations after infusion initiation (99 samples from 35 subjects) were below 0.34 mg/L (previously determined toxic threshold). The highest concentration achieved in a blood sample was 0.19 mg/L; all other values were <0.09 mg/L. The total amount of drug received during the study ranged from 1146 to 22,320 mg (median of 3722 mg). Catheters remained in situ for a median of 7 days (range: 3–23). From day 0 to 3 (preinfusion), 77% of the study participants had an increase in the serum free-fraction ropivacaine concentrations. The median concentration on day 3 was 0.025 mg/L (95% upper confidence limit for mean: 0.05, range: <0.01–0.19); P < 0.001 compared with preinfusion levels). From day 3 to 5, 68% of the participants had a decrease in the serum free ropivacaine concentrations (median level 0.016 mg/L [95% upper confidence limit for mean: 0.021] P = 0.007 for day 5 compared with day 3).

CONCLUSIONS: In this study, free serum ropivacaine concentrations remained well below toxic values despite large amounts of drug administration in combat-wounded patients. The administration of continuous ropivacaine infusions over prolonged time periods, coupled with multiple drug boluses, did not produce toxic or near-toxic serum concentrations.