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

肺动脉高压患者接受大关节置换术的围手术期死亡率

Perioperative Mortality in Patients with Pulmonary Hypertension Undergoing Major Joint Replacement

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Anesth Analg November 2010 111:1110-1116;

背景：目前缺乏慢性肺动脉高压患者（PHTN）接受非心脏手术的围手术期的数据。因此，临床医生没有资料来评估这类患者的并发症发病率和死亡率的风险。在这项研究中，作者评估了慢性肺动脉高压患者，首次接受全髋关节置换术（THA）或全膝关节置换术（TKA）的围手术期并发症的发生率及死亡率。
方法：根据美国最大的住院患者资料库，作者收集了 1998 年和 2006 年之间行 THA 及 TKA 的患者信息。将明确了 PHTN 的患者与健康人群资料中的非 PHTN 对照组配对。主要的结果是围手术期死亡率。应用多因素 logistic 回归模型评估 PHTN 对住院死亡率的影响。
结果：共收集 670，516 例 TKA 及 360，119 例 TKA。这些患者中，确诊为 PHTN 的分别有 2184 例（0.3%）及 1359 例（0.4%）（TKA 中 PHTN 年平均确诊率为 1180[507-2073]和 THA 中 PHTN 年平均确诊率 为 739 [467-1054]）。经校正后，相对于配对的对照组，接受 THA 手术的 PHTN 患者增加大约 4 倍死亡风险（2.4%vs 0.6%），接受 TKA 手术的 PHTN 患者则增加大约 4.5 倍死亡风险（0.9%vs 0.2 %），每次比较 P<0.001。原发性慢性肺动脉高压患者接受 THA 术的死亡率最高 (5% [95% CI, 2.3% – 7.7%])。
结论：这一分析表明，PHTN 患者在接受 THA 和 TKA 手术后围手术期死亡率风险增加。

（陈毓雯　译　陈杰　校）

BACKGROUND: There is a paucity of perioperative outcomes data for patients with chronic pulmonary hypertension (PHTN) undergoing noncardiac surgery. Clinicians, therefore, have little information on which to evaluate the risk for morbidity and mortality in this patient population. In this study, we evaluated the incidence and risks of perioperative morbidity and mortality in patients with PHTN undergoing primary total hip arthroplasty (THA) and total knee arthroplasty (TKA).

METHODS: Using the largest inpatient database in the United States (National Inpatient Sample), we identified entries for THA and TKA between the years of 1998 and 2006. Patients with the diagnosis of PHTN were identified and matched to those without the disease based on health-related demographic variables. Perioperative mortality was considered the primary outcome. Multivariate logistic regression models were fitted to assess the impact of PHTN on in-hospital mortality.

RESULTS: We identified 670,516 entries for TKA and 360,119 for THA. Of those patients, 2184 (0.3%) and 1359 (0.4%), respectively, had the diagnosis of PHTN (average annual rate of 1180 for TKA [range, 507–2073] and 739 for THA [range, 467–1054]). Patients with PHTN undergoing THA experienced an approximately 4-fold increased adjusted risk of mortality (2.4% vs 0.6%), and those undergoing TKA a 4.5-fold increased adjusted risk of mortality (0.9% vs 0.2%) compared with patients without PHTN in the matched sample ($P < 0.001$ for each comparison). Patients with primary PHTN undergoing THA experienced the highest mortality rate (5% [95% CI, 2.3%–7.7%]).

CONCLUSIONS: This analysis demonstrates that patients with PHTN are at increased risk for perioperative mortality after THA and TKA.

滴注法或喷雾法腹膜内给予罗哌卡因的药代动力学

The Pharmacokinetics of Ropivacaine After Intraperitoneal Administration: Instillation Versus Nebulization

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Anesth Analg November 2010 111:1140-1145;

背景：腹腔镜手术中，在腹膜内给予局麻药可以起到围手术期镇痛的效果。本研究比较了两种不同的腹膜内罗哌卡因给药途径，即滴注法和喷雾法的药代动力学。

方法：本研究用 5 只猪进行病例交叉试验，这 5 只猪都给予标准的麻醉方法，其 CO2 气腹压为 12mmHg，各维持 1 小时。每只猪都以其本身为对照组，间隔 8 天分别进行两次试验，试验顺序随机。即按 3mg/kg 罗哌卡因的剂量在气腹排气的时候以滴注法给药或在气腹时连续喷雾给药。每隔 10min 采取动脉血样直到给药后 120min，然后每隔 1h 直到 6h。用高效液相色谱仪和紫外可见光检测仪测量罗哌卡

因的浓度。血浆超速离心后检测游离血浆药物浓度。分别用房室和非房室模型分析计算药代动力学参数。本研究用 t 检验比较均数，wilcoxon 检验比较成组设计的样本均数。
结果：两种罗哌卡因的给药途径均以单室模型描述数据，喷雾组的起效时间延迟了 10min。喷雾组和滴注组的最大药物浓度分别为 0.96ug/ml 和 0.92ug/ml（P=0.66）。喷雾组罗哌卡因的吸收常数较低（0.043 vs 0.083/min,P=0.02）。药物的消除半衰期，消除常数，平均清除率，分布容积，曲线下面积和平均驻留时间在两组中没有差异。两组的血浆游离罗哌卡因浓度也无差异。
结论：喷雾法给予罗哌卡因与直接在腹膜内滴注罗哌卡因，其药代动力学相似，但是喷雾法的吸收率比滴注法低。
（张婷　译　陈杰　校）

BACKGROUND: Intraperitoneal local anesthetic administration provides perioperative analgesia during laparoscopic procedures. We compared the pharmacokinetics of intraperitoneal ropivacaine administered by instillation or nebulization.
METHODS: A crossover study was performed on 5 pigs under standardized general anesthesia with a carbon dioxide pneumoperitoneum of 12 mm Hg for 1 hour. Each animal, acting as its own control, was studied twice with an 8-day interval and received, in a randomized sequence, 3 mg/kg ropivacaine either by intraperitoneal instillation at the time of pneumoperitoneum exsufflation or by continuous nebulization in the carbon dioxide insufflation tubing. Arterial blood samples were taken every 10 minutes up to 120 minutes, and then hourly up to 6 hours. Ropivacaine concentrations were measured using high-performance liquid chromatography with ultraviolet-visible detection. The plasma-free fraction was evaluated after plasma ultracentrifugation. Pharmacokinetic parameters were calculated using both noncompartmental and compartmental analysis. The mean values were compared using the Student *t* test, or Wilcoxon test for paired series.
RESULTS: The data were described by a 1-compartment model for both ropivacaine administration techniques, with a delay of 10 minutes for the nebulization group. The maximal ropivacaine concentrations were 0.96 μg/mL for the nebulization group and 0.92 μg/mL for the instillation group ($P = 0.66$). The ropivacaine absorption constant was lower in the nebulization group (0.043 vs 0.083 min^{-1}, $P = 0.02$). There were no differences in the elimination half-life, elimination constant, mean total body clearance, distribution volume, mean area under the curve, and mean residence time. The free fraction of ropivacaine was also similar in the 2 groups.
CONCLUSIONS: The pharmacokinetic profile of ropivacaine nebulization is similar to direct intraperitoneal instillation, but with a lower absorption rate.

一种全麻下安全、无创监测喷射通气的方法——呼吸感应体积描记系统的初步研究

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

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Anesth Analg November 2010 111:1168-1175

背景：高频喷射通气对于气管和喉部的许多外科手术来说是最佳的通气模式，但也缺乏评估氧合或通气量是否充足的监测模式。呼吸感应体积描记系统是一种在睡眠实验室中运用的设备，其对胸部和腹部运动进行无创监测。作者应用通气感应体积描记系统作为喷射通气监测器作了初步观察研究。
方法：25 名患者在全凭静脉高频通气的全身麻醉下进行显微支撑喉镜检查。感应带被固定在患者的胸部和腹部，并以 50 赫兹的采样频率运用 12 位 A-D 转换器和自定义 LabVIEW 端口的 DC 模式收集采样口的氧供数据。对原始数据进行过滤，在 I，IIR 型峰梳状滤波器的基础上建立监测器以区别呼吸暂停、心源性振荡和喷射通气相关的呼吸运动。其主要目的是监测器对喷射通气存在的识别能力。所有病人的数据汇总生成受试者特征性曲线。
结果：呼吸感应体积描记系统能可靠地监测喷射呼吸。数据分析程序能有效得从心源性杂音产生的基础信号中提取波幅相对较小的呼吸喷射信号。用带宽 0.055 赫兹的滤波器过滤，敏感度在 85%左右。滤波器带宽增加而引起的敏感度的增高被 12.5 秒的监测延迟所抵消。
结论：呼吸感应体积描记系统能成功地应用在喉气管手术患者以检测高频喷射通气。此次初步研究证实了呼吸感应体积描记系统在喷射通气中作为监测器应用的可行性。
（曹强　译　陈杰　校）

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

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

3951 例超声引导下中心静脉长期埋管：操作情况、风险分析以及患者舒适度

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

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Anesth Analg November 2010 111:1194-1201;

背景：尽管已有足够的证据表明与解剖标志定位相比，超声引导下中心静脉穿刺置管安全性大大提高，但仍然不是所有医生在进行中心静脉穿刺置管时常规使用超声引导。

方法：作者收集超声引导技术应用中心静脉长期置管前后 7 年的病例资料。共 3951 个病例，放置导管的总天数为 1642402。其中 1584 例采用解剖标志定位（定位组，2000 年 1 月至 2003 年 5 月），2367 例采用超声引导（超声组，2003 年 6 月至 2007 年 5 月），所有操作都由监护室同一组人员进行。比较的标准包括：操作情况、并发症、病人的舒适度及看法。通过 t 检验和 χ^2 检验进行变量分析，多变量分析采用 COX 风险比率回归模型。

结果：超声引导下穿刺置入 PORT 式（平均差 4.9 ± 0.4 分钟，置信区间 CI 为 4.1 - 5.7）和隧道式导管（平均差 2.4 ± 0.8 分钟，CI 为 0.9-3.8）的时间均明显减少。解剖标志定位方法使整个围手术期并发症的风险增加（4.5，CI 为 3.6-5.6）。在所有的疾病中，急性白血病患者中心静脉相关性感染的风险显著增加（2.6，CI 为 2.1-3.8）。从两组病人递交的调查问卷看，超声引导下中心静脉穿刺置管可以提高患者的舒适度和满意度。

结论：超声引导可以减少患者的并发症，并提高舒适度。考虑到急性白血病患者感染的发生率较高，需要进一步研究来确定是否需要单独分类。

（黄丹　译　陈杰　校）

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

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

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

腰麻下剖腹产术期间四个固定速率苯肾上腺素输注方案维持血流动力学稳定的双盲、安慰剂、对照研究

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

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This study was presented in part at the Annual Scientific Meeting of the Society for Obstetric Anesthesia and Perinatology, Chicago, IL, May 2008.
Anesth Analg November 2010 111:1221-1229;

背景：预防性输注苯肾上腺素联合扩容可有效地减少腰麻下剖腹产术期间产妇低血压。但还没有一个理想的给药剂量方案。本研究中，作者探讨了维持不低于产妇收缩压 20%的预防性苯肾上腺素的固定输注的合适速率。
方法：行择期剖腹产的待产妇随机分组，腰麻后给予安慰剂或不同速率的预防性苯肾上腺素输注（每分钟 25，50，75 或 100ug 组），每组给药同时给予 2L 的液体负荷。使用预定方法来维持产妇收缩压在特定的范围内。比较各组的医生干预次数、血流动力学表现、手术操作引起的恶心呕吐及脐带血气。
结果：共分析了 101 例病人。安慰组和苯肾上腺素组在维持产妇收缩压在预定范围内的医生干预次数上没有差别。苯肾上腺素 25μg/min 组和 50μg/min 组 相对与 100μg/min 组，干预次数有显著差异(P = 0.004 vs 50 μg/min, P = 0.02 vs 25 μg/min)。对照组的产前低血压发生率比所有苯肾上腺素组高。苯肾上腺素 75μg/min 组和 100μg/min 的产前高血压发生率比对照组显著增高(P < 0.001 vs 75 μg/min and 100 μg/min)。随着苯肾上腺素输注速率提高，收缩压相对于基线的波动有增加趋势（P=0.06）且越来越高于基线值（P<0.001）。各组间手术操作引起的恶心呕吐发生率、严重程度和脐带血气没有差别。

结论：预防性给予苯肾上腺素不能显著地减少维持产妇收缩压 20%以内的医生干预次数。尽管如此，预防性给与苯肾上腺素减少了产前低血压的发生率。苯肾上腺素 25μg/min 和 50μg/min 比 75μg/min 和 100μg/min 更好地维持产妇血流动力学稳定。预防性固定速率苯肾上腺素输注的临床应用比较局限，需要进一步评估不同速率苯肾上腺素输注的血流动力学。

（唐颖　译　陈杰　校）

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

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

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

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

婴幼儿行体外循环后其炎症反应与临床预后的关系

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

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Anesth Analg November 2010 111:1244-1251;
背景：体外循环（CPB）可诱导全身性炎症反应。这种反应对婴幼儿的重要性和后果仍不清楚。作者评估了接受体外循环的婴幼儿其炎症状态与临床预后的关系。
方法：测定≤9 个月的婴幼儿血浆白介素(IL）-6 的和 IL-8 和 IL-10，肿瘤坏死因子α(TNF-α)和 IL -1β 和 C -反应蛋白（CRP）的浓度变化,时间点分别为 CPB 前,CPB 后即刻,以及 CPB 后 6h，12h 和 24h,并对围术期临床资料进行前瞻性研究。
结果：入组的 93 例患儿其临床诊断包括大动脉转位（40 例），法洛四联症（28 例），室间隔缺损（21 例），动脉干(2 例)，完全性房室通道（2 例）。其平均年龄为 37 天（范围为 2- 264 天）。低龄婴幼儿 CPB 前 IL-6 和 CRP 水平相对高，但与术后炎症介质的浓度或临床预后并无相关性。CPB 后 IL-6 浓度升高（CPB 前中位数为 3.2 pg/mL, CPB 后即刻为 24.2, 6h 为 95.4, 24h 为 90.3; 所有 P < 0.001）。CPB 后 C 反应蛋白浓度增加，峰值出现在 24h（CPB 后 24h 中位数为 27.5，CPB 前为 0.3; P < 0.001）。 IL-10 和 IL-8 在 CPB 后即升高。在对年龄和诊断因素进行校正后，术后 IL - 6 和 IL - 8 的水平与监护室停留时间长短以及术后血液制品输注相关,其中,对 IL-8 而言,还与术后 24h 乳酸水平相关。
结论：低龄婴幼儿术前高浓度的细胞因子和 C 反应蛋白的产生与其临床预后没有相关性;术后炎症介质的产生和临床预后的相关性有统计学意义，但无临床意义。综上,作者认为，对在一个高工作量心脏中心接受低等至中等难度心脏手术的婴幼儿而言,炎症介质的产生对术后生存率的影响有限.
（邹巧群　译　陈杰　校）
BACKGROUND: Cardiopulmonary bypass (CPB) induces a systemic inflammatory response. The magnitude and consequences in infants remain unclear. We assessed the relationship between inflammatory state and clinical outcomes in infants undergoing CPB.
METHODS: Plasma concentrations of interleukin (IL)-6, IL-8, IL-10, tumor necrosis factor α, IL-1β, and C-reactive protein (CRP) were measured pre-CPB and immediately post-CPB, and at 6, 12, and 24 hours post-CPB in infants ≤9 months old. Perioperative clinical data were collected prospectively.
RESULTS: Diagnoses of 93 patients included transposition of the great arteries (40), tetralogy of Fallot (28), ventricular septal defect (21), truncus arteriosus (2), and complete atrioventricular canal (2). The median age was 37 days (range = 2 to 264). Pre-CPB IL-6 and CRP were higher in younger infants but were not associated with postoperative inflammatory mediator concentrations or measured clinical outcomes. IL-6 increased post-CPB (median 3.2 pg/mL pre-CPB, 24.2 post-CPB, 95.4 at 6 hours, and 90.3 at 24 hours; all $P < 0.001$). CRP increased post-CPB, peaking at 24 hours (median 27.5 at 24 hours, 0.3 pre-CPB; $P < 0.001$). IL-10 and IL-8 increased immediately post-CPB. After adjusting for age and diagnosis, postoperative IL-6 and IL-8 correlated with

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

综述：遗传学对小儿麻醉医师意义：先天畸形、遗传药理学、蛋白质组学的基础

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

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Anesth Analg November 2010 111:1264-1274;

分子遗传学主要是一个在分子水平研究遗传信息如何储存，继承和表达，以及在健康和疾病中如何影响细胞的结构和功能的学科。虽然分子学方法是现代医学教育的核心，且在实验室中已经被应用了数十年，但是在临床的应用才刚刚开始。各种各样的高端技术可以快速而经济地实现 DNA 基因测序，基因表达图谱建立，基因克隆，基因操控基因转录，组蛋白生产和其他重要的生物医学科学。基因组学上的成功孕育了其他更巨大的科学工程，包括蛋白质组学，药物基因组学和生物信息学。这些技术提供医学所有领域包括麻醉学的新的诊断标准、预后、治疗机会。通过分子诊断和日趋便宜的分析技术，临床麻醉将越来越个体化，其重点将聚焦于患者遗传学组成。基于分子数据的手术和非手术决策对围术期麻醉管理越来越重要。这篇文章作者总结了在第 22 届儿科麻醉学会年会中的 3 个关于先天畸形、遗传药理学和蛋白质组学的演讲。
（杨秋娟　译　陈杰　校）
Molecular genetics is the study, at the molecular level, of how genetic information is stored, inherited, and expressed and of how it influences the structure and function of cells in health and in disease. Although molecular approaches have been used for decades in the laboratory and are at the core of modern medical education, they are only now beginning to influence clinical practice. A variety of sophisticated techniques permit rapid and affordable DNA sequencing, gene expression profiling, gene cloning, gene manipulation, gene transfer, recombinant protein production, and other technologies of enormous biomedical importance. Success in genomics has spawned additional ambitious endeavors, including proteomics, pharmacogenomics, and bioinformatics. These techniques are providing new diagnostic, prognostic, and therapeutic opportunities in all areas of medicine, including anesthesiology. With the use of molecular criteria and the diminishing cost of analytic technologies, anesthetic practice will become more individualized, and greater emphasis will be placed on the patient's genetic makeup. Both

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

联合应用直流和交流经颅电刺激对健康志愿者的镇痛和抗痛觉过敏作用

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

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Anesth Analg November 2010 111:1301-1307

背景：有报道显示经颅电刺激能产生显著的临床镇痛作用，但缺乏随机和双盲的试验。本文作者研究了经颅电刺激在人类实验性疼痛模型中的镇痛和抗痛觉过敏的作用。
方法：选择 20 名健康男性志愿者用 60Hz 和 100Hz 经颅电刺激对紫外线 B 灼伤皮肤和正常皮肤对实验性热和机械性痛的镇痛和抗痛觉过敏的作用。作者实验室先前的动物研究显示 60Hz 经颅电刺激有显著的镇痛作用，而 100Hz 经颅电刺激有合适的镇痛作用。该试验应用双盲，随机，两种方法交叉的方法。应用经颅电刺激 35 分钟，在经颅电刺激之前，之中，和 45 分钟之后定量感觉测试评估热和机械痛阈。
结果：经颅电刺激 TES (TES_{60Hz} > TES_{100Hz})能诱发紫外线 B 病灶显著的热和机械的抗痛觉过敏作用，而不影响没有受损皮肤的热痛觉。在本研究中并未显示单一的经颅电刺激产生长久的镇痛和抗痛觉过敏作用。
结论：经颅电刺激能产生显著的、频率相关的抗痛觉过敏和镇痛作用。经颅电刺激作用的特点很可能是由于它共同调节伤害的外周感受器和中枢过度兴奋。
（陈灵科　译　陈杰　校）

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

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

简要报告：椎管内阻滞后硬膜外血肿：来自中国的回顾性报告

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

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Abstract

Anesth Analg November 2010 111:1322-1324

作者对过去 54 年间在整个中国大学医学院行椎管内阻滞后发生硬膜外血肿的病例进行了详细的回顾性研究。统计中国人口硬膜外血肿的发生率，危险因素及结果处理。椎管内麻醉后硬膜外血肿的发生率为 2.14:100000（95%置信区间：0.44-6.25:100000）。细菌感染和急诊手术可以增加发生硬膜外血肿的风险。硬膜外血肿的病人及时的减压手术与良好的神经功能恢复有显著的相关性。
（张蕾　译　陈杰　校）

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

心型脂肪酸结合蛋白是冠脉搭桥手术后发生死亡和心室功能障碍的独立预示因子

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

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

背景：心型脂肪酸结合蛋白(hFABP)充当了心肌脂肪酸的转运蛋白，在心肌损伤的早期被释放进入循环。我们假设 hFABP 在冠脉搭桥(CABG)手术后优于常规的心脏生物标记物来预示围手术早期的心肌损伤。

方法：我们在 2 个医院对 1298 例进行在体外循环下的初次 CABG 患者进行了前瞻性队列研究。在围手术期的 7 个时间点检测四种血浆心肌损伤生物标记物（hFABP; 心肌肌钙蛋白 I [cTnI]; 肌酸激酶 MB [CK-MB]部分和肌红蛋白）。用 Cox 比例风险模型分析围手术期心脏生物标记物和心室功能障碍、住院时间(HLOS)以及术年 5 年死亡率（中位数 3.3 年）之间的联系。我们定义院内心室功能障碍为在脱离 CPB 后的手术阶段或者在术后重症监护室内新需要 2 种或 2 种以上正性肌力药物、或者新置入主动脉内球囊搏动、或者心室辅助装置。

结果：对于 hFABP 死亡率的阳性和阴性预示价值分别是 13%（95%可信区间[CI], 9%–19%）和 95% (95% CI, 94%–96%)，都高于 cTnI 和 CK-MB。调节临床预示因子之后，术后（POD）1 天和 hFABP 峰值水平都是 CABG 术后心室功能障碍($P < 0.0001$)、HLOS ($P < 0.05$)和 5 年死亡率($P < 0.0001$)的独立预示因子。此外，POD1 和 hFABP 峰值水平显著优于其他被评估的预示死亡率的生物标记物。在一个重复检测分析中，hFABP 超越其他所有适合 HLOS 的模型。POD2 的 hFABP 水平高于 CPB 后 hFABP 水平的患者，较那些 POD2 的 hFABP 水平低于 CPB 后水平的患者死亡率增加(危害比, 10.9; 95% CI, 5.0–23.7; $P = 7.2 \times 10^{-10}$)。120 例（10%）有 hFABP 峰值延迟的患者的死亡率是 18.3%，而峰值无延迟的患者死亡率是 4.7%。无论是 cTnI 还是 CK-MB，两者均未检测出死亡率的差异。

结论：与 CABG 术后传统的心肌损伤标记物比较，hFABP 峰值较早并且是一个较好的术后死亡率和心室功能障碍的独立预示因子。

（唐亮 译 马皓琳 李士通 校）

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

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

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

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

受控的气管内导管套囊压力与术后并发症的相关性：一项多中心研究

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

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Anesth Analg 2010; 111(11):1133-1137

背景：气管内插管相关的术后呼吸系统并发症通常表现为咳嗽、咽喉痛、声嘶以及痰中带血丝。在本研究中，我们研究了测量和控制气管内导管套囊（ETTc）压力对术后并发症的短期（小时计）影响。
方法：我们招募了 509 名在中国上海的 4 家大学附属的三级医院在全身麻醉下行择期手术的病人。他们被分成了 2 组，对照组不进行 ETTc 压力的测量，而试验组测量 ETTc 压力后予以调整。我们记录了手术操作和气管内导管放置的持续时间。我们在两组中选择了 20 名气管内导管放置持续时间在 120 到 180 分钟的病人，并且在拔出病人的气管导管后立即进行纤支镜检查。我们记录了在拔管后的 24 小时内包括咳嗽、咽喉痛、声嘶以及痰中带血丝在内的气管内插管相关并发症的情况。
结果：两组病人的性别、年龄、身高、体重、手术操作持续时间以及气管导管放置持续时间均无明显差异。在试验组中通过指示气囊的触诊估计出的 ETTc 平均压力在调整前为 43 ± 23.3 mmHg（最高者为 210mmHg），而调整后为 20 ± 3.1mm Hg ($P < 0.001$)。对照组术后的咽喉痛、声嘶和痰中带血丝的发生率显著高于试验组。在对照组中，随着气管内导管放置时间的延长，咽喉痛和痰中带血丝的发生率显著升高。在试验组中，随着气管内导管放置时间的延长，咽喉痛的发生率也明显增加。20 名病人的纤支镜检查表明两组病人的气道粘膜均受到了不同程度的损伤，但是对照组比试验组更为严重。
结论：通过个人经验的触诊以估计得到的 ETTc 压力常常显著高于测量值或者可能是最恰当的值。由测压计准确控制 ETTc 压力有助于减少即使在短小手术（1-3 小时）中发生的包括咳嗽、咽喉痛、声嘶以及痰中带血丝在内的 ETT 相关的术后呼吸系统并发症。
（毛祖旻 译 马皓琳 李士通 校）

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

缺氧时利用脉搏 CO-血氧测量仪提高高铁血红蛋白测量的精确性

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

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Anesth Analg 2010; 111(11):1160-1167

背景：血液中的高铁血红蛋白无法用传统血氧测定法检测，并可能使血氧测量仪对真实的动脉功能血氧含量（SaO_2）的估计值（SpO_2）产生偏倚。最近引进的“脉搏 CO-血氧测量仪”(Masimo Rainbow SET® Radical-7)可测量 SpMet，是一种无创的测量动脉血中高铁血红蛋白比率(%MetHb)的方法，研究显示这种方法在缺氧时测量值呈假性升高。我们通过本实验试图确定制造商的修正是否改善了设备同时发现并精确测量高铁血红蛋白及脱氧血红蛋白的能力。

方法：12 个健康成年志愿受试者在每个手的中指接上传感器，并置入桡动脉导管采集血样。静脉给予~300mg 亚硝酸钠使受试者高铁血红蛋白提高到 7%-11%的目标水平，通过不同的吸入氧浓度来引起缺氧到不同的 SaO_2 水平(70% -100%)。将脉搏 CO 血氧测量仪读数与 Radiometer ABL800 FLEX 多波长血氧测量仪的测量值相比较。通过偏倚（SpMet-%MetHb）以及在不同缺氧程度时发现有意义的读数错误的发生率和预测价值来分析脉搏 CO 血氧测量仪测量高铁血红蛋白的性能。在高铁血红蛋白升高的情况过程中评价 SpO_2 偏倚（$SpO_2 – SaO_2$）、精确性和标准误差。
结果：观察跨度 74% -100% SaO_2 以及 0.4% -14.4%高铁血红蛋白，包括 307 个血样和从 2 台血氧测量仪得到的 602 个数值。在整个 SaO_2 跨度中，Masimo 高铁血红蛋白读数偏倚及精确度分别是 0.16% 和 0.83%，且在此范围内结果相似。Masimo SpO_2 读数在 70%-100% 的 SaO_2 范围内偏倚−1.93%。
结论：在 74%–100%的血氧饱和度范围以及 0%–14%的高铁血红蛋白范围内，Rainbow 高铁血红蛋白读数的准确性是可接受的。
（瞿亦枫 译 马皓琳 李士通校）

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

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

一个关键性回顾：连续性心输出量监护仪测量心输出量动态变化的能力

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

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Anesth Analg 2010; 111(11):1180-1192

已生产出很多能提供连续读数而非间断读数的心输出量（CO）监护仪。Bland 和 Altman 已经变成了确认它们性能的并与较老的标准不同的标准方法。然而，Bland 和 Altman 方法只能评估精确度而不能评估仪器检测心输出量的连续变化（趋势能力）有多好。现在，对于该如何完成趋势能力或趋势分析尚没有一致意见。所以，我们对 1997 年到 2009 年之间发表的比较连续性心输出量测量方法的文章进行了一份文献综述。将被鉴定的文献根据测量方法和统计学方法进行分组。我们以发现一个可接受的统计学方法为目的对分析趋势能力的文献进行回顾。共鉴定 220 篇文献。最受欢迎的方法是脉搏轮廓线（69 篇文献）、多普勒（54）、生物阻抗（38）和经肺或连续性热稀释法（27）。41 篇文献涉及到趋势，其中只有 23 篇提供了深入分析。鉴定了若干个共同的统计项目：时距曲线、回归分析、使用 CO 变化（ΔCO）的 Bland 和 Altman 和使用 ΔCO 的变化方向来确定一致性的 4 象限曲线。该曲线通过排除小值数据被进一步精炼。用接收机操作特征曲线来定义排除区带。在动物实验中，经常使用一个可靠的参照标准如主动脉流量探测器，且可用回归曲线或时间曲线来显示趋势。临床实验有更多的问题，因为数据收集点较少（每个受试者 8-10 点）。一致意见是使用有排除区带的 4 象限曲线，并应用一致性分析。使用 15%区带时一致率〉92%表明趋势好。提出了一个在极化曲线上显示趋势数据 (ΔCO) 的新方法。通过与水平轴线所成的角度表示一致性，到中心的距离表示 ΔCO。用数据的垂直界限来评估趋势，与 Bland 和 Altman 方法类似。
（周洁 译 马皓琳 李士通 校）

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

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

决策树模型用于预测老年患者自主呼吸试验成功后拔管的预后

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

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Anesth Analg 2010; 111(11):1211-1218

背景：常用的单一测试是基于对某一生理变量的单次测量，其对于拔管预后的预测是很差的，因为它只检测了影响拔管预后的生理功能的某个单一的方面。我们假设建立一个决策树模型（它包含了多个变量，并考虑到这些变量的变化）可以更精确地预测拔管的成功率。
方法：这是一个前瞻性观察性研究。入选了 2007-2008 年在重症监护室辅助通气超过 48 小时的 113 例老年患者。所有患者进行持续 60 分钟的自主呼吸试验（SBT）【呼气末正压为 5cm H_2O，自动管路补偿，100%】。能够耐受该试验的患者立即拔管。记录患者自主呼吸试验 1 分钟、30 分钟和 60 分钟时的口腔阻断压（$P_{0.1}$）、浅快呼吸指数（RSBI）及两者的乘积（$P_{0.1}$ × RSBI）。SBT 的 30 分钟和 60 分钟时测定的 RSBI 变化（ΔRSBI30, ΔRSBI60）被评估为 RSBI30 或 RSBI60 与 SBT 第 1 分钟时 RSBI 的比率。
结果：22 例（19.5%）患者未通过自主呼吸试验，从本研究中剔除；91 例患者能够耐受试验，予以拔管。48 小时后，18 例（19.8%）患者需要重新插管（拔管失败），73 例（80.2%）患者拔管成功，不需再次插管。虽然拔管失败的患者（118% ± 34%）$\Delta RSBI_{30}$ 较拔管成功的患者（93% ± 35%, P = 0.01）高，但是受试者作用特性（ROC）分析显示，该指数在阈值<98%时对于拔管成功的预测能力很差，它在 ROC 曲线以下的面积（AUC）只有 0.76。分类回归树分析选择 3 个变量（$P_{0.1}$ × $RSBI_{30}$，$RSBI_1$，$\Delta RSBI_{30}$），并从 $P_{0.1}$ × $RSBI_{30}$ 开始。对于 $P_{0.1}$ × RSBI-$_{30}$ >474 cmH_2O*次/min/L 的患者，$\Delta RSBI_{30}$ >98%定义为包含了所有失败的患者而非成功的患者的一个组，而 $\Delta RSBI_{30}$ ≤98%包含了所有成功的患者而非失败的患者。对于 $P_{0.1}$ × $RSBI_{30}$ ≤474 cm H_2O*次/min/L 的患者，$P_{0.1}$ × $RSBI_{30}$ >328 cm H_2O*次/min/L 和 $RSBI_1$ >112 次/min/L 也合并定义了包含了所有成功的患者而非失败的患

者的一个组。事实上，当只包括 $P_{0.1} \times RSBI_{30}$ 时，树模型的诊断准确性为 89.1%，当包含 $P_{0.1} \times RSBI_{30}$ 和 $\Delta RSBI_{30}$ 两个参数时，其准确性增至 94.5%。最终的树模型包含了所有这 3 个变量，预测拔管成功的准确率达到 96.7%，AUC 为 0.94（95%可信区间[CI]，0.87-0.98）。

结论：如果通过大样本量的前瞻性研究能进一步确认现有的树模型，那么它将有助于指导医生为重症监护病房的老年患者做出拔管决策。

（徐妍君 译， 马皓琳 李士通 校）

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

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

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

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

产科病人椎管内吗啡镇痛和口腔疱疹病毒复发

Neuraxial Morphine and Oral Herpes Reactivation in the Obstetric Population

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

椎管内注射吗啡镇痛是剖宫产后镇痛的常规策略。吗啡通过此途径增加了分娩期妇女的一个常见疾病——唇疱疹（口腔疱疹）的复发。人们最主要关注的问题是病毒再活化后由母体传染给新生儿的风险。并没有研究显示复发性疱疹可导致严重的新生儿发病率，因此，母亲接受此种方法镇痛的益处大于母体疱疹复发导致的产后获得性新生儿疱疹的风险。

（刘伍 译 马皓琳 李士通 校）

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

唐氏综合征患儿使用七氟醚麻醉诱导过程中发生的心动过缓

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

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

背景：心动过缓是唐氏综合征患儿中与使用氟烷吸入麻醉诱导相关的并发症。虽然有报导这些儿童使用七氟醚麻醉诱导后发生了心动过缓，但其发生率是未知的。
目的：在这项研究中我们比较了健康对照儿童和唐氏综合征患儿使用七氟醚诱导后发生心动过缓的发生率和特征。
方法：我们回顾了八年间使用七氟醚吸入麻醉诱导的 209 例唐氏综合征患儿和 268 例健康对照组儿童的电子麻醉记录。从医疗记录中提取以下信息：一般资料、有无先心病史、心率、氧合血红蛋白浓度、呼气末七氟醚浓度、动脉血压和麻醉诱导开始后 360 秒内对心动过缓的所有处理。心动过缓和低血压被定义为建议激活儿科快

速反应团队对住院儿童床旁快速干预的低于临界值的心率和动脉血压。在单因素分析中识别与心动过缓相关的因素。用分步反向多因素逻辑回归模型分析来识别独立因素。采用 Fisher's 精确检验或卡方检验（用于分类数据）及 t 检验（用于连续数据）计算两组之间的差异。
结果：单因素分析表明，唐氏综合症、低 ASA 分级、先天性心脏病和平均七氟醚浓度都是心动过缓的相关因素。然而，多因素分析表明，只有唐氏综合征和低 ASA 分级仍是心动过缓的独立因素。
结论：使用七氟醚麻醉诱导过程中的心动过缓常见于伴或不伴有先天性心脏病的唐氏综合征患儿。
（滕凌雅 译 马皓琳 李士通 校）

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

丙泊酚能减少帕金森氏症患者丘脑下核神经元群峰电位活动

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

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Anesth Analg 2010; 111(11):1285-1289

背景：在治疗帕金森氏症时，通常通过微电极记录仪（MER）记录丘脑下核（STN）神经元群峰电位活动来实施在 STN 植入脑深部刺激（DBS）电极。镇静药对 MER 具有何种程度的干扰还未知。我们记录了丙泊酚镇静期间 STN 神经元的群峰电位活动，并检测其对神经元活动的影响。
方法：在治疗帕金森氏症患者的 DBS 手术中实施此操作。在 STN 一个固定的电极部位，我们以丙泊酚 50μg/kg/min 输注，直到达到稳定的镇静深度。我们记录了在丙泊酚输注前、中和后的电活动，并计算出其均方根（RMS）。
结果：记录了 16 名患者的 24 个电极轨迹的活动。在 24 个轨迹中有 18 个 STN 电活动的 RMS 在给予丙泊酚后显著降低。在丙泊酚输注期间标准化的 RMS 平均值下降了 23.2%± 9.1%（均值±标准差）(P < 0.001)，而在停用后 9.3 ± 4.0 分钟恢复到基础值。
结论：使用丙泊酚会导致 STN 神经元活动的明显减少。因此，这可能干扰了 MER 对 STN 边界的鉴定。然而，电活动在停用丙泊酚后很快恢复到基础水平。因此，可以安全地使用丙泊酚直到使用 MER 做 DBS 前即刻。
（杨秀娟译 马皓琳 李士通 校）

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

8-OH-DPAT 阻止吗啡导致的大鼠背缝神经核的凋亡：减少吗啡耐受的一个可能机制

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

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Anesth Analg 2010; 111(11):1316-1321

背景：以前，我们发现背缝神经核（DRN）中血清素-1A(5-HT1A)受体的活化减少了对吗啡镇痛作用耐受的发生。已表明对吗啡镇痛作用的耐受与中枢神经系统中的凋亡相关。在本实验中，我们欲评估 8-OH-DPAT（8-羟-2-[di-n-丙胺基]四氢萘，一种特殊的 5-HT1A 受体激动剂）对吗啡导致耐受及大鼠 DRN 中凋亡的影响。
方法：使用热板仪器评定伤害性感受。使用末梢脱氧核转移酶介导的 dUTP 缺口末标记（TUNEL）法分析凋亡。
结果：通过服用吗啡(5 mg/kg/d, i.p.)十天完成对吗啡镇痛作用的耐受，然而， 8-OH-DPAT 处理的动物在第十天仍有明显的镇痛作用。此外，结果显示与生理盐水处理组相比，吗啡耐受组大鼠（对照组：吗啡 i.p. + DRN 内生理盐水）中 TUNEL 阳性细胞的数量增加。结果还表明：与对照组相比，8-OH-DPAT (2、4 和 8 μg/大鼠/d)减少了 DRN 内凋亡细胞的数量。不过，使用 5-HT1A 受体拮抗剂 NAN-190 (6 μg/大鼠/d, DRN 内)时，8-OH-DPAT (8 μg/大鼠/d, DRN 内)不能减少吗啡导致的凋亡。
结论：我们发现：背缝神经核内注射一种特异 5-HT1A 受体激动剂减少了吗啡导致的大鼠 DRN 内的凋亡，这可能在吗啡耐受中起到一个关键作用。
（王海涛 译 马皓琳 李士通 校）

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

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

阿片类药物介导的预处理效应需依赖小窝蛋白-3 的生物表达

Opioid-Induced Preconditioning Is Dependent on Caveolin-3 Expression.
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Anesth Analg. 2010 Nov; 111(5):1117-21.

此次研究验证了该假说，即小窝蛋白-3（Cav-3）对于体内阿片类药物介导的预处理效应至关重要。将 Cav-3 过度表达小鼠、Cav-3 基因敲除小鼠及对照组小鼠分别暴露于载有 SNC-121（SNC）（选择性 δ 阿片受体激动剂）或纳络酮（非选择性阿片受体拮抗剂）的心肌缺血/再灌注（I/R）损伤模型。其中，对照组小鼠因接受 SNC 减少了 I/R 损伤。而接受 SNC 的 Cav-3 基因敲除小鼠并未产生保护作用。与应用纳络酮拮抗的对照组小鼠相比，Cav-3 过度表达小鼠表现出对于 I/R 损伤的固有保护作用。此次研究结果证实，阿片类药物介导的预处理效应需依赖小窝蛋白-3 的生物表达，而 Cav-3 过度表达小鼠产生的内源性保护作用也需依赖阿片类药物实现。
（范羽译 薛张纲校）
We tested the hypothesis that caveolin-3 (Cav-3) is essential for opioid-induced preconditioning in vivo. Cav-3 overexpressing mice, Cav-3 knockout mice, and controls were exposed to myocardial ischemia/reperfusion (I/R) in the presence of SNC-121 (SNC), a delta-selective opioid agonist, or naloxone, a nonselective opioid antagonist. Controls were protected from I/R injury by SNC. No protection was produced by SNC in Cav-3 knockout mice. Cav-3 overexpressing mice showed innate protection from I/R compared with controls that was abolished by naloxone. Our results show that opioid-induced preconditioning is dependent on Cav-3 expression and that endogenous protection in Cav-3 overexpressing mice is opioid dependent.

奈福泮在终末期肾病患者中的药代动力学

Nefopam Pharmacokinetics in Patients with End-Stage Renal Disease
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Anesth Analg. 2010 Nov;111(5):1146-53.

背景：终末期肾病患者的术后严重疼痛的治疗一直是麻醉医生所面临的问题。因为这些患者中存在着大量的药物蓄积和代谢转化的风险。奈福泮是一种具有潜在镇痛作用而不引起呼吸抑制的药物。它由肝脏代谢并且少量以原型从肾脏排出。这使得它在用于终末期肾病患者中具有一定的优势。然而肾功能衰竭对于奈福泮的药物分布的影响却从未有过研究。
方法：我们研究了12名终末期肾病患者(肌酐清除率<20ml/min, 平均年龄57±13岁)。他们在全身麻醉下接受了动静脉造瘘手术。术后从全身麻醉中苏醒30分钟以后，每位患者均接受一次20mg的奈福泮静脉注射。48小时后采集血样，通过液相色谱-串联质谱法测量血浆中奈福泮和双甲基奈福泮的药物浓度。与此同时，12名50至60岁的健康志愿者在30分钟内接受一次20mg奈福泮静脉注射，使用的是普通人群的药代动力学参数。比较两者所得到的药代动力学参数的数值。
结果：健康志愿者和终末期肾病患者的一般情况具有可比性。与健康志愿者相比，终末期患者的中央室容积比较小(健康志愿者的中央室容积为264L，尚未接受血液透析的患者中央室容积为115L，长期血液透析患者中央室容积为53L，差异均具有统计学意义)；奈福泮的平均清除速率比较慢(在健康志愿者，尚未接受血液透析和长期血液透析患者中分别为52.9L/h, 37.0L/h和27.3L/h，差异显著)，并且因此使得终末期肾病患者中奈福泮的药物峰浓度较高(在健康志愿者，尚未接受血液透析和长期血液透析患者中分别为61ng/ml, 121ng/ml和223ng/ml，差异显著)。
结论：奈福泮在终末期肾病患者中的分布和消除与普通人群不同。在终末期肾病患者中奈福泮的有效作用浓度增加。为了避免药物过量，建议将终末期肾病患者的奈福泮用量减少50%。
（黄剑译 薛张纲校）

BACKGROUND: Treatment of intense postoperative pain in patients with end-stage renal disease (ESRD) is a recurrent problem for anesthesiologists because of the risk of accumulation of numerous molecules and their metabolites. Nefopam is a potent analgesic metabolized by the liver and weakly eliminated intact in urine that may offer advantages for use in patients with ESRD because it lacks respiratory-depressive effects. However, the effects of renal failure on nefopam disposition have never been investigated.
METHODS: We studied 12 ESRD patients (creatinine clearance < 20 mL/min, mean age 57 ± 13 years) having surgery under general anesthesia to create or repair an arteriovenous fistula. Postoperatively, after complete recovery from anesthesia, each patient received a single 20-mg dose of nefopam IV over 30 minutes. Nefopam and desmethyl-nefopam concentrations in plasma samples obtained over 48 hours were determined by liquid chromatography-tandem mass spectrometry. The pharmacokinetic parameter values obtained were compared with those of 12 healthy 50- to 60-year-old volunteers who also received a single 20-mg nefopam infusion over 30 minutes using a population pharmacokinetic approach.

RESULTS: Healthy volunteers and ESRD patients had comparable demographic characteristics. In comparison with those volunteers, ESRD patients had a lower volume of central compartment (115 and 53 L vs. 264 L for patients not yet hemodialyzed and on chronic hemodialysis, respectively; $P < 0.001$) and lower mean nefopam clearance (37.0 and 27.3 L/h vs. 52.9 L/h, $P < 0.001$), resulting in higher mean nefopam peak concentration (121 and 223 ng/mL vs. 61 ng/mL, $P < 0.001$).
CONCLUSIONS: Nefopam distribution and elimination are altered in patients with ESRD, resulting in heightened exposure. To avoid too-high concentration peaks, it is suggested that the daily nefopam dose be reduced by 50%.

麻醉保护装置(Anaconda©)替代经典汽化设备的准确性

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

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Anesth Analg 2010;111:1176–9

背景：麻醉保护装置ACD和传统汽化设备做过对比。然而，挥发性麻醉剂给药浓度的精度尚未验证。现研究ACD用作携带式蒸发器的精准度。
方法：此项前瞻性研究包括 30 名 ASAI–III 级的全麻择期手术病人，随机分为 3 组，每组十人。每组七氟醚分别为 1.0 vol%, 1.5 vol%和 2.0 vol%肺泡浓度。每两分钟记录一次血流动力学数据，双频指数，呼气末七氟醚浓度。
结果：分析来自30名病人的801份数据显示，当靶浓度为1.0 vol%,时候，呼气末七氟醚浓度和靶浓度的平均差异是靶浓度的- 11.0±9.3%。当靶浓度为1.5 vol%时是-5.4±6.4%。当靶浓度为2.0 vol%是- 4.0 ±7.4%。在目标浓度误差里无显著性差异。
结论：证明 ACD 比传统汽化器更有效。使用方便，只需每小时调节一次给药速度。麻醉药储备不依赖回路和新鲜气体流速。
（毛慧译 薛张刚校）

BACKGROUND: The Anesthetic Conserving Device—AnaConDa_ (ACD)—has been compared with a conventional vaporizer. However, the accuracy of the administered concentration of volatile anesthetics was not examined. In the present study we measured the accuracy of the ACD when used as a portable vaporizer.
METHODS: This prospective study included 30 ASA I–III patients scheduled for elective surgery
under general anesthesia. The patients were randomly organized into 3 groups of 10 patients pergroup. In each group, the sevoflurane infusion rate was adjusted to deliver 1.0 vol%, 1.5 vol%,and 2.0 vol% alveolar concentration. Hemodynamic data, bispectral index, and end-tidal sevoflurane concentrations were recorded every 2 minutes.
RESULTS: We analyzed 801 data points from 30 patients. The mean difference between the end-tidal sevoflurane concentration and the target concentration was- 11.0±9.3%of the target when the target was 1.0 vol%, -5.4±6.4% when the target was 1.5 vol%, and -

4.0 ±7.4% when the target was 2.0 vol%. No significant differences were found in the error at the different target concentrations.
CONCLUSIONS: We found that the ACD may be a valid alternative to the conventional vaporizer.The ACD is very simple to use, delivery rate needs to be adjusted only once per hour, and the anesthetic savings are independent of the circuit characteristics and fresh gas flow rate.

卡维地洛在气道阻塞致心搏骤停大鼠模型的心肺复苏中的作用

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

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Anesth Analg November 2010 111:1207-1210

背景：卡维地洛是一种非选择性的β受体和选择性的α_1受体阻滞剂。与其他传统β受体阻滞剂相比，卡维地洛具有内皮依赖的血管舒张作用，所以它被广泛应用在高血压和/或慢性心功能不全的病人。我们观察了卡维地洛口服给药在气道阻塞致心搏骤停大鼠模型的心肺复苏中的作用。
方法：24 只大鼠被随机分为 2 组：对照组（不给药）和治疗组（口服卡维地洛每天 10mg/kg 持续 5 天）。大鼠被麻醉后，心搏骤停由气道阻塞诱发，并在心搏骤停后 3 分钟开始进行心肺复苏。胸外按压频率为每分钟 240-260 次，并调整按压深度以保持动脉舒张压在 25-30mmHg。在心肺复苏开始 5 分钟后给予肾上腺素 0.02mg/kg。在心搏骤停前、中、后均未给予其他治疗。
结果：治疗组气道阻塞致心搏骤停所需时间明显长于对照组（230±27 秒对比 203±24 秒； $P < 0.05$）。心肺复苏后大鼠恢复持续循环的比例明显高于对照组（92%对比 50%；$P < 0.05$）。酸中毒、血糖升高程度以及肿瘤坏死因子α浓度治疗组均低于对照组。
结论：本研究显示口服卡维地洛数日后，大鼠在气道阻塞后更能抵抗心搏骤停的发生，且在发生心搏骤停后更有可能被复苏。这些结果显示卡维地洛可能延长了呼吸衰竭时的安全缺血时间。
（任云译 薛张刚校）

BACKGROUND: Carvedilol is a nonselective β-adrenoceptor and selective α(1)-adrenoceptor blocker and is widely used in the treatment of patients with hypertensive and/or chronic heart failure because, unlike classic β-blockers, this drug has additional endothelium-dependent vasodilatory effects. We evaluated the effects of oral administration of carvedilol on cardiopulmonary resuscitation (CPR) in a rat model of cardiac arrest (CA) induced by airway obstruction.
METHODS: Twenty-four rats were randomly assigned to 2 groups: control group (no medication) and treatment group (oral administration of carvedilol [10 mg/kg/d] for 5 days) (n = 12 per group). All the animals were anesthetized, and CA was induced by obstructing the airway. Three minutes after CA, the animals were revived by administering CPR. The rate of chest compressions (CCs) was 240 to 260 CCs/min and the depth of CCs was adjusted to maintain the diastolic arterial blood pressure between

25 to 30 mm Hg in both groups. Epinephrine (0.02 mg/kg) was administered after 5 minutes of CPR. No other therapy was administered before, during, or after CA.
RESULTS: The time interval between airway obstruction and CA in the treatment group was significantly longer than in the control group (230 ± 27 vs 203 ± 24 seconds; $P < 0.05$). The rate of return of spontaneous circulation in the treatment group was significantly higher than in the control group (92% vs 50%; $P < 0.05$). Acidosis and increased glucose and tumor necrosis factor-α concentrations in the treatment group were significantly lower than in the control group.
CONCLUSIONS: The results of our study showed that rats that had been administered oral carvedilol for several days were more resistant to CA induced by airway obstruction, and when CA did occur, were more likely to be resuscitated. These findings suggest that carvedilol may prolong the safe ischemic time induced by respiratory failure.

在实行蛛网膜下腔阻滞的剖宫产手术中新福林的剂量依赖作用。

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

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Anesth Analg. 2010 Nov;111(5):1093-5.

背景：低血压是采用蛛网膜下腔阻行剖宫产手术时最常见的严重副作用。最近越来越多的医生采用新福林作为血管加压素，来提高孕妇心血管的稳定性和婴儿的安全产出。虽然在择期手术中新福林是安全的，但是仍然有很多人关注它所引起的母亲后负荷的增加和压力感受器介导的心动过缓，进而引起母亲的心输出量减少。为了能了解新福林对母亲心血管稳定性的剂量依赖作用，我们采用无创的方法来检测母亲的心输出量。如果有影响，那么它对婴儿的出生是否有影响。
方法：我们采用随机分组双盲的研究方法，75 名择期行剖宫产的孕妇分别给予新福林 25ug/min,50ug/min,100ug/min。我们从蛛网膜下腔阻滞开始至婴儿产出，用新福林滴定的方式来维持母亲的基础收缩压。我们记录母亲的心血管变化，包括心率和收缩压。我们分别在术前，蛛网膜阻滞开始后 20 分钟内每隔 5 分钟，在胸骨上用多普勒超声监测母亲的心输出量，每搏输出量，静脉回流和心肌收缩力。同时我们记录婴儿的 Apgar 评分和脐带血的血气。
结果：各组的收缩压都比较理想，但是和其他低剂量组相比，新福林 100ug/min 组却需要更大的剂量才能使血压维持好。各组在收缩压低于基础值的 80%出现的次数，和在使用麻黄素或者新福林使收缩压高于基础值的 80%的次数方面都没有显著性差异。各组中新福林引起的心率减慢和心输出量减少都与时间和剂量依赖都有显著性差异，如果各组中心率和心输出量随新福林使用的时间越长而越低，随其使用的浓度越高而越低。整个过程中每搏输出量都是稳定的。各组中的 Apgar 评分和脐带血血气都是相似的。
结论：给予高浓度的新福林（100ug/min）,我们会使母亲与婴儿需要更大剂量的新福林来维持血压，同时会引起心率和心输出量明显的下降（达 20%的下降）。仍

有待更多的研究来决定是否在急诊剖宫产蛛网膜下腔阻滞时使用新福林母亲心输量的减少是不利的。
（翁梅琳译 薛张刚校）

BACKGROUND: Hypotension is the most common serious side effect of spinal anesthesia for cesarean delivery. There has been a move recently toward the use of phenylephrine as a vasopressor infusion to improve maternal cardiovascular stability and fetal outcome. Although it seems safe in the elective setting, there have been concerns about its propensity for causing an increase in afterload and a baroreceptor-mediated bradycardia in the mother, with a consequent reduction in maternal cardiac output (CO). Using a noninvasive measure of CO, our aim was to investigate whether there were any dose-dependent effects of phenylephrine on maternal cardiovascular stability and, if so, any impact on fetal outcome.
METHODS: In this randomized, double-blind study, 75 women scheduled for elective cesarean delivery were allocated to receive a phenylephrine infusion at 25 μg/min, 50 μg/min, or 100 μg/min. This infusion was titrated to maintain maternal baseline systolic blood pressure (SBP), from induction of spinal anesthesia until delivery. The maternal cardiovascular variables recorded included heart rate (HR) and SBP. A suprasternal Doppler monitor measured CO and stroke volume, as well as measures of venous return (corrected flow time) and contractility, at baseline, and then every 5 minutes for 20 minutes after initiation of spinal anesthesia. Apgar scores and umbilical cord blood gases were recorded.
RESULTS: SBP control was satisfactory in all groups; however, the group receiving phenylephrine 100 μg/min required significantly higher doses to achieve arterial blood pressure control compared with the lower infusion rates. There were no significant differences in the number of times SBP decreased below 80% of baseline, or the numbers of boluses of ephedrine or phenylephrine required to maintain SBP above 80% of baseline. There were significant time and dose-dependent reductions in HR and CO with phenylephrine, such that HR and CO were seen to decrease with time in each group, and also with increasing concentrations of phenylephrine. Stroke volume remained stable throughout. Apgar scores and umbilical cord blood gases were similar among groups.
CONCLUSION: By infusing a higher concentration (100 μg/min), we subject the mother and fetus to a much higher dose of phenylephrine, with significant effects on maternal HR and CO (up to a 20% reduction). Future investigation is required to determine whether this reduction in maternal CO has detrimental effects when providing anesthesia for an emergency cesarean delivery for a compromised fetus.

口服造影剂对腹部 CT 检查儿童胃液容量的影响

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

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Anesth Analg November 2010 111:1252-1258

背景：口服肠道造影剂（ECM）应用 CT 扫描腹部时通常需要口服肠道造影剂来分辨胃肠道。但在镇静/麻醉前 2h 内给予口服 ECM 违背禁食指南，而且理论上会增

加吸入性肺炎的风险。在这项研究中，我们在麻醉/镇静前 1h 给予 ECM，并测量残余胃内容量。我们假定患者在麻醉/镇静前 1h 口服 ECM，其残余胃液容量（GFV）将>0.4 mL/kg。

方法：回顾分析 2005 年 1 月至 2009 年 6 月期间所有接受过镇静/麻醉下腹部 CT 扫描患者的麻醉和放射学报告，CT 片和部门事故报告。通过对感兴趣的包含有高弱化液体和低弱化的其他胃内容物的胃部分区域的轮廓描记来计算造影剂或胃液的容量。从患者的麻醉/镇静记录单上得出患者的人口学特征、当前病理学报告、麻醉/镇静诱导和维持的药物、气道干预措施、气管插管的途径和与口服 ECM 相关的并发症（包括氧饱和度下降、呕吐、咳嗽、支气管痉挛、喉痉挛和误吸）。

结果：我们确定了 365 例行腹部 CT 扫描患者（平均年龄 32 个月，年龄范围在 0.66 至 211.10 个月之间）在麻醉/镇静之前接受口服/静脉造影剂，47 例患者（平均年龄 52 个月，年龄范围在 0.63 至 215.84 个月之间）仅接受静脉造影剂随后常规禁食禁饮。对于口服造影剂患者，平均造影剂容量为 18.10ml/kg（范围在 1.5 至 82.76ml/kg 之间）。完成口服造影剂患者 1h 后的中位 GFV 明显高于仅仅接受静脉造影剂患者（0.38 mL/kg VS. 0.15 mL/kg，P = 0.0049）。有 189 位患者 GFV＞0.4ml/kg，其中口服造影剂组中占 49%（178/365），静脉造影剂组占 23%（11/47）（χ^2= 10.7874，P = 0.0010）。在接受口服造影剂的患者中，207 例行全身麻醉，158 例行深度镇静。全麻患者中据报道有 2 例发生呕吐，但没有吸入性肺炎的确切证据。

结论：对于行腹部 CT 扫描的儿童，发生残余 GFV＞0.4ml/kg 的患者，在麻醉/镇静 1h 前接受口服 ECM 患者中所占的比例为 49%（178//365），而在仅仅接受静脉造影剂的患者中所占比例为 23%（11//47）。

（吴少勇译 薛张纲校）

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

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

Results: We identified 365 patients (mean age = 32 months; range = 0.66 to 211.10 months) who received oral/IV contrast material before anesthesia/sedation for abdominal

CT and 47 patients (mean age = 52 months; range = 0.63 to 215.84 months) who received only IV contrast material and followed the traditional fast. For those who received oral contrast, the mean contrast volume administered was 18.10 mL/kg (range = 1.5 to 82.76 mL/kg). The median GVF 1 hour after completing the oral contrast was significantly higher than that in patients who received only IV contrast (0.38 mL/kg vs. 0.15 mL/kg, P = 0.0049). GFV exceeded 0.4 mL/kg in 189 patients (178 of 365 [49%] in the oral contrast group vs. 11 of 47 [23%] in the IV contrast group) ($\chi 2 = 10.7874$, P = 0.0010). Among those who received oral contrast, 207 patients had general anesthesia and 158 patients had deep sedation. Two cases of vomiting were reported in the general anesthesia group with no evidence of pulmonary aspiration identified.
Conclusion: For children receiving an abdominal CT, the residual GFV exceeded 0.4 mL/kg in 49% (178/365) of those who received oral ECM up to 1 hour before anesthesia/sedation in comparison with 23% (11/47) of those who received IV-only contrast.

咪达唑仑和异丙酚镇静对于大脑动态自动调节的不同效应

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

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Anesth Analg November 2010 111:1279-1284

背景:虽然咪达唑仑和异丙酚都通过作用于自主神经系统和内皮细胞介导的松弛作用降低脑血流。咪达唑仑介导的以交感神经为主，而异丙酚以副交感为主。咪达唑仑没有内皮细胞介导的松弛作用，然而异丙酚抑制内皮细胞依赖的松弛作用。而且，咪达唑仑明显使脑动脉收缩。因此我们假设咪达唑仑和异丙酚对于大脑动态自动调节具有不同效应。
方法：十名健康男性受试者接受了咪达唑仑、异丙酚和安慰剂的注射，这是一个随机、单盲、交叉的临床试验。修改的 评分评价镇静深度。在达到目标镇静深度或普通生理盐水作为安慰剂注射 15 分钟后，用经张力测量法测桡动脉平均动脉压变异、经颅多普勒超声测得大脑中动脉血流变异的分析来评估大脑动态自动调节。
结果:咪达唑仑和异丙酚能显著降低稳态脑血流(显著的相互作用,p=0.024)。然 2 而低频状态下转移函数斜率的显著下降只在咪达唑仑注射时发生（显著的相互作用，p=0.015），提示咪达唑仑镇静期间平均动脉压变化引起的脑血流波动减小。
结论：我们的研究结果显示咪达唑仑和异丙酚在脑血流的自动调节方面具有不同的效应，虽然在降低稳态脑血流方面具相同效应。只有咪达唑仑可能改善脑血流自动调节功能。
（姚敏敏译 薛张纲校）

BACKGROUND: Although midazolam and propofol reduce cerebral blood flow (CBF) similarly, they generate different effects on the autonomic nervous system and endothelium-induced relaxation. Midazolam induces sympathetic dominance, whereas

propofol induces parasympathetic dominance. Midazolam has no effect on endothelium-dependent relaxation, whereas propofol suppresses endothelium-dependent relaxation. Moreover, midazolam apparently constricts cerebral arterioles. We therefore hypothesized that midazolam and propofol have different effects on dynamic cerebral autoregulation.
METHODS: Ten healthy male subjects received midazolam, propofol, and placebo administrations in a randomized, single-blind, crossover study. The modified Observer's Assessment of Alertness/Sedation scale was used to assess sedation depth. After reaching a target depth of sedation (Observer's Assessment of Alertness/Sedation scale score 3, responds only after name is called loudly and/or repeatedly) or after 15 minutes of normal saline administration as placebo, dynamic cerebral autoregulation was evaluated by spectral and transfer function analyses between mean arterial blood pressure variability in the radial artery measured by tonometry, and CBF velocity variability in the middle cerebral artery measured by transcranial Doppler ultrasonography.
RESULTS: Steady-state CBF velocity decreased significantly with midazolam and propofol administration (significant interaction effects, P = 0.024). However, transfer function gain in the low-frequency range decreased significantly only with midazolam administration (significant interaction effects, P = 0.015), suggesting a reduced magnitude of transfer from mean arterial blood pressure oscillations to CBF fluctuations during midazolam sedation.
CONCLUSION: Our results suggest that midazolam and propofol sedation have different effects on dynamic cerebral autoregulation despite causing equivalent decreases in steady-state CBF velocity. Only midazolam sedation is likely to improve dynamic cerebral autoregulation.

低位肢端截肢术后使用长期外周神经阻滞：对幻肢综合征相关症状的效果

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

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Anesth Analg November 2010 111:1308-1315

背景：幻肢综合征（PLS）在截肢术后常见，出现于 90%截肢者中。尽管有各种不同的疗法，但没有一种是高度有效的。基于此，我们评价长期对外周神经注射高浓度局部麻醉剂来预防 PLS 的效果。
方法：在术前即刻或术中给 71 名将接受低位肢端截肢术的患者在外周神经处放置导管。术中以 5mL/h 的速度用一个可调控（非电子）的泵持续输注 0.5%罗哌卡因，并持续至术后 4 至 83 天。术后第一天和此后的第 1、2、3、4 周，第 3、6、9、12 月评估 PLS。评估患者在接受罗哌卡因输注期间停止输注 6 至 12 小时后（幻肢感觉恢复）PLS 是否出现及严重程度。幻肢严重程度和残肢痛用 5 度口述评

级量表（VRS）评估，0 级无痛，至 4 级无法忍受，幻肢感用存在或不存在评估。如果 VRS>1 分，或有显著的幻肢感，立即恢复以 5mL/h 的速度输注罗哌卡因。如果 VRS 保持 0 到 1 且患者 48 小时无幻肢感，罗哌卡因停止输注并拔除导管。
结果：输注局部麻醉剂时间的中位数为 30 天（置信区间 95%，25 到 30 天）。术后第一天 73%患者主诉从严重到无法忍受的程度的疼痛（视觉模拟量表>2）。但这一评价在第 12 个月的尾期仅出现在 3%的患者中，患者 VRS 疼痛评分结果：84%=0，10%=1,3%=2,3%=3,4%=无。但是幻肢感在第 12 个月的尾期出现在 39%的患者中。每个病人都会使用可调控输注系统。
结论：长期外周神经输注 0.5%罗哌卡因似乎是低位截肢术后治疗幻肢痛和幻肢感的有效方法。
（张玥琪译，薛张纲校）

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

单点对比三点注射行超声引导锁骨下阻滞：单点注射技术效果的确认

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

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Anesth Analg November 2010 111:1325-1327

背景：超声引导锁骨下阻滞时局麻药注射的最佳位点仍存在争议。
方法：患者随机分入接受 2%利多卡因 30mL 腋动脉后单点注射组（n=51）或理想的接近臂丛每个分支注射的三点注射组（n=49）。20 分钟后评估远端 4 个神经阻滞区域的针刺感和运动阻滞（3=未阻滞，0=完全阻滞）。
结果：单点注射没有显著的劣势（单点对比三点 20 分钟总阻滞分值均数[四分位间距]：5[2-9]对 7[3.5-11]），但是却有明显的优势（2-tailed test, P = 0.043)。单点注射技术与操作时间少量缩短相关。
结论：超声引导锁骨下阻滞局麻药注射最佳位置是腋动脉后方单点注射。
（朱兰芳译，薛张纲校）
BACKGROUND: The optimal site for local anesthetic placement during ultrasound-guided infraclavicular block remains controversial.
METHODS: Patients were randomized to receive lidocaine 2% 30 mL as a single injection posterior to the axillary artery (n = 51) or a triple injection ideally adjacent to each brachial plexus cord (n = 49). Pinprick sensory and motor block (3 = no block, 0 = complete block) were assessed to 20 minutes in the 4 distal nerve territories.
RESULTS: The single injection group was not significantly inferior (single versus triple injection median [interquartile range] 20-minute aggregate block score: 5 [2–9] vs 7 [3.5–11]) but also demonstrated superiority (2-tailed test, P = 0.043). The single injection technique was associated with a small reduction in procedural time.
CONCLUSIONS: The optimal site for local anesthetic placement during ultrasound-guided infraclavicular block is a single point injection posterior to the axillary artery.