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Anesth Analg September 2010 111:813-816; published ahead of print June 25, 2010

血小板或高浓度的VIII因子复合物可减弱硫酸鱼精蛋白的抗凝效应

The anticoagulant effect of protamine sulfate is attenuated in the presence of platelets or elevated factor VIII concentrations.

Bolliger D, Szlam F, Azran M, Koyama K, Levy JH, Molinaro RJ, Tanaka KA
Department of Anesthesiology, Emory University School of Medicine, 1364 Clifton
Road NE, Atlanta, GA 30322, USA.

Anesth Analg. 2010 111(3):601-8.

背景：作为肝素的特异拮抗剂，过量使用硫酸鱼精蛋白也可产生微弱的抗凝效应。

方法：此次研究共选取 6 名健康志愿者，通过测量组织因子或肌动蛋白激活后贫血小板血浆和富血小板血浆中凝血酶原时间与稀释印度蝰蛇毒磷脂时间的改变，及贫血小板血浆和全血中血栓弹力图的变化来评估不同浓度下鱼精蛋白（0-24 微克/毫升）抑制凝血酶增殖的效应。重组 VIIa 因子或 VIII 因子/血管性血友病因子复合物对于过量鱼精蛋白的逆转作用也需被检测。

结果：硫酸鱼精蛋白可剂量依赖性地延长凝血酶原时间和稀释印度蝰蛇毒磷脂时间。硫酸鱼精蛋白还可增加延滞时间并降低组织因子或肌动蛋白激活后贫血小板血浆中凝血酶的生成峰值。在拥有 $50-200 \times 10^3$ /微升血小板的富血小板血浆中，鱼精蛋白（24 微克/毫升）可延长延滞时间，但对凝血酶的生成峰值无影响。只有在 VIII 因子/血管性血友病因子复合物（1.5-3.0 单位/毫升）逆转鱼精蛋白（24 微克/毫升）的贫血小板血浆中，硫酸鱼精蛋白才减少延滞时间并提高肌动蛋白激活后凝血酶生成的峰值。重组 VIIa 因子的治疗浓度（60nM）仅对肌动蛋白激活后凝血酶生成的延滞时间有影响。此外，通过血栓弹力图的比较，与全血相比，硫酸鱼精蛋白可显著提高贫血小板血浆的凝血时间。

结论：此次试验证明硫酸鱼精蛋白可影响凝血酶的生成，但该作用可被血小板或高浓度的 VIII 因子/血管性血友病因子复合物部分逆转。现有数据表明，在严重的血小板减少症或低 VIII 因子情况下，过量的鱼精蛋白可潜在增加出血风险。

（范羽译 薛张纲校）

BACKGROUND: Protamine sulfate is the antidote for heparin, but in excess it exerts weak anticoagulation.

METHODS: We evaluated the effects of increasing protamine concentrations (0 to 24 microg/mL) on prothrombin time and diluted Russell's viper venom time measurements on thrombin generation in platelet-poor and platelet-rich plasma after activation by tissue factor or actin, and on thromboelastometry in platelet-poor plasma and whole blood from 6 healthy volunteers. The reversibility of excess protamine (24 microg/mL) by recombinant factor VIIa or factor VIII/von Willebrand factor concentrate was also tested.

RESULTS: Protamine prolonged prothrombin time and Russell's viper venom time, concentration dependently. Protamine also increased lag time and decreased peak of thrombin generation in platelet-poor plasma after tissue factor and actin activation. In platelet-rich plasma with platelets at 50 to 200 x 10³/microL, protamine (24 microg/mL) prolonged the lag time, but had no effect on peak thrombin generation. The addition of factor VIII/von Willebrand factor (1.5-3.0 U/mL) to platelet-poor plasma with protamine (24 microg/mL) decreased lag time and increased peak thrombin generation with actin activation. A therapeutic concentration of recombinant factor VIIa (60 nM) only affected the lag time of thrombin generation triggered with actin. In agreement, protamine increased coagulation time evaluated by thromboelastometry significantly more in platelet-poor plasma than in whole blood.

CONCLUSIONS: We demonstrated that protamine affects the propagation of thrombin generation, which is partially reversed by platelets or increased factor VIII/von Willebrand factor concentrations. The present data suggest that excess protamine might potentially increase bleeding in the case of severe thrombocytopenia or low factor VIII.

动脉交叉钳夹和再灌注在猪体中由于全身和局部血流重分配而导致微血管的氧合水平下降。

Arterial and venous pharmacokinetics of morphine-6-glucuronide and impact of sample site on pharmacodynamic parameter estimates.

Olofsen E, Mooren R, van Dorp E, Aarts L, Smith T, den Hartigh J, Dahan A, Sarton E. Department of Anesthesiology, Leiden University Medical Center, P5-Q, 2300 RC Leiden, The Netherlands. *Anesth Analg.* 2010;111(3):626-32.

背景：在药代动力学-药效学的模型研究中，静脉血浆样本常用来计算药效学模型的参数。本研究中将定量分析动静脉血中吗啡-6-葡萄糖苷酸药物浓度的差别。在比较静脉血和动脉血浓度与作用的关联时，我们使用了模拟研究来估算药效学模型参数的偏倚。

方法：17名健康志愿者在90秒内静脉注射0.3mg/Kg的吗啡-6-葡萄糖苷酸。分别采集桡动脉和肱静脉的血样标本。此外，根据动脉和静脉的房室建立一个扩展的药效学模型。使用NONMEM进行模型研究以探索和估计药效学模型参数的偏倚。用一级作用与抑制S形模型来模拟M6G的作用。由于M6G的动脉血浆-靶位平衡半衰期 $T(1/2)k(E0)$ 时间为5-240分钟，因此以多种不同的数值来模拟M6G的作用。

结果：动静脉血药物浓度差别显著。在静脉注射后即刻动脉血药物浓度较静脉血高，在接下来的超过60分钟时间里，静脉血M6G浓度逐渐上升并超过动脉血药物浓度。扩展的药代动力学模型很好地描述了这些数据的变化。这一模型由3个动脉室，1个中心静脉室和1个外周静脉室组成。模拟研究显示，由静脉血药物浓度数据得到的模型参数存在巨大偏倚。偏倚的大小取决于 $t(1/2)k(E0)$ 的值。假设M6G的 $t(1/2)k(E0)$ 的真实值范围是120-240分钟(取决于测量的终点)，那么使用静脉血浆标本进行分析的话，我们将低估 $t(1/2)k(E0)$ 达到30%，同时，效能参数将被高估达40%。

结论：由于M6G的动静脉血药物浓度间存在巨大差异，在使用传统的效应室模型进行静脉血药浓度与效应的关联估计时，药效学模型参数中的药物浓度部分将存在巨大的偏倚。

(黄剑译 薛张纲校)

BACKGROUND: In pharmacokinetic-pharmacodynamic modeling studies, venous plasma samples are sometimes used to derive pharmacodynamic model parameters. In the current study the extent of arteriovenous concentration differences of morphine-6-glucuronide (M6G) was quantified. We used simulation studies to estimate possible biases in pharmacodynamic model parameters when linking venous versus arterial concentrations to effect.

METHODS: Seventeen healthy volunteers received an IV 90-second infusion of 0.3 mg/kg morphine-6-glucuronide (M6G). Arterial and venous blood samples, from the radial artery and cubital vein, respectively, were obtained. An extended pharmacokinetic model was constructed linking arterial and venous compartments. The extent of bias in pharmacodynamic model parameter estimates was explored in simulation studies with NONMEM, simulating M6G effect using first-order effect-compartment-inhibitory

sigmoid E(MAX) models. M6G effect was simulated at various values for the arterial blood-effect-site equilibration half-lives ($t(1/2)k(E0)$), ranging from 5 to 240 minutes. **RESULTS:** Arteriovenous concentration differences were apparent, with higher arterial plasma concentrations just after infusion, whereas at later times (>60 minutes) venous M6G concentrations exceeded arterial concentrations. The extended pharmacokinetic model adequately described the data and consisted of 3 arterial compartments, 1 central venous compartment, and 1 peripheral venous compartment. The simulation studies revealed large biases in model parameters derived from venous concentration data. The biases were dependent on the value of $t(1/2)k(E0)$. Assuming that the true values of M6G $t(1/2)k(E0)$ range from 120 to 240 minutes (depending on the end point measured), we would have underestimated $t(1/2)k(E0)$ by 30%, whereas the potency parameter would have been overestimated by about 40%, when using venous plasma samples. **CONCLUSIONS:** Because of large arteriovenous differences in M6G plasma, concentration biases in pharmacodynamic model parameters will occur when linking venous concentration to effect, using a traditional effect-compartment model.

儿科气道管理器械的计算机模型和原型制作

Computational Modeling and Prototyping of a Pediatric Airway Management Instrument

Alan Gonzalez-Cota, MD,* Grant H. Kruger, PhD,† Padmaja Raghavan, MS,‡ and Paul I. Reynolds, MD§

From the *Department of Anesthesiology, University of Michigan Health System; †S.M. Wu Manufacturing Research Center, College of Engineering, University of Michigan; ‡College of Engineering, University of Michigan; and §Department of Pediatric Anesthesiology, University of Michigan Health System.

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背景：以前儿科纤支镜插管时压舌是为了增加上气道的开放度,用Magill钳作为舌拉钩可以做到，但是舌头往往不固定而且容易受伤。我们的研究就是应用电脑辅助工程改进以获得稳定的舌拉钩。

方法：我们运用解析和试验方法分析标准Magill钳的几何学和机械性能。这项设计应用计算机辅助设计技术可获得3维立体模型利于进一步进行几何精炼和数学测试，使原型能够速成。

结论：在试验发现的基础上我们调整设计约束以优化舌拉钩。老套的原型设计生产出一个部分功能塑料模型以进一步评估功能和设计改进对人类环境改造学的作用。为减少常规Magill钳对舌头的压力，我们整合（1）增大顶端直径已获得更好的舌部压力分布图，（2）设计棘轮以稳固这个压力，（3）便于抓握的柔软可塑性好的顶部。

结论：电脑辅助工程可用来重新设计并制作出一个简单的气道管理工具模型。基于计算机模型，我们在保留最初的几何学和通用性上改良了Magill钳以获得稳定的收缩力度，它应用于人体及在儿科纤支镜插管中的实用性还有待于研究。

（毛慧译，薛张刚校）

BACKGROUND: Anterior retraction of the tongue is used to enhance upper airway patency during pediatric fiberoptic intubation. This can be achieved by the use of Magill forceps as a tongue retractor, but lingual grip can become unsteady and traumatic. Our objective was to modify this instrument using computer-aided engineering for the purpose of stable tongue retraction.

METHODS: We analyzed the geometry and mechanical properties of standard Magill forceps with a combination of analytical and empirical methods. This design was captured using computeraided design techniques to obtain a 3-dimensional model allowing further geometric refinements and mathematical testing for rapid prototyping.

RESULTS: On the basis of our experimental findings we adjusted the design constraints to optimize the device for tongue retraction. Stereolithography prototyping was used to create a partially functional plastic model to further assess the functional and ergonomic effectiveness of the design changes. To reduce pressure on the tongue by regular Magill forceps, we incorporated (1) a larger diameter tip for better lingual tissue pressure profile, (2) a ratchet to stabilize such pressure, and (3) a soft molded tip with roughened surface to improve grip.

CONCLUSION: Computer-aided engineering can be used to redesign and prototype a popular instrument used in airway management. On a computational model, our modified Magill forceps demonstrated stable retraction forces, while maintaining the original geometry and versatility. Its application in humans and utility during pediatric fiberoptic intubation are yet to be studied.

系统性红斑狼疮：一篇麻醉学家的综述

Systemic Lupus Erythematosus: A Review for Anesthesiologists

Erez Ben-Menachem, MBCHB, MBA, FANZCA

From the Department of Anesthesia, Sheba Medical Center, Tel Hashomer, Israel.

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系统性红斑狼疮(SLE)是一种慢性免疫系统的结缔组织疾病，有不同临床表现。疾病严重程度从轻到重不等；其严重程度取决于受累的器官。这种疾病最早在 12 世纪中期由一名叫 Rogerius 的大夫描述，称一种面颊部疹为狼疮，在 1872 年 Moric Kaposi 首先描述了这种疾病的全身表现。SLE 因为其多器官受累、凝血功能异常和复杂的治疗，因此围手术期处理是麻醉医生的巨大挑战。自爱这篇文章中我们详细介绍了 SLE 的诊断和治疗，并讨论麻醉医生围手术期的管理。

(陈珺珺译 薛张纲校)

Systemic lupus erythematosus (SLE) is a chronic autoimmune connective tissue disorder, with a heterogeneous presentation. Disease severity is wide ranging, with most suffering milder forms; however, it is potentially fatal depending on organ involvement. The disorder was recognized as early as the Middle Ages, with the 12th-century physician Rogerius being the first to apply the term lupus to the classic malar rash, and in 1872, Moric Kaposi first recognized the systemic nature of the disease. Perioperatively, SLE

can present major challenges to the anesthesiologist because of accrued organ damage, coagulation defects, and complex management regimes. In this article I highlight adult SLE manifestations and treatments pertinent to the anesthesiologist and discuss perioperative management of these complex patients.

急性低氧性呼吸衰竭的救治方法

Rescue Therapies for Acute Hypoxemic Respiratory Failure

Linda L. Liu, MD, J. Matthew Aldrich, MD, David W. Shimabukuro, MDCM, Kristina R. Sullivan, MD, John M. Taylor, MD, Kevin C. Thornton, MD and Michael A. Gropper, MD, PhD

From the Department of Anesthesia and Perioperative Care, University of California San Francisco, San Francisco, California

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最近 H1N1 大流行造成了多人死亡,这主要是由于急性呼吸衰竭.我们综述了目前救治严重低氧血症的策略.策者略中包括了高频震荡通气,气道压力释放通气,吸入血管扩张剂和体外生命支持.所有的策略都旨在改善氧和,而氧和的改善和生存率的提高有关.并对这些策略的危险、优点和成本效益进行了比较。

(姚敏敏译 薛张纲校)

The recent H1N1 epidemic has resulted in a large number of deaths, primarily from acute hypoxemic respiratory failure. We reviewed the current strategies to rescue patients with severe hypoxemia. Included in these strategies are high-frequency oscillatory ventilation, airway pressure release ventilation, inhaled vasodilators, and the use of extracorporeal life support. All of these strategies are targeted at improving oxygenation, but improved oxygenation alone has yet to be demonstrated to correlate with improved survival. The risks and benefits of these strategies, including cost-effectiveness data, are discussed.

体位性血压改变和脊麻下剖宫产手术中低血压的风险：一项观察研究

Positional blood pressure change and the risk of hypotension during spinal anesthesia for cesarean delivery: an observational study.

Jeon YT, Hwang JW, Kim MH, Oh AY, Park KH, Park HP, Lee Y, Do SH.

Department of Anesthesia and Pain Medicine, Seoul National University Bundang Hospital, 300 Gumidong, Bundang, Seongnam, Kyonggi 463-707 South Korea.

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背景：我们研究了术前体位性动脉血压变化是否可预测脊麻下剖宫产中低血压的发生及是否需要麻黄素。

方法：测量了 66 名接受脊麻下剖宫产手术且右侧仰卧位的妇女的动脉血压。体位性血压变化指右侧仰卧位时血压与平均动脉压的差异。记录低血压 (<80%的基准)和需要麻黄素治疗的严重低血压 (<70%的基准)。

结果：体位性血压变化的平均值(范围)为 11 (3-29) 毫米汞柱,而低血压的发生率是 41%。体位性血压和心率的变化与低血压 ($P < 0.001$) 和麻黄素的需求 (P

= 0.004) 相关。体位性血压变化低血压患者高于无低血压患者 (平均值 (标准差), 17 (6) vs 7 (2) 毫米汞柱, $P < 0.001$)。

结论: 在体位变化后的术前血压升高也许能很好地预测脊麻下剖宫产过程中低血压发生情况。

(张玥琪译 薛张纲校)

BACKGROUND: We investigated whether preoperative positional arterial blood pressure change predicted hypotension and ephedrine requirement during spinal anesthesia for cesarean delivery.

METHODS: Arterial blood pressure was measured in 66 women undergoing cesarean delivery in the supine and the right lateral positions. Positional blood pressure change was defined as the difference between mean blood pressure in the right lateral and supine positions. Hypotension ($< 80\%$ baseline) was recorded, and severe hypotension ($< 70\%$ baseline) was treated with ephedrine.

RESULTS: The mean (range) positional blood pressure change was 11 (3-29) mm Hg, and the incidence of hypotension was 41%. Positional blood pressure change and heart rate correlated with hypotension ($P < 0.001$ for both) and ephedrine requirement ($P = 0.004$). Positional blood pressure change in those who developed hypotension was higher than for those without hypotension (mean (SD), 17 (6) vs. 7 (2) mm Hg, $P < 0.001$).

CONCLUSIONS: A preoperative increase in blood pressure after position change may be a good variable to predict hypotension during spinal anesthesia for cesarean delivery.

癫痫发作病史患者围术期的癫痫发作

Perioperative Seizures in Patients with a History of a Seizure Disorder

Adam D. Niesen, MD, Adam K. Jacob, MD, Lucyna E. Aho, RN, Emily J. Botten, RN, Karen E. Nase, RN, Julia M. Nelson, RN and Sandra L. Kopp, MD

From the Department of Anesthesiology, Mayo Clinic College of Medicine, Rochester, Minnesota

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背景: 既往存在癫痫发作病史的患者围术期的癫痫发作并不确定。有几个围术期特有的因素可增加患者手术期间癫痫发作的风险, 包括使用的药物, 给药间隔时间, 抗癫痫药物剂量错误以及睡眠剥夺。我们设计了这项回归性病例分析研究来评估既往存在癫痫发作病史的患者围术期癫痫发作的频率。

方法: 回顾性查阅从 2002 年 1 月 1 日至 2007 年 12 月 31 日期间所有接受过麻醉并且资料显示有癫痫发作病史的患者的医疗文件。接受门诊手术或颅内手术、ASA 分级为 V 级、孕妇以及小于 2 岁的患者除外。每位患者均为 24 小时内首次住院并在此期间接受麻醉。记录患者人口统计学资料、癫痫发作的特点、手术操作细节以及围术期 (麻醉后 3 天内) 癫痫发作的临床表现。

结果: 在 6 年的研究期间, 641 名有资料显示癫痫发作病史的患者在接受麻醉后至少 24 小时内被确认纳入研究。22 名患者经历了围术期的癫痫发作, 整体发作频率为 3.4% (95% 可信区间 2.2%–5.2%)。术前癫痫发作频率 ($P < 0.001$) 和最近癫痫发作的时限 ($P < 0.001$) 均被发现与围术期癫痫发作可能性明显相关。随着抗癫痫药物

数量的增加，围术期癫痫发作频率也增加($P < 0.001$)。手术类型和麻醉方式（全麻、局部麻醉或麻醉监护）都不影响这些患者围术期癫痫发作的频率。

结论：我们得出结论为既往存在癫痫发作病史的患者围术期大多数癫痫发作与患者基础病情最相关。麻醉和手术类型不影响癫痫发作频率。因为在基本状态下频繁发作癫痫的患者围术期更易经历癫痫发作，所以不管何种手术过程或麻醉技术，作好治疗癫痫发作的准备都是必要的。

（朱兰芳译，薛张纲校）

BACKGROUND: The occurrence of perioperative seizures in patients with a preexisting seizure disorder is unclear. There are several factors unique to the perioperative period that may increase a patient's risk of perioperative seizures, including medications administered, timing of medication administration, missed doses of antiepileptic medications, and sleep deprivation. We designed this retrospective chart review to evaluate the frequency of perioperative seizures in patients with a preexisting seizure disorder.

METHODS: We retrospectively reviewed the medical records of all patients with a documented history of a seizure disorder who received an anesthetic between January 1, 2002 and December 31, 2007. Patients excluded from this study include those who had an outpatient procedure or intracranial procedure, ASA classification of V, pregnant women, and patients younger than 2 years of age. The first hospital admission of at least 24 hours during which an anesthetic was provided was identified for each patient. Patient demographics, character of the seizure disorder, details of the surgical procedure, and clinically apparent seizure activity in the perioperative period (within 3 days after the anesthetic) were recorded.

RESULTS: During the 6-year study period, 641 patients with a documented seizure disorder were admitted for at least 24 hours after an anesthetic. Twenty-two patients experienced perioperative seizure activity for an overall frequency of 3.4% (95% confidence interval, 2.2%–5.2%). The frequency of preoperative seizures ($P < 0.001$) and the timing of the most recent seizure ($P < 0.001$) were both found to be significantly related to the likelihood of experiencing a perioperative seizure. As the number of antiepileptic medications increased, so did the frequency of perioperative seizures ($P < 0.001$). Neither the type of surgery nor the type of anesthetic (general anesthesia, regional anesthesia, or monitored anesthesia care) affected the frequency of perioperative seizures in this patient population.

CONCLUSIONS: We conclude that the majority of perioperative seizures in patients with a preexisting seizure disorder are likely related to the patient's underlying condition. The frequency of seizures is not influenced by the type of anesthesia or procedure. Because patients with frequent seizures at baseline are likely to experience a seizure in the perioperative period, it is essential to be prepared to treat seizure activity regardless of the surgical procedure or anesthetic technique.

高速实时 CT 透视显像引导下行经皮射频三叉神经离断术

Percutaneous Radiofrequency Mandibular Nerve Rhizotomy Guided by High-Speed Real-Time Computed Tomography Fluoroscopy

Shiro Koizuka, Shigeru Saito, Masaru Tobe, Kenichi Sekimoto, Hideaki Obata and Yoshinori Koyama

From the Department of Anesthesiology and the Department of Diagnostic Radiology and Nuclear Medicine, Gunma University Graduate School of Medicine, Maebashi, Japan.

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我们介绍的这种技术是通过高速实时 CT 透视显像引导下，通过经皮射频下颌神经离断术缓解下颌区域疼痛。11 名（13 次）原发性三叉神经痛患者进行了上述试验。CT 透视显像在一个荧光影象中同时显示三个图像（头尾向每 1mm 间隔一张），准确定位穿刺针的位置。所有患者的三叉神经痛症状均缓解，且没有出现严重的并发症。平均疼痛强度评分(\pm SD)从 6.5 分(\pm 1.8, 治疗前)下降到 1.8 (\pm 1.7, 治疗一个月后)和下降到 0.9 (\pm 1.0, 治疗 3 个月后)。我们有限的病例提示在 CT 显像引导下穿刺的优越性，但是上述发现有待于进一步随机对照及大样本量的研究。

（陈珺珺译 薛张纲校）

We present a new method of percutaneous radiofrequency mandibular nerve rhizotomy for pain relief in the mandibular region, in which needle placement is guided by high-speed real-time computed tomography (CT) fluoroscopy. Eleven patients (13 procedures) with idiopathic trigeminal neuralgia underwent the procedure. CT fluoroscopy simultaneously provided 3 slices (1-mm interval series, craniocaudally) in 1 fluoroscopic view, allowing for accurate needle placement. Trigeminal neuralgia improved in all patients without severe complications. The mean numerical rating scales of pain intensity (\pm SD) decreased from 6.5 (\pm 1.8, pretreatment) to 1.8 (\pm 1.7, 1 month after treatment) and to 0.9 (\pm 1.0, 3 months after treatment). Our limited-case series suggests potential advantages for the new CT fluoroscopy guidance, but these findings await confirmation from randomized controlled trials and large-case series.

脉冲射频应用于树脂毒素诱导出异常的机械性疼痛的大鼠的效果

The Effect of Pulsed Radiofrequency Current on Mechanical Allodynia Induced with Resiniferatoxin in Rats

Nobuhiko Tanaka, MD, Masaharu Yamaga, MD, Shingo Tateyama, MD, Takeshi Uno, MD, Isao Tsuneyoshi, MD and Mayumi Takasaki, MD

From the Department of Anesthesiology and Intensive Care, Faculty of Medicine, University of Miyazaki, Miyazaki; and Department of Anesthesiology and Pain Clinic, Junwakai Memorial Hospital, Miyazaki, Japan.

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背景：脉冲射频（PRF）是一种很流行的疼痛治疗方式。目前 PRF 应用于神经性疼痛尚没有详细研究。我们研究了通过树脂毒素(RTX)诱导出异常的机械性疼痛的大鼠，通过 PRF 治疗该疼痛的效果，特别是比较 PRF 前和 PRF 后对异常疼痛的耐受时间。

方法：成年雄性 SD 大鼠（体重在 250-400 克）腹腔内注射 RTX（200ug/kg）后吸入 2%至 3%的七氟醚麻醉。S₂组大鼠（n=5）在注射 RTX 后 1 周接受右坐骨神经 PRF 治疗 2 分钟，M₂组大鼠（n=6）在注射 RTX 后 3 周接受 PRF 治疗 2 分钟，L₂组大鼠（n=7）在注射 RTX 后 5 周接受 PRF 治疗 2 分钟，S₄组大鼠（n=5）在注射 RTX 后 1 周接受 PRF 治疗 4 分钟，S₆组大鼠（n=5）在注射 RTX 后 1 周接受 PRF 治疗 6 分钟，S₀组大鼠（n=3）没有进行 PRF 治疗。分别在 RTX 前及注射 RTX 后每周及 PRF 治疗后 1、2、3、4、5 周对所有的大鼠进行如下评估：通过 von Frey filaments 测定机械刺激的敏感性，通过温度测试仪测定热刺激敏感性，通过定位及抓握反射测定运动功能。

结果：各组两后爪缩爪的阈值在注射 RTX 后 1 周组均显著低于 RTX 前的基准值。在 S₂，S₄，S₆ 和 M₂ 组，PRF 治疗后同侧缩爪阈值明显增加，两者间有统计学差异。在 S₂组 PRF 后，同侧一对侧退爪的阈值均高于 M₂ 和 L₂组。M₂ 和 L₂组，在 PRF 后第 1，2，4 和 5 周有显著差异。PRF 后 5 周，S₆组同侧-对侧退爪阈值均高于 S₂和 S₄组。S₂和 S₄ 间在任何时间点没有统计学差异。在 PRF 后的各时间点，任何组均没有观察到对温度刺激的退爪阈值的影象及运动障碍。

结论：PRF 治疗在大鼠身上应用与机械性异常疼痛早期（1 周）是有效的。增加 PRF 暴露的时间，从 2 到 6 分钟可以有显著的对抗异常疼痛的作用，且没有运动功能损伤。我们提出应在异常疼痛出现后尽早行 PRF 治疗 6 分钟。

（陈珺珺译 薛张纲校）

BACKGROUND: Pulsed radiofrequency (PRF) is a popular pain treatment modality. The effect of PRF current on neuropathic pain has not been examined in detail. We investigated the effect of PRF current on mechanical allodynia induced with resiniferatoxin (RTX) in rats, especially regarding the influence of the duration of allodynia before PRF procedures and that of exposure time to PRF.

METHODS: Adult male Sprague-Dawley rats (weighing 250–400 g) received a single intraperitoneal injection of RTX (200 µg/kg) under 2 to 3% sevoflurane anesthesia. Rats in group S₂ (n = 5) were assigned to receive PRF current to the right sciatic nerve for 2 minutes 1 week after RTX treatment; rats in group M₂ (n = 6), PRF current for 2 minutes 3 weeks after RTX treatment; rats in group L₂ (n = 7), PRF current for 2 minutes 5 weeks after RTX treatment; rats in group S₄ (n = 5), PRF current for 4 minutes 1 week after RTX treatment; rats in group S₆ (n = 5), PRF current for 6 minutes 1 week after RTX

treatment; and rats in group S₀ (n = 3), no PRF current was delivered. Instead, the needle and electrode were inserted at proper points for 6 minutes 1 week after RTX treatment. All rats were evaluated for sensitivity to mechanical stimulation with von Frey filaments and to thermal stimulation with a thermal testing apparatus and for motor function using placing and grasping reflexes before injection of RTX, every week after injection of RTX, and 1, 2, 3, 4, and 5 weeks after PRF treatment.

RESULTS: The paw withdrawal thresholds of both hind paws 1 week after RTX treatment were significantly lower than the pre-RTX baseline in all groups. In groups S₂, S₄, S₆, and M₂, after PRF procedures, the ipsilateral paw withdrawal thresholds significantly increased. A statistically significant difference was detected between the PRF-treated and PRF-untreated hindpaws. The ipsilateral–contralateral paw withdrawal thresholds after PRF procedures in group S₂ were significantly higher than those in groups M₂ and L₂. Between groups M₂ and L₂, significant differences were found 1, 2, 4, and 5 weeks after PRF procedures. The ipsilateral–contralateral paw withdrawal thresholds in group S₆ were significantly higher than those in groups S₂ and S₄ 5 weeks after PRF procedures. No significant difference was found between groups S₂ and S₄ at any time. After PRF procedures, no difference in the withdrawal latency after heat stimulation and no motor disturbance were observed at any time in all groups.

CONCLUSIONS: PRF treatment was more effective when applied in the early stages of mechanical allodynia (1 week) in rats. Increased exposure time to PRF current from 2 to 6 minutes showed a significant antiallodynic effect without motor impairment. We propose the application of PRF current for 6 minutes adjacent to the nerve as soon as possible when allodynia appears.

一项关于腰段交感神经节阻滞发生腰肌和血管内注射的前瞻性评估

A Prospective Evaluation of Psoas Muscle and Intravascular Injection in Lumbar Sympathetic Ganglion Block

Ji H. Hong, MD, PhD, Ae R. Kim, MD, PhD, Mi Y. Lee, MD, PhD, Yong C. Kim, MD, PhD and Min J. Oh, MD

From the Department of Anesthesiology and Pain Medicine, and the Department of Preventive Medicine, Keimyung University Dong San Hospital, School of Medicine, Daegu, Korea, and the Department of Anesthesiology and Pain Medicine, Seoul National University Hospital, Seoul, Korea.

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背景：在腰段交感神经节阻滞(LSGB)期间，局麻药注入静脉及肌肉可以导致诊断阻滞效果的假阳性和假阴性结果。在这项研究中，我们前瞻性评估了 LSGB 期间局麻药注入肌肉或血管的发生率及可能的因素。

方法：我们评估了 83 名患者行 216 次 LSGBs。一名作者通过 3 针技术完成了所有的 LSGBs。最终穿刺针的位置通过 x 透视显像确定，进行了抽吸试验，并注射了

1ml 对比剂。我们通过静态即时 x 线透视评估了腰肌内注射、回血、和血管内对比剂扩散的发生。

结果：腰肌内注对比剂的发生率为 21.3%(46/216) ，它的发生与注射节段(L2)密切相关($\chi^2 = 14.773, P = 0.001$)。血管内注射对比剂的发生率为 12.5% (27/216)。在 27 例血管内注射的病例中，5.1% (11/216)的患者对比剂扩散的区域是同时假定交感神经节和血管区域，7.4% (16/216) 的患者只在血管中见对比剂。回抽试验和静态 x 线显像的敏感度分别为 40.7% 和 70.4%。

结论：相比于在 L3 和 L4 水平行 LSGB，在 L2 水平行 LSGB 腰肌注射的发生率最低。LSGB 期间，通过回抽试验及静态 x 线显像经常会不能显示血管内注射的情况。

(陈珺珺译 薛张纲校)

BACKGROUND: Intravascular and intramuscular injection of local anesthetics during lumbar sympathetic ganglion block (LSGB) can cause false positive or negative results in a diagnostic block, and complications. In the present study, we prospectively evaluated the incidence and possible factors causing intravascular and IM injection during LSGB.

METHODS: We evaluated 216 LSGBs in 83 patients. All LSGBs were performed by 1 of the authors using a 3-needle technique. After final needle position was confirmed by biplanar fluoroscopy, an aspiration test was conducted, and 1 mL of contrast was injected sequentially. Incidences of psoas muscle injection, blood flashback, and the presence of intravascular contrast spread on static and real-time fluoroscopy were assessed.

RESULTS: The incidence of psoas muscle injection of contrast was 21.3% (46/216), and it was associated with the level of injection (L2) significantly ($\chi^2 = 14.773, P = 0.001$). The incidence of intravascular injection of contrast was 12.5% (27/216). Among 27 cases of documented intravascular injections, 5.1% (11/216) of patients showed contrast spread at the area where the sympathetic ganglion was presumed to be and to the vessels simultaneously, and 7.4% (16/216) of patients showed only intravascular injection of contrast. The sensitivity of the aspiration test and static radiography were 40.7% and 70.4%, respectively.

CONCLUSIONS: LSGB at the L2 level showed the lowest incidence of psoas muscle injection of contrast in comparison with LSGB at L3 and L4. The aspiration test and static radiography frequently missed the intravascular injection of contrast during LSGBs.

机器人辅助局麻：一项模拟示教

Robot-Assisted Regional Anesthesia: A Simulated Demonstration

Patrick J. Tighe, MD, S. J. Badiyan, MD, I. Luria, MS, Andre P. Boezaart, MD, PhD and S. Parekattil, MD

From the Department of Anesthesiology and the Department of Orthopaedics and Rehabilitation, University of Florida College of Medicine, Gainesville, Florida; Department of Urology, University of Florida COM.

Anesth Analg 2010 111:813-816

近年来机器人辅助远程手术技术的开展使外科专家为地理位置偏远的患者提供服务成为可能。同样远程麻醉也可以为偏远患者提供围手术期管理。尽管很多关于远程麻醉的调查尚在进行中，但还没有涉及麻醉相关进程的具体操作。因此，我们描述了通过 da Vinci 多功能机器人系统在超声引导下神经阻滞定位。我们成功地进行了单次注射和外周神经置管的操作。

(陈珺珺译 薛张纲校)

Abstract

Recent advances in robotically assisted telesurgery offer expert surgical care for the geographically remote patient. Similar advances in teleanesthesia will be necessary to bring comparable perioperative care to the geographically remote patient. Although many preliminary investigations into teleanesthesia are underway, none involve remote performance of anesthesia-related procedures. Herein, we describe the placement of ultrasound-guided nerve blocks into an ultrasound phantom using the da Vinci multipurpose surgical robotic system (Intuitive Surgical, Sunnyvale, CA). Both single-injection and perineural catheter techniques were successfully performed

心脏移植过程中肝素诱发的血小板减少症患者在使用比伐卢定时静脉贮血器中的一个血栓

A Thrombus in the Venous Reservoir While Using Bivalirudin in a Patient with Heparin-Induced Thrombocytopenia Undergoing Heart Transplantation

Jim K. Wong, MD*, Ying Tian, MD*, Paul Shuttleworth, BSN‡, Anthony D. Caffarelli, MD†, Bruce A. Reitz, MD† and Christina T. Mora-Mangano, MD*

From *Department of Anesthesia, Division of Cardiovascular Anesthesia, and

†Department of Cardiothoracic Surgery, Stanford University, Stanford, California.

Anesth Analg 2011; 111(3): 609-612

在肝素诱发的血小板减少症患者的心肺转流术中，直接凝血酶抑制剂具有替代肝素的抗凝作用。我们报道的病例是关于使用比伐卢定时在静脉贮血器中形成了一个巨大血栓。本例提示术中血液淤滞和持续充满的静脉贮血器有关，导致在静脉滤罐顶端形成了一个巨大血栓。此外，在使用直接凝血酶抑制剂时，活化凝血时间或许不能准确地反映抗凝的强度。

(唐李隽译 马皓琳 李士通 校)

Direct thrombin inhibitors are heparin alternatives for anticoagulation during cardiopulmonary bypass in patients with heparin-induced thrombocytopenia. We report a case of a large thrombus forming in the venous reservoir while using bivalirudin. We suggest that blood stasis associated with the full venous reservoir maintained in this case

led to formation of a large thrombus at the top of the venous canister. Furthermore, activated clotting times may not accurately reflect the magnitude of anticoagulation when using direct thrombin inhibitors.

静脉注射加巴喷丁对猫吸入异氟醚时最低肺泡气有效浓度的影响

The Effects of Intravenous Gabapentin Administration on the Minimum Alveolar Concentration of Isoflurane in Cats

Patrick Reid, BA, Bruno H. Pypendop, DrMedVet, DrVetSci and Jan E. Ilkiw, BVSc, PhD

From the Department of Surgical and Radiological Sciences, School of Veterinary Medicine, University of California, Davis, California.

Anesth Analg 2011; 111(3): 633-637

背景：加巴喷丁结构上与哺乳动物中枢神经系统的一种抑制性神经递质 γ -氨基丁酸相似。加巴喷丁正被越来越多地用于预防性的控制术后疼痛。因此，研究它与吸入麻醉药之间的相互作用就有一定的临床意义。在本研究中，我们检查了加巴喷丁对猫吸入异氟醚时最低肺泡气有效浓度（MAC）的影响，并提出加巴喷丁可能剂量依赖性地降低异氟醚 MAC 的假设。

方法：共有 6 只猫入选本研究。静脉注射加巴喷丁使其血浆靶浓度达到 0 到 16 $\mu\text{g}/\text{mL}$ 之间，并记录每个血浆浓度对应的异氟醚 MAC 值。抽取血浆样本，使用液相色谱-质谱分析测定加巴喷丁的血浆浓度。使用用于球形假设违背的 Huynh-Feldt 校正检验对不同加巴喷丁血浆浓度下的 MAC 值进行重复测量的方差分析。

结果：靶浓度在 0、1、2、4、8 和 16 $\mu\text{g}/\text{mL}$ 时分别对应的加巴喷丁实际浓度为 0 ± 0 、 1.18 ± 0.23 、 2.25 ± 0.23 、 4.96 ± 1.19 、 10.63 ± 1.37 和 $19.69 \pm 3.97 \mu\text{g}/\text{mL}$ 。靶浓度为 0、1、2、4、8 和 16 $\mu\text{g}/\text{mL}$ 时，本研究中的异氟醚 MAC 值分别为 $2.10\% \pm 0.13\%$ 、 $2.10\% \pm 0.14\%$ 、 $2.13\% \pm 0.12\%$ 、 $2.06\% \pm 0.11\%$ 、 $2.11\% \pm 0.15\%$ 和 $2.09\% \pm 0.25\%$ 。

结论：我们认为加巴喷丁对猫吸入异氟醚的 MAC 值没有明显的影响。

（刘伍译，马皓琳、李士通校）

BACKGROUND: Gabapentin is a structural analog of γ -aminobutyric acid, one of the inhibitory neurotransmitters of the mammalian central nervous system. It is increasingly being used preemptively to control postoperative pain. Therefore, its interaction with inhaled anesthetics is of clinical interest. In this study, we examined the effects of gabapentin on the minimum alveolar concentration (MAC) of isoflurane in cats. We hypothesized that gabapentin would decrease the MAC of isoflurane in a dose-dependent manner.

METHODS: Six cats were included in the study. Gabapentin was administered IV to achieve target plasma concentrations between 0 and 16 $\mu\text{g}/\text{mL}$ and the MAC of isoflurane was determined at each gabapentin concentration. Gabapentin concentrations were quantitated by liquid chromatography-mass spectrometry analysis of extracted plasma samples. MAC values at the different gabapentin plasma concentrations were analyzed by a repeated-measures analysis of variance using the Huynh-Feldt correction for violation of the sphericity assumption.

RESULTS: Actual gabapentin concentrations were 0 ± 0 , 1.18 ± 0.23 , 2.25 ± 0.23 , 4.96 ± 1.19 , 10.63 ± 1.37 , and 19.69 ± 3.97 $\mu\text{g}/\text{mL}$ for the target concentrations of 0, 1, 2, 4, 8, and 16 $\mu\text{g}/\text{mL}$, respectively. The MAC of isoflurane in this study was $2.10\% \pm 0.13\%$, $2.10\% \pm 0.14\%$, $2.13\% \pm 0.12\%$, $2.06\% \pm 0.11\%$, $2.11\% \pm 0.15\%$, and $2.09\% \pm 0.25\%$ at target plasma concentrations of 0, 1, 2, 4, 8, and 16 $\mu\text{g}/\text{mL}$, respectively.

CONCLUSIONS: We conclude that gabapentin did not have a detectable effect on the MAC of isoflurane in cats.

一瞥监测：在手术室对麻醉医生的隐蔽观察

At-a-Glance Monitoring: Covert Observations of Anesthesiologists in the Operating Room

Simon Ford, MB, ChB, FRCA*, Elina Birmingham, PhD†, Ashlee King, BSc‡, Joanne Lim, MAsc‡ and J. Mark Ansermino, MBBCh, MSc(Inf), FFA‡

From the * Department of Anaesthesia, Morriston Hospital, Swansea, Wales, United Kingdom; † Division of Humanities and Social Sciences, California Institute of Technology, Pasadena, California; and ‡ Department of Anesthesiology, Pharmacology, and Therapeutics, University of British Columbia, Vancouver, British Columbia, Canada. *Anesth Analg* 2011; 111(3): 653-658

背景：患者监测显示屏是为了提高患者的安全性，而对麻醉医生如何与这些显示屏相互影响仍不十分清楚。以前对临床医生行为的研究是基于手术室中的监视器，但这样会使他们的行为发生有意识的改变。因此，我们运用了一种隐蔽的监视技术，来观察麻醉医生在麻醉维持的不同阶段查看监护仪显示屏的频率和持续时间，以及多人合作或伴随其他活动（如阅读）时是否会有改变。

方法：暗中拍摄了 5 名麻醉科医生、2 名麻醉研究员、3 名麻醉住院医师和 2 名医学生的 10 例两人麻醉病例和 10 例单人麻醉病例的麻醉全过程。之后将视频分段（维持早期[诱导后 5 分钟]、维持中期和维持晚期[掀敷料前]），统计麻醉医生查看患者监护仪显示屏的行为、麻醉记录单和其他书面材料。

结果：在麻醉维持的 3 个阶段，麻醉医生都频繁查看监护仪，每次持续 1-2 秒。总的来说，麻醉医生查看病人监护仪屏幕的时间只有所分析时间的 5%，比以前报道的要少。监测行为持续贯穿于麻醉维持的各阶段，与麻醉医生人数和职务（受训者或上级医生）没有明显关系。相反的，在所分析的麻醉维持各个阶段中，麻醉记录行为和其他书面材料察看发生了明显的改变。

结论：由于“一瞥监测”的存在，病人监护仪显示屏应运而生。必须开发显示器以优化监测者从简短的一瞥中获得的信息。

（徐妍君译 马皓琳 李士通校）

BACKGROUND: Patient monitoring displays are designed to improve patient safety, and yet little is known about how anesthesiologists interact with these displays. Previous studies of clinician behavior used an observer in the operating room, which may have altered behavior. We describe a covert observation technique to determine how often and for how long anesthesiologists actually look at the monitoring display during different segments of the maintenance phase of anesthesia, and to determine whether this changed with more than 1 anesthesia provider or during concomitant activities such as reading.

METHODS: Five staff anesthesiologists, 2 anesthesia fellows, 3 anesthesia residents, and 2 medical students were covertly videotaped across 10 dual anesthesia provider cases and 10 solo cases. Videotapes were later segmented (5 minutes postinduction [early maintenance], mid-maintenance, and immediately before the drapes came down [late maintenance]) and coded for looking behavior at the patient monitor, anesthesia chart, and other reading material.

RESULTS: Anesthesiologists looked at the monitor in 1- to 2-second glances, performed frequently throughout the 3 segments of maintenance anesthesia. Overall, the patient monitor was looked at only 5% of the analyzed time, which is less than has previously been reported. Monitoring behavior was constant across the segments of maintenance anesthesia and was not significantly affected by the number of anesthesia providers or role (trainee vs. senior). In contrast, charting behavior and other reading material viewing changed significantly over the analyzed segments of maintenance anesthesia.

CONCLUSIONS: The presence of “at-a-glance monitoring” has implications for the design of patient monitoring displays. Displays should be developed to optimize the information obtained from brief glances at the monitor.

在美国退伍军人事务医院引入快速应答系统可减少心搏骤停

Introduction of a Rapid Response System at a United States Veterans Affairs Hospital Reduced Cardiac Arrests

Geoffrey K. Lighthall, MD, PhD*†, Layla M. Parast, MS‡, Lisa Rapoport, MD, MS§ and Todd H. Wagner, PhD|| ¶

From the *Department of Anesthesia, §Critical Care Medicine, and || VA Health Economics Resource Center, Stanford University School of Medicine, Stanford, California; †Department of Anesthesia, and ¶VA Health Economics Resource Center, Veterans Affairs Medical Center, Palo Alto, California; and ‡Department of Biostatistics, Harvard University, Boston, Massachusetts.

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背景：我们试图确定快速应答系统对美国退伍老兵人群中的心搏骤停发生率以及死亡率的影响。

方法：我们对快速应答系统建立之前 9 月以及之后 27 个月里的心搏骤停病例进行前瞻性分析，并且回顾性分析了系统建立前 3.5 年以及之后 27 个月的死亡率。这项研究包括了一家大学附属美国退伍军人事务医学中心在实行快速应答系统前后的所有病人，快速应答系统包括一个教学程序、病人呼叫标准以及一个内科医生领导的医疗急救团队。主要结果标准化到出院率的医院广泛的心搏骤停的发生率以及死亡率。运用方差分析比较在实施过程的不同时间段之间事件的发生率。

结果：在研究期间有 378 例患者呼叫到医疗急救团队。与系统运用之前的时间点比较，心搏骤停的发生率减少 57%，相当于每 1000 名出院患者减少了 5.6 起心搏骤停的发生 ($P < 0.01$)。干预期间的死亡率降低，但这是由于研究的所有阶段都自然减少。

结论：应用这种干预后心搏骤停的发生率显著降低，并且死亡率亦趋于降低。我们预计在研究期间内防止了 51 例心搏骤停的发生。我们的结果提示：使快速应答系统的扩展到整个退伍军人事务网络中将可进一步降低死亡率。

(龚寅 译 马皓琳 李士通校)

BACKGROUND: We sought to determine the impact of a rapid response system on cardiac arrest rates and mortality in a United States veteran population.

METHODS: We describe a prospective analysis of cardiac arrests in 9 months before and 27 months after institution of a rapid response system, and retrospective analysis of mortality 3.5 years before the intervention and 27 months after the intervention. The study included all inpatients from a university-affiliated United States Veterans Affairs Medical Center, before and after implementation of a rapid response system, including an educational program, patient calling criteria, and a physician-led medical emergency team. Primary end points were hospital-wide cardiac arrests and mortality rates normalized to hospital discharges. Comparisons of event rates between various time points during the implementation process were made by analysis of variance.

RESULTS: Three hundred seventy-eight calls were made to the medical emergency team in the time period studied. Compared with preintervention time points, cardiac arrests were reduced by 57%, amounting to a reduction of 5.6 cardiac arrests per 1000 hospital discharges ($P < 0.01$). Mortality was reduced during the intervention, but this was attributable to a natural decrease occurring over all phases of the study.

CONCLUSIONS: A significant reduction in the rate of cardiac arrests was realized with this intervention, as well as a trend toward lower mortality. We estimate that 51 arrests were prevented in the timeframe studied. Our results suggest that further reductions in morbidity can be realized by expansion of rapid response systems throughout the Veterans Affairs network.

动态上呼吸道阻塞模型中采用不同频率的声门上型喷射通气时的固有呼气末正压 **Intrinsic Positive End-Expiratory Pressure at Various Frequencies of Supraglottic Jet Ventilation in a Model of Dynamic Upper Airway Obstruction**

Gerald C. Ihra, MD, Ching-Ju Tsai, MD and Oliver Kimberger, MD

From the Department of Anesthesia, General Intensive Care Medicine and Pain Therapy, Medical University Vienna, Vienna, Austria.

Anesth Analg 2011; 111(3): 703-706

背景：气道狭窄部以上采用注射器通气的声门上型喷射通气 (JV_s) 可能无意中导致肺高压。我们设计此研究以观察动态的上呼吸道梗阻模型中，通过一个远端注射器进行喷射通气时的固有呼气末正压(PEEP_i)。

方法：在使用一段猪的气管和一取栓导管的充气气囊以模拟 60% 和 80% 气道阻塞的气管肺模型中，记录 JV_s 期间的呼吸压力-时间曲线。JV_s 在不同的喷射频率(F_{jet} 30 min⁻¹、60 min⁻¹ 和 100 min⁻¹)和驱动压(1 bar 和 2 bar)下实施。

结果：JV_s 引起 PEEP_i 的产生，并且依赖于驱动压、梗阻程度以及通气频率。

结论：存在动态上呼吸道塞时，通过远端注射器进行的喷射通气可能导致固有的呼气末正压通气，而其在阻塞部前方监测气道压时就不能被检测到。

(杨秀娟 译 马皓琳 李士通 校)

BACKGROUND: Supraglottic jet ventilation (JV_S) with injectors above airway stenoses may result in inadvertent high lung pressures. We designed this study to investigate intrinsic positive end-expiratory pressure (PEEP_i) during jet ventilation via a distant injector in a model of dynamic upper airway obstruction.

METHODS: Respiratory pressure-time curves were recorded during JV_S in a tracheal lung model using a pig's trachea and an embolectomy catheter's air-filled balloon to simulate 60% and 80% airway obstruction. JV_S was performed at various jet frequencies (F_{jet} 30 min⁻¹, 60 min⁻¹, and 100 min⁻¹) and driving pressures (1 bar and 2 bar).

RESULTS: JV_S was associated with generation of PEEP_i, which depended on driving pressure, the degree of obstruction, and on ventilatory frequency.

CONCLUSIONS: In the presence of a dynamic upper airway obstruction, JV_S via a distant injector may result in PEEP_i, which cannot be detected when airway pressure is measured in front of the obstruction.

将研究的风险及益处呈现给父母：形式有关系吗？

Presenting Research Risks and Benefits to Parents: Does Format Matter?

Alan R. Tait, PhD*, Terri Voepel-Lewis, MSN, RN*, Brian J. Zikmund-Fisher, PhD†‡|| and Angela Fagerlin, PhD†§||

From the *Department of Anesthesiology, the †Division of General Internal Medicine, and the ‡Department of Health Behavior and Health Education, University of Michigan, Ann Arbor; §Ann Arbor Veterans Affairs HSR&D Center for Practice Management and Outcomes Research, Ann Arbor, Michigan; and || Center for Behavioral and Decision Sciences in Medicine, University of Michigan, Ann Arbor.

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背景：几项研究提示许多父母和研究参与者对知情同意书的内容的理解较差，尤其是对于风险和益处。然而，一些数据提示研究风险和益处的格式和结构可能是受试者理解的重要的决定性因素。我们研究了将研究的风险和益处用列表和图示的方式展示对于患儿父母理解一个调查性研究的影响。

方法：择期行外科手术的患儿的父母 ($n = 408$) 随机通过文字、表格或统计图表，接受关于术后疼痛控制的一项假研究的风险和益处的信息，然后完成一个调查问卷以判断他们对于该项信息的要点（基本的）和逐字（实际的）了解程度。并记录患儿父母的人口统计学资料以及他们的读写能力和计算能力。

结果：通过随机法经由表格和统计图表接受信息的患儿父母对于要点和逐字内容的理解明显好于那些通过标准的文字接受信息的父母 ($P < 0.025$)。在提高读写能力和计算能力较差的父母的理解力方面，表格和统计图表也优于文字。

结论：许多父母和病人在同化以及解释关于研究和处理的风险/益处信息方面均存在困难。这些部分是和风险/益处的传达方式有关，部分和个体的读写以及计算能力有关。该项研究的结果提示，一种简单而实际的方式可以提高具有不同读写能力和计算能力的父母对于风险/益处统计学的理解。

(黄丽娜 译 马皓琳 李士通 校)

BACKGROUND: Several studies suggest that many parents and research participants have poor understanding of the elements of consent, particularly the risks and benefits. However, some data suggest that the format and framing of research risks and benefits may be an important determinant of subject understanding. We examined the effect of tabular and graphical presentation of risks and benefits on parents' understanding of a research study.

METHODS: Parents of children scheduled to undergo an elective surgical procedure ($n = 408$) were randomized to receive information about the risks and benefits of a sham study of postoperative pain control using text, tables, or pictographs and then completed a questionnaire to examine their *gist* (essential) and *verbatim* (actual) understanding of the information. Parent demographics were recorded and their literacy and numeracy skills measured.

RESULTS: Parents randomized to receive information using tables or pictographs had significantly ($P < 0.025$) greater gist and verbatim understanding than did parents who received the information using standard text. Tables and pictographs were also superior to text in promoting understanding among parents with low numeracy and literacy skills.

CONCLUSIONS: Many parents and patients have difficulty in assimilating and interpreting risk/benefit information for both research and treatment. This is due, in part, to the manner in which risks and benefits are communicated and to the literacy and numeracy abilities of the individual. The results of this study suggest a simple and practical method for enhancing understanding of risk/benefit statistics for parents with varying numeracy and literacy skills.

创伤性颅脑损伤后对处理颅内压增高的手术途径

The Surgical Approach to the Management of Increased Intracranial Pressure After Traumatic Brain Injury

Lucia M. Li, MB BChir, Ivan Timofeev, MRCS, Marek Czosnyka, PhD and Peter J. A. Hutchinson, PhD, FRCS, Surg Neurol
Academic Neurosurgery Unit, University of Cambridge/Addenbrookes Hospital,
Cambridge, United Kingdom.

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重度创伤性颅脑损伤后发生的颅内压增高是一个常见而有潜在破坏性的现象。难以控制的颅内高压已被明确证实是预后较差的一个特征。目前理想的处理是基于一个连续的的结合医疗和手术治疗策略的靶驱动方法。目前常用的手术措施包括外脑室引流插入和开颅减压术。有证据表明这两个措施可以降低颅内压，但对预后尤其是长期预后的影响是模棱两可的。现代脑创伤协会指南建议及时地去除块状损害，并明确提出了颅内压监测的适应症，但开颅减压术只被谨慎地推荐用于择期手术病人。在这篇综述中我们着重讨论了关于开颅减压术用于创伤性脑损伤后控制颅内高压的讨论，包括最新的关于创伤性脑损伤后开颅减压术降低颅内压的效果以及相关的长期效果的文献的综述摘要。详细讨论了 RESCUEicp 和 DECRA 的研究。这两个随机对照研究评估了开颅减压术短期和长期的效果，希望它们为开颅减压术控制脑外伤后颅内压增高的作用提供了确凿的证据。

(滕凌雅 译 马皓琳 李士通 校)

Increased intracranial pressure occurring after severe traumatic brain injury is a common and potentially devastating phenomenon. It has been clearly demonstrated that increased intracranial pressure that is refractory to initial medical measures is a poor prognostic sign. Current optimal management is based on a sequential, target-driven approach combining both medical and surgical treatment strategies. The surgical measures in current common practice include external ventricular drain insertion and decompressive craniectomy. There is evidence that both of these measures reduce intracranial pressure but the effect on outcome, particularly in the long term, is equivocal. Current Brain Trauma Foundation guidelines recommend timely evacuation of mass lesions and there is clear guidance regarding the indications for intracranial pressure monitoring; however, decompressive craniectomy is only cautiously recommended as a possible option for selected patients. In this review, we highlight the ongoing debate about the use of decompressive craniectomy to control intracranial pressure after traumatic brain injury; included is a summary of review of the most recent literature on the effect of decompressive craniectomy on increased intracranial pressure after traumatic brain injury and associated long-term outcome. The RESCUEicp and DECRA studies are discussed in detail. It is hoped that these 2 randomized controlled trials, which are evaluating the short- and longer-term outcomes of decompressive craniectomy, will provide conclusive evidence regarding the role of decompressive craniectomy in managing increased intracranial pressure after trauma.

利多卡因减少培养的大鼠神经小胶质细胞内细胞外三磷酸腺苷诱导的前炎症细胞因子产物

Lidocaine Attenuates Proinflammatory Cytokine Production Induced by Extracellular Adenosine Triphosphate in Cultured Rat Microglia

Diansan Su, MD, PhD*, Yang Gu, BA*, Zhenhong Wang, MD, PhD* and Xiangrui Wang, MD, PhD*

From the *Department of Anesthesiology, Renji Hospital, Shanghai Jiaotong University School of Medicine, Shanghai, China.

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背景：我们之前的研究已证实鞘内利多卡因治疗能够对慢性缩窄性损伤导致的痛觉过敏或痛觉异常产生持续的逆转作用。实际上，鞘内利多卡因治疗能明显抑制功能亢进的神经小胶质细胞内 p38 细胞分裂素活化蛋白激酶（MAPK）的活性。在本实验中，我们提出：利多卡因可能直接作用于神经小胶质细胞并且减少细胞因子的释放。

方法：我们评估了利多卡因对培养的大鼠神经小胶质细胞内细胞外三磷酸腺苷（ATP）触发的磷酸化 p38 MAPK、肿瘤坏死因子- α （TNF- α ）、白介素-1 β （IL-1 β ）、IL-6 和细胞内钙离子水平。我们实验方法包括：免疫印迹法（Western blot）、实时逆转录—多聚酶链反应（real-time RT-PCR）、酶联免疫吸附法（ELISA）和钙离子成像。

结果：我们发现：利多卡因通过抑制三种细胞因子 mRNAs 的转录和减少它们各自蛋白浓度（TNF- α 、IL-1 β 和 IL-6，与 ATP 组比较， $P < 0.05$ ），明显减少了 1 mM

ATP触发的 p38 MAPK 活性。SB203580 (P38 拮抗剂) 减少了小胶质细胞内 ATP 激活的 TNF- α 、IL-1 β 和 IL-6 的高蛋白水平。添加 10 mM 利多卡因也减少了 ATP 诱导的细胞内高钙离子 ([Ca²⁺]_i) 水平 (与 ATP 组比较, $P < 0.05$)。

结论: 这些发现表明利多卡因能直接作用于小胶质细胞。利多卡因通过抑制细胞内钙离子的增加抑制了 p38 MAPK 活性并且减少了细胞外 ATP 触发的培养的大鼠小胶质细胞内前炎症细胞因子产物 (包括 TNF- α 、IL-1 β 和 IL-6)。

(王海涛 译, 马皓琳 李士通 校)

BACKGROUND: Our previous studies demonstrated that intrathecal lidocaine treatment could produce prolonged reversal of established hyperalgesia or allodynia, both induced by chronic constriction injury. Indeed, intrathecal lidocaine treatment remarkably suppressed the activation of p38 mitogen-activated protein kinase (MAPK) in hyperactive microglia. In the present study we suggest that lidocaine may act directly on the microglia and attenuate the release of cytokines.

METHODS: We assessed the influence of lidocaine on the levels of phospho-p38 MAPK, tumor necrosis factor- α (TNF- α), interleukin-1beta (IL-1 β), IL-6, and intracellular calcium triggered by extracellular adenosine triphosphate (ATP) in cultured rat microglia. Our experimental methods included Western blot, real-time reverse transcription-polymerase chain reaction, enzyme-linked immunosorbent assay, and calcium imaging.

RESULTS: We found that lidocaine (in a dose-dependent manner) significantly attenuated p38 MAPK activation triggered by 1 mM ATP, by inhibiting the transcription of 3 cytokine messenger RNAs and causing a decrease in their respective protein concentrations (TNF- α , IL-1 β , and IL-6, $P < 0.05$, vs. the ATP group). SB203580, an antagonist of P38, attenuated ATP-activated elevation in protein levels of TNF- α , IL-1 β , and IL-6 in the microglia. The high level of intracellular calcium ([Ca²⁺]_i) that is induced by ATP was decreased by the addition of 10 mM lidocaine ($P < 0.05$ vs. the ATP group).

CONCLUSIONS: These findings indicate that lidocaine can directly act on microglia. Lidocaine, by inhibiting the increase of intracellular calcium, also inhibited p38 MAPK activation and attenuated the production of proinflammatory cytokines (including TNF- α , IL-1 β , and IL-6), which were triggered by extracellular ATP in cultured rat microglia.

在布比卡因造成的心脏停跳后运用脂类药物复苏过程中注射肾上腺素：兔子的循环短暂的恢复

Epinephrine Injection in Lipid-Based Resuscitation from Bupivacaine-Induced Cardiac Arrest: Transient Circulatory Return in Rabbits

Martyn Harvey, FACEM*, Grant Cave, FACEM†, Gaynor Prince, MBBS* and Daniel Lahner, MD*‡

From the *Emergency Department, Waikato Hospital, Hamilton; †Emergency Department, Hutt Hospital, Lower Hutt, New Zealand; and ‡Department of Anesthesiology, General Intensive Care, and Pain Medicine, Medical University of Vienna, Vienna, Austria.

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背景：静脉注射脂肪乳剂已经证明能有效治疗布比卡因导致的心脏毒性。然而，在毒性导致心脏停跳后使用脂肪乳剂的同时运用肾上腺素的作用还不是很清楚。我们假设在布比卡因造成的心脏停跳时静脉注射脂肪乳剂来进行复苏的兔子模型中，不使用肾上腺素会有更好的复苏结果。

方法：20只镇静过且连接仪器的新西兰实验白兔给予10mg/kg布比卡因的静脉注射，造成心脏停跳。30秒后开始进行机械通气和胸外按压。1分钟的时候，给予动物5mL/kg的20%脂肪乳剂，此外给予四种中的一种额外的静脉治疗（所有组 $n=5$ ）：0.9%的盐水、2.5 $\mu\text{g}/\text{kg}$ 肾上腺素、10 $\mu\text{g}/\text{kg}$ 肾上腺素或100 $\mu\text{g}/\text{kg}$ 肾上腺素；所有组都是1mL/kg。在4分钟的时候再次给予脂肪乳剂的推注。自主血液循环和血流动力学指标达到15分钟。在15分钟的时候，盐水组再给予大剂量肾上腺素（100 $\mu\text{g}/\text{kg}$ ）治疗，接着进行监测到20分钟。

结果：与盐水对照组比较，大剂量的肾上腺素的给予能够增加血液循环恢复的比例（盐水治疗组0/5例；2.5 $\mu\text{g}/\text{kg}$ 肾上腺素组0/5例；10 $\mu\text{g}/\text{kg}$ 肾上腺素组3/5例[$P=0.167$]和100 $\mu\text{g}/\text{kg}$ 肾上腺素组4/5例[$P=0.048$])。在100 $\mu\text{g}/\text{kg}$ 肾上腺素组的4/5例中15分钟内持续出现自主心跳，但是循环功能下降（ $P=0.048$ ）；15分钟时平均动脉压为：盐水组12.8(SEM 2.8)mmHg、2.5 $\mu\text{g}/\text{kg}$ 肾上腺素组12.0(2.5)mmHg、10 $\mu\text{g}/\text{kg}$ 肾上腺素组20.6(2.7)mmHg和100 $\mu\text{g}/\text{kg}$ 肾上腺素组26.4(3.9)mmHg（ $P=0.008$ ）。盐水治疗组中4/5例在使用延迟的肾上腺素治疗后出现自主循环的恢复（ $P=0.048$ ）。大剂量的给予肾上腺素后，在自主循环恢复之前会使冠状动脉灌注压显著性增加。

结论：在布比卡因导致的心脏停跳的兔子模型中，肾上腺素似乎对自主循环的恢复是有必要的，但是随后会出现血流动力学指标的下降。需要进一步的研究来确定肾上腺素在局麻药导致的心脏停跳后进行脂类药物复苏时的作用。

（唐亮译 马皓琳 李士通校）

BACKGROUND: IV lipid emulsion has demonstrated to be effective therapy for bupivacaine-induced cardiotoxicity. However, the role of epinephrine when coadministered with lipid emulsion in toxin-induced cardiac arrest is unclear. We postulated superior resuscitation outcome in the absence of epinephrine in a rabbit model of bupivacaine-induced cardiac arrest resuscitated with IV lipid emulsion.

METHODS: Twenty sedated, instrumented New Zealand White rabbits received 10 mg/kg IV bupivacaine producing asystole. Mechanical ventilation and external chest compressions were commenced at 30 seconds. At 1 minute, animals received 5 mL/kg 20% lipid emulsion in addition to 1 of 4 additional IV treatments ($n=5$ all groups): 0.9% saline, 2.5 $\mu\text{g}/\text{kg}$ epinephrine, 10 $\mu\text{g}/\text{kg}$ epinephrine, 100 $\mu\text{g}/\text{kg}$ epinephrine; all at 1 mL/kg. Lipid emulsion bolus was repeated at 4 minutes. Return of spontaneous circulation and hemodynamic metrics were obtained to 15 minutes. Saline group animals additionally received high-dose epinephrine (100 $\mu\text{g}/\text{kg}$) treatment at 15 minutes, and were monitored to 20 minutes.

RESULTS: High-dose epinephrine administration was associated with increased rate of return of spontaneous circulation compared with saline control (0 of 5 saline-treated animals; 0 of 5 animals in the 2.5 $\mu\text{g}/\text{kg}$ epinephrine group; 3 of 5 in the 10 $\mu\text{g}/\text{kg}$ group [$P=0.167$]; and 4 of 5 in the 100 $\mu\text{g}/\text{kg}$ group [$P=0.048$]). Spontaneous but decreasing circulation was maintained at 15 minutes in 4 of 5 animals in the 100 $\mu\text{g}/\text{kg}$ group alone

($P = 0.048$); mean arterial blood pressure at 15 minutes was 12.8 (SEM 2.8) mm Hg saline, 12.0 (2.5) mm Hg 2.5 $\mu\text{g}/\text{kg}$ epinephrine, 20.6 (2.7) mm Hg 10 $\mu\text{g}/\text{kg}$ epinephrine, and 26.4 (3.9) mm Hg 100 $\mu\text{g}/\text{kg}$ epinephrine ($P = 0.008$). Four of five animals in the saline-treated group exhibited return of spontaneous circulation after delayed epinephrine treatment ($P = 0.048$). High-dose epinephrine administration was associated with a significant increase in coronary perfusion pressure before return of spontaneous circulation.

CONCLUSIONS: Epinephrine seemed to be necessary for return of spontaneous circulation, but was subsequently associated with declining hemodynamic variables in this rabbit model of bupivacaine-induced cardiac arrest. Further study is required to define the role of epinephrine in lipid-based resuscitation from local anesthetic-induced cardiac arrest.

使用 2%利多卡因 1ml 在超声引导下腋路法臂丛神经阻滞的阻滞特性的一项临床评定

A Clinical Evaluation of Block Characteristics Using One Milliliter 2% Lidocaine in Ultrasound-Guided Axillary Brachial Plexus Block

Brian O'Donnell, MB, FCARCSI, MSc, John Riordan, MB, FCARCSI, Ishtiaq Ahmad, MBBS, FCARCSI and Gabriella Iohom, FCARCSI, MD, PhD

From the Department of Anaesthesia, Cork University Hospital and University College Cork, Cork, Ireland.

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我们报道使用 2%利多卡因复合 1:200000 肾上腺素 1ml (局麻药总量 4ml) 在超声引导下腋路法臂丛神经阻滞的起效和持续时间。测定阻滞操作时间、阻滞起效时间、手术时间和阻滞持续时间。招募了 17 个连续的病人。阻滞操作和起效时间的平均数 (SD) 分别是 271(67.9)秒和 9.7(3.7)分钟。阻滞平均持续时间是 160.8(30.7)分钟。所有手术都只使用区域麻醉。对于大多数手外科门诊手术的麻醉时间是足够的。

(周洁译 马皓琳 李士通 校)

We report onset and duration of ultrasound-guided axillary brachial plexus block using 1 mL of 2% lidocaine with 1:200,000 epinephrine per nerve (total local anesthetic volume 4 mL). Block performance time, block onset time, duration of surgery, and block duration were measured. Seventeen consecutive patients were recruited. The mean (SD) block performance and onset times were 271 (67.9) seconds and 9.7 (3.7) minutes, respectively. Block duration was 160.8 (30.7) minutes. All operations were performed using regional anesthesia alone. The duration of anesthesia obtained is sufficient for most ambulatory hand surgery.

一项前瞻性临床记录：超声引导区域麻醉下行门诊肩部手术

A Prospective Clinical Registry of Ultrasound-Guided Regional Anesthesia for Ambulatory Shoulder Surgery

Spencer S. Liu, MD, Michael A. Gordon, MD, Pamela M. Shaw, BS, Sarah Wilfred, BA, Teena Shetty, MD and Jacques T. YaDeau, MD, PhD

From the Department of Anesthesiology, Hospital for Special Surgery, New York, New York.

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背景：目前缺乏证明超声引导下区域麻醉的疗效和安全性的临床记录资料。肌间沟神经阻滞对于肩关节镜检查是有效的，超声引导可降低风险。另外，超声引导下锁骨上神经阻滞是肩部麻醉的一个新方法，相对肌间沟神经阻滞，产生神经症状的风险更小。

方法：这项前瞻性临床记录包括了 1169 例超声引导区域麻醉下门诊行肩关节镜检查的患者。收集了标准的围术期数据，包括术前神经功能筛查。由临床团队判断后决定行肌间沟阻滞或是锁骨上阻滞。在麻醉后复苏室以及术后 1 周进行标准化随访。由一个对实验未知的神经科医生在 1 周后采用相同的筛查工具对患者的术后神经系统症状（PONS）进行评估。

结果：超声引导下肌间沟神经阻滞（ $n=515$ ）和超声引导下锁骨上神经阻滞（ $n=654$ ）均有很高的麻醉成功率（99.8%；95%可信区间[CI]，99.4%–99.9%），穿刺到血管或血管内注射的发生率为 0%（95% CI, 0%–0.3%）。锁骨上阻滞麻醉复苏室内声音嘶哑的发生率（22%，95% CI, 19%–26%）显著低于肌间沟阻滞（31%，95% CI, 27%–35%）。呼吸困难的发生率两者相似（锁骨上阻滞 7%，肌间沟阻滞 10%）。没有一例出现明显的气胸。术后 PONS 的发生率非常低（0.4%，95% CI, 0.1%–1%），永久性神经损伤的发生率为 0%（95% CI, 0%–0.3%）。

结论：超声引导下肌间沟阻滞和锁骨上阻滞对于肩关节镜检查是安全并有效的，暂时和永久的 PONS 的发生率很低。

（黄丹 译 陈杰 校）

BACKGROUND: There is a lack of clinical registries to document efficacy and safety of ultrasound-guided regional anesthesia. Interscalene blocks are effective for shoulder arthroscopy, and ultrasound guidance may reduce risk. Furthermore, ultrasound-guided supraclavicular block is a novel approach for shoulder anesthesia that may have less risk for neurological symptoms than interscalene block.

METHODS: One thousand one hundred sixty-nine patients undergoing ultrasound-guided regional anesthesia for ambulatory shoulder arthroscopy were enrolled in our prospective registry. Standardized perioperative data were collected including a preoperative neurological screening tool. Either interscalene or supraclavicular block was performed at the discretion of the clinical team. Standardized follow-up was performed in the postanesthesia care unit and at 1 week. Postoperative neurological symptoms (PONS) were assessed at the 1-week follow-up with the same screening tool by a blinded neurologist.

RESULTS: Ultrasound-guided interscalene ($n = 515$) and supraclavicular ($n = 654$) blocks had excellent anesthetic success (99.8%；95% confidence interval [CI], 99.4%–99.9%) with 0% (95% CI, 0%–0.3%) incidence of vascular puncture or intravascular injection. The incidence of hoarseness in the postanesthesia care unit was significantly less with supraclavicular (22% with 95% CI, 19%–26%) than interscalene block (31%

with 95% CI, 27%–35%). The incidence of dyspnea was similar (7% for supraclavicular vs 10% with interscalene). No patient had a clinically apparent pneumothorax. The incidence of PONS was very low (0.4% with 95% CI, 0.1%–1%), and there was a 0% (95% CI, 0%–0.3%) incidence of permanent nerve injury.

CONCLUSIONS: Ultrasound-guided interscalene and supraclavicular blocks are effective and safe for shoulder arthroscopy. Temporary and permanent PONS is uncommon.

氟哌利多对于长 QT 综合症的细胞和计算机模型的动作电位时程的亚型特异性影响 The Subtype-Specific Effects of Droperidol on Action Potential Duration in Cellular and Computational Models of Long QT Syndrome

Alexander P. Schworer, MD*, Julia Kebernik, MS*, Heimo Ehmke, MD* and Patrick Friederich, MD†

From the *Department of Vegetative Physiology and Pathophysiology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany; and †Department of Anesthesiology, Bogenhausen Hospital, Technische Universität München, Munich, Germany.

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背景：氟哌利多是治疗术后恶心呕吐一种高效的丁酰苯类药物。它对于无心血管疾病史和长 QT 综合症患者的心脏安全性是一个有争议的问题。在这项研究中，作者探索了氟哌利多对于长 QT 综合症的细胞和计算机模型是否具有特异性影响。
方法：从成年豚鼠的心脏中分离出左心室心肌细胞。长 QT1 型的采用色原烷醇 293B (10 μ mol/L) 进行药理学诱导，长 QT2 型的采用 E4031 (10 μ mol/L) 进行药理学诱导。采用 Luo-Rudy 动态模型进行计算机分析，数据用均数 \pm 标准差来表示。

结果：在心肌对照组，氟哌利多以浓度依赖的方式延长动作电位，在 0.6 μ mol/L 的浓度下最大的延长量为 37% \pm 13% ($n=4$)。在长 QT1 型细胞中，氟哌利多 (0.6 μ mol/L) 再延长动作电位 31% \pm 6% ($n=6$)，但长 QT2 型细胞的动作电位缩短了 11% \pm 2% ($n=8$)。计算机模型支持这一概念：氟哌利多除了迅速延迟 K⁺ 电流，还能阻止去极化如 L 型 Ca²⁺ 电流、Na⁺-Ca²⁺ 交换泵, 和 Na⁺-K⁺ ATP 泵。

结论：相对于长 QT2 型心肌细胞，氟哌利多对于长 QT1 型心肌细胞复极会产生更多不利影响，也就是表明对长 QT 综合症的患者有亚型特异性的心脏毒性作用。氟哌利多的亚型特异性似乎是由于氟哌利多与多个不同的分子靶点产生的一个复杂的相互作用。这种相互作用值得进一步研究，以确定长 QT 综合症患者围术期管理的亚型靶向治疗方法的可行性。

(黄丹 译 陈杰 校)

BACKGROUND: Droperidol is a highly potent butyrophenone used for the therapy of postoperative nausea and vomiting. Its cardiac safety in cardiovascular-healthy patients and those with long QT (LQT) syndrome is a matter of debate. In this study, we investigated whether droperidol has subtype-specific effects in cellular and computational models of LQT syndrome.

METHODS: Left ventricular cardiac myocytes were isolated from adult guinea pig hearts. LQT1-like behavior was pharmacologically induced by chromanol 293B (10 $\mu\text{mol/L}$) and LQT2-like states by E4031 (10 $\mu\text{mol/L}$). Computational analysis was performed using the Luo-Rudy dynamic model. Data are given as mean \pm SEM.

RESULTS: In control myocytes, droperidol lengthened action potentials in a concentration-dependent manner with a maximal prolongation of $37\% \pm 13\%$ ($n = 4$) at a concentration of 0.6 $\mu\text{mol/L}$. In LQT1-like myocytes, droperidol (0.6 $\mu\text{mol/L}$) further prolonged action potentials by $31\% \pm 6\%$ ($n = 6$) but shortened action potentials of LQT2-like myocytes by $11\% \pm 2\%$ ($n = 8$). Computational modeling supported the concept that droperidol, in addition to the rapid component of the delayed K^+ current, blocks depolarizing targets, such as the L-type Ca^{2+} current, the Na^+ - Ca^{2+} exchanger, and the Na^+ - K^+ adenosine triphosphatase.

CONCLUSIONS: Droperidol has more detrimental effects on cardiac repolarization of LQT1-like than of LQT2-like myocytes suggesting subtype-specific cardiotoxic effects in patients with LQT syndrome. The subtype specificity of droperidol seems to be caused by a complex interaction of droperidol with several different molecular targets. This interaction deserves further investigation to establish the feasibility of a subtype-directed approach in the perioperative management of patients with LQT syndrome.

肝部分切除手术中中心静脉压合适的参考零点是什么？

What Is the Preferred Central Venous Pressure Zero Reference for Hepatic Resection?

Chris Giordano, MD*, Lori A. Deitte, MD†, Nikolaus Gravenstein, MD* and Mark J. Rice, MD*

From the Departments of *Anesthesiology, and †Radiology, University of Florida College of Medicine, Gainesville, Florida.

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背景：在肝部分切除手术中，维持中心静脉压（central venous pressure，CVP）低于 5mmHg 以减少失血量是一个麻醉惯例，但这同时可增加静脉空气栓塞（venous air embolism，VAE）的风险。当 CVP 为 5mmHg 时，流体静压大约为 7cm H₂O（1 mm Hg = 1.36 cm H₂O），而我们发现，肝脏的前后径可远远长于 7cm。由此，作者着手此项研究，目的在于阐明肝脏前后径长短的变化及对 CVP 传感器位置的影响，从而平衡出血与 VAE 的风险。

方法：100 例成人患者中，通过静脉注射造影剂，应用连续存档的胸部 CT 摄片测量肝脏的前后径，及它到其它解剖位置的距离。

结果：研究结果表明，肝脏前后径及患者肝门处标准的解剖学标志有着明显的个体差异，其中肝门前后径的范围为 12.0-28.5cm，均值为 $17.9 \pm 2.8\text{cm}$ 。

结论：肝脏前后径长以及肝脏手术部位的巨大差异，使我们重新考虑在肝脏手术中，应寻找合适的 CVP 探头零点的水平。我们应更重视肝静脉本身的压力而不是 CVP，这样才能同时减小 VAE 和出血的风险。文中作者还列举了 2 种传感器归零的方法。

(周姝婧 译 陈杰 校)

BACKGROUND: The common practice of maintaining central venous pressure (CVP) below 5 mm Hg to reduce blood loss during hepatic resection increases the risk of venous air embolism (VAE). We initiated this study after observing that the anteroposterior (AP) diameter of the liver can be much larger than 7 cm, which is the approximate hydrostatic pressure corresponding to a CVP of 5 mm Hg (1 mm Hg = 1.36 cm H₂O). The purpose of this study was to characterize the liver AP diameter and thereby describe how this might affect the placement of the CVP transducer to balance the risks of bleeding and VAE.

METHODS: We measured the AP liver diameter and its distance from other anatomic sites using consecutive archived chest tomograms with IV contrast from 100 adults.

RESULTS: The results of our study demonstrate a large interindividual range in AP liver dimensions (17.9 ± 2.8 cm, range = 12.0–28.5 cm) and standardized anatomic landmarks relative to the portal triad.

CONCLUSIONS: The significant variability in AP liver diameter, along with the variability in the liver surgical site, suggests that we rethink the zero reference point for the CVP transducer during hepatic surgeries. By considering the actual hepatic venous pressure itself, rather than the CVP, we can minimize the risks of VAE and hemorrhage. Two methods for zeroing the reference transducer are suggested.

在危重患者中使用简易床边肺部超声检查可显著减少 X 线摄片和电脑断层扫描的次数

The Use of Point-of-Care Bedside Lung Ultrasound Significantly Reduces the Number of Radiographs and Computed Tomography Scans in Critically Ill Patients

Adriano Peris, MD*, Lorenzo Tutino, MD*, Giovanni Zagli, MD*, Stefano Batacchi, MD*, Giovanni Cianchi, MD*, Rosario Spina, MD*, Manuela Bonizzoli, MD*, Luisa Migliaccio, MD*, Lucia Perretta, MD*, Marco Bartolini, MD†, Kevin Ban, MD‡ and Martin Balik, MD, PhD§

From the *Anaesthesia and Intensive Care Unit of Emergency Department and

†Diagnostic Imaging Department, Careggi Teaching Hospital, Florence, Italy;

‡Department of Emergency Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, Massachusetts; and Anaesthesia and Intensive Care, General Teaching Hospital, Prague, Czech Republic.

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背景：胸部 X 线摄片对重症监护病房 (intensive care unit, ICU) 内的危重患者的诊断价值很低，而胸部计算机断层扫描 (computed tomography, CT) 需要患者被运送至 ICU 以外的地方，这增加了患者发生意外的风险。本研究中，作者评估了常规床边胸部超声检查 (lung ultrasound, LUS) 在评估 ICU 内胸腔积液 (pleural effusions, PE) 的有效性。

方法：本研究纳入了 2008 年 3 月至 2009 年 4 月间因重大创伤 (46.3%)、内科病 (41.5%) 以及手术后并发症 (12.2%) 而在 ICU 内接受治疗的 376 位患者。患者入住一家三级医院的 ICU，由一组专业 ICU 人员实施常规 LUS 检查，随机分为对照组 (组 C) 和研究组 (组 S)。为了减少研究偏倚，本次研究中实施 LUS 的人员均不了解研究目的。收集的数据包括患者人口学、诊疗经过以及接受过胸部 X

线摄片和 CT 扫描的次数。作为研究的次要目的，作者另评价了 Balik 公式在 PE 评估中的可靠性。

结果：两组患者在人口学和 ICU 内诊疗经过方面没有明显的统计学差异。S 组患者拍摄胸部 X 线片的总次数 (-26%， $P < 0.001$) 和 CT 扫描的总次数 (-47%， $P < 0.001$) 明显少于 C 组患者。对 ICU 内的 LUS 方案进行 6 个月的随访后，PE 患者对放射检查的需求呈时间依赖性减少。最后，用 LUS 和 Balik 公式评估的 PE 的量与抽吸得到的有效的胸水量有良好的相关性 ($r = 0.65$ ， $P < 0.0001$)。

结论：ICU 内常规使用 LUS 可减少患者胸部 X 线摄片和 CT 扫描的次数。

(周姝婧 译 陈杰 校)

BACKGROUND: Chest radiography has been reported to have low diagnostic accuracy in critically ill intensive care unit (ICU) patients, and chest computed tomography (CT) scans require patients to be transported out of the ICU, putting them at risk of adverse events. In this study we assessed the efficacy of routine bedside lung ultrasound (LUS) in the evaluation of pleural effusions (PE) in the ICU.

METHODS: Three hundred seventy-six patients admitted to the ICU for major trauma (46.3%), medical pathology (41.5%), and postsurgical complications (12.2%) (May 2008 to April 2009) were included in this study. Patients were placed into either the control group (group C) or the study group (group S), on the basis of the introduction of routine LUS performed by a single group of intensivists in 1 tertiary care ICU. To reduce provider bias, the physicians conducting the LUS were not aware of the study. Collected data included patient demographics, clinical course, and number of chest radiographs and CT scans performed. As a secondary goal, we assessed the reliability of Balik's formula in PE estimation.

RESULTS: No significant differences were found between the 2 groups with regard to their demographics and ICU clinical course. Group S had a significant reduction in the total number of chest radiographs obtained (-26%; $P < 0.001$) and CT scans (-47%; $P < 0.001$) in comparison with the comparison group C. A 6-month follow-up analysis of the ICU LUS protocol revealed a time-dependent decrease in the number of radiological examinations requested for patients with PE. Lastly, PE volume estimation using the LUS and Balik's formula correlates well with the effective volume drained ($r = 0.65$; $P < 0.0001$).

CONCLUSIONS: Routine use of LUS in the ICU setting can be associated with a reduction of the number of chest radiographs and CT scans performed.

简报：肝脏疾病患者肌肉生成抑制蛋白水平增高可能引起骨骼肌萎缩

Brief-Reports: Elevated Myostatin Levels in Patients with Liver Disease: A Potential Contributor to Skeletal Muscle Wasting

Paul S. García, MD, PhD*, Amy Cabbabe, MD*, Ravi Kambadur, PhD†, Gina Nicholas, PhD‡ and Marie Csete, MD, PhD*§

From the *Department of Anesthesiology, Emory University School of Medicine, Atlanta, Georgia; †School of Biological Sciences, Nanyang Technological University, Singapore; ‡AgResearch, Hamilton, New Zealand; and §Organovo, Inc., San Diego, California.

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作为终末期肝病（ESLD）的一项并发症-骨骼肌重量下降,我们对其并不十分了解。基于近期关于干细胞的文献，作者假设肌肉生成抑制蛋白（**Myostatin**）作为骨骼肌的有效负调节蛋白在 ESLD 相关的骨骼肌萎缩方面起到主要作用。在此项初步研究中，作者对肝移植患者运用 ELISA 法测量评估其 **Myostatin** 水平。与健康对照组相比，ESLD 患者 **Myostatin** 水平显著增高。这些数据表明应当对 **Myostatin** 进行进一步研究来阐明其作用靶点，以保持 ESLD 患者的骨骼肌重量。
(赵嫣红译 陈杰 校)

Loss of skeletal muscle mass is a poorly understood complication of end-stage liver disease (ESLD). Based on recent stem cell literature, we hypothesized that the potent negative regulator of muscle mass, myostatin, could play a role in the muscle loss associated with ESLD. In this preliminary investigation, we measured myostatin levels in patients undergoing liver transplant evaluation, using a novel enzyme-linked immunosensitivity assay. Myostatin levels were significantly elevated in patients with ESLD compared with healthy controls. These data suggest that myostatin deserves further investigation as a target for therapies designed to preserve muscle mass in patients with ESLD.

住院医师对心脏手术婴幼儿患者行股静脉穿刺置管：超声引导与标记定位技术的比较

Femoral Vein Cannulation Performed by Residents: A Comparison Between Ultrasound-Guided and Landmark Technique in Infants and Children Undergoing Cardiac Surgery

Marie T. Aouad, MD, Ghassan E. Kanazi, MD, Faraj W. Abdallah, MD, Farah H. Moukaddem, MD, Massud J. Turbay, MD, Mounir Y. Obeid, MD and Sahar M. Siddik-Sayyid, MD

From the Department of Anesthesiology, American University of Beirut, Beirut, Lebanon. Anesth Analg September 2010 111:724-728;

背景：对婴幼儿患者行经皮股静脉穿刺置管在技术上具有挑战性，特别是由培训阶段的住院医师进行操作时。在此项研究中，作者研究了实施心脏手术的婴幼儿患者，应用超声实时引导下行股静脉穿刺置管是否优于传统定位技术。

方法：所有患者事先随机分为两组。在 LM 组中，应用传统方法触摸动脉搏动行股静脉穿刺置管。在 US 组中，应用具有实时扫描功能的超声探头行股静脉穿刺置管。比较两组在完成穿刺置管的时间（主要结果）、成功率、穿刺次数，第一针穿刺置管成功率及并发症发生率的差别。

结果：共 48 例婴幼儿患者入组。在两组完成穿刺置管时间上，US 组要显著短于 LM 组(155 [46–690] vs 370 [45–1620] 秒; $P = 0.02$)。在穿刺成功率上两组相比基本相似(95.8%)。在穿刺次数上 US 组要显著少于 LM 组(1 [1–8] vs 3 [1–21]; $P = 0.001$)。而在第一针穿刺置管成功率上，US 组要显著高于 LM 组(18 vs 6; $P = 0.001$)。两组患者在误穿股动脉的发生率相似。

结论：当由高年资麻醉住院医师对婴幼儿患者实施超声引导下股静脉穿刺置管，其在穿刺速度、穿刺次数等方面优于定位技术，并能显著提高第一次穿刺成功率。

（赵嫣红 译 陈杰 校）

BACKGROUND: Percutaneous cannulation of the femoral vein, in the pediatric age group, can be technically challenging, especially when performed by residents in training. We examined whether the use of real-time ultrasound guidance is superior to a landmark technique for femoral vein catheterization in children undergoing heart surgery.

METHODS: Patients were prospectively randomized into 2 groups. In group LM, the femoral vein was cannulated using the traditional method of palpation of arterial pulse. In group US, cannulation was guided by real-time scanning with an ultrasound probe. The time to complete cannulation (primary outcome), success rate, number of needle passes, number of successful cannulations on first needle pass, and incidence of complications were compared between the 2 groups.

RESULTS: Forty-eight pediatric patients were studied. The time to complete cannulation was significantly shorter (155 [46–690] vs 370 [45–1620] seconds; $P = 0.02$) in group US versus group LM. The success rate was similar in both groups (95.8%). The number of needle passes was smaller (1 [1–8] vs 3 [1–21]; $P = 0.001$) and the number of successful cannulations on first needle pass higher (18 vs 6; $P = 0.001$) in group US compared with group LM. The incidence of femoral artery puncture was comparable between the 2 groups.

CONCLUSIONS: Ultrasound-guided cannulation of the femoral vein, in pediatric patients, when performed by senior anesthesia residents, is superior to the landmark technique in terms of speed and number of needle passes, with remarkable improvement in first attempt success.

减压病的加压和辅助治疗：一项随机对照试验的系统性回顾

Recompression and Adjunctive Therapy for Decompression Illness: A Systematic Review of Randomized Controlled Trials

Michael H. Bennett, MD, FANZCA*, Jan P. Lehm, MD, FANZCA*, Simon J. Mitchell, PhD, FANZCA† and Jason Wasiak, MPH‡

From the *Department of Diving and Hyperbaric Medicine, Prince of Wales Hospital and University of New South Wales, New South Wales, Australia; †Department of Anaesthesia, Auckland City Hospital and Faculty of Medicine and Health Sciences, University of Auckland, New Zealand; and ‡Victorian Adult Burns Service and School of Public Health and Preventative Medicine, Monash University, Alfred Hospital, Victoria, Australia.

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介绍：减压病(DCI)是由于环境压力降低时血液或组织内气泡形成而引起的。临床上，DCI可能引起包括从轻微症状到麻痹、意识丧失、心血管功能障碍甚至死亡。复压是DCI治疗公认的治疗标准。复压延误时，应用其他措施以改善预后。作者研究了复压和辅助治疗对DCI治疗的效果和安全性。

方法：查阅 CENTRAL (Cochrane Central Register of Controlled Trials) (*The Cochrane Library* 2009, Issue 2); MEDLINE (医学文献分析与检索在线系统) (1966-2009.7); CINAHL (Cumulative Index to Nursing and Allied Health Literature) (1982 -2009.7); EMBASE (Excerpta Medica Database) (1980 -2009.7); 高压氧血中随机对照试验 (RCTs) (2009.7)，以及手动搜索的期刊和文本。纳入 RCTs，比较任何复压方案或者辅助治疗复合一个标准加压方案的效果，不受任何语言限制。三名作者独立提取数据。评估每个试验的有效性，并且通过讨论解决分歧。数据输入到 RevMan 5.0 软件(Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2008)。

结果：两个 RCTs 符合纳入标准。数据的汇集不交叉。其中一个研究，没有证据证明在常规复压治疗中加入非类固醇类抗炎药物可以提高疗效（6 周中，相对风险 1.04，95% 可信区间[CI]: 0.90–1.20, $P = 0.58$), 但在应用替诺昔康时，对于加压治疗的需求次数有所降低 ($P = 0.01$, 95% CI: 0–1)。在另一个研究中，与应用氧治疗方案相比，应用一个氦氧混合气(heliox)复合加压的优势比较小(相对风险 0.56, 95% CI: 0.31–1.00, $P = 0.05$)。

讨论：复压治疗是治疗 DCI 的标准方法，但这并没有 RCT 的证据。非类固醇类抗炎药物(替诺昔康)的加入或者应用氦氧混和气 (heliox) 可能降低加压的需求次数，但是两者均没有提高恢复的优势比。这些措施的应用可能是合理的。因研究人数有限需谨慎解释。益处主要在经济方面，但应进行经济学分析。应进行一项方法严密的大样本随机试验以确定在复压期间应用合适的气体和压力。

(怀晓蓉 译 陈杰 校)

INTRODUCTION: Decompression illness (DCI) is caused by bubble formation in the blood or tissues after a reduction in ambient pressure. Clinically, DCI may range from a trivial illness to paralysis, loss of consciousness, cardiovascular collapse, and death. Recompression is the universally accepted standard for the treatment of DCI. When recompression is delayed, a number of strategies have been suggested to improve the outcome. We examined the effectiveness and safety of both recompression and adjunctive therapies in the treatment of DCI.

METHODS: We searched CENTRAL (Cochrane Central Register of Controlled Trials) (*The Cochrane Library* 2009, Issue 2); MEDLINE (Medical Literature Analysis and Retrieval System Online) (1966 to July 2009); CINAHL (Cumulative Index to Nursing and Allied Health Literature) (1982 to July 2009); EMBASE (Excerpta Medica Database) (1980 to July 2009); the Database of Randomized Controlled Trials (RCTs) in Hyperbaric Medicine (July 2009); and hand-searched journals and texts. We included RCTs that compared the effect of any recompression schedule or adjunctive therapy with a standard recompression schedule and applied no language restrictions. Three authors extracted the data independently. We assessed each trial for internal validity and resolved differences by discussion. Data were entered into RevMan 5.0 software (Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2008).

RESULTS: Two RCTs satisfied the inclusion criteria. Pooling of data was not possible. In one study, there was no evidence of improved effectiveness with the addition of a nonsteroidal antiinflammatory drug to routine recompression therapy (at 6 weeks: relative risk 1.04, 95% confidence interval [CI]: 0.90–1.20, $P = 0.58$), but there was a reduction in the number of recompression treatments required when tenoxicam was added ($P = 0.01$, 95% CI: 0–1). In the other study, the odds of multiple recompressions were lower with a

helium and oxygen (heliox) table compared with an oxygen treatment table (relative risk 0.56, 95% CI: 0.31–1.00, $P = 0.05$).

DISCUSSION: Recompression therapy is the standard for treatment of DCI, but there is no RCT evidence. The addition of a nonsteroidal antiinflammatory drug (tenoxicam) or the use of heliox may reduce the number of recompressions required, but neither improves the odds of recovery. The application of either of these strategies may be justified. The modest number of patients studied demands a cautious interpretation. Benefits may be largely economic, and an economic analysis should be undertaken. There is a case for large randomized trials of high methodological rigor to define any benefit from the use of different breathing gases and pressure profiles during recompression.

局麻药可通过细胞内碱化使大鼠背根神经节神经元细胞线粒体膜电位去极化

Local Anesthetics Depolarize Mitochondrial Membrane Potential by Intracellular Alkalinization in Rat Dorsal Root Ganglion Neurons

Shin Onizuka, MD*, Ryuji Tamura, MD*, Nobuko Hosokawa, MD*, Yuko Kawasaki, MD* and Isao Tsuneyoshi, MD, PhD*

From the *Department of Anesthesiology and Faculty of Medicine, University of Miyazaki, Kiyotake, Miyazaki, Japan.

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背景：尽管已经有报道：局部麻醉药，特别是利多卡因，具有细胞毒性，但机制尚不清楚。线粒体膜电位的去极化($\Delta\Psi_m$)，是线粒体功能障碍的标志之一，受质子电化学梯度(ΔH^+)调节。因此，细胞内 pH 值([pH]_{in})和线粒体 pH([pH]_m)是调整 $\Delta\Psi_m$ 的重要因素。然而，局麻药对于 [pH]_{in} and [pH]_m 的影响尚不清楚。为了研究线粒体对于局麻药的反应，作者同时检测了 [pH]_m、[pH]_{in} 以及 $\Delta\Psi_m$ 。

方法：用比率计量荧光探针 JC-1 和 HPTS 同时测量大鼠背根神经节神经元的 $\Delta\Psi_m$ 和 [pH]_{in}。carboxy-SNARF-1 荧光探针用来测定 [pH]_m。评估对象为利多卡因、甲哌卡因、布比卡因、普鲁卡因、QX-314 (利多卡因的一种带电形式) 以及氯化铵 (NH_4Cl)。

结果：应用利多卡因、甲哌卡因、布比卡因和普鲁卡因时， $\Delta\Psi_m$ 去极化，而 [pH]_{in} 呈现剂量相关的增加。在灌注利多卡因、甲哌卡因、布比卡因、普鲁卡因和 NH_4Cl 时， $\Delta\Psi_m$ 和 [pH]_{in} 之间存在明显联系。相反，灌注 QX-314 时，没有改变 $\Delta\Psi_m$ 和 [pH]_{in}。在低 pH 的溶液 (pH6)，以及弱酸的环境中，利多卡因没有增加 [pH]_{in} 或者使 $\Delta\Psi_m$ 去极化。灌注利多卡因、甲哌卡因、布比卡因、普鲁卡因，以及氯化铵 (NH_4Cl) 时也增加了 [pH]_m。

结论：结果表明不带电 (原形) 局麻药导致 $\Delta\Psi_m$ 去极化。原因之一是细胞内和线粒体的碱化。

(怀晓蓉 译 陈杰 校)

BACKGROUND: Although it has been reported that local anesthetics, especially lidocaine, are cytotoxic, the mechanism is unclear. Depolarization of the mitochondrial membrane potential ($\Delta\Psi_m$), one of the markers of mitochondrial failure, is regulated by the proton electrochemical gradient (ΔH^+). Therefore, intracellular pH ([pH]_{in}) and

mitochondrial pH ([pH]_m) are important factors for modifying $\Delta\Psi_m$. However, the effects of local anesthetics on [pH]_{in} and [pH]_m are unclear. To investigate mitochondrial responses to local anesthetics, we simultaneously measured [pH]_m and [pH]_{in}, along with $\Delta\Psi_m$.

METHODS: The ratiometric fluorescent probe JC-1 and HPTS were used for the simultaneous measurements of $\Delta\Psi_m$ with [pH]_{in} in rat dorsal root ganglion neurons. A carboxy-SNARF-1 fluorescent probe was used to measure [pH]_m. Lidocaine, mepivacaine, bupivacaine, procaine, QX-314, a charged form of lidocaine, and ammonium chloride (NH₄Cl) were evaluated.

RESULTS: $\Delta\Psi_m$ was depolarized and [pH]_{in} was increased by lidocaine, mepivacaine, bupivacaine, and procaine in a dose-dependent manner. Significantly, a relationship between $\Delta\Psi_m$ and [pH]_{in} was observed for lidocaine, mepivacaine, bupivacaine, procaine, and NH₄Cl perfusion. In contrast, QX-314 did not change $\Delta\Psi_m$ or [pH]_{in}. In low-pH saline (pH6) and in the presence of a weak acid, lidocaine failed to increase [pH]_{in} or depolarize $\Delta\Psi_m$. The [pH]_m was also increased by lidocaine, mepivacaine, bupivacaine, procaine, and NH₄Cl.

CONCLUSION: These results demonstrate that uncharged (base) forms of local anesthetics induce $\Delta\Psi_m$ depolarization. One of the causes is intracellular and mitochondrial alkalization.

在妇科癌症手术中腹横肌平面阻滞对多模式镇痛无附加益处

Transversus Abdominis Plane Block Does Not Provide Additional Benefit to Multimodal Analgesia in Gynecological Cancer Surgery

James D. Griffiths, MB, BS, FANZCA, MEpi*, Justine V. Middle, BSc, MBBS, FRCA*, Fiona A. Barron, MBChB, FRCA*, Sarah J. Grant*, Phillip A. Popham, BSc, MBBS, FRCA, MD* and Colin F. Royse, MD[†]

From *Royal Women's Hospital, Parkville, Victoria, Australia; and [†]Anaesthesia and Pain Management Unit, Department of Pharmacology, University of Melbourne, and Royal Melbourne Hospital, Melbourne, Australia.

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背景：腹横肌平面阻滞是一种最新的被描述为在腹壁的腹内斜肌层和腹横肌层间注射局部麻醉药的新技术。它已被证实在多种临床环境下在减少吗啡用量及改善术后疼痛的缓解方面有效。

方法：作者对明确或怀疑是妇科恶性肿瘤并行腹正中中线剖腹探查的成年女性病例在超声定位下以注射 2×20ml 的 0.5% 罗哌卡因和 0.9% 生理盐水行双侧腹横肌阻滞来进行随机对照试验比较。两组试验对象均接受多模式静脉镇痛。本次研究的主要结果是通过确定是否有术后 2 小时用力呼吸的镇痛不足（通过视觉模拟评分法数值 >50mm 评定）及术后 2 小时及 24 小时的吗啡总消耗量来评定。

结果：本次研究共包括 65 名患者的资料。各组年龄、体重、手术时间和术中吗啡用量相匹配。在 2 小时镇痛不足患者比例上对照组和实验组无论是休息状态（39%：22%，P=0.13）还是咳嗽状态（61%：53%，P=0.54）无显著性差异。对照组和实验组在术后 2 小时吗啡总用量（13.5mg：11.87mg，P=0.54）和 24 小时吗

啡总用量（34mg：36.1mg， $P=0.76$ ）上也无显著性差异。在阿片类药物副反应及患者满意度上两组无显著性差异。

结论：本次研究证明对于进行妇科癌症手术的女性患者，腹横肌平面阻滞对于多模式镇痛无附加益处。

（曹强 译 陈杰 校）

BACKGROUND: The transversus abdominis plane (TAP) block is a recently described technique involving injecting local anesthetic between the internal oblique and transversus abdominis layers of the abdominal wall. It has been shown to be effective in reducing morphine consumption and improving postoperative pain relief in several clinical settings.

METHODS: We performed a randomized placebo-controlled trial comparing bilateral ultrasound-guided TAP blocks (2×20 mL 0.5% ropivacaine or 0.9% saline) in adult female patients undergoing midline laparotomy for known or presumed gynecological malignancy. Both groups received multimodal IV analgesia. The primary outcomes for the study were defined as the incidence of “inadequate” analgesia (defined as a score >50 mm on a visual analog scale) with forced expiration at 2 hours postoperatively and total postoperative morphine consumption at 2 hours and 24 hours.

RESULTS: Data from 65 patients were included in the study. The groups were comparable in terms of age, weight, surgical duration, and intraoperative morphine doses. There were no significant differences between the control and treatment groups in the proportion of patients with inadequate analgesia either at rest (39% vs. 22%, $P = 0.13$) or with coughing (61% vs. 53%, $P = 0.54$) at 2 hours. There was no significant difference in postoperative morphine consumption between the placebo and treatment groups at 2 hours (13.5 mg vs. 11.87 mg, $P = 0.53$) or 24 hours (34.0 mg vs. 36.1 mg, $P = 0.76$). There were no significant differences in the incidence of opioid side effects or patient satisfaction.

CONCLUSION: This study demonstrated that TAP blockade conferred no benefit in addition to multimodal analgesia in women undergoing major gynecological cancer surgery.

简报：区域麻醉穿刺针会引导超声凝胶进入组织

Brief Reports: Regional Anesthesia Needles Can Introduce Ultrasound Gel into Tissues

David Belavy, BMedSc, MBBS, FANZCA

From the Centre for Burns, Trauma and Critical Care, University of Queensland; and Department of Anaesthesiology and Perioperative Medicine, Royal Brisbane and Women's Hospital, Brisbane, Queensland, Australia.

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背景：麻醉医生在超声引导的区域麻醉中会将穿刺针穿透超声凝胶。在本次研究中，作者拟明确穿刺针能否将凝胶导入组织中。

方法：被染成蓝色的超声凝胶在猪肉薄皮上进行试验。将 Tuohy 针和短锥穿刺针穿过凝胶和猪肉。然后证实穿刺针内有无超声凝胶的存在。

结果：包括有管心针在内的所有穿刺针，针腔内都带有凝胶和组织。

结论：在区域组织操作过程中，超声凝胶会被注射到神经周围或者神经中。需要进一步研究以明确其影响。

（曹强 译 陈杰 校）

BACKGROUND: Anesthesiologists may insert needles through ultrasound gel when performing ultrasound-guided regional anesthesia. In this study, it was determined whether needles carry gel into tissues.

METHODS: Ultrasound gel dyed blue was applied to pork rashers. Tuohy and short-bevel needles were passed through the gel and pork. The needles were then assessed for the presence of ultrasound gel.

RESULTS: All needles, including those with stylets, carried gel and tissue within the lumen.

CONCLUSIONS: Ultrasound gel may be injected around (and perhaps in) nerves during regional anesthesia procedures. Studies are needed to determine the implications of this practice.