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经旋转血栓弹性测定法 (ROTEM(R)) 证实纤溶亢进的严重创伤患者其死亡率较高

Hyperfibrinolysis Diagnosed by Rotational Thromboelastometry (ROTEM(R)) Is Associated with Higher Mortality in Patients with Severe Trauma.

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此项研究旨在探究纤溶亢进及其严重程度与创伤或非创伤患者结局间的相互关系。2008年4月至2010年4月间所有经诊断证实为纤溶亢进的急诊患者均纳入该项研究。根据有无躯体创伤将上述纤溶亢进患者分为创伤组（创伤纤溶亢进组）与非创伤组（非创伤纤溶亢进组）。另将24位无纤溶亢进的多发伤患者（创伤配对组）与创伤纤溶亢进患者相配对。采集旋转血栓弹性测定法的测量结果、血气分析（代谢状态）、实验室检查、创伤严重程度评分以及30天死亡率等相关数据以供分析。经鉴定共有35名患者被诊断为纤溶亢进（其中创伤患者13名，非创伤患者22名）。纤溶亢进的总体死亡率为54%。创伤纤溶亢进组患者的死亡率（77%

±12%) 明显高于非创伤纤溶亢进组 (41%±10%; P=0.001, 95%CI 5%-67%) 与创伤配对组 (33% ±10%; P=0.009, 95%CI 13%-74%) 患者。纤溶亢进与创伤患者的死亡率间存在显著相关性 (P=0.017)。比较血气分析所反馈的代谢状态, 创伤纤溶亢进组患者仅在 pH 值 (P=0.02) 与钾离子浓度 (P=0.01) 两方面较非创伤纤溶亢进组患者明显降低。基于创伤纤溶亢进患者的死亡率显著高于创伤患者与非创伤纤溶亢进患者, 因此可将纤溶亢进作为预测创伤患者死亡的独立危险因素。旋转血栓弹性测定法所提供的纤溶亢进实时诊断为早期治疗创造了条件。

(范羽译 薛张纲校)

We investigated whether hyperfibrinolysis and its severity was associated with outcome of traumatized and nontraumatized patients. From April 2008 to April 2010, all emergency patients with hyperfibrinolysis were enrolled in this study. Hyperfibrinolysis patients were divided into traumatized (trauma hyperfibrinolysis group) and nontraumatized (nontrauma hyperfibrinolysis group). The trauma hyperfibrinolysis group was matched with 24 polytrauma patients without hyperfibrinolysis (matched trauma group). Data from rotational thromboelastometry measurements, blood gas analysis (metabolic state), laboratory analysis, injury severity score, and 30-day mortality were collected. Thirty-five patients with hyperfibrinolysis were identified (13 traumatized, 22 nontraumatized). Overall mortality for hyperfibrinolysis was 54%. Mortality in the trauma hyperfibrinolysis group (77% ± 12%) was significantly higher than in the nontrauma hyperfibrinolysis group (41% ± 10%; P = 0.001, 95% CI 5%-67%) and the matched trauma group (33% ± 10%; P = 0.009, 95% CI 13%-74%). Hyperfibrinolysis is significantly (P = 0.017) associated with mortality in trauma patients. In the blood gas analysis representing the metabolic state, only pH (P = 0.02) and potassium (P = 0.01) were significantly lower in the trauma hyperfibrinolysis group compared to the nontrauma hyperfibrinolysis group. Mortality from hyperfibrinolysis is significantly higher in trauma compared with nontrauma patients, and hyperfibrinolysis is an independent factor predicting mortality in trauma patients. Rotational thromboelastometry provides real-time recognition of hyperfibrinolysis allowing early treatment.

关于验证和观察麻醉药物作用于早期脊神经网络（离体八目鳗脊髓）的研究

Validation and insights of anesthetic action in an early vertebrate network: the isolated lamprey spinal cord

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背景：八目鳗脊髓是一种典型的脊椎网络便于我们理解麻醉剂的作用。我们检测了一系列关于八目鳗的麻醉临床应用及麻醉剂作用位点和机制的假设。

方法：离体的八目鳗脊髓，在 d-谷氨酸盐介导的虚拟的游动或者毒物刺激尾部时，应用氟烷、异氟醚、七氟醚、地氟醚、丙泊酚或者非制动剂 f6（1、2-六氟环乙烷），来确定这些麻醉剂使受体不动的最低浓度即(MICs)。检验存在和不存在土的宁和或印防己毒时异氟醚和丙泊酚对虚拟游动的影响。

结果：挥发性麻醉剂的最低制动浓度是客观的可以进行比较的。异氟醚对虚拟游动和毒素刺激诱发的活动的 MIC 是相同的。F6不能制动，但是会降低虚拟游动的幅度和滞相。异氟醚降低虚拟游动的频率，幅度，自动校正，首尾滞相和连贯性。在异氟醚作用下土的宁和印防己毒仅仅诱导出不规则的体动，且在 MIC 浓度时引起小幅度降低。丙泊酚的效果不同于异氟醚，因为所有运动器官除了振幅以外的节律各不相同。相比哺乳动物，八目鳗的丙泊酚 MIC 要大得多。然而，印防己毒通过再调节运动器官的活动和增加 MIC(>8倍) 来拮抗丙泊酚的抗体动作用。

结论：八目鳗脊髓是一种研究麻醉剂作用的确切的易于处理的脊椎网络模型。异氟醚扰乱神经元间的运动网络。 γ -氨基丁酸 A 和甘氨酸受体对异氟醚抑制八目鳗体动也有微弱的作用。丙泊酚选择性的 GABA 受体介导的抑制体动机制在八目鳗身上被保留。异氟醚和丙泊酚相比，不同的抑制运动的机制在哺乳动物中反应出来，并且进一步提示存在不同的抑制运动的神经网络模型。

(侯文婷译 薛张纲校)

BACKGROUND:The lamprey spinal cord is a well-characterized vertebrate network that could facilitate our understanding of anesthetic action. We tested several hypotheses concerning the lamprey's clinical application to anesthesia, and the sites/mechanisms of anesthetic action.

METHODS:In isolated lamprey spinal cords, minimum immobilizing concentrations (MICs) were determined for halothane, isoflurane, sevoflurane, desflurane, propofol, or the nonimmobilizer F6 (1,2-dichlorohexafluorocyclobutane), applied during d-glutamate-induced fictive swimming or noxious tail stimulation. Isoflurane and propofol effects on fictive swimming were tested in the presence and absence of strychnine and/or picrotoxin.

RESULTS:Volatile anesthetic MICs were clinically comparable. Isoflurane MIC for fictive swimming and noxious stimulus-evoked movement were the same. F6 did not produce immobility, but decreased the amplitude and phase lag of fictive swimming. Isoflurane decreased fictive swimming cycle frequency, amplitude, autocorrelation, rostrocaudal phase lag, and coherence. Strychnine and picrotoxin elicited only disorganized motor activity under isoflurane and caused small increases in MIC. The effects of propofol differed from isoflurane for all locomotor rhythm variables except amplitude. The propofol MIC was much larger in lampreys compared with mammals. However, picrotoxin reversed propofol-induced immobility by reinitiating coordinated locomotor activity and increasing MIC >8-fold.

CONCLUSIONS:The lamprey spinal cord is a relevant and tractable vertebrate network model for anesthetic action. Isoflurane disrupts interneuronal locomotor networks. γ -Aminobutyric acid A and glycine receptors have marginal roles in isoflurane-induced immobility in lampreys. Propofol's selective γ -aminobutyric acid A receptor-mediated 介导 immobilizing mechanism is conserved in lampreys. The differential immobilizing mechanisms of isoflurane versus propofol reflect those in mammals, and further suggest different network modes of immobilizing action.

结直肠手术中脉氧变异指数对液体治疗反应性的预测价值

Pleth variability index to predict fluid responsiveness in colorectal surgery.

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背景：腹部手术时，目标导向性的液体治疗可以减少术后并发症。脉氧变异指数(PVI)是由脉氧波型得出的一种数值。已经有研究表明它可以在多种手术中预测液体治疗的反应。本次研究选择了低危的结直肠癌根治手术，采用食道超声多普勒测量每搏输出量为标准，测试脉氧变异指数是否能够准确预测液体治疗的反应。

方法：研究选取了25名全麻下行结直肠癌根治术的患者。经食道超声多普勒测量患者每搏输出量的基础值，指尖和耳垂测量患者脉氧变异指数的基础值。麻醉诱导气管插管后，手术开始前立即给予500ml液体负荷量，然后记录此时每搏输出量和脉氧变异指数为静息时的最终值。术中监测经食道超声多普勒，当每搏输出量降低超过10%时则给予250ml的追加剂量。此为每搏输出量和脉氧变异指数的动态最终值。根据每搏输出量的增加量是否超过10%将研究对象分为有反应组和无反应组。

结果：不论是静息状态还是术中的情况下，对液体治疗有反应组的指尖脉氧变异指数基础值均显著较高。在静息状态下，指尖和耳垂的脉氧变异指数均可以预测每搏输出量的增加：指尖脉氧变异指数的曲线下面积AUC=0.96 95%可信区间为0.88-1, P=0.011；耳垂脉氧变异指数的曲线下面积AUC=0.98 95%可信区间为0.93-1, P=0.008。术中动态情况下，指尖脉氧变异指数可以预测每搏输出量的增加，其曲线下面积为AUC=0.71 95%可信区间为0.57-0.85, P=0.006，然而耳垂脉氧变异指数则不具有此预测价值。

结论：指尖脉氧变异指数可以预测手术中行机械通气下的患者对于液体治疗的反应性。

(黄剑译 薛张纲校)

BACKGROUND: Goal-directed fluid therapy during major abdominal surgery may reduce postoperative morbidity. The Pleth Variability Index (PVI), derived from the pulse oximeter waveform, has been shown to be able to predict fluid responsiveness in a number of surgical circumstances. In the present study, we sought to determine whether PVI could predict fluid responsiveness in low-risk colorectal surgery patients who had fluid therapy guided by esophageal Doppler stroke volume measurements.

METHODS: Twenty-five low-risk patients undergoing colorectal resection under general anesthesia were studied. Baseline values for esophageal Doppler stroke volume and PVI taken from finger and ear probes were compared with final values after (a) a 500-mL fluid bolus immediately after induction (steady state) and tracheal intubation before the start of the surgery, and (b) 250-mL boluses given in response to a decrease in stroke volume of 10% during surgery as measured by esophageal Doppler (dynamic). Patients were classified into responders and nonresponders based on a stroke volume increase of >10%.

RESULTS: Baseline PVI at the finger was significantly higher in responders in both steady-state and intraoperative conditions. In steady state, PVI at both finger and earlobe had significant predictive ability of an increase in stroke volume: area under the curve for finger 0.96 (95% confidence interval [CI], 0.88-1.00; P = 0.011) and for earlobe 0.98 (95% CI, 0.93-1.00; P = 0.008). In dynamic intraoperative conditions, PVI at the finger predicted increases in stroke volume, area under the curve 0.71 (95% CI, 0.57-0.85; P = 0.006), but PVI at the earlobe had no predictive value.

CONCLUSIONS: PVI measured at the finger may be able to predict fluid responsiveness during surgery in ventilated patients.

在开腹手术中使用 PerfectTemp 和热风加温法的随机比较

A Randomized Comparison of Intraoperative PerfectTemp and Forced-Air Warming During Open Abdominal Surgery

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背景： PerfectTemp 是在身体下面放置可以加温并有缓冲压力作用的弹性海绵，从而控制温度的加温系统。这个系统的临床效果有待正式评估。因此我们该假设进行验证：在全身麻醉下行开腹手术患者，通过测定术中远端食管（核心）的温度比较 PerfectTemp（身体下面控温）加温系统和上半身吹热风的效果。

方法： 在全身麻醉下进行择期开腹大手术（肝、胰、妇科和结肠手术）的成年患者被分到两个中心。患者被随机分为两组：身体下面控温和上半身吹热风组。身体下面控温组当患者被转运至手术室床上系统开始加热；上半身吹热风组在患者铺巾后开始加热。主要结果为在手术时间及体重平均的情况下，身体下面加温的效果不比上半身吹热风差，调整基线特征并使用 0.5°C 的缓冲。

结果： 36 例患者被随机安排到身体下面控温组，34 例患者被安排到上半身吹热风组。两组患者的基线温度和手术特点大体相似。我们有足够的证据得出结论 ($P = 0.018$)：在手术时间及体重相似的情况下，身体下面控温组的效果不比上半身吹热风组差，他们只有 -0.12°C 的微小差别（95%的置信区间为 -0.37 到 0.14）。手术结束时的核心温度在身体下面控温组为 36.3°C（95%CI 为 36 到 36.5），在上半身吹热风组为 36.6（95%CI 为 36.4 到 36.8），两者之间的平均差别为 -0.34°C（95%CI 为 -0.69 到 0.01）。

结论： 手术时间及体重平均的情况下，身体下面控温组的保温效果不比上半身吹热风组差。身体下面加温装置可能是上半身吹热风的一种替换的选择。

（刘珏莹译 薛张纲校）

BACKGROUND: The PerfectTemp is an underbody resistive warming system that combines servocontrolled underbody warming with viscoelastic foam pressure relief. Clinical efficacy of the system has yet to be formally evaluated. We therefore tested the hypothesis that intraoperative distal esophageal (core) temperatures with the PerfectTemp (underbody resistive) warming system are noninferior to upper-body forced-air warming in patients undergoing major open abdominal surgery under general anesthesia.

METHODS: Adults scheduled for elective major open abdominal surgery (liver, pancreas, gynecological, and colorectal surgery) under general anesthesia were enrolled at 2 centers. Patients were randomly assigned to underbody resistive or forced-air warming. Resistive heating started when patients were transferred to the operating room table; forced-air warming started after patients were draped. The primary outcome was

noninferiority of intraoperative time-weighted average core temperature, adjusted for baseline characteristics and using a buffer of 0.5°C.

RESULTS: Thirty-six patients were randomly assigned to underbody resistive heating and 34 to forced-air warming. Baseline and surgical characteristics were generally similar. We had sufficient evidence ($P = 0.018$) to conclude that underbody resistive warming is not worse than (i.e., noninferior to) upper-body forced-air warming in the time-weighted average intraoperative temperature, with a mean difference of -0.12°C [95% confidence interval (CI) -0.37 to 0.14]. Core temperatures at the end of surgery averaged 36.3°C [95% CI 36 to 36.5] in the resistive warming patients and 36.6°C [95% CI 36.4 to 36.8] in those assigned to forced-air warming for a mean difference of -0.34°C [95% CI -0.69 to 0.01].

CONCLUSIONS: Mean intraoperative time-weighted average core temperatures were no different, and significantly noninferior, with underbody resistive heating in comparison with upper-body forced-air warming. Underbody resistive heating may be an alternative to forced-air warming.

一项比较头上抬 30 度和仰卧位两种体位下，对于临产妇肺功能残气量（FRC）的影响差别随机对照试验研究

A Randomized Crossover Study to Determine the Effect of a 30° Head-Up Versus a Supine Position on the Functional Residual Capacity of Term Parturients

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背景：产科的气道管理对于麻醉科医生来讲一直是一项挑战。作为氧气的储存库，功能残气量在妊娠的 6 个月之后减少，而在仰卧位的时候减少更加明显。在呼吸暂停之后，增加 FRC 可能会延迟低氧血症的开始。目前尚未可知半直立位的体位对于临产妇 FRC 改变的价值是怎么样的。我们假设认为，与仰卧位相比较，头上抬 30 度对于健康临产妇的 FRC 的增加是有帮助的。

方法：22 位健康临产妇纳入我们的研究。早期进行的肺功能的检查是用以除外原先是否有肺的基础疾病。通过氮稀释的方法来测定平卧位、头上抬 30 度、坐位三种体位 FRC 的量。受测者随机被安排不同的体位进行测定。另外，在每个测试体位下，进行无创血压、心率以及氧饱和度的测量。

结果：分析 20 位受测者的测量结果。每位受测者基础肺功能的检查均在正常范围内。不同体位下 FRC 的测定结果则意义显著 ($p < 0.001$)。从平卧位到头上抬 30

度，FRC 平均增加了 188ml ($p=0.03$ ，95%置信区间是 18-358ml)。其他生命体征上各种体位下的比较并没有差异 ($p>0.16$)。

结论：经过我们的研究认为，健康临产妇的 FRC 在头上抬 30 度的体位下要比平卧位明显要多。

(陆丽虹译 薛张纲校)

BACKGROUND: Airway management continues to pose challenges to the obstetric anesthesiologist. Functional residual capacity (FRC), which acts as an oxygen reservoir, is reduced from the second trimester onwards and is exacerbated in the supine position. Mechanisms to increase FRC may delay the onset of hypoxemia during periods of apnea. Values for changes in FRC in term parturients in semierect positions are unknown. We hypothesized that the FRC of healthy term parturients would increase significantly in the 30° head-up position in comparison with the supine position.

METHODS: Twenty-two healthy term parturients were recruited. Initial screening spirometry was performed to exclude undiagnosed respiratory disease. FRC was measured using the helium dilution technique in the supine, 30° head-up, and sitting erect positions. Subjects were randomized to sequence of position testing order. Noninvasive systolic blood pressure, heart rate, and oxygen saturation were measured twice in each testing position.

RESULTS: Results from 20 subjects were analyzed. The spirometry results for all subjects were within predicted normal reference intervals. FRC measurements differed significantly ($P < 0.001$) among all positions. FRC increased by a mean of 188 mL (95% confidence interval 18 to 358 mL) from the supine to the 30° head-up position ($P = 0.03$). There were no significant differences in vital signs among testing positions ($P > 0.16$).

CONCLUSIONS: We have demonstrated that the FRC of healthy term parturients increases significantly in the 30° head-up position in comparison with supine.

综述：右旋美托咪啉在儿童中的应用：现状与展望

Reviewarticle: dexmedetomidine in children: current knowledge and future applications.

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摘要：关于右旋美托咪啉在婴儿和儿童中的应用目前已有 200 多个研究和报道发表。我们回顾了其中的英文文献，总结了实践麻醉学家对于此药在儿科应用目前的认识。右旋美托咪啉对于婴儿和儿童来说是一种有效的镇静剂，其几乎不抑制呼吸系统，保持了呼吸道开放。但是右旋美托咪啉抑制了心血管系统。特别是心动过缓、低血压和高血压根据儿童年龄不同程度的发生。低血压更易发生于使用大剂量右旋美托咪啉后的婴儿。与其 2 小时的消除半衰期相一致，使用右旋美托咪啉后苏醒期较其他镇静药延长。右旋美托咪啉产生和增强镇痛作用，并且减少了术后寒战

和躁动。在有适当监护和干预来管理心血管结局的情况下，右旋美托咪啶使用的安全记录提示该药可安全有效用于儿童。

（任云译 薛张纲校）

Abstract: More than 200 studies and reports have been published regarding the use of dexmedetomidine in infants and children. We reviewed the English literature to summarize the current state of knowledge of this drug in children for the practicing anesthesiologist. Dexmedetomidine is an effective sedative for infants and children that only minimally depresses the respiratory system while maintaining a patent airway. However, dexmedetomidine does depress the cardiovascular system. Specifically, bradycardia, hypotension, and hypertension occur to varying degrees depending on the age of the child. Hypertension is more prevalent when larger doses of dexmedetomidine are given to infants. Consistent with its 2-hour elimination half-life, recovery after dexmedetomidine may be protracted in comparison with other sedatives. Dexmedetomidine provides and augments analgesia and diminishes shivering as well as agitation postoperatively. The safety record of dexmedetomidine suggests that it can be used effectively and safely in children, with appropriate monitoring and interventions to manage cardiovascular sequelae.

S 型氯胺酮在体外通过抑制神经元 Ca^{2+} 的振荡，从而在发挥其分化神经元的毒性作用

The Toxic Effects of S(+)-Ketamine on Differentiating Neurons In Vitro as a Consequence of Suppressed Neuronal Ca^{2+} Oscillations

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背景：在未成熟的大脑中，在一段高度塑型期中，神经元的 Ca^{2+} 振荡会出现，并调节神经元的分化和突触发生。在这项研究中，我们研究了长期阻断海马的 Ca^{2+} 振荡，它是 NMDA 受体的重要角色，并影响了 S 型氯胺酮在神经元突触蛋白的表达。

方法：海马的神经元被放在有特殊 NMDA 受体拮抗剂地佐环平中培养15天或者 S 型氯胺酮中培养24小时。末端脱氧核苷酰转移酶（TUNEL）和活化的半胱天冬酶用来检测凋亡的神经元。给神经元染色后检测 Ca^{2+} 振荡，并用双波长荧光显微镜观察。用 western 印迹来测量 Ca^{2+} /钙调节蛋白激酶 II。用共焦点抗突触蛋白免疫荧光法来鉴定突触蛋白。

结果：用 MK801 或者 S 型氯胺酮去阻滞 NMDA 受体会引起神经元凋亡增加。MK801 导致细胞溶质中 Ca^{2+} 浓度显著增加，并减少 Ca^{2+} 振荡的幅度和频率。和 MK801 相似，长期使用 S 型氯胺酮可导致冲洗后24小时内细胞溶质中 Ca^{2+} 浓度显著增加。这与下调了 Ca^{2+} /钙调节蛋白激酶 II 并降低冲洗后24小时内突触蛋白有关系。

结论：神经元 Ca^{2+} 振荡通过激活 Ca^{2+} /钙调节蛋白激酶 II，介导了神经元的分化和突触发生。通过作用于 NMDA 受体，S 型氯胺酮通过抑制神经元 Ca^{2+} 振荡，下调 Ca^{2+} /钙调节蛋白激酶 II，连续地减低突触的完整性，从而发挥其毒性作用。

(翁梅琳译 薛张纲校)

Background: In the immature brain, neuronal Ca^{2+} oscillations are present during a time period of high plasticity and regulate neuronal differentiation and synaptogenesis. In this study we examined the long-term blockade of hippocampal Ca^{2+} oscillations, the role of the *N*-methyl-d-aspartate (NMDA) receptors and the effects of S(+)-ketamine on neuronal synapsin expression.

Methods: Hippocampal neurons were incubated at day 15 in culture with the specific NMDA receptor antagonists dizocilpine (MK 801, 100 μM) or S(+)-ketamine (3 μM to 25 μM) for 24 hours. Terminal-deoxynucleotidyl-transferase (TUNEL) and activated caspase3 were used to detect apoptotic neurons. Ca^{2+} oscillations were detected after loading the neurons with the Ca^{2+} -sensitive dye fura-2AM, and dual wavelength excitation fluorescence microscopy was performed. Ca^{2+} /calmodulin kinase II (CaMKII) was measured using Western blots. Synapsin was identified with confocal antisynapsin immunofluorescence.

Results: Blocking the NMDA receptor with MK 801 or 25 μM S(+)-ketamine resulted in a significant increase in apoptotic neurons. MK 801 led to a significant increase in cytosolic Ca^{2+} concentration and reduction of the amplitude and frequency of the Ca^{2+} oscillations. Similar to MK 801, the long-term application of S(+)-ketamine resulted in a significant increase in cytosolic Ca^{2+} concentration 24 hours after washout. This was associated with a down-regulation of the CaMKII and a reduction of the synapsin 24 hours after washout.

Conclusion: Neuronal Ca^{2+} oscillations mediate neuronal differentiation and synaptogenesis via activating CaMKII. By acting via the NMDA receptor, S(+)-ketamine exerts its toxic effect through the suppression of neuronal Ca^{2+} oscillations, down-regulation of the CaMKII, and consecutively reduced synaptic integrity.

在一个三级转诊中心麻醉过程中的过敏反应

Allergic Reactions During Anesthesia at a Large United States Referral Center
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背景:能引起术中过敏反应的药物根据报道不尽相同，且在美国近期没有相关报道。在本回顾性研究中，我们回顾了一个大型三级转诊中心的围术期过敏反应。**方法:**为了明确与过敏反应相关的围术期过敏原，我们回顾了 1992 年至 2010 年 Mayo 临床中心的过敏性疾病皮肤测试信息。回顾内容包括了所有接受围术期及麻醉药物过敏原检测的病人。过敏专家处获得的详细病史，皮肤检测结果和类胰蛋白酶检测均记录入病历。

结果:38名病人在麻醉时发生过敏反应，其中有18例为IgE介导的过敏反应（根据皮肤检测确定的疑似药物），6例为非IgE介导的过敏反应（类胰蛋白酶水平升高，皮肤测试阴性），14例可能是非IgE介导的过敏反应（类胰蛋白酶水平正常或者未获得，皮肤测试阴性）。在所有IgE介导的过敏反应中，抗生素是最常见的过敏原（50%），而神经肌肉阻滞药物占了11%。

结论:抗生素是IgE介导的过敏反应中最常见的过敏原；然而，52.6%的过敏反应中，并不能明确过敏原，提示其为非IgE介导的过敏反应。未明确过敏原的过敏反应使得病人可能持续暴露于同一过敏原，也可能导致本来安全的药物治疗。

（姚敏敏译 薛张纲校）

BACKGROUND: The types of agents implicated to trigger intraoperative anaphylactic reactions vary among reports, and there are no recent series from the United States. In this retrospective study, we examined perioperative anaphylactic reactions that occurred at a major tertiary referral academic center.

METHODS: To characterize perioperative allergens associated with anaphylactic reactions, we reviewed the Mayo Clinic Division of Allergic Diseases skin test database between 1992 to 2010. The records of all patients who were tested for perioperative and anesthetic medications were reviewed. Charts that included a detailed history obtained by an allergist, skin test results, and tryptase measurements when available were reviewed and categorized.

RESULTS: Thirty-eight patients were found to have an anaphylactic reaction during anesthesia, of which 18 were immunoglobulin (Ig)E-mediated anaphylactic reactions (likely causative agent identified by skin test), 6 were non-IgE-mediated anaphylactic reactions (elevated tryptase levels and negative skin test), and 14 were probable non-IgE-mediated anaphylactic reactions (tryptase levels normal or not obtained and negative skin test). Of the IgE-mediated anaphylactic reactions, antibiotics were the most prevalent likely causative agent (50%) whereas neuromuscular blocking drugs were implicated as a likely causative agent in 11% of reactions.

CONCLUSION: Antibiotics were the most common likely causative agent associated with IgE-mediated anaphylactic reactions; however, for 52.6% of reactions, a causative agent could not be determined, suggesting a non-IgE-mediated anaphylactic reaction. The undiagnosed allergic reactions place patients at risk of a subsequent reexposure to the same allergen, or lead to unnecessary avoidance of needed medications.

胸段硬膜外使用布比卡因减轻炎症反应，肠脂质过氧化，氧化损伤，肠系膜缺血/再灌注诱导的胃黏膜上皮细胞凋亡

Thoracic epidural bupivacaine attenuates inflammatory response, intestinal lipid peroxidation, oxidative injury, and mucosal apoptosis induced by mesenteric ischemia/reperfusion.

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背景：我们进行这项研究，以评估胸段硬膜外麻醉（TEA）对大鼠肠系膜缺血/再灌注（I/R）模型的炎症反应、脂质过氧化和氧化应激的影响。

方法：大鼠分为4组：假手术组（N=6，深水剖腹手术），对照组（N=6，I/R），布比卡因组（N=6；肠系膜I/R，20 μL/h的0.5%布比卡因）和生理盐水组（N=6，肠系膜I/R，20 μL/h的0.9%生理盐水）。I/R损伤由肠系膜上动脉夹闭1小时、12小时后再灌注诱发。检测血气，肿瘤坏死因子-α，白细胞介素-6，白细胞介素-1β，谷胱甘肽 peroxidase，超氧化物歧化酶，catalase，髓过氧化物酶浓度，免疫组化考试（细胞间黏附分子-1），细胞凋亡和肠道水肿的干/湿比例。

结果：布比卡因显著减低细胞因子，丙二醛，髓过氧化物酶水平而增加抗氧化酶的水平。湿/干比比较显示，布比卡因组（2.88±0.17）相较于对照组（5.45±0.67）和生理盐水组（5.87±0.17）显著降低。在，硬膜外布比卡因（2[1-2]）输注组与对照组（3[2-3]）和生理盐水（3[2-4]）组相比大鼠肠道损伤评分显著下降。布比卡因（63%）仅比对照组细胞凋亡的百分比（85%）有明显的下降。布比卡因（27.4±7.1）组与对照组（12.3±7.4）和生理盐水组（24.9±3.2）比较，ICAM-1水平下降。

结论：这项研究表明，硬膜外布比卡因减少了肠系膜I/R-相关的炎症反应和肠道损伤。

（张玥琪译，薛张纲校）

BACKGROUND: We conducted this study to evaluate the effects of thoracic epidural anesthesia (TEA) on inflammatory response, lipid peroxidation, and oxidative stress in a rat model of mesenteric ischemia/reperfusion (I/R).

METHOD: Rats were divided into 4 groups: sham group (n = 6; sham laparotomy), control group (n = 6; I/R), bupivacaine group (n = 6; mesenteric I/R and 20 μL/h 0.5% bupivacaine), and saline group (n = 6, mesenteric I/R and 20 μL/h 0.9% saline). I/R injury was established by occluding the superior mesenteric artery for 1 hour followed by 12 hours reperfusion. Blood gas, tumor necrosis factor-α, interleukin-6, interleukin-1β, glutathione peroxidase, superoxide dismutase, catalase, myeloperoxidase concentrations, immunohistochemical examinations (intracellular adhesion molecule-1), apoptosis determination, and wet/dry ratio of intestinal edema were determined.

RESULTS: Bupivacaine significantly decreased the cytokine, malondialdehyde, and myeloperoxidase levels and increased the antioxidant enzyme levels. Wet/dry ratio comparison showed a significant decrease in the bupivacaine (2.88 ± 0.17) group in comparison with control (5.45 ± 0.67) and saline (5.87 ± 0.17) groups. The intestinal injury score was significantly decreased in rats in the epidural bupivacaine (2 [1-2]) infusion group in comparison with rats in the control (3 [2-3]) and saline (3 [2-4]) groups. Bupivacaine (63%) caused a significant decrease in the percentage of apoptotic cells in comparison with control (85%) only. ICAM-1 levels in the bupivacaine (27.4 ± 7.1) group decreased in comparison with control (12.3 ± 7.4) and saline (24.9 ± 3.2) groups.

CONCLUSION: This study demonstrated that epidural bupivacaine attenuates the mesenteric I/R-related inflammatory response and intestinal damage.

氯胺酮通过激活 L-精氨酸/一氧化氮/cGMP 通路导致大鼠外周镇痛作用

Ketamine Activates the L-Arginine/Nitric Oxide/Cyclic Guanosine Monophosphate Pathway to Induce Peripheral Antinociception in Rats

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背景：许多镇痛药物通过作用于 L-精氨酸/一氧化氮/cGMP 通路达到镇痛作用，包括 μ 、 κ 或 δ 阿片受体激动剂、非甾体类抗炎药、胆碱能受体激动剂和 α_{2C} 肾上腺能受体激动剂。在我们的这项研究中，我们研究了氯胺酮——一种分离性麻醉药物 NMDA 受体拮抗剂，是否也是通过 L-精氨酸/一氧化氮/cGMP 通路导致外周镇痛作用。

方法：在大鼠足底注射前列腺素 E2 诱导痛觉，并测定脚爪压力。所有的药物均局部注射入雄性 Wistar 大鼠的后爪。

结果：氯胺酮 (10, 20, 40, 80 $\mu\text{g}/\text{爪}$) 所致的局部镇痛作用可以被非选择性 NOS 抑制剂 L-NOARG (12, 18, 和 24 $\mu\text{g}/\text{爪}$) 或选择性 NOS 抑制剂 L-NPA (12, 18, 和 24 $\mu\text{g}/\text{爪}$) 拮抗。在另一项实验中，我们使用抑制剂 L-NIO 和 L-NIL (24 $\mu\text{g}/\text{爪}$) 分别选择性地抑制内皮及诱导的 NOS。这两种药物都不能有效的阻断外周使用氯胺酮的作用。此外爪均质的亚硝酸盐的水平提示外源性氯胺酮可以增加 NO 的释放。可溶性的鸟苷酰环化酶抑制剂 ODQ (25, 50 和 100 $\mu\text{g}/\text{爪}$) 可以阻断氯胺酮的作用，cGMP-磷酸二酯酶抑制剂 敏喘宁 (50 $\mu\text{g}/\text{爪}$) 可以增强低剂量氯胺酮 (10 $\mu\text{g}/\text{爪}$) 的镇痛作用。

结论：我们的结果提示氯胺酮通过 NO 合酶刺激 L-精氨酸/NO/cGMP 通路，从而产生外周抗伤害性刺激的作用。

(陈珺珺译 薛张纲校)

Background: The involvement of the L-arginine/nitric oxide (NO)/cyclic guanosine monophosphate (cGMP) pathway in antinociception has been implicated as a molecular mechanism of antinociception produced by several antinociceptive agents, including μ -, κ -, or δ -opioid receptor agonists, nonsteroidal analgesics, cholinergic agonist, and α_{2C} adrenoceptor agonist. In this study, we investigated whether ketamine, a dissociative anesthetic N-methyl-D-aspartate receptor antagonist, was also capable of activating the L-arginine/NO/cGMP pathway and eliciting peripheral antinociception.

Methods: The rat paw pressure test was used, with hyperalgesia induced by intraplantar injection of prostaglandin E₂. All drugs were locally administered into the right hindpaw of male Wistar rats.

Results: Ketamine (10, 20, 40, 80 $\mu\text{g}/\text{paw}$) elicited a local antinociceptive effect that was antagonized by the nonselective NOS inhibitor L-NOARG (12, 18, and 24 $\mu\text{g}/\text{paw}$) and by the selective neuronal NOS inhibitor L-NPA (12, 18, and 24 $\mu\text{g}/\text{paw}$). In another experiment, we used the inhibitors L-NIO and L-NIL (24 $\mu\text{g}/\text{paw}$) to selectively inhibit endothelial and inducible NOS, respectively. These 2 drugs were ineffective at blocking the effects of the peripheral ketamine injection. In addition, the level of nitrite in the homogenized paw indicated that exogenous ketamine is able to induce NO release. The soluble guanylyl cyclase inhibitor ODQ (25, 50, and 100 $\mu\text{g}/\text{paw}$) blocked the action of ketamine, and the cGMP-phosphodiesterase inhibitor zaprinast (50 $\mu\text{g}/\text{paw}$) enhanced the antinociceptive effects of low-dose ketamine (10 $\mu\text{g}/\text{paw}$).

Conclusions: Our results suggest that ketamine stimulates the L-arginine/NO/cyclic GMP pathway via neuronal NO synthase to induce peripheral antinociceptive effects

一项关于行膝关节镜手术的随机、双盲研究：腰麻时在布比卡因中加入小剂量利多卡因不能缩短麻醉持续时间

The Addition of Lidocaine to Bupivacaine Does Not Shorten the Duration of Spinal Anesthesia : A Randomized, Double-Blinded Study of Patients Undergoing Knee Arthroscopy

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背景：对于日间手术，使用布比卡因行腰麻的作用时间通常过长。最近一项研究提示行经尿道手术患者行腰麻时，在重比重布比卡因中加入小剂量的利多卡因可以缩短运动击感觉阻滞的时间。在这项前瞻性、随机、双盲试验中，我们对行单侧膝关节镜患者进一步研究上述发现。

方法：五十名患者随机分为两组：分别接受 2ml 重比重 0.5% 布比卡因加 0.6ml 1% 利多卡因（利多卡因组）或 0.6ml 生理盐水（对照组）。分别监测感觉击运动功能直到患者完全恢复直至准备出院。术后第二天及第 7 天分别随访有无任何副反应及短暂神经综合症的任何症状。

结果：总共获得 45 名患者的数据并对其分析（利多卡因组有 24 例）。两组在以下几方面没有统计学差异：可以满足手术起效时间、最大程度感觉阻滞或运动阻滞的起效时间及持续时间及离开复苏室的时间。对照组中的 2 名患者及试验组中的 1 名患者在术后 24 小时内出现了短暂神经综合症。一名患者出现排尿困难并持续三天。所有症状都自行缓解。没有患者出现背痛或头痛。

结论：我们尚不能确定行膝关节镜患者进行腰麻时，在重比重布比卡因中加入小剂量的利多卡因是否可以缩短感觉或运动阻滞持续时间，以及是否可以缩短离开复苏室的时间。

（陈珺珺译 薛张纲校）

BACKGROUND: The duration of spinal anesthesia with bupivacaine is often too long for day surgery. A recent study of patients presenting for transurethral surgery suggested that the addition of a small amount of lidocaine to intrathecal hyperbaric bupivacaine could shorten the duration of the sensory and motor blocks. In this prospective, randomized double-blind study we investigated these findings in patients undergoing unilateral knee arthroscopy.

METHODS: Fifty patients were randomized to receive 2 mL hyperbaric 0.5% bupivacaine plus either 0.6 mL 1% lidocaine (lidocaine group) or 0.6 mL saline (control group). The sensory and motor blocks were monitored until complete regression and the patient was ready for discharge. The patients were interviewed 2 and 7 days after the operation about any side effects and any signs of transient neurologic syndrome.

RESULTS: Data on 45 patients were available for analysis (24 in the lidocaine group). There was no statistically significant difference between the groups regarding time to readiness for surgery, maximum level of sensory block, total duration of sensory, and motor blocks or time to discharge from the postoperative care unit. Two patients in the control group and 1 patient in the study group had symptoms of transient neurologic syndrome for <24 hours after the operation. One patient had voiding difficulties for 3 days. All symptoms resolved spontaneously. No patient had spinal headache or backache. **CONCLUSION:** We did not confirm, in patients undergoing knee arthroscopy, that the addition of a small dose of lidocaine to intrathecal hyperbaric bupivacaine could shorten the duration of sensory or motor blocks or time to readiness for discharge from the postanesthesia care unit.

心脏手术中使用肺动脉导管缺乏有效性

Lack of Effectiveness of the Pulmonary Artery Catheter in Cardiac Surgery

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背景：尽管肺动脉导管（PAC）的安全性和有效性的关注度在提高，其仍然一直广泛用于心脏搭桥术中的血流动力学监测。考虑到冠脉搭桥病人使用 PAC 的资料相对缺乏以及临床实践的不易改变，作者在不同的医学中心评估了致命、非致命冠脉搭桥病人使用 PAC 的效果。

方法：设计前瞻性观察实验：一共收录了从 1996 年 11 月到 2000 年 6 月间，70 个中心共 5065 个病人。用倾向性因子配对分析来调整置入肺动脉导管时不同的可能性。如果出现以下结果，则预定试验结束：死亡（不论原因），心功能异常（心梗或充血性心衰），脑功能障碍（脑梗或脑病），肾功能障碍（异常或肾衰），肺功能异常（ARDS），第二变量包括治疗（强心药的使用，液体管理），术后插管时间，ICU 入住时间。分类基础是 PAC 和经食管超声心动图的使用（都使用，都不用，仅使用 PAC 及仅使用经食管超声心动图）。作者对比了仅使用 PAC 和都不用的患者（共 3321 例病人），共产生 1273 组配对。

结果：有 271 例 PAC 病人和 196 例未使用 PAC 病人试验终止（21.3% vs.15.4%；调整优势比[AOR]：1.68；95%可信区间 [CI], 1.24 to 2.26; $P < 0.001$ ）。PAC 组死亡率 3.5%对 1.7%（AOR, 2.08; 95% CI, 1.11 to 3.88; $P = 0.02$ ），心功能异常（AOR, 1.58; 95% CI, 1.14 to 2.20; $P = 0.007$ ），脑功能异常（AOR, 2.02; 95% CI, 1.08 to 3.77; $P = 0.03$ ），肾功能异常（AOR, 2.47; 95% CI, 1.68 to 3.62; $P < 0.001$ ）。PAC 病人使用更多的强心药（57.8% vs 50.0%; $P < 0.001$ ），更多的静脉补液（3220 mL vs 3022 mL; $P = 0.003$ ），以及更长的拔管时间（15.40 hours [11.28/20.80] 对 13.18 hours [9.58/19.33], 中位数加 Q1/Q3 四分位间距; $P < 0.0001$ ），使用 PAC 也与入 ICU 时间延长有关（14.5% vs 10.1%; AOR, 1.55; 95% CI, 1.06 to 2.27; $P = 0.02$ ）。

结论：在这个匹配观察实验中，心脏搭桥术中使用肺动脉导管与高死亡率和高终末器官并发症有关。理想的是今后以血流动力学目标的随机对照研究以证实或否定这一观察结果。

（范逸辰 译 陈杰 校）

BACKGROUND: The pulmonary artery catheter (PAC) continues to be used for monitoring of hemodynamics in patients undergoing coronary artery bypass graft (CABG) surgery despite concerns raised in other settings regarding both effectiveness and safety. Given the relative paucity of data regarding its use in CABG patients, and given entrenched practice patterns, we assessed the impact of PAC use on fatal and nonfatal CABG outcomes as practiced at a diverse set of medical centers.

METHODS: Using a formal prospective observational study design, 5065 CABG patients from 70 centers were enrolled between November 1996 and June 2000 using a systemic sampling protocol. Propensity score matched-pair analysis was used to adjust for differences in likelihood of PAC insertion. The predefined composite endpoint was the occurrence of any of the following: death (any cause), cardiac dysfunction (myocardial infarction or congestive heart failure), cerebral dysfunction (stroke or encephalopathy), renal dysfunction (dysfunction or failure), or pulmonary dysfunction (acute respiratory distress syndrome). Secondary variables included treatment indices (inotrope use, fluid administration), duration of postoperative intubation, and intensive care unit length of stay. After categorization based on PAC and transesophageal echocardiography use (both, neither, PAC only, transesophageal echocardiography only), we performed the primary analysis contrasting PAC only and neither (total, 3321 patients), from which propensity pairing yielded 1273 matched pairs.

RESULTS: The primary endpoint occurred in 271 PAC patients versus 196 without PAC (21.3% vs.15.4%; adjusted odds ratio [AOR], 1.68; 95% confidence interval [CI], 1.24 to 2.26; $P < 0.001$). The PAC group had an increased risk of all-cause mortality, 3.5% vs 1.7% (AOR, 2.08; 95% CI, 1.11 to 3.88; $P = 0.02$) and an increased risk of cardiac (AOR, 1.58; 95% CI, 1.14 to 2.20; $P = 0.007$), cerebral (AOR, 2.02; 95% CI, 1.08 to 3.77; $P = 0.03$) and renal (AOR, 2.47; 95% CI, 1.68 to 3.62; $P < 0.001$) morbid outcomes. PAC patients received inotropic drugs more frequently (57.8% vs 50.0%; $P < 0.001$), had a larger positive IV fluid balance after surgery (3220 mL vs 3022 mL; $P = 0.003$), and experienced longer time to tracheal extubation (15.40 hours [11.28/20.80] versus 13.18 hours [9.58/19.33], median plus Q1/Q3 interquartile range; $P < 0.0001$). Use of PAC was also associated with prolonged intensive care unit stay (14.5% vs 10.1%; AOR, 1.55; 95% CI, 1.06 to 2.27; $P = 0.02$).

CONCLUSIONS: Use of a PAC during CABG surgery was associated with increased mortality and a higher risk of severe end-organ complications in this propensity-matched observational study. A randomized controlled trial with defined hemodynamic goals would be ideal to either confirm or refute our findings.

梗阻性黄疸患者其依托咪酯的需要量减少

The Etomidate Requirement Is Decreased in Patients with Obstructive Jaundice

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背景:梗阻性黄疸患者对吸入麻醉药的敏感性升高。在鼠类动物的大脑中，胆红素能增强 γ -氨基丁酸的 A/甘氨酸突触传递。依托咪酯是一类非巴比妥类静脉催眠药，可以通过中枢神经系统的 γ -氨基丁酸 A 受体产生镇静作用。作者假设梗阻性黄疸患者对依托咪酯的敏感性有所改变并就此研究。

方法:本研究比较了梗阻性黄疸患者与胆红素正常的慢性胆石症患者脑电双频指数达到 50 的依托咪酯的需要量。在达到预期值之前依托咪酯以 30 $\mu\text{g}/\text{kg}/\text{min}$ 输注。

结果:梗阻性黄疸患者依托咪酯的需要量较对照组显著减少 ($150 \pm 46 \mu\text{g}/\text{kg}$ 与 $206 \pm 74 \mu\text{g}/\text{kg}$, $P = 0.007$)，平均减少量为 56 $\mu\text{g}/\text{kg}$ (95% 置信区间: 16–96 $\mu\text{g}/\text{kg}$)。另外，作者发现血清总胆红素和依托咪酯需要量有显著的负相关，Pearson r 值为 -0.545 ，而 r 值的 95% 置信区间为 -0.791 到 -0.148 。所有受试者在实验中血流动力学稳定。

结论: 梗阻性黄疸患者依托咪酯麻醉达到脑电双频指数 50 时的需要量减少。

(俞劫晶 译 陈杰 校)

BACKGROUND: Patients with obstructive jaundice have increased sensitivity to inhaled anesthetics. In rodent brain, bilirubin can enhance γ -aminobutyric acid A/glycinergic synaptic transmission. Etomidate is a nonbarbiturate hypnotic that induces sedation through γ -aminobutyric acid A receptors in the central nervous system. We tested the hypothesis that patients with obstructive jaundice have an altered sensitivity to etomidate.

METHODS: The study design was a comparison of etomidate requirements to reach a Bispectral Index of 50 in patients with obstructive jaundice versus patients with chronic cholelithiasis and normal bilirubin levels. Etomidate was infused at 30 $\mu\text{g}/\text{kg}/\text{min}$ until this end point was reached.

RESULTS: The etomidate requirement in the obstructive jaundice group was lower than that in the control group ($150 \pm 46 \mu\text{g}/\text{kg}$ vs $206 \pm 74 \mu\text{g}/\text{kg}$, $P = 0.007$). The average decrease in etomidate requirement was 56 $\mu\text{g}/\text{kg}$ (95% confidence interval: 16–96 $\mu\text{g}/\text{kg}$). In addition, we found a significant negative correlation between serum total bilirubin and etomidate requirement with Pearson r of -0.545 , and 95% confidence interval for r value (-0.791 to -0.148). All subjects were hemodynamically stable during the study.

CONCLUSIONS: Etomidate requirements to reach a level of anesthesia defined by a Bispectral Index of 50 are reduced in patients with obstructive jaundice.

心脏手术后无创多波长脉搏血氧饱和度测量血红蛋白的准确度

The Accuracy of Noninvasive Hemoglobin Measurement by Multiwavelength Pulse Oximetry After Cardiac Surgery

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背景：2008年3月，Radical Masimo（Rad7; Masimo Corp., Irvine, CA）公司开发提供了一种无创血红蛋白监测仪。它的准确度已经在健康成人和一些外科手术病人中得到证实，但对于心脏术后重症监护的有术后出血和贫血事件高风险的人群的早期诊断，它的准确度还未得到证实。

方法：一项在心血管重症监护室进行的前瞻性观察研究，作者比较使用 Rad7 监测出的血红蛋白值和使用 XE-2100 血细胞分析仪（罗氏，塞纳河，法国）检测出的动脉血红蛋白值。Rad7 的两个软件版本（V 7.3.0.1，14 个病人中 42 点比较；升级版 V 7.3.1.1，27 个病人中 61 点比较）在两个为一周的周期内研究。偏差定义为这两种方法（Masimo SpHb 和 XE-2100 测得血红蛋白）之间的差异。负偏差定义为 Masimo 测得血红蛋白值低于实验室分析仪的测量值。Rad7 的灌注指数和血红蛋白偏差值之间的相关性也进行了研究。

结果：Rad 和 XE-2100 之间的相关性很小，两个版本 V 7.3.0.1 和 V 7.3.1.1 的相关性分别为 0.11 和 0.27。V 7.3.0.1 和 V 7.3.1.1 版本的平均偏差分别为 -1.3g/dl 和 -1.7g/dl，95% 预测区间分别为 -4.6-2.1g/dl 和 -5.7-2.3 g/dl。随着灌注指数的下降血红蛋白偏差的绝对值增加。V 7.3.0.1 版本，当灌注指数 <2 时和 >2 时的平均偏差绝对值分别为 1.9 g/dL 和 0.8g/dL ($P = 0.03$)。V 7.3.1.1 版本，当灌注指数 <2 时和 >2 时的平均偏差绝对值分别为 2.1g/dL 和 1.6g/dL ($P = 0.26$)。

结论：作者的研究表明多波长脉搏血氧饱和度测量的无创血红蛋白和实验室血液分析仪测量出的血红蛋白值之间相关性较差。当脉搏灌注指数较小时两者差异较大，如在发生休克、体温过低或血管收缩的病人。多波长血氧饱和度监测血红蛋白在心血管重症监护室中的临床应用并不精确。

（滕凌雅 译 陈杰 校）

BACKGROUND: In March 2008, a new multiwavelength pulse oximeter, the Radical 7 (Rad7; Masimo Corp., Irvine, CA), was developed that offers noninvasive measurement of hemoglobin concentration. Accuracy has been established in healthy adults and some surgical patients, but not in cardiac surgery intensive care patients, a group at high risk of postoperative bleeding events and anemia in whom early diagnosis could improve management.

METHODS: In this prospective, observational study conducted in a cardiovascular intensive care unit, we compared hemoglobin concentrations shown by the Rad7 with

arterial hemoglobin concentrations determined by an automated hematology analyzer, XE-2100 (Roche, Neuilly sur Seine, France). Two software versions of Rad7 (V 7.3.0.1 [42 points of comparison in 14 patients] and the updated V 7.3.1.1 [61 points of comparison in 27 patients]) were studied during two 1-week periods. Bias, defined as the difference between the 2 methods (Masimo SpHb – XE-2100 laboratory hemoglobin), was calculated. A negative bias indicated that the Masimo underestimated hemoglobin compared with the laboratory analyzer. Correlation between the perfusion index given by Rad7 and the hemoglobin bias was also studied.

RESULTS: Correlations between Rad7 and XE-2100 were weak for both software versions ($R^2 = 0.11$ for V 7.3.0.1 and $R^2 = 0.27$ for V 7.3.1.1). Mean bias was -1.3 g/dL for V 7.3.0.1 and -1.7 g/dL for V 7.3.1.1, with wide 95% prediction intervals for the bias (respectively, -4.6 to 2.1 g/dL and -5.7 to 2.3 g/dL). The absolute hemoglobin bias tended to increase when the perfusion index decreased. For the V 7.3.0.1 software, the average absolute bias was 1.9 g/dL for perfusion index <2 and 0.8 g/dL for perfusion index >2 ($P = 0.03$). For V 7.3.1.1, the mean absolute bias was 2.1 g/dL when the perfusion index was <2 , and 1.6 g/dL when the perfusion index was >2 ($P = 0.26$).

CONCLUSIONS: Our study demonstrates poor correlation between hemoglobin measured noninvasively by multiwavelength pulse oximetry and a laboratory hematology analyzer. The difference was greater when the pulse oximetry perfusion index was low, as may occur in shock, hypothermia, or vasoconstriction patients. The multiwavelength pulse oximetry is not sufficiently accurate for clinical use in a cardiovascular intensive care unit.

45°特伦德伦伯格卧位下机器人协助腹腔镜前列腺癌根治术时血流动力学的变化 Hemodynamic Perturbations During Robot-Assisted Laparoscopic Radical Prostatectomy in 45° Trendelenburg Position

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背景：机器人协助的腹腔镜下前列腺癌根治术已被广泛应用。然而当患者置于完全的特伦德伦伯格卧位(45°)时的血流动力学变化尚未阐明。

方法：作者研究了 16 例平均年龄为 59 岁 (ASA 分级为 I-II)，择期行机器人协助的腹腔镜下前列腺癌根治术的患者 (45°头低位，腹腔内压力位 11–12 mm Hg)。采集气腹前以及气腹期间、摆置特伦德伦伯格卧位时以及手术后的血流动力学参数、超声心动图、气体交换以及肺通气-灌注系数等各种数据，

结果：在 45°头低位时，中心静脉压力较基础值升高了 3 倍，平均肺动脉压力以及肺毛细血管楔压增加 2 倍 ($P < 0.01$)。平均动脉压力增加 35%。心率，每搏输出量，心排量以及混合静脉血氧饱和度以及超声心动图下心脏大小在术中并未改变。麻醉诱导后，等容舒张期延长，在术中并未有进一步改变。减速时间是正常的并且稳定。气腹放气置于平卧位时，充盈压已经平均动脉压恢复至基础水平。气腹

减少了肺顺应性 40% ($P < 0.01$)。增加了 45°头低位时引起了进一步减少($P < 0.05$)。动脉血气酸碱平衡在术中是正常的。肺通气量不改变的情况下呼气末二氧化碳压力增加的同时动脉血二氧化碳分压并未受影响。气腹增加了 PaO₂ ($P < 0.05$)。通气-灌注比例，以及死腔通气在术中保持不变。

结论：气腹以及 45°头低位引起了 2-3 倍充盈压的增加，心功能并未受影响。充盈压在术后马上回复至基础值。肺顺应性减少，气体交换并未受影响。手术期间心血管并发症并未出现。

(龚寅 译 陈杰 校)

BACKGROUND: Robot-assisted laparoscopic radical prostatectomy has gained widespread use. However, circulatory effects in patients subjected to an extreme Trendelenburg position (45°) are not well characterized.

METHODS: We studied 16 patients (ASA physical status I–II) with a mean age of 59 years scheduled for robot-assisted laparoscopic radical prostatectomy (45° head-down tilt, with an intraabdominal pressure of 11–12 mm Hg). Hemodynamics, echocardiography, gas exchange, and ventilation-perfusion distribution were investigated before and during pneumoperitoneum, in the Trendelenburg position and, in 8 of the patients, also after the conclusion of surgery.

RESULTS: In the 45° Trendelenburg position, central venous pressure increased almost 3-fold compared with the initial value, with an associated 2-fold increase in mean pulmonary artery pressure and pulmonary capillary wedge pressure ($P < 0.01$). Mean arterial blood pressure increased by 35%. Heart rate, stroke volume, cardiac output, and mixed venous oxygen saturation were unaffected during surgery, as were echocardiographic heart dimensions. After induction of anesthesia, isovolumic relaxation time was prolonged, with no further change during the study. Deceleration time was normal and stable. In the horizontal position after pneumoperitoneum exsufflation, filling pressures and mean arterial blood pressure returned to baseline levels.

Pneumoperitoneum reduced lung compliance by 40% ($P < 0.01$). Addition of the Trendelenburg position caused a further decrease ($P < 0.05$). Arterial blood acid-base balance was normal. End-tidal carbon dioxide tension increased whereas arterial carbon dioxide was unaffected with unchanged ventilation settings. Pneumoperitoneum increased PaO₂ ($P < 0.05$). Ventilation-perfusion distribution, shunt, and dead space were unaltered during the study.

CONCLUSIONS: Pneumoperitoneum and 45° Trendelenburg position caused 2- to 3-fold increases in filling pressures, without effects on cardiac performance. Filling pressures were normalized immediately after surgery. Lung compliance was halved. Gas exchange was unaffected. No perioperative cardiovascular complications occurred.

在肺萎陷程度相同的情况下，自主呼吸比控制通气更能改善肺内分流和氧合

Spontaneous Breathing Improves Shunt Fraction and Oxygenation in Comparison with Controlled Ventilation at a Similar Amount of Lung Collapse

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背景：在不同的急性肺损伤的模型中，机械通气(MV)时允许自主呼吸(SB)能改善氧合。然而，在机械通气不支持SB时是否能改善氧合尚不明确。因此，在猪萎陷肺的模型中，作者比较了不使用任何支持的SB与用相同的潮气量(V_T)和呼吸频率(RR)不使用呼吸末正压MV的呼吸情况。

方法：在25例麻醉的猪中，通过使用负压肺萎陷模型，并随机分组至SB组或者MV组，相同的 V_T (5 mL/kg; 95% 可信区间: 3.8 至 6.4) 且RR (65 每分钟[57-73])，在SB初始阶段开始记录。记录血气中的氧分压($n = 15$)，此外，可能的肺复张通过X线表现 ($n=10$)

结果：在肺萎陷后， PaO_2/FIO_2 下降至90 mm Hg (76 至 103)。使用SB， PaO_2/FIO_2 在15min中增加至235 mm Hg (177 至 93)，而MV并没有改善氧合。肺萎陷后45min，SB组中肺内分流较低(SB: 27% [24 至 30] vs MV: 41% [28 至 55]; $P = 0.017$)。SB和MV都不能减少减少肺萎陷的面积。

结论：与相同呼吸参数下MV相比，无任何支持的SB能改善氧合，减少肺内分流。这可能有益于促进肺复张。

(丁佳 译 陈杰 校)

BACKGROUND: Spontaneous breathing (SB), when allowed during mechanical ventilation (MV), improves oxygenation in different models of acute lung injury. However, it is not known whether oxygenation is improved during mechanically unsupported SB. Therefore, we compared SB without any support with controlled MV at identical tidal volume (V_T) and respiratory rate (RR) without positive end-expiratory pressure in a porcine lung collapse model.

METHODS: In 25 anesthetized piglets, stable lung collapse was induced by application of negative pressure, and animals were randomized to either resume SB or to be kept on MV at identical V_T (5 mL/kg; 95% confidence interval: 3.8 to 6.4) and RR (65 per minute [57 to 73]) as had been measured during an initial SB period. Oxygenation was assessed by blood gas analysis ($n = 15$) completed by multiple inert gas elimination technique ($n = 8$ of the 15) for shunt measurement. In addition, possible lung recruitment was studied with computed tomography of the chest ($n = 10$).

RESULTS: After induction of lung collapse, PaO_2/FIO_2 decreased to 90 mm Hg (76 to 103). With SB, PaO_2/FIO_2 increased to 235 mm Hg (177 to 293) within 15 minutes, whereas MV at identical V_T and RR did not cause any improvement in oxygenation. Intrapulmonary shunt by 45 minutes after induction of lung collapse was lower during SB (SB: 27% [24 to 30] versus MV: 41% [28 to 55]; $P = 0.017$). Neither SB nor MV reduced collapsed lung areas on computed tomography.

CONCLUSIONS: SB without any support improves oxygenation and reduces shunt in comparison with MV at identical settings. This seems to be achieved without any major signs of recruitment of collapsed lung regions.

高分辨率熔解曲线分析兰尼碱恶性高热致病突变基因 1 的筛选

Screening of the Ryanodine 1 Gene for Malignant Hyperthermia Causative Mutations by High Resolution Melt Curve Analysis

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背景：恶性高热（MH）的诊断可在体外肌肉挛缩测试（IVCT）执行中被确定或确定一个已知的兰尼碱恶性高热致病突变基因 1(*RYR1*)。基因诊断优于 IVCT，因为它创伤小。直接测序非常大的 *RYR1* 的编码区（15.117 碱基），是一个艰苦的和昂贵的任务。在这项研究中，作者采用高分辨率熔解曲线（HRM）分析筛查基因编码的整个区域。

方法：在 16 个 MH 易感经 IVCT 确诊的患者队列中从外周血标本中提取基因组 DNA。*RYR1* 总的编码区通过在 131 个 DNA 片段的聚合酶链反应被划分和扩增并将融化型与对照样本作比较。转基因 Q 软件和外观检验用于评估高分辨率熔解曲线。对表现出异常的融化型的片段进行测序，以确定基本的序列变异。

结果：520/2520（21%）的 DNA 片段，呈显著异常的融化型。经测序，131 个已知的多态性与 17 个已知或怀疑有突变在 16 例 MH 易感患者中有 13 例（81%）。因此，测序的工作量减少了 79%。

结论：高分辨率熔解曲线分析是复杂的基因（如 *RYR1* 基因）核苷酸序列变异识别的一个敏感和具成本效益的工具。

(孙晓琼 译 陈杰 校)

BACKGROUND: A diagnosis of malignant hyperthermia (MH) can be determined by performing an in vitro (muscle) contracture test (IVCT) or by identifying a known MH causative mutation in the ryanodine receptor 1 gene (*RYR1*). Genetic diagnosis has an advantage over IVCT because it is less invasive. Direct sequencing of the very large *RYR1* coding region (15.117 bases) is a laborious and expensive task. In this study, we applied the High Resolution Melting (HRM) curve analysis as a tool to screen the entire coding region of the gene.

METHODS: Genomic DNA was extracted from peripheral blood samples in a cohort of 16 MH-susceptible patients diagnosed by the IVCT. The total coding region of *RYR1* was divided and amplified by polymerase chain reaction in 131 DNA fragments and the melting profiles were compared with those of control samples. HRM curves were evaluated by Rotor-Gene Q software and visual inspection. Fragments showing aberrant melting profiles were sequenced to identify the underlying sequence variation.

RESULTS: A subset of 520 of 2520 DNA fragments (21%) showed significantly aberrant melting profiles. Upon sequencing, 131 known polymorphisms and 17 known or

suspected mutations were found in 13 of 16 MH-susceptible patients (81%). Thus, the workload of sequencing was reduced by 79%.

CONCLUSION: HRM curve analysis is a sensitive and cost-effective tool for the identification of nucleotide sequence variants in complex genes such as the *RYR1* gene.

异氟醚对未成熟海马椎体神经元细胞产生 γ -氨基丁酸兴奋性毒性损伤

GABAergic Excitotoxicity Injury of the Immature Hippocampal Pyramidal Neurons' Exposure to Isoflurane

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背景：某些麻醉药物会对未成熟大脑造成神经损伤而对成熟大脑无损伤作用。 γ -氨基丁酸 (GABA) 是成年大脑中主要的抑制性神经递质，而对非成熟神经细胞具兴奋作用，通过与 A 型 GABA 受体结合产生作用，逆转膜内外的氯离子浓度，使膜电位去极化，引起胞内钙离子浓度升高。目前几类啮齿类动物的实验数据显示早期接触异氟醚可以导致神经元细胞的兴奋性中毒和凋亡。A 型 GABA 受体介导的突触电压依赖钙离子通道的过度活化和钙涌入参与了这些神经改变。

方法：作者采用 Fluo-4 AM 荧光成像监测 $[Ca^{2+}]_i$ 浓度。采用全细胞膜片钳技术，记录原代小鼠海马神经元细胞（培养 5 天）暴露于异氟醚后的 I_{VDCC} （电压依赖钙离子通道电流）。为更深一步探究剂量依赖和时间依赖两种不同异氟醚暴露方法导致的胞质内高浓度游离钙对神经细胞的损伤，通过 western blot 技术和实时定量-聚合酶链式反应 (RTQ-PCR) 评估 caspase-3 水平升高的可能性。数据显著性通过团体 t 检验或者单因素方差分析后进行 Tukey 显著性差异比较来评价。

结果：在控制条件下，异氟醚能剂量依赖增强 GABA 诱导的 $[Ca^{2+}]_i$ 升高。丹曲林和尼卡地平能显著抑制这种由异氟醚介导的增强效应。同时，在无钙离子的介质中，采用异氟醚预处理后并未发现其对咖啡因诱导的 $[Ca^{2+}]_i$ 浓度升高产生影响。同样的，采用全细胞膜片钳记录后发现，异氟醚能使培养的小鼠海马神经元的 I_{VDCC} 的去极化峰值幅度升高。不同浓度的异氟醚 (0.25, 0.5, 0.75, and 1 最小肺泡浓度 [MAC]) 加强 I_{VDCC} 峰电流的幅度分别为 $109.11\% \pm 9.03\%$, $120.56\% \pm 11.46\%$, $141.33\% \pm 13.87\%$, and $146.78\% \pm 15.87\%$ 。从蛋白水平方面分析，异氟醚引起 caspase-3 既有剂量依赖也有时间依赖，1MAC 的异氟醚暴露 6 小时可到达最大 caspase-3 活动 ($P < 0.001$)。但是，在 mRNA 水平，发育中的海马神经元的 caspase-3 mRNA 水平是在暴露于 0.25MAC 6 小时后开始显著升高。

结论：异氟醚介导的 GABA 触发 $[Ca^{2+}]_i$ 释放增强作用是由于膜去极化和继发的 VDCC 激活，进一步导致钙诱导阿诺碱敏感的钙池中的钙释放。A 型 GABA 受体激活和 VDCC 的开放导致 $[Ca^{2+}]_i$ 增加是异氟醚诱导非成熟小鼠海马神经元产生钙超载所必须的，这可能是异氟醚造成发育中的啮齿类动物大脑产生神经毒性效应的机制的一部分。

(陆秉玮 译 陈杰 校)

BACKGROUND: Certain anesthetics exhibit neurotoxicity in the brains of immature but not mature animals. γ -Aminobutyric acid (GABA), the primary inhibitory neurotransmitter in the adult brain, is excitatory on immature neurons via its action at the GABA_A receptor, depolarizing the membrane potential and inducing a cytosolic Ca²⁺ increase ([Ca²⁺]_i), because of a reversed transmembrane chloride gradient. Recent experimental data from several rodent studies have demonstrated that exposure to isoflurane during an initial phase causes neuronal excitotoxicity and apoptosis. GABA_A receptor-mediated synaptic voltage-dependent calcium channels' (VDCCs) overactivation and Ca²⁺ influx are involved in these neural changes.

METHODS: We monitored [Ca²⁺]_i using Fluo-4 AM fluorescence imaging. Using whole-cell patch clamp techniques, I_{VDCC} (voltage-dependent calcium channel currents) were recorded from primary cultures of rat hippocampal neurons (5-day culture) exposed to isoflurane. To further investigate the neurotoxicity of high cytosolic-free calcium after isoflurane in a dose- and time-dependent manner, the possibility of increased caspase-3 levels was evaluated by Western blot and quantitative real-time polymerase chain reaction. Statistical significance was assessed using the Student *t* test or 1-way analysis of variance followed by the Tukey post hoc test.

RESULTS: Under control conditions, isoflurane enhanced the GABA-induced [Ca²⁺]_i increase in a dose-dependent manner. Dantrolene and nifedipine markedly inhibited this enhancement mediated by isoflurane. Moreover, in Ca²⁺-free media, pretreatment with isoflurane did not show any influence on the caffeine-induced increase of [Ca²⁺]_i. Similarly, using whole-cell recording, isoflurane increased the peak amplitude of I_{VDCC} in the cultured neurons from rat hippocampus by depolarization pulses. Isoflurane (0.25, 0.5, 0.75, and 1 minimum alveolar concentration [MAC]) potentiated I_{VDCC} peak current amplitude by 109.11% ± 9.03%, 120.56% ± 11.46%, 141.33% ± 13.87%, and 146.78% ± 15.87%, respectively. To analyze variation in protein levels, the effect of treatments with isoflurane on caspase-3 activity was dose- and time-dependent, reaching a maximal caspase-3 activity after exposure to 1 MAC for 6 hours (*P* < 0.001). However, in the mRNA levels, hippocampal caspase-3 mRNA levels began to be significantly increased in isoflurane-treated developing rat hippocampal neurons after 6 hours of exposure to 0.25 MAC isoflurane (*P* < 0.001).

CONCLUSIONS: Isoflurane-mediated enhancement of GABA-triggered [Ca²⁺]_i release results from membrane depolarization with subsequent activation of VDCCs and further Ca²⁺-induced Ca²⁺ release from the ryanodine-sensitizing Ca²⁺ store. An increase in [Ca²⁺]_i, caused by activation of the GABA_A receptor and opening of VDCCs, is necessary for isoflurane-induced calcium overload of immature rat hippocampal neurons, which may be involved in the mechanism of an isoflurane-induced neurotoxic effect in the developing rodent brain.

在大鼠中，远端肢体后处理可以通过 δ 蛋白激酶 C 的活性氧调节抑制剂降低大脑再灌注损伤

Limb Remote Postconditioning Alleviates Cerebral Reperfusion Injury Through Reactive Oxygen Species-Mediated Inhibition of Delta Protein Kinase C in Rats

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背景：现在认为，远隔缺血后处理对于脑梗死的保护有一定作用，但是其机制尚不清楚。本研究的目的是证实在大鼠脑缺血模型中活性氧和 δ 蛋白激酶C对于实现远隔缺血后处理的脑保护作用以及两者之间的联系。

方法：在雄性大鼠中通过夹闭大脑中动脉来建立大鼠脑缺血模型。大脑中动脉再灌注时通过反复夹闭/再灌注右侧大腿股动脉来实行远隔缺血后处理，3-10分钟一个周期。研究中分别只进行远隔缺血后处理或者事先给予N-乙酰半胱氨酸（一种活性氧的清除剂）。在各组中，再灌注开始时分别给予TAT- δ V1-1，一种 δ 蛋白激酶C的选择性肽抑制剂。大脑缺血损伤程度由神经病学评分，梗死面积以及TUNEL染色来判定。在缺血半影区 δ 蛋白激酶C被激活，再灌注后可以被蛋白质印迹发现。

结果：远隔缺血后处理提高了神经疾病的预后，减少梗死面积，抑制神经细胞凋亡以及再灌注后 δ 蛋白激酶C的激活。另外，给予TAT- δ V1-1后可以抑制再灌注损伤，从而保护大脑。再灌注后， δ 蛋白激酶C激活，若事先给予N-乙酰半胱氨酸不仅完全抑制了远隔缺血后处理的脑保护作用，而且逆转了远隔缺血后处理引起的抑制 δ 蛋白激酶C激活的作用。

结论：结果显示大鼠模型局部脑缺血后，通过 δ 蛋白激酶C的活性氧调节抑制剂，远隔缺血后处理可以减少再灌注损伤。

(张婷 译 陈杰 校)

BACKGROUND: Remote ischemic postconditioning (RPostC) is an emerging concept for cerebral infarction protection, and its potential protective mechanisms have not been well established. We attempted to investigate the implications of reactive oxygen species (ROS) and δ protein kinase C (δ PKC) in neuroprotection induced by RPostC in a rat model of focal cerebral ischemia, and also to explore a possible relationship between ROS and δ PKC.

METHODS: Focal cerebral ischemia was induced by middle cerebral artery occlusion using the intraluminal filament technique in male rats. RPostC was generated by 3 10-minute cycles of femoral artery occlusion/reperfusion on the right limb at the onset of middle cerebral artery reperfusion. RPostC was performed alone or with pretreatment of N-acetylcysteine, a ROS scavenger. In separate group, TAT- δ V1-1, a δ PKC-selective peptide inhibitor, was administered at the onset of reperfusion. Brain ischemic injury was evaluated by neurologic scores, infarction volumes, and TUNEL staining. Moreover, the activation of δ PKC in the ischemic penumbra was investigated by Western blot after reperfusion.

RESULTS: RPostC improved neurologic outcome, reduced infarct size, and inhibited neuronal apoptosis as well as suppressed the activation of δ PKC after reperfusion. Moreover, systemic delivery of TAT- δ V1-1 conferred neuroprotection against cerebral reperfusion injury at the onset of reperfusion. Pretreatment with N-acetylcysteine not only completely prevented all aspects of RPostC-induced neuroprotection, but also reversed RPostC-induced inhibition of δ PKC activation after reperfusion.

CONCLUSION: These findings suggested that RPostC performed in one limb alleviated reperfusion injury after focal cerebral ischemia through ROS-mediated inhibition of endogenous δ PKC activation signaling cascade in an in vivo rat model of focal cerebral ischemia.

一项门诊腹腔镜后腹横肌阻滞对术后恢复质量及镇痛影响的剂量研究

A Dose-Ranging Study of the Effect of Transversus Abdominis Block on Postoperative Quality of Recovery and Analgesia After Outpatient Laparoscopy

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背景: 术后疼痛可延缓门诊术后功能恢复。多渠道镇痛可改善术后疼痛并提高复苏质量。该研究中,作者利用复苏质量(QoR-40)问卷调查,来评估妇科腹腔镜手术腹横肌平面(TAP)阻滞的剂量效果反应。QoR-40分值从40至200,分别代表非常差至复苏质量高。

方法: 门诊妇科腹腔镜手术患者随机术前给予生理盐水、0.25%罗哌卡因或0.5%罗哌卡因进行TAP阻滞。由一名不知情的研究者在超声引导下双侧TAP阻滞局麻药或生理盐水15 mL)。术后24小时内进行QoR-40评分来评估镇痛效果。主要结果为术后24小时为QoR-40评分。数据分析采用Kruskal-Wallis检验。6对事后成对比较采用Dunn检验P值和Bonferroni校正95%可信区间。

结果: 75例患者入组,其中70名受试者完成了这项研究。TAP阻滞,生理盐水组、0.25%罗哌卡因组、0.5%罗哌卡因组QoR-40评分分别为157(127-193),173(133-195),和172(130-196)。0.5%罗哌卡因组、0.25%罗哌卡因组QoR-40评分的平均差(99.2%可信区间)分别为17[2-31], $P=0.01$;16[1-30], $P=0.03$,均高于生理盐水组(-1[-16 to 12], $P=1.0$),但两者无明显差异。QoR-40评分增加对应减少麻醉后恢复过程中疼痛时间区域曲线($\rho=-0.56$,99.2%上限(UCL)=0.28),24小时阿片类药物使用($\rho=-0.61$,99.2%UCL=-0.34)、24小时内疼痛评分(0-10分),($\rho=-0.53$,99.2%UCL=-0.25),及出院时间($\rho=-0.65$,99.2%UCL=0.42)。上述变量在罗哌卡因组均低于生理盐水组。

结论: TAP阻滞是腹腔镜术后多模式镇痛中一种有效的辅助镇痛方法。使用0.5%罗哌卡因或0.25%罗哌卡因可减少疼痛及阿片类药物使用,并提供更好的恢复质量并促使尽早出院。

(陈毓雯 译 陈杰 校)

BACKGROUND: Postoperative pain can delay functional recovery after outpatient surgery. Multimodal analgesia can improve pain and possibly improve quality of recovery. In this study, we evaluated the dose-dependent effects of a preoperative transversus abdominis plane (TAP) block on patient recovery using the Quality of Recovery 40 (QoR-40) questionnaire after ambulatory gynecological laparoscopic surgery. Global QoR-40 scores range from 40 to 200, representing very poor to outstanding quality of recovery, respectively.

METHODS: Healthy women undergoing outpatient gynecological laparoscopy were randomly allocated to receive a preoperative TAP block using saline, ropivacaine 0.25%, or ropivacaine 0.5%. Needle placement for the TAP blocks was performed using ultrasound guidance and 15 mL of the study solution was injected bilaterally by a blinded investigator. QoR-40 score and analgesic use were assessed 24 hours postoperatively. The primary outcome was global QoR-40 score at 24 hours after surgery. Data were analyzed using the Kruskal-Wallis test. Post hoc pairwise comparisons were made using the Dunn test with *P* values and 95% confidence intervals Bonferroni corrected for 6 comparisons.

RESULTS: Seventy-five subjects were enrolled and 70 subjects completed the study. The median (range) for the QoR-40 score after the TAP block was 157 (127–193), 173 (133–195), and 172 (130–196) for the saline group and 0.25% and 0.5% ropivacaine groups, respectively. The median difference (99.2% confidence interval) in QoR-40 score for 0.5% bupivacaine (16 [1–30], *P* = 0.03) and 0.25% bupivacaine (17 [2–31], *P* = 0.01) was more than saline but not significantly different between ropivacaine groups (–1 [–16 to 12], *P* = 1.0). Increased global QoR-40 scores correlated with decreased area under the pain score time curve during postanesthesia recovery room stay (ρ = –0.56, 99.2% upper confidence limit [UCL] = –0.28), 24-hour opioid consumption (ρ = –0.61, 99.2% UCL = –0.34), pain score (0–10 scale) at 24 hours (ρ = –0.53, 99.2% UCL = –0.25), and time to discharge readiness (ρ = –0.65, 99.2% UCL = –0.42). The aforementioned variables were lower in the TAP block groups receiving ropivacaine compared with saline.

CONCLUSIONS: The TAP block is an effective adjunct in a multimodal analgesic strategy for ambulatory laparoscopic procedures. TAP blocks with ropivacaine 0.25% and 0.5% reduced pain, decreased opioid consumption, and provided earlier discharge readiness that was associated with better quality of recovery.

超前镇痛：何去何从？

Review Article: Preventive Analgesia: Quo Vadimus?

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传统对超前镇痛的界定需要两组患者在术前或术后接受相同治疗。两组患者唯一的不同点是给药的时间点不同。手术后给药这组的实验结果往往是令人感兴趣的，这是由于产生了阳性结果，这一结果为我们提供了在哪个时间段内给药能观察到效果这一“时间窗”，其可能的机制如下所示：传统观点假设术中伤害性刺激所导致的术后疼痛远远大于术后伤害性刺激对术后疼痛的影响。然而，这一观点过于狭隘，因为众所周知，致敏作用由很多因素影响包括切皮及术中相关有害因素引起的外周伤害性刺激。预防术后疼痛的方法可以主要概括为最小化的减少手术期间直接有害因素及长效有害因素的产生。对于超前镇痛，我们不应该聚焦在镇痛药物及镇静麻醉药物的给药时间上，而是应该聚焦在尽量减少术前术中及术后外周伤害性刺激。这些有害刺激包括外周致敏及中枢致敏，这会增加术后疼痛强度并且增加镇痛药物

的需要量。保护致敏现象能减少疼痛及减少镇痛药物用量。当术后疼痛及术后镇痛药减少量超过了药物的持续时间则证实产生疼痛保护。这一结果表明，我们观察到的镇痛现象并不是镇痛药物的直接作用。在这篇文章中，笔者简要回顾了超前镇痛的历史及镇痛保护的广义定义，笔者特别强调了一些超前镇痛及疼痛保护的设计实验及文献，并为其进来的研究作一展望。

(赵嫣红 译 陈杰 校)

The classic definition of preemptive analgesia requires 2 groups of patients to receive identical treatment before or after incision or surgery. The only difference between the 2 groups is the timing of administration of the drug relative to incision. The constraint to include a postincision or postsurgical treatment group is methodologically appealing, because in the presence of a positive result, it provides a window of time within which the observed effect occurred, and thus points to possible mechanisms underlying the effect: the classic view assumes that the intraoperative nociceptive barrage contributes to a greater extent to postoperative pain than does the postoperative nociceptive barrage. However, this view is too restrictive and narrow, in part because we know that sensitization is induced by factors other than the peripheral nociceptive barrage associated with incision and subsequent noxious intraoperative events. A broader approach to the prevention of postoperative pain has evolved that aims to minimize the deleterious immediate and long-term effects of noxious perioperative afferent input. The focus of preventive analgesia is not on the relative timing of analgesic or anesthetic interventions, but on attenuating the impact of the peripheral nociceptive barrage associated with noxious preoperative, intraoperative, and/or postoperative stimuli. These stimuli induce peripheral and central sensitization, which increase postoperative pain intensity and analgesic requirements. Preventing sensitization will reduce pain and analgesic requirements. Preventive analgesia is demonstrated when postoperative pain and/or analgesic use are reduced beyond the duration of action of the target drug, which we have defined as 5.5 half-lives of the target drug. This requirement ensures that the observed effects are not direct analgesic effects. In this article, we briefly review the history of preemptive analgesia and relate it to the broader concept of preventive analgesia. We highlight clinical trial designs and examples from the literature that distinguish preventive analgesia from preemptive analgesia and conclude with suggestions for future research.

腹腔内罗哌卡因雾化疗法用于腹腔镜胆囊切除术后镇痛：与腹腔内灌注疗法的比较研究

Intraperitoneal Ropivacaine Nebulization for Pain Management After Laparoscopic Cholecystectomy: A Comparison with Intraperitoneal Instillation

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背景：关于腹腔内灌注局部麻醉药用于腹腔镜术后疼痛缓解治疗的研究结果目前仍存在争议。在本次随机、双盲研究中，作者评估了腹腔内雾化喷射局部麻醉药对腹腔镜胆囊切除术后疼痛的缓解作用。

方法：将接受择期腹腔镜胆囊切除术的患者随机分为两组：一组患者在气腹后即刻在腹腔内管着 0.5% 罗哌卡因 20ml，另一组患者在术前以及术后在腹腔内雾化喷射 1% 罗哌卡因各 3ml。所有的患者均采用标准化的麻醉和手术方案。在术后第 6、24 和 48 小时评估患者的静息及深呼吸时疼痛程度、肩部痛的发生率、吗啡的消耗量、无需借助外力步行的时间以及术后恶心呕吐的发生情况。

结果：在 60 位纳入研究的患者中，3 位因手术中转开腹而剔除。两组患者的疼痛评分或吗啡消耗量没有明显的差异。雾化治疗组的患者中无一例发生肩部痛，而灌注治疗组的患者中有 83% 发生了肩部疼痛（绝对风险减少-83，95% 置信区间-70 至 -90， $p < 0.001$ ）。雾化治疗组的患者中，有 19 位（70%）在术后 12 小时即可不借助外力步行，在灌注治疗组该数据为 14 位（47%）（绝对风险减少-24，95% 置信区间-48 至 1， $p = 0.04$ ）。术后发生呕吐的患者数在灌注治疗组和雾化治疗组分别为 1 位（3%）和 6 位（22%）。

结论：腹腔内罗哌卡因雾化疗法可减少腹腔镜胆囊切除术后肩部疼痛，并可使患者提早下床自主活动，但其术后呕吐的发生率较高。

(周姝婧 译 陈杰 校)

BACKGROUND: Studies evaluating intraperitoneal local anesthetic instillation for pain relief after laparoscopic procedures have reported conflicting results. In this randomized, double-blind study we assessed the effects of intraperitoneal local anesthetic nebulization on pain relief after laparoscopic cholecystectomy.

METHODS: Patients undergoing elective laparoscopic cholecystectomy were randomly assigned to receive either instillation of ropivacaine 0.5%, 20 mL after induction of the pneumoperitoneum, or nebulization of ropivacaine 1%, 3 mL before and after surgery. Anesthetic and surgical techniques were standardized. Degree of pain at rest and on deep breathing, incidence of shoulder pain, morphine consumption, unassisted walking time, and postoperative nausea and vomiting were evaluated at 6, 24, and 48 hours after surgery.

RESULTS: Of the 60 patients included, 3 exclusions occurred for conversion to open surgery. There were no differences between groups in pain scores or in morphine consumption. No patients in the nebulization group presented significant shoulder pain in comparison with 83% of patients in the instillation group (absolute risk reduction -83, 95% CI -97 to -70, $P < 0.001$). Nineteen (70%) patients receiving nebulization walked without assistance within 12 hours after surgery in comparison with 14 (47%) patients receiving instillation (absolute risk reduction -24, 95% CI -48 to 1, $P = 0.04$). One (3%) patient in the instillation group vomited in comparison with 6 (22%) patients in the nebulization group (absolute risk reduction -19%, 95% CI -36 to -2, $P = 0.03$).

CONCLUSIONS: Intraperitoneal ropivacaine nebulization was associated with reduced shoulder pain and unassisted walking time but with an increased incidence of postoperative vomiting after laparoscopic cholecystectomy.

在麻醉科术前评估门诊使用 BATHE 法

Use of the BATHE Method in the Preanesthetic Clinic Visit

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背景：在最初的术前访视过程中，使用 BATHE 法（询问背景、干预措施、发现问题、解决方法、移情作用）对病人进行问诊可以增加病人的满意度。此方法是一项可以发现病人身心疾病的简明的心理学疗法。目前并没有对 BATHE 法作为提高病人术前满意度的一种方法进行评价。在本次研究中，我们希望了解麻醉医生在术前评估病人时使用 BATHE 法是否能增加手术病人术前的满意度。

方法：我们在一家学术性医院的麻醉前门诊访视了 50 名心外科手术病人和 50 名普外科手术病人。所有病人随机分到 BATHE 组和对照组，并被要求在访视后完成一项不记名的满意度调查。这个调查是从近期研究加工后制定的，但并未在其他研究中验证过。与访视过程、病人满意度及病人对 BATHE 各项的报告相关的可能影响 BATHE 结果的相关因素我们同样都进行了调查。

结果：研究小组访视的病人中有 92% 自愿加入本次研究中。用 BATHE 方法访视的病人报告较对照组显著更频繁地被询问所有的 BATHE 问题： $t(98) = 19.10, P = 0.001$ (95% 置信区间 [CI] = 2.59, 3.20)。在麻醉科术前评估门诊中，BATHE 组病人较对照组满意度更高： $t(98) = 5.37, P = 0.001$ (95% CI = 0.19, 0.41)。使用 BATHE 法并没有显著增加医生评估病人所花的时间： $t(98) = 0.110, P = 0.912$ (95% CI = -1.519, 1.359)。

结论：本次初步研究显示在学术性医疗中心的心外科和普外科麻醉前门诊使用 BATHE 法进行访视，结果是有希望的。在我们能够令人信服地得出结论认定 BATHE 法是增加患者满意度的有效手段之前，我们还需要更加有效和完善的调查方法进行研究。

（刘伍 译 马皓琳 李士通 校）

BACKGROUND: In the primary care setting, use of the BATHE (Background, Affect, Trouble, Handling, and Empathy) method of interviewing has been shown to increase patient satisfaction. This technique is a brief psychotherapeutic method used to address patients' physical and psychosocial problems. The BATHE technique has not been evaluated in the perioperative setting as a way of improving patient satisfaction. In this study, we sought to determine whether satisfaction could be enhanced by use of the BATHE technique during the preoperative evaluation by anesthesiologists.

METHODS: Fifty cardiac and 50 general surgery patients were interviewed in the preanesthesia clinic (PAC) of an academic hospital. They were randomly enrolled in the

BATHE group or the control group and asked to complete an anonymous satisfaction survey after their visit. This survey was modified from current studies and not validated elsewhere. The relative influence of the BATHE condition was examined as it pertained to interview duration, patient satisfaction, and patient report of the BATHE items being asked.

RESULTS: Ninety-two percent of patients approached by the study group voluntarily enrolled. Patients interviewed using the BATHE method reported being asked about all BATHE questions significantly more often than control patients: $t(98) = 19.10$, $P = 0.001$ (95% confidence interval [CI] = 2.59, 3.20). Patients in the BATHE group were more satisfied with their visit to the PAC than those in the control group: $t(98) = 5.37$, $P = 0.001$ (95% CI = 0.19, 0.41). The use of the BATHE method did not significantly increase the amount of time physicians spent evaluating patients: $t(98) = 0.110$, $P = 0.912$ (95% CI = -1.519, 1.359).

CONCLUSIONS: Use of the BATHE method in an academic medical center's cardiac and general PAC showed promising results in this preliminary study. A validated and fully developed survey instrument is needed before we can convincingly conclude that the BATHE method is an effective way of improving patient satisfaction.

新型水溶性镇静催眠药 JM-1232(-)对小鼠海马 CA1 区长时程增强效应的影响

The Effect of a New Water-Soluble Sedative-Hypnotic Drug, JM-1232(-), on Long-Term Potentiation in the CA1 Region of the Mouse Hippocampus

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背景: JM-1232(-){(-)-3-[2-(4-甲基-1-哌嗪基)-2-氧代乙基]-2-苯-3,5,6,7-四氢环戊二烯并 a[f]异吲哚-1(2H)-酮}是一种对 γ -氨基丁酸 A 受体上苯二氮卓结合位点具有亲和力的新型水溶性镇静催眠药物。JM-1232(-)对大脑突触传递的效应还不甚明了。我们在本实验中研究了 JM-1232(-)对小鼠海马切片 CA1 区锥体细胞突触传递、突触可塑性(如长时程增强效应[LTP]和成对脉冲易化)以及兴奋性/抑制性突触后电流 (EPSCs/IPSCs)的影响。

方法: 在小鼠海马脑片 CA1 区,我们采用全细胞膜片钳技术记录了 Schaffer 侧枝刺激诱发的区域兴奋性突触后电位和锥体细胞的 EPSCs 和 IPSCs。

结果: JM-1232(-)对区域兴奋性突触后电位无明显影响。在 θ 短阵快速脉冲刺激前, JM-1232(-)处理脑片 20min 能够剂量依赖性地损伤 LTP。JM-1232(-)也损伤成对脉冲易化。苯二氮卓激动剂氟马西尼抵消了 JM-1232(-)对 LTP 和成对脉冲易化的抑制作用。JM-1232(-)对 Schaffer 侧枝刺激诱发的 EPSCs 无影响,反而能增加 CA1 区锥体细胞中诱发的 IPSCs 的振幅,并延长其衰退。氟马西尼阻断 JM-1232(-)对诱发的 IPSCs 振幅和衰退的影响。JM-1232(-)抑制 θ 短阵快速脉冲刺激过程中 CA1 区锥体细胞动作电位放电,且此作用可被氟马西尼逆转。

结论：JM-1232(-)增强小鼠海马 CA1 区神经元的突触抑制，并损伤 LTP 和成对脉冲易化。这些作用是通过 γ -氨基丁酸 A 受体上苯二氮卓类结合位点介导的。
(江继宏 译 马皓琳 李士通 校)

BACKGROUND:

JM-1232(-){(-)-3-[2-(4-methyl-1-piperazinyl)-2-oxoethyl]-2-phenyl-3,5,6,7-tetrahydrocyclopenta[*f*]isoindol-1(2*H*)-one} is a new water-soluble sedative-hypnotic drug with affinity for the benzodiazepine binding site on γ -aminobutyric acid A receptors. The effects of JM-1232(-) on synaptic transmission in the brain are not known. In the present study, we investigated the effects of JM-1232(-) on synaptic transmission, synaptic plasticity (i.e., long-term potentiation [LTP] and paired-pulse facilitation), and excitatory/inhibitory postsynaptic currents (EPSCs/IPSCs) of pyramidal neurons in the CA1 region of mouse hippocampal slices.

METHODS: We recorded Schaffer collateral-evoked field excitatory postsynaptic potentials and EPSCs and IPSCs of pyramidal neurons using whole-cell patch-clamp techniques in the CA1 region of mouse hippocampal slices.

RESULTS: JM-1232(-) had no significant effect on the field excitatory postsynaptic potentials. Application of JM-1232(-) for 20 minutes before theta-burst stimulation dose dependently impaired LTP. JM-1232(-) impaired paired-pulse facilitation. The benzodiazepine antagonist flumazenil abolished the inhibitory effect of JM-1232(-) on LTP and paired-pulse facilitation. JM-1232(-) had no effect on Schaffer collateral stimulation-evoked EPSCs, whereas it potentiated the amplitude and prolonged the decay of evoked IPSCs in CA1 pyramidal neurons. Flumazenil blocked the effect of JM-1232(-) on the amplitude and decay of evoked IPSCs. JM-1232(-) suppressed the action potential discharge in the CA1 pyramidal neurons during theta-burst stimulation, which was reversed by flumazenil.

CONCLUSION: JM-1232(-) enhances synaptic inhibition and impairs LTP and paired-pulse facilitation in area CA1 of the mouse hippocampus. These effects were mediated by benzodiazepine binding sites on γ -aminobutyric acid A receptors.

对一种新型麻醉药物清除接口的初步评估

An Initial Evaluation of a Novel Anesthetic Scavenging Interface

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在过去的 30 年间麻醉废气清除技术没有发生一点变化。开放式贮气系统产生高容量的室内空气并且在排入大气前稀释废气。这个过程需要一个大的真空泵，它需要昂贵的安装并且即使效率非常高也需要连续运转，并且接近满负荷生产。在一个能源成本和环保意识日益增长的时代，减少碳足迹是一个优先选项，并且安全清除麻醉废气的更加高效的系统是非常可取的。我们测试了一个低流量清除接口来评估成本和能源的节省潜力。这种接口应用在一排 4 个术间使每台麻醉机的清除流量从恒定的 37L/min 降低到等于新鲜气流量的值（通常是 2L/min）。应用通气机增加了

这种流量约 6 L/min，是因为通气机驱动气体排出到清除环路。中央真空泵的日常工作负荷从 92% 降到 12%（表达为工作期）。新系统节约了能源并且可能增加了真空泵寿命。

（刘朝辉译，马皓琳，李士通校）

Waste anesthetic gas scavenging technology has not changed appreciably in the past 30 years. Open reservoir systems entrain high volumes of room air and dilute waste gases before emission into the atmosphere. This process requires a large vacuum pump, which is both costly to install and, although efficient, operates continuously and at near-full capacity. In an era of increasing energy costs and environmental awareness, carbon footprint reduction is a priority and a more efficient system of safely scavenging waste anesthetic gases is desirable. We tested a low-flow scavenger interface to evaluate the potential for cost and energy savings. The use of this interface in a suite of 4 operating rooms reduced scavenging flow from a constant 37 L/min to a value equal to the fresh gas flow (usually 2 L/min) for each anesthesia machine. Using the ventilator increased this flow by approximately 6 L/min because of the exhaust of ventilator drive gas into the scavenging circuit. Daytime workload of the central vacuum pump decreased from 92% to 12% (expressed as duty cycle). The new system produces energy savings and may increase vacuum pump lifespan.

Pentax-AWS 视频喉镜与 Macintosh 喉镜用于病态肥胖患者的随机对照研究

A Randomized Comparison Between the Pentax AWS Video Laryngoscope and the Macintosh Laryngoscope in Morbidly Obese Patients

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背景：Pentax-AWS 是一种新型视频喉镜，通过提供喉入口的间接可视化影像以便于气管插管。本试验旨在比较 Pentax-AWS 喉镜与经典的 Macintosh 喉镜的插管成功率以及插管时间。我们还特别检验了以下假说：在肥胖患者中使用 Pentax-AWS 喉镜插管比标准的 Macintosh #4 喉镜片更快、更方便。

方法：105 名需经口气管插管行择期手术的肥胖患者（体重指数 30~50 kg/m²）随机分配到 Macintosh（用#4 喉镜片）插管或 Pentax-AWS 喉镜插管组。由两名经验丰富的麻醉医师作为喉镜检查专家。记录插管成功率、插管时间、插管难度和并发症发生率。

结果：使用 Macintosh 喉镜和 #4 喉镜片插管明显快于使用 Pentax-AWS 装置：半数使用 Macintosh #4 喉镜片的患者成功在 26 秒内完成气管插管，而使用 AWS 喉镜达到同样比例需要 38 秒。使用 Pentax-AWS 喉镜首次尝试的成功率为 86%，二次尝试的成功率增加到 90%。相比之下，所有使用 Macintosh #4 喉镜片的患者均成功完成气管插管，首次尝试的成功率为 92%，二次尝试的成功率增加到 100%。

结论：使用 Pentax-AWS 喉镜行气管插管所需时间长于 Macintosh 喉镜和 #4 喉镜片。在病态肥胖患者中不应该常规用 AWS 喉镜替代传统的 Macintosh #4 喉镜片。

(陈彬彬译 马皓琳 李士通校)

BACKGROUND: The Pentax AWS is a novel video laryngoscope designed to facilitate tracheal intubation by providing indirect visualization of the laryngeal inlet. We sought to compare the intubation success rate and time to intubation for the Pentax AWS and the classic Macintosh laryngoscope. Specifically, we tested the hypothesis that intubation with the Pentax AWS would be easier and faster than with a standard Macintosh #4 blade in obese patients.

METHODS: One hundred five obese patients (body mass index between 30 and 50 kg/m²) requiring orotracheal intubation for elective surgery were allocated randomly to tracheal intubation with either the Macintosh (using a #4 blade) or the Pentax AWS laryngoscope. Two experienced anesthesiologists served as laryngoscopists. Intubation success rate, time to intubation, ease of intubation, and occurrence of complications were recorded.

RESULTS: Intubations using the Macintosh laryngoscope and #4 blade were significantly faster than with the Pentax AWS device: half of the patients' tracheas were intubated successfully within 26 seconds with the Macintosh #4 blade, whereas the same fraction required 38 seconds with the AWS. The first-attempt success rate with the Pentax AWS was 86%; the rate increased to 90% with a second attempt. In contrast, all patients' tracheas were intubated successfully with the Macintosh #4 blade, with a first-attempt success rate of 92%, which increased to 100% by the second attempt.

CONCLUSION: The time required for tracheal intubation using the Pentax AWS was longer than for the Macintosh laryngoscope and #4 blade. The AWS should not routinely be substituted for a conventional Macintosh #4 blade in morbidly obese patients.

恶性高热研究及患者监护的未来方向

Future Directions in Malignant Hyperthermia Research and Patient Care

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恶性高热 (MH) 是一个复杂的肌肉代谢的遗传性药理学紊乱疾病。为了更进一步调查 MH 以及其他相关肌肉紊乱疾病的复杂性, 美国恶性高热协会 (MHAUS) 最近发起了一项科学会议, 在会上不同学科组的专家聚集一堂, 分享新信息及新观念。在这篇专文中, 我们着重于会议提出的在 MH 研究及患者护理方面的关键概念及理论, 同时还有令人欣喜的新的趋势和挑战。

(瞿亦枫 译 马皓琳 李士通 校)

Malignant hyperthermia (MH) is a complex pharmacogenetic disorder of muscle metabolism. To more closely examine the complexities of MH and other related muscle disorders, the Malignant Hyperthermia Association of the United States (MHAUS) recently sponsored a scientific conference at which an interdisciplinary group of experts gathered to share new information and ideas. In this Special Article, we highlight key concepts and theories presented at the conference along with exciting new trends and challenges in MH research and patient care.

同胞出生群组中孩童时期早期麻醉暴露及发育和行为失常的风险

Early Childhood Exposure to Anesthesia and Risk of Developmental and Behavioral Disorders in a Sibling Birth Cohort

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背景：在体内和体外实验中，麻醉药的研究已经证实对发育中的大脑有严重的神经毒性反应。然而，这些发现对于进行麻醉的儿童临床相关性尚不清晰。应用从同胞出生群组得到的数据，我们评价了低于3岁手术病人的麻醉暴露与发育和行为失常风险之间的关系。

方法：我们组建了一个回顾性研究的队列，包括出生于1999年至2005年之间并且登记入纽约州医疗援助计划的10450名同胞儿童。暴露组为304名无发育和行为失常病史并在小于3岁时接受了外科手术的儿童。非暴露组为10146名在3岁以前没有接受任何外科手术的儿童。暴露组患儿在手术之日进入数据分析。非暴露组在10月龄（暴露组进行手术的平均年龄）进入数据分析。随访暴露组和非暴露组儿童，直到诊断为发育或行为异常、失随访或2005年底。用比例危险度模型以及配对检验分析评价麻醉暴露与随后的发育和行为失常之间的关系。

结果：在暴露组群中，发育和行为失常的发生率为每1000人一年中128.2例诊断。而在非暴露组群中，为每1000人一年中56.3例诊断。通过调整性别和分娩相关的医学并发症史以及同胞情况的聚集，3岁以前暴露于麻醉相关的发育和行为失常的估计危害比为1.6（95%可信区间 [CI] 为1.4, 1.8）。手术次数增加，危险度增加：1次手术的危险度为1.1（95% CI: 0.8, 1.4），而2次手术的危险度为2.9（94% CI: 2.5, 3.1），大于等于3次手术的危险度为4.0（95% CI: 3.5, 4.5）。138对同胞之间进行配对分析，相对危险度为0.9（95% CI: 0.6, 1.4）。

结论：进入州医疗援助计划且小于3岁时曾经进行手术的患儿随后诊断为发育和行为失常的风险比未接受过外科手术的同胞儿童的相近群组风险高60%。更为严谨的配对分析提示过分危险的程度归因于麻醉或由待确定的不可测的因素介导。

（黄丽娜 译 马皓琳 李士通 校）

BACKGROUND: In vitro and in vivo studies of anesthetics have demonstrated serious neurotoxic effects on the developing brain. However, the clinical relevance of these findings to children undergoing anesthesia remains unclear. Using data from a sibling birth cohort, we assessed the association between exposure to anesthesia in the setting of

surgery in patients younger than 3 years and the risk of developmental and behavioral disorders.

METHODS: We constructed a retrospective cohort of 10,450 siblings who were born between 1999 and 2005 and who were enrolled in the New York State Medicaid program. The exposed group was 304 children without a history of developmental or behavioral disorders who underwent surgery when they were younger than 3 years. The unexposed group was 10,146 children who did not receive any surgical procedures when they were younger than 3 years. Exposed children were entered into analysis at the date of surgery. Unexposed children were entered into analysis at age 10 months (the mean age at which exposed children underwent surgery). Both exposed and unexposed children were followed until diagnosis with a developmental or behavioral disorder, loss to follow-up, or the end of 2005. The association of exposure to anesthesia with subsequent developmental and behavioral disorders was assessed with both proportional hazards modeling, and pair-matched analysis.

RESULTS: The incidence of developmental and behavioral disorders was 128.2 diagnoses per 1000 person-years for the exposed cohort and 56.3 diagnoses per 1000 person-years for the unexposed cohort. With adjustment for sex and history of birth-related medical complications, and clustering by sibling status, the estimated hazard ratio of developmental or behavioral disorders associated with any exposure to anesthesia when they were younger than 3 years was 1.6 (95% confidence interval [CI]: 1.4, 1.8). The risk increased from 1.1 (95% CI: 0.8, 1.4) for 1 operation to 2.9 (94% CI: 2.5, 3.1) for 2 operations and 4.0 (95% CI: 3.5, 4.5) for ≥ 3 operations. The relative risk in a matched analysis of 138 sibling pairs was 0.9 (95% CI: 0.6, 1.4).

CONCLUSION: The risk of being subsequently diagnosed with developmental and behavioral disorders in children who were enrolled in a state Medicaid program and who had surgery when they were younger than 3 years was 60% greater than that of a similar group of siblings who did not undergo surgery. More tightly matched pairwise analyses indicate that the extent to which the excess risk is causally attributable to anesthesia or mediated by unmeasured factors remains to be determined.

麻醉药品对发育中大脑的神经毒性

Neurotoxicity of Anesthetic Drugs in the Developing Brain

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麻醉会导致婴儿期动物（包括灵长类动物）的脑部神经元死亡，并可导致永久性和进行性神经认知水平下降。麻醉界和监管当局同样关心人类是否也是这样。在本综述中，我总结了我們目前了解的小儿麻醉对于长期认知功能的風險。如果在人类中发现麻醉导致认知能力的下降，我们需要知道如何预防和治疗。预防需要了解麻醉引起的认知能力下降的机制。本综述概述了一些已经被提出的麻醉引起认知能力下降的机制，并讨论了可能的治疗选择。如果在人类中麻醉导致认知能力的下降，我们需要知道什么类型麻醉和多长的麻醉是安全的，并且如果有的话，什么是不安全的。本综述讨论了关于动物麻醉的神经毒性的比较性研究的早期结果。在我们知道

儿科麻醉是否影响人类的认知和如何影响之前，改变麻醉实践还为时过早，没有更好的供选方案的证据可以遵循，因此还有潜在的危险。由国际麻醉研究学会及食品和药物管理局共同自发支持的 SmartTots 的目的是，为设计来揭示这些麻醉界和公众同样高度重视的问题的研究提供经费，因此值得这些感兴趣的群体的全力支持。（唐亮 译 马皓琳 李士通 校）

Anesthesia kills neurons in the brain of infantile animals, including primates, and causes permanent and progressive neurocognitive decline. The anesthesia community and regulatory authorities alike are concerned that is also true in humans. In this review, I summarize what we currently know about the risks of pediatric anesthesia to long-term cognitive function. If anesthesia is discovered to cause cognitive decline in humans, we need to know how to prevent and treat it. Prevention requires knowledge of the mechanisms of anesthesia-induced cognitive decline. This review gives an overview of some of the mechanisms that have been proposed for anesthesia-induced cognitive decline and discusses possible treatment options. If anesthesia induces cognitive decline in humans, we need to know what type and duration of anesthetic is safe, and which, if any, is not safe. This review discusses early results of comparative animal studies of anesthetic neurotoxicity. Until we know if and how pediatric anesthesia affects cognition in humans, a change in anesthetic practice would be premature, not guided by evidence of better alternatives, and therefore potentially dangerous. The SmartTots initiative jointly supported by the International Anesthesia Research Society and the Food and Drug Administration aims to fund research designed to shed light on these issues that are of high priority to the anesthesia community and the public alike and therefore deserves the full support of these interest groups.

**一项全髋关节置换术后病人自控硬膜外布比卡因和可乐定镇痛的前瞻性调查：
1000 名患者用布比卡因和氢吗啡酮改变前后的比较**

A Prospective Survey of Patient-Controlled Epidural Analgesia with Bupivacaine and Clonidine After Total Hip Replacement: A Pre- and Postchange Comparison with Bupivacaine and Hydromorphone in 1,000 Patients

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背景和目的：用布比卡因和氢吗啡酮的病人自控硬膜外镇痛（PCEA）可以提供矫形外科手术的高质量镇痛效果，但是同时伴随着阿片类药物相关副作用的高发生率（15%–30%）。硬膜外可乐定有不同的副作用，但是没有记录其使用的大样本调查。我们进行了此项前瞻性调查，以评估全髋置换术后将 PCEA 从用布比卡因/氢吗啡酮改为布比卡因/可乐定前后的镇痛和副作用的情况。

方法：五百名接受 0.06% 布比卡因和氢吗啡酮（10 mcg/mL）PCEA 的连续患者作为之前描述的改变前的对照组。该标准镇痛方案随后系统性地改为 0.06% 布比卡因和可乐定（1mcg/mL），PCEA 设置和围术期医护均不变，五百名连续病人作为改变后组。前瞻性输入所有数据，然后从电子医疗记录中提取。采集的数据包括每日

口头疼痛评分（VPS）、瘙痒、恶心、低血压、静脉注射液体的需要、镇静和呼吸抑制。测定对改变的员工满意程度的在线调查表发给所有参与的外科医生、麻醉医师、理疗医生以及医师助理。

结果：2组病人的特征类似。大部分病人采用椎管内麻醉（99%）。术后当天，可乐定组病人静息VPS评分更低（2.3比3.7， $P < 0.001$ ，差值的95%可信区间[CI]为1.4[1.1,1.7]）。可乐定组恶心的发生率为10%-11%，氢吗啡酮组为13%-15%。可乐定组瘙痒的发生率更低（1%比10%， $P < 0.01$ ，差值的95%可信区间为9%[6,12]）。然而，可乐定组低血压发生率（20%比11%， $P < 0.001$ ，差值的95%CI为9%[5, 14]）以及静脉需要注射液体的发生率较高（36比19%， $P < 0.001$ ，差值的95%可信区间为16[11,12]）。65%的员工完成了在线调查问卷，70%认为可乐定比氢吗啡酮差。

结论：从硬膜外氢吗啡酮系统性地换成硬膜外可乐定产生了混合的结果，并且没有明显的优越性。静息时VPS评分仅仅在术后当天降低，瘙痒减少了，但是低血压增多了。根据医务人员的偏爱，我们中止了系统性的更换药物，并且回复到我们原本用于全髋置换术后PCEA的布比卡因和氢吗啡酮的标准溶液。

（安光惠 译 马皓琳 李士通 校）

BACKGROUND AND OBJECTIVES: Patient-controlled epidural analgesia (PCEA) with bupivacaine and hydromorphone provides high quality analgesia after orthopedic surgery but is associated with a frequent incidence of opioid-related side effects (15%–30%). Epidural clonidine has a different side effect profile, but there are no large surveys documenting its use. We performed this prospective survey to evaluate analgesia and the side effect profile in total hip replacement patients before and after a systematic change from PCEA with bupivacaine/hydromorphone to bupivacaine/clonidine.

METHODS: Five hundred consecutive patients received PCEA with 0.06% bupivacaine and hydromorphone (10 mcg/mL) as a previously described prechange control group. The standard analgesic regimen was then systematically changed to 0.06% bupivacaine and clonidine (1 mcg/mL) without changing the PCEA settings or other aspects of perioperative care, and 500 consecutive patients were included as a postchange group. All data were prospectively entered and then abstracted from the electronic medical record. Data collection included daily verbal pain scores (VPS), pruritus, nausea, hypotension, need for IV fluid boluses, sedation, and respiratory depression. An online survey to measure staff satisfaction with the changeover was sent to all participating surgeons, anesthesiologists, physical therapists, and physician's assistants.

RESULTS: Patient characteristics were similar between groups. Most patients received central neuraxial anesthesia (99%). The clonidine group had lower VPS at rest (2.3 vs 3.7, $P < 0.001$ with 95% confidence interval [CI] of difference of 1.4 [1.1, 1.7]) on POD0. The incidence of nausea was 10%–11% for clonidine and 13%–15% for hydromorphone. The incidence of pruritus was less with clonidine (1 vs 10%, $P < 0.01$ with 95% CI of difference of 9% [6, 12]). However, the incidence of hypotension (20 vs 11%, $P < 0.001$ with 95% CI of differences 9% [5, 14]) and IV fluid boluses was more frequent with clonidine (36 vs 19%, $P < 0.001$ with 95% CI of differences of 16 [11, 12]). Sixty-five percent of staff completed the online survey, and 70% considered clonidine worse than hydromorphone.

CONCLUSION: The systematic changeover from epidural hydromorphone to clonidine produced mixed results without obvious superiority. The VPS at rest was reduced only on postoperative day 0; pruritus was reduced, but hypotension was increased. On the basis of medical staff preference, we discontinued the systematic change and returned to our previous standard solution of bupivacaine and hydromorphone for PCEA after total hip replacement.

感觉刺激阈值会影响腰椎平面射频去神经化结果吗？一项前瞻性临床相关性研究

Does Sensory Stimulation Threshold Affect Lumbar Facet Radiofrequency Denervation Outcomes? A Prospective Clinical Correlational Study

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背景：射频平面去神经化在用于慢性腰背痛治疗的最常用方法之一。尽管感觉刺激常被当做一种替代方法来指示电极与神经足够接近，但是没有研究阐明刺激阈值是否对结果有影响。

方法：我们前瞻性地记录了 61 个进行了腰椎平面射频去神经化并在内侧分支阻滞后有明显疼痛减轻的连续病人的数据。对每例神经损伤，均进行了多次尝试以使感觉刺激阈值(SST)达到最大。根据用于每例内侧支以 0.1 V 的增量察觉到的最小刺激来计算平均的 SST。阳性结果定义为背痛感减轻大于等于 50%加上阳性的满意评分持续大于等于三个月。通过受试者工作特征曲线 (ROC) 和不同截断值基础上的分层结果来评估平均 SST 与去神经化结果之间的关系。

结果：平均 SST 与疼痛减轻之间没有显著关联，无论在静息(皮尔森检验的 $r = -0.01$, 95% 可信区间[CI]: -0.24 到 0.23 , $P = 0.97$)或活动($r = -0.17$, 95% CI: -0.40 到 0.07 , $P = 0.20$)状态下，都没有成功的结果。无法定义最佳 SST。

结论：在腰椎平面射频去神经化过程中的平均 SST 和治疗结果之间没有显著关系，可能是由于个人的感知觉有差异。由于对每个病人的刺激阈值进行了最优化，因此这些数据并不能作为建议取消感觉测试或可取地采纳首次尝试取得的高感觉刺激阈值的依据。

(张怡译 马皓琳 李士通校)

BACKGROUND: Radiofrequency facet denervation is one of the most frequently performed procedures for chronic low back pain. Although sensory stimulation is

generally used as a surrogate measure to denote sufficient proximity of the electrode to the nerve, no study has examined whether stimulation threshold influences outcome.

METHODS: We prospectively recorded data in 61 consecutive patients undergoing lumbar facet radiofrequency denervation who experienced significant pain relief after medial branch blocks. For each nerve lesioned, multiple attempts were made to maximize sensory stimulation threshold (SST). Mean SST was calculated on the basis of the lowest stimulation perceived at 0.1-V increments for each medial branch. A positive outcome was defined as a $\geq 50\%$ reduction in back pain coupled with a positive satisfaction score lasting ≥ 3 months. The relationship between mean SST and denervation outcomes was evaluated via a receiver's operating characteristic (ROC) curve, and stratifying outcomes on the basis of various cutoff values.

RESULTS: No correlation was noted between mean SST and pain relief at rest (Pearson's $r = -0.01$, 95% confidence interval [CI]: -0.24 to 0.23 , $P = 0.97$), with activity ($r = -0.17$, 95% CI: -0.40 to 0.07 , $P = 0.20$), or a successful outcome. No optimal SST could be identified.

CONCLUSIONS: There is no significant relationship between mean SST during lumbar facet radiofrequency denervation and treatment outcome, which may be due to differences in general sensory perception. Because stimulation threshold was optimized for each patient, these data cannot be interpreted to suggest that sensory testing should not be performed, or that high sensory stimulation thresholds obtained on the first attempt should be deemed acceptable.

大鼠神经病模型中抗抑郁药和脊髓刺激的疼痛缓解作用之间的相互作用

The Interaction Between Antidepressant Drugs and the Pain-Relieving Effect of Spinal Cord Stimulation in a Rat Model of Neuropathy

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背景：脊髓刺激（SCS）已被证明为治疗神经痛的有效方法。基于我们先前关于SCS作用模式的研究，鞘内注射亚效应剂量的特定药物可增强SCS病人的疼痛缓解作用。目前认为抗抑郁药对于神经痛有有益的作用。我们进行本研究来检验抗抑郁药阿米替林（三环类抗抑郁药）、氟西汀（选择性5-羟色胺再摄取抑制剂）及米那普仑（选择性5-羟色胺/去甲肾上腺素再摄取抑制剂）与SCS潜在的协同或拮抗作用。

方法：我们评估了在清醒、可自由活动的大鼠在外周神经损伤后，SCS对于机械超敏反应的作用。通过鞘内给予抗抑郁药。

结果：当SCS与亚效应剂量的阿米替林或米那普仑联合应用时，SCS对于机械超敏反应的抑制作用较单独应用SCS有所增强。而氟西汀则未发现此作用。没有发现任何药物对SCS的作用有拮抗作用。

结论：这些发现表明SCS与三环类抗抑郁药或选择性5-羟色胺/去甲肾上腺素再摄取抑制剂的联合应用在临床上可能应用于已证实SCS本身无效的病例。

（毛祖旻 译 马皓琳 李士通 校）

BACKGROUND: Spinal cord stimulation (SCS) has proven to be a valuable treatment in neuropathic pain. On the basis of our previous studies on the mode of action of SCS, intrathecal administration of subeffective doses of certain drugs has been shown to enhance the pain-relieving effect in patients with SCS. Antidepressants have a well-established beneficial effect in neuropathic pain. We performed the present study to examine potential synergistic or antagonistic effects on SCS of antidepressants: amitriptyline (tricyclic antidepressant), fluoxetine (selective serotonin reuptake inhibitor), and milnacipran (selective serotonin/noradrenaline reuptake inhibitor).

METHODS: In rats, the effect of SCS on mechanical hypersensitivity after peripheral nerve injury was assessed in awake, freely moving animals. Antidepressants were administered intrathecally.

RESULTS: When combining SCS with subeffective doses of amitriptyline or milnacipran, the suppressive effect of SCS on the mechanical hypersensitivity was enhanced in comparison with that obtained with SCS alone. There was no detectable effect of fluoxetine. No signs of an antagonistic effect of the drugs on the SCS effect were observed.

CONCLUSIONS: These findings suggest a possible clinical application with a combination of SCS and a tricyclic antidepressant or selective serotonin/noradrenaline reuptake inhibitor drug in cases in which SCS per se has proven inefficient.

超声引导下以刺激型导管行股神经阻滞过程中用于监测导管-神经接触的运动反应的敏感度

The Sensitivity of Motor Responses for Detecting Catheter-Nerve Contact During Ultrasound-Guided Femoral Nerve Blocks with Stimulating Catheters

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背景：以超声检查作为参考，我们测定了确定导管-神经发生接触时刺激型导管诱发的运动反应的敏感度。

方法：用刺激型导管在超声扫描下与 25 例患者的股神经产生接触。输出电流从最小值开始增加，直到股四头肌发生收缩。以 0.5 mA 作为阈电流计算确定导管-神经接触时运动反应的灵敏度。

结果：用来激发运动反应的导管刺激所需要电流范围为 0.18 到 2.0 mA。25 例患者中有 16 例对 0.5 mA 电流刺激产生了肌肉收缩反应。运动反应对神经刺激的敏感度为 64%(95%可信区间：0.43, 0.82)。

结论：当刺激电流 ≤ 0.5 mA 而肌肉无反应时，并不一定代表导管-神经未发生接触。

(瞿亦枫 译 马皓琳 李士通 校)

BACKGROUND: We determined the sensitivity of motor responses evoked by stimulating catheters in determining catheter-nerve contact using ultrasonography as reference.

METHODS: Femoral nerves were contacted using stimulating catheters under ultrasonography scanning in 25 patients. The output current was increased from its minimum until quadriceps muscle contraction occurred. The sensitivity of the motor response in determining catheter-nerve contact was calculated using 0.5 mA as current threshold.

RESULTS: The current required for catheter stimulation to evoke a motor response ranged between 0.18 and 2.0 mA. Muscle contraction in response to 0.5 mA occurred in 16 of 25 subjects. The sensitivity of motor response for nerve stimulation was 64% (95% confidence interval: 0.43, 0.82).

CONCLUSIONS: The absence of muscle responses at a stimulating current ≤ 0.5 mA does not necessarily indicate the absence of catheter-nerve contact.