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再生性血小板减少和免疫性血小板减少状态下, 纤维蛋白原和 von Willebrand 因子对血栓形成及血小板粘附的不同作用

**Differential Roles of Fibrinogen and von Willebrand Factor on Clot Formation and Platelet Adhesion in Reconstituted and Immune Thrombocytopenia**

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**背景：**免疫性血小板减少症（ITP）的出血倾向与血小板减少的数量并不总是对应关系，提示还存在着血小板功能变化。作者比较含有正常全血的血小板减少模型与 ITP 患者两者在血小板功能和其他止血参数方面的差异。本研究进一步探讨在体外实验中加入 von Willebrand 因子（vWF）和纤维蛋白原对血小板功能及止血参数的影响。

**方法：**使用 Cone and Plate(let) Analyzer (CPA) 测量在一定的剪切率(1200 s<sup>-1</sup>) 状态下血小板粘附（表面覆盖度[SC]，%）和聚集（平均面积，μm<sup>2</sup>）功能。使用血栓弹力图描记仪 ROTEM 测量由氯化钙和组织因子触发的血栓形成相关参数。

**结果：**血小板减少模型与 ITP 类似，血小板数量在 5 至 80 × 10<sup>6</sup>/mL 范围内, 表面覆盖度和某种程度的平均面积与血小板数量呈正相关。大部分 ITP 患者的测试样本结果包含在血小板减少模型所设定上下界限内。全血中加入 2 U/mL von Willebrand 因子 (Haemate-P)(根据血浆容量计算)，将增加 SC 及平均面积，但并不影响血栓形成。加入纤维蛋白原 100 和 300 mg/dL 不影响血小板吸附，但可改善血栓形成。

**结论：**含有正常全血的血小板减少模型能够建立 CPA 法和 ROTEM 法的参考变量，并评估严重血小板减少状态下血小板功能和血栓形成。结果显示大部分 ITP 患者的血小板的功能与正常血小板相当。研究同时发现，vWF 和纤维蛋白原对初期和二期止血功能的影响存在差异。因此两者皆对出血有效，并可用于 ITP 患者的治疗。

（陈毓雯 译 陈杰 校）

**BACKGROUND:** Bleeding tendencies in immune thrombocytopenia (ITP) do not always correlate with the number of platelets, suggesting platelet function variation. We used a model of normal whole blood thrombocytopenia to compare platelet function and other hemostatic variables with ITP patients. We further investigated the effect of in vitro spiking with von Willebrand factor (vWF) and fibrinogen on platelet function and hemostatic variables.

**METHODS:** The Cone and Plate(let) Analyzer was used to measure platelet adhesion (surface coverage [SC], %) and aggregation (average size, μm<sup>2</sup>) under defined shear rate (1200 s<sup>-1</sup>). Rotational thromboelastometry was used to determine variables of clot formation triggered by CaCl<sub>2</sub> and tissue factor.

**RESULTS:** In both the model of thrombocytopenia as well as in ITP, the SC and to some extent the average size were correlated to the platelet number over a range of 5 to

80 × 10<sup>6</sup>/mL. The results obtained for most ITP samples were within the boundaries of the lower and upper limits set by the whole blood model of thrombocytopenia. The addition of 2 U/mL vWF (Haemate-P) to whole blood (calculated to plasma volume) results in an increase in the SC and average size without affecting clot formation. Spiking with fibrinogen (100 and 300 mg/dL) did not affect platelet deposition but improved clot formation.

**CONCLUSIONS:** Using a model of whole blood thrombocytopenia enables us to establish reference variables for the Cone and Plate(let) Analyzer and rotational thromboelastometry and to assess platelet function and clot formation in the presence of severe thrombocytopenia. We demonstrated that in most cases of ITP, platelet function is comparable to normal platelets. This work also suggests that vWF and fibrinogen differentially affect primary and secondary hemostasis and therefore both may perform a function in the bleeding phenotype and possibly may be considered for treatment in patients with ITP.

### 综述：高风险：心脏手术期间危险风险

#### Review Article: High Stakes and High Risk: A Focused Qualitative Review of Hazards During Cardiac Surgery

Elizabeth A. Martinez, MD, MHS\*, David A. Thompson, DNSc, MS, RN†, Nicole A. Errett, BA‡, George R. Kim, MD§, Laura Bauer, MPH†, Lisa H. Lubomski, PhD†, Ayse P. Gurses, PhD†‡, Jill A. Marsteller, PhD, MPP‡, Babak Mohit, MPH, MHA, MBA‡, Christine A. Goeschel, MPA, ScD, RN†‡ and Peter J. Pronovost, MD, PhD†‡

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心脏手术是一种由多科室团队利用复杂仪器和技术共同完成的高风险手术。近十余年来，大量工作致力于提高心脏手术病人的安全性，但是关于在临床上如何识别过失以及如何提高病人安全性，文献报道提供的相关指导有限。这篇专题的主要内容作为 FOCUS 项目(Flawless Operative Cardiovascular Unified Systems)中的一部分，FOCUS 项目是在心血管麻醉医生协会支持下进行的，其作用在于判别心脏手术的各种风险，完善循证指南，从而提高病人心脏手术的安全性。任何对病人构成潜在或真实危险的事件都被定义为风险，包括手术中的各种过失、侥幸未发的疏漏以及不良事件。根据标题选取出 1438 篇文章，其中 390 篇根据摘要筛选，而 69 篇文献则阅读了全文，最后 55 篇文章符合本综述的入选标准。形成两大关键主题：首先，文章绝大多数都是反应性的（对事件或报道的回应）而不是前瞻性的（使用前瞻性研究设计比如自身评估和外部的评论者等），而且文章中很少涉及到了干预措施。其次，小事件可能预示着大的问题：多次、往往微小的正常过程的偏离可引起级联反应，从而导致最终变成大的不良事件。本文弥补了之前文献报道中对心脏手术安全性评估的缺陷，对已知风险进行系统性确认和分类。文中总结了提高病人术后预后

的一些方法，如建立安全性文化，促进透明性，标准化训练，增强团队合作，同时密切监测手术操作过程。以后还需要更多的文献来评估干预对于减少心脏手术固有风险的作用。

(张婷 译 陈杰 校)

Cardiac surgery is a high-risk procedure performed by a multidisciplinary team using complex tools and technologies. Efforts to improve cardiac surgery safety have been ongoing for more than a decade, yet the literature provides little guidance regarding best practices for identifying errors and improving patient safety. This focused review of the literature was undertaken as part of the FOCUS initiative (Flawless Operative Cardiovascular Unified Systems), a multifaceted effort supported by the Society of Cardiovascular Anesthesiologists Foundation to identify hazards and develop evidence-based protocols to improve cardiac surgery safety. Hazards were defined as anything that posed a potential or real risk to the patient, including errors, near misses, and adverse events. Of the 1438 articles identified for title review, 390 underwent full abstract screening, and 69 underwent full article review, which in turn yielded 55 meeting the inclusion criteria for this review. Two key themes emerged. First, studies were predominantly reactive (responding to an event or report) instead of proactive (using prospective designs such as self-assessments and external reviewers, etc.) and very few tested interventions. Second, minor events were predictive of major problems: multiple, often minor, deviations from normal procedures caused a cascade effect, resulting in major distractions that ultimately led to major events. This review fills an important gap in the literature on cardiac surgery safety, that of systematically identifying and categorizing known hazards according to their primary systemic contributor (or contributors). We conclude with recommendations for improving patient outcomes by building a culture of safety, promoting transparency, standardizing training, increasing teamwork, and monitoring performance. Finally, there is an urgent need for studies that evaluate interventions to mitigate the inherent risks of cardiac surgery.

### 丙泊酚通过抑制细胞的缝隙连接降低了 X 线辐射造成的细胞毒性

#### Propofol Depresses the Cytotoxicity of X-ray Irradiation Through Inhibition of Gap Junctions

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**背景：**全身麻醉药物（如丙泊酚）能影响手术中放疗的治疗效果，但原因大多未知。已有对丙泊酚能短暂抑制细胞间隙连接功能，以及功能性细胞间隙连接能增强在某些癌细胞中的放疗效果的报道。但是丙泊酚抑制间隙连接的功能，以及丙泊酚对术中放疗的治疗效果的影响的机制目前仍未知。

**方法：**采用含连接素 32 (Cx32) 质粒转染 Hela 细胞，通过检测连接素的表达，缝隙连接的表达及功能，来探究临床浓度的丙泊酚对射线辐射后 Hela 细胞的细胞毒

性的影响。缝隙连接功能，Cx32 蛋白表达以及 Cx32 mRNA 的表达分别采用“降落伞”染料耦合技术，Western 印迹法，逆转录-聚合酶链反应进行测定。

**结果：**只有存在功能性缝隙连接的情况下，丙泊酚才能显著减少放射导致的细胞毒性。4 小时的丙泊酚暴露主要是通过减少 CX32 蛋白水平而非影响 Cx32 mRNA 表达水平来抑制缝隙连接的功能。

**结果：**这些结果提示了丙泊酚能够通过非转录依赖机制减少 Cx32 蛋白水平，从而抑制了间隙连接的功能。进一步显示了丙泊酚通过抑制细胞间隙连接的活性，来降低放射线辐射造成的细胞毒性。

(陆秉玮 译 陈杰 校)

**BACKGROUND:** General anesthetics (e.g., propofol) influence the therapeutic activity of intraoperative radiotherapy but the mechanism of the effects is largely unknown. It has been reported that propofol inhibits gap junction (GJ) function briefly, and a functional GJ enhances the efficacy of radiotherapy in some cancer cells. Yet the mechanisms underlying the inhibition of GJ function by propofol and the influence of propofol on therapeutic activity of intraoperative radiotherapy are unknown.

**METHODS:** The role of propofol at clinically relevant concentrations in the modulation of radiograph-induced cytotoxicity in HeLa cells transfected with connexin 32 (Cx32) plasmid was explored by manipulation of connexin expression, GJ presence, and function. GJ function, Cx32 protein level, and Cx32 mRNA expression were determined by “Parachute” dye-coupling assay, Western blotting, and reverse transcriptase-polymerase chain reaction, respectively.

**RESULTS:** Propofol significantly reduced radiograph-induced cytotoxicity only in the presence of functional GJ. Four-hour propofol exposure inhibited GJ function mainly by diminution of Cx32 protein levels but without influence on Cx32 mRNA expression.

**CONCLUSIONS:** These results suggest that propofol inhibits the function of the GJ through the reduction of Cx32 protein levels by a transcription-independent mechanism. They further indicate that propofol depresses the cytotoxicity of radiograph irradiation through inhibition of GJ activity.

### 医学信息学文章: 手术室外高频通气新用途

#### Medical Intelligence Article: Novel Uses of High Frequency Ventilation Outside the Operating Room

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高频喷射通气 (HFJV) 是一种常用于重症监护病房和气管及耳鼻喉外科手术中的一项技术。本研究探讨 HFJV 在重症监护室和手术室以外实施的价值。HFJV 能提供机械通气，还可使胸部和腹部接近静止状态，使之成为一个非常有吸引力的技术，应用于如房颤的肺静脉隔离和消融术治疗，肺和肝肿瘤的靶向放射治疗，以及某些诊断成像技术。

(孙晓琼 译 陈杰 校)

High frequency jet ventilation (HFJV) is a technique that is most frequently used in the intensive care unit and during tracheal and otorhinolaryngologic surgery. The utility of HFJV for procedures performed outside of the intensive care unit and operating room is currently being explored. The ability of HFJV to provide mechanical ventilation, yet achieve near static conditions of the chest and abdomen, makes it a very appealing technique for procedures such as pulmonary vein isolation and ablation for atrial fibrillation, targeted radiation therapy for lung and liver tumors, and certain diagnostic imaging techniques.

### 肥胖与院前困难气管插管的关系

#### The Association Between Obesity and Difficult Prehospital Tracheal Intubation

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**背景：**非医师的急救人员常在入院前对出现心脏骤停及其他威胁生命情况的患者进行气管插管，此时气道评估及气道管理的设备非常有限。然而，在这种情况下肥胖患者中出现困难插管的频率却不是很清楚。本研究通过对一队有气管插管经验的急救人员的研究以确定与气管插管成功有关的因素及体重指数对气管插管困难的预测作用，从而用来指导未来的院前急救。

**方法：**针对4年内所有15岁及以上、同时在院前由西雅图医疗系统的随行医务人员行过气管插管、且被转移至1级地区创伤中心的病例进行回顾性研究。所有数据汇总自患者入院前先期收集的气道管理数据库及医院内的医疗记录，其中包括了人口统计学信息，气管插管的尝试次数，气管插管成功或失败，患者体重/身高（体重指数）。计算描述性统计参数及多元logistic回归结果。作为主要结果的困难气管插管定义为气管插管尝试次数 $\geq 4$ 次或者需要应用其他气道管理技术。

**结果：**在4年的研究内80501例患者中有4114例尝试气管插管，823例患者符合入围标准。气管插管成功率为98.5%（811/823），符合困难气管插管定义的为6.8%（56/823）。困难气管插管与患者的年龄、性别、琥珀胆碱的使用、医学诊断（创伤或非创伤）之间无显著关联。与偏瘦患者组（ $BMI < 30 \text{ kg/m}^2$ ）相比，III级肥胖患者（ $BMI > 40 \text{ kg/m}^2$ ）与困难气管插管存在显著关联（优势比3.68，置信区间2.37-10.59）。然而I/II级肥胖患者（ $40 \text{ kg/m}^2 > BMI \geq 30 \text{ kg/m}^2$ ）与困难气管插管间无显著关联（优势比0.98，置信区间0.46-2.07）。

**结论：**在急救人员以往记录的成功的支气管插管中，极度肥胖患者被发现会增加气管插管的难度，而轻度肥胖患者则不会。因为极度肥胖是一种极易辨别的特征，教学和临床上，对这样的情况进行气道管理时应将重点放在与肥胖相关的气道管理的

方法策略上，其中包括特殊设备、患者体位和实际操作，这可能会是气管插管和其他气道管理技术变得更容易。

(曹强 译 陈杰 校)

**BACKGROUND:** Nonphysician advanced life support (ALS) providers often perform tracheal intubation (TI) for cardiac arrest or other life-threatening indications in the prehospital setting, where airway assessment and airway management tools are limited. However, the frequency of difficult TI in obese patients in this setting is unclear. In this study we determined factors associated with TI success, and determined TI difficulty as a function of body mass index (BMI) in a system of ALS providers experienced in TI, to guide future prehospital education efforts.

**METHODS:** A retrospective review was performed of all patients  $\geq 15$  years of age who underwent prehospital TI by paramedics in the Seattle Medic One system over a 4-year period, and were transported to the regional level 1 trauma center (Harborview Medical Center). Data were abstracted from a prospectively collected prehospital airway management database and from the hospital medical records, including demographic information, number of TI attempts, TI success or failure, and body weight/height (BMI). Descriptive statistics and multivariable logistic regression were calculated, with the primary end point being difficult TI (defined as  $\geq 4$  TI attempts or the need to use an alternative airway management technique).

**RESULTS:** Of 80,501 patient contacts in whom 4114 TIs were attempted during the 4-year study period, 823 met study entry criteria (including a calculable BMI). The overall TI success rate in the study population was 98.5% (811 out of 823), with 6.8% (56 out of 823) meeting the predetermined definition for difficult TI. There was no significant association between difficult TI and patient age, gender, use of succinylcholine, or medical diagnosis (trauma vs. nontrauma). In comparison with the lean patient subgroup (BMI  $< 30$  kg/m<sup>2</sup>), patients with class III obesity (BMI  $> 40$  kg/m<sup>2</sup>) had a significant association with difficult TI (odds ratio 3.68; confidence interval [CI] 1.27–10.59), whereas those with class I/II obesity (BMI  $\geq 30$  kg/m<sup>2</sup> and  $< 40$  kg/m<sup>2</sup>) did not (odds ratio 0.98; CI 0.46–2.07).

**CONCLUSIONS:** Among prehospital ALS providers with previously documented and published successful TI performance, increased difficulty with TI was observed in patients with extreme obesity, but not in patients with lesser degrees of obesity. Because extreme obesity is an easily identifiable patient characteristic, didactic and clinical (e.g., operating room) airway management education for such providers should emphasize airway management challenges and strategies associated with obesity, including specific equipment, patient positioning, and practice recommendations that may facilitate both TI and alternative airway management techniques in this population.

### 长 QT 综合征患儿的麻醉启示

#### Implications of Anesthesia in Children with Long QT Syndrome

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**背景：**患有先天性长 QT 综合征（LQTS）的患者易于发生阵发性恶性室性快速性心律失常，即通常所说的“扭转性室速”，这将可能导致心跳骤停和死亡。当患者处于生理或情感应激以及暴露于某些药物时，可发生严重的心血管事件，以至于发生昏厥、抽搐，以及心源性死亡，这其中包括暴露于麻醉药物。作者描述了患有先天性 LQTS 的儿童在接受挥发性全身麻醉时围术期发生心律失常相关不良事件（AEs）的发生情况，并且描述了相关的风险因素。

**方法：**一项回顾性队列研究，对象是在挥发性全身麻醉下接受非心脏手术、非装置置入术及非心脏节律转复手术的患有先天性 LQTS 的儿童。该研究是一项回顾性病例调查，所收集的数据来源于患者电脑化或者电子化的医学记录。

**结果：**研究共纳入 76 位患有先天性 LQTS 的患者，共接受 114 次麻醉。在这 114 次麻醉中，共发生 3 次 AE，其中 2 次有明确定义，1 次为可能 AE，总发生率为 2.6%。事件发生于 3 名男孩（年龄分别为 11、13 和 15 岁），他们在挥发性全身麻醉下接受非心脏手术，均在围术期接受了  $\beta$  受体阻滞剂治疗。AEs 发生于应用逆转性药物（抗胆碱酯酶/抗胆碱混合药物）及止吐药昂丹司琼后即刻。事件发生在麻醉苏醒期，几乎都发生在接受了逆转性药物和昂丹司琼的患者。所有 AE 在接受短期抗心律失常药物治疗后均成功逆转，患者均于次日晨出院。

**结论：**当交感神经活动增强、尤其是在麻醉苏醒期，AE 的发生风险增加。如果在这一时期应用了延长已纠正的 QT 间期的药物、或者延长跨壁复极离散度药物、或者增加心动过速发生风险的药物时，AE 发生的风险将进一步升高。在这一时期和术后，限制对离子通道产生不利影响的药物的应用，并且时刻警惕和严密监测 AE，这将有效防止 AE 或者抑制其进一步恶化。

（周姝婧 译 陈杰 校）

**BACKGROUND:** Patients with congenital long QT syndrome (LQTS) are susceptible to an episodic malignant ventricular tachyarrhythmia known as torsade de pointes, which can result in a cardiac arrest and death. Patients can suffer severe cardiac events resulting in syncope, seizures, and sudden cardiac death during times of physical and emotional stress and when exposed to certain drugs including anesthetics. We describe the occurrence of perioperative adverse events (AEs) related to arrhythmias in children with congenital LQTS exposed to volatile general anesthesia and describe associated risk factors.

**METHODS:** We performed a retrospective cohort study of children with LQTS undergoing general anesthesia for noncardiac surgery or device implant, or revision for cardiac rhythm management. This study was a retrospective chart review with data collection from computerized and electronic patient medical records.

**RESULTS:** Seventy-six patients with congenital LQTS were identified who had a total of 114 anesthetic encounters. Of the 114 anesthetic encounters, there were 3 AEs, 2 definite and 1 probable AE, for an incidence of 2.6%. The events occurred in boys (aged 11, 13, and 15 years) while undergoing noncardiac surgery under volatile general anesthesia. All were receiving  $\beta$ -blocker therapy preoperatively. The AEs occurred in close proximity to the administration of reversal drugs (anticholinesterase/anticholinergic

combinations) and the antiemetic ondansetron. The events occurred during emergence from anesthesia, and exclusively in the group of patients who received both reversal drugs and ondansetron. All were treated successfully with short-term antiarrhythmic drug therapy and discharged the next morning.

**CONCLUSIONS:** There is an increased risk of AEs during periods of enhanced sympathetic activity, especially emergence. This risk seems to be further enhanced if drugs are administered at this time that are known either to prolong the corrected QT interval or the transmural dispersion of repolarization or increase the incidence of tachycardia. Restriction of medications that adversely affect ion channels and intense vigilance and monitoring during this time and in the postoperative phase could help prevent occurrence or progression of AEs.

### 术后认知功能障碍与手术和麻醉类型无关

#### Postoperative Cognitive Dysfunction Is Independent of Type of Surgery and Anesthetic

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**背景：**已经证实心脏和非心脏手术后存在术后认知功能障碍（POCD）。手术和麻醉的类型已被假定与其发病率相关，但很少有前瞻性研究数据来比较不同过程的发病率。此项研究试图确定手术和麻醉的类型与 POCD 发生率的关系，包括轻度镇静，非心脏手术全身麻醉，以及存在体外循环的心脏手术全身麻醉。

**方法：**研究分为四组：分别为三个不同手术和麻醉类型的试验组和一个未进行手术的对照组。在研究最初、术后 7 天和术后 3 个月，每个受试者分别进行 8 项神经心理测试。使用可信改变指数计算 POCD。这项研究样本所包括 3 个独立的试验组，分别为轻度镇静下的冠状动脉造影（CA）（经皮穿刺诊断），全身麻醉下非心脏手术（全髋关节置换术[THJR]手术）和全身麻醉下冠状动脉搭桥术（CABG）手术。

**结果：**收集了 644 例手术组患者和 34 例对照组患者的资料。THJR 手术（n = 162）和冠脉搭桥手术（n = 281）术后第 7 天的神经心理学结果是有效的。THJR 手术和冠状动脉搭桥手术在术后第 7 天 POCD 的发生率分别是 17% 和 43%（调整后优势比 = 0.2，95% 可信区间 [CI]：0.1，0.4，P < 0.01）。术后 3 个月，所有组（n = 636）总的 POCD 发生率为 17%（轻度镇静下 CA 为 21%，THJR 手术为 16%，冠状动脉搭桥手术为 16%）。各组间 POCD 比例的差异的平均值（95% 可信区间）为：冠状动脉搭桥术与 THJR 比较 0.00（-0.07，0.07）（P = 0.91），冠状动脉搭桥术与 CA 比较 -0.05（-0.12，0.03）（P = 0.21），和 THJR 与 CA 比较 -0.05（-0.13，0.03）（p = 0.24）。各组间无显著性差异（调整后优势比 = 1.21，95% CI 为：0.94，1.55，P = 0.13）。

**结论：**老年和高龄患者在术后第7天，冠状动脉搭桥术后 POCD 的发生率比 THJR 手术后的发生率高，但术后3个月 CA、THJR 和 CABG 组之间 POCD 的发生率相当，与所接受的手术和麻醉类型无关。心血管危险因素对任何过程之后 POCD 的发生没有预测作用。

（怀晓蓉 译 陈杰 校）

**BACKGROUND:** Postoperative cognitive dysfunction (POCD) has been documented after cardiac and noncardiac surgery. The type of surgery and anesthetic has been assumed to be associated with the incidence but there are few prospective data comparing the incidence after different procedures. In this study, we sought to determine the association of the type of surgical procedure and anesthesia on the incidence of POCD after procedures involving light sedation, general anesthesia for noncardiac surgery, and general anesthesia for cardiac surgery involving cardiopulmonary bypass.

**METHODS:** Eight neuropsychological tests were administered at baseline and at 7 days and 3 months postoperatively to subjects from 3 procedure groups and a nonoperative control group. Reliable change index was used to calculate POCD. The study sample consisted of subjects involved in 3 separate trials investigating coronary angiography (CA) (percutaneous diagnostic procedure) under sedation, major noncardiac surgery (total hip joint replacement [THJR] surgery) under general anesthesia, and coronary artery bypass graft (CABG) surgery under general anesthesia.

**RESULTS:** Data were collected from 644 patients in the patient groups and 34 subjects in the control group. Neuropsychological results were available for POCD at day 7 for THJR surgery ( $n = 162$ ) and CABG surgery ( $n = 281$ ). The incidence of POCD at day 7 was 17% for THJR surgery and 43% for CABG surgery (adjusted odds ratio = 0.2, 95% confidence interval [CI]: 0.1, 0.4;  $P < 0.01$ ). At 3 months, the incidence of POCD for all groups combined ( $n = 636$ ) was 17% (21% for CA under sedation, 16% for THJR surgery, and 16% for CABG surgery). The mean (95% CI) for the difference in proportions of POCD among groups was 0.00 (-0.07, 0.07) ( $P = 0.91$ ) for CABG versus THJR; -0.05 (-0.12, 0.03) ( $P = 0.21$ ) for CABG versus CA; and -0.05 (-0.13, 0.03) ( $P = 0.24$ ) for THJR versus CA. There were no significant differences among groups (adjusted odds ratio = 1.21, 95% CI: 0.94, 1.55;  $P = 0.13$ ).

**CONCLUSIONS:** The incidence of POCD in old and elderly patients at day 7 was higher after CABG surgery than THJR surgery, but POCD at 3 months was independent of the nature or the type of procedure or anesthetic when comparing CA, THJR, and CABG surgery groups. Cardiovascular risk factors were not predictive of POCD after any procedure.

**简报：老年手术患者术前虚弱状态与术后早期谵妄有关**

**Brief Report: Preoperative Frailty in Older Surgical Patients Is Associated with Early Postoperative Delirium**

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此次研究调查除传统老年患者危险因素以外，术前虚弱状态是否与老年非心脏手术患者术后谵妄的发生有关。1/3 患者术后虚弱评分 $\geq 3$ ，这一数值在其他相关研究中被定义为“虚弱”。其中 25% 的患者经谵妄评定法（confusion assessment method, CAM）确认为术后谵妄。多因素 logistic 回归分析数据显示：年龄、日常生活能力、工具性日常生活能力及术前认知功能与老年患者术后谵妄的发生并无明显相关性。然而，术前抑郁症状(优势率 = 1.42; 95% 可信区间 = 1.06–1.91;  $P = 0.018$ )及虚弱评分(优势比 = 1.84; 95% 可信区间 = 1.07–3.1;  $P = 0.028$ )是术后谵妄发生的两个独立相关因素。

(赵嫣红 译 陈杰 校)

We investigated whether preoperative frailty among older noncardiac surgical patients provides information about the development of postoperative delirium that is in addition to traditional geriatric risk factors. One-third of patients had a frailty score  $\geq 3$ , which is considered “frail” in others' research. Twenty-five percent of patients developed postoperative delirium, which was measured using the confusion assessment method. Multivariable logistic regression showed that age, activities of daily living dependence, instrumental activities of daily living dependence, and cognitive functioning did not contribute significantly to the prediction of postoperative delirium. Only preoperative symptoms of depression (odds ratio = 1.42; 95% confidence interval = 1.06–1.91;  $P = 0.018$ ) and the frailty score (odds ratio = 1.84; 95% confidence interval = 1.07–3.1;  $P = 0.028$ ) were independently associated with the development of postoperative delirium.

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### **Central and Local Administration of Ginkgo Biloba Extract EGb 761® Inhibits Thermal Hyperalgesia and Inflammation in the Rat Carrageenan Model**

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**背景** 口服标准银杏针提取物 EGb 761® 已在啮齿类动物的炎症和术后疼痛模型上证实可以抑制热痛觉过敏，但其机制不明。本研究试图通过局部或中枢给予角叉菜胶炎症模型的大鼠 EGb 761 后，观察此药抗痛觉过敏和抗炎特性来确定其作用部位。

**方法** 成年雄性 Wistar 大鼠左后肢足底注射 3% 的角叉菜胶或生理盐水，3 小时后左爪足底注射 EGb 761 (30, 100, or 300  $\mu\text{g}$ ) 或媒介物，或者在腰椎鞘内注射 EGb 761 (0.5, 1, 3, 10, or 100  $\mu\text{g}$ ) 或媒介物。给予 100 $\mu\text{g}$  双氯酚酸作为阳性对照。在注射角叉菜胶后 0、2、4、6、24 小时记录后肢对热刺激的潜伏期（以秒计）、对机械刺激的反应阈值（以克表示）以及足趾体积。

**结果** 足底注射 (30, 100, and 300  $\mu\text{g}$ ) 和鞘内注射 (0.5 and 1  $\mu\text{g}$ ) EGb 761 可显著抑制角叉菜胶产生的热痛觉过敏，作用效果和双氯酚酸一样，但对机械过敏症没有作用。脊髓内应用  $\geq 3 \mu\text{g}$  EGb 761 会对行动产生不良影响，妨碍进一步的伤害性测试。足底注射 300 $\mu\text{g}$  和鞘内注射 1 $\mu\text{g}$  EGb 761 可以显著减轻足趾水肿。

**结论** 这项研究表明 EGb 761 在外周和脊髓水平都有抗炎和抑制热痛觉过敏的作用，可能有助于炎性疼痛的治疗。

(黄丹 译 陈杰 校)

**BACKGROUND:** Oral administration of the standardized Ginkgo biloba extract EGb 761® has been shown to inhibit thermal hyperalgesia in rodent models of inflammatory and postsurgical pain, but the mechanism underlying these effects is not known. We sought to determine the site of action of EGb 761 by investigating the antihyperalgesic and antiinflammatory properties of EGb 761 after local and central drug administration in the rat carrageenan model of inflammation.

**METHODS:** Adult male Wistar rats received an intraplantar injection of carrageenan (3%) or saline into the left hindpaw followed 3 hours later by an intraplantar injection of EGb 761 (30, 100, or 300 µg) or vehicle into the left paw; or intrathecal injection of EGb 761 (0.5, 1, 3, 10, or 100 µg) or vehicle into the lumbar spinal cord region. Diclofenac (100 µg) was administered as a positive control. Hindpaw withdrawal latency (in seconds) to thermal stimulation, response threshold (in grams) to mechanical stimulation, and paw volume were measured at 0, 2, 4, 6, and 24 hours after carrageenan injection.

**RESULTS:** Both intraplantar (30, 100, and 300 µg) and intrathecal (0.5 and 1 µg) EGb 761 significantly inhibited carrageenan-induced thermal hyperalgesia and were equally as effective as diclofenac, but had no effect on mechanical hypersensitivity. Application  $\geq 3$  µg EGb 761 to the spinal cord induced adverse behavioral effects, which precluded further nociceptive testing. Intraplantar (300 µg) and intrathecal (1 µg) EGb 761 also significantly reduced paw edema.

**CONCLUSION:** These studies show that EGb 761 acts both at the site of inflammation and centrally at the spinal cord level to inhibit inflammation and thermal hyperalgesia, and may be useful in the treatment of inflammatory pain.

### 成人术前利钠肽浓度的预测价值:一项系统回顾和荟萃分析

#### The Predictive Value of Preoperative Natriuretic Peptide Concentrations in Adults Undergoing Surgery: A Systematic Review and Meta-Analysis

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**背景:** 已有几项研究评估了术前 B 型利钠肽浓度对于预测术后死亡率的价值；但每个研究的死亡数较少，限制了这些研究的影响力。我们进行了一项系统回顾和荟萃分析，旨在分析术前利钠肽水平与预测心脏手术和非心脏手术后的死亡率。

**方法:** 我们使用“利钠肽”、“手术”等词条，结合预后指标和诊断方面的词条，检索了 MEDLINE 和 EMBASE。有两名调查员独立评估研究资格和提取数据。研究终点为任何原因导致的  $\geq 6$  个月或  $\leq 90$  天的死亡率。我们使用了双变量模型推导其预后的准确性和特异性。我们使用贝叶斯定理马尔科夫链蒙特卡罗方法计算了混合的阳性预测值 (PPV) 和阴性预测值 (NPV)。

**结果:** 检索到的 1558 篇文章中，有 23 篇研究符合先前定义的标准。在心血管手术后， $\geq 6$  个月死亡率的利钠肽诊断比值比为 4.11 (95% 可信区间为 2.22-

7.60)，阳性预测值为 0.17（95% 贝叶斯可信区间为 0.07-0.36），阴性预测值为 0.96（95% 可信区间为 0.90-0.98）。非心脏术后，≥6 个月死亡率的利钠肽诊断比值比为 4.97（95% 可信区间为 3.06-8.07），相应的阳性预测值为 0.24（95% 可信区间为 0.14-0.38），阴性预测值为 0.94（95% 可信区间为 0.88-0.97）。≤90 天的死亡率的结果是相似的。

**结论：**术前利钠肽浓度水平与心脏手术和非心脏手术后的死亡率有关。在两种手术中利钠肽都表现较高的阳性预测值，这表明术前利钠肽浓度用于术前风险分层可能具有很大的帮助。

（滕凌雅译 马皓琳 李士通校）

**BACKGROUND:** Several studies have evaluated preoperative B-type natriuretic peptides (NPs) for predicting mortality after surgery; however, the number of deaths in each study was small, limiting the power of these studies. We conducted a systematic review and meta-analysis of studies addressing preoperative NP levels to predict mortality after cardiac and noncardiac surgery.

**METHODS:** We searched MEDLINE and EMBASE using the terms “natriuretic peptides,” “surgery or surgical procedures,” and a validated combination of prognostic and diagnostic terms. Two investigators independently assessed studies for eligibility and extracted data. The end points were all-cause mortality at ≥6 months and at ≤90 days. We used a bivariate model to derive measures of prognostic accuracy and their heterogeneity. We calculated the pooled positive predictive value (PPV) and negative predictive value (NPV) by Bayesian Markov chain Monte Carlo methods.

**RESULTS:** Of the 1558 retrieved articles, 23 studies satisfied the predefined eligibility criteria. After cardiac surgery, the diagnostic odds ratio of NP was 4.11 (95% confidence interval, 2.22–7.60) for ≥6-month mortality, the PPV 0.17 (95% Bayesian confidence interval, 0.07–0.36), and the NPV 0.96 (0.90–0.98). After noncardiac surgery, the diagnostic odds ratio of NP was 4.97 (3.06–8.07) for ≥6-month mortality. The corresponding PPV was 0.24 (0.14–0.38) and the NPV 0.94 (0.88–0.97). Results were similar for ≤90-day mortality.

**CONCLUSIONS:** Preoperative NP concentrations were associated with mortality after cardiac and noncardiac surgery. NP had high NPVs for both types of surgery suggesting that preoperative NP concentrations may be helpful in preoperative risk stratification.

## 血管老化的暗示

### Implications of Vascular Aging

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年龄是一个完全明确了的心血管疾病发展的危险因素。然而这些随着年龄在脉管系统中积聚的病变是高度变异的。现在越来越多地认识到，血管健康指数比年龄本身更能可靠地预测心血管的不良预后。年龄相关血管病变进展的变异是由多种遗传以及环境因素造成的。在本综述中，笔者着重阐述了表现血管老化表型特征的一些病

理生理机制。此外，我们提供了一个对主要预后研究的回顾，这些研究大体概述了这些血管健康指数的价值，并讨论了其对围术期心血管预后的潜在影响。

（瞿亦枫 译 马皓琳 李士通校）

Chronological age is a well-established risk factor for the development of cardiovascular diseases. The changes that accumulate in the vasculature with age, however, are highly variable. It is now increasingly recognized that indices of vascular health are more reliable than age per se in predicting adverse cardiovascular outcomes. The variation in the accrual of these age-related vascular changes is a function of multiple genetic and environmental factors. In this review, we highlight some of the pathophysiological mechanisms that characterize the vascular aging phenotype. Furthermore, we provide an overview of the key outcome studies that address the value of these vascular health indices in general and discuss potential effects on perioperative cardiovascular outcomes.

### 暗示对氯胺酮引起的不愉快梦境的作用

#### **The Effect of Suggestion on Unpleasant Dreams Induced by Ketamine Administration**

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应用氯胺酮镇静后会伴随着对不愉快梦境的回忆，我们假设镇静前给予正面的暗示能减少氯胺酮诱导的噩梦的发生率。为了证明这一假设，我们将纳入研究的 100 例接受氯胺酮镇静的患者随机分为 2 组，1 组患者在氯胺酮给药前由一名麻醉医生给予一定情绪上正面的暗示（暗示组），对照组则不给予暗示。然后根据梦中的心情对患者进行评级，分为梦境极度不愉悦（1 级），很不愉悦（2 级），两者都无或两者都有（3 级），很愉悦（4 级），极度愉悦（5 级）。在失去意识的患者中，暗示组 1、2、3、4 和 5 级的发生率分别为 0%、0%、46%、24% 和 30%，对照组分别为 6%、2%、70%、12% 和 10%（ $P=0.01$ ）；而在以治疗为目的的患者中两组间整体的发生率相似。本研究表明，当氯胺酮作为部分镇静用药时，正面的暗示能够帮助减少对不愉快梦境的回忆。

（徐妍君 译，马皓琳 李士通校）

The use of ketamine may be associated with the recall of unpleasant dreams after sedation. We hypothesized that a positive suggestion before sedation could reduce the incidence of ketamine-induced unpleasant dreams. To test this hypothesis, we randomized 100 patients receiving sedation with ketamine for their procedure into 2

groups with 1 group having an anesthesiologist provide a mood-elevating suggestion to the patient before ketamine administration (suggestion group), whereas in the control group no suggestion was provided. Patients were provided with a pleasantness/unpleasantness scale to rate “the overall mood of the dream” as very unpleasant (grade 1), quite unpleasant (grade 2), neither or mixed (grade 3), quite pleasant (grade 4), and very pleasant (grade 5). In those patients who lost consciousness, the frequencies of grades 1, 2, 3, 4, and 5 were 0%, 0%, 46%, 24%, and 30% in the suggestion group and were 6%, 2%, 70%, 12%, and 10%, respectively, in the control group ( $P = 0.01$ ). In the intent-to-treat population the overall frequency between groups was very similar. This study implies that when administering ketamine as part of a sedation regimen, positive suggestion may help reduce the recall of unpleasant dreaming.

对使用一种新的纤维光学传感器从肠道获得的光体积描记术信号和初步脉搏血氧定量法评估的一个活体内研究

### **An In Vivo Investigation of Photoplethysmographic Signals and Preliminary Pulse Oximetry Estimation from the Bowel Using a New Fiberoptic Sensor**

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**背景：**内脏器官血氧饱和度的连续监测使组织氧合不充分的早期检测成为可能，从而减少了血流灌注不足、严重缺血、多器官衰竭和最终死亡的风险。当前评估内脏灌注的方法在临床治疗中并没有被广泛接受使用。为了克服当前技术的局限性，一种新的纤维光学光体积描记术（PPG）/脉搏血氧定量法的传感器被研制成功，作为在人类手术过程中评估内脏器官灌注的一种方法。

**方法：**开发出了一种新的纤维光学内脏脉搏血氧计和与其光学性质相同的纤维光学手指脉搏血氧计。同时从肠道（小肠和大肠）和手指获得的 PPG 信号和动脉血氧饱和度的初步估计值来自于进行开腹手术的 17 个病人（男/女：3/14）。

**结果：**所有病人从大肠、小肠和手指都获得了高品质的 PPG 信号（比率的 95% 可信区间低限是 0.64）。使用内脏和手指纤维光学传感器获得的血氧饱和度值与使用商用手指脉搏血氧计获得的血氧饱和度值相比较表明，它们之间的差异无统计学意义（所有的  $P > 0.454$ ）。描述从肠道纤维光学脉搏血氧计和纤维光学手指脉搏血氧计获得的血氧饱和度均值与其平均值的比例之间的差异的 Bland and Altman 曲线显示小肠测量结果的一致区间是[-3.8%，4.2%]，大肠测量结果的一致区间是[-3.4%，4.3%]。2 种设备之间差异的 95% 预测区间是[-4.2%，4.7%]。

**结论：**本研究表明使用新的纤维光学传感器可以从肠道获得高品质的 PPG 信号。尚需进一步的评估来确定肠道纤维光学脉搏血氧定量法是否可以作为监测内脏灌注提供一种适合的方法。

（周洁 译，马皓琳 李士通 校）

**BACKGROUND:** The continuous monitoring of splanchnic organ oxygen saturation could make the early detection of inadequate tissue oxygenation feasible, reducing the risk of hypoperfusion, severe ischemia, multiple organ failure, and, ultimately, death. Current methods for assessing splanchnic perfusion have not been widely accepted for use in the clinical care environment. In an attempt to overcome the limitations of the current techniques, a new fiberoptic photoplethysmographic (PPG)/pulse oximetry sensor was developed as a means of assessing splanchnic organ perfusion during surgery in humans.

**METHODS:** A new fiberoptic splanchnic pulse oximeter and an optically identical fiberoptic finger pulse oximeter have been developed. Simultaneous PPG signals and preliminary estimates of arterial oxygen saturation from the bowel (small and large) and finger were obtained in 17 patients (3 men and 14 women) undergoing open laparotomy. **RESULTS:** Good quality PPG signals were obtained from the small and large bowel and from the finger in all patients (lower 95% confidence limit for the proportion was 0.64). Comparisons of blood oxygen saturation values acquired when using the splanchnic and the finger fiberoptic sensors and a commercial finger pulse oximeter indicated that there was no statistically significant difference between them (all  $P > 0.454$ ). A Bland and Altman plot of the difference between blood oxygen saturation values from the bowel fiberoptic pulse oximeter and the fiberoptic finger pulse oximeter against their mean showed that the limits of agreement between the 2 pulse oximeters were  $-3.8\%$  and  $4.2\%$  for small bowel measurements, and  $-3.4\%$  and  $4.3\%$  for large bowel measurements. The 95% prediction interval for the difference between the 2 devices was between  $-4.2\%$  and  $4.7\%$ .

**CONCLUSION:** This study demonstrated that good quality PPG signals can be obtained from the bowel using a new fiberoptic sensor. Further evaluation is required to determine whether fiberoptic pulse oximetry of the bowel may provide a suitable method for monitoring splanchnic perfusion.

### 磁共振成像技术在用可编程植入鞘内给药系统的患者中的安全性：一项为期 3 年的前瞻性研究

#### The Safety of Magnetic Resonance Imaging in Patients with Programmable Implanted Intrathecal Drug Delivery Systems: A 3-Year Prospective Study

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**背景：**在临床上对留置可编程鞘内给药系统（IDD）的患者实施磁共振成像（MRI）是很常见的做法，虽然该过程安全与否从未被文献记录。我们进行了一项单中心、为期 3 年的研究，该研究前瞻性地评估可编程植入 IDD 的患者的不适、IDD 的技术故障以及暴露于 MRI 期间和之后的不良反应。

**方法：**连续选择 43 例植入可编程 IDD 系统（SynchroMed® EL 植入式输液泵，型号 8626L-18，和 SynchroMed® II，型号 8637-20、8637-40；Medtronic, Inc., 明尼阿波利斯, 明尼苏达州）并需要预定 MRI 评估的患者，进行了 3 年的研究。所有的 MRI 扫描均采用一个 1.5-tesla 的临床应用的磁体和不超过 0.9W/kg 的比吸收率。用 X 线显像控制来确认暴露后泵转子运动和检测系统的混乱。记录 IDD 系统故障、病人满意度和不适。

**结果：**没有患者出现因过量注入药物而导致循环、呼吸和神经系统改变的现象。MRI 后的射线评估证实鞘内导管尖或泵体没有发生空间位移，并且程序员遥测证实了输注复苏。病人术后的满意度很高。

**结论：**对已协定的植入美敦力可编程 IDD 的患者实行 MRI 扫描，几乎可以避免任何技术和医疗并发症。

（杨秀娟 译 李士通 马皓琳 校）

**BACKGROUND:** It is common clinical practice to perform magnetic resonance imaging (MRI) in patients with indwelling programmable intrathecal drug delivery (IDD) systems, although the safety of the procedure has never been documented. We performed a single-center, 3-year, prospective evaluation in patients with a programmable implanted IDD to assess patient discomfort, IDD technical failures, and adverse effects during and after exposure to MRI.

**METHODS:** Forty-three consecutive patients with an implanted programmable IDD system (SynchroMed® EL Implantable Infusion Pump, Model 8626L-18, and SynchroMed® II Model 8637-20, 8637-40; Medtronic, Inc., Minneapolis, MN) requiring a scheduled MRI evaluation were studied during a 3-year period. All MRI scans were performed with a 1.5-tesla clinical use magnet and a specific absorption rate of no more than 0.9 W/kg. Radiograph control was used to confirm postexposure pump rotor movement and detect system dislocations. IDD system failures, patient satisfaction, and discomfort were recorded.

**RESULTS:** None of the patients experienced signs of drug overinfusion that could lead to hemodynamic, respiratory, or neurologic alterations. Radiologic evaluation after MRI revealed no spatial displacements of the intrathecal catheter tip or body pump, and programmer telemetry confirmed the infusion recovery. Patients' satisfaction after the procedure was high.

**CONCLUSION:** Performing an MRI scan with the proposed protocol in patients with an implanted Medtronic programmable IDD system resulted in virtually no technical or medical complications.

### 改善大手术的预后——从病理生理学角度考虑

#### Improving Outcome After Major Surgery: Pathophysiological Considerations

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外科和麻醉相关的操作可以减少进行高风险手术的患者机体的应激，但是有越来越多的有合并症的患者需要进行大手术。改善此类患者预后的措施包括增加组织氧输送和减少代谢需要这两方面。然而，这些措施会引起矛盾的结果。为理解这些尝试对改善预后的成败，应分析围术期的血流动力学、代谢和免疫改变的病理生理学。本综述的目的是提供用于改善大手术术后预后的各种方法的一个调查。本文从3个不同的角度阐述该内容：病人的角度、外科干预的角度和麻醉的角度。尤其关注围术期的炎症及免疫应答之间的相互作用的结果。

(毛祖旻 译 马皓琳 李士通 校)

Surgical and anesthesia-related techniques may reduce physical stress for patients undergoing high-risk surgery, but major surgery is increasingly performed in patients with substantial comorbidities. Strategies for improving the outcome for such patients include approaches that both increase tissue oxygen delivery and reduce metabolic demand. However, these strategies have produced conflicting results. To understand the success and failure of attempts to improve postoperative outcome, the pathophysiology of perioperative hemodynamic, metabolic, and immunological alterations should be analyzed. Our aim in this review is to provide a survey of fields of opportunities for improving outcome after major surgery. The issues are approached from 3 different angles: the view of the patient, the view of the surgical intervention, and the view of the anesthesia. Special attention is also given to what could be considered the result of the interaction among the 3: perioperative inflammation and immune response.

### 镁对琥珀酰胆碱诱导的恶性高热的临床过程无影响

#### **Magnesium Does Not Influence the Clinical Course of Succinylcholine-Induced Malignant Hyperthermia**

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**背景：**恶性高热（MH）是潜在致命的代谢亢进综合征。吸入麻醉药和/或琥珀酰胆碱可致细胞内钙离子浓度增加，进而导致细胞内一系列反应的激活。二氧化碳的产生，继而是乳酸盐，是细胞能量消耗增加的早期信号。从细胞水平上看，镁作为生理性钙离子拮抗剂，导致肌浆网释放钙离子程度下降。在本次实验中，我们研究了静脉注射镁对恶性高热危象的临床过程的影响。

**方法：**10只皮特兰猪（10只为恶性高热易感型[MHS]和6只恶性高热不敏感型[MHN]）使用不触发恶性高热的药物进行麻醉。给予4mg/kg琥珀酰胆碱之前建立有创血流动力学监测。4只易感型猪10分钟之后给予硫酸镁10mg/kg。连续监测血流动力学变化（心率、平均动脉压和脉搏血氧饱和度）。每隔15分钟抽取静脉和动脉血气（pH、PCO<sub>2</sub>、PO<sub>2</sub>、剩余碱和乳酸盐）。实验数据采用H检验和U检验进行统计，P < 0.05为组间差异有显著性意义。

**结果：**给予琥珀酰胆碱之前两组实验猪体重、血流动力学和代谢水平无显著差异。对于所有恶性高热易感型猪，琥珀酰胆碱均导致平均动脉压的显著下降和心率

的增加。两组易感型猪均发生了代谢性合并呼吸性酸中毒。琥珀酰胆碱对恶性高热不敏感组无影响。血流动力学和代谢水平在两组易感型猪之间无显著差异，但在易感型和不敏感型两组有显著差异。

**结论：**琥珀酰胆碱仅在恶性高热易感型猪体内导致血流动力学和代谢水平的变化。镁剂治疗不影响恶性高热的临床过程。这种干预对恶性高热危象的急性期治疗无有利的影响。

（刘伍 译 马皓琳 李士通 校）

**BACKGROUND:** Malignant hyperthermia (MH) is a potentially lethal hypermetabolic syndrome. Volatile anesthetics and/or succinylcholine lead to an increase of the intracellular calcium concentration resulting in activation of various intracellular processes. A production of carbon dioxide, and later lactate, are early signs of increased cellular energy consumption. On a cellular level, magnesium acts as a physiological calcium inhibitor resulting in less-intense calcium liberation from the sarcoplasmic reticulum. In this study, we examined the effects of IV magnesium administration on the clinical course of an MH crisis.

**METHODS:** Sixteen Pietrain pigs (10 MH-susceptible [MHS] and 6 MH-nonsusceptible [MHN]) were anesthetized without an MH trigger substance. Invasive hemodynamic monitoring was established before 4 mg/kg succinylcholine was administered. Four of the MHS pigs received 10 mg/kg magnesium sulfate 10 minutes later. Hemodynamic changes (heart rate, mean arterial blood pressure, and oxygen saturation as measured by pulse oximetry) were continuously monitored. Venous and arterial blood gases (pH, PCO<sub>2</sub>, PO<sub>2</sub>, base excess, and lactate) were taken at 15-minute intervals. The *H* test and *U* test were used with *P* < 0.05 for significant differences among the groups.

**RESULTS:** No differences among the groups were seen for weight, hemodynamic, and metabolic variables before administration of succinylcholine. In all MHS animals, succinylcholine led to a marked decrease of mean arterial blood pressure and increase of heart rate. Animals in both MHS groups developed combined metabolic and respiratory acidosis. Succinylcholine had no effect on animals in the MHN group. Hemodynamic and metabolic values were not different between the 2 MHS groups but were between groups MHS and MHN.

**CONCLUSION:** Succinylcholine led to a hemodynamic and metabolic reaction in only MHS pigs. Treatment with magnesium did not influence the clinical course. The intervention had no beneficial effect in the acute phase of an MH crisis.

## 吸入性麻醉药不会对人体神经元样细胞引起显著毒性

### Volatile Anesthetics May Not Induce Significant Toxicity to Human Neuron-Like Cells

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**背景：**离体实验和动物体内研究提示了吸入性麻醉药（包括异氟烷）对脑细胞的有害效应。现在吸入性麻醉药是否会导致人脑细胞损伤还不是很清楚。

**方法：**人神经母细胞瘤细胞系的 SH-SY5Y 细胞经诱导分化成终末神经元样细胞。这些分化的细胞和 HCN-2 细胞（一种皮质神经元细胞系）在 37°C 温度下暴露于 2% 至 5% 的异氟烷、6% 七氟烷或 12% 地氟烷 48 小时。测量释放的乳酸脱氢酶 (LDH) 和半胱天冬酶 3、突触囊泡蛋白和肌联脑蛋白的表达。

**结果：**暴露于 2% 至 4% 异氟烷的分化 SH-SY5Y 和 HCN-2 细胞不会增加 LDH 的释放和半胱天冬酶 3 的表达，半胱天冬酶 3 的激活作用会导致细胞凋亡。突触囊泡蛋白（一种突触的蛋白）和肌联脑蛋白（一种树突棘蛋白）在分化的 SH-SY5Y 细胞中的表达也不受 2% 至 4% 的异氟烷影响。暴露于 6% 七氟烷或 12% 地氟烷不会影响 LDH 从分化的 SH-SY5Y 细胞的释放量。然而，5% 的异氟烷显著增加了 LDH 从这些细胞的释放量。

**结论：**我们的结果提示了吸入性麻醉药在临床应用的相关浓度水平上，并不会造成人类神经元样细胞的损伤。异氟烷也不会改变在这些人体细胞中树突棘和突触的数量。

（唐亮 译 马皓琳 李士通 校）

**BACKGROUND:** In vitro experiments and in vivo animal studies suggest detrimental effects of volatile anesthetics including isoflurane on brain cells. It is not clear whether volatile anesthetics can cause human brain cell injury.

**METHODS:** The SH-SY5Y cells, a human neuroblastoma cell line, were induced to differentiate into terminal neuron-like cells. These differentiated cells and the HCN-2 cells, a human cortical neuronal cell line, were exposed to 2% to 5% isoflurane, 6% sevoflurane, or 12% desflurane for 48 hours at 37°C. Lactate dehydrogenase (LDH) release and the expression of caspase 3, synaptophysin, and drebrin were then measured.

**RESULTS:** Exposure of the differentiated SH-SY5Y and HCN-2 cells to 2% to 4% isoflurane did not increase LDH release and the expression of caspase 3 whose activation leads to apoptosis. The expression of synaptophysin, a synaptic protein, and drebrin, a dendritic spine protein, in the differentiated SH-SY5Y cells was also not affected by 2% to 4% isoflurane. Exposure to 6% sevoflurane or 12% desflurane did not affect LDH release from differentiated SH-SY5Y cells. However, 5% isoflurane significantly increased LDH release from those cells.

**CONCLUSIONS:** Our results suggest that volatile anesthetics at clinically relevant concentrations do not cause human neuron-like cell injury. Isoflurane also may not alter the quantity of dendritic spines and synapses in these human cells.

### 围手术期和重症监护室镇静对脑器官功能障碍的影响

## The Effects of Perioperative and Intensive Care Unit Sedation on Brain Organ Dysfunction

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为了允许进行有创操作、预防疼痛和焦虑、减少应激和氧耗、便于机械通气、以及舒适性和安全性等原因，治疗室、手术室以及重症监护室中的患者常规需接受镇痛和镇静治疗。然而，越来越多的研究和证据显示，普通处方镇静剂是许多意外事件的危险因素，并且使病人转归恶化，包括表现为谵妄和昏迷的脑器官功能障碍。镇静剂对转归的影响也受镇静深度的影响，这迫使我们必须减少这类药物的用药总量。对比镇静药物广泛使用的必要性和因镇静剂使用导致的患者及社会急性和长期认知功能障碍所付出的代价，目前医生必须在遵守医学誓言不伤害病人的前提下，力争平衡病人需求量和产生舒适的必须量。幸运的是，我们的镇静方法和药物选择有可能减轻这种认知功能障碍的风险。在本综述中，我们详述了围手术期间和ICU中镇静对谵妄和认知损害的进展的影响，并且提供一个循证方式的镇静和镇痛规范来改善病人转归。

(江继宏 译 马皓琳 李士通 校)

Analgesia and sedation are routinely administered to patients in procedural suites, operating rooms, and intensive care units to permit invasive procedures, prevent pain and anxiety, reduce stress and oxygen consumption, allow mechanical ventilation, and for numerous other patient comfort and safety reasons. Increasing research and evidence, however, has implicated commonly prescribed sedative medications as risk factors for untoward events and worse patient outcomes, including brain organ dysfunction manifested as delirium and coma. The effect of sedatives on outcomes is also influenced by the depth of sedation, making it imperative to reduce total exposure to this class of medications. Juxtaposing the widespread necessity and use of sedation with the cost of acute and long-term cognitive dysfunction to patients and society, physicians must now strive to balance patients' demands and requisite for comfort with their own oath to do no harm. Fortunately, our methods of sedation and choice of medications can likely mitigate this cognitive risk. In this review, we detail the effects of perioperative and intensive care unit sedation on the development of delirium and cognitive impairment and provide an evidence-based approach towards analgesia and sedation paradigms to improve patient outcomes.

### 实时超声引导下 Taylor 路径脊麻

#### Real-Time Ultrasound-Guided Spinal Anesthesia Using Taylor's Approach

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超声扫描在脊麻中的应用主要受限于操作前成像和解剖结构的辨别。本实验介绍了在实时超声技术下进行可视化脊麻操作的经验。早期的尸体研究对 5 位未腐尸体进行脊麻操作，从而促进了实时超声引导下通过 Taylor 路径（L5-S1 间隙旁正中路径）脊麻操作技术的发展。其后，对 10 名择期关节成形术的患者俯卧位下进行实时超声引导下脊麻。相关解剖结构和针尖均顺利地显示，且所有用于关节成形手术的脊麻均有效。

（王海涛 译 马皓琳 李士通 校）

The role of ultrasound scanning in spinal anesthesia is principally limited to preprocedure imaging and identification of anatomical structures. We describe our experience with a real-time ultrasound technique for visualization and performance of spinal anesthesia. An initial cadaver study was performed in 5 un embalmed cadavers to develop a technique for real-time performance of ultrasound-guided spinal anesthesia via Taylor's approach (paramedian approach to the L5-S1 interspace). Subsequently, 10 patients scheduled for joint arthroplasty underwent real-time ultrasound-guided spinal anesthesia in the prone position. The relevant anatomy and the needle tip were visualized easily and all spinals were effective for joint arthroplasty.

#### 择期剖宫产手术患者血栓弹力图参数与总体估计失血量的关系

#### **The association between thromboelastographic parameters and total estimated blood loss in patients undergoing elective cesarean delivery.**

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.Anesth Analg 2011 112:1041-1047

**背景：**此项研究旨在评估择期剖宫产手术（CD）患者白陶土活化血栓弹力图（TEG®）凝血参数与总体估计失血量（EBL）之间的关系。

**方法：**此项研究共记录了 52 名择期剖宫产手术患者手术前后的血栓弹力图参数。其中，21 名患者同时接受了实验室凝血指标（凝血酶原时间、活化部分凝血酶时间、纤维蛋白原）的测定。运用相关与线性回归分析对血栓弹力图参数、相关临床变量及总体估计失血量的相互关系进行评估。将手术前后血栓弹力图参数与凝血资料的比较进行二次分析。

**结果：**估计失血量与最大振幅的变化百分率（ $r=0.3$ ;  $P=0.04$ ）及剖宫产术后血栓生成的最大比率（ $r=0.31$ ;  $P=0.02$ ）呈弱相关性。将剖宫产术后的检测值为分割点，则反应时间、最大比率凝血酶生成时间、凝血酶原时间及活化部分凝血酶时间均较基线值明显延长（ $P<0.05$ ）。而剖宫产术后的  $\alpha$  角、最大振幅、总血栓生成、纤维蛋白原及血小板计数则较基线值明显减少（ $P<0.05$ ）。

**结论：**在椎管内麻醉下行择期剖宫产手术的患者其凝血强度（通过白陶土活化血栓弹力图评定）与估计失血量呈弱相关性；但在择期剖宫产术的产后早期，产妇的高凝状态可发生中等程度的弱化。

（范羽译 薛张纲校）

**Background:** In this study, we assessed the relationship between coagulation parameters using kaolin-activated thromboelastography (TEG®) and total estimated blood loss (EBL) in patients undergoing elective cesarean delivery (CD).

**Methods:** TEG® parameters were recorded in 52 patients before and after elective CD. Laboratory markers of coagulation (prothrombin time, activated partial thromboplastin time, fibrinogen) were also assessed in a smaller subset (21 patients). Correlation and linear regression analysis was used to assess the relationship among TEG® parameters, relevant clinical variables, and total EBL. Secondary analysis included comparisons of TEG® and coagulation profiles pre-CD versus post-CD.

**Results:** EBL weakly correlated with percentage change in maximum amplitude ( $r=0.3$ ;  $P=0.04$ ) and post-CD maximum rate of thrombus generation ( $r=0.31$ ;  $P=0.02$ ). Post-CD values for split point, reaction time, time to maximum rate of thrombin generation, prothrombin time, and activated partial thromboplastin time were significantly increased compared with baseline values ( $P<0.05$ ). Post-CD  $\alpha$  angle, maximum amplitude, total thrombus generation, fibrinogen, and platelet counts were significantly decreased compared with baseline values ( $P<0.05$ ).

**Conclusions:** There is a weak association between clot strength (as assessed by kaolin-activated TEG®) and EBL in patients undergoing elective CD under neuraxial anesthesia, and a modest reduction in the degree of maternal hypercoagulability occurs in the early postpartum period after elective CD.

### 输注丙泊酚与咪达唑仑对椎管内麻醉进行镇静过程中做梦的比较的研究

#### **Dreaming in sedation during spinal anesthesia: a comparison of propofol and midazolam infusion**

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**背景:**尽管在椎管内麻醉过程中经常进行镇静，但是术中做梦的具体情况至今仍无报道。我们设计这项前瞻性研究目的在于比较两组静脉镇痛方法（输注丙泊酚和咪达唑仑）在镇静过程中对做梦方面的影响。

**方法:**将 220 名行椎管内麻醉的成年患者随机分成两组，分别予以输注丙泊酚或咪达唑仑进行深镇静。在患者出现梦境及其后 30 分钟时随访病人，以确定做梦的概率、内容、性质。术后也要对做梦的满意度进行评估。

**结果:**有 215 名患者进入了最后的分析中（丙泊酚组及咪达唑仑组分别为 108 和 107 名）。丙泊酚组做梦的比例为 39.8%（43/108），而咪达唑仑组为 12.1%

（13/107）（优势比=4.78；95%可信区间：2.38 到 9.60）。相比接受咪达唑仑的患

者，接受丙泊酚的患者的梦境更为难忘和生动。多数梦是对日常生活的简单而愉快的思维反刍（56个做梦者中有36位，占64.3%）。两组患者都同样的对镇静非常满意。

**结论:**对椎管内麻醉进行深镇静，虽然接受丙泊酚输注的患者做梦的几率是咪达唑仑的5倍之多，但这并不影响镇静的满意度。因此，当我们为椎管内麻醉的病人选择丙泊酚或咪达唑仑作为镇静药时，我们没必要考虑术中做梦的情况。

（侯文婷译 薛张纲校）

**BACKGROUND:** Although sedation is often performed during spinal anesthesia, the details of intraoperative dreaming have not been reported. We designed this prospective study to compare 2 different IV sedation protocols (propofol and midazolam infusion) with respect to dreaming during sedation.

**METHODS:** Two hundred twenty adult patients were randomly assigned to 2 groups and received IV infusion of propofol or midazolam for deep sedation during spinal anesthesia. Patients were interviewed on emergence and 30 minutes later to determine the incidence, content, and nature of their dreams. Postoperatively, patient satisfaction with the sedation was also evaluated.

**RESULTS:** Two hundred fifteen patients (108 and 107 in the propofol and midazolam groups, respectively) were included in the final analysis. The proportion of dreamers was 39.8% (43/108) in the propofol group and 12.1% (13/107) in the midazolam group (odds ratio = 4.78; 95% confidence interval: 2.38 to 9.60). Dreams of the patients receiving propofol were more memorable and visually vivid than were those of the patients receiving midazolam infusion. The majority of dreams (36 of 56 dreamers, 64.3%) were simple, pleasant ruminations about everyday life. A similarly high level of satisfaction with the sedation was observed in both groups.

**CONCLUSIONS:** In cases of spinal anesthesia with deep sedation, dreaming was almost 5 times more common in patients receiving propofol infusion than in those receiving midazolam, although this did not influence satisfaction with the sedation. Thus, one does not need to consider intraoperative dreaming when choosing propofol or midazolam as a sedative drug in patients undergoing spinal anesthesia.

### 人胚肾细胞表达的 $\alpha(1)\beta(2)\gamma(2)L$ 和 $\alpha(1)\beta(2)\gamma(2)S$ GABA(A)受体中咪唑安定和异丙酚的相互作用

#### Interactions of Midazolam and Propofol on $\{\alpha\}1\{\beta\}2\{\gamma\}2L$ and $\{\alpha\}1\{\beta\}2\{\gamma\}2S$ Gamma Aminobutyric Acid Type A Receptors Expressed in Human Embryonic Kidney Cells.

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**背景：**咪唑安定和异丙酚等多种麻醉药物均作用于GABA的A型受体。它们通过激活GABA(A)受体，产生镇静催眠的作用，但是作用靶点相同的麻醉药物之间的相

互作用，仍然缺乏研究。为此我们研究了咪唑安定和异丙酚对于  $\alpha(1)\beta(2)\gamma(2)L$  和  $\alpha(1)\beta(2)\gamma(2)S$  GABA(A)受体的相互作用。

**方法：**将  $\alpha(1)\beta(2)\gamma(2)L$  和  $\alpha(1)\beta(2)\gamma(2)S$  GABA(A)受体转染至人的胚胎肾293T细胞，然后使用全细胞膜片钳技术检测了咪唑安定和异丙酚与其发生作用时所产生的电流。

**结果：**咪唑安定和异丙酚均可各自加强GABA(A)受体的反应，并且呈现剂量相关性。对于  $\alpha(1)\beta(2)\gamma(2)S$  GABA(A)受体，还具有附加效应，但是在  $\alpha(1)\beta(2)\gamma(2)L$  GABA(A)受体中则无此额外作用。但是在抑制了蛋白激酶C之后可以观察到咪唑安定和异丙酚之间对于  $\alpha(1)\beta(2)\gamma(2)L$  GABA(A)受体具有相互作用。

**结论：**咪唑安定和异丙酚之间的相互作用在不同受体亚型间有差异。蛋白磷酸化激酶会影响它们之间对于  $\alpha(1)\beta(2)\gamma(2)L$ 受体的相互作用。

(黄剑译 薛张纲校)

**BACKGROUND:**The gamma aminobutyric acid type A (GABA(A)) receptor is a prime target of many anesthetics, including midazolam and propofol. Although these anesthetics have sedative and hypnotic properties by enhancing GABA(A) receptor activity, their interactions at the GABA(A) receptors have not been explored. We investigated the interaction of midazolam and propofol with  $\alpha(1)\beta(2)\gamma(2)L$  and  $\alpha(1)\beta(2)\gamma(2)S$  GABA(A) receptors.

**METHODS:**Using the whole-cell patch clamp technique, we tested the effects of midazolam and propofol on GABA-induced currents in human embryonic kidney 293 T cells transfected with  $\alpha(1)\beta(2)\gamma(2)L$  and  $\alpha(1)\beta(2)\gamma(2)S$  GABA(A) receptors.

**RESULTS:**Midazolam and propofol on their own enhanced the amplitude of GABA(A) receptor responses in a dose-dependent manner, and they had additive effects on  $\alpha(1)\beta(2)\gamma(2)S$  GABA(A) receptors, but not on  $\alpha(1)\beta(2)\gamma(2)L$  GABA(A) receptors. However, additive interactions of midazolam and propofol on the  $\alpha(1)\beta(2)\gamma(2)L$  GABA(A) receptors were observed when protein kinase C was inhibited.

**CONCLUSIONS:**The interaction between midazolam and propofol is affected by receptor subtype, and protein kinase phosphorylation influences their interaction on the  $\alpha(1)\beta(2)\gamma(2)L$  receptor.

### 1987年至2006年丹曲林相关并发症：一项来自美国恶性高热组织关于北美恶性高热的报道

#### Complications Associated with the Administration of Dantrolene 1987 to 2006: A Report from the North American Malignant Hyperthermia Registry of the Malignant Hyperthermia Association of the United States

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**背景：**丹曲林是唯一一种针对由于吸入麻醉药和琥珀酰胆碱诱导而引起的致命的、基因紊乱所致的恶性高热的特异性治疗。由于恶性高热没有特异性的症状，且延误治疗的后果是致命的，一旦怀疑是恶性高热应尽快给予丹曲林治疗。我们已经在 AMRA（麻醉中不利于代谢、肌肉的反应）中报道了丹曲林的并发症并提交给北美恶性高热注册表。

**方法：**AMRA 的报告分析了个体伴或不伴有与丹曲林并发症之间的相关性。文献已将丹曲林的剂量和个体的体重纳入标准。由于一些已报道的并发症可能归咎于其他因素而与丹曲林无关，还确定有一些剔除的标准。我们使用了  $\chi^2$  and Mann-Whitney 的方法测试。用逻辑回归法分析与并发症的风险增加的相关的因素。

**结果：**在 368 个的受试者中，最常见的与丹曲林相关的并发症是肌无力（21.7%），静脉炎（9%），胃肠道不适（4.1%），呼吸衰竭（3.8%）。逻辑回归法显示任何时候，丹曲林的剂量增加了一倍时，并发症的危险因素增加 29%，若液体的管理成为治疗的一部分，危险因素增加 144%。而在神经外科则发生率下降 83%，在口腔外科则下降 74%。在数据组中，移除一些被认为可能是已经存在的疾病或恶性高热的严重并发症后，还剩下 349 位被试者。最常见的与丹曲林相关的并发症是肌无力（14.6），静脉炎（9.2%），胃肠不适（4.3%）。在剔除过的数据组中，用逻辑回归法分析，任何时候当丹曲林的剂量加倍，增加并发症的危险因素会增加 25%。在妇科或产科手术中，危险因素会增加 572%。若给予呋塞米，危险因素会减少 56%，而这些与液体管理和或手术的类型无关。

**结论：**丹曲林并发症较常见的，但很少有危及生命。在外科的手术中不确定因素与并发症的发生有关。作为恶性高热治疗的一部分，液体管理与丹曲林的使用后的并发症紧密相关，应该严密监控。

（刘珏莹译 薛张纲校）

**BACKGROUND:** Dantrolene is the only specific treatment for malignant hyperthermia (MH), a genetic disorder in which life-threatening temperature increase has been induced by inhalation anesthetics and succinylcholine. Because MH presents with nonspecific signs and delay of treatment can be fatal, dantrolene may be given as soon as MH is suspected. We report the complications associated with dantrolene administration as documented in AMRA (adverse metabolic/musculoskeletal reaction to anesthesia) reports submitted to the North American Malignant Hyperthermia Registry.

**METHODS:** AMRA reports were analyzed for differences between subjects with and without complications attributed to dantrolene. Documentation of dantrolene dose and subject weight were inclusion criteria. Because some reported complications were likely due to factors other than dantrolene, a reduced set of cases was also defined. We used  $\chi^2$  and Mann-Whitney tests. Logistic regression was applied to describe factors associated with increased risk of complications.

**RESULTS:** In the full dataset of 368 subjects, the most frequent complications associated with dantrolene were muscle weakness (21.7%), phlebitis (9%), gastrointestinal upset (4.1%), and respiratory failure (3.8%). Logistic regression described a 29% increase in risk of any complication when the total dantrolene dose was doubled, a 144% increase in risk when fluid administration was part of treatment, an 83% decrease in risk in the presence of neurosurgery, and a 74% decrease in risk in the presence of oral surgery. In the dataset reduced by removal of some serious

complications that were judged likely to have been due to preexisting disease or the MH event, there were 349 subjects. The most frequent complications associated with dantrolene were muscle weakness (14.6%), phlebitis (9.2%), and gastrointestinal upset (4.3%). In this reduced dataset, logistic regression described a 25% increase in risk of any complication when the total dantrolene dose was doubled, a 572% increase in risk in the presence of obstetric or gynecologic surgery, a 56% decrease in risk if furosemide was given, and no relationship with fluid administration or other types of surgery.

**CONCLUSIONS:** Complications after dantrolene are common, but rarely life threatening. Unidentified factors in the surgical environment are associated with changes in the risk of complications. Fluid management, as part of the treatment of MH, has an important association with the risk of complications after dantrolene administration and should be monitored closely.

### 三种急性肺损伤大鼠实验模型的生理和生物学特性

#### Physiologic and Biologic Characteristics of Three Experimental Models of Acute Lung Injury in Rats

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**背景:** 试图减轻通气相关性肺损伤的方法已经在各种急性肺损伤 (ALI) 的试验中测试过。结论往往来自生理和生物学效应, 但是模型对这些结果的影响尚不清楚。我们在这一研究的目的是描述急性肺损伤常用实验模型的生理生物学特性。

**方法:** 取 20 只 SD 级被麻醉的大鼠, 肺部机械通气 5 小时。三个急性肺损伤实验模型 (表面活性剂冲洗, 酸性环境, 高潮气量通气) 进行了血流动力学, 呼吸力学, 气体交换, 肺病理学, 和炎症反应方面的研究。没有急性肺损伤动物作为对照组。

**结果:** 对每组五只动物进行了分析。所有组在 1 小时后动态顺应性及吸氧率  $Pao_2/\text{fraction}$  下降至少 50%。所有模型顺应性均降低, 5 个小时后灌洗组的基线值氧返回。弥漫性肺泡损害是在高潮气量组最糟, 对照组和灌洗组没有区别。白介 6 在支气管肺泡灌洗组和高潮气量模型组增加了。

**结论:** 虽然所有模型都会出现相似的急性呼吸窘迫综合症的生理影响。但生物反应在不相同肺损伤模型中是不同的。酸环境急性肺损伤模型的建立通常都出现呼吸和炎症反应, 这些数据表明, 它可能是临床上最适用的模型来研究通气相关肺损伤对大鼠的中远期影响。

(陆丽虹译 薛张纲校)

**BACKGROUND:** Strategies to attenuate ventilator-associated lung injury have been tested in various experimental methods of acute lung injury (ALI). Conclusions are often drawn from physiologic and biologic effects, but the influence of the model on these

results is not known. Our aim in this study was to characterize frequently used models of experimental ALI.

**METHODS:** Twenty Sprague Dawley rats were anesthetized and their lungs mechanically ventilated for 5 hours. Three models of ALI (surfactant washout, acid aspiration, and high tidal volume ventilation) were investigated with regard to hemodynamics, respiratory mechanics, gas exchange, lung pathology, and inflammatory reactions. Animals without ALI served as controls.

**RESULTS:** Five animals in each group were analyzed. Dynamic compliance and Pao<sub>2</sub>/fraction of inspired oxygen ratio decreased by at least 50% in all groups after 1 hour. Whereas compliance remained decreased in all models, oxygenation returned to baseline values in the lavage group after 5 hours. Diffuse alveolar damage was worse in the high tidal volume model and was not different between the control and lavage animals. Interleukin-6 was increased in bronchoalveolar lavage fluid in the aspiration and high tidal volume models.

**CONCLUSIONS:** Although comparable physiologic effects meeting acute respiratory distress syndrome criteria were achieved in all models, the biologic responses varied among lung injury models. The acid aspiration model created both respiratory and inflammatory responses typically seen in ALI; these data suggest that it may be the most clinically applicable model to study the intermediate-term effects of ventilator-associated lung injury in rats.

在以异丙酚为基础的儿科病人麻醉时大剂量的瑞芬太尼抑制窦房传导和窦房结自律性

### High-dose remifentanyl suppresses sinoatrial conduction and sinus node automaticity in pediatric patients under propofol-based anesthesia

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**背景：**我们在行射频消融术的儿科病人中研究了瑞芬太尼对窦房结功能和心房-希氏束间期的作用。

**方法：**60例预激综合征儿科病人入选这项前瞻性研究。全身麻醉由异丙酚诱导和维持。我们在平稳的麻醉状态下分别记录了计算的窦房传导时间(CSACT)、校正的窦房结恢复时间(CSNRT)和心房-希氏束间期，并且在使用中等(0.2 μg · kg<sup>-1</sup> · min<sup>-1</sup>)和大剂量(0.4 μg · kg<sup>-1</sup> · min<sup>-1</sup>)瑞芬太尼时比较了这些数值。数据由平均值表示(95%置信区间)。

**结果：**中等剂量的瑞芬太尼延长了校正的窦房结恢复时间(用药后 177[117-237]毫秒到 245[167-322]毫秒；P=0.016)，但对计算的窦房传导时间(P=0.59)和心房-希氏束间期(P=0.11)没有作用。大剂量的瑞芬太尼延长了校正的窦房结恢复时间(用药后从 201[144-260]毫秒到 307[232-382]毫秒；P=0.019)和计算的窦房传导时间(用药后从 48[31-65]毫秒到 78[59-96]毫秒；P=0.038)，但对心房-希氏束间期没有作用。

( $P=0.058$ )。瑞芬太尼的使用与其剂量对校正的窦房结恢复时间的作用不同 ( $P=0.44$ )。

**结论：**瑞芬太尼抑制了心房内的传导和窦房结自律性，但对房室结传导没有作用。我们使用  $0.2$  到  $0.4 \mu\text{g} \cdot \text{kg}(-1) \cdot \text{min}(-1)$  范围内瑞芬太尼时没有观察到剂量相关性。

(任云译 薛张纲校)

**BACKGROUND:** We sought to determine the effect of remifentanil on sinus node function and the atrial-His (AH) interval in pediatric patients undergoing radiofrequency catheter ablation.

**METHODS:** Sixty pediatric patients with Wolff-Parkinson-White syndrome were prospectively enrolled in this study. General anesthesia was induced and maintained with a continuous infusion of propofol. We recorded the calculated sinoatrial conduction time (CSACT), corrected sinus node recovery time (CSNRT), and AH interval when the patients were in a stable anesthetic state and compared the values before and during remifentanil administration at a moderate dose ( $0.2 \mu\text{g} \cdot \text{kg}(-1) \cdot \text{min}(-1)$ ) or a high dose ( $0.4 \mu\text{g} \cdot \text{kg}(-1) \cdot \text{min}(-1)$ ). Data are expressed as mean (95% confidence interval).

**RESULTS:** At the moderate dose, remifentanil prolonged CSNRT (from 177 [117-237] milliseconds to 245 [167-322] milliseconds after administration;  $P = 0.016$ ), but had no effect on either CSACT ( $P = 0.59$ ) or AH interval ( $P = 0.11$ ). However, high-dose remifentanil prolonged both CSNRT (from 201 [144-260] milliseconds to 307 [232-382] milliseconds after administration;  $P = 0.019$ ) and CSACT (from 48 [31-65] milliseconds to 78 [59-96] milliseconds after administration;  $P = 0.038$ ), but had no effect on the AH interval ( $P = 0.058$ ). The interaction in CSNRT between remifentanil administration and its dose was not different ( $P = 0.44$ ).

**CONCLUSIONS:** Remifentanil may inhibit both intraatrial conduction and sinus node automaticity, but it has no effect on conduction through the atrioventricular node. Dose dependency was not observed within the range of  $0.2$  to  $0.4 \mu\text{g} \cdot \text{kg}(-1) \cdot \text{min}(-1)$  of remifentanil.

### 在老年患者行关节成形术后发生谵妄的情况和预测谵妄发生的因素

#### Cognitive and functional predictors and sequelae of postoperative delirium in elderly patients undergoing elective joint arthroplasty.

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**背景：**术后谵妄在老年病人中很普遍，常常与不良的预后有关。在外科择期手术后发生术后谵妄的发生情况也并不清楚。我们试图去发现（1）如果敏感的神经认知测试得分低是否是老年病人发生术后谵妄的独立风险因素。（2）发生术后谵妄的病人在术后3个月后认知和功能状态是否会下降。

**方法：**我们进行了一项前瞻性的队列研究，研究对象为年龄≥65岁，行全膝或者全髋关节成形术的患者。我们使用意识混乱评价方法来诊断术后谵妄。患者发生了谵妄并接受了治疗，术后3个月后将重复认知和功能的评估。

**结果：**有418名患者符合我们的标准，其中42%的患者发生了术后谵妄。经过组间比较我们发现两组在心理状态评分，滥用酒精，抑郁，口头表达能力方面没有差异。术后谵妄的独立预测因素包括年龄，精神疾病史，降低的功能状态，降低的言语记忆。对于所有的测试来说，发生术后谵妄的病人术前评估和术后3个月再评估都是很相似的。

**结论：**术前神经认知和功能状态的微妙减低预示着术后会发生谵妄。然而，在术后发生谵妄的小部分病人中，术后3个月再评估认知和功能状态与之前相似。在老年病人中发生术后谵妄与术前认知功能减低有关，但是对术后3个月后的认知功能无不良影响。

(翁梅琳译 薛张纲校)

**BACKGROUND:** Postoperative delirium (POD) is common in the elderly and associated with adverse outcomes. The cognitive and functional sequelae of POD in elective surgical patients are not known. We sought to determine whether (1) lower scores on sensitive neurocognitive tests are an independent risk factor for POD in elderly surgical patients, and (2) POD predicts cognitive and functional decline 3 months postoperatively.

**METHODS:** We conducted a prospective, cohort study on patients ≥65 years old undergoing total hip or knee arthroplasty. Participants underwent preoperative neurocognitive and functional testing. POD was diagnosed using the Confusion Assessment Method. Patients who developed POD and matched controls underwent repeat neurocognitive and functional testing 3 months after surgery.

**RESULTS:** Four hundred eighteen patients met entry criteria, and 42 (10%) developed POD. There were no differences in baseline Mini-Mental State Examination scores, alcohol abuse, depression, and verbal intelligence between groups. Independent predictors of POD included age, history of psychiatric illness, decreased functional status, and decreased verbal memory. For all tests, changes from before to 3 months after surgery were similar between those patients with POD and matched controls.

**CONCLUSIONS:** Subtly reduced preoperative neurocognitive and functional status predict POD. However, in the small group that developed POD, there was no evidence of cognitive and functional decline 3 months after surgery. POD is associated with decreased preoperative cognitive reserve but, in elderly elective surgical patients, may be without adverse cognitive or functional sequelae 3 months postoperatively.

### 术后谵妄:具有长期危害的急性改变

#### Postoperative Delirium: Acute Change with Long-Term Implications

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**摘要:**谵妄是认知功能和注意力的急性改变,其中可能包括了意识改变和思维瓦解。虽然谵妄在各年龄段均可发生,其在老年人中最常见,特别是术前存在认知功能损害者。谵妄病人相较无谵妄病人术后恢复更缓慢,并且住院时间和费用增加。术后谵妄的发生依据手术类型、是否急诊手术和谵妄评价方法敏感程度而各有不同。虽然谵妄被认为是一个短期改变,但是它能持续数月,且与不良认知改变和功能损害相关。本文中,我们提供了术前评估谵妄发生危险度的方法和预防、诊断、治疗这一常见的并发症。对这类病人关怀的进步体现在术前识别谵妄发生的危险、训练有素的外科医生、麻醉医生和护士筛查谵妄的发生;应用预防谵妄发生的程序和开发标准谵妄治疗方案可能使谵妄发生下降并且减少相关的并发症。

(姚敏敏译 薛张纲校)

Delirium is an acute change in cognition and attention, which may include alterations in consciousness and disorganized thinking. Although delirium may affect any age group, it is most common in older patients, especially those with preexisting cognitive impairment. Patients with delirium after surgery recover more slowly than those without delirium and, as a result, have increased length of stay and hospital costs. The measured incidence of postoperative delirium varies with the type of surgery, the urgency of surgery, and the type and sensitivity of the delirium assessment. Although generally considered a short-term condition, delirium can persist for months and is associated with poor cognitive and functional outcomes beyond the immediate postoperative period. In this article, we provide a guide to assess delirium risk preoperatively and to prevent, diagnose, and treat this common and morbid condition. Care improvements such as identifying delirium risk preoperatively; training surgeons, anesthesiologists, and nurses to screen for delirium; implementing delirium prevention programs; and developing standardized delirium treatment protocols may reduce the risk of delirium and its associated morbidity.