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ATP 敏感钾通道参与七氟烷和丙泊酚对大鼠糖代谢的不同作用

The Involvement of Adenosine Triphosphate-Sensitive Potassium Channels in the Different Effects of Sevoflurane and Propofol on Glucose Metabolism in Fed Rats

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背景：最近，本研究组报道了七氟烷和丙泊酚对糖代谢影响具有显著差异：七氟烷损害了葡萄糖利用，而丙泊酚却不然。β 胰岛细胞的 ATP 敏感钾离子通道的开放减少胰岛素分泌，而阻断 β 胰岛细胞的 ATP 敏感钾离子通道可增加胰岛素分泌。据报道吸入性麻醉药可使 ATP 敏感钾离子通道开放，而丙泊酚阻断此离子通道。在正常血容量和血容量减少情况下，本研究围绕胰岛素的分泌，观察七氟烷和丙泊酚对糖代谢的影响。
方法：所有大鼠接受七氟烷诱导麻醉（1L/ml 氧流量，3%浓度）。术前准备后，大鼠被分为两组。第一组接受七氟烷吸入维持麻醉（1L/ml 氧流量，2%浓度），第二组接受丙泊酚维持麻醉（负荷剂量为 30mg/kg，维持剂量为 30 mg $\cdot kg^{-1} \cdot h^{-1}$）。每一组再分为三个亚组：没有经过预处理，用格列苯脲预处理以及用尼可地尔预处理。经过 30 分钟稳定阶段后，抽出 15 mL/kg 的血液导致低血容量。本研究通过测定血糖水平和血浆胰岛素水平，来评估正常血容量以及低血容量情况下糖代谢情况。
结果：在正常血容量以及低血容量情况下，七氟烷麻醉大鼠血糖水平明显高于丙泊酚麻醉大鼠，且七氟烷麻醉大鼠血浆胰岛素水平明显低于丙泊酚麻醉大鼠。格列苯脲，作为一种 ATP 敏感的钾离子通道阻滞剂，明显降低七氟烷麻醉状态下血糖水平并明显增加胰岛素水平。这表明七氟烷通过开放 β 胰岛细胞的 ATP 敏感钾离子通道抑制胰岛素分泌。格列苯脲同样明显降低丙泊酚麻醉状态下血糖水平并明显增加胰岛素水平；然而用格列苯脲预处理组中，丙泊酚麻醉状态下大鼠的胰岛素水平高于七氟烷麻醉状态下大鼠。同时，未行预处理的丙泊酚麻醉大鼠的胰岛素水平似乎等于甚至高于经格列苯脲预处理的七氟烷麻醉大鼠。这些结果提示：七氟烷与丙泊酚通过调节 β 胰岛细胞的 ATP 敏感钾离子通道，对胰岛素分泌作用有显著差异。尼可地尔，一种 ATP 敏感的钾离子通道开放剂，对于七氟烷及丙泊酚麻醉状态下的糖代谢皆无明显影响。
结论：通过 β 胰岛细胞的 ATP 敏感钾离子通道调节的胰岛素分泌参与(或至少部分参与)七氟烷与丙泊酚对糖代谢的不同作用。
（龚寅　译　陈杰　校）

BACKGROUND: Recently, we reported marked differences in the effects of sevoflurane and propofol on glucose metabolism; glucose use is impaired by sevoflurane, but not by propofol. Opening of adenosine triphosphate-sensitive potassium channels (K_{ATP} channels) in β islet cells attenuates insulin secretion, while inhibition of K_{ATP} channels in β islet cells increases insulin secretion. It is reported that volatile anesthetics open K_{ATP} channels, whereas propofol inhibits K_{ATP} channels. In this study, we examined the effects of sevoflurane and propofol on glucose metabolism under normovolemic and hypovolemic conditions, focusing on insulin secretion.

METHODS: Anesthesia was induced with sevoflurane (3% in 1 L/min oxygen) in all rats. After surgical preparation, rats were assigned to 2 groups. Anesthesia was maintained with sevoflurane (2% in 1 L/min oxygen) in the 1st group, and with propofol (a bolus dose of 30 mg/kg followed by continuous infusion at a rate of 30 mg $\cdot kg^{-1} \cdot h^{-1}$) in the 2nd group. Each group was divided into 3 subgroups: rats without pretreatment, rats pretreated with glibenclamide, and rats pretreated with nicorandil. After a 30-minute stabilization period, we withdrew 15 mL/kg of

blood to induce hypovolemia. We evaluated glucose metabolism under both normovolemic and hypovolemic conditions by measuring blood glucose levels and plasma insulin levels.
RESULTS: Under both normovolemia and hypovolemia, glucose levels in rats anesthetized with sevoflurane were significantly higher than those in rats anesthetized with propofol, and insulin levels in rats anesthetized with sevoflurane were significantly lower than those in rats anesthetized with propofol. Glibenclamide, a K_{ATP} channel inhibitor, significantly decreased glucose levels and significantly increased insulin levels under sevoflurane anesthesia, suggesting that sevoflurane decreases insulin secretion by opening K_{ATP} channels in β islet cells. Glibenclamide significantly decreased glucose levels and significantly increased insulin levels under propofol anesthesia as well; however, insulin levels in rats pretreated with glibenclamide under propofol anesthesia were much higher than those in rats pretreated with glibenclamide under sevoflurane anesthesia. Furthermore, insulin levels in rats without pretreatment under propofol anesthesia seemed to be equal to or higher than those in rats pretreated with glibenclamide under sevoflurane anesthesia. These results suggest that there are marked differences in the effects of sevoflurane and propofol on insulin secretion regulated by K_{ATP} channels in β islet cells. Nicorandil, a K_{ATP} channel opener, produced no significant effects on glucose metabolism under both sevoflurane and propofol anesthesia.
CONCLUSIONS: Insulin secretion regulated by K_{ATP} channels in β islet cells is involved, at least in part, in the different effects of sevoflurane and propofol on glucose metabolism.

综述：麻醉中的闭合回路系统：闭合回路式的液体管理和血流动力学最佳化可否实现？

Review Article: Closed-Loop Systems in Anesthesia: Is There a Potential for Closed-Loop Fluid Management and Hemodynamic Optimization?

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闭合回路（自动化）控制器在现代化生活中各方面，从空调到宇宙飞行，随处可见。尽管这些系统无所不在，但由于生理系统非常复杂且从病人中得到可靠的反馈数据较难，故很少用于麻醉学上。尽管存在这些挑战，关于应用在医疗方面的闭合管路系统的研究和改进越来越多。两项最新研究使液体管理的闭合回路控制成为可能。首先，对液体反应性的动态预测指标的进一步描述和发展为指导液体管理提供了一项有力的控制参数。第二，无创伤性心输出量监测和其他血流动力学参数的快速发展使靶向治疗能应用于临床各种环境下的各种患者。此文章回顾了临床使用的闭合回路控制装置的历史，讨论了对液体反应性的动态预测指标目前的理解及局限，以及试验如何将这些参数整合入闭合回路式的液体管理系统中。
（丁佳　译　陈杰　校）
Closed-loop (automated) controllers are encountered in all aspects of modern life in applications ranging from air-conditioning to spaceflight. Although these systems are virtually ubiquitous, they are infrequently used in anesthesiology because of the complexity of physiologic systems and the difficulty in obtaining reliable and valid feedback data from the patient. Despite these challenges, closed-loop systems are being increasingly studied and improved for medical use. Two recent developments have made fluid administration a candidate for closed-loop control.

First, the further description and development of dynamic predictors of fluid responsiveness provides a strong parameter for use as a control variable to guide fluid administration. Second, rapid advances in noninvasive monitoring of cardiac output and other hemodynamic variables make goal-directed therapy applicable for a wide range of patients in a variety of clinical care settings. In this article, we review the history of closed-loop controllers in clinical care, discuss the current understanding and limitations of the dynamic predictors of fluid responsiveness, and examine how these variables might be incorporated into a closed-loop fluid administration system.

6% 羟乙基淀粉 (130/0.4)用于重症患者的液体复苏：一项最新系统性综述和荟萃分析

Fluid Resuscitation with 6% Hydroxyethyl Starch (130/0.4) in Acutely Ill Patients: An Updated Systematic Review and Meta-Analysis

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背景: 最新研究显示 6% 羟乙基淀粉 (HES) 130/0.4 已成为全球范围最常用于液体复苏的液体之一。 评估其使用的回顾性研究提出有必要对其安全性和有效性的证据进行重新评估。
方法: 选取了未被召回的随机对照试验，内容为比较 6% 羟乙基淀粉（130/0.4）与其他胶体或晶体对重症或围术期患者死亡率、急性肾损伤/衰竭以及出血情况的影响，并以此完成系统性综述及荟萃分析。敏感度分析也纳入了那些研究的数据。
结果: 所有的 36 项研究中 2149 名参与者符合选择标准，其中 11 项研究被重研究(*n* = 541)。余下的 25 项研究中，17 项有严重的偏倚风险；19 项(*n* = 1246)对象为围术期患者，6 项(*n* = 362)则着眼于重症患者。16 项研究报告了死亡率：1184 名参与者中有 104 例死亡。死亡相对危险度为 0.95 (95%置信区间 0.64–1.42, I^2 = 0%, *P* = 0.73)；若加上重新评估的研究中 14 名死亡病例，相对危险度则为 0.92 (95%置信区间 0.63–1.34, I^2 = 0%, *P* = 0.95)。急性肾损伤、红细胞输注及出血情况的数据因数量和质量不足而未进入荟萃分析。
结论: 已出版研究质量欠缺，且其事件报道过少以至于无法可靠评估输注 6% 羟乙基淀粉（130/0.4）后的收益或风险。无论是否纳入重新评估的研究，结论均是如此。考虑到 6% 羟乙基淀粉（130/0.4）的广泛应用，迫切需要含有大量事件报道的高质量研究结果。
（俞劼晶　译　陈杰　校）
BACKGROUND: Recent research suggests that 6% hydroxyethyl starch (HES) 130/0.4 is one of the most frequently used resuscitation fluids worldwide. The retraction of studies evaluating its use necessitates a reevaluation of available evidence regarding its safety and efficacy.
METHODS: We performed a systematic review and meta-analysis of unretracted randomized controlled trials comparing the effects of 6% HES 130/0.4 with other colloid or crystalloid

solutions on mortality, acute kidney injury/failure, and bleeding in acutely ill or perioperative patients. A sensitivity analysis including the data from retracted studies was also conducted.
RESULTS: Overall, 36 studies reporting 2149 participants met the inclusion criteria, of which 11 (n = 541) have been retracted. Of the remaining 25 studies, there was a high risk of bias in 17 studies; 19 studies (n = 1246) were conducted in perioperative patients and 6 (n = 362) in critically ill patients. Sixteen studies reported mortality: 104 deaths in 1184 participants. The relative risk of death was 0.95 (95% confidence interval 0.64–1.42, I^2 = 0%, P = 0.73); including the retracted studies added a further 14 deaths and the relative risk was 0.92 (95% confidence interval 0.63–1.34, I^2 = 0%, P = 0.95). The data reporting acute kidney injury, red blood cell transfusion, and bleeding were of insufficient quantity and quality and not amenable to meta-analysis.
CONCLUSIONS: Published studies are of poor quality and report too few events to reliably estimate the benefits or risks of administering 6% HES 130/0.4. This same conclusion is reached with or without the retracted studies. Given the widespread use of 6% HES 130/0.4, high-quality trials reporting a large number of events are urgently required.

热点综述：产科麻醉的模拟训练

Focused Review: Simulation in Obstetric Anesthesia

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模拟训练可以被用来教授技术，评价临床医生的操作水平，帮助评估监护环境的安全性，提高团队合作意识。所有这些已成功应用于产科麻醉的模拟。硬膜外置管、插管失败、失血量估计的模拟装置均可提高麻醉医生操作的水平。可以对一个住院医师在处理急诊剖腹产中的表现进行测试和评估并考察其在同行中的水平。在分娩病区（现场训练）进行急诊模拟可以帮助确认和纠正潜在的安全隐患（潜在错误），并避免使病人受到隐患所造成的危害。最后，模拟训练可以有效评估和培养团队手段和行为。然而现在还不清楚在模拟环境中学习到的技术如何转化为临床上更好的应对和护理，以及模拟是否可以提高病人的预后，需要更多的研究来帮助回答这些问题。
（范逸辰　译　陈杰　校）
Simulation can be used to teach technical skills, to evaluate clinician performance, to help assess the safety of the environment of care, and to improve teamwork. Each of these has been successfully demonstrated in obstetric anesthesia simulation. Task simulators for epidural placement, failed intubation, and blood loss estimation seem to improve performance. Resident performance in an emergency cesarean delivery can be measured and assessed against his/her peers. Running simulated crises on a labor and delivery unit (in situ drills) can help to identify and correct potential safety concerns (latent errors) without exposing patients to the risks associated with these concerns. Finally, simulation can effectively assess and teach teamwork tools and behaviors. It is unclear, however, how well the lessons learned in the simulated environment translate into improved behaviors or better care in the clinical setting, or whether simulation improves patient outcomes. More research is needed to help answer these questions.

鞘内注射 Nav1.8 阻滞剂对辣椒素和外周缺血引起的机械痛敏和热痛觉过敏在诱导期和维持期的不同效应

The Differential Effect of Intrathecal Nav1.8 Blockers on the Induction and Maintenance of Capsaicin- and Peripheral Ischemia-Induced Mechanical Allodynia and Thermal Hyperalgesia

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背景：据报道，选择性阻断 Nav1.8 钠离子通道是一种无副作用镇痛药发展的方向。但是，脊髓 Nav1.8 对持续性疼痛的确切作用，如机械痛敏（MA）和热痛觉过敏(TH)仍然不明。本研究设计用于探讨脊髓 Nav1.8 是否与辣椒素诱导的及外周缺血引起的 MA 和 TH 有关。
方法：在足底注射辣椒素之前或之后鞘内注射 Nav1.8 阻滞剂，即 A-803467 或氨溴索。为了评估辣椒素诱导的脊髓神经元活性，本研究量化背角的 Fos 免疫反应细胞的数量。在血栓引起的缺血性疼痛模型中，研究测定 A-803467 在 MA 诱导期或维持期的不同效应。
结果：在足底注射辣椒素之前鞘内注射 A-803467 (10, 30, 100 nmol)或氨溴索(241, 724, 2410 nmol)可剂量依赖性地预防 MA 和 TH 的反应。然而，足底辣椒素之后鞘内注射 A-803467（100 nmol）和氨溴索（2410nmol）不能减轻已经出现的 MA，但可以显著抑制辣椒素诱导的 TH。此外，通过预处理给予 Nav1.8 阻滞剂能显著减少辣椒素诱发的脊髓 Fos 免疫反应细胞增加，而通过后处理给予则不可。在血栓引起的缺血性疼痛的大鼠中，在诱导期重复给予 A-803467 也可以阻碍 MA 的发展，但在维持期给予 A-803467 对预防和减轻 MA 的治疗是无效的。
结论：这些结果表明脊髓 Nav1.8 的激活参与 MA 诱导期的调节，但对 MA 维持期没有作用。但鞘内注射 Nav1.8 阻滞剂对 TH 的诱导和维持期都有调节作用。这些研究结果表明，诱导早期使用 Nav1.8 阻滞剂在炎症和缺血性疼痛相关的慢性 MA 的临床管理中是一个重要的因素。
（滕凌雅　译　陈杰　校）

BACKGROUND: It has been reported that the selective blockade of Nav1.8 sodium channels could be a possible target for the development of analgesics without unwanted side effects. However, the precise role of spinal Nav1.8 in the induction and maintenance of persistent pain, e.g., mechanical allodynia (MA) and thermal hyperalgesia (TH), is not clear. We designed this study to investigate whether spinal Nav1.8 contributes to capsaicin-induced and peripheral ischemia-induced MA and TH.
METHODS: The Nav1.8 blockers, A-803467 or ambroxol, were injected intrathecally either before or after intraplantar capsaicin injection. To evaluate capsaicin-induced neuronal activation in the spinal cord, we quantified the number of Fos-immunoreactive cells in the dorsal horn. In the thrombus-induced ischemic pain model, we determined the differential effect of A-803467 on the induction phase or maintenance phase of MA.
RESULTS: Intrathecal injection of A-803467 (10, 30, 100 nmol) or ambroxol (241, 724, 2410 nmol) before intraplantar injection of capsaicin dose dependently prevented the induction of both MA and TH. However, posttreatment with A-803467 (100 nmol) and ambroxol (2410 nmol) did

not reduce the MA that had already developed, but did significantly suppress capsaicin-induced TH. Moreover, the capsaicin-induced increase of spinal Fos-immunoreactive cells was significantly diminished by pretreatment, but not posttreatment with Nav1.8 blockers. In thrombus-induced ischemic pain rats, repetitive treatments of A-803467 during the induction period also prevented the development of MA, whereas A-803467 treatments during the maintenance period were ineffective in preventing or reducing MA.
CONCLUSIONS: These results demonstrate that spinal activation of Nav1.8 mediates the early induction of MA, but not the maintenance of MA. However, both the induction and maintenance of TH are modulated by the intrathecal injection of Nav1.8 blockers. These findings suggest that early treatment with a Nav1.8 blocker can be an important factor in the clinical management of chronic MA associated with inflammatory and ischemic pain.

简报：超声引导下腘窝坐骨神经阻滞时向胫腓神经分叉处头向和尾向注射的效果比较：一项前瞻性随机研究

Brief Report: A Comparison of an Injection Cephalad or Caudad to the Division of the Sciatic Nerve for Ultrasound-Guided Popliteal Block: A Prospective Randomized Study
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背景：对于超声引导下腘窝坐骨神经阻滞局麻药注射的最佳位置仍存在争议。
方法：患者随机分为两组：A 组患者在胫腓神经分叉处头向围绕坐骨神经注射 25 毫升 0.75%罗哌卡因（N =51），B 组在分叉处的尾向注射同样的局麻药（N= 51）。每 5 分钟评估感觉和运动阻滞直至注射局麻药后 30 分钟。
结果：完全的感觉阻滞和手术麻醉成功率方面，B 组显著优于 A 组（P <0.0001）。
结论：尾向技术提供了更好的手术麻醉。
（孙晓琼　译　陈杰　校）
BACKGROUND: The optimal site for local anesthetic injection during ultrasound-guided sciatic popliteal block remains controversial.
METHODS: Patients were randomized to receive 25 mL ropivacaine 0.75% around the sciatic nerve cephalad to the peroneal-tibial division in group A (*n* = 51) or caudad to the division in group B (*n* = 51). The sensory and motor blocks were evaluated every 5 minutes up to 30 minutes.
RESULTS: Rates of complete sensory block and surgical anesthesia were superior in group B (*P* < 0.0001).
CONCLUSION: The caudad technique provided better surgical anesthesia.

特殊文章：恶性高热患者从 ASC 转移到接收医院过程中的指南

Special Article: Creation of a Guide for the Transfer of Care of the Malignant Hyperthermia Patient from Ambulatory Surgery Centers to Receiving Hospital Facilities
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Anesth Analg January 2012 114:117-121

临床问题：挥发性麻醉药和/或琥珀可能引发潜在的致命的恶性高热事件需要紧急护理危机管理。如果在 ASC 发生恶性高热，病人需要转移到接收医院。2010 前，没有临床指南的制定一个具体的转移计划。
机制的产生：13 个来自美国的恶性高热协会的代表经过 18 个月的协商达成共识，在门诊手术的基础上，联合动态麻醉学会，学会学术急诊医学，和急救医学协会成立了本指南。
指南的依据：指南的大部分内容是根据 13 位代表的临床经验和科学知识。代表名单出现在附录 1。转移病人前建议静脉注射丹曲林，临床研究也证实这种做法，转移病人前每延迟使用丹曲林 30 分钟会增加 50%的并发症的发生。（Anesth Analg 2010；110:498–507）。
声明：本指南包括一系列潜在的临床治疗的问题和干预措施，来协助各 ASC 在发展自己独特的病人转移计划中借鉴。要点包括接受医疗保健设施的能力，病人指标的的稳定性和必要的数据报告，转运小组的顾虑和能力，实现转移的决定，和各 ASC 之间的协调沟通，接收医院，和运输队。见附录 2 的指导。
（陆丽虹译 薛张纲校）

Clinical Problem: Volatile anesthetics and/or succinylcholine may trigger a potentially lethal malignant hyperthermia (MH) event requiring critical care crisis management. If the MH triggering anesthetic is given in an ambulatory surgical center (ASC), then the patient will need to be transferred to a receiving hospital. Before May 2010, there was no clinical guide regarding the development of a specific transfer plan for MH patients in an ASC.
Mechanism by which the statement was generated: A consensual process lasting 18 months among 13 representatives of the Malignant Hyperthermia Association of the United States, the Ambulatory Surgery Foundation, the Society for Ambulatory Anesthesia, the Society for Academic Emergency Medicine, and the National Association of Emergency Medical Technicians led to the creation of this guide.
Evidence for the statement: Most of the guide is based on the clinical experience and scientific expertise of the 13 representatives. The list of representatives appears in Appendix 1. The recommendation that IV dantrolene should be initiated pending transfer is also supported by clinical research demonstrating that the likelihood of significant MH complications doubles for every 30-minute delay in dantrolene administration (Anesth Analg 2010;110:498–507).

Statement: This guide includes a list of potential clinical problems and therapeutic interventions to assist each ASC in the development of its own unique MH transfer plan. Points to consider include receiving health care facility capabilities, indicators of patient stability and necessary report data, transport team considerations and capabilities, implementation of transfer decisions, and coordination of communication among the ASC, the receiving hospital, and the transport team. See Appendix 2 for the guide.

肝硬化大鼠异丙酚 ED50 和恢复时间变化

ED50 and Recovery Times After Propofol in Rats with Graded Cirrhosis.ft

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背景：终末期肝病患者对全身麻醉的敏感性增加。在这项研究中，我们试图在肝硬化的大鼠模型身上，对异丙酚灵敏度进行了量化并作为肝病肝功能程度的评估。
方法：对3个研究小组分别注射6、9或12周的四氯化碳，并诱发出肝病。对照组和四氯化碳组一样注射了相同时间表的生理盐水。第二个控制组（相比较）在饮用9周含巴比妥和10%酒精的水后，用苯巴比妥治疗一周。肝功能是由肝功能试验和肝脏组织学病理评分进行评估的。
结果：逐渐恶化的肝硬化依据组织学标准，脾亢、肝体比值、肝功能试验进行长期四氯化碳治疗有关。主要的结果是轻度肝病（脂肪变性或纤维化）与对丙泊酚敏感性增加无关，但是丙泊酚负荷剂量和输注后，对于有严重肝纤维化的大鼠，恢复时间显著增加。
结论：轻度肝病并不显著影响丙泊酚的敏感性，和临床观察相似，但终末期肝病（纤维化）显著延长丙泊酚输注后的恢复时间。这项研究中所使用的累进型肝病的模型，对严格的研究麻醉剂敏感性作为肝细胞纤维化肝病的肝功能程度的研究是有帮助的。
（侯文婷译 薛张纲校）
BACKGROUND：Patients with end-stage liver disease have increased sensitivity to general anesthetics. In this study, we sought to quantify sensitivity to propofol as a function of the degree of liver disease, in a rat model of cirrhosis.
METHODS: Liver disease was induced by carbon tetrachloride (CCl(4)) injections for 6, 9, or 12 weeks in 3 study groups. Control rats received saline injections on the same schedule as CCl(4)-injected rats. A second control (comparison) group was treated with phenobarbital for a week followed by 9 weeks of phenobarbital and 10% ethanol in drinking water. Liver function was assessed by liver function tests and pathologic scoring of liver histology.
RESULTS: Progressively worse cirrhosis was associated with longer CCl(4) treatment by histologic criteria, by hypersplenism, liver to body weight ratios, and liver function tests. The major findings were that mild liver disease (either steatosis or fibrosis) was not associated with increased propofol sensitivity, but recovery times after propofol bolus and propofol infusion were significantly increased in rats with more severe liver fibrosis.

CONCLUSION: Propofol sensitivity is not significantly affected in the setting of mild liver disease, similar to clinical observations, but end-stage liver disease (fibrosis) is associated with significantly prolonged time to recovery after propofol infusion. The progressive liver disease model used in these studies is useful for rigorously studying anesthetic sensitivity as a function of degree of hepatocellular-fibrotic liver disease.

行大手术患者上呼吸道损伤的流行病学

The Epidemiology of Upper Airway Injury in Patients Undergoing Major Surgical Procedures

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背景：呼吸道损伤是麻醉期间潜在的严重的、增加费用的并发症。但是呼吸道损伤的流行病学特点尚没有文献报道。
方法：全美外科质量改进计划（NSQIP）是一项多中心、前瞻性、结果-来源于患者行外科手术的原始数据的研究。利用 NSQIP 的 2005 年至 2008 年的数据，我们分析了呼吸道损伤的发生率及危险因素。
结果：我们研究了 163,190 名患者，1202 (0.2%)名患者出现的呼吸道损伤。最常见的呼吸道损伤是唇撕裂伤/血肿(61.4%)，其他常见的为牙齿损伤(26.1%), 舌撕裂伤(5.7%), 咽裂伤(4.7%)，和喉裂伤(2.1%)。多因素回归分析提示 Mallampati 分级 III 级患者增加出现呼吸道损伤的风险(调整的 odds 值[OR], 1.69，99% 的置信区间为[CI], 1.36–2.11, 相比于 Mallampati 分级 I 及 II 的患者) 或 IV 级患者(调整的 OR 值为 2.6， 99% CI, 1.52–4.02)，患者年龄大于等于 80 岁(调整的 OR 值为 1.50， 99% CI 为 1.02–2.19，相比于年龄在 40 至 49 岁患者)。
结论：患者手术过程中出现呼吸道损伤的风险大约为 1:500。Mallampati 分级为 III 及 IV 级的患者常提示有困难气道，会增加呼吸道损伤的风险。
（黄剑译 薛张纲校）
BACKGROUND: Airway injury is a potentially serious and costly adverse event of anesthesia care. The epidemiologic characteristics of airway injury have not been well documented.
METHODS: The American College of Surgeons National Surgical Quality Improvement Program (NSQIP) is a multicenter, prospective, outcome-oriented database for patients undergoing major surgical procedures. Using the NSQIP data for the years 2005 to 2008, we examined the incidence of, and risk factors for, airway injury.
RESULTS: Of the 563,190 patients studied, 1202 (0.2%) sustained airway injury. The most common airway injury was lip laceration/hematoma (61.4%), followed by tooth injury (26.1%), tongue laceration (5.7%), pharyngeal laceration (4.7%), and laryngeal laceration (2.1%). Multivariable logistic modeling revealed an increased risk of airway injury in patients with Mallampati class III (adjusted odds ratio [OR], 1.69; 99% confidence interval [CI], 1.36–2.11, relative to patients with Mallampati classes I and II) or class IV (adjusted OR, 2.6; 99% CI,

1.52–4.02), and in patients aged 80 years or older (adjusted OR, 1.50; 99% CI, 1.02–2.19, relative to patients aged 40 to 49 years).
CONCLUSIONS: The risk of airway injury for patients undergoing major surgical procedures is approximately 1 in 500. Patients with difficult airways as indicated by Mallampati classes III and IV are at significantly increased risk of sustaining airway injury during anesthesia for major surgical procedures.

使用神经轴索分娩镇痛在种族和民族间的差异

Racial and ethnic disparities in neuraxial labor analgesia.

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摘要：对于疼痛的治疗在种族和民族间的差异已有记录，证据证实这种差异也存在于神经轴索分娩镇痛中。本研究的目的是在即将分娩的西班牙、非裔美国和高加索妇女中，分析使用及预期使用神经轴索分娩镇痛在种族或民族间的差异，并从社会统计学、临床、决策方面评估这些妇女实际和希望使用神经轴索分娩镇痛的预测因素。
方法：在大城市教学医院中即将分娩的妇女都会被面对面访视来确定可能影响分娩镇痛选择的个人因素。在分娩后，分娩镇痛的方式被记录。记录下的主要方式是神经轴索分娩镇痛。多变量 logic 回归模型被建立来检验是否不同种族和民族与使用神经轴索分娩镇痛、预期使用神经轴索分娩镇痛或产时决定使用神经轴索分娩镇痛显著相关。
结果：种族和民族与实际或预期使用神经轴索分娩镇痛间单变量相关。但是在产时决定使用神经轴索分娩镇痛与种族和民族不相关。在控制混杂因素后，实际使用神经轴索分娩镇痛与种族和民族没有保持显著性差异（调整后的优势率：西班牙对比高加索妇女 0.66，95%置信区间：0.24 到 1.80；非裔美洲对比高加索妇女 0.93，95%置信区间：0.31 到 2.77）。相对而言，甚至是控制混杂因素后，西班牙妇女仍比高加索妇女较少愿意使用神经轴索分娩镇痛（调整后的优势率 0.40，95%置信区间：0.20 到 0.82）。
结论：在控制混杂因素后，西班牙妇女仍比其他种族和民族妇女较少愿意使用神经轴索分娩镇痛；但是实际使用情况在各组间类似。
（任云译 薛张纲校））

BACKGROUND:Racial and ethnic disparities in the treatment of pain have been well documented, and there is evidence of such disparities in neuraxial analgesia use. Our objectives of this study were to analyze racial/ethnic disparities in neuraxial analgesia use, as well as anticipated use, among laboring Hispanic, African-American, and Caucasian women, and to evaluate sociodemographic, clinical, and decision-making predictors of actual and anticipated neuraxial analgesia use among these women.
METHODS:Laboring women, in a large urban academic hospital, were interviewed using a face-to-face survey to determine individual factors that may influence choice of labor analgesia. After delivery, the type of labor analgesia used was recorded. The primary outcome was use of neuraxial analgesia. Multivariable logistic regression models were estimated to test the

likelihood that race and ethnicity were significantly associated with neuraxial analgesia use, anticipated neuraxial analgesia use, and the intrapartum decision to use neuraxial analgesia.
RESULTS:There was a univariate association between race/ethnicity and anticipated as well as actual use of neuraxial analgesia. However, there was no association between race/ethnicity and the intrapartum decision to use neuraxial analgesia. After controlling for confounders, the association between race/ethnicity and actual use of neuraxial analgesia no longer remained significant (adjusted odds ratio: Hispanic versus Caucasian women 0.66, 95% confidence interval [CI]: 0.24 to 1.80; African-American versus Caucasian women 0.93, 95% CI: 0.31 to 2.77). In contrast, Hispanic women were less likely than Caucasian women to anticipate using neuraxial analgesia even after controlling for confounders (adjusted odds ratio 0.40, 95% CI: 0.20 to 0.82).
CONCLUSIONS:After controlling for confounding variables, Hispanic women anticipated using neuraxial analgesia at a lower rate than other racial/ethnic groups; however, actual use was similar among groups.

右美托嘧啶镇静作用对儿童心血管的影响。

Cardiovascular effects of dexmedetomidine sedation in children.

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背景：右美托嘧啶会影响成人心率、平均动脉压、心输出量、每搏输出量、全身血管阻力指数。在这项研究中我们努力去探寻是否右美托嘧啶在儿童身上也会有相似的作用。
方法：在儿童行影像学检查的同时静脉给药右美托嘧啶，观察其血流动力学的变化。一组有8名儿童接受2mcg/kg 的冲击剂量，在10分钟内完成检查。第2组有9名儿童除接受冲击剂量外，还在需要镇静时接受1mcg/kg 的剂量，检查时间超过10分钟。我们使用一个持续无创心输出量监测仪器来监测心输出量、每搏输出量、全身血管阻力指数。我们分别在10分钟、20分钟、离开（患者离开时 Aldrete 评分需 ≥9）时监测血流动力学的改变，并将其与基础值比较。
结果：我们从第1组与第2组的实验中获得数据。在第1组，心率和心输出量都降低了。其他的血流动力学变量没有改变,在复苏时期所有的血流动力学变量都会恢复到基础值。在第2组中，心率和心输出量在复苏期都保持降低。另外，在复苏期每搏输出量降低，全身血管阻力指数升高。在两组中平均动脉压并没有明显改变。
结论：右美托嘧啶能降低儿童的心率，有累积作用。对儿童来说经过长时间的检查，在复苏期间其心率和心输出量都会保持降低，同时伴每搏输出量有降低和全身血管阻力指数有上升。
（翁梅琳译 薛张纲校）

BACKGROUND:Dexmedetomidine (DEX) affects heart rate (HR), mean arterial blood pressure, cardiac index (CI), stroke index (SI), and systemic vascular resistance index (SVRI) in

adults. In this study we sought to determine whether similar effects occur in children undergoing DEX sedation.
METHODS:Hemodynamic changes in children were followed during IV DEX sedation for radiological procedures. One group of 8 patients (DEX-brief) received a bolus (2 mcg/kg bolus over 10 minutes) and completed the procedure within 10 minutes. The second group of 9 patients (DEX-prolong) received the bolus plus additional DEX as needed to maintain sedation for procedures lasting longer than 10 minutes (additional 1 mcg/kg/hr infusion with second bolus if needed). CI, SI, and SVRI were measured using a continuous noninvasive cardiac output monitor. Changes in hemodynamic variables at minutes 10, 20, and discharge (time at which patient achieved Aldrete Score ≥9) were compared to baseline by repeated measures ANOVA with effect sizes reported as mean [95% confidence interval].
RESULTS:Data were obtained during 8 DEX-brief and 9 DEX-prolong procedures. In DEX-brief, HR and CI decreased (18.9 [2.3 to 35.5] bpm and 0.74 [0.15 to 1.33] L/min/m(2); respectively) at T1. There was no change in any other hemodynamic variables and all hemodynamic variables returned to baseline at recovery. In DEX-prolong, both HR and CI remained decreased (24.0 [8.3 to 39.6] bpm, 1.51 [0.95 to 2.06] L/min/m(2); respectively) at recovery. In addition, SI was decreased (8.01 [1.71 to 14.31] mL/m(2)) and SVRI was increased (776.0 [271.9 to 1280.4] dynes-sec/cm(5)/m(2)) at recovery in the DEX-prolong group. There were no significant changes in mean arterial blood pressure in either group.
CONCLUSION:DEX decreases CI in children and has a cumulative effect. For patients undergoing prolonged procedures HR and CI remained decreased at the time of discharge together with a decrease in SI and an increase in SVRI.

静脉注射瑞芬太尼导致短暂撤药性痛觉超敏，与注射时间相关

Intravenous Infusion of Remifentanil Induces Transient Withdrawal Hyperalgesia Depending on Administration Duration in Rats

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背景:最近的研究显示,同其他阿片类相似,瑞芬也可能导致痛觉超敏。我们进行了动物实验来验证临床使用的注射模式是否会导致痛觉过敏，在何种情况下导致痛觉过敏。同时还研究了瑞芬诱导的痛觉超敏是否与胞外信号调节蛋白激酶（ERK1/2）的磷酸化相关。
方法:向雄性 SD 大鼠尾静脉注射瑞芬太尼，注射时间分别为 10 分钟（30ug/kg/min），30 分钟（0.1,1,10ug/kg/min），120 分钟（0.1,1,3,10ug/kg/min），然后进行 von Frey 试验和夹尾试验以及免疫组化。同时研究鞘内预注胞外信号调节激酶抑制剂 U0126 是否抑制痛觉超敏。
结果:瑞芬太尼有剂量依赖性镇痛作用但很快消失。10 或 30 分钟瑞芬的注射并不导致痛觉超敏。然而，注射 120 分钟瑞芬组的夹尾反射的潜伏期和机械疼痛阈明显低于对照组，不管是何种剂量。痛觉超敏的时间小于 60 分钟。虽然 U0126 本身不能抑制超敏，与 30 分钟组未发生超敏者比较，120 分钟痛觉超敏组大鼠的表面脊髓背侧角观察到了更多磷光体 ERK1/2 免疫反应神经元。

结论:静脉注射瑞芬太尼在停止注射后导致短暂的撤药性的痛觉超敏。这种痛觉超敏与暴露于瑞芬太尼的时间呈强相关。而与我们的假设相反，ERK1/2 本身并不是诱导产生痛觉超敏的必要因素。

（姚敏敏译 薛张纲校）

BACKGROUND: Recent studies suggest that remifentanil, similar to other μ-opioid agonists, may induce hyperalgesia. We performed animal experiments to determine whether IV remifentanil infusion, the mode of administration used in clinical practice, induces hyperalgesia and the conditions in which this phenomenon occurs. We also determined whether remifentanil-induced hyperalgesia is related to extracellular signal-regulated protein kinase 1/2 (ERK1/2) phosphorylation.

METHODS: Remifentanil was administered through a catheter in the tail vein of male Sprague-Dawley rats for 10 minutes (30 $\mu g \cdot kg^{-1} \cdot min^{-1}$), 30 minutes (0.1, 1, and 10 $\mu g \cdot kg^{-1} \cdot min^{-1}$), or 120 minutes (0.1, 1, 3, and 10 $\mu g \cdot kg^{-1} \cdot min^{-1}$).

The von Frey test and a tail-flick test were performed, followed by ERK1/2 immunohistochemistry. We examined whether intrathecal preadministration of the mitogen-activated protein kinase inhibitor U0126 suppresses hyperalgesia.

RESULTS: Remifentanil had a dose-dependent antinociceptive effect that rapidly diminished. Ten- or 30-minute remifentanil infusion did not induce hyperalgesia. However, tail-flick latency and mechanical pain threshold after infusion termination were significantly lower in the 120-minute remifentanil administration group than those in the control group, regardless of dose. Hyperalgesia duration was no longer than 60 minutes. Significantly more phospho-ERK1/2-immunoreactive neurons in the superficial spinal dorsal horn were observed in the remifentanil 120-minute groups with hyperalgesia than in the 30-minute remifentanil groups without hyperalgesia, although U0126 did not suppress hyperalgesia.

CONCLUSIONS: IV remifentanil induces transient withdrawal hyperalgesia soon after its termination. This hyperalgesia is strongly associated with the duration of exposure to remifentanil. Contrary to our hypothesis, ERK1/2 by itself was not the essential factor involved in the induction of the hyperalgesia.

综述：超声引导下闭孔神经阻滞：平面内短轴技术

Brief reports: ultrasound-guided obturator nerve block: a proximal interfascial technique.

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背景：在这份报道中，我描述和评估了短轴超声（US）引导下平面内注射局麻药至耻骨肌的闭孔神经阻滞技术。

方法：超声探头倾斜寻找直至前耻骨支可见来识别和定位耻骨肌。在这个平面局麻药在平面内注射至耻骨肌和闭孔神经间。

结果：识别注射点的时间是 4 秒（95%置信区间，3-5 秒）。运动阻滞起效的中位数时间是 4 分钟（95%置信区间，3-5 分钟）。所有病人（100%）的闭孔神经的前后支都被成功阻滞。

结论：超声引导下的用平面内注射局麻药至耻骨前支，在耻骨肌和闭孔肌之间，这是个实施闭孔神经阻滞的简单而成功的方法。
（张玥琪译 薛张纲校）
BACKGROUND: In this report, I describe and evaluate a proximal ultrasound (US)-guided obturator nerve block technique using an interfascial local anesthetic (LA) injection deep to the pectineus muscle.
METHODS: The pectineus muscle was identified and followed, while the US probe was tilted cranially until the superior pubic ramus was visualized. In this plane, LA was injected interfascially between the pectineus and obturator externus.
RESULTS: The median time required to identify the injection site was 4 seconds (95% confidence interval, 3-5 seconds). The median motor block onset was 4 minutes (95% confidence interval, 3-5 minutes). Both obturator nerve branches were blocked successfully in all patients (100%).
CONCLUSION: The US-guided obturator nerve block using interfascial LA injection inferior to the superior pubic ramus, between the pectineus and obturator externus muscles, was shown to be a simple and successful technique.

单次注射肉毒杆菌毒素降低局部和远处位点神经传递的安全阈值

A Single Injection of Botulinum Toxin Decreases the Margin of Safety of Neurotransmission at Local and Distant Sites

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背景：我们对单次注射肉毒杆菌毒素不仅在局部，而且远处影响肌肉功能、生化特性和阿曲库铵的药效动力学这一假设进行了验证。
方法：我们对麻醉后大鼠（n=26）一侧胫骨肌注射肉毒杆菌毒素（2.5U）。另一侧未注射的胫骨肌用作观察肉毒杆菌毒素的远处影响。对照组大鼠（n=25）注射生理盐水。注射后 0、4 和 16 天分别评估胫骨肌的神经肌肉功能、药理学及乙酰胆碱受体(nAChRs)的表达，并同时与盐水注射组进行比较。
结果：第 4 天时，肉毒杆菌毒素造成注射侧的胫骨肌完全瘫痪，同时对侧表现为绝对肌颤搐张力的下降(1.8 N [1.6; 1.9]比 3.0 N [2.8; 3.1], 牛顿, $P < 0.05$)。第 16 天时，仅在注射侧的胫骨肌上出现肌力减退，表现为绝对肌颤搐强度的下降(0.6 N [0.6, 0.7]比 3.4 N [3.1, 3.7], $P < 0.05$)。注射侧的胫骨肌在第 4 天(1.46 mg/g [1.43, 1.48]比 1.74 mg/g [1.72; 1.75], $P < 0.05$)和第 16 天(0.78 mg/g [0.76, 0.79] vs 1.73 mg/g [1.69; 1.77], $P < 0.05$)时均质量降低。第 16 天时远离注射点的部位出现了变化，此时我们观察到临近的腓肠肌和比目鱼肌也出现了萎缩。标准化到胫骨肌质量后，我们观察到与对照组相比，注射毒素对侧的胫骨肌特有的颤搐张力（张力/克肌肉）在第 4 天时下降，注射毒素侧的下降则出现在第 16 天。第 16 天时，我们发现注射毒素侧的胫骨肌对阿曲库铵的敏感性增加，其证据是阿曲库铵 ED_{50} 的降低(0.23 mg/kg [0.13, 0.33]比 0.72 mg/kg [0.63, 0.82], $P < 0.05$)以及输注速率的降低(38 μL/kg/min [32, 43]比 135 μL/kg/min [126, 144], $P < 0.05$)，同时达到基础（绝对）肌颤搐张

力下降到 50%稳态时所需的阿曲库铵血浆浓度也出现降低(0.5 μg/mL [0.4, 0.7]比 4.5 μg/mL [3.8, 5.2], $P < 0.05$)。注射毒素对侧胫骨肌阿曲库铵的 ED_{50} 与对照组相比在第 16 天时也出现了下降。注射毒素侧的胫骨肌 nAChRs 与时间配对的对照组相比，在第 4 天时增加至 123 fmol/mg [115, 131]比 28 fmol/mg [25, 29] ($P < 0.05$)，第 16 天到 378 [341, 413]比 27 fmol/mg [25, 29] ($P < 0.05$)。
结论：肉毒杆菌毒素在局部和远处均能对肌肉产生作用。特有的肌颤搐张力减弱提示肌肉萎缩不能单独解释肌肉功能的变化，神经肌肉传导同样遭到了破坏。注射毒素侧的肌肉对阿曲库铵的敏感性增强，尽管 nAChRs 上调，这似乎是肉毒杆菌毒素特有的变化。
（刘伍 译 马皓琳 李士通 校）

BACKGROUND: We tested the hypothesis that a single injection of botulinum toxin not only has local, but also distant effects on muscle function, biochemistry, and pharmacodynamics of atracurium.
METHODS: Botulinum toxin (2.5 U) was injected into the tibialis muscle of anesthetized rats ($n = 26$). The contralateral side with no injection served to study distant effects. Control animals ($n = 25$) received a saline injection. Neuromuscular function, pharmacology, and expression of acetylcholine receptors (nAChRs) were evaluated in the tibialis at 0, 4, and 16 days after injection and in comparison with saline- injected controls.
RESULTS: On day 4, botulinum toxin caused complete paralysis of the tibialis, while its contralateral side showed a decrease in absolute twitch tension (1.8 N [1.6; 1.9] vs 3.0 N [2.8; 3.1], Newton, $P < 0.05$). On day 16, muscle weakness was only present on the toxin-injected side where absolute twitch tension was decreased (0.6 N [0.6, 0.7] vs 3.4 N [3.1, 3.7], $P < 0.05$). Tibialis mass was decreased on the toxin-injected side at day 4 (1.46 mg/g [1.43, 1.48] vs 1.74 mg/g [1.72; 1.75], $P < 0.05$) and on day 16 (0.78 mg/g [0.76, 0.79] vs 1.73 mg/g [1.69; 1.77], $P < 0.05$). Effects distant from the site of injection were seen on day 16, when muscle atrophy was also present in the adjacent gastrocnemius and soleus muscles. Normalized to tibialis mass, specific twitch tension (tension/g muscle) was reduced on the contralateral side at day 4 and on the toxin-injected side at day 16 in relation to saline controls. At day 16, an increased sensitivity to atracurium was seen on the toxin-injected side, evidenced as a decreased ED_{50} (0.23 mg/kg [0.13, 0.33] vs 0.72 mg/kg [0.63, 0.82], $P < 0.05$) and a lower infusion rate (38 μL/kg/min [32, 43] vs135 μL/kg/min [126, 144], $P < 0.05$), together with a reduced plasma concentration requirement of atracurium (0.5 μg/mL [0.4, 0.7] vs 4.5 μg/mL [3.8, 5.2], $P < 0.05$) to achieve a steady state 50% reduction in baseline (absolute) twitch tension. ED_{50} of atracurium was also decreased on the contralateral side at day 16 in relation to saline controls. The nAChRs in the tibialis were increased on the toxin-injected side to 123 fmol/mg [115, 131] vs 28 fmol/mg [25, 29] ($P < 0.05$) in time-matched saline-injected controls at day 4 and to 378 [341, 413] vs 27 fmol/mg [25, 29] ($P < 0.05$) at day 16.
CONCLUSIONS: Botulinum toxin has local and distant effects on muscle. The decrease in specific twitch tension indicates that the muscle atrophy alone cannot explain the functional changes; neuromuscular transmission is also impaired. An increased sensitivity to atracurium on the toxin-injected side, despite up-regulation of nAChRs, seems unique to botulinum toxin.

人体血清白蛋白中阿片类药物的结合位点

Opioid Binding Sites in Human Serum Albumin

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背景：人体血清白蛋白（HSA）是阿片类药物的一个重要载体，但结合位点的位置仍然不明。在本研究中，我们利用多种生物化学和生物物理的技术来说明阿片类药物与 HSA 之间相互作用的特点：（a）结合位点的位置；（b）是否纳洛酮与吗啡占据同样的结合位点；（c）是否阿片受体激动剂与全身麻醉药占据同样的结合位点。
方法：我们应用洗脱色普法来测定总体的相互作用，应用色氨酸内荧光来确定阿片类药物和 HSA 的局部相互作用。研究中应用等温线滴定量热法进行的竞争研究来确定阿片受体激动剂、拮抗剂及全身麻醉药结合位点的重叠。一种计算自动对接的技术用于预测可能的结合位点以及评价分离研究的结果。
结果：在进行过洗脱色普法固化的 HSA 上，纳洛酮、吗啡和芬太尼的停留时间延长，但短于异丙酚。纳洛酮所致的色氨酸荧光性的抑制不会被吗啡或者芬太尼影响。丙泊酚和氟烷与 HSA 结合的测热性热特点有显著改变，但是与吗啡、纳洛酮或者芬太尼不一致。与直接的结合研究一致，对接的结果显示阿片类药物与全身麻醉药占据同样的位点；研究发现一个纳洛酮的独特的结合位点，它靠近 HSA 中唯一的色氨酸，而此位点不与吗啡共用。
结论：与丙泊酚相比，阿片类药物与 HSA 的相互作用较弱。纳洛酮在 HSA 上有一个不与阿片类激动剂共用的独特的结合位点。阿片类药物和全身麻醉药在 HSA 上占用同样的结合位点。
（毛祖旻 译 马皓琳 李士通 校）
BACKGROUND: Human serum albumin (HSA) is an important carrier for opioids. However, the locations of the binding sites remain unclear. In the present study, we have characterized opioid–HSA interactions using multiple biochemical and biophysical techniques to reveal: (a) the location of the binding site(s); (b) whether naloxone shares the binding site with morphine; and (c) whether opioid agonists share their binding site(s) with general anesthetics.
METHODS: Elution chromatography to determine the global interactions and tryptophan intrinsic fluorescence to determine the localized interactions of opioids with HSA were used. Competition studies using isothermal titration calorimetry were used to determine the overlap of binding site(s) among opioid agonists, antagonists, and general anesthetics. An automatic docking calculation was used to predict the possible binding sites and to assess findings of the solution studies.
RESULTS: For elution chromatography with immobilized HSA, the retention times of naloxone, morphine, and fentanyl were prolonged but shorter than that of propofol. The inhibition of tryptophan fluorescence by naloxone was not affected by morphine or fentanyl. The calorimetric heat profiles of propofol and halothane interaction with HSA were changed significantly, but not equally by morphine, naloxone, or fentanyl. Consistent with direct binding studies, docking results demonstrated that opioids share sites with general anesthetics; a distinct binding site for naloxone was revealed near the sole tryptophan in HSA that is not shared with morphine.

CONCLUSIONS: The interaction of opioids with HSA is weak in comparison with propofol. Naloxone has a distinct binding site in HSA not shared with opioid agonists. Opioids share binding sites with general anesthetics in HSA.

通过 I-gel™ 声门上通气道与 Fastrach™ 喉罩行气管插管的比较：一项随机对照试验

Tracheal Intubation Through the I-gel™ Supraglottic Airway Versus the LMA Fastrach™: A Randomized Controlled Trial

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背景：i-gel™ 是一种不需要充气气囊即可实现长时间通气的声门上通气道。这样的设计为气管导管创造出一条无障碍的通道，先前已有研究证实该装置有利于对准声门开口。在这项前瞻性随机试验中，我们比较了使用 i-gel 以及 Fastrach™ 喉罩（LMA）进行盲插的成功率。
方法：160 例需要全麻和气道管理的病人被随机应用 i-gel 或 Fastrach LMA 行气管插管。全麻诱导后置入所在组别的装置，保证充足的肺通气，然后尝试盲插。评估第一次尝试以及总的气管插管成功率，记录气管插管次数。
结果：每个实验组收集 80 例病人。69%的 i-gel 以及 74%的 LMA Fastrach 组在第一次气管插管尝试中即获得成功(差别的 95%可信区间 [CI], −9%~19%, *P* = 0.60)。 i-gel 组总的气管插管成功率低于 LMA Fastrach 组(73%比 91%, 差异的 95%可信区间, 7%~31%, *P* < 0.0001)。
结论：对于第一次气管插管盲插尝试，i-gel 和 LMA Fastrach 的成功率相当。然而当第一次盲插尝试不成功时，在后续尝试中应用 i-gel 并不明显增加气管插管的成功率。LMA Fastrach 可以产生更高的总体插管成功率。
（瞿亦枫 译 李士通 马皓琳 校）
BACKGROUND: The i-gel™ is a supraglottic airway device not requiring inflation of a cuff for lung ventilation. Its design allows for unobstructed passage of a tracheal tube and previous studies have demonstrated a favorable alignment with the glottic inlet. In this prospective randomized study, we compared the success rate of blind tracheal intubation using the i-gel and the laryngeal mask airway (LMA) Fastrach™.
METHODS: One hundred sixty patients requiring general anesthesia and airway management were randomized to tracheal intubation using the i-gel or the LMA Fastrach. After induction of general anesthesia, the allocated device was inserted and adequate lung ventilation was confirmed. Blind tracheal intubation was then attempted. First attempt and overall tracheal intubation success rates were evaluated and tracheal intubation times were measured.
RESULTS: Eighty patients were recruited in each study group. Successful tracheal intubation was obtained on the first attempt in 69% of patients with the i-gel and 74% of patients with the LMA Fastrach (95% confidence interval [CI] of difference, −9% to 19%, *P* = 0.60). The overall

intubation success rate was lower using the i-gel than it was using the LMA Fastrach (73% vs 91%, 95% CI of difference, 7% to 31%, $P < 0.0001$).
CONCLUSIONS: On first attempts, successful blind tracheal intubation was obtained at comparable rates using the i-gel and the LMA Fastrach. However, when the first attempt was unsuccessful, subsequent attempts through the i-gel did not significantly increase tracheal intubation success rate. The LMA Fastrach yielded a higher overall intubation success rate.

伤口连续输注罗哌卡因与硬膜外注射吗啡用于剖宫产术后镇痛的比较：一项随机对照试验

Ropivacaine Continuous Wound Infusion Versus Epidural Morphine for Postoperative Analgesia After Cesarean Delivery: A Randomized Controlled Trial

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背景：在手术伤口输注局部麻醉药在术后疼痛的多模式管理中很有帮助。我们假设剖宫产术后在伤口输注局麻药比硬膜外注射吗啡镇痛的镇痛效果更好。
方法：本项评估者设盲的随机试验纳入对象为拟择期行剖宫产术的足月妊娠健康妇女。患者随机分组接受镇痛，通过置于伤口筋膜下的多孔导管输注罗哌卡因（5mL/h，2mg/mL），或硬膜外间断注射吗啡（2mg/12h）镇痛。两种镇痛方案均持续 48 小时。主要指标是术后 24 小时静息状态的疼痛，根据口头疼痛等级评分（0-10 级）。疼痛强度、解救的镇痛药消耗量和副作用分别在剖宫产术后 2、6、24 和 48 小时由一名不知分组情况的观察人员进行评估。出院后 3 个月，评估患者满意度、残留疼痛、手术伤口并发症。
结果：58 名妇女参加了本项试验。24 小时的静息口头疼痛等级评分的中位数，在连续输注组为 0（四分位数间距：0-0），在硬膜外吗啡组为 3（四分位数间距：2-3；95%可信区间差异：1-3 单位，$P < 0.001$）。2、6、48 小时的静息疼痛评分中位数和 2、6、24 小时运动疼痛评分中位数，连续伤口输注组也低于硬膜外吗啡组($P < 0.001$)。伤口输注组的恶心、呕吐、瘙痒和尿潴留的发生率明显更低，且肠功能恢复时间较短。在此 48 小时随访评价过程中，仅与镇痛方案相关的护士访视次数的中位数，在连续伤口输注组为 1（四分位数间距：1-2），在硬膜外吗啡组为 8（四分位数间距 7-10）（差异的 95%可信区间：6-8 次访视；$P < 0.001$）。
结论：在剖宫产术后 48 小时连续伤口输注罗哌卡因，与硬膜外吗啡镇痛相比，可产生更好的镇痛效果，副作用发生率更低，护理需求更少，住院时间更短。
（陈彬彬译 马皓琳 李士通校）
BACKGROUND: The infusion of local anesthetic in the surgical wound is helpful in the multimodal management of postoperative pain. We hypothesized that local anesthetic wound infusion after cesarean delivery would provide better pain control than epidural morphine analgesia.
METHODS: Healthy, term women scheduled for elective cesarean delivery were included in this assessor-blinded, randomized study. Patients were randomly assigned to receive analgesia through a multiorifice wound catheter placed below the fascia and connected to a 5 mL/h ropivacaine 2 mg/mL infusion or an epidural bolus of morphine 2 mg every 12 hours. Both

analgesic regimens were continued for 48 hours. The primary outcome was pain at rest at 24 hours postoperatively using the verbal rating score for pain (0–10 scale). Pain intensity, rescue analgesia consumption, and side effects were assessed at 2, 6, 24, and 48 hours after cesarean delivery by an observer blinded to group allocation. Three months after discharge, patient satisfaction, residual pain, and surgical wound complications were assessed.
RESULTS: Fifty-eight women participated in the study. At 24 hours, the median rest verbal rating score for pain was 0 (interquartile range: 0–0) in the continuous infusion group and 3 in the epidural morphine group (interquartile range: 2–3; 95% confidence interval of difference: 1–3 units; $P < 0.001$). The median scores of the 2-, 6-, and 48-hour pain assessments at rest were also lower in the continuous wound infusion group than in the epidural morphine group, and at 2, 6, and 24 hours with movement ($P < 0.001$). The incidence of nausea, vomiting, pruritus, and urinary retention was significantly lower in the wound infusion group and time to recovery of bowel function was shorter. During the 48-hour follow-up evaluation, the median number of nurse visits attributed exclusively to the analgesic regimen was 1 (interquartile range: 1–2) in the continuous wound infusion group and 8 (interquartile range: 7–10) in the epidural morphine group (95% confidence interval of difference: 6–8 visits; $P < 0.001$).
CONCLUSIONS: Continuous wound infusion with ropivacaine for 48 hours after cesarean delivery was associated with better analgesia, a lower incidence of side effects, less need for nursing care, and shorter duration of stay compared with epidural morphine analgesia.

Salvinorin A 预处理通过细胞外信号调节激酶/促分裂原活化蛋白激酶（ERK/MARK）通路保护小猪脑缺氧/缺血性损伤后的脑血管自身调节功能

Salvinorin A Pretreatment Preserves Cerebrovascular Autoregulation After Brain Hypoxic/Ischemic Injury via Extracellular Signal-Regulated Kinase/Mitogen-Activated Protein Kinase in Piglets

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背景：婴儿先天性心脏病手术中的脑缺氧/缺血现象并非罕见，并且能引起余生持久的严重神经残疾。缺氧/缺血所致的脑血管功能障碍被认为是神经学损伤的重要原因，且尚未发现有药物能够预防。一般认为分裂原活化蛋白激酶(MAPK)，包括细胞外信号调节激酶(ERK)、c-Jun 氨基末端激酶(JNK)以及 p38 在缺血预处理中起重要作用。我们探究唯一的天然非阿片类 κ 受体激动剂 salvinorin A 预处理是否能通过 MAPK 途径保护软脑膜动脉的自身调节作用。
方法：在给予或不给予 ERK 上游蛋白激酶抑制剂 U0126、JNK 抑制剂 sp600125 或 p38 抑制剂 sb203580 的情况下，于缺氧和缺血前后，监测装备有封闭的头颅窗口的小猪软脑膜动脉对低血压和高碳酸血症的反应。salvinorin A 处理组动物在缺氧/缺血前 30 min 给予 salvinorin A (10 μg/kg IV)。在注射 salvinorin A 之前和注射后 30 min 收集脑脊液样本用于检测 MAPK。采用重复测量方差分析法分析数据(n = 5)。
结果：缺氧/缺血处理后，软脑膜动脉对低血压和高碳酸血症的舒张反应变得迟钝，但是 salvinorin A 预处理组则得到保护。U0126 而非 sp600125 和 sb203580 抵消 salvinorin A 对

低血压和高碳酸血症的脑血管自身调节的保护作用。salvinorin A 预处理组动物脑脊液中 pERK/ERK 比值明显增加，且能被 U0126 抑制。
结论：在小猪模型中，Salvinorin A 预处理通过 ERK 通路保护缺氧/缺血后软脑膜血管对低血压和高碳酸血症的自身调节功能。
（江继宏 译 马皓琳 李士通 校）

BACKGROUND: Cerebral hypoxia/ischemia during infant congenital heart surgery is not uncommon and may induce devastating neurologic disabilities persistent over the lifespan. Hypoxia/ischemia-induced cerebrovascular dysfunction is thought to be an important contributor to neurological damage. No pharmacological agents have been found to prevent this. Mitogen activated protein kinase (MAPK), including extracellular signal regulated kinase (ERK), c-Jun-*N*-terminal kinase, and p38, is thought to contribute to ischemic preconditioning. We investigated whether pretreatment with salvinorin A, the only natural nonopioid κ receptor agonist, could preserve autoregulation of the pial artery via MAPK.
METHODS: The response of the pial artery to hypotension and hypercapnia was monitored in piglets equipped with a closed cranial window before and after hypoxia and ischemia in the presence or absence of U0126, an inhibitor for the protein kinase upstream of ERK, sp600125, an inhibitor of c-Jun-*N*-terminal kinase or sb203580, an inhibitor of p38. Salvinorin A (10 μg/kg IV) was administered 30 minutes before hypoxia/ischemia in salvinorin-treated animals. Cerebrospinal fluid samples were collected before and 30 minutes after salvinorin A administration for the measurement of MAPK. Data (n = 5) were analyzed by repeated-measures analysis of variance.
RESULTS: Pial artery dilation to hypercapnia and hypotension was blunted after hypoxia/ischemia but preserved well by pretreatment with salvinorin A. U0126, but not sp600125 or sb203580, abolished the preservative effects of salvinorin A on cerebral vascular autoregulation to hypotension and hypercapnia. The ratio of pERK/ERK in cerebrospinal fluid increased significantly in salvinorin-treated animals, which was inhibited by U0126.
CONCLUSIONS: Salvinorin A pretreatment preserves autoregulation of the pial artery to hypotension and hypercapnia after hypoxia/ischemia via ERK in a piglet model.

下腹部手术病人在超声引导下行腹直肌鞘阻滞后血浆罗哌卡因浓度

Plasma Ropivacaine Concentrations After Ultrasound-Guided Rectus Sheath Block in Patients Undergoing Lower Abdominal Surgery

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腹直肌鞘阻滞可以为正中切口的病人提供术后镇痛。但是关于此阻滞中局部麻醉药的药代动力学的相关信息较少。在这项研究中，我们详细描述了此阻滞后罗哌卡因浓度的时间过程。39 名择期行下腹部手术的病人被分成 3 组接受不同浓度的罗哌卡因腹直肌鞘阻滞。血浆峰浓度呈剂量依赖性，达到血浆峰浓度的时间没有明显差别。现有数据同时提示罗哌卡因腹直肌鞘阻滞后与其他间隔阻滞相比表现为较慢的吸收动力学。
（张怡译 马皓琳 李士通校）

A rectus sheath block can provide postoperative analgesia for midline incisions. However, information regarding the pharmacokinetics of local anesthetics used in this block is lacking. In this study, we detail the time course of ropivacaine concentrations after this block. Thirty-nine patients undergoing elective lower abdominal surgery were assigned to 3 groups receiving rectus sheath block with 20 mL of different concentrations of ropivacaine. Peak plasma concentrations were dose dependent, and there were no significant differences in the times to peak plasma concentrations. The present data also suggested a slower absorption kinetics profile for ropivacaine after rectus sheath block than other compartment blocks.