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[体外循环中血液滤过不能降低心脏手术后的房颤发生率](#)

Hemofiltration During Cardiopulmonary Bypass Does Not Decrease the Incidence of Atrial Fibrillation After Cardiac Surgery

William J. Mauermann, MD, Gregory A. Nuttall, MD, David J. Cook, MD, Andrew C. Hanson, BS, Darrell R. Schroeder, MS, and William C. Oliver, MD
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背景：心脏手术后有20%-50%的病人发生房颤并与增加的并发症的发病率和死亡率有关。据报道，皮质类固醇可减少术后房颤的发生率，可能与它可以减轻手术及体外循环（CPB）引起炎症有关。作者假设，在体外循环中的血液滤过可能减轻炎症，可能会降低心脏手术后房颤的发生率。

方法：这一双盲，安慰剂对照的在体外循环心脏手术围术期时类固醇治疗和血液滤过对术后机械通气期间的影响因素进行评估的回顾性分析。在这项研究中，192例心脏手术患者随机分为1到3组：对照组（安慰剂），体外循环中过滤血液组，类固醇治疗组。记录新发房颤的证据。房颤定义为具有心电图证据的房颤或患者临床诊断的房颤。

结果：192例参加试验的患者，3例不符合实验规定和4例慢性房颤史被排除。共有185例患者原始数据。60例（32%）有心脏手术后新发房颤。各组间房颤发生无差异（对照组21%；类固醇组41%；血液滤过组36%， $P = 0.057$ ）。年龄是房颤发生的唯一危险因素（房颤患者的平均年龄， 65.4 ± 10.1 岁，无房颤患者 61.4 ± 11.5 岁， $P = 0.024$ ）。当年龄，生活方式和存在或不存在慢性阻塞性肺疾病经多变量分析，组间差异不明显（ $P = 0.108$ ）。

结论：围手术期皮质类固醇或体外循环使用血液过滤并未减少心脏手术后房颤的发生率。在常规的使用之前，围术期类固醇应用防止术后房颤发生的有效性和安全性需更深入的评估。

(张磊 译 陈杰 校)

BACKGROUND: Atrial fibrillation (AF) occurs in 20%–50% of patients after cardiac surgery and is associated with increased morbidity and mortality. Corticosteroids are reported to decrease the incidence of postoperative AF, presumably by attenuating inflammation caused by surgery and cardiopulmonary bypass (CPB). We hypothesized that hemofiltration during CPB, which may attenuate inflammation, might decrease the incidence of AF after cardiac surgery.

METHODS: This was a retrospective review of patients previously enrolled in a double-blind, placebo-controlled trial evaluating the effects of perioperative steroid therapy and hemofiltration during CPB on duration of postoperative mechanical ventilation. In that study, 192 patients undergoing cardiac surgery were randomized to 1 of 3 groups: controls (placebo), hemofiltration during CPB, or perioperative steroid therapy. Patient records were reviewed to determine the incidence of new onset AF defined as any electrocardiogram evidence of AF or AF diagnosed by the patients' clinicians.

RESULTS: Of the 192 enrolled patients, 3 were excluded for protocol violations and 4 were excluded for history of chronic AF. Data from 185 patients from the original study were available for review. Sixty patients (32%) had new onset AF after cardiac surgery. There was no difference among groups in the incidence of AF (control group, 21%; steroid group, 41%; hemofiltration group, 36%; $P = 0.057$ among groups). The only risk factor for the development of AF was age (mean age of patients with AF, 65.4 ± 10.1 yr vs patients without AF, 61.4 ± 11.5 yr; $P = 0.024$). When age, procedure type, and presence or absence of chronic obstructive pulmonary disease were controlled for in multivariate analysis, the difference among study groups remained nonsignificant ($P = 0.108$).

CONCLUSIONS: Perioperative corticosteroids or the use of hemofiltration during CPB did not decrease the incidence of AF after cardiac surgery. Further studies evaluating the efficacy and safety of perioperative corticosteroids for prevention of postoperative AF are warranted before their routine use can be recommended.

心脏手术病人，大剂量氨甲环酸与临床非缺血性癫痫发作有关

High-Dose Tranexamic Acid Is Associated with Nonischemic Clinical Seizures in Cardiac Surgical Patients

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Anesth Analg 2010 110: 350-353.

背景：在 2 个独立的中心，作者观察到经历重大心脏手术的病人，术后癫痫发作的发生率有显著的增加（从 1.3% 到 3.8%）。这些事件从一般临床应用治疗的角度说，与抑肽酶撤出后大剂量氨甲环酸（血栓素）应用的时间上相一致。本研究进行了回顾性分析，研究心脏手术后血栓素的使用是否和惊厥发生有关。

方法：作者对 24 例围手术期癫痫发作的病人进行了深入的研究，对其中的 11 例进行脑电波记录，所有病人均行神经系统评估和脑成像研究。

结果：24 例患者中的 21 例无新的脑缺血损伤的证据，3 例患者可能由于缺血性脑损伤。所有癫痫发作的病人没有永久性的神经异常，所有的发生癫痫的 24 名病人接受了大剂量的血栓素治疗（61 to 259 mg/kg），平均年龄为 69.9 岁。24 例中 21 例为心内直视术而非冠脉搭桥手术。除了一例外均在体外循环下手术。无明确的脑缺血，代谢，或高温导致癫痫发作的证据。

结论：研究结果表明，在体外循环下心内直视术老年患者中使用高剂量血栓素与临床易感癫痫发作有一定的联系。

(刘世文 译 陈杰 校)

BACKGROUND: In 2 separate centers, we observed a notable increase in the incidence of postoperative convulsive seizures from 1.3% to 3.8% in patients having undergone major cardiac surgical procedures. These events were temporally coincident with the initial use of high-dose tranexamic acid (TXA) therapy after withdrawal of aprotinin from general clinical usage. The purpose of this review was to perform a retrospective analysis to examine whether there was a relation between TXA usage and seizures after cardiac surgery.

METHODS: An in-depth chart review was undertaken in all 24 patients who developed perioperative seizures. Electroencephalographic activity was recorded in 11 of these patients, and all patients had a formal neurological evaluation and brain imaging studies.

RESULTS: Twenty-one of the 24 patients did not have evidence of new cerebral ischemic injury, but seizures were likely due to ischemic brain injury in 3 patients. All patients with seizures did not have permanent neurological abnormalities. All 24 patients with seizures received high doses of TXA intraoperatively ranging from 61 to 259 mg/kg, had a mean age of 69.9 years, and 21 of

24 had undergone open chamber rather than coronary bypass procedures. All but one patient were managed using cardiopulmonary bypass. No evidence of brain ischemic, metabolic, or hyperthermia-induced causes for their seizures was apparent.

CONCLUSION: Our results suggest that use of high-dose TXA in older patients in conjunction with cardiopulmonary bypass and open-chamber cardiac surgery is associated with clinical seizures in susceptible patients.

骨内输液：针对麻醉医生的小儿领域应用的综述

Intraosseous Infusions: A Review for the Anesthesiologist with a Focus on Pediatric Use

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骨内输液(IO)用于不能迅速建立外周静脉的急诊重症婴幼儿。尽管骨内输液在上述情况下是有效的，但它在急救室外的抢救或复苏中的应用仍有限。然而这项技术的重点在于培训急诊室或婴幼儿重症监护室的医护人员如何应用，因此也体现出其在围手术期中应用的局限性。当在手术室内不能成功建立外周静脉通路时，中心静脉置管、外科血管切开等方式往往能成功建立安全的血管通路。但是这些方式花费大量时间。对有条件的患儿进行骨内输液，可望使所有的婴幼儿麻醉医生的工作变得快速而便捷。本文着力于介绍骨内输液的发展，回顾骨髓腔解剖结构，探讨其在围手术期中的应用价值以及分析其并发症。

(叶乐 译 陈杰 校)

Intraosseous (IO) access is used most frequently for emergency care of critically ill infants and children when IV access cannot be rapidly achieved. Despite its efficacy in such situations, applications outside of the emergency room or resuscitation scenario have been limited. Furthermore, although the technique is emphasized in the teaching of those caring for critically ill infants and children in the emergency room or critical care setting, there is limited emphasis on its potential use in the perioperative setting. When peripheral venous access cannot be achieved in the operating room, alternative means of securing vascular access such as central line placement or surgical cutdown are generally successful; however, these techniques may be time consuming. Anyone providing anesthesia care for infants and children may want to become facile with the use of IO infusions for selected indications. We present the history of IO infusions, review the anatomy of the bone marrow space, discuss the potential role of IO infusions in the perioperative period, and analyze its adverse effect profile.

麻醉和老年人大脑

Anesthesia and the Old Brain

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围手术期老年患者的认知功能可能出现长期的严重后果。在这篇特别的文章中，作者总结了麻醉因素在其中的所起作用 and 证据。证据这一点需进一步的研究，尤其是在人类。

(舒慧刚 译 陈杰 校)

The perioperative period may have long-term consequences on cognitive function in the elderly patient. In this special article, we summarize the rationale and evidence that the anesthetic *per se* is a contributor. The evidence at this point is considered suggestive and further research is needed, especially in humans.

阿尔茨海默病转基因小鼠与同窝出生的非转基因小鼠相比有着更大的异氟醚最低肺泡有效浓度

Transgenic Alzheimer Mice Have a Larger Minimum Alveolar Anesthetic Concentration of Isoflurane than Their Nontransgenic Littermates

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背景：超过 12%的人在年龄超过 65 岁后会得阿尔茨海默氏症。由于目前对于此类患者麻醉时挥发性麻醉剂的需要量没什么研究，研究者测定了年轻和年老的遭受阿尔茨海默氏病威胁的转基因小鼠的异氟醚的最低肺泡有效浓度（APP23 与瑞典双突变杂合的小鼠）。为了区分转基因模型的非特异性因素的影响与阿尔茨海默病的影响，研究者另加了一组与实验组相比除了没有阿尔茨海默氏症致病基因外其他基因构成都相同的瑞典双突变体（与 APP51/16 杂合的小鼠）。

方法：测定 60 只（每组 10 只）小鼠的 MAC 值：4 月大和 18 月大的 APP23 杂合小鼠及其未经基因改造的野生同窝小鼠，18 月大的 APP51/16 杂合小鼠及其野生同窝小鼠。异氟醚与氧气或空气混合后进行麻醉诱导。异氟醚的吸入浓度维持在 1.0%和 2.0%之间，并记录伤害性刺激引起体动反应的情况。用非配对 t 检验的方法对 MAC 值进行比较。

结果：18 月大的 APP23 杂合小鼠的 MAC 为 1.67 ± 0.09 ，比野生同窝小鼠的 MAC 值高 9%（ 1.53 ± 0.14 ， $P = 0.020$ ）。而 APP51/16 杂合小鼠的 MAC 比野生同窝小鼠低（ 1.32 ± 0.14 ， 1.48 ± 0.13 ， $P = 0.037$ ）。所有的野生同窝小鼠和年轻的 APP23 小鼠有着类似 MAC 值。

结论：老年 APP23 杂合小鼠异氟醚 MAC 值的增加似乎与阿尔茨海默氏症引起的机体变化有关。

(丁俊云 译 陈杰 校)

BACKGROUND: More than 12% of all people older than 65 yr have Alzheimer's disease. Because nothing is known about changes in demand of volatile anesthetics in this disease, we determined minimum alveolar anesthetic concentration (MAC) values of isoflurane in young and aged transgenic mice at risk of developing Alzheimer's disease (heterozygote APP23 mice with the "Swedish double mutation"). To differentiate between unspecific effects of the transgenic model and specific Alzheimer effects, we additionally evaluated MAC values in mice with the same genetic construct but without the Alzheimer's disease-causing Swedish double mutation (heterozygote APP51/16 mice).

METHODS: MAC was determined in 60 mice (10 per group): heterozygote APP23 mice and their wild type littermates at the age of 4 and 18 mo, respectively, and heterozygote APP51/16

mice and their wild type littermates at the age of 18 mo. Anesthesia was induced with isoflurane in oxygen/air. The concentration of inhaled isoflurane varied between 1.0 and 2.0 Vol%, and the motor reaction to toeclamping was recorded. Means of the MAC values were compared with an unpaired *t*-test.

RESULTS: The MAC of 18-mo-old heterozygote APP23 mice was 1.67 ± 0.09 , i.e., 9% larger than the MAC of their wild type littermates (1.53 ± 0.14 ; $P = 0.020$). Heterozygote APP51/16 mice had a lower MAC than their wild type littermates (1.32 ± 0.14 vs 1.48 ± 0.13 ; $P = 0.037$). All wild type groups and young heterozygote APP23 mice had comparable MAC values.

CONCLUSIONS: The increased MAC value in aged heterozygote APP23 mice seems to be attributable to changes related to Alzheimer's disease.

挥发性芳香族麻醉药对人类 $\alpha_4\beta_2$ 神经元烟碱受体的抑制作用依赖于药物疏水性

Inhibition of Human $\alpha_4\beta_2$ Neuronal Nicotinic Acetylcholine Receptors by Volatile Aromatic Anesthetics Depends on Drug Hydrophobicity

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背景：苯等挥发性芳香族化合物是全身麻醉药，吸入后会在伤害性刺激下产生遗忘，催眠和镇静作用。虽然这些化合物不应用于临床，但它们被频繁地用于商业产品，如溶剂和家用清洁用品，并被滥用于吸入性毒品。挥发性芳香族麻醉剂是有用的药理学工具，可在假定的全麻靶目标上探索化学结构和药物效应之间的关系。神经元烟碱（乙酰胆碱）受体广泛表达于大脑的配体门控离子通道，被认为在学习和记忆方面发挥重要作用。在这项研究中，作者验证了这个假设：芳香族麻醉剂可逆性抑制 $\alpha_4\beta_2$ 神经元乙酰胆碱受体功能，作者同时试图确定受体抑制作用与结构的相关性。

方法：电生理学技术用于量化挥发性芳香族麻醉剂，由 1 mM Ach 探出，并调整人类乙酰胆碱受体在爪蟾卵母细胞中的表达。

结果：本研究中使用的所有的挥发性芳香族麻醉剂可逆性抑制了 $\alpha_4\beta_2$ 乙酰胆碱受体，从 0.00091 大气压下的 1,2 二氟苯到 0.045 大气压下的六氟苯的 IC₅₀ 值。除六氟苯外，这些化合物 IC₅₀ 值低于最低有效肺泡浓度。抑制效应与化合物的 cation- π 结合能力并不相关（R² = 0.48，P = 0.059）。然而，抑制强度与辛醇/气分配系数有良好的相关性（R² = 0.87，P = 0.0008）。

结论：挥发性芳香族麻醉药能强效及可逆性地抑制人类 $\alpha_4\beta_2$ 神经元乙酰胆碱受体。这种抑制作用可能在产生遗忘方面起着作用。相对于 N-甲基-D-天冬氨酸受体，芳香族麻醉剂对 $\alpha_4\beta_2$ 神经元乙酰胆碱受体的抑制强度似乎依赖于药物的疏水性，而不是静电性能。这意味着，挥发性芳香族麻醉药与 $\alpha_4\beta_2$ 神经元乙酰胆碱受体结合位点在性质上是疏水性，这与 N-甲基-D-天冬氨酸受体结合位点性质不同。

(唐颖 译 陈杰 校)

BACKGROUND: Volatile aromatic compounds such as benzene are general anesthetics that cause amnesia, hypnosis, and immobility in response to noxious stimuli when inhaled. Although these compounds are not used clinically, they are frequently found in commercial items such as solvents and household cleaning products and are abused as inhalant drugs. Volatile aromatic

anesthetics are useful pharmacological tools for probing the relationship between chemical structure and drug activity at putative general anesthetic targets. Neuronal nicotinic acetylcholine (nACh) receptors are ligand-gated ion channels widely expressed in the brain, which are thought to play important roles in learning and memory. In this study, we tested the hypothesis that aromatic anesthetics reversibly inhibit $\alpha_4\beta_2$ neuronal nACh receptor function and sought to determine the structural correlates of receptor inhibition.

METHODS: Electrophysiological techniques were used to quantify the effects of 8 volatile aromatic anesthetics on currents elicited by 1 mM ACh and mediated by human $\alpha_4\beta_2$ nACh receptors expressed in *Xenopus* oocytes.

RESULTS: All of the volatile aromatic anesthetics used in this study reversibly inhibited $\alpha_4\beta_2$ nACh receptors with IC_{50} values ranging from 0.00091 atm for 1,2-difluorobenzene to 0.045 atm for hexafluorobenzene. With the exception of hexafluorobenzene, all of the compounds had IC_{50} values less than minimum alveolar concentration. Inhibitory potency correlated poorly with the cation- π binding energies of the compounds ($r^2 = 0.48$, $P = 0.059$). However, there was a good correlation between inhibitory potency and the octanol/gas partition coefficient ($r^2 = 0.87$, $P = 0.0008$).

CONCLUSIONS: Volatile aromatic anesthetics potently and reversibly inhibit human $\alpha_4\beta_2$ neuronal nACh receptors. This inhibition may play a role in producing amnesia. In contrast to *N*-methyl-d-aspartate receptors, the inhibitory potencies of aromatic anesthetics for $\alpha_4\beta_2$ neuronal nACh receptors seem to be dependent on drug hydrophobicity rather than electrostatic properties. This implies that the volatile aromatic anesthetic binding site in the $\alpha_4\beta_2$ neuronal nACh receptor is hydrophobic in character and differs from the nature of the binding site in *N*-methyl-d-aspartate receptors.

围术期血糖调控的原则与临床意义

Scientific Principles and Clinical Implications of Perioperative Glucose Regulation and Control

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大手术后高血糖非常普遍，并由多因素调控。常见因素包括围术期代谢状态、术中病人管理及手术引起的神经内分泌应激反应。急性胰岛素抵抗也会引起围术期高血糖，并且起到很大作用。高血糖与危重病人及手术病人的不良预后具有相关性。经调查多数“高血糖”的诊断过于随便，而且其初始治疗阈值也大相迥异。曾有研究表明接受强化血糖控制（IGC, 目标血糖浓度 < 110 mg/dL）的危重及手术病人预后得以改善。这些结果被其他临床领域借鉴，并且围术期也广泛采用强化血糖控制。然而，很少有研究证实围术期血糖控制的意义。此外，因没有（确定）适当的血糖治疗目标值，也没有阐明围术期血糖控制的真正效能，最近这些前瞻性实验并不能体现 IGC 的益处。执业医师们需理解不同血糖测量技术的临床意义。IGC 显著增加高血糖的危险性，而这在危重病人并无相关性。最新收集数据表明：围术期血糖应慎重地控制在 < 180 mg/dL，同时血糖控制应基于密切的血糖监测。

(邹巧群 译 陈杰 校)

Development of hyperglycemia after major operations is very common and is modulated by many factors. These factors include perioperative metabolic state, intraoperative management of the patient, and neuroendocrine stress response to surgery. Acute insulin resistance also develops perioperatively and contributes significantly to hyperglycemia. Hyperglycemia is associated with poor outcomes in critically ill and postsurgical patients. A majority of the investigations use the term "hyperglycemia" very loosely and use varying thresholds for initiating treatment. Initial studies demonstrated improved outcomes in critically ill, postsurgical patients who received intensive glycemic control (IGC) (target serum glucose <110 mg/dL). These results were quickly extrapolated to other clinical areas, and IGC was enthusiastically recommended in the perioperative period. However, there are few studies investigating the value of intraoperative glycemic control. Moreover, recent prospective trials have not been able to show the benefit of IGC; neither an appropriate therapeutic glycemic target nor the true efficacy of perioperative glycemic control has been fully determined. Practitioners should also appreciate technical nuances of various glucose measurement techniques. IGC increases the risk of hypoglycemia significantly, which is not inconsequential in critically ill patients. Until further specific data are accumulated, it is prudent to maintain glucose levels <180 mg/dL in the perioperative period, and glycemic control should always be accompanied by close glucose monitoring.

亨廷顿病病人的麻醉管理

Anesthetic Management of Patients with Huntington Disease

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Anesth Analg 2010 110: 515-523.

背景：亨廷顿病(HD)是一种罕见的常染色体显性遗传性疾病。以舞蹈症、肌张力减退、共济失调、认知障碍和行为减退为症状。在病例报道中显示这类患者对于麻醉的异常反应，需提高对这类患者麻醉安全的关注度。

方法：作者检索了 Mayo Clinic 中亨廷顿病病人接受全身麻醉的医疗记录数据。主要是回顾麻醉技术、药物使用及术后并发症。

结果：有 17 例全麻的 11 例基因确诊的亨廷顿病病人。精神类药物的使用非常广泛，有 6 例使用抗精神病药物，抗抑郁药使用 7 例，3 例使用苯二氮卓类药物。司可林使用 7 例，非去极化肌松药使用 11 例，均无不良反应。患者在麻醉诱导及维持期间均无异常反应。严重的并发症也未发生。

结论：与以前的病例报告比较，作者发现，亨廷顿病病人进行全身麻醉时无异常反应。但是，麻醉医生应该认识到麻醉药和这类病人经常使用的精神药物之间的相互作用。另外，因为延髓功能障碍可能是这种疾病表现，所以应该采取相应的措施来降低误吸的危险性。

(张蕾 译 陈杰 校)

BACKGROUND: Huntington disease (HD) is a rare autosomal dominant disease with symptoms of chorea, dystonia, incoordination, cognitive decline, and behavioral difficulties. Abnormal responses to anesthesia have been reported in case reports and raised concerns regarding the safety of anesthesia in this patient population.

METHODS: We performed a computerized search of the Mayo Clinic medical records database searching for patients with HD who underwent general anesthesia. Medical records were reviewed for anesthetic technique, medications used, and postoperative complications.

RESULTS: We identified 11 patients with genetically confirmed HD who underwent 17 general anesthetics. Psychiatric medication use was common, with 6 patients using antipsychotics, 7 patients using antidepressants, and 3 patients using benzodiazepines. Succinylcholine was used in 7 anesthetics, and nondepolarizing neuromuscular blocking drugs in 11 anesthetics, all without adverse effects. Patients had normal responses to induction and maintenance of anesthesia without adverse effects. Serious postoperative complications did not occur.

CONCLUSION: Contrary to previous case reports, we found that patients with HD have normal responses to general anesthesia. However, the anesthesiologist should be aware of interactions between anesthetics and psychiatric medications frequently used by these patients. Measures should also be taken to minimize the risk of pulmonary aspiration because bulbar dysfunction may be a manifestation of this disease.

血管活性药物对内毒素血症的大鼠肠道功能性毛细血管密度 (FCD) 的影响：活体显微视频分析

The Effects of Vasoactive Drugs on Intestinal Functional Capillary Density in Endotoxemic Rats: Intravital Video-Microscopy Analysis

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背景：应用血管活性药物来恢复脓毒血症休克病人动脉血压仍然是危重病医学的基础。然而，升压药会加重脓毒血症休克病人内脏的灌注不足而导致细菌侵入和内毒素血症。在这项研究中，作者比较了不同血管活性药物对内毒素血症休克未行液体治疗的大鼠，肠道微循环和组织氧合的影响。

方法：戊巴比妥麻醉后的 Wistar Kyoto 大鼠由大肠杆菌内毒素 (2mg/kg 静注) 诱导至内毒素血症休克。通过持续注射血管活性药物维持动脉血压，这些药物有肾上腺素、去甲肾上腺素、苯肾上腺素、多巴胺，还有多巴酚丁胺与去甲肾上腺素的合剂。使用活体视频显微镜评估小肠肌层的功能性毛细血管密度。同时进行肠系膜静脉血气和乳酸分析。

结果：静注肾上腺素、去甲肾上腺素和苯肾上腺素后，功能性毛细血管密度约下降 25%~60%。注射多巴胺、多巴酚丁胺、多巴酚丁胺与去甲肾上腺素的合剂没有引起消化道功能性毛细血管密度的重大变化。此外，在注射苯肾上腺素后肠系膜静脉乳酸含量增加，注射肾上腺素和去甲肾上腺素后其乳酸含量有升高趋势，而注射多巴胺、多巴酚丁胺、多巴酚丁胺与去甲肾上腺素合剂后其乳酸含量没有显著升高。

结论：这项研究证实了感染性休克实验模型中系统血流动力学和微循环两者影响分离。此外，研究显示多巴胺、多巴酚丁胺、多巴酚丁胺和去甲肾上腺素合剂对内毒素血症大鼠的肠肌层微循环有保护作用。

(杨秋娟 译 陈杰 校)

BACKGROUND: The use of vasoactive drugs to restore arterial blood pressure in patients with septic shock remains a cornerstone of intensive care medicine. However, vasopressors can accentuate the hypoperfusion of the gut during septic shock, allowing bacterial translocation and endotoxemia. In this study, we compared the effects of different vasoactive drugs on intestinal microcirculation and tissue oxygenation, independent of the effects of fluid therapy, in a rat model of endotoxemic shock.

METHODS: Pentobarbital-anesthetized Wistar Kyoto rats were submitted to endotoxemic shock induced by *Escherichia coli* lipopolysaccharide (2 mg/kg IV). Arterial blood pressure was normalized by a continuous infusion of different vasoactive drugs, including epinephrine, norepinephrine, phenylephrine, dopamine, dobutamine, or a combination of dobutamine and norepinephrine. The functional capillary density (FCD) of the muscular layer of the small intestine was evaluated by intravital video-microscopy. Mesenteric venous blood gases and lactate concentrations were also analyzed.

RESULTS: FCD decreased by approximately 25% to 60% after the IV infusion of epinephrine, norepinephrine, and phenylephrine. Administration of dopamine, dobutamine, and the combination of dobutamine and norepinephrine did not induce significant alterations in gut FCD. In addition, the mesenteric venous lactate concentration increased in the presence of phenylephrine and showed a tendency to increase after the administration of epinephrine and norepinephrine, whereas there was no observable increase after the administration of dopamine, dobutamine, and the combination of dobutamine with norepinephrine.

CONCLUSION: This study confirms dissociation of the systemic hemodynamic and microvascular alterations in an experimental model of septic shock. Moreover, the results indicate that the use of dopamine, dobutamine, and dobutamine in combination with norepinephrine yields a protective effect on the microcirculation of the intestinal muscular layer in endotoxemic rats.

Meta 分析比较地氟醚和七氟醚拔管平均时间和变异率

Statistical Modeling of Average and Variability of Time to Extubation for Meta-Analysis Comparing Desflurane to Sevoflurane

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背景: 理想的麻醉药和麻醉方法是复苏快 (例如: 从手术结束到拔管平均 5min) 且变异度小 (例如: 总是 4-7min)。作者用 AIMS 数据研究如何模仿从手术结束到拔管的时间。应用 meta 分析测试那些信息, 比较使用地氟醚和七氟醚后的拔管时间。

方法: AIMS data 研究由 95 位外科医生实施的 32,792 例手术, 包括在手术室的气管插管和拔管, 以及使用麻醉挥发气体。Meta 分析通过 2008 年 29 个随机对照研究来比较应用七氟醚和地氟醚的拔管时间。方法和标准偏差百分比的不同应用随机 meta 分析和 Bayesian 法来研究。

结果: 拔管的时间用威布尔分布分析较正态分布分析更适合。药物选择对平均值和标准差的影响几乎一致, 正像变异系数未变一样 (29 个研究中 26 个研究 $P > 0.10$) 及差值变异系数变化无意义 (七氟醚 - 地氟醚 = -1%, 95% 可信区间 [CI] -3% to 1%, $P = 0.22$)。地氟

醚减少拔管时间 25% (95% 可信区间 17%–32%, $P < 0.0001$)和标准偏差降低 21% (95%可信区间 16%–26%)。为评价长时间拔管的无形成本 (例如:外科医生无益的等待时间),作者认为 15% AIMS 案例拔管时间大于 15min。这些案例从出手术室到外科医生进行下一台手术平均延长 4.9min (95% 可信区间 2.7–7.1 min, $P < 0.0001$)。平均时间和标准差减少 20%–25%将会减少拔管延长时间的发生率 71%–82% (95% 可信区间 68%–84%)。

结论:与七氟醚相比地氟醚能减少平均拔管时间和变异率 20%–25%。这些方面的主要的经济价值是手术花费时间的减少。然而,应考虑拔管时间延长造成随后工作延迟导致有关的难以确定的花费。地氟醚较七氟醚拔管时间平均值和不一致的减少可解释和测定预期延长拔管发生率减少 75%。

(陈灵科 译 陈杰 校)

BACKGROUND: The recovery profile of an ideal anesthetic or technique would be fast (e.g., mean of 5 min from end of surgery to extubation) with little variability (e.g., always 4–7 min). We used anesthesia information management system (AIMS) data to learn how to model the time from end of surgery to extubation. We applied that knowledge for meta-analyses of trials comparing extubation times after use of desflurane and sevoflurane.

METHODS: AIMS data studied were 32,792 cases performed by 95 surgeons that included tracheal intubation and extubation in the operating room (OR) and use of volatile anesthetic(s). Meta-analysis included the 29 randomized controlled trials through 2008 comparing extubation times with desflurane and sevoflurane. Percentage differences in means and standard deviations were studied using random effects meta-analysis and a Bayesian method.

RESULTS: Times to extubation were better fit by (skewed) Weibull distributions than by (symmetric) normal distributions. Drug choice had nearly equally proportional effects on the means and standard deviations of extubation times, as shown by unchanged coefficients of variation ($P > 0.10$ for 26 of 29 studies) and nonsignificant pooled difference in the coefficient of variation (sevoflurane – desflurane = –1%, 95% confidence interval [CI] –3% to 1%, $P = 0.22$). Applying these findings, desflurane reduced the mean extubation time by 25% (95% CI 17%–32%, $P < 0.0001$) and standard deviation by 21% (95% CI 16%–26%). To value the intangible costs (e.g., frustrated waiting surgeons) of prolonged extubation times, we considered the 15% of AIMS cases with times >15 min. These cases averaged 4.9 min longer times from out of the OR to the start of surgery of the surgeon's next case (95% CI 2.7–7.1 min, $P < 0.0001$). Reduction in the means and standard deviations by 20%–25% would likely reduce incidences of these prolonged extubation times by 71%–82% (95% CI 68%–84%).

CONCLUSIONS: Desflurane reduces the average extubation time and the variability of extubation time by 20%–25% relative to sevoflurane. The principal economic value of these end points is their reductions of direct (labor) costs of OR time. However, reductions in intangible costs of prolonged extubation are real, being associated with subsequent delays. Reductions in the average and variance of times to extubation can be interpreted and monitored in terms of corresponding expected 75% reductions in the incidences of prolonged extubation times by using desflurane relative to sevoflurane.

大麻隆对纤维肌痛病人其睡眠质量的作用:随机对照试验

The Effects of Nabilone on Sleep in Fibromyalgia: Results of a Randomized Controlled Trial

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背景：睡眠障碍会对许多有慢性疼痛的病人造成影响。曾有报道称印度大麻可帮助病人入睡。以广泛的慢性疼痛和失眠症为主要特征的纤维肌痛症也会引起睡眠障碍，因而本文主要讨论研究了一种合成的大麻素，即大麻隆，在治疗此种睡眠障碍过程中的安全性和有效性。

方法：作者应用随机，双盲，主动对照及交叉试验的方法比较了大麻隆(睡前 0.5-1.0mg)和阿米替林(睡前 10-20mg)对于有慢性失眠症的纤维肌痛病人的不同作用。受试者各服用大麻隆和阿米替林这两种药物两个星期，之后各有两个星期的药物洗脱期。主要的评价是睡眠质量，用失眠严重指数以及利兹睡眠评估问卷来测试。次要的评价结果包括疼痛，情绪，生活质量和副反应。

结果：31 个受试者加入了这个实验，其中 29 个人完成了这项试验(26 个女性，平均年龄 49.5 岁)。尽管大麻隆和阿米替林都能帮助睡眠，但是大麻隆比阿米替林的作用效果更好(失眠严重指数相差 3.2, 95%CI=1.2-5.3)。大麻隆可以帮助病人好好地休息，在这方面比阿米替林稍稍优越(利兹睡眠评估问卷差别=0.5 (0.0-1.0))，然而对于不眠症，大麻隆和阿米替林相比没有多大差别(差值=0.3 (-0.2-0.8))。我们没有发现两种药对于疼痛，情绪和生活质量的影响。但是有轻到中度的副反应，而且大麻隆的副反应相较于阿米替林更频繁。大麻隆最常见的副反应是头昏眼花，恶心和口干。

结论：大麻隆可有效提高纤维肌痛病人的睡眠质量，且耐受性好。作者认为每天睡前应给予低剂量的大麻隆，而不选择阿米替林。还需进行更多的试验来明确大麻隆这种药物作用的持续时间以及长期使用这种药物的安全性问题。

(张婷 译 陈杰 校)

BACKGROUND: Sleep disorders affect many patients with chronic pain conditions. Cannabis has been reported by several patient populations to help sleep. We evaluated the safety and efficacy of nabilone, a synthetic cannabinoid, on sleep disturbance in fibromyalgia (FM), a disease characterized by widespread chronic pain and insomnia.

METHODS: We conducted a randomized, double-blind, active-control, equivalency crossover trial to compare nabilone (0.5–1.0 mg before bedtime) to amitriptyline (10–20 mg before bedtime) in patients with FM with chronic insomnia. Subjects received each drug for 2 wk with a 2-wk washout period. The primary outcome was sleep quality, measured by the Insomnia Severity Index and the Leeds Sleep Evaluation Questionnaire. Secondary outcomes included pain, mood, quality of life, and adverse events (AEs).

RESULTS: Thirty-one subjects were enrolled and 29 completed the trial (26 women, mean age 49.5 yr). Although sleep was improved by both amitriptyline and nabilone, nabilone was superior to amitriptyline (Insomnia Severity Index difference = 3.2; 95% confidence interval = 1.2–5.3). Nabilone was marginally better on the restfulness (Leeds Sleep Evaluation Questionnaire difference = 0.5 [0.0–1.0]) but not on wakefulness (difference = 0.3 [–0.2 to 0.8]). No effects on pain, mood, or quality of life were observed. AEs were mostly mild to moderate and were more frequent with nabilone. The most common AEs for nabilone were dizziness, nausea, and dry mouth.

CONCLUSIONS: Nabilone is effective in improving sleep in patients with FM and is well tolerated. Low-dose nabilone given once daily at bedtime may be considered as an alternative to amitriptyline. Longer trials are needed to determine the duration of effect and to characterize long-term safety.

创伤患者接受长期连续外周神经阻滞导管治疗后其血清罗哌卡因浓度和局麻药的全身毒性之间的关系

Serum Ropivacaine Concentrations and Systemic Local Anesthetic Toxicity in Trauma Patients Receiving Long-Term Continuous Peripheral Nerve Block Catheters

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背景：罗哌卡因是一种长效局麻药，常用于外周神经阻滞及连续外周神经阻滞导管中。在 Walter Reed 部队医疗中心，战争创伤患者疼痛治疗方案的一部分就是接受连续外周神经阻滞导管。这些导管通常在原处留置数日至数周不等。在本次研究中，作者通过检测患者血清中结合的和非结合的局麻药的浓度，以评估随着时间的推移，创伤患者罗哌卡因的血药浓度水平。同时，还检测了长时间接受罗哌卡因输注患者的血清 α -酸糖蛋白的浓度。

方法：本次研究共有 15 位患者入组，其中 2 位因仅获取到一个罗哌卡因浓度而被排除。在其余 13 位患者中，2 位在入组时放置了外周神经阻滞导管，另外 11 位在入组前即已放置，且这些患者在首次测试局麻药水平之前，已接受输注 0.2% 罗哌卡因 18-126 小时。0.2% 罗哌卡因的输注速度为 6-14ml/h，导管内单次给药时罗哌卡因的浓度为 0.5%。在第 1、3、5、7 和 10 日及此后每 3 日一次测量局麻药的血药浓度，直到拔除所有导管，但患者并未全部接受所有检测。

结果：在研究入组的 13 位患者中，共获取了 59 个血样本。为了控制急性疼痛，导管在原处留置的平均时间为 7 日（范围：6-27 日）。患者入组后导管留置在原处的平均时间为 7 日（范围：4-25 日）。每位患者平均获取到 4 个血样本（范围：2-10 个样本）。2 位患者的血清游离罗哌卡因浓度异常升高并超出之前认为的毒性范围，且没有明显的下降的迹象。这两位患者在抽取该血样本之前约 24 小时内接受 0.5% 罗哌卡因的单次给药共 300mg。研究整个过程中罗哌卡因的平均浓度为 0.11mg/l（范围：测不到至 0.63mg/l）。在研究开始后的第一周内，每位患者的血清罗哌卡因浓度的平均变化值为 0.00mg/l（范围：-0.35-0.47mg/l）。

结论：尽管 2 位患者的血清游离罗哌卡因浓度异常升高并超出之前认为的毒性范围，但是 Walter Reed 部队医疗中心所使用的连续外周神经阻滞导管及其给予的局麻药剂量并未在临床上导致明显的全身毒性。除了 1 位在入组前已接受罗哌卡因输注外，其余患者的罗哌卡因浓度和 α -酸糖蛋白的浓度之间没有相关性。尽管如此，局麻药输注的总时间似乎并不影响药物的游离浓度。

(张婷译 陈杰校)

BACKGROUND: Ropivacaine is a long-acting local anesthetic used frequently for peripheral nerve blocks and continuous peripheral nerve block catheters. Combat trauma patients at Walter Reed Army Medical Center often receive continuous peripheral nerve block catheters as part of their pain regimen. These catheters remain *in situ* for several days to weeks. In this study, we evaluated the free ropivacaine drug levels over time in trauma patients by measuring the serum concentration of bound and unbound local anesthetic. The corresponding α_1 -acid glycoprotein concentration in patients with prolonged ropivacaine infusions was also measured.

METHODS: Fifteen patients were enrolled in the study; 2 patients were excluded because only a single ropivacaine level was obtained. Of the remaining 13 patients in the study, 2 had peripheral nerve catheters placed at the time of enrollment; the remaining 11 patients had catheters placed before enrollment. These patients were already receiving 0.2% ropivacaine infusions for a period of 18–126 h before the first assessment of local anesthetic level. Catheters infused 0.2% ropivacaine at a rate of 6–14 mL/h; catheter boluses were administered with 0.5% ropivacaine. Local anesthetic blood concentrations were scheduled to be measured on Days 1, 3, 5, 7, and 10 and every 3 days thereafter until all catheters were removed, although not all patients underwent each assessment. Specimens were assayed using high-performance liquid chromatography for total and free serum ropivacaine concentrations. α_1 -Acid glycoprotein was also measured.

RESULTS: Thirteen patients remained in the study, for a total of 59 blood samples. The median number of days catheters remained *in situ* for the duration of acute pain therapy was 7 days (range: 6–27 days). The median number of days catheters remained *in situ* after enrollment into the study was 7 days (range: 4–25 days). The median number of blood samples collected per patient was 4 (range: 2–10 samples). Two patients had isolated increased concentrations of free ropivacaine into a previously identified toxic range with no obvious mitigating factors; both patients had received a 300-mg bolus of 0.5% ropivacaine approximately 24 h before that blood collection. The median ropivacaine concentration over the length of the study was 0.11 mg/L (range: undetectable to 0.63 mg/L). During the first week of the study, the median change in ropivacaine concentration per patient was 0.00 mg/L (range: –0.35 to 0.47 mg/L).

CONCLUSION: Although 2 patients demonstrated isolated serum ropivacaine concentration spikes into a previously identified toxic range, continuous peripheral nerve block catheter management and local anesthetic doses as practiced at Walter Reed Army Medical Center did not result in clinically evident systemic ropivacaine toxicity. There was no correlation between free ropivacaine concentration and α_1 -acid glycoprotein concentration except in patients who had already been receiving ropivacaine infusions before entering the study. Despite this lack of correlation, the total duration of local anesthetic infusion did not seem to influence the free concentration of the drug.

低温体外循环复温过程中的脑血流自动调节功能受损及其与中风的潜在联系

Impaired Autoregulation of Cerebral Blood Flow During Rewarming from Hypothermic Cardiopulmonary Bypass and Its Potential Association with Stroke

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背景：心脏手术患者术后的脑损伤与低温体外循环（CPB）后的复温相关。在本研究中，我们评估成人患者体外循环过程中先降温后升温是否导致脑血流—血压自动调节的变化。方法：在 127 位行体外循环心脏手术的成年患者中使用经颅多普勒超声监测左右大脑中动脉的血流速度。11 位行体外循环的患者保持动脉流入温度 $>35^{\circ}\text{C}$ 作为对照组。平均速度指数(Mx)计算为大脑中动脉血流速度慢波和平均动脉压之间的移动的线性相关系数。脑血流—血压自动调节功能完整时的 Mx 接近 0。Mx 随脑血流—血压自动调节功能受损程度的加重而增加，接近于 1。比较体外循环前（基础值）、体外循环的降温相和升温相过程中及体外循环后的 Mx 的时间平均值。测定体外循环各个阶段的 Mx 计数 >4.0 即提示脑血流的自动调节功能受损的患者人数。

结果：在降温过程中，Mx（左， 0.29 ± 0.18 ；右， 0.28 ± 0.18 [平均数 \pm 标准差]）较基础值提高（左， 0.17 ± 0.21 ；右， 0.17 ± 0.20 ； $P \leq 0.0001$ ）。体外循环升温过程中的 Mx（左， 0.40 ± 0.19 ；右， 0.39 ± 0.19 ； $P = 0.0001$ ）较基础值（ $P \leq 0.001$ ）和降温阶段（ $P \leq 0.0001$ ）增加，提示脑血流的自动调节功能受损。体外循环后，Mx（左， 0.27 ± 0.20 ；右， 0.28 ± 0.21 ）较基础值增高（左， $P = 0.0004$ ；右， $P = 0.0003$ ），与降温过程无差别，但是较升温过程降低（左， $P \leq 0.0001$ ；右， $P \leq 0.0005$ ）。43 个患者（34%）在体外循环降温过程中及 68 位患者（53%）在复温过程中平均 Mx ≥ 0.4 。11 位温度控制的患者中 9 位在个体外循环过程中 Mx ≥ 0.4 。在术后 7 位患者发生中风，1 例短暂脑缺血发作。所有发生中风的患者在复温过程中的 Mx ≥ 0.4 （ $P = 0.015$ ）。复温时 Mx ≥ 0.4 的患者发生任何神经系统意外（中风或短暂脑缺血发作）的未调整优势比为 6.57(95% 可信区间, 0.79~55.0, $P < 0.08$)。

结论：低温体外循环会引起脑血流—血压自动调节功能的损伤，而升温过程会加重这种损伤。我们发现脑血流自动调节受损证据的患者的中风发生率较高。升温过程中压力被动的脑血流状态是否导致脑缺血损伤发生的危险有待进一步的研究。

(胡艳 译 马皓琳 李士通 校)

BACKGROUND: Patient rewarming after hypothermic cardiopulmonary bypass (CPB) has been linked to brain injury after cardiac surgery. In this study, we evaluated whether cooling and then rewarming of body temperature during CPB in adult patients is associated with alterations in cerebral blood flow (CBF)—blood pressure autoregulation.

METHODS: One hundred twenty-seven adult patients undergoing CPB during cardiac surgery had transcranial Doppler monitoring of the right and left middle cerebral artery blood flow velocity. Eleven patients undergoing CPB who had arterial inflow maintained at $>35^{\circ}\text{C}$ served as controls. The mean velocity index (Mx) was calculated as a moving, linear correlation coefficient between slow waves of middle cerebral artery blood flow velocity and mean arterial blood pressure. Intact CBF—blood pressure autoregulation is associated with an Mx that approaches 0. Impaired autoregulation results in an increasing Mx approaching 1.0. Comparisons of time-averaged Mx values were made between the following periods: before CPB (baseline), during the cooling and rewarming phases of CPB, and after CPB. The number of patients in each phase of CPB with an Mx >4.0 , indicative of impaired CBF autoregulation, was determined.

RESULTS: During cooling, Mx (left, 0.29 ± 0.18 ; right, 0.28 ± 0.18 [mean \pm sd]) was greater than that at baseline (left, 0.17 ± 0.21 ; right, 0.17 ± 0.20 ; $P \leq 0.0001$). Mx increased during the rewarming phase of CPB (left, 0.40 ± 0.19 ; right, 0.39 ± 0.19) compared with baseline ($P \leq 0.001$) and the cooling phase ($P \leq 0.0001$), indicating impaired CBF autoregulation. After CPB, Mx (left, 0.27 ± 0.20 ; right, 0.28 ± 0.21) was higher than at baseline (left, $P = 0.0004$; right, $P = 0.0003$), no different than during the cooling phase, but lower than during rewarming (left, $P \leq 0.0001$; right, $P \leq 0.0005$). Forty-three patients (34%) had an Mx ≥ 0.4 during the cooling phase of CPB and 68 (53%) had an average Mx ≥ 0.4 during rewarming. Nine of the 11 warm controls had an average Mx ≥ 0.4 during the entire CPB period. There were 7 strokes and 1 TIA after surgery. All strokes were in patients with Mx ≥ 0.4 during rewarming ($P = 0.015$). The unadjusted odds ratio for any neurologic event (stroke or transient ischemic attack) for patients with Mx ≥ 0.4 during rewarming was 6.57 (95% confidence interval, 0.79 to 55.0, $P < 0.08$).

CONCLUSIONS: Hypothermic CPB is associated with abnormal CBF–blood pressure autoregulation that is worsened with rewarming. We found a high rate of strokes in patients with evidence of impaired CBF autoregulation. Whether a pressure-passive CBF state during rewarming is associated with risk for ischemic brain injury requires further investigation.

左布比卡因对离体大鼠主动脉的直接影响与脂氧酶通道激活和内皮源性一氧化氮释放有关

The Direct Effect of Levobupivacaine in Isolated Rat Aorta Involves Lipoygenase Pathway Activation and Endothelial Nitric Oxide Release

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背景:左布比卡因是一种长效局部麻醉药,它临床特点与消旋布比卡因类似,但是它有较大的安全范围。在活体上,左布比卡因能产生剂量依赖性的血管收缩。本篇离体研究中,我们的目的是:研究花生四烯酸代谢通路在左布比卡因导致离体大鼠主动脉收缩中的作用及探讨哪种内皮源性血管舒张剂调节左布比卡因诱导血管收缩。

方法:分离大鼠胸主动脉环并悬吊,用于记录等长张力。在 10^{-6} 到 3×10^{-4} M 浓度范围内,在以下三组实验绘制累积左布比卡因剂量-反应曲线:1) 无药物预处理的主动脉环组;2) 内皮剥除的主动脉环组,预处理用二盐酸喹吖因(非特异性磷脂酶 A2 抑制剂: 2×10^{-5} 、 4×10^{-5} M)、去甲二氢愈创木酸(NDGA)(脂氧合酶抑制剂: 10^{-5} 、 3×10^{-5} M)、消炎痛(非特异环氧合酶抑制剂: 10^{-5} M)、AA-861(5-脂氧合酶抑制剂: 10^{-5} 、 5×10^{-5} M)、氟康唑(细胞色素 P450 环氧化酶抑制剂: 10^{-5} M)、维拉帕米(10^{-5} M)或无钙溶液;3) 内皮完整的主动脉环组,预处理用 N^o-硝基-L 精氨酸甲酯(L-NAME)(一氧化氮合成酶抑制剂: 5×10^{-5} M)、消炎痛、或氟康唑。在内皮剥除主动脉环组,评

估在每个浓度水平 (10^{-4} 、 3×10^{-4}) 左布比卡因诱导的收缩反应。在使用 NDGA 和 AA-861 或不使用情况下, 分别绘制出内皮剥除主动脉环中氯化钾的剂量-反应曲线。在单独使用左布比卡因或左旋布比卡因加 AA-861 干预的血管平滑肌细胞内, 通过使用 Fluo-4 荧光进行 Ca^{2+} 图像分析来监测细胞内 Ca^{2+} 水平。

结果: 左布比卡因使离体主动脉环产生紧张性收缩。在左布比卡因浓度为 10^{-4} M 时, 该反应最大, 在浓度为 3×10^{-4} M 时, 反应逐渐减弱。左布比卡因诱导内皮剥除主动脉环收缩强度比内皮完整主动脉环收缩强度大。内皮剥除主动脉环组: 二盐酸喹吖因、NDGA、AA-861、维拉帕米和无钙溶液都减弱了左布比卡因诱导的主动脉环收缩, 消炎痛则在较小程度上减弱其收缩。内皮完整主动脉环组: L-NAME 增强了左布比卡因诱导的主动脉环收缩, 消炎痛轻微减弱了其收缩。NDGA 和 AA-861 减弱了氯化钾导致的主动脉环收缩。AA-861 减弱了左布比卡因导致的血管平滑肌细胞内钙离子增加。

结论: 数据表明左布比卡因诱导大鼠主动脉平滑肌收缩主要由激活脂氧合酶途径调节及部分由激活环氧合酶途径调节。另外, 激活脂氧合酶途径似乎增加了钙离子通过 L 型钙通道的内流。内皮源性一氧化氮减弱了左布比卡因诱导的主动脉收缩。

(王海涛 译 马皓琳 李士通 校)

BACKGROUND: Levobupivacaine is a long-acting local anesthetic with a clinical profile similar to that of racemic bupivacaine but with a greater margin of safety. Levobupivacaine produces dose-dependent vasoconstriction *in vivo*. Our goal in this *in vitro* study was to investigate the role of pathways involved in arachidonic acid metabolism in the levobupivacaine-induced contraction of isolated rat aorta and to determine which endothelium-derived vasodilators are involved in the modulation of levobupivacaine-induced contraction.

METHODS: Rat thoracic aortic rings were isolated and suspended for isometric tension recording. Cumulative levobupivacaine dose-response curves over a range of 10^{-6} to 3×10^{-4} M were constructed in 1) aortic rings with no drug pretreatment; 2) endothelium-denuded rings pretreated with quinacrine dihydrochloride (nonspecific phospholipase A_2 inhibitor: 2×10^{-5} , 4×10^{-5} M), nordihydroguaiaretic acid (NDGA) (lipoxygenase inhibitor: 10^{-5} , 3×10^{-5} M), indomethacin (nonspecific cyclooxygenase inhibitor: 10^{-5} M), AA-861 (5-lipoxygenase inhibitor: 10^{-5} , 5×10^{-5} M), fluconazole (cytochrome P450 epoxygenase inhibitor: 10^{-5} M), verapamil (10^{-5} M), or calcium-free solution; and 3) endothelium-intact rings pretreated with N^{ω} -nitro-L-arginine methyl ester (L-NAME) (nitric oxide synthase inhibitor: 5×10^{-5} M), indomethacin, or fluconazole. Levobupivacaine-induced contractile response at each concentration (10^{-4} , 3×10^{-4} M) was assessed in endothelium-denuded rings. Dose-response curves for potassium chloride in endothelium-denuded rings were generated in the presence or absence of NDGA and AA-861. Intracellular Ca^{2+} levels were monitored by Ca^{2+} image analysis using Fluo-4 fluorescence in vascular smooth muscle cells treated with levobupivacaine alone or AA-861 plus levobupivacaine.

RESULTS: Levobupivacaine produced a tonic contraction in isolated rat aorta rings; this response was maximal at 10^{-4} M levobupivacaine and gradually attenuated at 3×10^{-4} M levobupivacaine. Levobupivacaine-induced contractions of endothelium-denuded rings were larger than those of endothelium-intact rings. Levobupivacaine-induced contraction of endothelium-denuded rings was attenuated by quinacrine dihydrochloride, NDGA, AA-861, verapamil, and calcium-free solution and, to a lesser extent, by indomethacin. L-NAME enhanced levobupivacaine-induced contraction of endothelium-intact rings and indomethacin slightly attenuated this contraction. NDGA and AA-861 attenuated the potassium chloride-

induced contraction. AA-861 attenuated the levobupivacaine-induced intracellular calcium increase in vascular smooth muscle cells.

CONCLUSIONS: Our data indicate that levobupivacaine-induced contraction of rat aortic smooth muscle is mediated mainly by activation of the lipoxigenase pathway and in part by activation of the cyclooxygenase pathway. In addition, activation of the lipoxigenase pathway seems to facilitate calcium influx via L-type calcium channels. Endothelial nitric oxide attenuates levobupivacaine-induced contraction.

围手术期儿童晶体液和胶体液的管理：我们已经做到的和如何做到的？

Perioperative Crystalloid and Colloid Fluid Management in Children: Where Are We and How Did We Get Here?

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Holliday 和 Segar 在他们里程碑式的文献中（*Pediatrics* 1957; 19:823-32）推荐了给予住院儿童肠外支持补液的速度和成分，这已经有 50 多年历史了。在围手术期对液体管理的实践操作也多以此文献为基础。但小儿手术病人对葡萄糖、电解质和血管内容量的需求也许和最初的人群已大相径庭，因此，使用由 Holliday 和 Segar 推荐的传统低渗液体可能导致高血糖、低钠血症等术后并发症。在术后使用等渗液还是低渗液还存在较大的争论。我们讨论儿童围手术期液体管理的起源，综述当前晶体液管理的选择，并呈现有关在小儿患者使用胶体液的信息。

(滕凌雅 译 马皓琳 李士通 校)

It has been more than 50 yr since the landmark article in which Holliday and Segar (*Pediatrics* 1957;19:823–32) proposed the rate and composition of parenteral maintenance fluids for hospitalized children. Much of our practice of fluid administration in the perioperative period is based on this article. The glucose, electrolyte, and intravascular volume requirements of the pediatric surgical patient may be quite different than the original population described, and consequently, use of traditional hypotonic fluids proposed by Holliday and Segar may cause complications, such as hyperglycemia and hyponatremia, in the postoperative surgical patient. There is significant controversy regarding the choice of isotonic versus hypotonic fluids in the postoperative period. We discuss the origins of perioperative fluid management in children, review the current options for crystalloid fluid management, and present information on colloid use in pediatric patients.

比较丙泊酚和右美托咪啶静脉镇静作用：在中枢和自主神经系统作用的一项随机、交叉研究

A Comparison of Propofol and Dexmedetomidine for Intravenous Sedation: A Randomized, Crossover Study of the Effects on the Central and Autonomic Nervous Systems

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我们比较了志愿者在心理应激期间丙泊酚(PROF)和右美托咪啉(DEX)对自主神经兴奋性和主观感觉的作用。在一项交叉设计中, 25 名受试者接受 PROF 和 DEX 滴定直到脑电双频指数达 75~80。记录心率、心率变异性、 α -唾液淀粉酶(客观指标)和面部焦虑量表(主观指标)。询问受试者两种镇静剂中的喜好。客观指标在两组中有类似的改变。面部焦虑指数仅在 PROF 组中减少, 且受试者更青睐 PROF。镇静剂量的丙泊酚对抑制焦虑情感比 DEX 更有效。

(唐李隽 译 马皓琳 李士通 校)

We compared, in volunteers, the effect of propofol (PROP) and dexmedetomidine (DEX) sedation on autonomic nervous activities and subjective feelings during psychological stresses. In a crossover design, 25 subjects received PROP and DEX titrated to a bispectral index value of 75 to 85. Heart rate, heart rate variability, and salivary α -amylase (objective indices) and a faces anxiety scale (subjective index) were assessed. Subjects were asked their preference between 2 sedatives. Objective indices showed similar changes in both groups. The faces anxiety scale decreased only in the PROP group and subjects preferred PROP. Propofol more effectively suppressed anxious feelings compared with DEX during sedation.

麻醉药性能以外的方面: 异氟醚对脑细胞死亡、神经发生和长时间的认知功能的影响

Beyond Anesthetic Properties: The Effects of Isoflurane on Brain Cell Death, Neurogenesis, and Long-Term Neurocognitive Function

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麻醉药物会引起新生大鼠的脑细胞死亡和长时间的认知功能障碍。最近, 人类数据也显示生命早期施行麻醉可能引起认知功能损害。脑细胞死亡和神经认知功能下降的联系尚不确切。可以想象的是, 除了脑细胞死亡以外, 有其它机制可促使新生儿麻醉导致神经认知损害。在一系列的研究中, 显示暴露于异氟醚会导致出生后 7 天的大鼠明显的高碳酸血症, 暴露于异氟醚和二氧化碳 4 小时会引起脑细胞死亡。然而, 暴露于异氟醚 1 小时并不足以引起脑细胞死亡。而且, 仅仅暴露于异氟醚 4 小时, 而不是暴露于异氟醚 1 小时或 2 小时或暴露于二氧化碳 4 小时, 会引起海马功能损害, 这一现象引起了关于麻醉诱导的脑细胞死亡与神经认知功能障碍之间联系的疑问。在发育期和成人齿状回的神经发生对海马功能尤其是学习和记忆能力是重要的。 γ -氨基丁酸可以调节发育期和成熟大脑的增生和神

神经元分化。吸入麻醉药是 γ -氨基丁酸能的，可能因此会影响神经发生，这可能是介导麻醉引起非成熟大鼠的神经认知功能下降的另一机制。明白这一机制，将有助于引导目的在于界定人类中这一问题领域的临床试验，并可能会得出预防性的和治疗性的策略。

(黄丽娜 译 马皓琳 李士通 校)

Anesthetic drugs cause brain cell death and long-term neurocognitive dysfunction in neonatal rats. Recently, human data also suggest that anesthesia early in life may cause cognitive impairment. The connection between cell death and neurocognitive decline is uncertain. It is conceivable that mechanisms other than brain cell death contribute to neurocognitive outcome of neonatal anesthesia. In a series of experiments, we demonstrate that isoflurane exposure causes significant hypercarbia in postnatal day 7 rats and that exposure to isoflurane or carbon dioxide for 4 h provoked brain cell death. However, 1 h of isoflurane exposure was not sufficient to cause brain cell death. Moreover, only 4 h of isoflurane exposure, but not 1 or 2 h of exposure or 4 h of carbon dioxide, led to impaired hippocampal function, questioning the association between anesthesia-induced brain cell death and neurocognitive dysfunction. Neurogenesis both in the developing and adult dentate gyrus is important for hippocampal function, specifically learning and memory. γ -Amino-butyric-acid regulates proliferation and neuronal differentiation both in the developing and the adult brain. Inhaled anesthetics are γ -amino-butyric-acid-ergic and may therefore affect neurogenesis, which could be an alternative mechanism mediating anesthesia-induced neurocognitive decline in immature rats. Understanding the mechanism will help guide clinical trials aiming to define the scope of the problem in humans and may lead to preventive and therapeutic strategies.

氨茶碱对志愿者意识丧失、BIS 值、异丙酚需要量以及地氟醚最低肺泡有效浓度的影响

The Effect of Aminophylline on Loss of Consciousness, Bispectral Index, Propofol Requirement, and Minimum Alveolar Concentration of Desflurane in Volunteers

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背景：腺苷是催眠类的神经递质，而在临床上作为支气管扩张剂的氨茶碱，能在中枢神经系统对抗腺苷此作用。因此，我们检验了此假说，即氨茶碱延迟了丙泊酚麻醉患者的意识丧失（LOC）同时加快了意识恢复（ROC），并且增加了地氟醚的最低有效肺泡浓度（MAC）值。

方法：在这个双盲交叉研究中，志愿者在不同日期里被随机分到氨茶碱组或盐水对照组中。在研究日，先予 6 mg/kg 氨茶碱静脉推注，然后以 1.5 mg · kg⁻¹ · h⁻¹ 速度泵入维持 24 小时。在泵入氨茶碱或盐水 1 小时后，以 20 mg/min 的速度给予丙泊酚 200mg。持续监测

BIS 值及达到 LOC 和 ROC 的时间。当志愿者从异丙酚麻醉中恢复后，以七氟醚全麻诱导，并以地氟醚维持麻醉。用 Dixon 的“上下”法来测定在反复的强直电刺激后每个志愿者的 MAC 值。

结果：八名志愿者均完成了两组研究。氨茶碱组达到 LOC 所需时间较盐水组延长（均值 ± 标准差）（ 7.7 ± 2.03 min 比 5.1 ± 0.75 min, $P = 0.011$ ）。氨茶碱组达到 LOC 的总异丙酚用量更大（ 2.2 ± 0.9 比 1.4 ± 0.4 mg/kg, $P = 0.01$ ），而达到 ROC 所需时间更短（ 6.18 ± 3.96 比 12.2 ± 4.73 min, $P = 0.035$ ）。最低 BIS 值氨茶碱组更大（ 51 ± 15 比 38 ± 9 , $P = 0.034$ ），而两组 MAC 值无明显差异。

结论：氨茶碱削弱了异丙酚的镇静作用，但对强直电刺激法检测的地氟醚 MAC 值无影响。

BACKGROUND: Adenosine is a soporific neuromodulator; aminophylline, which is clinically used as a bronchodilator, antagonizes the action of adenosine in the central nervous system. Thus, we tested the hypothesis that aminophylline delays loss of consciousness (LOC) and speeds recovery of consciousness (ROC) with propofol anesthesia, and that aminophylline increases the minimum alveolar concentration (MAC) of desflurane.

METHODS: In this double-blind crossover study, volunteers were randomized to either aminophylline or saline on different days. Aminophylline 6 mg/kg was given IV, followed by $1.5 \text{ mg} \cdot \text{kg}^{-1} \cdot \text{h}^{-1}$ throughout the study day. After 1 h of aminophylline or saline administration, propofol 200 mg was given at a rate of 20 mg/min. The bispectral index was continuously monitored, as were times to LOC and ROC. After recovery from propofol, general anesthesia was induced with sevoflurane and subsequently maintained with desflurane. The Dixon "up-and-down" method was used to determine MAC in each volunteer after repeated tetanic electrical stimulation.

RESULTS: Eight volunteers completed both study days. Time to LOC was prolonged by aminophylline compared with saline (mean ± sd) (7.7 ± 2.03 min vs 5.1 ± 0.75 s, respectively, $P = 0.011$). The total propofol dose at LOC was larger with aminophylline (2.2 ± 0.9 vs 1.4 ± 0.4 mg/kg, $P = 0.01$), and the time to ROC was shorter (6.18 ± 3.96 vs 12.2 ± 4.73 min, $P = 0.035$). The minimum bispectral index was greater with aminophylline (51 ± 15 vs 38 ± 9 , $P = 0.034$). There was no difference in MAC.

CONCLUSION: Aminophylline decreases the sedative effects of propofol but does not affect MAC of desflurane as determined by tetanic electrical stimulation.

脉动式染色光密度测定法和吲哚花青绿血浆消除用于 ASA I-II 级病人

Pulse Dye Densitometry and Indocyanine Green Plasma Disappearance in ASA Physical Status I-II Patients

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背景：吲哚花青绿血浆消除率（ICG-PDR）被用于评估肝功能。虽然 ICG-PDR $<18\%$ /min 通常被认为出现了肝功能衰竭，但 ICG 清除率并不太适合用于定义健康人群肝功能，区

分正常肝功能和肝功能衰竭的清晰的界限值还没有被描绘。我们因此在另一健康患者人群定义 ICG 清除率。另外，我们评估了无创性检测 ICG-PDR(经皮在手指和鼻部脉动式染色光密度测定法[PDD])，并与同时完成的有创性 ICG-PDR（在动脉血）测定进行比较。

方法：无肝脏疾病体征，并择期非肝脏手术患者静脉注射 10 mg ICG 后通过 PDD(DDG-2001, Nihon Kohden, 东京, 日本) 检测 ICG-PDR。一组病人收集动脉血，比较有创性 ICG 检测与 PDD。使用 Bland-Altman 分析比较两种测定方法。我们研究和报道的关于鉴别性使用 ICG-PDR 评估肝功能衰竭的研究的结果被用于构建受者作用特征曲线。

结果：41 名患者参加研究：33 名用于手指探头，8 名用于鼻部探头。在该人群中非侵入性 ICG-PDR 的均数±标准差是 $23.1\% \pm 7.9\%/min$ ($n = 41$)，范围在 9.7% 到 43.2%/min。相对于动脉血检测，用 PDD 检测的 ICG-PDR 与在动脉血中测得的值之间的偏倚 (± 2 sd，一致限) 在手指探头是 $1.6\%/min$ ($-5.2\% \sim 8.3\%/min$)，在鼻部探头是 $-6.0\%/min$ ($-15.5\% \sim 3.4\%/min$)。

结论：没有肝功能衰竭人群中的 ICG-PDR 值范围都低于 18%/min，这被引用为肝功能衰竭的临界值。这一临界值需要被重新考虑。另外，我们的结论是 ICG 浓度可通过 PDD 充分地无侵入性地检测。

(王宏翻译，马皓琳、李士通校)

BACKGROUND: Indocyanine green plasma disappearance rate (ICG-PDR) is used to evaluate hepatic function. Although hepatic failure is generally said to occur with an ICG-PDR $<18\%/min$, ICG disappearance rate is poorly defined in the healthy population, and a clear cutoff value of ICG-PDR that discriminates between normal hepatic function and hepatic failure has not yet been described. We therefore defined the ICG disappearance rate in an otherwise healthy patient population. In addition, we evaluated the noninvasive measurement of ICG-PDR

(transcutaneously by pulse dye densitometry [PDD] at the finger and the nose) and compared these with the simultaneously performed invasive measurements of ICG-PDR (in arterial blood).

METHODS: In patients without signs of liver disease, scheduled for elective nonhepatic surgery, 10 mg ICG was administered IV and ICG-PDR measured by PDD (DDG-2001, Nihon Kohden, Tokyo, Japan). In a subset of patients, arterial blood samples were gathered to compare PDD with invasive ICG measurements. Methods were compared using Bland-Altman analysis. The results of our study and reported studies on discriminative use of ICG-PDR in assessing liver failure were used to construct receiver operating characteristic curves.

RESULTS: Forty-one patients were studied: 33 using the finger probe and 8 using the nose probe. The mean \pm sd noninvasive ICG-PDR in this patient population is $23.1\% \pm 7.9\%/min$ ($n = 41$) with a range of 9.7% to 43.2%/min. Bias (± 2 sd, limits of agreement) for ICG-PDR measured by PDD compared with those measured in arterial blood were $1.6\%/min$ (-5.2% to $8.3\%/min$) for the finger probe and $-6.0\%/min$ (-15.5% to $3.4\%/min$) for the nose probe.

CONCLUSION: ICG-PDR values in a population without liver failure ranged well below 18%/min, cited as the cutoff value for hepatic failure. This cutoff value needs reconsideration. In addition, we conclude that the ICG concentration is adequately determined noninvasively by PDD.

无纤维支气管镜辅助下的 Univent 管置管

Placement of the Univent Tube Without Fiberoptic Bronchoscope Assistance

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背景：在此项研究中，我们通过与纤维支气管镜（FOB）引导下或者根据厂商推荐的盲插技术放置 Univent 管（Fuji 系统，日本，东京）比较，评估在听诊（AUS）或者发光探条（LS）辅助下放置 Univent 管的可行性和准确性。

方法：80 位 ASA I–II 级择期行胸科手术需单肺通气的成人患者，根据放置 Univent 管方法的不同随机分为 4 组：厂商推荐（MR）组（n=20）；FOB 组（n=20）；AUS 组（n=20）和 LS 组（n=20）。在麻醉诱导后，由同一位麻醉医生应用一种上述方法使用直接硬质喉镜进行 Univent 管插管并定位。然后由另外一位麻醉医生使用 FOB 检查导管位置。记录导管定位成功所需的尝试次数、阻塞套囊打气所需空气容量和插管时间以及单肺通气的时间和潜在支气管损伤并发症。

结果：AUS 组和 LS 组插管时间分别是 182 ± 42 秒和 176 ± 50 秒，比 FOB 组（ 278 ± 111 秒）和 MR 组（ 266 ± 127 秒）短（ $P < 0.05$ ）。在 AUS、LS 和 MR 组，第一次插管将支气管阻塞套囊插入左主支气管成功率分别是 100%、79% 和 25%。MR 组的阻塞套囊放置尝试次数和套囊打气的空气容量显著高于 AUS 和 LS 组（ $P < 0.05$ ）。平卧位时，MR 组的支气管阻塞套囊位置满意率为 14/20（70%），显著少于 FOB 组（18/20，90%）（ $P < 0.05$ ）。AUS 组和 LS 组的支气管阻塞套囊位置满意率分别为 19/20（95%）和 16/20（80%）。病人侧卧后，在 MR 组，支气管阻塞套囊位置满意率为 10/18（56%），显著少于 FOB 组（17/19，89.5%）（ $P < 0.05$ ）。在 AUS 和 LS 组，满意率分别为 15/20（75%）和 15/19（79%）。

结论：在 AUS 或 LS 辅助下放置 Univent 管是可行的，使用这两种技术时，耗时均比使用 FOB 或者厂商推荐的方法放置时间短。

(沙欢欢 译 马皓琳 李士通校)

BACKGROUND: In this study, we evaluated the feasibility and accuracy of Univent tube (Fuji Systems, Tokyo, Japan) placement with the aid of auscultation (AUS) or as guided by a lighted stylet (LS) compared with placement guided by the fiberoptic bronchoscope (FOB) or the blind intubation technique as recommended by the manufacturer's guidelines.

METHODS: Eighty ASA physical status I–II adult patients requiring single-lung ventilation for elective thoracic surgery were randomly allocated into 4 groups according to the method used for Univent tube positioning: manufacturer-recommended (MR) group ($n = 20$); FOB group ($n = 20$); AUS group ($n = 20$); and LS group ($n = 20$). Tracheal placement of the Univent tube was accomplished with direct rigid laryngoscopy after anesthetic induction and was positioned by the same anesthesiologist using 1 of the above-described methods. Its position was then checked by another anesthesiologist with an FOB. The number of attempts required for successful tube positioning, the volume of air needed for blocker cuff inflation, and intubation times were recorded, as were the times for single-lung ventilation and the potential for bronchial injury.

RESULTS: The intubation time was 182 ± 42 s in the AUS group and 176 ± 50 s in the LS group, shorter than that in the FOB (278 ± 111 s) and MR (266 ± 127 s) ($P < 0.05$) groups. The success rate of bronchial blocker insertion into the left bronchus on the first attempt was 100% in the AUS group, 79% in the LS group, and 25% in the MR group. The number of blocker insertion attempts and the volume of air in the blocker cuff in the MR group were significantly higher than those in the AUS and LS ($P < 0.05$) groups. In the supine position, the number of acceptable bronchial blocker placements was 14 of 20 attempts (70%) in the MR group, significantly fewer than that in the FOB group (18 of 20, 90%) ($P < 0.05$). In the AUS and LS groups, the number of acceptable bronchial blocker placements was 19 of 20 (95%) and 16 of 20 (80%), respectively. After patients were turned to the lateral decubitus position, the number of acceptable bronchial blocker placements was 10 of 18 (56%) in the MR group, significantly fewer than that in the FOB group (17 of 19, 89.5%) ($P < 0.05$). In the AUS and LS groups, the number of acceptable bronchial blocker placements was 15 of 20 (75%) and 15 of 19 (79%), respectively.

CONCLUSIONS: The placement of the Univent tube with the aid of AUS or an LS is feasible, and both techniques require less time than placement aided by an FOB or as recommended by the manufacturer.

灌注压对实验性胃管模型的胃组织血流量的影响

The Effect of Perfusion Pressure on Gastric Tissue Blood Flow in an Experimental Gastric Tube Model

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背景：吻合口瘘及狭窄的形成仍然是食管癌患者行食管切除术及胃管重建术后严重并发症。由于在胃管近端的吻合口灌注完全取决于微循环，使之容易出现灌注不足。我们推测，增加灌注压可以改善胃管吻合口处的血流量。

方法：9头猪行胃管重建术。通过激光散斑成像和温度记录成像分别测量胃管基部、中间部、近吻合口处以及顶部的血流量和温度。取平均动脉压（MAP）50-110毫米汞柱作为分段测量点。

结果：除了MAP，实验中血流动力学总体没有改变。在每一个相同水平MAP，胃管顶部血流量明显低于基部和中间部。升高MAP并未对胃管任何位置的血流量造成显著影响。温度分布与不同部位流量分布相似。升高MAP没有改变胃管任何位置的温度。

结论：胃管上部的血流量相比更近端的部位有所下降。胃组织血流量不随灌注压增加而上升。因此，不建议通过升高MAP到超常水平来增加吻合口组织血流量以及减少术后并发症。

(宋村笛 译 马皓琳 李士通校)

BACKGROUND: Anastomotic leakage and stricture formation remain an important surgical challenge after esophagectomy with gastric tube reconstruction for cancer of the esophagus. The perfusion of the anastomotic site at the proximal site of the gastric tube depends exclusively on

the microcirculation, making it susceptible to hypoperfusion. We hypothesized that increasing the perfusion pressure would improve blood flow at the anastomotic site of the gastric tube.

METHODS: A gastric tube was reconstructed in 9 pigs. Laser speckle imaging and thermographic imaging were used to measure blood flow and temperature, respectively, at the base, medial part, future anastomotic site, and top of the gastric tube. Measurements were repeated at every stepwise increase of mean arterial blood pressure (MAP) from 50 to 110 mm Hg.

RESULTS: Besides MAP, global hemodynamics did not change throughout the experiment. The blood flow in the top of the gastric tube was significantly lower than the flow in the base and medial part of the gastric tube at all levels of MAP. Increasing MAP did not have a significant effect on blood flow at any location in the gastric tube. Distribution of temperature was similar to distribution of flow for the different locations. Increases in MAP did not change temperature values at any location of the gastric tube.

CONCLUSION: Blood flow in the upper part of the gastric tube is decreased compared with more proximal sites. Gastric tissue blood flow does not increase with increased perfusion pressure. Therefore, it is not recommended to increase MAP to supranormal levels to increase anastomotic tissue blood flow and reduce postoperative complications.

产科麻醉的新热点：2009 Gerard W.Ostheimer 讲座

What's New in Obstetric Anesthesia: The 2009 Gerard W. Ostheimer Lecture

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本文总结了 2008 年以来与产科麻醉密切相关的出版物。在 70 多本被认为对产科麻醉实践最有影响的英文刊物中的数千篇文章中选出 42 篇。

(龚寅 译 马皓琳 李士通 校)

This article summarizes the most relevant publications in obstetric anesthesiology from 2008. Forty-two articles were selected from a pool of several thousand in >70 English-language journals that were deemed as having the most impact on the practice of obstetric anesthesia.

颈动脉内膜剥脱术后发生颈部血肿病人的气道管理

Airway Management in Patients Who Develop Neck Hematomas After Carotid Endarterectomy

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背景：颈动脉内膜剥脱术后病人由于颈部血肿或水肿而发生的进行性气道受压是令人担心的并发症。尽管如此，关于此人群中气道管理技术和病人转归之间的关系还没有得到系统性的研究。我们报道了对颈动脉内膜剥脱术后患者运用各项技术进行气道管理的成功率。

方法：我们回顾分析了明尼苏达州罗切斯特市梅奥诊所十年来在颈动脉内膜剥脱术后 72 小时内需要进行气道管理用于颈部探查的病人。

结果：在十年里我们的医疗机构中共有 3225 名患者进行了颈动脉内膜剥脱手术。44 名患者（1.4%）由于颈部血肿需要进行颈部探查术，其中有 42 名需要在颈部探查术前立即进行气道管理（另外 2 名病人在颈动脉内膜剥脱术后气道导管尚未拔除）。从 CEA 完成到重回手术室进行血肿清除的平均时间是 6.0 ± 6.0 小时（平均值 \pm 标准差；范围， $<1-32$ 小时）。在麻醉诱导前进行纤维支气管镜插管的 20 名患者中有 15 名（75%）成功，剩下的 5 名患者纤维支气管镜插管失败后改用直接喉镜法插管也成功了（3 名患者在麻醉诱导前完成了插管，2 名在诱导后完成了插管）。其余 22 名患者首先用直接喉镜作为气道管理方法，而未尝试用纤维支气管镜。在未进行麻醉诱导的情况下直接喉镜法插管的成功率是 5/7（71%），而进行全麻诱导后直接喉镜法插管的成功率是 13/15（87%）。血肿减压使 4 名直接喉镜下气管插管失败的患者中的 3 名直接喉镜下插管成功，剩下的 1 名患者则做了气管切开。用于血肿清除的喉镜插管过程中未遇到困难的患者中有 36% 发现有动脉出血点，而发生困难插管的患者概率为 6% ($P = 0.03$)。44 名患者中有 36 名 (82%) 在颈部探查术后 24 内就拔除了气管导管。没有气道管理相关并发症发生。血肿清除术后 2 周没有患者死亡。

结论：在全麻诱导前后我们可以采用多种方法成功地进行气道控制。既可以选用可视纤维支气管镜插管也可以选用直接喉镜。在声门暴露困难的情况下，通过外科切开使气道减压可方便插管。

(姜旭晖 译 马皓琳 李士通 校)

BACKGROUND: Progressive airway compromise from neck hematoma and edema is a feared complication of carotid endarterectomy (CEA). Despite this, the relationship of airway management technique to patient outcome has not been systematically studied in this population. We report the rate of successful airway management using various techniques in post-CEA patients.

METHODS: A 10-year retrospective analysis was conducted to identify patients requiring airway management for neck exploration within 72 hours after CEA at Mayo Clinic, Rochester, MN.

RESULTS: Three thousand two hundred twenty-five patients underwent CEA over a 10-year period at our institution. Forty-four (1.4%) required neck exploration for hematoma, and 42 of these required airway management immediately before neck exploration surgery. (The tracheal tube had not been removed after CEA in the remaining 2 patients.) The average interval between the completion of CEA and return to the operating room for hematoma evacuation was 6.0 ± 6.0 hours (mean \pm sd; range, $<1-32$ hours). Fiberoptic airway management, performed before the induction of anesthesia, was successful in 15 of 20 patients (75%) and, in patients in whom fiberoptic tracheal intubation failed, direct laryngoscopy (DL) was successful in all 5 (3 before and 2 after the induction of general anesthesia). In the remaining 22 patients, DL was used as the initial management technique without a trial of fiberoptic intubation. DL was successful in 5 of 7 patients (71%) when performed before induction of general anesthesia and was successful in 13 of 15 patients (87%) when performed after induction of general anesthesia. Hematoma decompression facilitated DL in 3 of 4 failures of DL; tracheostomy was performed in the remaining patient. An arterial site of bleeding was subsequently identified in 36% of patients in whom no difficulty was encountered during laryngoscopy for hematoma evacuation versus 6% in whom difficulty was noted ($P = 0.03$). In 36 of 44 patients (82%), the tracheal tube was removed

within 24 hours of surgery for neck exploration. No adverse events related to airway management were noted. There were no deaths at 2 weeks after hematoma evacuation.

CONCLUSIONS: Multiple techniques resulted in successful airway control both before and after the induction of general anesthesia. Tracheal intubation was accomplished with both fiberoptic visualization and DL. In instances of poor direct visualization of the glottis, decompression of the airway by opening of the surgical incision may facilitate intubation of the trachea.

激活大鼠 脊髓 α -2 肾上腺受体而非 μ -阿片受体，降低鞘内注射 N-甲基-D-天冬氨酸 (NMDA) 所致脊髓 NR1 亚单位磷酸化增加和感受伤害行为学改变

Activation of Spinal α -2 Adrenoceptors, but Not μ -Opioid Receptors, Reduces the Intrathecal N-Methyl-d-Aspartate-Induced Increase in Spinal NR1 Subunit Phosphorylation and Nociceptive Behaviors in the Rat

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背景：我们实验室先前的研究显示，神经病理模型大鼠鞘内(IT)注射 α -2 肾上腺受体激动剂可乐定产生的抗痛觉过敏作用与脊髓 NMDA 受体 NR1 亚单位磷酸化(pNR1)的明显降低有关。我们在本研究中验证鞘内注射可乐定或者 μ 阿片受体的激动剂[d-Ala², NMe-Phe⁴, Gly-ol⁵]-脑啡肽(DAMGO)是否能减轻注射 NMDA 所致的自发痛和 pNR1 表达增加。

方法：我们检验了注射可乐定(20 μ g/大鼠)和 DAMGO (1 μ g/大鼠)对鞘内注射 NMDA 所致的自发感受伤害行为学和脊髓背侧角 pNR1 表达的影响。同时，验证可乐定的作用是否通过 α -2A 或 α -2C 肾上腺素能受体介导。最后，对大鼠脊髓 pNR1、 α -2A 或 α -2C 肾上腺受体或 μ -阿片受体进行双重染色免疫组化处理。

结果：鞘内给予可乐定而不是 DAMGO，明显降低了 NMDA 所致 pNR1 表达和感受伤害性行为的增加。可乐定的止痛作用可以被 α -2A (BRL44408, 30 μ g/大鼠)或者 α -2C (JP-1302, 50 μ g/大鼠)肾上腺受体拮抗剂所阻断。此外，免疫细胞化学显示脊髓 pNR1 免疫反应细胞同时含有 α -2A 和 α -2C 肾上腺素受体。

结论：结果显示，激活脊髓背侧角 α -2 肾上腺受体而非 μ -阿片受体明显降低鞘内注射 NMDA 所致 pNR1 表达和感受伤害性行为的增加。此外，这些发现显示脊髓 NR1 磷酸化的调节与鞘内注射可乐定对突触后神经元活性的作用相关。

(江继宏 译 马皓琳 李士通 校)

BACKGROUND: A previous study from our laboratories showed that a significant reduction in spinal N-methyl-d-aspartate (NMDA) receptor NR1 subunit phosphorylation (pNR1) is associated with the antiallodynic effect produced by intrathecal (IT) injection of the α -2

adrenoceptor agonist, clonidine, in neuropathic rats. In this study, we determined whether the spontaneous pain and increased pNR1 expression induced by NMDA injection are reduced by IT injection of either clonidine or the μ -opioid receptor agonist, [d-Ala², NMe-Phe⁴, Gly-ol⁵]-enkephalin (DAMGO).

METHODS: We examined the effect of clonidine (20 μ g/rat) or DAMGO (1 μ g/rat) injection on IT NMDA-induced spontaneous nociceptive behavior and pNR1 expression in the spinal dorsal horn. We also determined whether the effect of clonidine is mediated by α -2A or α -2C adrenoceptors. Finally, rat spinal cords were immunohistochemically processed for double staining of pNR1 and α -2A or α -2C adrenoceptors or μ -opioid receptors.

RESULTS: The NMDA-induced increase in both pNR1 expression and nociceptive behavior was significantly reduced by IT clonidine but not DAMGO. This analgesic effect of clonidine was blocked by administration of either an α -2A (BRL44408, 30 μ g/rat) or an α -2C (JP-1302, 50 μ g/rat) adrenoceptor antagonist. In addition, immunocytochemistry revealed that spinal pNR1 immunoreactive cells co-contain α -2A and α -2C adrenoceptors.

CONCLUSIONS: These results demonstrate that the IT NMDA-induced increase in pNR1 expression and nociceptive behavior is significantly reduced by activation of α -2 adrenoceptors, but not μ -opioid receptors, in the spinal cord dorsal horn. Furthermore, these findings suggest that the modulation of spinal NR1 phosphorylation is linked to the effect of IT clonidine on postsynaptic neuronal activity.

心肺动脉分流手术对小鼠全身白细胞介素-6 释放，脑核因子- κ B 表达和神经认知功能的影响

The Impact of Cardiopulmonary Bypass on Systemic Interleukin-6 Release, Cerebral Nuclear Factor-kappa B Expression, and Neurocognitive Outcome in Rats

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背景：行心肺动脉分流手术（CPB）的心脏手术后出现神经认知功能障碍一直以来都影响着患者的生存质量，炎症反应可能是造成这一后果的原因之一。我们设计这个实验就是为了研究小鼠在心肺动脉分流手术后围手术期全身白细胞介素-6（IL-6）的浓度，脑核因子- κ B（NF- κ B）的表达以及神经认知功能的状况。氧合器大小对这些结果的影响也一并被监测研究。

方法：小鼠被随机分为四组：控制对照组（7例，未行麻醉）；伪手术组（10例，行麻醉，插套管，但未行心肺动脉分流手术）；两组手术组，一组（10例）行麻醉，插套管，并用一台小容量的小鼠氧合器进行90分钟的心肺动脉分流手术；另一组（10例）行麻醉，插套管，并用一台新生儿氧合器进行90分钟的心肺动脉分流手术。分别于心肺动脉分流手术前、终止时以及两小时后（或相同时间点）监测全身白细胞介素-6。用免疫组化法于术后21天测海马脑核因子- κ B的表达值。以术前模拟洞板实验测试结果作为神经认知功能的基础值，于术后21天复测。

结果：两组手术组的全身白细胞介素-6的水平均比伪手术组高；相较于小鼠氧合器组，新生儿氧合器组的全身白细胞介素-6水平在术后2小时大大增高（手术组/小鼠氧合器：220pg/mL[16-415]；手术组/新生儿氧合器：1400pg/mL[592-5812]）（ $P < 0.05$ ）。实验组海马脑核因子- κ B的值比控制对照组要高（10 \pm 4）。相较于伪手术组（173 \pm 24），实验组更多地表达为脑核因子- κ B阳性神经元。（手术组/新生儿氧合器 271 \pm 57，手术组/小鼠氧合器 269 \pm 72）。各个组的神经认知及行为功能均未改变，无法比较。

结论：实验表明，心肺动脉分流手术所引起的全身炎症反应以及海马脑核因子- κ B的表达与术后神经认知功能的损伤并不相关。这也就提示，除外心肺动脉分流手术以及炎症反应，可能是其他原因导致了心脏手术后神经认知功能的损伤。

（单嘉琪译 薛张纲校）

BACKGROUND: Neurocognitive deficits after cardiac surgery with cardiopulmonary bypass (CPB) continue to affect patients' quality of life, and an inflammatory reaction may be one of the contributors. We designed this experiment to study perioperative systemic interleukin-6 (IL-6) concentrations, cerebral expression of nuclear factor-kappa B (NF-[kappa]B), and neurocognitive outcome after CPB in young rats. The impact of oxygenator size on these outcomes was also assessed.

METHODS: Rats were randomly assigned to 1 of 4 groups: control ($n = 7$, nonanesthetized), sham-operated rats ($n = 10$, anesthetized, cannulated, and not connected to CPB), and 2 CPB groups, anesthetized, cannulated, and subjected to 90 min of CPB, using either a small-volume rat oxygenator (CPB/rat oxygenator, $n = 10$) or a neonate oxygenator (CPB/neonate oxygenator, $n = 10$). Systemic IL-6 was determined before, at the end of, and 2 h after CPB or at equivalent times. Hippocampal NF-[kappa]B expression was assessed on postoperative day 21 using immunohistochemistry. Neurocognitive performance was assessed with the modified hole-board test at baseline and for 21 postoperative days.

RESULTS: Both CPB groups had increased systemic IL-6 levels compared with sham, with the neonate oxygenator causing a substantially larger increase at 2 h after CPB compared with the rat oxygenator group (CPB/rat oxygenator: 220 pg/mL [16-415]; CPB/neonate oxygenator: 1400 pg/mL [592-5812]) ($P < 0.05$). Hippocampal NF-[kappa]B was increased in experimental groups compared with controls (10 \pm 4). CPB resulted in more NF-[kappa]B-positive neurons (271 \pm 57 CPB/neonate oxygenator and 269 \pm 72 CPB/rat oxygenator) compared with sham operation (173 \pm 24). Neurocognitive and behavioral performances were unaltered and comparable among all groups.

CONCLUSIONS: Pronounced systemic inflammatory responses to experimental CPB associated with increased hippocampal expression of NF-[kappa]B were not accompanied by neurocognitive impairment. This suggests that other factors beyond CPB and inflammatory responses might contribute to adverse neurocognitive outcomes after cardiac surgery.

脉压差与冠脉搭桥术后的长期生存状况

Pulse Pressure and Long-Term Survival After Coronary Artery Bypass Graft Surgery.

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背景：纵向研究数据显示脉压差增宽往往是罹患冠心病及死亡的重要预知因素，但目前仍不清楚其是否会降低冠心病患者冠脉搭桥术后的长期生存率。因此，此项研究旨在评价脉压差增宽患者在行冠状动脉搭桥术后的长期生存状况。

方法：选取 1993 年 1 月至 2004 年 7 月间行冠状动脉搭桥手术的患者为该项回顾性观察研究的研究对象，对其中 973 名患者行长期生存状况评估。将麻醉诱导前自动记录保存系统中前 3 次血压测量结果的中间值定为患者的基础动脉血压。运用 Cox 比例风险回归模型评估基础脉压差对患者术后生存状况的影响，同时将所测得的基础平均动脉压、收缩压、舒张压及是否合并糖尿病、Hannan 风险指数、抑肽酶使用情况、体外循环持续时间等作为协同变量一并引入进行分析。

结果：随访期间共有 220 例（22.9%）患者死亡（中位数：7.3 年[第一四分位数：5 年，第三四分位数：10 年]），其中 94 例为心脑血管原因。基础脉压差增宽是预测患者术后长期生存率下降的重要因素，具有显著的统计学差异（ $P < 0.001$ ）；此外，Hannan 风险指数（ $P < 0.001$ ）、体外循环持续时间（ $P < 0.001$ ）、是否合并糖尿病（ $P < 0.001$ ）等也是具有显著统计学意义的重要预知因子。基础动脉收缩压（ $P = 0.40$ ）、舒张压（ $P = 0.38$ ）及平均动脉压（ $P = 0.78$ ）与患者术后长期生存状况无关。脉压差的危险比（已对模型中的其它变量进行校正）为每升高 10mmHg 1.11（1.05-1.18）。

结论：冠状动脉搭桥术后患者长期生存状况不佳与围手术期脉压差增宽密切相关。回顾先前所报道的脉压差与住院患者致命或非致命血管并发症间的联系，应考虑将脉压差修订并纳入已制定的手术危险评估、患者咨询及治疗指南中。

（范羽译 薛张纲校）

Background: Data from longitudinal studies reveal that widened pulse pressure (PP) is a major predictor of coronary heart disease and mortality, but it is unknown whether PP similarly decreases survival after coronary artery bypass graft (CABG) surgery for coronary heart disease. We therefore assessed long-term survival in patients with increased PP at the time of presentation for CABG surgery.

Methods: In this retrospective observational study of patients undergoing CABG surgery between January 1993 and July 2004, 973 subjects were included for assessment of long-term survival. Baseline arterial blood pressure (BP) measurements were defined as the median of the first 3 measurements recorded by the automated record keeping system before induction of anesthesia. The effect of baseline PP on survival after surgery was evaluated using a Cox proportional hazards regression model and bootstrap resampling with baseline mean arterial BP, systolic BP, diastolic BP, diabetes, Hannan risk index, aprotinin use, and cardiopulmonary bypass time as covariates.

Results: There were 220 deaths (22.9%) during the follow-up period (median, 7.3 yr [Q1: 5, Q3: 10 yr]) including 94 deaths from cardiovascular causes. Increased baseline PP was a significant predictor of reduced long-term survival ($P < 0.001$) along with Hannan risk index ($P < 0.001$), duration of cardiopulmonary bypass ($P < 0.001$), and diabetes ($P < 0.001$). Baseline systolic ($P = 0.40$), diastolic ($P = 0.38$), and mean arterial BPs ($P = 0.78$) were not associated with long-term survival. The hazard ratio for PP (adjusted for other covariates in the model) was 1.11 (1.05-1.18) per 10-mm Hg increase.

Conclusions: An increase in perioperative PP is associated with poor long-term survival after CABG surgery. Together with our previous report linking PP to in-hospital fatal and nonfatal vascular complications, the established models for surgical risk assessment, patient counseling, and treatment should be revised to include PP.

多科协作共迎止血难题

Multidisciplinary approach to the challenge of hemostasis.

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由麻醉学，血液学，血库，重症监护和多个外科（包括创伤外科，心脏外科，儿外科，神经外科，妇科及血管科）的专家组成的多学科联合专家组于2008年1月召开了一次会议专门讨论了关于不同临床情况下的止血方法及出血病人的管理。会议着重关注于术中的相应评估和措施。止血有多种定义，临床上将之定义为控制活动性出血而不伴有病理性血栓栓塞事件(在促凝和抗凝，纤溶和抗纤溶之间达到平衡点)。止血目前仍存在很多问题，比如止血药物用于治疗时缺乏科学的证据和规范化的指南，需要一个可信而快速的实验室检查指标以及病人的个体差异性。临床上需要有意义的又快速准确的实验室检查结果来反映病人当前的出凝血功能从而指导临床治疗决策。当前使用中的常规出凝血功能实验室检查(如血小板计数，凝血酶原时间/国际标准化比值和活化部分凝血酶时间)并不能反应人体复杂的出凝血功能状态，从而有时会误导临床工作者。尽管凝血弹性描记法和弹性测定法等这些点状局部凝血功能监测方法可以提供全面地凝血功能状态，但是这些监测方法有耗时，难以解读，需要专门受过培训的人员操作等缺点。临床上迫切需要发展出一些实验室检查项目来反映抗凝抗血小板药物的作用效果，预测出血并发症，指导是否需要以及何时需要使用血制品或者药物治疗。予会专家们组成了一个治疗出血病人的组织，该组织将会进行多学科间合作沟通促进关于止血治疗现状的讨论以及止血的未来研究进展。止血法需要大量研究支持，包括有意义的临床终点指标合适的研究人群的临床对照试验，还有观察性研究，队列研究和大量样本量的数据库。由于保持出凝血功能的平衡非常复杂，仍需要进一步的研究和多学科间的合作以改进对病人的处理改善病人的预后。

(黄剑译 薛张纲校)

A multidisciplinary panel consisting of experts chosen by the 2 chairs of the group representing experts in anesthesiology, blood banking, hematology, critical care medicine, and various surgical disciplines (trauma, cardiac, pediatric, neurologic, obstetrics, and vascular) convened in January 2008 to discuss hemostasis and management of the bleeding patient across different clinical settings, with a focus on perioperative considerations. Although there are many ways to define hemostasis, one clinical definition would be control of bleeding without the occurrence of pathologic thrombotic events (i.e., when balance among procoagulant, anticoagulant, fibrinolytic, and antifibrinolytic activities is achieved). There are common hemostatic challenges that include lack of scientific evidence and standardized guidelines for the use of therapeutic drugs, need for reliable and rapid laboratory tools for measuring hemostasis, and individual variability. Clinically meaningful and accurate real-time laboratory data reflecting a patient's hemostatic status are needed to guide treatment decisions. Current available routine laboratory tests of hemostasis (e.g., platelet count, prothrombin time/international normalized ratio, and activated partial thromboplastin time) do not reflect the complexity of in vivo hemostasis and can mislead the clinician. Although point-of-care coagulation monitoring tests including measures of

thromboelastography/elastometry provide insight into overall hemostatic status, they are time-consuming to perform, complex to interpret, and require trained personnel. There is a particular need to develop laboratory tests that can measure the effects of anticoagulant and antiplatelet agents for individual patients, predict bleeding complications, and guide therapy when and if treatment with blood products or pharmacologic drugs is required. Formation of an organization comprised of specialists who treat bleeding patients will foster multidisciplinary collaborations and promote discussions of the current state of hemostasis treatment and future priorities for hemostasis research. Controlled trials with clinically meaningful end points and suitable study populations, as well as observational studies, investigator-initiated studies, and large registry and database studies are essential to answer questions in hemostasis. Because of the complexities of maintaining hemostatic balance, advances in hemostasis research and continuing communication across specialties are required to improve patient care and outcomes.

手术解剖学分级对于术后苏醒室内应用止吐药物的影响

The Effect of an Anatomically Classified Procedure on Antiemetic Administration in the Postanesthesia Care Unit.

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背景：关于不同手术类型对术后恶心呕吐（PONV）的影响一直存在着争议。我们希望通过这个回顾性的数据分析研究来分析不同手术类型（根据解剖学定义来划分和比较）在术后苏醒室观察的 2 小时内对应用止吐治疗情况的影响。

方法：我们所使用的肿瘤手术（样本量 $n=18,109$ ）回顾性分析的数据来自于我们的自动化麻醉信息系统数据库。我们将手术类型按解剖学定义分为七大类，并将体表肌肉骨骼及浅表手术作为对照组。我们也就另九大恶心呕吐危险因素对每位患者进行了分析，这九大危险因素为：性别，吸烟状况，恶心呕吐史或运动障碍，麻醉时间，预防性止吐药物的应用，术中阿片类药物、非甾体类抗炎药物、硬膜外的应用，以及术后阿片类药物的应用。在调整平衡其他危险因素的同时，就不同手术类型在术后苏醒室观察的 2 小时内对应用止吐治疗情况的影响应用多项变异逻辑性回归的方法进行评估分析。

结果：相较于体表肌肉骨骼及浅表手术，接受神经外科手术（ $P<0.0001$ ），头颈部手术（ $P<0.0001$ ），和腹部手术（ $P<0.0001$ ）的患者在苏醒室明显需要应用更多的止吐药物，而接受胸外科手术（ $P=0.02$ ）的患者在苏醒室所需接受的止吐药物则明显较少。乳房或腋窝手术（ $P=0.74$ ）以及内镜手术（ $P=0.28$ ）使用止吐药物的情况与对照组并无明显差异。以下几大因素与术后苏醒室早期应用止吐药物明显相关：女性，不吸烟者，有恶心呕吐史或运动障碍史，麻醉时间，以及术中或术后应用过阿片类药物。

结论：通过使用我们的自动化麻醉信息系统数据库研究分析，我们发现，就人群而言，根据解剖学定义所划分的不同类型的手术与术后苏醒室早期应用止吐药物的频率增多有关。

(李莹译 薛张纲校)

BACKGROUND: The effect of the type of surgical procedure on postoperative nausea and vomiting (PONV) rate has been debated in the literature. Our goal in this retrospective database study was to investigate the effect the type of surgical procedure (categorized and compared anatomically) has on antiemetic therapy within 2 h of admission to the postanesthesia care unit (PACU).

METHODS: We retrospectively analyzed data for oncology surgeries (n = 18,109), from our automated anesthesia information system database. We classified the types of surgical procedures anatomically into seven categories, with the integumentary musculoskeletal and the superficial surgeries chosen as the referent group. Our analysis included nine other risk factors for each patient, such as gender, smoking status, history of PONV or motion sickness, duration of anesthesia, number of prophylactic antiemetics administered, intraoperative opioids, ketorolac, epidural use, and postoperative opioids. Multivariate logistic regression was used to assess the effect of the type of surgery on antiemetic administration within the first 2 h of PACU admission, while adjusting for the other risk factors.

RESULTS: Compared with integumentary musculoskeletal and superficial surgeries, patients undergoing neurological (P < 0.0001), head or neck (P < 0.0001), and abdominal (P < 0.0001) surgeries were administered PACU antiemetic significantly more often, whereas patients undergoing thoracic surgeries were administered PACU antiemetic significantly less often (P = 0.02). Breast or axilla (P = 0.74) and endoscopic (P = 0.28) procedures did not differ from the referent category. Female, nonsmoker, history of PONV or motion sickness, anesthesia duration, and intraoperative and postoperative opioid administration were significantly associated with antiemetic administration during early PACU admission.

CONCLUSIONS: Using our automated anesthesia information system database, we found that the type of surgery, when categorized anatomically, was associated with an increased frequency of early PACU antiemetic administration in our population.

吸入麻醉药在老年阿茨海默症小鼠中的效能

Inhaled Anesthetic Potency in Aged Alzheimer

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背景：随着人口老龄化，需要手术治疗的明显或初期阿茨海默症老年人数量在增加。全麻可能加重阿茨海默症的症状和病理改变，所以减少麻醉暴露可能很重要。我们需要知道阿茨海默症持续性的病理改变是否会改变麻醉药效能。

方法：在 12 至 14 月龄的三重转基因阿茨海默症(3xTgAD)小鼠为实验组和以野生型 C57BL6 小鼠为对照组的研究中，用 MAC 来观察以翻正反射消失为终点时异氟醚、氟

烷、和七氟醚的诱导效能和起效时间。三重转基因阿茨海默症小鼠的模型通过 APP_{Swe}, Tau, 和 PS1 人类转基因这三个与人类阿茨海默症家族型相关的基因而实现。

结果：三重转基因阿茨海默症小鼠对吸入麻醉药稍有抵抗（从 8% 至 30% 不等），但在起效时间方面三种吸入麻醉药在两组间没有差别。

结论：该结果显示阿茨海默症的基因易感性和病理改变使之对三种吸入麻醉药的催眠作用敏感性下降。起效时间没有改变。

(姚敏敏译 薛张纲校)

BACKGROUND: The number of elderly patients with frank or incipient Alzheimer's disease (AD) requiring surgery is growing as the population ages. General anesthesia may exacerbate symptoms of and the pathology underlying AD, so minimizing anesthetic exposure may be important. This requires knowledge of whether the continuing AD pathogenesis alters anesthetic potency.

METHODS: We determined the induction potency and emergence time for isoflurane, halothane, and sevoflurane using the minimum alveolar anesthetic concentration for loss of righting reflex as an end point in 12- to 14-mo-old triple transgenic Alzheimer (3xTgAD) mice and wild type C57BL6 controls. 3xTgAD mice model AD by harboring three distinct mutations: the APP_{Swe}, Tau, and PS1 human transgenes, each of which has been associated with familial forms of human AD.

RESULTS: The 3xTgAD mice exhibited mild resistance (from 8% to 30%) to volatile anesthetics but displayed indistinguishable emergence patterns from all three inhaled anesthetics.

CONCLUSIONS: These results show that the genetic vulnerabilities and neuropathology associated with AD produce a small but significant decrease in sensitivity to the hypnotic actions of three inhaled anesthetics. Emergence times were not altered.

麻醉药导致的神经元凋亡以及应对方法

The Young: Neuroapoptosis Induced by Anesthetics and What to Do About It

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在美国及全世界每年有数以百万计的胎儿、婴儿、和儿童暴露于麻醉药。在神经发育的关键阶段应用麻醉药物被认为是安全的，且没有长期不良结果。然而，近期的报道提供的很多证据显示在快速突触形成期，即大脑生长突增期，未成熟动物大脑暴露于麻醉药会引起广泛神经元退化凋亡，抑制神经发生，导致严重的长期神经认知功能损害。在这里，我们总结了现有麻醉药导致的大脑病理改变及相关的长期神经认知缺陷方面的证据，讨论如何保证麻醉药物有益作用同时制定保护大脑避免潜在损害的有用方法。

(姚敏敏译 薛张纲校)

Millions of human fetuses, infants, and children are exposed to anesthetic drugs every year in the United States and throughout the world. Anesthesia administered during critical stages of neurodevelopment has been considered safe and without adverse long-term consequences. However, recent reports provide mounting evidence that exposure of the immature animal brain to anesthetics during the period of rapid synaptogenesis, also known as the brain growth spurt

period, triggers widespread apoptotic neurodegeneration, inhibits neurogenesis, and causes significant long-term neurocognitive impairment. Herein, we summarize currently available evidence for anesthesia-induced pathological changes in the brain and associated long-term neurocognitive deficits and discuss promising strategies for protecting the developing brain from the potentially injurious effects of anesthetic drugs while allowing the beneficial actions of these drugs to be realized.

缺少 N-甲基-d-天冬氨酸受体亚单位 GluR1 的突变小鼠中异氟醚和一氧化氮固定性减小由基因敲除的激发效应引起

Reduced Immobilizing Properties of Isoflurane and Nitrous Oxide in Mutant Mice Lacking the N-Methyl-d-Aspartate Receptor GluR1 Subunit Are Caused by the Secondary Effects of Gene Knockout

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背景：直到最近，N-甲基-D-天冬氨酸（NMDA）受体被认为可能能够介导吸入麻醉药如异氟醚和一氧化氮所产生的固定性。然而，新的证据显示这种受体在取消此运动反应中并没有以前想象的重要。为了提供对于这一观点进一步的支持或者质疑的证据，我们研究了在敲除亚单位 GluR 1 造成 NMDA 受体功能障碍的转基因动物身上异氟醚和一氧化氮的固定性能。

方法：小鼠中吸入麻醉药的固定性能通过最低有效肺泡浓度（MAC）来定量，由经典的夹尾试验评估。

结果：和野生型对照组相比，NMDA 受体亚单位 GluR1 敲除的小鼠中异氟醚的 MAC 值更大，显示了其对异氟醚固定性的反作用。在以前的研究中显示敲除小鼠具有由遗传操纵引起的扩大的单胺类活性，而由此引起的 MAC 值增加可以在我们的实验中通过 5 羟色胺 2A 受体拮抗剂酮舍林或者多巴胺 D2 受体拮抗剂氟哌啶的预处理来废除，而这种剂量在野生型动物中不会影响 MAC 值。突变小鼠同时表现出对异氟醚对于一氧化氮 MAC 值减小效应的反作用，但是这种反作用可能同样通过酮舍林或氟哌啶被废除。因此，基因敲除小鼠中吸入麻醉药的固定作用减小可能继发于增加的单胺活性，而非直接由 NMDA 受体功能受损引起。

结论：我们的结果证实，NMDA 受体对于异氟醚和一氧化氮的固定作用并没有重大贡献。此外，他们表明这种改变的能力继发于基因操纵，从而影响全球基因敲除研究获得的结果。

(俞佳译 薛张纲校)

BACKGROUND: Until recently, the N-methyl-d-aspartate (NMDA) receptor was considered to possibly mediate the immobility produced by inhaled anesthetics such as isoflurane and nitrous oxide. However, new evidence suggests that the role of this receptor in abolition of the movement response may be less important than previously thought. To provide further evidence supporting or challenging this view, we examined the anesthetic potencies of isoflurane and

nitrous oxide in genetically modified animals with established NMDA receptor dysfunction caused by GluR 1 subunit knockout.

METHODS: The immobilizing properties of inhaled anesthetics in mice quantitated by the minimum alveolar anesthetic concentration (MAC) were evaluated using the classic tail clamp method.

RESULTS: Compared with wild-type controls, NMDA receptor GluR 1 subunit knockout mice displayed larger isoflurane MAC values indicating a resistance to the immobilizing action of isoflurane. Knockout mice were previously shown to have enhanced monoaminergic tone as a result of genetic manipulation, and this increase in MAC could be abolished in our experiments by pretreatment with the serotonin 5-hydroxytryptamine type 2A receptor antagonist ketanserin or with the dopamine D2 receptor antagonist droperidol at doses that did not affect MAC values in wild-type animals. Mutant mice also displayed resistance to the isoflurane MAC-sparing effect of nitrous oxide, but this resistance was similarly abolished by ketanserin and droperidol. Thus, resistance to the immobilizing action of inhaled anesthetics in knockout mice seems to be secondary to increased monoaminergic activation after knockout rather than a direct result of impaired NMDA receptor function.

CONCLUSIONS: Our results confirm recent findings indicating no critical contribution of NMDA receptors to the immobility induced by isoflurane and nitrous oxide. In addition, they demonstrate the ability of changes secondary to genetic manipulation to affect the results obtained in global knockout studies.

1987 至 2006 年北美的恶性高热病人的临床表现、治疗和并发症

Clinical Presentation, Treatment, and Complications of Malignant Hyperthermia in North America from 1987 to 2006

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背景：我们分析了北美恶性高热管理处接到的恶性高热病例的临床表现、治疗和并发症报告。

方法：我们的入选标准：1987年1月1日之2006年12月31日递交的AMRA（对麻醉的异常代谢或骨骼肌反应）报告；临床分级量表列为“很像”或“几乎肯定”的恶性高热；美国或加拿大居民；超过一种麻醉用药的。排除标准：病理学除外恶性高热；为了明确该并发症，病人使用丹曲林后疗效不确切或很小的被排除。应用 Wilcoxon 秩和和 Pearson 精确 χ^2 检验。一个根据 Hosmer-Lemeshow 标准逐步确诊的恶性高热多样化模型建立。

结果：一个以青年男性（74.8%）为主的样本。总共有 6.5% 的人有恶性高热家族史；152 名恶性高热患者中有 77 名报道了超过 2 例的不确切的既往全麻经历。10 例皮肤温度未升高。常见的恶性高热前兆体征为高碳酸血症、窦性心动过速或咬肌痉挛。63.5% 的病人体温异常（中位最大值为 39.1°C）较上述三个体征早出现。78.6% 的病人同时出现肌溶解和呼吸性酸中毒，只有 26.0% 的病人有代谢性酸中毒。丹曲林的总剂量的中位数是 5.9 mg/kg（q1/4 为 3.0 mg/kg，q3/4 为 10.0 mg/kg），22 名患者未接受丹曲林且痊愈了。53.9% 的病人接受了碳酸氢盐治疗。并发症不包括复发、心跳骤停或死亡，这些出现在

181 名恶性高热患者中的 63 名患者身上。21 名患者体温 $<41.6^{\circ}\text{C}$ （人类极限高温）出现了血液或神经系统并发症。最高体温每上升 2°C 并发症出现的可能性增加 2.9 倍，使用丹曲林治疗 30 分钟后为 1.6 倍。

结论：体温上升可能是恶性高热的早期体征。体温上升发生频率最高，1/3 发生代谢性酸中毒，全麻过程中精确的体温监测和早期的丹曲林治疗可降低 35% 的恶性高热发病率。（张玥琪译，薛张纲校）

BACKGROUND: We analyzed cases of malignant hyperthermia (MH) reported to the North American MH Registry for clinical characteristics, treatment, and complications.

METHODS: Our inclusion criteria were as follows: AMRA (adverse metabolic/musculoskeletal reaction to anesthesia) reports between January 1, 1987 and December 31, 2006; "very likely" or "almost certain" MH as ranked by the clinical grading scale; United States or Canadian location; and more than one anesthetic drug given. An exclusion criterion was pathology other than MH; for complication analysis, patients with unknown status or minor complications attributable to dantrolene were excluded. Wilcoxon rank sum and Pearson exact χ^2 tests were applied. A multivariable model of the risk of complications from MH was created through stepwise selection with fit judged by the Hosmer-Lemeshow statistic.

RESULTS: Young males (74.8%) dominated in 286 episodes. A total of 6.5% had an MH family history; 77 of 152 patients with MH reported ≥ 2 prior unremarkable general anesthetics. In 10 cases, skin liquid crystal temperature did not trend. Frequent initial MH signs were hypercarbia, sinus tachycardia, or masseter spasm. In 63.5%, temperature abnormality (median maximum, 39.1°C) was the first to third sign. Whereas 78.6% presented with both muscular abnormalities and respiratory acidosis, only 26.0% had metabolic acidosis. The median total dantrolene dose was 5.9 mg/kg (first quartile, 3.0 mg/kg; third quartile, 10.0 mg/kg), although 22 patients received no dantrolene and survived. A total of 53.9% received bicarbonate therapy. Complications not including recrudescence, cardiac arrest, or death occurred in 63 of 181 patients (34.8%) with MH. Twenty-one experienced hematologic and/or neurologic complications with a temperature $<41.6^{\circ}\text{C}$ (human critical thermal maximum). The likelihood of any complication increased 2.9 times per 2°C increase in maximum temperature and 1.6 times per 30-minute delay in dantrolene use.

CONCLUSION: Elevated temperature may be an early MH sign. Although increased temperature occurs frequently, metabolic acidosis occurs one-third as often. Accurate temperature monitoring during general anesthetics and early dantrolene administration may decrease the 35% MH morbidity rate.

羟乙基淀粉(HES 130/0.42 and HES 200/0.5)活化肾小管上皮细胞的效应

The effect of hydroxyethyl starches (HES 130/0.42 and HES 200/0.5) on activated renal tubular epithelial cells.

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背景：急性肾功能衰竭是败血症的一个常见并发症。羟乙基淀粉(HES)广泛应用于此类患者。然而，败血症时应用 HES 对患者肾功能的影响仍有争论。我们建立了肿瘤坏死因子

α (TNF- α) 引导的人类近端小管上皮细胞(HK-2) 的离体模型，来确定 HES 130/0.42 和 HES 200/0.5 对这些活化细胞的效果。

方法：在有 HES 130/0.42 或 200/0.5 的环境下应用 TNF- α 刺激 HK-2 细胞，同时设立空白对照。经过 4，10 和 18 小时的培养后，测定单核细胞趋化蛋白-1(MCP-1)，该蛋白是中性粒细胞和巨噬细胞的重要化学趋化因子。同时进行细胞活性和毒性测定。

结果：在 TNF- α 的刺激下 MCP-1 双倍表达。在持续 10 小时和 18 小时的刺激期间应用含 2% 和 4% HES 200/0.5 液体，MCP-1 的浓度可下降 26% 和 56% ($P < 0.05$)。TNF- α 的刺激导致细胞活性显著下降了 53%-63%，而应用 HES 130/0.42 联合培养，细胞活性仅下降 32%-40% ($P < 0.005$)，应用 HES 200/0.5 联合培养后细胞活性受 TNF- α 的影响更少 ($P < 0.001$)。TNF- α 引导的细胞凋亡率因 HES 200/0.5 的应用而减少($P < 0.05$)。

结论：这项离体研究显示两种羟乙基淀粉产品均可通过炎性刺激调节细胞损伤。HES 200/0.5 较 HES 130/0.42 的效果更显著，意味着不同类型的羟乙基淀粉之间可能存在不同的生物学效应。

(张钊译 薛张纲校)

BACKGROUND: Acute renal failure is a frequent complication of sepsis. Hydroxyethyl starch (HES) is widely used in the treatment of such patients. However, the effect of HES on renal function during sepsis remains controversial. We established an in vitro model of tumor necrosis factor-alpha (TNF-alpha)-stimulated human proximal tubular epithelial (HK-2) cells to assess the possible effects of HES 130/0.42 and HES 200/0.5 on these activated cells.

METHODS: HK-2 cells were stimulated with TNF-alpha in the presence or absence of HES 130/0.42 or 200/0.5. After 4, 10, and 18 h of incubation, monocyte chemoattractant protein-1 (MCP-1), a key chemoattractant for neutrophils and macrophages, was measured. In addition, viability and cytotoxicity assays were performed.

RESULTS: MCP-1 expression was doubled upon TNF-alpha exposure. In the presence of 2% and 4% HES 200/0.5 in 98% (96%) medium over a stimulation time period of 10 h and 18 h, the MCP-1 concentration was decreased between 26% and 56% ($P < 0.05$). TNF-alpha stimulation resulted in a significant decrease of viability by 53%-63%, whereas viability decreased by only 32%-40% in cocubation with HES 130/0.42 ($P < 0.005$) and remained even less affected by TNF-alpha in the presence of HES 200/0.5 ($P < 0.001$). The TNF-alpha-induced cell death rate was attenuated in the presence of HES 200/0.5 ($P < 0.05$).

CONCLUSIONS: This in vitro study shows that both HES products modulate cell injury upon inflammatory stimulation. The effect was more pronounced in the HES 200/0.5 group than for HES 130/0.42, suggesting a possible biological difference between the HES types.

一项使用空气或盐水阻力消失试验鉴定硬膜外间隙有效性的回顾性研究

A Retrospective Effectiveness Study of Loss of Resistance to Air or Saline for Identification of the Epidural Space

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背景：比价用空气和盐水阻力消失试验来鉴定硬膜外间隙的随机试验证明了盐水的优越性。我们假设在实际临床工作中麻醉医师使用他们更擅长的技术包括使用空气或盐水都将得到相似的镇痛结果。

方法：对 929 名产妇要求行椎管内分娩镇痛的记录进行回顾性分析，比较镇痛技术（硬膜外或硬膜外联合蛛网膜下腔，空气或盐水行阻力消失试验）、镇痛结果（开始的舒适度，不对称阻滞，追加病人自控硬膜外镇痛剂量的需求，导管的更换）及并发症（感觉异常，静脉内或鞘内置管，意外蛛网膜刺伤）。

结果：929 例分娩镇痛中，52.6%用空气进行阻力消失试验，47.4%使用盐水。在至少实施过 10 次椎管内阻滞的麻醉医生中有 82%至少 70%的次数只使用一种物质。空气组和盐水组的病人特征、镇痛技术和阻滞成功率无差异。对于使用一种物质的操作者，使用一种更擅长的技术意味着更少的穿刺次数(1.3 ± 0.7 比 1.6 ± 0.8 , $P = 0.001$)、更少的感觉异常 (8.7% 比 18.5%, $R = 0.42$, $P = 0.007$)、更少的意外蛛网膜刺伤(1.0% 比 4.4%, $R = 0.23$, $P = 0.03$)。

结论：在麻醉医生谨慎使用的前提下，用空气和盐水行阻力消失试验定位硬膜外间隙的阻滞成功率无明显差别。

(朱兰芳译，薛张纲校)

BACKGROUND: Randomized trials comparing air to saline for loss of resistance (LOR) for identification of the epidural space have suggested the superiority of saline. We hypothesized that, in actual clinical practice, anesthesiologists using their preferred technique would produce similar analgesic outcomes with either air or saline.

METHODS: The labor analgesia records for 929 parturients requesting neuraxial analgesia were reviewed with respect to technique (epidural or combined spinal-epidural; air or saline for LOR), analgesic outcomes (initial comfort, asymmetry of the block, need for physician top-up during patient-controlled epidural analgesia, and catheter replacement), and complications (paresthesia, IV or intrathecal catheter placement, and unintentional dural puncture).

RESULTS: Of 929 labor analgesics analyzed, 52.6% were performed with LOR to air and 47.4% to saline. Among anesthesiologists who performed at least 10 blocks, 82% used 1 medium at least 70% of the time. There were no differences between the air and saline groups in patient characteristics, analgesic technique, or block success. Among operators with a preference for 1 medium, use of the preferred technique was associated with fewer attempts (1.3 ± 0.7 vs 1.6 ± 0.8 , $P = 0.001$), fewer paresthesias (8.7% vs 18.5%, odds ratio = 0.42, $P = 0.007$), and fewer unintentional dural punctures (1.0% vs 4.4%, odds ratio = 0.23, $P = 0.03$).

CONCLUSIONS: When used at the anesthesiologist's discretion, there is no significant difference in block success between air and saline for localization of the epidural space by LOR.

全麻下行颈动脉内膜剥脱术患者在颈动脉钳夹后，吸入氧浓度和呼末二氧化碳对脑氧合的影响

The Influence of Inspired Oxygen Fraction and End-Tidal Carbon Dioxide on Post-Cross-Clamp Cerebral Oxygenation During Carotid Endarterectomy Under General Anesthesia
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背景：百分之十到十五的行颈动脉钳闭的患者出现了继发于大脑低灌注引起的神经功能损伤。上述的损伤可以通过增加吸入氧浓度(F_{iO_2})来逆转其损伤，在清醒患者行颈动脉钳夹术时增加 F_{iO_2} 可以通过改善大脑局部的氧合(rSO_2)。在颈动脉内膜剥脱术中，颈动脉钳夹期间出现脑血流异常的改善，而在颈动脉钳夹后正常；通过脑动电流描记法发现，这种异常与低碳酸血症有关。我们设计了这项研究，研究了对于全麻下行颈动脉内膜剥脱术患者在颈动脉钳夹期间 F_{iO_2} 和呼末二氧化碳($PetCO_2$)与 rSO_2 的关系。

方法：20 名患者入选这项研究。10 名行选择性分流。病人接受全身麻醉。使用 INVOS 5100B 监测仪器(Somanetics Corporation, Troy, MI)测量 rSO_2 颈动脉钳夹后，根据以下要求连续调节 F_{iO_2} 和分钟通气量： F_{iO_2} 30%， $PetCO_2$ 30–35 mm Hg；2) F_{iO_2} 100%， $PetCO_2$ 30–35 mm Hg；和 3) F_{iO_2} 100%， $PetCO_2$ 40–45 mm Hg。在每个时间点分别记录手术和非手术处的 rSO_2 ，并行血气分析。

结果：分流及没有分流的患者的结果分开分析。增加 F_{iO_2} ：相比于 F_{iO_2} 30%，非分流组患者给予 100% 的氧气并维持 $PetCO_2$ 在 30–35 mm Hg 范围可以增加手术处 rSO_2 8% ($P = 0.008$)，非手术处增加 rSO_2 6% ($P = 0.011$)。在分流组患者，相比于 F_{iO_2} 30%，给予 100% 的氧气并维持 $PetCO_2$ 在 30–35 mm Hg 范围，在手术和非手术处均增加 rSO_2 4% (手术处 $P = 0.008$ ，非手术处 $P = 0.011$)。增加 $PetCO_2$ ： F_{iO_2} 维持在 100% 时，相比于 $PetCO_2$ 维持在 30–35 mm Hg，对于非分流患者， $PetCO_2$ 维持在 40–45 mm Hg，手术处 rSO_2 增加了 6% ($P = 0.008$)，非手术处增加了 5% ($P = 0.024$)。对于分流患者 F_{iO_2} 维持在 100%，相比于 $PetCO_2$ 维持在 30–35 mm Hg， $PetCO_2$ 维持在 40–45 mm Hg 时，手术处 rSO_2 增加了 3% ($P = 0.018$)，非手术处增加了 4% ($P = 0.007$)。

结论：对于全麻行颈动脉内膜剥脱术患者，颈动脉钳夹期间增加 F_{iO_2} 可以有效改善 rSO_2 。增加 $PetCO_2$ 可能也会改善患者的 rSO_2 。

(陈珺珺译 薛张纲校)

BACKGROUND: Ten to fifteen percent of awake patients develop neurological deficits secondary to cerebral hypoperfusion after carotid artery cross-clamping. The reversal of such deficits by increasing the inspired oxygen fraction (F_{iO_2}) has been demonstrated, and regional cerebral oxygenation (rSO_2) has been shown to improve during carotid cross-clamping in awake patients by increasing F_{iO_2} . Paradoxical improvements in cerebral blood flow during carotid endarterectomy (CEA) at the time of cross-clamping and normalization of post-cross-clamp electroencephalographic abnormalities have been induced by hypocapnia. We performed this study to determine the influence of F_{iO_2} and end-tidal carbon dioxide ($PetCO_2$) on rSO_2 in patients undergoing CEA with general anesthesia during carotid cross-clamping.

METHODS: Twenty patients were recruited. Ten underwent elective shunting. Patients received standardized general anesthesia. rSO_2 was measured using the INVOS 5100B monitor (Somanetics Corporation, Troy, MI). After carotid cross-clamping, F_{iO_2} and minute ventilation were sequentially adjusted: 1) F_{iO_2} 30%, $PetCO_2$ 30–35 mm Hg; 2) F_{iO_2} 100%, $PetCO_2$ 30–35 mm Hg; and 3) F_{iO_2} 100%, $PetCO_2$ 40–45 mm Hg. At each point, rSO_2 was recorded from both operative and nonoperative sides, and arterial blood gas analysis was performed.

RESULTS: Results from shunted and unshunted patients were analyzed separately. Increasing F_{iO_2} : Administration of 100% oxygen while maintaining $PetCO_2$ in the range 30–35 mm Hg in unshunted patients resulted in an 8% increase ($P = 0.008$) in rSO_2 on the operative side and a 6%

increase ($P = 0.011$) on the nonoperative side compared with an F_{iO_2} of 30%. In shunted patients, administration of 100% oxygen while maintaining the P_{etCO_2} in the range 30–35 mm Hg resulted in a 4% increase in rSO_2 on both the operative side ($P = 0.008$) and the nonoperative side ($P = 0.011$) compared with an F_{iO_2} of 30%. Increasing P_{etCO_2} : In unshunted patients, there was a 6% ($P = 0.008$) increase in rSO_2 on the operative side and a 5% increase ($P = 0.024$) on the nonoperative side at P_{etCO_2} 40–45 mm Hg compared with P_{etCO_2} 30–35 mm Hg maintaining F_{iO_2} at 100%. In shunted patients, there was a 3% increase ($P = 0.018$) in rSO_2 on the operative side and a 4% increase ($P = 0.007$) on the nonoperative side at P_{etCO_2} 40–45 mm Hg compared with P_{etCO_2} 30–35 mm Hg maintaining F_{iO_2} at 100%.

CONCLUSION: rSO_2 is reliably improved during carotid cross-clamping by increasing F_{iO_2} in patients undergoing CEA with general anesthesia. Additional improvement in rSO_2 may be gained by increasing P_{etCO_2} .

甘氨酸转运体-2 抑制剂 ALX1393 在大鼠急性疼痛模型中的抗伤害的作用

The Antinociceptive Effect of Intrathecal Administration of Glycine Transporter-2 Inhibitor ALX1393 in a Rat Acute Pain Model

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背景: 脊髓背侧角甘氨酸能神经元与脊髓水平抑制外周炎症及慢性疼痛有关。烟胺比林对碘氧基甲醚甘氨酸转运体-2 (GlyT2) 可以重摄取突触前释放的甘氨酸，并调节甘氨酸的神经传递。在这项研究中，我们研究选择性 GlyT2 抑制剂 ALX1393 是否可以在大鼠急性疼痛模型中诱导抗伤害性刺激的效应。

方法: 在雄性 Sprague-Dawley 大鼠的鞘内植入导管。分别在鞘内注射 ALX1393 (剂量分别为 4, 20, or 40 μ g)，通过轻弹尾巴、热平板、压迫爪子及福尔马林试验评估大鼠对于温度、机械刺激及化学性伤害性刺激的反应。此外，我们还进一步研究 ALX1393 是否对运动功能有影响，并进行了循环试验。

结果: 对于温度及机械刺激，ALX1393 表现出剂量依赖性抗伤害的作用。在注射 ALX1393 后 15 分钟表现出最大的效果，显著的作用时间持续 60 分钟。这种抗伤害性刺激的作用可以立刻被土的宁完全逆转。在福尔马林试验中，ALX1393 的抗疼痛作用表现为剂量依赖性，在早期及晚期均有效，并且早期的作用更显著。相比于抗伤害性作用，40 μ g 的 ALX1393 对于运动功能没有影响。

结论: 这项试验证明了 ALX1393 具有对抗急性疼痛引起的伤害性刺激作用。这些发现提示神经递质转运体抑制剂可以用来治疗急性疼痛，选择性 GlyT2 抑制剂是可以用来治疗急性疼痛的药物。

(陈珺珺译 薛张纲校)

BACKGROUND: Glycinergic neurons in the spinal dorsal horn have been implicated in the inhibition of spinal pain processing in peripheral inflammation and chronic pain states. Neuronal isoform glycine transporter-2 (GlyT2) reuptakes presynaptically released glycine and regulates

the glycinergic neurotransmission. In this study, we examined whether a selective GlyT2 inhibitor, ALX1393, elicits an antinociceptive effect in a rat acute pain model.

METHODS: Male Sprague-Dawley rats were implanted with a catheter intrathecally. The effects of intrathecal administration of ALX1393 (4, 20, or 40 μ g) on thermal, mechanical, and chemical nociception were evaluated by tail flick, hot plate, paw pressure, and formalin tests. Furthermore, to explore whether ALX1393 affects motor function, a rotarod test was performed.

RESULTS: ALX1393 exhibited antinociceptive effects on the thermal and mechanical stimulations in a dose-dependent manner. The maximal effect of ALX1393 was observed at 15 min after administration, and a significant effect lasted for about 60 min. These antinociceptive effects were reversed completely by strychnine injected immediately after the administration of ALX1393. In the formalin test, ALX1393 inhibited pain behaviors in a dose-dependent manner, both in the early and late phases, although the influence was greater in the late phase. In contrast to antinociceptive action, ALX1393 did not affect motor function up to 40 μ g.

CONCLUSIONS: This study demonstrates the antinociceptive action of ALX1393 on acute pain. These findings suggest that the inhibitory neurotransmitter transporters are promising targets for the treatment of acute pain and that the selective inhibitor of GlyT2 could be a novel therapeutic drug.

在超声引导下在腓窝经侧路行坐骨神经阻滞：比较分别行胫神经及腓总神经阻滞及坐骨神经分叉近端阻滞起效时间

Ultrasound-Guided Sciatic Nerve Block in the Popliteal Fossa Using a Lateral Approach: Onset Time Comparing Separate Tibial and Common Peroneal Nerve Injections Versus Injecting Proximal to the Bifurcation

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背景：我们假设，相比于阻滞坐骨神经分叉近端，通过超声引导下阻滞坐骨神经分叉远端可以缩短完全阻断胫神经和腓总神经的时间。

方法：76名行足部或脚踝手术的患者进行坐骨神经阻滞，阻滞的位点在坐骨神经分叉近端或远端。局麻药的最大量为28 mL 1.5%的甲派卡因加100 μ g 可乐定加1 mL 8.4%的碳酸氢钠，总共为30ml。通过超声引导下调整进针的位置。阻滞成功定义为两神经分布区域针刺感觉完全消失46分钟。

结果：胫神经-腓总神经阻滞组起效的时间显著快于坐骨神经组。(19.2 vs 26.1分钟， $P = 0.006$)。

结论：相比于坐骨神经分叉近端阻滞，在腓窝分叉后分别行胫神经和腓总神经阻滞的起效时间较快。

(陈珺珺译 薛张纲校)

BACKGROUND: We hypothesized that blocking the tibial and common peroneal nerves individually using ultrasound distal to sciatic bifurcation would decrease time to complete block compared with a block proximal to the bifurcation.

METHODS: Seventy-six patients undergoing foot or ankle surgery received a sciatic nerve block either proximal or distal to the point of bifurcation. A mixture of 28 mL 1.5% mepivacaine with 100 µg clonidine and 1 mL 8.4% sodium bicarbonate for a total of 30 mL was used. Ultrasound was used to guide needle adjustments to achieve circumferential spread. Block success was defined as a loss of sensation to pinprick in both nerve distributions within 46 minutes.

RESULTS: Patients in the tibial-peroneal group had significantly faster time to complete block than the sciatic group (19.2 vs 26.1 minutes; $P = 0.006$).

CONCLUSIONS: Blocking the tibial and common peroneal nerves in the popliteal fossa separately provides for a faster onset than a prebifurcation sciatic block.