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内皮多糖在啮齿类动物出血性休克模型中的血浆修复作用

Plasma Restoration of Endothelial Glycocalyx in a Rodent Model of Hemorrhagic Shock

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背景:在有出血性休克的创伤患者中使用以血浆为基础的复苏疗法可降低死亡率。尽管一些人提出通过凝血蛋白替换产生有益效果，但血浆给予保护效果的确切机制仍不清楚。我们先前证实在一个细胞培养模型中血浆与晶体液相比降低了内皮细胞的通透性。由蛋白聚糖和糖蛋白组成的内皮多糖包被粘附到多配体聚糖骨架上，它们共同保护下面的内皮层。我们假设出血性休克后血浆产生的内皮细胞保护作用是由于其对内皮多糖包被的修复作用和多配体聚糖-1的保护作用。

方法:大鼠遭受出血性休克后，达到平均动脉血压 30mmHg 并持续 90 分钟。随后接受乳酸林格氏液或新鲜血浆复苏，达到平均动脉血压 80mmHg，并与假手术组和单纯休克组作对比。2 小时后取出肺检测多配体聚糖 mRNA、用抗多配体聚糖-1 免疫染色，或者用苏木素和曙红染色。为了特异性检测血浆对内皮的作用，我们从小肠系膜灌注钨标记的溶液来识别小静脉，并通过电子显微镜使多糖包被显影。所有资料用均数±标准误表示。用单因素方差分析和 Tukey 后续检验来分析结果。

结果:电子显微镜显示出血性休克后多糖包被降解，这被血浆而不是乳酸林格氏液所部分缓解。在接受血浆复苏的动物组肺部多配体聚糖-1 mRNA 的表达(2.76 ± 0.03)要高于单纯休克组(1.39 ± 0.22)和乳酸林格氏液组(0.82 ± 0.03)，并且和细胞表面多配体聚糖-1 免疫染色相关。组织学评分是(1.63 ± 0.26)显示休克也导致明显的肺部损伤，此作用可血浆复苏减轻(0.67 ± 0.17)，而不是乳酸林格氏液(2.0 ± 0.25)。

结论:血浆在出血性休克后的保护效果可能是部分由于其修复内皮多糖包被和保护多配体聚糖-1 的能力。

(刘朝辉译 马皓琳 李士通校)

BACKGROUND: The use of plasma-based resuscitation for trauma patients in hemorrhagic shock has been associated with a decrease in mortality. Although some have proposed a beneficial effect through replacement of coagulation proteins, the putative mechanisms of protection afforded by plasma are unknown. We have previously shown in a cell culture model that plasma decreases endothelial cell permeability in comparison with crystalloid. The endothelial glycocalyx consists of proteoglycans and glycoproteins attached to a syndecan backbone, which together protect the underlying endothelium. We hypothesize that endothelial cell protection by plasma is due, in part, to its restoration of the endothelial glycocalyx and preservation of syndecan-1 after hemorrhagic shock.

METHODS: Rats were subjected to hemorrhagic shock to a mean arterial blood pressure of 30 mm Hg for 90 minutes followed by resuscitation with either lactated Ringer's (LR) solution or fresh plasma to a mean arterial blood pressure of 80 mm Hg and compared with shams or shock alone. After 2 hours, lungs were harvested for syndecan mRNA, immunostained with antisyndecan-1, or stained with hematoxylin and eosin. To specifically examine the effect of plasma on the endothelium, we infused small bowel mesentery with a lanthanum-based solution, identified venules, and visualized the glycocalyx by electron microscopy. All data are presented as mean \pm SEM. Results were analyzed by 1-way analysis of variance with Tukey post hoc tests.

RESULTS: Electron microscopy revealed degradation of the glycocalyx after hemorrhagic shock, which was partially restored by plasma but not LR. Pulmonary syndecan-1 mRNA expression was higher in animals resuscitated with plasma (2.76 ± 0.03) in comparison with shock alone (1.39 ± 0.22) or LR (0.82 ± 0.03) and correlated with cell surface syndecan-1 immunostaining. Shock also resulted in significant lung injury by histopathology scoring (1.63 ± 0.26), which was mitigated by resuscitation with plasma (0.67 ± 0.17) but not LR (2.0 ± 0.25).

CONCLUSION: The protective effects of plasma may be due in part to its ability to restore the endothelial glycocalyx and preserve syndecan-1 after hemorrhagic shock.

异氟烷选择性抑制漂亮新小杆线虫中远端线粒体复合物 I

Isoflurane Selectively Inhibits Distal Mitochondrial Complex I in *Caenorhabditis Elegans*

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背景：线粒体电子传递链（ETC）中的复合物 I 是挥发性麻醉剂（Vas）的一个可能靶点。复合物 I 酶的活性能够被 VAs 抑制，而复合物 I 功能障碍则能够导致蠕虫和人对 Vas 的超敏反应。漂亮新小杆线虫（*C. elegans*）的突变分析提示 VAs 可以在复合物 I 底物泛醌结合部位特异性地干扰复合物 I 功能。我们假设异氟烷通过与泛醌竞争结合复合物 I 而抑制电子传递。

方法：采用野生型和突变型漂亮新小杆线虫来研究异氟烷对离体线粒体的作用。使用确定的方法测定 ETC 的酶活性并确定剂量-反应曲线。异氟烷处理线粒体后行线粒体蛋白的平面非变性凝胶电泳。

结果：复合物 I 是 ETC 中对异氟烷抑制作用最敏感的组成部分；而复合物 I 近端部位（黄素蛋白）则对异氟烷相对不敏感。异氟烷和醌并不竞争结合复合物 I 上的公用位点。在体外研究中，复合物 I 酶活性的绝对比例不能预测异氟烷对动物的制动作用。异氟烷对线粒体超复合物的稳定性无可测量的影响。通过复合物 I 减少泛醌表现为不受异氟烷影响的正性协同动力学作用。

结论：异氟烷在远离黄素蛋白亚复合物的一个位点直接抑制复合物 I。然而，我们推翻了先前的假设，即异氟烷和泛醌竞争结合复合物 I 上的同一个疏水性结合位点。此外，异氟烷对线虫的制动作用并非是由于减少了离体线粒体中测得的复合物 I 电子传递的绝对数量。

(江继宏 译 马皓琳 李士通 校)

BACKGROUND: Complex I of the electron transport chain (ETC) is a possible target of volatile anesthetics (VAs). Complex I enzymatic activities are inhibited by VAs, and dysfunction of complex I can lead to hypersensitivity to VAs in worms and in people. Mutant analysis in *Caenorhabditis (C.) elegans* suggests that VAs may specifically interfere with complex I function at the binding site for its substrate ubiquinone. We hypothesized that isoflurane inhibits electron transport by competing with ubiquinone for binding to complex I.

METHODS: Wildtype and mutant *C. elegans* were used to study the effects of isoflurane on isolated mitochondria. Enzymatic activities of the ETC were assayed and dose-response curves determined using established techniques. Two-dimensional native gels of mitochondrial proteins were performed after exposure of mitochondria to isoflurane.

RESULTS: Complex I is the most sensitive component of the ETC to isoflurane inhibition; however, the proximal portion of complex I (the flavoprotein) is relatively insensitive to isoflurane. Isoflurane and quinone do not compete for a common binding site on complex I. The absolute rate of complex I enzymatic activity in vitro does not predict immobilization of the animal by isoflurane. Isoflurane had no measurable effect on stability of mitochondrial supercomplexes. Reduction of ubiquinone by complex I displayed positive cooperative kinetics not disrupted by isoflurane.

CONCLUSIONS: Isoflurane directly inhibits complex I at a site distal to the flavoprotein subcomplex. However, we have excluded our original hypothesis that isoflurane and ubiquinone compete for a common hydrophobic binding site on complex I. In addition, immobilization of the nematode by isoflurane is not due to limiting absolute amounts of complex I electron transport as measured in isolated mitochondria.

肝移植手术前黄疸病人与近红外脑组织氧饱和度低相关的实验室指标

Laboratory Variables Associated with Low Near-Infrared Cerebral Oxygen Saturation in Icteric Patients Before Liver Transplantation Surgery

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背景：尽管局部脑组织的氧饱和度（ rSO_2 ）监测可以探测到脑部的氧合失调，然而其有效性在高胆红素血症病人中受到了限制。我们在行肝移植手术前的有终末期肝病的清醒患者中，采集了 rSO_2 和其他可能影响低 rSO_2 解释的实验室指标之间的关系。

方法：全麻诱导前，我们对 164 名肝硬化患者（Child 分级 A/B/C = 19/41/104）和 8 名暴发性肝功能衰竭的患者测定了 rSO_2 。将 West Haven 肝性脑病评级为 3 或 4 级的患者排除。使用相关分析和多变量回归分析以及接收者操作特征曲线分析来评价 rSO_2 与实验室检查指标之间的关系。

结果：单变量分析结果表明 rSO_2 （中位数 58.5%，范围 15%~82%）与血清总胆红素、血红蛋白（Hb）、肌酐、钠离子和镁离子的浓度以及凝血酶原时间相关（ P 均 < 0.001），但与血清中葡萄糖、白蛋白、钾及氨的浓度无关。多元逻辑回归分析结果表明仅有较高的总胆红素（范围为 0.4 至 66mg/dL，比值比[OR]=1.31,95%置信区间[CI]为 1.18 至 1.45）和低血红蛋白（范围为 5.4 至 15.7g/dL，比值比=0.21,95%置信区间为 0.11 至 0.43）与 rSO_2 <50% 独立相关。观察 rSO_2 <50% 的最佳界值点是总胆红素 >7.2 mg/dL（灵敏性 89%，特异性 90%）以及血红蛋白 <9.6 g/dL（灵敏性 70%，特异性 82%）。

结论：在等待肝移植手术的终末期肝病患者的患者中，高总胆红素和低血红蛋白浓度与 rSO_2 值低于 50% 独立相关。本研究的结果可鉴别那些低 rSO_2 可能是一种假象而非脑缺血的患者。

（刘伍 译 马皓琳 李士通 校）

BACKGROUND: Although regional cerebral oxygen saturation (rSO_2) measurements can detect disturbances in cerebral oxygenation, their usefulness is limited in patients with hyperbilirubinemia. We examined the relationship between rSO_2 and other laboratory variables that may affect interpretation of low rSO_2 in awake patients with end-stage liver disease before liver transplantation surgery.

METHODS: Before induction of general anesthesia, rSO_2 was measured in 164 patients with liver cirrhosis (Child class A/B/C = 19/41/104) and 8 with fulminant hepatic failure. Patients with West Haven hepatic encephalopathy of grade 3 or 4 were excluded. Relationships between rSO_2 and laboratory variables were evaluated by correlation and multivariate regression, and by receiver operating characteristic curve analysis.

RESULTS: Univariate analyses showed that rSO_2 (median 58.5%, range 15% to 82%) correlated with serum total bilirubin, hemoglobin (Hb), creatinine, sodium, and magnesium concentrations, and prothrombin time (P < 0.001 each), but not with serum concentrations of glucose, albumin, potassium, and ammonia. Multiple logistic regression analysis showed that only elevated total bilirubin (range 0.4 to 66 mg/dL; odds ratio [OR] = 1.31; 95% confidence interval [CI] = 1.18 to 1.45) and low Hb (range 5.3 to 15.7 g/dL; OR = 0.21; 95% CI = 0.11 to 0.43) were independently related to rSO_2 <50%. The

optimum cutoff points for observing an $rSO_2 < 50\%$ were total bilirubin > 7.2 mg/dL (sensitivity 89%, specificity 90%) and Hb < 9.6 g/dL (sensitivity 70%, specificity 82%).
CONCLUSIONS: High total bilirubin and low Hb concentrations were independently associated with rSO_2 values below 50% in end-stage liver disease patients awaiting liver transplantation. The results of this study identify patients in whom a low rSO_2 may be an artifact rather than cerebral ischemia.

活性炭可有效清除现代麻醉机中的吸入麻醉药

Activated Charcoal Effectively Removes Inhaled Anesthetics from Modern Anesthesia Machines

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背景：如果一名恶性高热易感病人要接受一个麻醉药，之前使用过挥发性麻醉药的麻醉机必须用大流量的新鲜气流冲洗过以后才能使用。根据以往的不一致的研究结果提出的建议是冲洗时间从 10-104 分钟不等。曾经有研究者提出了一种净化技术：在呼吸回路的吸气端放置一个活性炭的滤器。

方法：我们在一些污染的麻醉机的吸气和呼气端都放置了活性炭滤器，并测定使输出的异氟醚、七氟醚和地氟醚的浓度要小于 5 个兆北率 (ppm) 所需要的冲洗时间。接下来我们模拟了麻醉诱导后 90 分钟诊断为恶性高热的病例，并研究活性炭限制恶性高热病人吸入麻醉药进一步暴露的作用的大小。

结果：活性炭滤器可以在小于 2 分钟的时间内使污染的麻醉机输送的挥发性麻醉药的浓度降低到一个可接受的水平，并且可以在至少 60 分钟内维持浓度小于 5ppm。我们发现，当麻醉诱导后诊断为恶性高热时，现在使用的麻醉机加用活性炭滤器后，在吸入麻醉药浓度超过 5ppm 之前，至少还可以使用 67 分钟。

结论：使用过吸入麻醉药的麻醉机的冲洗时间一般需要 10-104 分钟，活性炭滤器提供了一种改变了这一时间的方法。

(安光惠译 马皓琳 李士通校)

INTRODUCTION: If a malignant hyperthermia-susceptible patient is to receive an anesthetic, an anesthesia machine that has been used previously to deliver volatile anesthetics should be flushed with a high fresh gas flow. Conflicting results from previous studies recommend flush times that vary from 10 to 104 minutes. In a previously proposed alternative decontamination technique, other investigators placed an activated charcoal filter in the inspired limb of the breathing circuit.

METHODS: We placed activated charcoal filters on both the inspired and expired limbs of several contaminated anesthesia machines and measured the time needed to flush the machine so that the delivered concentrations of isoflurane, sevoflurane, and desflurane would be < 5 parts per million (ppm). We next simulated the case for which malignant hyperthermia is diagnosed 90 minutes after induction of anesthesia and measured how well activated charcoal filters limit further exposure.

RESULTS: Activated charcoal filters decrease the concentration of volatile anesthetic delivered by a contaminated machine to an acceptable level in <2 minutes. The concentrations remained well below 5 ppm for at least 60 minutes. When malignant hyperthermia is diagnosed after induction of anesthesia, we found that with charcoal filters in place, the current anesthesia machine may be used for at least 67 minutes before the inspired concentration exceeds 5 ppm.

CONCLUSIONS: Activated charcoal filters provide an alternative approach to the 10 to 104 minutes of flushing that are normally required to prepare a machine that has been used previously to deliver a volatile anesthetic.

维持高危手术患者的组织灌注：一项随机临床试验的系统回顾

Maintaining Tissue Perfusion in High-Risk Surgical Patients: A Systematic Review of Randomized Clinical Trials

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背景：器官储备有限的手术患者被认为是高危病人，有更高的围术期死亡率。为此，他们需要更严密的围术期血流动力学控制方案，以避免组织低灌注。本研究中，我们系统回顾了通过运用血流动力学治疗方案来对高危手术患者维持充足组织灌注的随机对照临床试验。

方法：我们搜索了 MEDLINE、Embase、LILACS 和 Cochrane 数据库来确认通过对高危手术患者围术期组织灌注的血流动力学治疗方案以期降低死亡率和发病率的随机对照临床试验。发病的特征为术后出现至少一个脏器功能障碍。为了明确的结果，计算出混合优势比（POR）和 95% 可信区间（CI）。

结果：选出 32 项临床试验，包含 5056 例高危手术患者。总体的荟萃分析显示当用血流动力学治疗方案来维持组织灌注时，死亡率(POR: 0.67; 95% CI: 0.55–0.82; $P < 0.001$)和术后器官功能障碍发生率(POR: 0.62; 95% CI: 0.55–0.70; $P < 0.00,001$)显著降低。当对照组的死亡率>20%时，血流动力学治疗方案以使组织最佳化的应用进一步降低死亡率（POR: 0.32; 95% CI: 0.21–0.47; $P < 0.00,001$ ）。通过肺动脉导管监测心输出量及增加氧的运输和/或减少消耗也显著降低了死亡率(分别为 POR: 0.67; 95% CI: 0.54–0.84; $P < 0.001$ 和 POR: 0.71; 95% CI: 0.57–0.88; $P < 0.05$)。以增加混合或中心静脉氧饱和度为目标的治疗不能显著降低死亡率(POR: 0.68; 95% CI: 0.22–2.10; $P > 0.05$)。唯一一项用乳酸作为组织灌注标志的实验未能显示死亡率的统计学上显著下降(OR: 0.33; 95% CI: 0.07–1.65; $P > 0.05$)。

结论：对高危手术病人用血流动力学治疗方案来维持组织灌注可减少死亡率及术后器官衰竭。监测心输出量计算氧的运输和消耗有助于指导治疗。有必要进行另外的随机对照临床试验来分析监测混合或中心静脉血氧饱和度以及乳酸对高危手术病人的价值。

（瞿亦枫 译 马皓琳 李士通校）

BACKGROUND: Surgical patients with limited organic reserve are considered high-risk patients and have an increased perioperative mortality. For this reason, they need a more rigorous perioperative protocol of hemodynamic control to prevent tissue hypoperfusion. In this study, we systematically reviewed the randomized controlled clinical trials that used a hemodynamic protocol to maintain adequate tissue perfusion in the high-risk surgical patient.

METHODS: We searched MEDLINE, Embase, LILACS, and Cochrane databases to identify randomized controlled clinical studies of surgical patients studied using a perioperative hemodynamic protocol of tissue perfusion aiming to reduce mortality and morbidity; the latter characterized at least one dysfunctional organ in the postoperative period. Pooled odds ratio (POR) and 95% confidence interval (CI) were calculated for categorical outcomes.

RESULTS: Thirty-two clinical trials were selected, comprising 5056 high-risk surgical patients. Global meta-analysis showed a significant reduction in mortality rate (POR: 0.67; 95% CI: 0.55–0.82; $P < 0.001$) and in postoperative organ dysfunction incidence (POR: 0.62; 95% CI: 0.55–0.70; $P < 0.00,001$) when a hemodynamic protocol was used to maintain tissue perfusion. When the mortality rate was $>20\%$ in the control group, the use of a hemodynamic protocol to maintain tissue optimization resulted in a further reduction in mortality (POR: 0.32; 95% CI: 0.21–0.47; $P < 0.00,001$). Monitoring cardiac output with a pulmonary artery catheter and increasing oxygen transport and/or decreasing consumption also significantly reduced mortality (POR: 0.67; 95% CI: 0.54–0.84; $P < 0.001$ and POR: 0.71; 95% CI: 0.57–0.88; $P < 0.05$, respectively). Therapy directed at increasing mixed or central venous oxygen saturation did not significantly reduce mortality (POR: 0.68; 95% CI: 0.22–2.10; $P > 0.05$). The only study using lactate as a marker of tissue perfusion failed to demonstrate a statistically significant reduction in mortality (OR: 0.33; 95% CI: 0.07–1.65; $P > 0.05$).

CONCLUSIONS: In high-risk surgical patients, the use of a hemodynamic protocol to maintain tissue perfusion decreased mortality and postoperative organ failure. Monitoring cardiac output calculating oxygen transport and consumption helped to guide therapy. Additional randomized controlled clinical studies are necessary to analyze the value of monitoring mixed or central venous oxygen saturation and lactate in high-risk surgical patients.

一氧化氮吸入用于成人和儿童的急性呼吸窘迫综合征及急性肺损伤：一项用荟萃分析和试验序贯分析进行的系统综述

Inhaled Nitric Oxide for Acute Respiratory Distress Syndrome and Acute Lung Injury in Adults and Children: A Systematic Review with Meta-Analysis and Trial Sequential Analysis

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背景：急性缺氧性呼吸衰竭（定义为急性肺损伤和急性呼吸窘迫综合征）是一种在各年龄段病人中有较高发病率和死亡率的高危情况。吸入性一氧化氮（iNO）已被应用于改善氧合，但其作用仍具有争议性。因此我们用荟萃分析和试验序贯分析对临床随机对照试验（RCTs）做了一个系统综述。我们检索了 CENTRAL、Medline、Embase、国际科学网站（International Web of Science）、LILACS、中国生物医学文献数据库和 CINHAL（截止到 2010 年 1 月 31 日）。另外我们手工查阅了参考文献，联系了作者和专家，并寻找了正在进行临床试验的登记者。其中两位评论者独立地选择所有平行组的随机对照试验，对比了 iNO 组与安慰剂组或无干预组，并萃取了与研究方法、干预措施、数据结果、偏倚风险和不良事件相关的数据。所有试验中，均不考虑盲法和语言环境。用循证医学方法评估找回的试验。讨论解决意见不合处。我们的主要结果观察指标为所有原因导致的死亡率。我们进行了分组和敏感性分析来评估 iNO 在成人和儿童以及对各种临床和生理学指标的影响。我们通过分析试验方法的组成评估了偏倚风险，并通过试验序贯分析评估了随机误差的危险度。

结果：我们的研究涉及 14 项随机对照试验，共 1303 名参与者；其中有 10 项试验有较高偏倚风险。iNO 在改善总体死亡率上没有统计学显著性差异（40.2%对 38.6%）（相对危险度为 1.06,95%可信区间为 0.93 至 1.22； $I^2 = 0$ ），但在一些分组和敏感性分析中有阳性结果。有限的证据表明 iNO 对机械通气时间、脱离呼吸机时间、ICU 停留时间以及住院天数并无统计学显著性作用。我们发现首个 24 小时中 iNO 对氧合有统计学显著但暂时性改善的作用，表现在 PO_2 和吸入氧分数的比例(平均差[MD] 为 15.91，95%可信区间为 8.25 至 23.56； $I^2 = 25\%$)。然而，iNO 可能会增加成人肾功能损害的风险（相对危险度为 1.59,95%可信区间为 1.17 至 2.16； $I^2 = 0$ ），但并不增加出血、高铁血红蛋白或二氧化氮形成的风险。

结论：iNO 在急性缺氧性呼吸衰竭病人中不能推荐使用。iNO 可以暂时改善氧合，但不能降低死亡率并可能有其他危害。

（张怡 译 马皓琳 李士通校）

BACKGROUND: Acute hypoxemic respiratory failure, defined as acute lung injury and acute respiratory distress syndrome, are critical conditions associated with frequent mortality and morbidity in all ages. Inhaled nitric oxide (iNO) has been used to improve oxygenation, but its role remains controversial. We performed a systematic review with meta-analysis and trial sequential analysis of randomized clinical trials (RCTs). We searched CENTRAL, Medline, Embase, International Web of Science, LILACS, the Chinese Biomedical Literature Database, and CINHAL (up to January 31, 2010). Additionally, we hand-searched reference lists, contacted authors and experts, and searched registers of ongoing trials. Two reviewers independently selected all parallel group RCTs comparing iNO with placebo or no intervention and extracted data related to study methods, interventions, outcomes, bias risk, and adverse events. All trials, irrespective of blinding or language status were included. Retrieved trials were evaluated with Cochrane methodology. Disagreements were resolved by discussion. Our primary

outcome measure was all-cause mortality. We performed subgroup and sensitivity analyses to assess the effect of iNO in adults and children and on various clinical and physiological outcomes. We assessed the risk of bias through assessment of trial methodological components. We assessed the risk of random error by applying trial sequential analysis.

RESULTS: We included 14 RCTs with a total of 1303 participants; 10 of these trials had a high risk of bias. iNO showed no statistically significant effect on overall mortality (40.2% versus 38.6%) (relative risks [RR] 1.06, 95% confidence interval [CI] 0.93 to 1.22; $I^2 = 0$) and in several subgroup and sensitivity analyses, indicating robust results. Limited data demonstrated a statistically insignificant effect of iNO on duration of ventilation, ventilator-free days, and length of stay in the intensive care unit and hospital. We found a statistically significant but transient improvement in oxygenation in the first 24 hours, expressed as the ratio of PO_2 to fraction of inspired oxygen (mean difference [MD] 15.91, 95% CI 8.25 to 23.56; $I^2 = 25\%$). However, iNO appears to increase the risk of renal impairment among adults (RR 1.59, 95% CI 1.17 to 2.16; $I^2 = 0$) but not the risk of bleeding or methemoglobin or nitrogen dioxide formation.

CONCLUSION: iNO cannot be recommended for patients with acute hypoxemic respiratory failure. iNO results in a transient improvement in oxygenation but does not reduce mortality and may be harmful.

某三级儿科医院 101,885 例实施麻醉后的患儿术后死亡率

Postoperative Mortality in Children After 101,885 Anesthetics at a Tertiary Pediatric Hospital

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背景：死亡率是衡量麻醉质量及安全性的一项基本指标。目前，儿科的临床麻醉相关死亡率数据很少。我们的研究旨在明确麻醉后 24 小时和 30 天死亡率，并明确大型三级医院儿科临床麻醉相关死亡的发生率及性质。

方法：研究选取澳大利亚墨尔本皇家儿童医院在 2003 年 1 月 1 日到 2008 年 8 月 30 日之间接受麻醉的 ≤18 岁儿童。数据通过综合分析数据库中所有在皇家儿童医院实施麻醉并精确电子记录的患儿的死亡率而得。确定麻醉后 30 天内及 24 小时内死亡的病例，检查其病史及麻醉记录。麻醉相关性死亡的定义是指经包含 3 名高年资麻醉医师的专家小组一致认定麻醉或麻醉医生控制的因素可能影响了死亡时间的那些病例。

结果：在为期 68 个月的时间内，共对 56,263 名患儿实施了 101,885 次麻醉。麻醉后任何原因导致的总计 24 小时死亡率为 13.4/10,000，30 天死亡率为 34.5/10,000。出生 30 天内的患儿死亡发生率最高。实施心脏手术的患儿 24 小时及 30 天的死亡率都高于实施非心脏手术的患儿。在 101,885 次麻醉中有 10 例为麻醉相关性死

亡。麻醉相关性死亡的发生率为 1/101,888 或 0.98/10,000 (95%可信区间为 0.5-1.8)。在这 10 个病例中,基础疾病被认为是导致患儿死亡的重要因素。其中 5 例 (50%) 患儿合并肺动脉高压。

结论: 麻醉相关死亡率在心脏病患儿中较高,尤其是合并肺动脉高压的患儿。无重大合并症患儿没有麻醉相关性死亡,这支持了健康儿童中小儿麻醉的安全性。(陈彬彬译 马皓琳 李士通校)

BACKGROUND: Mortality is a basic measure for quality and safety in anesthesia. There are few anesthesia-related mortality data available for pediatric practice. Our objective for this study was to determine the incidence of 24-hour and 30-day mortality after anesthesia and to determine the incidence and nature of anesthesia-related mortality in pediatric practice at a large tertiary institution.

METHODS: Children ≤ 18 years old who had an anesthetic between January 1, 2003, and August 30, 2008, at the Royal Children's Hospital, Melbourne, Australia, were included for this study. Data were analyzed by merging a database for every anesthetic performed with an accurate electronic record of mortality of children who had ever been a Royal Children's Hospital patient. Cases of children dying within 30 days and 24 hours of an anesthetic were identified and the patient history and anesthetic record examined. Anesthesia-related death was defined as those cases whereby a panel of 3 senior anesthesiologists all agreed that anesthesia or factors under the control of the anesthesiologist more likely than not influenced the timing of death.

RESULTS: During this 68-month period, 101,885 anesthetics were administered to 56,263 children. The overall 24-hour mortality from any cause after anesthesia was 13.4 per 10,000 anesthetics delivered and 30-day mortality was 34.5 per 10,000 anesthetics delivered. The incidence of death was highest in children ≤ 30 days old. Patients undergoing cardiac surgery had a higher incidence of 24-hour and 30-day mortality than did those undergoing noncardiac surgery. From 101,885 anesthetics there were 10 anesthesia-related deaths. The incidence of anesthesia-related death was 1 in 10,188 or 0.98 cases per 10,000 anesthetics performed (95% confidence interval, 0.5 to 1.8). In all 10 cases, preexisting medical conditions were identified as being a significant factor in the patient's death. Five of these cases (50%) involved children with pulmonary hypertension.

CONCLUSIONS: Anesthesia-related mortality is higher in children with heart disease and in particular those with pulmonary hypertension. The lack of anesthesia-related deaths in children who did not have major comorbidities reinforces the safety of pediatric anesthesia in healthy children.

周围神经的局部麻醉药阻滞用于神经痛治疗:系统分析

Local Anesthetic Blockade of Peripheral Nerves for Treatment of Neuralgias: Systematic Analysis

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背景：局部麻醉药用于神经阻滞已被用于神经痛的诊断与治疗。这些阻滞通常与皮质类固醇和其他有效药物联合应用。虽然神经阻滞对神经痛的长久效益被长期研究，但缺乏决定性的证据。在本系统性综述中我们有以下目的：分析有神经痛和神经根痛综合征的患者行局部麻醉药周围神经阻滞的实践背后的证据；评估传导阻滞作用消退后疼痛缓解的持续时间；并且评价对这些综合症的一系列阻滞治疗的效果。

方法：我们搜索了美国医学索引、荷兰医学文摘、叙述性综述和书籍篇章。只收集发表的英文文献。我们共搜索到 3347 篇文章，我们全文阅读了其中的 39 篇文章，在这其中 12 篇达到入选标准。

结果：我们分析了入选的 12 篇文章。每篇均为个案报告或病例系列分析，其中没有对照研究。9 篇报告对单一神经阻滞作出评价；所有文章均记录了超过传导阻滞持续期间的疼痛缓解。这 9 篇报告共有 69 名患者，其中 30 名疼痛完全缓解，10 名疼痛缓解 $\geq 50\%$ 。7 篇关于行单一神经阻滞后连续评估疼痛 ≥ 1 周的报告表明在 17 名患者中有 11 名得到完全或很大程度的疼痛缓解。所有 3 篇评价大样本量（共 270 名）阻滞系列的报告报道了全部的阳性结果。

结论：因为所有综述性文章均为个案报告或病例系列分析，所以对于神经痛用局部麻醉药行神经阻滞的效果不能得出可靠的结论。但是，被分析的报道的 2 个特点，即结果的巨大幅度和报道结果的高度一致性，表明未来更多的研究工作是合理的。

（毛祖旻 译 马皓琳 李士通 校）

BACKGROUND: Nerve blocks with local anesthetics have been used in the diagnosis and treatment of neuralgias. Usually these blocks were administered in combination with corticosteroids and other drugs that can be effective by themselves. Although lasting benefits from nerve blocks in neuralgias have long been described, definitive evidence is lacking. We had the following objectives in this systematic review: to analyze the evidence behind the practice of peripheral nerve blockade with local anesthetics in patients with neuralgias and radicular pain syndromes; to assess the duration of pain relief after conduction block resolution; and to evaluate the effectiveness of the treatment of these syndromes with a series of blocks.

METHODS: We searched Medline, Embase, narrative reviews, and book chapters. Only articles published in English were collected. The list of 3347 identified articles was reduced to 39 articles that were read entirely, 12 of which met inclusion criteria.

RESULTS: Twelve included articles were analyzed. Each can be classified as a single case report or case series; there were no controlled studies among them. Nine reports assessed a single block outcome; all recorded pain relief beyond the duration of conduction blockade. Those 9 reports represented a total of 69 patients, 30 of whom had complete pain relief and 10 had relief $\geq 50\%$. Seven reports with the assessment of continuous pain ≥ 1 week after a single block reported complete or profound pain relief in 11 of 17 patients. All 3 reports with the assessment of a series of blocks in a large number of patients (total of 270) reported overall positive results.

CONCLUSION: Because all reviewed articles were only single case reports or case series, no reliable conclusion could be drawn concerning the effectiveness of nerve blocks with local anesthetics in neuralgia. However, 2 features of the analyzed reports—

the large magnitude of the effect and the high consistency of the reported outcome— indicate that future research efforts are warranted.

腹横肌平面阻滞的新途径对于结直肠术后镇痛的有效性

The Efficacy of a Novel Approach to Transversus Abdominis Plane Block for Postoperative Analgesia After Colorectal Surgery

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背景：腹横肌平面(TAP)阻滞的镇痛效应是已在进行腹部手术患者确立。我们评估一种新的 TAP 阻滞途径对于结直肠手术术后镇痛的有效性。

方法：招募了 40 例 ASA 分级为 I 至 III 级进行结直肠手术的成年患者到这一双盲随机对照试验。使用了一个标准化的全麻技术。在手术结束时，用 22G 的钝针在脐水平和腋中线处，从腹壁内侧穿刺到腹横肌，进行 TAP 阻滞。这些患者随机分配接受 20mL 的 0.25%布比卡因 (TAP 组) 或生理盐水 (对照组) 注射腹壁的每一侧。每一患者在术后 0、0.5、1、2、4、8、12 和 24 小时的时候评估静息与咳嗽时的疼痛视觉模拟评分。用静脉注射吗啡来作为术后补救镇痛。记录第一次需要补救镇痛的时间、24 小时内总吗啡需求量、2、4、6、12 和 24 小时累积的吗啡消耗量以及副作用情况 (呼吸抑制、嗜睡、恶心/呕吐)。

结果：TAP 组 24 小时总吗啡消耗量比对照组减少 65% ($P < 0.0001$)。在所有时间点上，TAP 组的累积吗啡需求量明显较低。虽然第一次需要吗啡注射的时间两组相当，但是后续吗啡剂量所需的时间间隔 TAP 组明显长于对照组。在所有评估的时间点上，TAP 组患者静息和咳嗽时的疼痛评分都明显低于对照组。在术后 1、2、4 和 6 小时时，TAP 组中嗜睡的发生率较低 ($P < 0.05$)。

结论：这一新的 TAP 阻滞方法为结直肠手术提供了有效的术后镇痛。

(唐亮 译 马皓琳 李士通 校)

BACKGROUND: The analgesic efficacy of transversus abdominis plane (TAP) block has been established for patients undergoing abdominal surgery. We evaluated the efficacy of a novel approach to TAP block for postoperative analgesia after colorectal surgery.

METHODS: Forty adult ASA physical status I to III patients undergoing colorectal surgery were recruited to this double-blind randomized controlled trial. A standard general anesthetic technique was used. TAP block was performed at the end of surgery by piercing the transversus abdominis muscle from inside the abdominal wall at the midaxillary line at the level of the umbilicus with a 22-gauge blunt needle. The patients were randomly assigned to receive either 20 mL of 0.25% bupivacaine (TAP group) or normal saline (control group) on each side of the abdominal wall. Each patient was assessed at 0, 0.5, 1, 2, 4, 8, 12, and 24 hours postoperatively for pain at rest and on coughing using a visual analog scale. IV morphine was used for postoperative rescue analgesia. Time to first request for rescue analgesia, total morphine requirement in 24

hours, cumulative morphine consumption at 2, 4, 6, 12, and 24 hours, and adverse effects (respiratory depression, sedation, nausea/vomiting) were recorded.

RESULTS: A 65% decrease in 24-hour total morphine consumption was observed in the TAP group compared with the control group ($P < 0.0001$). The cumulative morphine requirement was also significantly lower in the TAP group at all time points. Although the time to first request for morphine was comparable, the subsequent doses of morphine were required at significantly longer time intervals in the TAP group than in the control group. TAP group patients had significantly lower pain scores at rest and on coughing as compared with the control group, at all time points assessed. The incidence of sedation was also less in the TAP group at 1, 2, 4, and 6 hours postoperatively ($P < 0.05$).

CONCLUSIONS: This new approach to the TAP block provides effective postoperative analgesia after colorectal surgery.

基于尿渗透压监测通宵禁食下的机体水化状态不改变低风险患者全身麻醉时低血压的发生

Hydration Status After Overnight Fasting as Measured by Urine Osmolality Does Not Alter the Magnitude of Hypotension During General Anesthesia in Low Risk Patients

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背景: 细胞间隙中晶体溶液分布增加可能会降低患者血管内容量扩充的有效性。作者研究通宵禁食患者的术前水化状态是否会影响组织间液再分布和全身麻醉中低血压的发生。

方法: 60例接受鼓室成形术 ASA I/II级患者,午夜开始禁食。麻醉诱导用芬太尼、异丙酚,麻醉维持用七氟醚和瑞芬太尼。麻醉诱导时,输注15mL/kg醋酸林格氏溶液60分钟,之后给予1mL/kg醋酸林格氏液30分钟。在麻醉诱导后以及实验过程中测定尿渗透压(pre- U_{osm} , post- U_{osm}),实验结束后测定全身细胞外液生物电阻抗与基础值相比下降的百分比(ΔRe)。根据患者pre- $U_{osm} < 25%$ 或pre- $U_{osm} > 75%$ 分别进入水化组及脱水组。对一系列变量,包括在相对于基线30-90分钟期间平均动脉压和 ΔRe 进行组间比较。

结果: 脱水组(pre- $U_{osm} > 759.5$ mOsm/kg, $n = 15$)相对水化组(pre- $U_{osm} < 378.5$ mOsm/kg, $n = 15$),年龄较小(44vs52岁, $P = 0.049$),并有较高的post- U_{osm} (181 vs 55 mOsm/kg, $P = 0.001$)。且相对于基线30-90分钟期间平均动脉压变化(0.67 vs 0.67, $P = 0.85$),95%的置信区间(-0.070到0.084)和 ΔRe (5.6% vs 6.0%, $P = 0.58$),95%的置信区间(-1.85%至1.06%)方面,脱水组与水化组相似。

结论: 利用尿渗透压监测术前因通宵禁食导致脱水并不改变全身麻醉期间低血压。这一结果表明,使用晶体液对术前通宵禁食患者进行血管内容量扩充,防止全身麻醉期间低血压的做法并无根据。

(陈毓雯 译 陈杰 校)

BACKGROUND: The increased distribution of crystalloid solution into the interstitial space may decrease the effectiveness of intravascular volume loading in patients. We investigated whether preoperative hydration status after overnight fasting affects interstitial fluid redistribution and thus the magnitude of hypotension during general anesthesia.

METHODS: Sixty ASA physical status I/II patients undergoing tympanoplasty fasted from midnight. Anesthesia was induced by fentanyl and propofol and maintained with sevoflurane and remifentanyl. Coinciding with the induction of anesthesia, 15 mL/kg acetated Ringer solution was infused IV over 60 minutes followed by 1 mL/kg acetated Ringer solution over the next 30 minutes. Urine osmolalities after induction of anesthesia and during the study period (pre- U_{osm} , post- U_{osm}) and percent decreases of whole-body bioelectrical resistance for extracellular fluid relative to baseline at the end of the study period (ΔR_e) were measured. Patients with a pre- U_{osm} < the 25th percentile or with a pre- U_{osm} > the 75th percentile of pre- U_{osm} were categorized in the hydrated or the dehydrated group, respectively. A range of variables, including mean arterial blood pressure during the 30- to 90-minute period relative to baseline, and ΔR_e , were compared between the groups.

RESULTS: The dehydrated group (pre- U_{osm} >759.5 mOsm/kg, $n = 15$) had a lower age (44 vs 52 years, $P = 0.049$) and had a higher post- U_{osm} (181 vs 55 mOsm/kg, $P = 0.001$) compared with the hydrated group (pre- U_{osm} <378.5 mOsm/kg, $n = 15$). Mean arterial blood pressure during the 30- to 90-minute period relative to baseline (0.67 vs 0.67, $P = 0.85$) with 95% confidence interval for the difference of means (-0.070 to 0.084) and ΔR_e (5.6% vs 6.0%, $P = 0.58$) with 95% confidence interval for the difference of means (-1.85% to 1.06%) were similar for the hydrated and dehydrated groups.

CONCLUSIONS: Preoperative dehydration after overnight fasting as measured by urine osmolality did not alter the magnitude of hypotension during general anesthesia. This finding suggests that intravascular volume loading with crystalloid solution to prevent hypotension during general anesthesia is an unfounded practice for low risk patients after overnight fasting.

阿替卡因的浓度依赖性神经毒性：大鼠坐骨神经电生理和体视学研究

Concentration-Dependent Neurotoxicity of Articaine: An Electrophysiological and Stereological Study of the Rat Sciatic Nerve

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背景：本研究采用大鼠坐骨神经内分别注射 50ul 的生理盐水、2%的阿替卡因和 4%的阿替卡因的方法，定量分析阿替卡因的神经毒性。

方法：研究中分别在给药前、给药后即刻以及给药后 3 星期记录刺激坐骨神经的诱发脊髓电图。试验药物均注射在右侧坐骨神经，而未作处理的左侧坐骨神经作为对照组。3 星期后将动物处死，取得坐骨神经横断标本进行体视学研究。

结果：与生理盐水组相比，注射阿替卡因组的大鼠在注射药物后即刻就出现诱发脊髓区域的神经电位逐渐衰减；且神经电位的衰减随阿替卡因浓度的增加而相应增加，在给药后 3 个星期更明显。对照组均无明显反应。相应处理不影响有髓鞘轴突的数量。从坐骨神经的横断面上看，注射 4%阿替卡因组大鼠的轴突平均区域和髓鞘的平均厚度明显减少。

结论：注射不同剂量的阿替卡因（2%和 4%），神经损伤有明显的区别，这说明阿替卡因的神经毒性是浓度依赖性的。而注射生理盐水时的机械性损伤对神经传导和组织学没有显著影响。

(张婷 译 陈杰 校)

BACKGROUND: We performed this study to quantify the detrimental effect of intraneural injection of 50 μ L of saline, articaine 2%, or articaine 4% in the rat sciatic nerve.

METHODS: Lumbar-evoked electrospinograms from stimulation of the sciatic nerve were recorded before and immediately after injection and again after 3 weeks. Test substance was injected into the right sciatic nerve, and the untreated left sciatic nerve served as control. The animals were killed after the 3-week follow-up, and cross-sections of the sciatic nerve were examined stereologically.

RESULTS: The evoked spinal cord field potential in the articaine groups faded away immediately after injection and was concentration-dependently, significantly more reduced at the 3-week follow-up in comparison with the saline group. The response from the control sides was unaffected in all groups. The number of myelinated axons was unaffected by the treatment. The mean cross-sectional axon area and the mean myelin sheath thickness were significantly reduced in animals injected with articaine 4%.

CONCLUSIONS: These observations indicate concentration-dependent neurotoxic injuries after injection of articaine with a significant difference between 2% and 4% formulations. The mechanical injury of needle penetration with saline injection had no significant effect on nerve conduction or histomorphology.

技术交流：关于经皮局部静脉血氧仪的可行性研究

Technical Communication: Transcutaneous Regional Venous Oximetry: A Feasibility Study

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背景：动脉脉搏血氧仪是 20 世纪 70 年代引入临床的一种方便、实用、目前普遍应用的麻醉监测设备。不幸的是，虽然动脉血氧饱和度是与心输出量和血红蛋白浓度

有关的三个氧供成分之一，它并不反映区域氧供是否是足够。而借助周围或区域静脉氧饱和度 ($SxvO_2$) 可进行区域氧供和氧需的分析。本研究目标是评估在 3 个解剖部位上使用 $SxvO_2$ 经皮评估的可行性。

方法：将 Nonin 血氧饱和度探头（由明尼苏达州，普利茅茨，Nonin Medical 公司提供）直接放置在 10 名志愿者前臂，颈外，颈内静脉上，测量红色和红外线电磁辐射的吸收度。对这些吸收波形进行快速傅里叶变换。将不同的频率下红光和红外线辐射的脉冲吸收比与非脉冲吸收比作比较，并且基于以往经验得出的相关性计算 $SxvO_2$ 。

结果：经皮 $SxvO_2$ 估计范围介于 41% 至 97%，其中在前臂、颈外和颈内静脉处测量的平均值分别为 75%、80%、80%。总体而言，93% 的 $SxvO_2$ 预测值 $<90\%$ 。

结论：这一技术的审定和随后的改进需要我们将其与静脉血气测量的结果相关联，其次是需要联合相关领域氧饱和度测量技术（胎儿反射式血氧仪和近红外光谱）和先进的信号处理技术。

(孙晓琼 译 陈杰 校)

BACKGROUND: The arterial pulse oximeter, which was introduced clinically in the 1970s, is a convenient, useful, and now ubiquitous anesthesia monitor. Unfortunately, although percent saturation of arterial hemoglobin is, along with cardiac output and concentration of hemoglobin, one of 3 components of oxygen delivery, it does not indicate whether oxygen delivery to a region of interest is adequate. Knowledge of peripheral or regional venous oxygen saturation ($SxvO_2$) may lend insight into analysis of regional oxygen supply and demand. Our goal was to assess the suitability of 3 anatomic sites for the transcutaneous assessment of $SxvO_2$.

METHODS: Using a Nonin reflectance oximetry probe (provided by Nonin Medical, Plymouth, MN) placed directly over the antecubital, external jugular, and internal jugular veins in 10 volunteers, we measured the absorbance of red and infrared electromagnetic radiation. We performed fast Fourier transformation on these absorbance waveforms. The ratio of pulsatile absorbance of red and infrared radiation at different frequencies was compared with nonpulsatile absorption, and $SxvO_2$ was calculated based on previously derived empiric correlations.

RESULTS: Estimates of transcutaneous $SxvO_2$ ranged from 41% to 97%, with mean values of 75%, 80%, and 80% at the antecubital, external jugular, and internal jugular veins, respectively. Overall, 93% of predicted $SxvO_2$ values were $<90\%$.

CONCLUSION: Validation and subsequent improvement of this technique requires correlation of our results with venous blood gas measurements, followed by incorporation of technologies from related fields in oximetry (fetal reflectance oximetry and near-infrared spectroscopy), as well as the development of advanced signal processing techniques.

通过沿中心静脉走行的体表标志估计右及左侧中心静脉导管置入深度的效果评估

An Estimation of Right- and Left-Sided Central Venous Catheter Insertion Depth Using Measurement of Surface Landmarks Along the Course of Central Veins

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背景：本项研究试图寻找是否存在一种根据中心静脉走行的局部解剖的方法，来估测中心静脉导管置入深度。

方法：通过左或右颈静脉（IJV）或锁骨下静脉（SCV）进行 200 例中心静脉穿刺置管。将胸锁乳突肌作为体表标志进行 IJV 置管，而采用锁骨下入路进行 SCV 插管。局部解剖学测量是随导管的自然弯曲从皮肤褶皱的置入针刺点开始，通过同侧的锁骨切迹，直达右侧第二肋软骨及胸骨柄关节。中心静脉置管的置入和固定深度通过局部解剖方法判定。中心静脉导管头端到气管隆突的距离以及左侧中心静脉头端到中线的成角均由术后胸片测定。

结果：50 例通过右颈静脉行中心静脉置管的头端位置的平均值（标准差）是气管隆突以上 0.1（1.1）cm，右侧锁骨下静脉、左侧颈静脉、以及左锁骨下静脉置管的导管头端位置距离气管隆突分别为 0.0（0.9）cm、以上 0.3（1.0）cm，以下 0.2（0.9）cm。中心静脉置管位置据此可预测 95% 的患者的误差区间为隆突下 2.2cm 及隆突上 2.3cm。左侧中心静脉置管中如果与中线角度过陡（ $\geq 40^\circ$ ）则头端在隆突上的可能（54 例中有 17 例）大于隆突下（46 例中有 2 例）。

结论：通过中心静脉走行的体表标志的方法可以估计中心静脉的置管深度。

(陆秉玮 译 陈杰 校)

BACKGROUND: In this study we sought to determine whether the topographical measurement along the course of the central veins can estimate the approximate insertion depths of central venous catheters (CVC).

METHODS: Two hundred central venous catheterizations were performed via the right and left internal jugular vein (IJV) or subclavian vein (SCV). The anterior approach, using the sternocleidomastoid muscle as a landmark, was used for IJV catheterization and the infraclavicular approach for SCV. Topographical measurement was performed by placing the catheter with its own curvature over the draped skin starting from the insertion point of the needle through the ipsilateral clavicular notch, and to the insertion point of the second right costal cartilage to the manubriosternal joint. The CVC was inserted and secured to a depth determined topographically. The distance between the CVC tip and the carina and the angle of the left-sided CVC tip to the vertical were measured on the postoperative chest radiograph.

RESULTS: The mean (SD) tip position of 50 CVCs placed via the right IJV was 0.1 (1.1) cm above the carina; right SCV, 0.0 (0.9) cm; left IJV, 0.3 (1.0) cm above the carina, and left SCV, 0.2 (0.9) cm below the carina. CVC locations could be predicted with a margin of error between 2.2 cm below the carina and 2.3 cm above the carina in 95% of patients. There were steeper ($\geq 40^\circ$) angles to the vertical in the left-sided CVCs whose tips were above the carina (17 out of 54) than below the carina (2 out of 46).

CONCLUSIONS: The approximate insertion depth of a CVC can be estimated using measurement of surface landmarks along the pathway of central veins.

一项关于血流动力学的预处理改善中高危患者的手术转归的系统回顾和荟萃分析

A Systematic Review and Meta-Analysis on the Use of Preemptive Hemodynamic Intervention to Improve Postoperative Outcomes in Moderate and High-Risk Surgical Patients

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背景：大手术的并发症往往令人生厌、较为常见、却可避免的。短期手术并发症带来的长期症状被公认为对幸存者的寿命和生活质量有重大影响。在过去的 30 年中，有大量研究在努力尝试通过预先人为地对围术期血流动力学进行干预来减少术中死亡率和发病率。早期研究因对照组死亡率较高而遭诟病并认为其在现行实践没有代表性，因此反对其应用于常规医疗。本回顾旨在更新此领域研究成果，通过调查现行实践和医疗质量改善的有效性，以了解先前此领域的定量分析结论是否仍然有效。

方法：通过多种方法选取关于评估血流动力学的预处理来改善手术转归的随机临床实验。在电子数据库（联机医学文献分析和检索系统，荷兰医学文摘数据库，循证医学对照临床试验登记）筛查潜在试验，检查选取研究的参考目录，另外还有来自专家和产业代表的额外资源。符合入选标准的研究必须通过完全核查并进行相对应的定量分析，亚组分析或灵敏度分析。

结果：共有 29 个研究入选，其中 23 个报道了手术并发症。29 个研究包括 4805 例患者，总死亡率为 7.6%。血流动力学的预处理减少了死亡率（比值比【95%可信区间】为 0.48 [0.33–0.78]; $P = 0.0002$ ）和手术并发症（优势比 0.43 [0.34–0.53]; $P < 0.0001$ ）。亚组分析显示相对单独应用补液，使用肺动脉导管、超常复苏目标、研究应用心脏指数或者氧供为目标，并且应用补液和升压药可显著降低死亡率。四次亚组分析中每组的并发症率都有明显的下降。

结论：血流动力学的预处理策略和伴随治疗可减少手术死亡率和并发症发生率。（杨秋娟 译 陈杰 校）

BACKGROUND: Complications from major surgery are undesirable, common, and potentially avoidable. The long-term consequences of short-term surgical complications have recently been recognized to have a profound influence on longevity and quality of life in survivors. In the past 30 years, there have been a number of studies conducted attempting to reduce surgical mortality and morbidity by deliberately and preemptively manipulating perioperative hemodynamics. Early studies had a high control-group mortality rate and were criticized for this as being unrepresentative of current practice and raised opposition to its implementation as routine care. We performed this review to update this body of literature and to examine the effect of changes in current practice and quality of care to see whether the conclusions from previous quantitative analyses of this field remain valid.

METHODS: Randomized clinical trials evaluating the use of preemptive hemodynamic intervention to improve surgical outcome were identified using multiple methods. Electronic databases (MEDLINE, EMBASE, and the Cochrane Controlled Clinical Trials register) were screened for potential trials, reference lists of identified trials were

examined, and additional sources were sought from experts and industry representatives. Identified studies that fulfilled the entry criteria were examined in full and subjected to quantifiable analysis, subgroup analysis, and sensitivity analysis where possible.

RESULTS: There were 29 studies identified, 23 of which reported surgical complications. In total, the 29 trials involved 4805 patients with an overall mortality of 7.6%. The use of preemptive hemodynamic intervention significantly reduced mortality (pooled odds ratio [95% confidence interval] of 0.48 [0.33–0.78]; $P = 0.0002$) and surgical complications (odds ratio 0.43 [0.34–0.53]; $P < 0.0001$). Subgroup analysis showed significant reductions in mortality for studies using a pulmonary artery catheter, supranormal resuscitation targets, studies using cardiac index or oxygen delivery as goals, and the use of fluids and inotropes as opposed to fluids alone. By contrast, there was a significant reduction in morbidity for each of the 4 subgroups analyzed.

CONCLUSION: The use of a preemptive strategy of hemodynamic monitoring and coupled therapy reduces surgical mortality and morbidity.

椎管内麻醉下的分娩镇痛对儿童学习障碍的影响

Neuraxial Labor Analgesia for Vaginal Delivery and Its Effects on Childhood Learning Disabilities

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背景：先前研究表明椎管内麻醉进行剖宫产的儿童学习障碍的发病率较低于阴道分娩。作者推测，椎管内麻醉能够减少分娩中的应激反应，而应激则与以后的神经发育相关。为了进一步探讨这种可能性，作者在以人口为基础的阴道分娩出生儿童的队列中分析了椎管内麻醉下镇痛分娩与儿童学习障碍的关系。

方法：作者回顾了在美国明尼苏达州的5个小镇从1976到1982年出生并在原社区居住至5岁的儿童的所有教育和医疗记录，筛选出在此人群中确诊为有学习障碍的对象。Cox回归模型被用于比较在分娩中使用或不使用椎管内麻醉的儿童成长后学习障碍的发生率，包括对那些与临床有潜在相关性的因素或者单变量分析2组之间存在差异进行校准的分析。

结果：在这个研究队列中，4686名产妇经过阴道分娩，其中1495例接受了椎管内麻醉镇痛。在这个队列中儿童学习障碍的发生与椎管内麻醉镇痛的使用没有相关性。（校准危险比1.05；95%可信区间，0.85-1.31， $P=0.63$ ）

讨论：分娩期间是否使用椎管内镇痛与在19岁之前确诊的学习障碍没有独立的相关性。未来的研究需要评估早先发表的关于学习障碍的发生率在椎管内麻醉下剖宫产的儿童低于经阴道自然顺产的儿童的潜在的机制。

(张蕾 译 陈杰 校)

Abstract

BACKGROUND: In prior work, children born to mothers who received neuraxial anesthesia for cesarean delivery had a lower incidence of subsequent learning disabilities compared with vaginal delivery. The authors speculated that neuraxial anesthesia may reduce stress responses to delivery, which could affect subsequent neurodevelopmental outcomes. To further explore this possibility, we examined the association between the use of neuraxial labor analgesia and development of childhood learning disabilities in a population-based birth cohort of children delivered vaginally.

METHODS: The educational and medical records of all children born to mothers residing in the area of 5 townships of Olmsted County, Minnesota from 1976 to 1982 and remaining in the community at age 5 years were reviewed to identify those with learning disabilities. Cox proportional hazards regression was used to compare the incidence of learning disabilities between children delivered vaginally with and without neuraxial labor analgesia, including analyses adjusted for factors of either potential clinical relevance or that differed between the 2 groups in univariate analysis.

RESULTS: Of the study cohort, 4684 mothers delivered children vaginally, with 1495 receiving neuraxial labor analgesia. The presence of childhood learning disabilities in the cohort was not associated with use of labor neuraxial analgesia (adjusted hazard ratio, 1.05; 95% confidence interval, 0.85–1.31; $P = 0.63$).

CONCLUSION: The use of neuraxial analgesia during labor and vaginal delivery was not independently associated with learning disabilities diagnosed before age 19 years. Future studies are needed to evaluate potential mechanisms of the previous finding indicating that the incidence of learning disabilities is lower in children born to mothers via cesarean delivery under neuraxial anesthesia compared with vaginal delivery.

机械通气下的婴幼儿肺萎陷对锁骨下静脉位置和大小影响

The Effect of Lung Deflation on the Position and Size of the Subclavian Vein in Mechanically Ventilated Infants and Children

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背景: 如果肺的萎陷增加了锁骨下静脉 (SCV) 到胸膜的距离以及静脉的直径, 那么它可能减少气胸的风险并增加锁骨下静脉穿刺置管的成功率。本研究评估机械通气的小儿患者肺压缩对锁骨下静脉到胸膜的距离和对锁骨下静脉横截面积的影响。

方法: 50 名患者 (25 名不到一岁的婴儿和 25 名一到八岁的儿童) 取肩部垫高仰卧位, 机械通气的潮气量为 6 到 7 mL/kg。将气管连通大气实现肺的萎陷。用超声分别在肺膨胀末期及肺萎陷后的 0, 30, 60, 90 和 120 秒测量锁骨下静脉到胸膜的距离和锁骨下静脉的横截面积。P 值 < 0.05 被认为有统计学意义。距离增加 5% 及横截面积增加 25% 被认为有临床相关性。

结果：分析了 43 名病人包括 22 名婴儿和 21 名儿童的数据。没有发现肺的萎陷对锁骨下静脉到胸膜的距离及锁骨下静脉的横截面积的改变有临床相关性。锁骨下静脉到胸膜的距离和锁骨下静脉的横截面积并没有随着时间进一步增加。

结论：肺萎陷不能增加锁骨下静脉到胸膜的距离及锁骨下静脉的横截面积，且未必能有利于避免气胸及增加锁骨下静脉穿刺置管的成功率。

(唐颖 译 陈杰 校)

BACKGROUND: If lung deflation increases the distance from the subclavian vein (SCV) to the pleura and the diameter of the vein, it might decrease the risk of pneumothorax and increase the success rate of subclavian venous cannulation. We evaluated the effect of lung deflation on the distance from the SCV to the pleura (SCV-pleura distance) and on the cross-sectional area (CSA) of the SCV in mechanically ventilated pediatric patients.

METHODS: Fifty patients (25 infants younger than 1 year and 25 children aged 1 to 8 years) were placed supine over a shoulder roll, and their lungs were ventilated with a tidal volume of 6 to 7 mL/kg. Lung deflation was achieved by opening the endotracheal tube to the atmosphere. The SCV-pleura distances and the SCV CSAs were measured using ultrasound at the end of inflation and 0, 30, 60, 90, and 120 seconds after lung deflation. A *P* value <0.05 was considered statistically significant. Increases of 5% in the distance and 25% in the CSA were defined as clinically relevant.

RESULTS: The available data from 43 patients, 22 infants and 21 children, were analyzed. No clinically relevant changes in the SCV-pleura distance or in the SCV CSA were induced by lung deflation. Neither the SCV-pleura distance nor the CSA showed any further increase with time.

CONCLUSIONS: Lung deflation failed to increase the SCV-pleura distance and the CSA of the SCV. Its application is unlikely to be advantageous in avoiding pneumothorax or improving the success rate of subclavian venous cannulation.

三磷酸腺苷敏感性钾通道阻滞剂减弱了 R-PIA 对神经损伤性大鼠的抗痛觉异常效应

Adenosine Triphosphate-Sensitive Potassium Channel Blockers Attenuate the Antiallodynic Effect of R-PIA in Neuropathic Rats

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Abstract

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背景：神经损伤可产生神经性疼痛。鞘内注射腺苷可减弱其伴随的机械性痛觉敏化。腺苷神经保护作用是由三磷酸腺苷 (ATP) 敏感性钾通道(K_{ATP}) 所介导。作者使用大鼠神经结扎为神经病理性疼痛的损伤模型评估腺苷 A1受体激动剂，N6-(1-

苯基-2-丙醇)腺苷 (R - PIA) 和 K_{ATP} 通道关系, 以确定是否 R - PIA 的抗痛觉异常疗效也由 K_{ATP} 通道介导。

方法: 由牢固结扎左腰椎第五和第六脊椎神经诱发机械性痛敏。左后爪的机械痛敏以 von Frey 暗条测痛法测量缩爪阈值来评估。鞘内注射 R - PIA (0.5, 1 或 2 μ g) 诱导抗痛觉异常疗效。我们评估 K_{ATP} 通道阻滞剂格列本脲或 5-羟色胺(5-HT) 预处理是否能逆转 R - PIA 的抗痛觉异常效果。此外, 作者评估了 K_{ATP} 通道开放剂二氮嗪是否有抗痛觉异常效果并促进了 R - PIA 的作用。最后, 研究电压依赖的钾通道阻断剂 4 - 氨基吡啶是否削弱了 R - PIA 的效果。

结果: 鞘内注射 R - PIA 浓度为 2 μ g 时能产生最大的抗痛觉异常效应 ($P < 0.05$)。鞘内注射格列本脲预处理和腹腔内预注 5-HT 显著降低了 R - PIA 的抗痛觉异常效应。二氮嗪产生了抗痛觉异常效果, 也增强了 R - PIA 的作用。4 - 氨基吡啶并没有对 R - PIA 的作用有影响。

结论: 在大鼠结扎神经损伤模型中, 腺苷 A1 受体刺激的抗痛觉异常效果可能与 K_{ATP} 通道的活动有关。

(邹巧群 译 陈杰 校)

BACKGROUND: Nerve injury can generate neuropathic pain. The accompanying mechanical allodynia may be reduced by the intrathecal administration of adenosine. The neuroprotective effects of adenosine are mediated by the adenosine triphosphate (ATP)-sensitive potassium (K_{ATP}) channel. We assessed the relationship between the adenosine A1 receptor agonist, N^6 -(R)-phenylisopropyl adenosine (R-PIA), and K_{ATP} channels to determine whether the antiallodynic effects of R-PIA are also mediated through K_{ATP} channels in a rat nerve ligation injury model of neuropathic pain.

METHODS: Mechanical allodynia was induced by tight ligation of the left lumbar fifth and sixth spinal nerves. Mechanical allodynia in the left hindpaw was evaluated using von Frey filaments to measure withdrawal thresholds. R-PIA (0.5, 1, or 2 μ g) was administered intrathecally to induce antiallodynia. We assessed whether pretreatment with the K_{ATP} channel blockers glibenclamide or 5-hydroxydecanoate reversed the antiallodynic effect of R-PIA. Also, we evaluated whether diazoxide, a K_{ATP} channel opener, had an antiallodynic effect and promoted the antiallodynic effect of R-PIA. Lastly, we investigated whether the voltage-activated K channel blocker 4-aminopyridine attenuated the effect of R-PIA.

RESULTS: Intrathecal R-PIA produced maximal antiallodynia at 2 μ g ($P < 0.05$). Intrathecal pretreatment with glibenclamide and intraperitoneal pretreatment 5-hydroxydecanoate significantly reduced the antiallodynic effect of R-PIA. Diazoxide produced an antiallodynic effect and also enhanced the antiallodynic action of R-PIA. 4-Aminopyridine had no effect on the antiallodynic action of R-PIA.

CONCLUSIONS: The antiallodynic effects of adenosine A1 receptor stimulation may be related to K_{ATP} channel activity in a rat model of nerve ligation injury.

短交互式动画视频信息对麻醉前焦虑、麻醉知识了解及术前访视时间的影响：一项随机对照试验

The Effects of Short Interactive Animation Video Information on Preanesthetic Anxiety, Knowledge, and Interview Time: A Randomized Controlled Trial.

Kakinuma A, Nagatani H, Otake H, Mizuno J, Nakata Y

背景：此研究设计的交互式动画视频提供了包括风险、效益及供选方案在内的麻醉实施过程基本说明。本研究假设这段视频将增进患者对于麻醉过程的了解、减轻术前焦虑及缩短访视时间。

方法：将 211 名术前入院至少 1 天并计划择期于全麻或硬膜外复合全麻下行肿瘤手术的患者随机分配至视频组 (n=106) 或非视频组 (n=105)。视频组患者要求在病房观看短交互式动画视频。看完视频后，麻醉医师将对该组患者进行术前访视并例行风险评估。非视频组患者也由麻醉医师实施术前访视，但不要求观看视频。在麻醉医师访视前与手术日当天，两组患者均要求完成状态-特质焦虑量表及共 14 分值的知识测验。此外，本研究还对术前访视时间进行了测算。

结果：两组患者无人口统计学差异。较非视频组患者而言，视频组患者的访视时间缩短了 34.4% (视频组 12.2 ± 5.3 分钟，非视频组 18.6 ± 6.4 分钟；缩短时间百分比的 95% 置信区间 [CI]：32.7%-44.3%)，且麻醉知识的知晓度增进了 11.6% (视频组得分 12.5 ± 1.4 ，非视频组得分 11.2 ± 1.7 ；知识增长百分比的 95% 置信区间 [CI]：32.7%-44.3%)。然而，对于麻醉前焦虑，两组患者间无统计学差异。

结论：本研究的短交互式动画视频帮助患者了解麻醉并缩短了麻醉医师的访视时间。

(范羽译 薛张纲校)

Background: We designed an interactive animated video that provides a basic explanation-including the risks, benefits, and alternatives-of anesthetic procedures. We hypothesized that this video would improve patient understanding of anesthesia, reduce anxiety, and shorten the interview time.

Methods: Two hundred eleven patients scheduled for cancer surgery under general anesthesia or combined general and epidural anesthesia, who were admitted at least 1 day before the surgery, were randomly assigned to the video group (n = 106) or the no-video group (n = 105). The patients in the video group were asked to watch a short interactive animation video in the ward. After watching the video, the patients were visited by an anesthesiologist who performed a preanesthetic interview and routine risk assessment. The patients in the no-video group were also visited by an anesthesiologist, but were not asked to watch the video. In both groups, the patients were asked to complete the State-Trait Anxiety Inventory and a 14-point scale of knowledge test before the anesthesiologist's visit and on the day of surgery. We also measured interview time.

Results: There was no demographic difference between the 2 groups. The interview time was 34.4% shorter (video group, 12.2 ± 5.3 minutes, vs. no-video group, 18.6 ± 6.4 minutes; 95% confidence interval [CI] for the percentage reduction in time: 32.7%-44.3%), and knowledge of anesthesia was 11.6% better in the video group (score 12.5 ± 1.4 vs. no-video group score 11.2 ± 1.7 ; 95% CI for the percentage increase in knowledge: 8.5%-13.9%). However, there was no difference in preanesthetic anxiety between the 2 groups.

Conclusion: Our short interactive animation video helped patients' understanding of anesthesia and reduced anesthesiologists' interview time.

异丙酚诱发血管舒张并通过血管周围脂肪组织和内皮细胞进行调节的机制

The Mechanisms of Propofol-Induced Vascular Relaxation and Modulation by Perivascular Adipose Tissue and Endothelium

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背景：异丙酚作为直接或间接的血管扩张剂导致平滑肌细胞松弛从而引起低血压。血管周围脂肪组织（PVAT）及内皮削弱血管收缩作用，并且高血压及糖尿病改变了PVAT的功能。PVAT是否影响麻醉剂对血管功能的作用尚不清楚。我们研究了有关血管周围的脂肪组织和血管内皮参与的丙泊酚诱发血管扩张的机制。

方法：准备Wistar老鼠的胸主动脉环——PVAT+、PVAT-、E+、E-，用于功能研究。

结果：经新福林收缩后的血管，异丙酚诱发的血管扩张在PVAT+及E+的血管最明显，两者均缺如的血管扩张作用最不明显。丙泊酚通过内皮细胞依赖和非依赖两种机制介导血管张作用。对异丙酚引起的血管舒张反应，一氧化氮合酶抑制剂、钾通道阻断剂（四乙铵及格列本脲）对E+和E-血管均显著减弱，可溶性鸟氨酸环化酶抑制剂1H-[1,2,4]恶二唑[4,3-a]喹啉-1-酮及过氧化氢清除剂（过氧化氢酶）对E-的血管显著减弱。PVAT的存在显著的增强了对异丙酚诱导的血管舒张作用。经新福林预收缩后，PVAT+或E+的血管对异丙酚诱发的舒张有作用，相比之下，经KCl预收缩后，四种类型的血管对异丙酚诱发的舒张作用相似。

结论：PVAT通过内皮依赖性及非内皮依赖性两种途径增强异丙酚诱发的老鼠主动脉舒张效应，因此突显了PVAT的临床重要性。

（侯文婷译 薛张纲校）

Background: Propofol causes hypotension due to relaxation of vascular smooth muscle cells through its direct or indirect vasodilator effects. Perivascular adipose tissue (PVAT) and endothelium attenuate vascular contraction, and the function of PVAT is altered in hypertension and diabetes. Whether PVAT affects the action of anesthetics on vascular function is unknown. We studied the mechanisms of propofol-induced relaxation in relation to the involvement of PVAT and endothelium.

Methods: Thoracic aortic rings from Wistar rats were prepared with or without PVAT (PVAT+ and PVAT-), intact endothelium (E+), or both, or with the endothelium removed (E-) for functional studies.

Results: In phenylephrine precontracted vessels, propofol-induced relaxation was highest with both PVAT and E+ and lowest in vessels denuded of both PVAT and endothelium. Propofol-induced relaxation occurred via both endothelium-dependent and -independent mechanisms. The relaxation response induced by propofol was significantly reduced by nitric oxide synthase inhibitor (L-NNA), K(+) channel blockers (tetraethylammonium and glibenclamide) in E+ and E- vessels, and by soluble guanylyl cyclase inhibitor 1H-(1,2,4)oxadiazolo(4,3-A)quinazoline-1-one and hydrogen peroxide scavenger (catalase) in E- vessels. The presence of PVAT significantly enhanced the relaxation response induced by propofol. In contrast to phenylephrine precontracted vessels in which the presence of PVAT or endothelium had an effect, in vessels precontracted with KCl, propofol-induced relaxation was similar among the 4 types of vessel preparation.

Conclusions: PVAT enhances the relaxation effect induced by propofol in rat aorta through both endothelium-dependent and endothelium-independent pathways thus highlighting the clinical importance of PVAT.

简报报告：间距紧密双极感应可以抑制烧灼引起的电磁干扰对心脏植入式电设备的干扰

Brief report: suppression of cautery-induced electromagnetic interference of cardiac implantable electrical devices by closely spaced bipolar sensing.

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背景：手术中使用电刀等设备产生的电磁干扰可以使心脏起搏器或植入式除颤器受抑制或者高敏而导致心律失常。特别需要指出的是，频繁使用广泛间距传感装置(如整合的双极传感)可以使植入式除颤器对电磁干扰更加敏感性。因此通常会使用无创程式在手术前关闭自动除颤功能并且在手术后重新开启。间距紧密传感装置(如真正的双极)受电磁干扰的影响最小，因此手术中使用双极电凝可以尽量避免手术前对植入式除颤器的重新编程并且保护起搏装置的功能。

方法：我们的研究对象包括了23名新接受植入式除颤器或者正在接受植入式除颤脉冲发生器治疗的患者。每个病人都分别尝试电灼引起的电磁干扰对于间距紧密传感装置和广泛间距传感装置的影响。

结果：比较这两种感应模式，在广泛间距双极感应时，心电图右心室振幅明显增大并且电磁干扰的噪声幅度也较大。此外，广泛间距双极感应时，有22人发生了植入式除颤器起搏功能抑制，并且有17人检出了错误的"心室颤动"。相反，紧密双极感应则不伴有起搏抑制或者错误的心室颤动感知。

结论：间隔紧密的双极感应(即真正的双极性)可以很好地屏除电灼引起的电磁干扰。对于植入式起搏装置采用间隔紧密的双极感应可以减少围手术期重新编程同时保持手术中的正常功能。

(黄剑译 薛张纲校)

BACKGROUND : Electromagnetic interference (EMI) induced by electrocautery during surgery in patients with cardiac pacemakers or implanted cardioverter-defibrillators (ICDs) may inhibit pacing and cause inappropriate tachyarrhythmia oversensing. In particular, susceptibility to EMI may be enhanced in ICDs by frequently used wide interelectrode sensing (i.e., integrated bipolar sensing). Consequently, ICD function is usually disabled preoperatively and restored later by noninvasive programming. Because sensing by closely spaced electrodes (i.e., true bipolar) may be less susceptible to EMI, preoperative programming to a true bipolar mode may minimize the need for perioperative programming while preserving device function.

METHODS : Our study population consisted of 23 consecutive patients either receiving a new ICD or undergoing ICD pulse generator change. In each patient, electrocautery-induced EMI was initiated with the ICD in the closely spaced sensing configuration and again during widely spaced sensing.

RESULTS : In comparing the 2 sensing modes, right ventricular electrogram amplitude was significantly greater and EMI noise amplitude tended to be greater with widely spaced bipolar sensing. Furthermore, widely spaced bipolar sensing was associated with ICD pacing inhibition in 22 of 23 patients and incorrect "ventricular fibrillation" detection in 17 of 23 patients. Conversely, closely spaced bipolar sensing was not accompanied by either pacing inhibition or incorrect ventricular fibrillation sensing.

CONCLUSION : Closely spaced bipolar sensing (i.e., true bipolar) appropriately rejects electrocautery-induced EMI. Programming implanted devices to closely spaced bipolar sensing may minimize the need for perioperative reprogramming while preserving intraoperative device operation.

慢性肾脏疾病与择期整形手术后死亡率得关系

Chronic Kidney Disease and Postoperative Morbidity After Elective Orthopedic Surgery

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背景: eGFR 被认为与增加心血管的风险和各种原因的死亡联系紧密。择期中危的非心血管的手术的风险没有被发现有相关性。我们假设 CKD 与择期中危的整形科的手术的高发病率相关。

方法: 研究择期整形手术的关节的置换术后, 显示在大部分全球的手术过程, 麻醉和手术操作的特征都是及其相似的。eGFR 是用修改后的肾脏疾病的饮食的公式, 从常规的肌酐酸酐的测量结果中计算出来的。CKD 是 $eGFR < 60 \text{ mL/min/1.73 m}^2$ 。心脏风险(修改后的心脏风险指南), 循证医学, 围手术期的因素与围手术期的发病率(手术的时间, 失血量, 手术时的温度)的相关性也是有记录的。主要的要点是手术后的发病率, 尽量用手术后的发病率的调查来报告。发病率的差异是在有 CKD 的病人和肾脏功能正常的病人(用 X2 的测试)用 HR 或 OR 或 95% Cis 进行分析的。第二个要点是在有 ckd 和肾功能正常的病人中比较出院的时间和变成没有发病的时间(用 log-rank 的测试来分析)。多元还原分析显示 ckd, 围手术期的因素和发病率, 和住院的时间都相关

结果: 手术后的发病率的调查结果记录了 526 个进行择期的整形手术的病人中。Ckd 的病人($n = 142$; 27%) 在手术后的第 5 日(OR 2.1 [95% CI: 1.2–3.7]; $P < 0.0001$) 有很高发病率。ckd 得病人用更长的时间(HR 1.6 [95% CI: 1.2–1.9])去变成复发的病人

(HR 1.4 [95% CI: 1.2–1.7]; $P = 0.0001$; log-rank test).ckd 病人的出院时间被延误 4 日。ckd 病人患肺部疾病，感染，心血管疾病，肾脏疾病，神经系的疾病，还有疼痛的发病是较为持久的。进一步将 ckd 得病人分层后显示术前 eGFR ≤ 50 mL/min/1.73 m² 与高发病率，住院时间长相关，与年龄无关。多元还原分析显示术前 ckd ($P = 0.006$) 和充血性心衰($P = 0.002$)与住院时间延长相关。

结论：大致上小部分的有 ckd 的病人进行择期整形科手术是有长时间发病和长时间的住院时间的比例是增加的。术前 eGFR 可能比其余的危险因素更增加围术期的风险。

(刘珏莹译 薛张纲校)

BACKGROUND: Reduced estimated glomerular filtration rate (eGFR) is strongly associated with increased cardiovascular risk and all-cause mortality. Associations with morbidity in elective, moderate-risk noncardiac surgery have not been explored. We hypothesized that chronic kidney disease (CKD) would be associated with excess morbidity after elective, moderate-risk orthopedic surgery.

Methods: Patients undergoing elective orthopedic joint replacement procedures were studied, representing a large proportion of global surgical procedures and characterized by highly homogeneous anesthetic and surgical practice. eGFR was calculated from routine creatinine measurements using the Modification of Diet in Renal Disease equation. CKD was defined as eGFR < 60 mL/min/1.73 m². Cardiac risk (Revised Cardiac Risk Index) and evidence-based, perioperative factors associated with perioperative morbidity (operative time, blood loss, perioperative temperature) were also recorded prospectively. The primary end point was postoperative morbidity, recorded prospectively using the postoperative morbidity survey. Morbidity differences were analyzed between patients with CKD and normal preoperative renal function (χ^2 test for trend) and presented as hazard ratio (HR) or odds ratio (OR) with 95% confidence intervals (95% CIs). The secondary end points were time to hospital discharge and time to become morbidity free (analyzed by log-rank test), both between and within CKD compared with normal renal function patients. Multiple regression analysis was performed to assess the association of CKD, perioperative factors with morbidity, and length of hospital stay.

Results: Postoperative morbidity survey was recorded in 526 patients undergoing elective orthopedic surgery. CKD patients ($n = 142$; 27%) sustained excess morbidity on postoperative day 5 (OR 2.1 [95% CI: 1.2–3.7]; $P < 0.0001$). CKD patients took longer (HR 1.6 [95% CI: 1.2–1.9]) to become morbidity free (log-rank test, $P < 0.0001$). Time to hospital discharge was delayed by 4 days in CKD patients (HR 1.4 [95% CI: 1.2–1.7]; $P = 0.0001$; log-rank test). CKD patients sustained more pulmonary (OR 2.2 [95% CI: 1.3–3.6]; $P = 0.002$), infectious (OR 1.7 [95% CI: 1.1–2.7]; $P = 0.01$), cardiovascular (OR 2.4 [95% CI: 1.2–4.8]; $P = 0.01$), renal (OR 2.3 [95% CI: 1.5–3.5]; $P < 0.00,001$), neurological (OR 4.3 [95% CI: 1.3–17.7]; $P = 0.005$), and pain (OR 1.8 [95% CI: 1.03–3.1]; $P = 0.04$) morbidities. Further stratification of CKD revealed preoperative eGFR ≤ 50 mL/min/1.73 m² to be associated with more frequent morbidity and longer hospital stay, independent of age. Multiple regression analysis identified CKD ($P = 0.006$) and congestive cardiac failure ($P = 0.002$) as preoperative factors associated with prolonged hospital stay.

Conclusions: A substantial minority of patients with CKD undergoing elective orthopedic procedures are at increased risk of prolonged morbidity and hospital stay. Preoperative eGFR may enhance perioperative risk stratification beyond traditional risk factors.

腺病毒依附的血管生成素-1 加速内毒素诱导的急性肺损伤小鼠模型对炎症的反应

Adenovirus-Delivered Angiotensin 1 Accelerates the Resolution of Inflammation of Acute Endotoxic Lung Injury in Mice

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背景：免疫系统在保护机体免受感染中起着关键的作用。免疫系统可以及时处理炎症反应，在保护机体返回内环境稳态，保持正常的器官功能中起至关重要的作用。血管生成素-1 可以防止作为炎症反应的病原体的一部分的内皮细胞的激活，并在急性肺损伤中起抗炎作用。我们设计这项研究，通过增加血清血管生成素-1 的含量，研究是否可以加速内毒素诱导的急性肺损伤小鼠模型对炎症的反应。

方法：气管内注入脂多糖诱导动物急性肺损伤模型，这些小鼠 24 小时前分别用腺病毒载体或腺病毒 GFP- GFP – 血管生成素-1 预处理过。每组额外的 6 只已预处理过小鼠在滴入脂多糖前被处死作为对照。分析他们的炎症指数。用荧光激活细胞分选测定凋亡多形核白细胞和巨噬细胞的吞噬功能。对组织中的血管生成素-1 和支气管肺泡灌洗液中粒细胞巨噬细胞集落刺激因子的表达进行了测量。

结果：脂多糖诱导的白细胞浸润到肺泡中，48 小时后滴入脂多糖渗透幅度达到最大。用腺病毒- GFP – 血管生成素-1 预处理组血管生成素-1 显著表达，减少白细胞和中性粒细胞浸润，炎症的持续时间缩短。腺病毒- GFP – 血管生成素-1 预处理组粒细胞巨噬细胞集落刺激因子幅度没有改变。

结论：我们的研究结果表明：血管生成素-1 预处理过的小鼠在内毒素诱导的急性肺损伤模型中通过加速了中性粒细胞和巨噬细胞的凋亡大大促进炎症反应。

(陆丽虹译 薛张纲校)

BACKGROUND: The immune system plays a key role in protecting the organism from infection. Timely resolution of the inflammatory response to infection plays a vital role in returning homeostasis and maintaining normal organ function. Angiotensin1 prevents endothelial activation, part of the inflammatory response to a pathogen, and has an anti-inflammatory effect in acute lung injury. We designed this study to investigate whether increasing serum production of angiotensin1 by IV administration of adenoviral-delivered angiotensin1 could accelerate the resolution of inflammation in endotoxin-induced acute lung injury in mice.

METHODS: Lipopolysaccharide was intratracheally instilled to induce acute lung injury in animals pretreated for 24 hours with adenoviral-GFP vector or adenoviral-GFP-angiotensin1, respectively. An additional 6 mice in each pretreatment group were killed before lipopolysaccharide instillation to serve as controls. Indices of resolution of

inflammation were analyzed. Apoptotic polymorphonuclear leukocytes and their phagocytosis by macrophages were determined by fluorescent activated cell sorter. The expression of angiopoietin1 in tissues and granulocyte macrophage colony-stimulating factor in the bronchoalveolar lavage fluid were measured.

RESULTS: Lipopolysaccharide induced leukocyte infiltration into air spaces, with maximal infiltration 48 hours after lipopolysaccharide instillation. Pretreatment with adenovirus-GFP-angiopoietin1 markedly increased angiopoietin1 expression, reduced leukocyte, and neutrophil infiltration and shortened the duration of inflammation. Adenovirus-GFP-angiopoietin1 pretreatment augmented the magnitude without altering the time course of granulocyte macrophage colony-stimulating factor.

CONCLUSIONS: Our results suggest that angiopoietin1 pretreatment promotes resolution of inflammation in endotoxin-induced acute lung injury in mice by accelerating the apoptosis of neutrophils and their phagocytosis by macrophages.

在脊麻剖宫产中母体和胎儿 $\beta 2$ 肾上腺素受体和一氧化氮合酶基因型对血管加压素需求和胎儿酸碱状态的影响

The Effect of Maternal and Fetal $\beta 2$ -Adrenoceptor and Nitric Oxide Synthase Genotype on Vasopressor Requirement and Fetal Acid-Base Status During Spinal Anesthesia for Cesarean Delivery

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背景：先前的研究证实了在剖宫产术中 $\beta 2$ 肾上腺素受体基因(ADRB2)的母体单元型影响了麻黄碱的需要量。与纯 α 肾上腺素受体激动剂如去氧肾上腺素对比，麻黄碱的使用与脐动脉(UA)血 pH 降低有关，这被认为继发于增加的胎儿代谢。没有数据评估了胎儿或新生儿基因型对母体给予血管加压素后胎儿代谢反应的影响。我们假设新生儿 ADRB2 基因型会影响新生儿酸血症的程度。我们同时研究了在低血压时，母体 ADRB2 和内皮细胞氮氧化物合酶基因(NOS3)对麻黄碱和去氧肾上腺素需求量的影响。

方法：共有 104 名在脊麻下行剖宫产术的中国妇女入选了这项双盲随机临床试验，评估了麻黄碱和去氧肾上腺素输注对母体和新生儿的影响。血样采自于脐动脉、脐静脉和母体桡动脉，试验测量了血气值、乳酸、麻黄碱和去氧肾上腺素浓度，并在 ADRB2 密码子 16(rs1042713)和 27 (rs1042714)以及 NOS 密码子 298 (rs1799983)用非同义单核苷酸多态性确定母体和新生儿基因型。临床变量(脐动脉血 pH、乳酸和血管加压素的剂量)在不同基因型中对照，回归分析被创建来评价基因型对血管加压素剂量和胎儿酸碱状态的影响。

结果：母体 ADRB2 基因型不影响麻黄碱用量。新生儿基因型密码子 16 影响了胎儿酸碱状态。脐动脉血 pH 在精氨酸 16 纯合子新生儿中升高(7.31 ± 0.03 在 p.16Arg/Arg 对比 7.25 ± 0.11 在 p.16 Arg/Gly 和 p.16 Gly/Gly; $P < 0.001$, 差异的 95% 置信区间(CI)为 $0.03 \sim 0.09$)，脐动脉血乳酸值降低($2.67 \text{ mmol/L} \pm 0.99$ in p.16Arg/Arg 对比 $4.28 \text{ mmol/L} \pm 2.79$ 在 p.16 Arg/Gly 和 p.16 Gly/Gly; $P < 0.001$, 差异的 95% 置信区间(CI)为 $-2.40 \sim -0.82$)。在母亲接受麻黄碱的新生儿中，基因型间的差异程度更大(pH 7.30 ± 0.02 在 p.16Arg/Arg 对比 7.19 ± 0.10 在 p.16 Arg/Gly 和 p.16 Gly/Gly; $P < 0.001$, 差异的 95% 置信区间(CI)为 $0.07 \sim 0.14$)，脐动脉血乳酸含量更低($3.66 \text{ mmol/L} \pm 1.30$ 在 p.16Arg/Arg 对比 $5.79 \text{ mmol/L} \pm 2.88$ 在 p.16 Arg/Gly 和 p.16 Gly/Gly; $P = 0.003$, 差异的 95% 置信区间(CI)为 $-3.48 \sim -0.80$)。在多元线性回归模型中($R^2 = 63.6\%$; $P = 0.03$)，新生儿 ADRB2 基因型(p.16Arg/Arg 和 p.27Gln/Glu)和更低的新生儿出生体重预示了更低的脐动脉血乳酸浓度。去氧肾上腺素剂量不为母体 ADRB2 或 NOS3 基因型所改变，胎儿型 NOS3 基因型不影响脐动脉血 pH 和乳酸值。

结论：与之前北美人群研究对比，在中国人群择期剖宫产手术中，母体型 ADRB2 基因型不影响麻黄碱需求。尽管如此，我们的研究显示新生儿 ADRB2 p.Arg16 纯合子基因型对麻黄碱诱导的胎儿酸血症有保护作用。

(任云译 薛张纲校)

BACKGROUND: Previous work demonstrated that maternal haplotypes of the $\beta(2)$ -adrenoceptor gene (ADRB2) influence ephedrine requirements during cesarean delivery. The use of ephedrine versus a pure α -adrenergic agonist such as phenylephrine has been associated with lower umbilical artery (UA) pH, thought to be secondary to increased fetal metabolism. There are no data evaluating the effect of fetal/neonatal genotypes on the metabolic response to maternally administered vasopressors. We hypothesized that neonatal ADRB2 genotype would affect the extent of neonatal acidemia. We also examined the effect of maternal ADRB2 and the endothelial nitric oxide synthase gene (NOS3) on ephedrine and phenylephrine requirements for treatment of maternal hypotension.

METHODS: The study was performed on 104 Chinese women scheduled for cesarean delivery under spinal anesthesia who were participating in a double-blind randomized clinical trial evaluating the maternal and neonatal effects of ephedrine versus phenylephrine infusions. Blood samples were drawn from the UA, umbilical vein, and maternal radial artery to measure blood gas values and lactate, ephedrine, and phenylephrine concentrations, and to determine maternal and neonatal genotype at nonsynonymous single nucleotide polymorphisms at codons 16 (rs1042713) and 27 (rs1042714) of ADRB2 and codon 298 (rs1799983) of NOS. Clinical variables (UA pH, UA lactate, and dose of vasopressors) among genotypes were compared, and regression models were created to assess the effect of genotype on vasopressor dose and fetal acid-base status.

RESULTS: Maternal ADRB2 genotype did not affect the ephedrine dose. Neonatal genotype at codon 16 influenced fetal acid-base status. UA pH was higher in Arg16 homozygous neonates (7.31 ± 0.03 in p.16Arg/Arg vs. 7.25 ± 0.11 in p.16 Arg/Gly and p.16 Gly/Gly; $P < 0.001$, 95% confidence interval (CI) of difference $0.03 \sim 0.09$) and UA lactate was lower ($2.67 \text{ mmol/L} \pm 0.99$ in p.16Arg/Arg vs $4.28 \text{ mmol/L} \pm 2.79$ in p.16

Arg/Gly and p.16 Gly/Gly; $P < 0.001$, 95% CI of difference $-2.40 \sim -0.82$). In neonates born to mothers receiving ephedrine, the magnitude of the difference among genotypes was even greater (pH 7.30 ± 0.02 in p.16Arg/Arg vs. 7.19 ± 0.10 in p.16 Arg/Gly and p.16 Gly/Gly; $P < 0.001$, 95% CI of difference $0.07 \sim 0.14$) and UA lactate was lower ($3.66 \text{ mmol/L} \pm 1.30$ in p.16Arg/Arg vs. $5.79 \text{ mmol/L} \pm 2.88$ in p.16 Arg/Gly and p.16 Gly/Gly; $P = 0.003$, 95% CI of difference $-3.48 \sim -0.80$). In a multiple linear regression model ($R(2) = 63.6\%$; $P = 0.03$), neonatal ADRB2 genotypes (p.16Arg/Arg and p.27Gln/Glu) and lower neonatal birth weight predicted lower UA lactate concentrations. Phenylephrine dose was not affected by maternal ADRB2 or NOS3 genotypes, and neonatal NOS3 genotype did not affect UA pH or UA lactate.

CONCLUSION: In contrast to previous findings in a North American cohort, maternal ADRB2 genotype did not affect ephedrine requirements during elective cesarean delivery in a Chinese cohort. However, our findings suggest that neonatal ADRB2 p.Arg16 homozygosity confers a protective effect against developing ephedrine-induced fetal acidemia.

在颈动脉内膜剥脱术中降压药对术中升压药需求的影响。

The Effect of Antihypertensive Class on Intraoperative Pressor Requirements During Carotid Endarterectomy

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背景：有某种类型的降压药与术中低血压有关，通常还与病人同时使用多种类型的降压药有关。我们试图去寻找在全麻下颈动脉内膜剥脱术中，是否一种降压药单独或者联合其它几种降压药同时使用会增加术中低血压的发生率。我们通过术中监测血压，使用加压药的剂量来决定低血压的发生率。

方法：有 252 名患者择期在全麻下行颈动脉的内膜剥脱术，他们都参加了认知功能不良的评估。这些患者都服用一种或者几种降压药。麻醉方案是事先制订的，使用苯肾上腺素（新福林）来滴定维持平颈动脉血压在颈动脉夹闭前维持在基线水平，在颈动脉夹闭期间维持在基线的 20% 以上。通过计算机记录麻醉数据，记录血流动力学的波动，并保证术中用药。

结果：服用利尿剂的患者比单独服用其他降压药的患者术中需要更多的新福林（1.6 倍）。这种使用新福林的差异只在颈动脉夹闭前发生，即从诱导到夹闭颈动脉来维持术中血压稳定。然而，和这个结果相反的是，在颈动脉夹闭期间使用新福林来维持血压高于基线的 20%，各降压药组均没有差异。

结论：在全麻下行颈动脉内膜剥脱术，在颈动脉内膜夹闭前，平时服用利尿剂来降压的患者术中需要更多的升压药来维持血压的稳定。

（翁梅琳译 薛张纲校）

Background: Certain classes of antihypertensive drugs have been associated with intraoperative hypotension, and frequently, patients are receiving multiple classes of

antihypertensive medications. We sought to determine whether one class of antihypertensive medication either alone, or in combination with other classes of antihypertensive medications, increased the probability of intraoperative hypotension, determined by the amount of vasopressor required during carotid endarterectomy (CEA) performed under general anesthesia with specific arterial blood pressure management.

Methods: This is a post hoc analysis of 252 patients scheduled for elective CEA under general anesthesia, all of whom participated in a prospective evaluation of cognitive dysfunction. Patients were characterized by class and number of preoperative antihypertensive medications taken. A predetermined anesthetic regimen was administered to all patients, with a phenylephrine infusion titrated to maintain mean arterial blood pressure at baseline before clamping the carotid artery, and approximately 20% above baseline during clamping. Computerized anesthesia records were used to record hemodynamics and to quantify medication administered intraoperatively.

Results: Patients taking diuretics as part of their antihypertensive regimen required significantly more (1.6 times) total intraoperative phenylephrine than those not taking diuretics, independently of the number of other antihypertensive medications. This difference in the phenylephrine requirement occurs only during the preclamp period, i.e., from induction to application of carotid artery clamping for the maintenance of preoperative blood pressure. However, in contrast to this result, there is no difference in pressor requirement comparing classes of antihypertensive medications to increase the mean arterial blood pressure 20% above baseline during the period when the carotid artery is clamped.

Conclusion: Diuretics are associated with increased vasopressor requirements in patients having a CEA under general anesthesia in the preclamp period, which is likely true for any patient having a general anesthetic.

低剂量 α_2 受体拮抗剂反常性提高大鼠去甲肾上腺素和可乐定的镇痛效能

Low Dose Alpha-2 Antagonist Paradoxically Enhances Rat Norepinephrine and Clonidine Analgesia

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超低剂量阿片类拮抗剂延长了阿片类的镇痛作用并且阻断耐受。

本研究中我们探讨了低剂量 α_2 受体阻断剂，阿替美唑是否同样具有 α_2 受体介导的镇痛作用和耐受作用。在大鼠鞘内注射去甲肾上腺素或者可乐定联合阿替美唑，用夹尾试验进行测试。连续注射后可介导对去甲肾上腺素的急性耐受。低剂量阿替美唑显著延长了去甲肾上腺素和可乐定介导的镇痛作用。阿替美唑和 α_2 受体激动剂的联合注射也能预防急性耐受模型中激动剂效能的丧失。该试验显示了低剂量 α_2 受体拮抗剂对于 α_2 受体激动剂介导的镇痛作用的反常扩大效应。

(姚敏敏译，薛张纲校)

Ultralow-dose opioid antagonists prolong opioid antinociception and block tolerance. In this study we determined whether low doses of the α_2 adrenergic receptor (A2-R)

antagonist, atipamezole, similarly influenced A2-R-induced antinociception and tolerance. In rats, intrathecal norepinephrine (NE) or clonidine in combination with atipamezole was tested using tail-flick and paw pressure tests. Acute tolerance to NE was induced by serial injections. Low-dose atipamezole significantly prolonged NE and clonidine-induced antinociception. Coadministration of atipamezole with A2-R agonists also prevented loss of agonist potency in the acute tolerance model. This study demonstrates paradoxical effects of low-dose A2-R antagonists augmenting A2-R agonist-induced analgesia.