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一个关于心血管手术术中自体血回输有效性的 **Meta** 分析随机试验

The Efficacy of an Intraoperative Cell Saver During Cardiac Surgery: A Meta-Analysis of Randomized Trials

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背景：在心血管手术中也许可以通过自体血回输来避免同种异基因输血。也有人提出，从脱落细胞中清除碎片可改善病人的预后，但这也可能会增加中风或神经意识功能障碍的风险。在这次的研究中，我们试图通过系统性的回顾已发表的随机控制性试验，并加以 Meta 分析，来明确在心血管手术中进行自体血回输的整体安全性和有效性。
方法：我们进行了全面的检索，找出了关于心血管手术中应用自体血回输技术的所有随机试验。截止到 2008 年 11 月的 MEDLINE，Cochrane 图书馆，EMBASE 和摘要资料库已被检索完全。所有将心血管手术中自体血回输技术应用与否进行比较，并且报导至少一个明确的临床结果的随机试验均被列为研究对象。随机效应模型被用来依次计算比值比（OR，95%可信区间），二分法加权平均差（WMD，95%可信区间）和连续变量。
结果：包括 2282 位患者在内的 31 个随机试验最终被作为研究对象进行 Meta 分析。在心血管手术中，进行术中自体血回输减少了接触任何同种异基因血制品（比值比 0.63，95%可信区间：0.43-0.94，P=0.02）以及红细胞（比值比 0.60，95%可信区间：0.39-0.92，P=0.02）的概率，也降低了平均每位患者输注同种异基因血制品的总量（加权平均差 -256 mL，95%可信区间：-416 to -95 mL，P=0.002）。但在以下几个方面进行自体血回输组与未进行自体血回输组之间并无差异，包括：院内死亡率（比值比 0.65，95%可信区间：0.25-1.68，P=0.37），术后中风或短暂性缺血性发作（比值比 0.59，95%可信区间：0.20-1.76，P=0.34），房颤（比值比 0.92，95%可信区间：0.69-1.23，P=0.56），肾功能衰竭（比值比 0.86，95%可信区间：0.41-1.80，P=0.70），感染（比值比 1.25，95%可信区间：0.75-2.10，P=0.39），患者接受新鲜冰冻血浆治疗（比值比 1.16，95%可信区间：0.82-1.66，P=0.40）以及患者接受血小板输注治疗（比值比 0.90，95%可信区间：0.63-1.28，P=0.55）。
结论：现有的证据表明应用自体血回输技术可减少心血管手术中患者血制品或红细胞的输注。进一步的分析认为，自体血回输可能只有在用于脱落细胞和（或）或剩余细胞，或者在整个手术过程中应用时才是有利的。如果只是在心切开术的心肺旁路期应用自体血回输技术吸引血液，对于血液保存和增加新鲜冰冻血浆输注是没有明显效应的。
（单嘉琪译 薛张纲校）

BACKGROUND: Cell salvage may be used during cardiac surgery to avoid allogeneic blood transfusion. It has also been claimed to improve patient outcomes by removing debris from shed blood, which may increase the risk of stroke or neurocognitive dysfunction. In this study, we sought to determine the overall safety and efficacy of cell salvage in cardiac surgery by performing a systematic review and meta-analysis of published randomized controlled trials.
METHODS: A comprehensive search was undertaken to identify all randomized trials of cell saver use during cardiac surgery. MEDLINE, Cochrane Library, EMBASE, and abstract databases were searched up to November 2008. All randomized trials comparing cell saver use and no cell saver use in cardiac surgery and reporting at least one predefined clinical outcome were included. The random effects model was used to calculate the odds ratios (OR, 95% confidence intervals [CI]) and the weighted mean differences (WMD, 95% CI) for dichotomous and continuous variables, respectively.
RESULTS: Thirty-one randomized trials involving 2282 patients were included in the meta-analysis. During cardiac surgery, the use of an intraoperative cell saver reduced the rate of exposure to any allogeneic blood product (OR 0.63, 95% CI: 0.43-0.94, P =

0.02) and red blood cells (OR 0.60, 95% CI: 0.39-0.92, P = 0.02) and decreased the mean volume of total allogeneic blood products transfused per patient (WMD -256 mL, 95% CI: -416 to -95 mL, P = 0.002). There was no difference in hospital mortality (OR 0.65, 95% CI: 0.25-1.68, P = 0.37), postoperative stroke or transient ischemia attack (OR 0.59, 95% CI: 0.20-1.76, P = 0.34), atrial fibrillation (OR 0.92, 95% CI: 0.69-1.23, P = 0.56), renal dysfunction (OR 0.86, 95% CI: 0.41-1.80, P = 0.70), infection (OR 1.25, 95% CI: 0.75-2.10, P = 0.39), patients requiring fresh frozen plasma (OR 1.16, 95% CI: 0.82-1.66, P = 0.40), and patients requiring platelet transfusions (OR 0.90, 95% CI: 0.63-1.28, P = 0.55) between cell saver and noncell saver groups.
CONCLUSIONS: Current evidence suggests that the use of a cell saver reduces exposure to allogeneic blood products or red blood cell transfusion for patients undergoing cardiac surgery. Subanalyses suggest that a cell saver may be beneficial only when it is used for shed blood and/or residual blood or during the entire operative period. Processing cardiotomy suction blood with a cell saver only during cardiopulmonary bypass has no significant effect on blood conservation and increases fresh frozen plasma transfusion.

应用苯妥英的开颅手术患儿输注丙泊酚对其肝、胰功能及酸碱平衡状态的影响

The effects of propofol infusion on hepatic and pancreatic function and acid-base status in children undergoing craniotomy and receiving phenytoin.

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背景：此项研究针对以应用苯妥英为抗癫痫预防药物的开颅手术患儿，探讨输注丙泊酚后，肝酶、胰酶及酸碱平衡状态较之基线值的变化和影响。
方法：此次前瞻性临床研究共测量 30 名 4 至 12 岁患儿血清中的谷草转氨酶（AST）、谷丙转氨酶（ALT）、γ-谷氨酰胺转移酶（GGT）、碱性磷酸酶（ALP）、胰淀粉酶、脂肪酶及甘油三酯水平。所有患儿均接受丙泊酚麻醉并使用苯妥英作为抗癫痫的预防用药。对于已使用苯妥英者继续其先前治疗方案；尚未接受苯妥英的患儿则需以 5mg/kg/d 的初始剂量口服给药。血清 AST、ALT、GGT、ALP、胆红素、胰淀粉酶、脂肪酶及甘油三酯水平分别于入院后、术前 1 天及术后第 1、3、5、7 天进行测量。插管后、手术期间（第 2 和第 4 小时）、拔管即刻及拔管后第 1、2、6、12 小时需对动脉血气进行采样。
结果：与基线值相比，术后患儿血清中的 AST、ALT、GGT、ALP、胰淀粉酶、脂肪酶及甘油三酯水平均显著提高，且术后第 1 天达到峰值，并于术后一星期内恢复正常范围。碱剩余在拔管后较基线值明显下降，尽管仍处于正常值范围内，但通常需手术后 6 小时才可恢复至原先基线水平。研究过程中所有患儿均未出现肝炎和胰腺炎的临床征象。胆红素水平也属正常。未有患儿在术后 4 至 6 月内发生肝胰相关的临床并发症。
结论：对于实施开颅手术的患儿，尽管其术后肝酶、胰酶水平轻度增加，但应用丙泊酚进行麻醉维持并不会对肝酶、胰酶及酸碱平衡状态产生显著的临床效应。（范羽译 薛张纲校）

BACKGROUND: In this study, we investigated the effects of propofol infusion on hepatic and pancreatic enzymes and acid-base status compared with baseline values in children undergoing craniotomy who were receiving phenytoin for antiepileptic prophylaxis.
METHODS: In this prospective clinical study, we measured the serum aspartate aminotransferase (AST), alanine aminotransferase (ALT), gamma-glutamyl

transpeptidase (GGT), alkaline phosphatase (ALP), pancreatic amylase, lipase, and triglyceride levels of 30 children ranging from 4 to 12 yr. All children received propofol anesthesia and were taking phenytoin for antiepileptic prophylaxis. Patients already receiving phenytoin were continued on their medication. Peroral 5 mg x kg(-1) x d(-1) phenytoin was started in patients who were not receiving phenytoin. Serum AST, ALT, GGT, ALP, bilirubin, pancreatic amylase, lipase, and triglyceride levels were studied on admission to the hospital, 1 day before surgery, and on postoperative Days 1, 3, 5, and 7. Arterial blood gas samplings were taken after tracheal intubation, during the operation (2nd and 4th h), just after extubation, and 1, 2, 6, and 12 h after extubation.

RESULTS: Serum AST, ALT, GGT, ALP, pancreatic amylase, lipase, and triglyceride levels were increased significantly in the postoperative period compared with baseline with a peak value on postoperative Day 1 and returned to normal values within a week. Base excess levels after extubation were significantly decreased compared with baseline. They were in the normal range, however, and returned to baseline values by 6 h after surgery. There were no clinical signs of hepatitis or pancreatitis. Bilirubin levels were normal. None of the children developed complications related to the liver or pancreas during the 4-6 mo after surgery.

CONCLUSIONS: Despite the slightly increased pancreatic and hepatic enzyme levels during the postoperative period, anesthesia maintenance with propofol in children undergoing craniotomy had no significant clinical effect on the acid-base status or pancreas or liver enzymes.

地氟烷与七氟烷用于门诊病人手术麻醉维持时近期和远期苏醒状态以及呛咳反应的对比

Desflurane versus sevoflurane for maintenance of outpatient anesthesia: the effect on early versus late recovery and perioperative coughing..

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背景：对于门急诊手术病人麻醉维持中使用地氟烷与七氟烷孰优的问题，长久以来一直有着很大争论。尽管有些研究已经坚定地认为与七氟烷相比地氟烷在急诊手术中更优，但是在后期恢复上的一些问题使得这一观点尚未完全得到公认。并且，与七氟烷相比，地氟烷发生呛咳的机率更高，这也使得地氟烷饱受争议。

方法：随机挑选130名需在全麻下行浅表手术的病人，将之根据麻醉维持药物不同分为2组。所有病人使用丙泊酚2mg/kg静注诱导后放置喉罩，空氧混合加1%-3%七氟烷维持，或者加3%-8%地氟烷维持。调整吸入性麻醉气体的浓度以获得稳定的血流动力学指标并且维持脑电双频指数值在50-60之间。局部麻醉和酮咯酸30mg静注镇痛。手术结束时给予昂丹司琼4mg,地塞米松4mg以及甲氧氯普胺10mg预防呕吐。于手术结束开始观察至出院后24小时，评价指标包括眼睛睁开，对指令有反应，定向力恢复，快速定位分数达到14分，首次进食，坐下，起立，独立行走以及出院的时间。病人对麻醉是否满意，术后首日能否恢复日常活

动，不良反应（如呛咳，体动，血氧饱和度下降低于90%，咽喉痛，术后恶心呕吐)，以及是否需要术后镇痛止吐。
结果：两组间具有可比性。总体上地氟烷组术间发生呛咳率为60%，高于七氟烷组为32%，P<0.05，但是挥发性麻醉药物麻醉维持期间呛咳发生率在两组间没有显著性差异。地氟烷麻醉后病人苏醒更快，然而所有病人均能在离开手术室前达到快速恢复的标准，快速定向分数大于等于12分。最后，七氟烷组的出院时间为90+/-31分钟，地氟烷为98+/-35分钟；术后第一天能够恢复日常活动能力病人的百分比为七氟烷组48%，地氟烷组60%。这两项指标在两组间均无显著性差异。
结论：地氟烷用于麻醉维持具有快速苏醒和易呛咳的特点。除去早期的快速苏醒之外，晚期苏醒的效果在这两种挥发性麻醉药物间没有差别。地氟烷与七氟烷均适用于门诊手术病人。
（黄剑译 薛张纲校）
BACKGROUND: There is controversy regarding the relative perioperative benefits of desflurane versus sevoflurane when used for maintenance of anesthesia in the ambulatory setting. Although studies have consistently demonstrated a faster emergence with desflurane (versus sevoflurane), the impact of this difference on the later recovery end points has not been definitively established. Furthermore, the effect of desflurane (versus sevoflurane) on the incidence of coughing is also controversial.
METHODS: We randomized 130 outpatients undergoing superficial surgical procedures requiring general anesthesia to one of two maintenance anesthetic treatment groups. All patients were induced with propofol, 2 mg/kg IV, and after placement of a laryngeal mask airway, anesthesia was maintained with either sevoflurane 1%-3% or desflurane 3%-8% in an air/oxygen mixture. The inspired concentration of the volatile anesthetic was varied to maintain hemodynamic stability and a Bispectral Index value of 50-60. Analgesia was provided with local anesthetic infiltration and ketorolac (30 mg IV). Antiemetic prophylaxis consisted of a combination of ondansetron (4 mg), dexamethasone (4 mg), and metoclopramide (10 mg) at the end of surgery. Assessments included recovery times to eye opening, response to commands, orientation, fast-track score of 14, first oral intake, sitting, standing, ambulating unassisted, and actual discharge. Patient satisfaction with anesthesia, the ability to resume normal activities on the first postoperative day, adverse side effects (e.g., coughing, purposeful movement, oxygen desaturation <90%, sore throat, postoperative nausea, and vomiting), and the requirement for postoperative analgesic and antiemetic drugs were recorded in the early postoperative period and during the initial 24-h period after discharge.
RESULTS: The two study groups had comparable demographic characteristics. Although the overall incidence of coughing during the perioperative period was higher in the desflurane group (60% versus 32% in the sevoflurane group, P < 0.05), the incidences of coughing during the actual administration of the volatile anesthetics (i.e., the maintenance period) did not differ between the two groups. Emergence from anesthesia was more rapid after desflurane; however, all patients achieved fast-track recovery criteria (fast-track score >or=12) before leaving the operating room. Finally, the time to discharge home (90 +/- 31 min in sevoflurane and 98 +/- 35 min in desflurane, respectively) and the percentage of patients able to resume normal activities on the first postoperative day (sevoflurane 48% and desflurane 60%) did not differ significantly between the two anesthetic groups.
CONCLUSIONS: Use of desflurane for maintenance of anesthesia was associated with a faster emergence and a higher incidence of coughing. Despite the faster initial recovery with desflurane, no significant differences were found between the two volatile anesthetics in the later recovery period. Both volatile anesthetics should be available for ambulatory anesthesia.

一项对 SVV- Vigileo™/FloTrac™ 系统和主动脉多普勒超声心动图测定心搏量变异的比较

A Comparison of Stroke Volume Variation Measured by Vigileo™/FloTrac™ System and Aortic Doppler Echocardiography

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背景：这个研究的目的是比较两种方法测定心搏量变异（SVV），经外周动脉使用 Vigileo™/FloTrac™ 测定 SVV 系统(SVV-FloTrac)，与心脏旁主动脉多普勒超声心动图（SVV-Doppler)相比较。
方法：30 名病人行肝移植手术的病人参与此项研究，同时使用 SVV-FloTrac 和 SVV-Doppler 两种方法分别在容量扩张前后测定 SVV 的值。
结果：SVV-FloTrac 和 SVV-Doppler 在血容量扩张前平均的偏倚为 0.7%，95%的置信区间为–4.2% 到 5.5%。测定对扩容有无反应的受试者工作曲线的曲线下面积发现，使用 SVV-FloTrac 和 SVV-Doppler 两种方法测定的结果没有差异。
结论：SVV-FloTrac 和 SVV-Doppler 显示的的偏移和置信区间是可以接受的，对于肝移植手术的病人，通过它们测定机体对扩容反应是相似的。
（陈珺珺译 薛张纲校）

BACKGROUND: The goal of this study was to compare stroke volume variation (SVV) assessed from a peripheral artery with the Vigileo™/FloTrac™ system (SVV-FloTrac) with SVV derived close to the heart by aortic Doppler (SVV-Doppler).
METHODS: Thirty patients undergoing liver transplantation underwent simultaneous SVV-FloTrac and SVV-Doppler measurements before and after intravascular volume expansion.
RESULTS: SVV-FloTrac and SVV-Doppler comparison before intravascular volume expansion showed a mean bias of 0.7%, and 95% limits of agreement of –4.2% to 5.5%. The areas under the receiver operating characteristic curves generated to discriminate responders and nonresponders to intravascular volume expansion were not different for SVV-FloTrac and SVV-Doppler.
CONCLUSIONS: SVV-FloTrac and SVV-Doppler measurements show acceptable bias and limits of agreement, and similar performance in terms of fluid responsiveness in patients undergoing liver transplantation.

原发性肺癌行射频消融时出现大面积空气栓塞

Massive Systemic Air Embolism During Percutaneous Radiofrequency Ablation of a Primary Lung Tumor

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我们报道一例原发性肺癌行射频消融期间出现大面积空气栓塞的病例。在手术近结束时，患者突然出现心肌梗塞，并发室颤，心脏骤停和脑梗塞。胸部 CT 提示左房，左室，主动脉弓和冠状动脉有气液平。头颅 CT 提示额顶部有梗塞灶。通过心肺复苏及高压氧疗治疗心梗和脑梗是有效的。该种治疗肿瘤的方法可能出现严重威胁生命的并发症，这就要求训练有数的麻醉医生参与麻醉。

（陈珺珺译 薛张纲校）
We report the case of a systemic air embolism occurring during pulmonary radiofrequency ablation. At the end of the procedure, the patient experienced a sudden myocardial infarction, complicated by ventricular fibrillation, cardiac arrest, and cerebral infarction. Thoracic computed tomography showed an air-blood level inside the left atrium and ventricle, the aortic arch, and the coronary arteries. Cerebral computed tomography showed an infarct in the frontoparietal area. Myocardial infarction and stroke responded to resuscitation measures, including hyperbaric oxygenation. The occurrence of this life-threatening event confirms the need to train experienced anesthesiologists in these new invasive approaches to cancer treatment.

静脉给予丙氨酸－谷氨酰胺来补充重症监护室中行场内营养的创伤病人血浆谷胱甘肽水平：随机对照试验的结果

The Effect of Intravenous Alanyl-Glutamine Supplementation on Plasma Glutathione Levels in Intensive Care Unit Trauma Patients Receiving Enteral Nutrition: The Results of a Randomized Controlled Trial

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背景：对于严重创伤行肠内营养的病人，我们寻找静脉给予丙氨酸－谷氨酰胺以补充血浆谷胱甘肽水平的治疗效果。
方法：40 名严重创伤、创伤严重评分〉20 分的病人入选了这项随机、对照研究。病人被分为两组：G 组给予静脉补充 0.5 $g \cdot kg^{-1} \cdot d^{-1}$ 的丙氨酸－谷氨酰胺，C 组给予不含丙氨酸－谷氨酰胺的对照液体，药物给予 7 天。我们分别在给药前、给药后第三天、第七天和第十天抽取血标本测定血清谷胱甘肽水平。
结果：在第七、第十天，G 组血浆谷胱甘肽水平均明显高于 C 组 (分别为 1.34 ± 0.20 μM vs 1.13 ± 0.14 μM, 和 1.38 ± 0.19 μM vs 1.12 ± 0.16 μM) ($P < 0.001$).
结论：该项试验证明，对于严重创伤需给予标准肠内营养的病人，静脉给予丙氨酸－谷氨酰胺七天可以增加血浆谷胱甘肽水平。
（陈珺珺译 薛张纲校）
Background: We sought to investigate the effect of IV alanyl-glutamine supplementation on plasma glutathione levels in severely traumatized patients receiving enteral nutrition.
METHODS: Forty adult patients with severe trauma according to the Injury Severity Score >20 were enrolled in this randomized, controlled study. The patients were assigned to two groups: Group G received 0.5 $g \cdot kg^{-1} \cdot d^{-1}$ of alanyl-glutamine dipeptide supplementation IV, and Group C received a control solution without alanyl-glutamine for 7 days. Blood samples were taken for analysis of glutathione before the initiation of supplementation and on the 3rd, 7th, and 10th days of feeding.
RESULTS: Total plasma glutathione levels significantly increased in Group G when compared with Group C on Days 7 and 10 (1.34 ± 0.20 μM vs 1.13 ± 0.14 μM, and 1.38 ± 0.19 μM vs 1.12 ± 0.16 μM) ($P < 0.001$).
CONCLUSIONS: This study demonstrates that IV alanyl-glutamine supplementation for 7 days increases total plasma glutathione levels in critically ill trauma patients receiving standard enteral nutrition.

一项随机试验：在行腰段硬膜外穿刺时使用传统坐位与腘绳肌腱伸展体位的比较

A Randomized Trial of the Traditional Sitting Position Versus the Hamstring Stretch Position for Labor Epidural Needle Placement

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背景：无对照的实验证据提示在行硬膜外镇痛时，采用坐位，关节尽量伸展、髋关节内收、人前倾（腘绳肌腱伸展体位），相比于传统的坐位，可以逆转腰段脊柱前凸。
方法：我们选择了产科病人进行了这项随机试验，在行腰段硬膜外镇痛操作时，分别采用了传统体位和腘绳肌腱伸展体位，对两者进行比较。原始结果是针和骨接触的次数。
结果：两组针和骨接触的次数是一样的。
结论：行腰段硬膜外穿刺时，腘绳肌腱伸展体位与传统体位相比较，在针骨接触次数方面两者是没有差异的。
（陈珺珺译 薛张纲校）
BACKGROUND: Anecdotal and experimental evidence suggest that a sitting position with maximum knee extension, hip adduction, and forward lean (hamstring stretch position) may produce better reversal of the lumbar lordosis than a traditional sitting position.
METHODS: In a randomized trial during initiation of epidural labor analgesia, we compared the traditional versus hamstring stretch positions. The primary outcome was the number of needle-bone contacts.
RESULTS: The groups were equivalent with respect to the number of needle-bone contacts.
CONCLUSIONS: The hamstring stretch position is equivalent to the traditional sitting position in terms of the number of needle-bone contacts encountered when placing labor epidural needles.

轻至中度灰白质低温对大鼠脊髓缺血后的长期疗效

The Long-Term Effects of Mild to Moderate Hypothermia on Gray and White Matter Injury After Spinal Cord Ischemia in Rats

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背景：脊髓缺血后灰质低温的短期疗效已经确认。我们试图观察脊髓缺血后灰白质轻至中度低温的长期疗效。
方法：根据脊髓缺血时的体温（32°C, 35°C, 或 38°C ）和再灌注时间(2或28天)将95只大鼠随机分为8组。脊髓缺血模型通过球囊导管堵塞15分钟和抽血实现。在评估完大鼠后肢运动功能后，灰白质的损伤通过各自正常神经元的数量和空泡变性的程度来评价。
结果： 32°C和35°C 低温组第2天和第28天大鼠的后肢运动功能显著好于正常体温组。32°C和35°C 低温组第2天和第28天大鼠正常神经元的数量显著高于正常体温组。32°C和35°C 低温组第2天和第28天大鼠神经元空泡变性的范围显著小于正常体温组。

结论：缺血时轻至中度低温对灰白质损伤的神经保护作用最多可长至脊髓缺血后28天。

（姚敏敏译 薛张纲校）

BACKGROUND: The short-term effects of hypothermia on gray matter injury after spinal cord ischemia (SCI) have been established. We sought to investigate the long-term effects of mild to moderate hypothermia on gray and white matter injury after SCI.

METHODS: Ninety-five rats were randomly divided into eight groups according to body temperature during SCI (32°C, 35°C, or 38°C) and reperfusion interval (2 or 28 days). SCI was conducted for 15 min using a balloon catheter and blood withdrawal. After assessing the hindlimb motor function, gray and white matter injury was assessed using the number of normal neurons and the extent of vacuolation, respectively.

RESULTS: Hindlimb motor function at 2 and 28 days was significantly better in hypothermic groups of 32°C and 35°C than in the normothermic group. The number of normal neurons at 2 and 28 days was significantly higher in the hypothermic group of 32°C than in the normothermic group. The percentage areas of vacuolation at 2 and 28 days were significantly lower in hypothermic groups of 32°C and 35°C than in the normothermic group.

CONCLUSIONS: The neuroprotective effects of intraischemic mild to moderate hypothermia on gray and white matter injury are mostly sustained for a long-term period of 28 days after SCI.

延时持续后路腰丛阻滞对髋关节成形术后健康相关生活质量的影响：一项前瞻性，一年随访的随机、三盲、安慰剂对照研究

Health-related quality of life after hip arthroplasty with and without an extended-duration continuous posterior lumbar plexus nerve block: a prospective, 1-year follow-up of a randomized, triple-masked, placebo-controlled study.

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背景：我们曾报道过，髋关节成形术后，将原本持续一夜的连续后路腰丛阻滞延长至 4 天可以在术后一段时间内提供明显的好处。然而延时输注是否可以提高其后健康相关的生活质量还不得而知。

方法：接受髋关节成形术的患者从手术直至第二天早上被施予后路腰丛阻滞，用 0.2%罗哌卡因神经周围输注。其后患者被随机分成两组，一组继续给予罗哌卡因（n=24），另一组给予生理盐水（n=23），这项研究实行双盲。患者带着导管和便携式输注泵出院，在术后第四天拔除导管。健康相关生活质量的衡量使用术前，7 天内，还有术后 1，2，3，6 和 12 个月的西安大略和麦克马斯特大学骨关节炎（WOMAC）指数。WOMAC 指数评价三维的健康相关的生活质量，比如疼痛，僵硬和身体功能障碍（全球评分从 0 到 96 分，较低的评分表明较低程度的症状和身体残疾）。为了初步分析，我们需要 6 个时间点中的 3 个，包括第 7 天，第 3、6、12 月中的两个。

结论：两个治疗组有相似的全球 WOMAC 评分，曲线下平均面积计算（两组间曲线下平均面积差异点估计【延时输注组-对照组】=0.8，95%置信区间：-5.3—+6.8【-5.5%— +7.1%】；P=0.80），在所有独立的时间段（P>0.05）。

结论：这项研究发现没有证据证明将继续一夜的连续后路腰丛神经阻滞延长到 4 天可以提高（或降低）髋关节置换术后 7 天到 12 月的健康相关的生活质量。

（俞佳译 薛张纲校）

BACKGROUND: We previously reported that extending an overnight continuous posterior lumbar plexus nerve block to 4 days after hip arthroplasty provides clear benefits during the perineural infusion in the immediate postoperative period. However, it remains unknown whether the extended infusion improves subsequent health-related quality of life.

METHODS: Patients undergoing hip arthroplasty received a posterior lumbar plexus perineural infusion of ropivacaine 0.2% from surgery until the following morning, at which time patients were randomized to continue either perineural ropivacaine (n = 24) or normal saline (n = 23) in a double-masked fashion. Patients were discharged with their catheter and a portable infusion pump, and catheters were removed on postoperative Day 4. Health-related quality of life was measured using the Western Ontario and McMaster Universities Osteoarthritis (WOMAC) Index preoperatively and then at 7 days and 1, 2, 3, 6, and 12 mo after surgery. The WOMAC evaluates three dimensions of health-related quality of life, such as pain, stiffness, and physical functional disability (global score of 0-96, lower scores indicate lower levels of symptoms or physical disability). For inclusion in the primary analysis, we required a minimum of three of the six timepoints, including Day 7 and at least two of Months 3, 6, and 12.

RESULTS: The two treatment groups had similar global WOMAC scores for the mean area under the curve calculations (point estimate for the difference in mean area under the curve for the two groups [extended infusion group-overnight infusion group] = 0.8, 95% confidence interval: -5.3 to + 6.8 [-5.5% to + 7.1%]; P = 0.80) and at all individual timepoints (P > 0.05)。

CONCLUSIONS: This investigation found no evidence that extending an overnight continuous posterior lumbar plexus nerve block to 4 days improves (or worsens) subsequent health-related quality of life between 7 days and 12 mo after hip arthroplasty.

腹腔镜子宫切除术后地塞米松的有效镇痛剂量

The Effective Analgesic Dose of Dexamethasone After Laparoscopic Hysterectomy

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背景：除却镇吐作用，糖皮质激素还有镇痛特性。地塞米松在术后镇痛中的最佳剂量尚未确定。在这个安慰剂对照、剂量探索研究中，我们评估了腹腔镜子宫切除术后三种剂量的地塞米松的镇痛效果。
方法：我们随机将 129 名择期行腹腔镜子宫切除术的妇女分成四组分别在麻醉诱导前接受安慰剂、5mg 地塞米松（D5）、10mg 地塞米松（D10）和 15mg 地塞米松（D15）。患者常规地由异丙酚和瑞芬太尼进行麻醉。至手术后第一日的早晨，术后疼痛由静脉病人自控注射羟考酮控制。术后三天的视觉疼痛评分表、副作用和镇痛药用量被记录下来。
结果：羟考酮的总剂量（术后 0-24 小时）D15 组（0.34 mg/kg [0.11-0.87])较安慰剂组(0.55 mg/kg [0.19-1.13])小(P = 0.003)。术后 0-2 小时羟考酮用量 D10 组(0.17 mg/kg [0.03-0.36])和 D15(0.17 mg/kg [0.03-0.35])组较安慰剂组 (0.26 mg/kg [0.10-0.48]) 小 (P = 0.001, D10 组 VS 安慰剂组; P < 0.001, D15 组 VS 安慰剂组)。术后 2-24 小时，羟考酮的剂量在安慰剂组、D5 组、D10 组和 D15 组却是差不多的(分别为 0.31 mg/kg [0.03-0.78], 0.22 mg/kg [0.03-0.92], 0.24 mg/kg [0.05-0.87], and 0.20 mg/kg [0-0.65])。休息、活动或咳嗽时视觉痛觉量表评分在各实验组无差别。术后第一个 24 小时的眩晕发生率 D15 组较安慰剂组(P = 0.001)、D5 组(P = 0.006)和 D10 组(P = 0.030)低。在以后的恢复期中眩晕在各组的发生率无明显差别。
结论：麻醉诱导前静脉注射 15mg 地塞米松可减少腹腔镜子宫切除术后 24 小时内羟考酮的用量。在术后的 2 小时内，地塞米松 10mg 和 15mg 对减少羟考酮的用量的效果是一致的。
（张玥琪译，薛张纲校）

BACKGROUND: Apart from being antiemetic, glucocorticoids have an analgesic property. The optimal dose of dexamethasone in the management of pain after surgery has not been established. In this placebo-controlled, dose-finding study, we evaluated the analgesic effect of three doses of dexamethasone after laparoscopic hysterectomy.
METHODS: We randomized 129 women scheduled for laparoscopic hysterectomy to receive placebo, dexamethasone 5 mg (D5), 10 mg (D10), or 15 mg (D15) IV before the induction of anesthesia. The patients were anesthetized with propofol and remifentanil in a standardized manner. Until the first postoperative morning, postoperative pain was managed with IV oxycodone using patient-controlled analgesia. The visual analog scale scores for pain and side effects, and the amounts of the analgesics were recorded for 3 days after surgery.
RESULTS: The total dose of oxycodone (0-24 h after surgery) was smaller in the D15 (0.34 mg/kg [0.11-0.87]) group than in the placebo group (0.55 mg/kg [0.19-1.13]) (P = 0.003). The doses of oxycodone during Hours 0-2 after surgery were smaller in the D10 (0.17 mg/kg [0.03-0.36]) and D15 (0.17 mg/kg [0.03-0.35]) groups than in the placebo (0.26 mg/kg [0.10-0.48]) (P = 0.001, D10 versus placebo; P < 0.001, D15 versus placebo) group. During Hours 2-24 after surgery, however, the doses of oxycodone were equal in the placebo, D5, D10, and D15 groups (0.31 mg/kg [0.03-0.78], 0.22 mg/kg [0.03-0.92], 0.24 mg/kg [0.05-0.87], and 0.20 mg/kg [0-0.65], respectively). The visual analog scale scores for pain at rest, in motion, or at cough did not differ in the study groups. The incidence of dizziness was lower in the D15 group than in the placebo group (P = 0.001), the D5 group (P = 0.006), and the D10 group (P = 0.030) during the first 24 h after surgery. During the later course of recovery, the incidence of dizziness did not differ among the four study groups.
CONCLUSIONS: IV dexamethasone 15 mg before induction of anesthesia decreases the oxycodone consumption during the first 24 h after laparoscopic hysterectomy.

During first 2 h after surgery, dexamethasone 10 mg reduces the oxycodone consumption as effectively as the 15 mg dose.

kappa 阿片受体激动剂对初级感觉神经元上的抗河豚毒钠通道的影响

The effect of kappa-opioid receptor agonists on tetrodotoxin-resistant sodium channels in primary sensory neurons.

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背景：在动物及人体试验中已有报道 kappa 阿片受体激动剂(kappa-ORAs)可抑制脊髓背根神经节(DRGs)的非阿片受体介导的钠通道，产生抗伤害作用。在此研究中，我们仔细观察不同结构 kappa-ORAs 对成年鼠 DRGs 上的抗河豚毒(TTX-r)钠通道的抑制作用。

方法：记录试验用成年鼠脊髓背根神经节(DRGs)完整细胞的抗河豚毒(TTX-r)钠离子流。研究不同结构 kappa-ORAs 抑制 TTX-r 钠通道的能力。

结果：消旋的 kappa-ORA，(+/-)U50,488，通过电压依赖方式抑制 TTX-r 钠离子流，半抑制浓度 IC(50)在 49 和 8muM 之间，分别在-100 和 -40 mV 产生预电位。此外，我们发现 kappa-ORA U50,488 的活性异构体 1S,2S U50,488 和非活性异构体 1R,2R U50,488 对 TTX-r 钠离子流的抑制效力相同。然而，钠通道抑制剂和 kappa-ORA 的构效关系有明显不同，因为另外一种 kappa-ORA (ICI 204,488) 对 TTX-r 钠通道无效。我们通过研究(+/-)U50,488 发现这类复合物对钠通道的阻滞作用是通过优先与 TTX-r 钠通道相互作用使其处于慢性失活状态并妨碍其复活。

结论：我们的结果暗示 TTX-r 钠通道可被多种 kappa-ORAs 通过非阿片受体依赖性机制抑制。虽然通过抑制钠通道产生的的效力明显弱于阿片受体介导的作用，但这类复合物仍可起到一定的抗伤害作用。

（张钊译 薛张纲校）

BACKGROUND: A non-opioid receptor-mediated inhibition of sodium channels in dorsal root ganglia (DRGs) by kappa-opioid receptor agonists (kappa-ORAs) has been reported to contribute to the antinociceptive actions in animals and humans. In this study, we examined structurally diverse kappa-ORAs for their abilities to inhibit tetrodotoxin-resistant (TTX-r) sodium channels in adult rat DRGs.

METHODS: Whole-cell recordings of TTX-r sodium currents were performed on cultured adult rat DRGs. Structurally diverse kappa-ORAs were studied for their abilities to inhibit TTX-r sodium channels.

RESULTS: The racemic kappa-ORA, (+/-)U50,488, inhibited TTX-r sodium currents in a voltage-dependent manner, yielding IC(50) values of 49 and 8 muM, at prepulse potentials of -100 and -40 mV, respectively. Furthermore, we found that both the kappa-ORA U50,488 active enantiomer 1S,2S U50,488 and the inactive enantiomer 1R,2R U50,488 were equally potent inhibitors of TTX-r sodium currents. Structurally related kappa-ORAs, such as BRL 52537 and ICI 199,441 also inhibited TTX-r sodium currents. However, sodium channel inhibition and kappa-opioid receptor agonism have a distinct structure-activity relationship because another kappa-ORA (ICI 204,488) was inactive versus TTX-r sodium channels. We further investigated the sodium channel block of this class of compounds by studying (+/-)U50,488. (+/-)U50,488 was found to preferentially interact with the slow inactivated state of TTX-r sodium channels and to retard recovery from inactivation.

CONCLUSION: Our results suggest that TTX-r sodium channels can be inhibited by many kappa-ORAs via an opioid receptor-independent mechanism. Although the

potency for sodium channel inhibition is typically much less than apparent affinity for opioid receptors, sodium channel block may still contribute to the antinociceptive effects of this class of compounds.

穿刺前旁正中超声指导硬膜外麻醉

Preinsertion Paramedian Ultrasound Guidance for Epidural Anesthesia

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背景：超声指导硬膜外麻醉穿刺正获得越来越多的益处。定义旁正中超声扫描技术可能有助于更准确的识别脊椎水平。寻找硬膜外间隙深度的代理测量方法也可能提高扫描技术。

方法：在旁正中水平用硬膜外超声对 20 名孕妇进行测量，并比较预测的硬膜外间隙深度与实际正中的深度。也比较受试者生物测定学值、横突深度和腰部脂肪厚度与各对应实际值。

结果：扫描技术可以测量所有个体的硬膜外间隙深度。超声测得的深度与实际深度非常接近(R^2 = 0.8、95%可信区间–14.8 to 5.2 mm)，这与患者的生物测定学值(R^2 < 0.25)、相邻横突深度(R^2 = 0.35、95%可信区间–13.8 to 19.1 mm)以及表层的脂肪厚道不同(R^2 = 0.66)。试验之初超声扫所需时间为 10 分钟，但到最后只需 3 分钟。

结论：旁正中超声可以用来估计正中距硬膜外间隙的深度。然而，代理测量与硬膜外间隙深度的相关度还不足以建议可以用它们的测量值来代替硬膜外间隙测量的实际深度。

（朱兰芳译 薛张纲校）

BACKGROUND: Ultrasound is receiving growing interest for improving the guidance of needle insertion in epidural anesthesia. Defining a paramedian ultrasound scanning technique would be helpful for correctly identifying the vertebral level. Finding surrogate measures of the depth of the epidural space may also improve the ease of scanning.

METHODS: We examined 20 parturients with pre-epidural ultrasound in the paramedian plane, and the predicted depth was compared with the actual midline depth. The actual depth was also compared with subject biometrics, depth of transverse process, and thickness of lumbar fat.

RESULTS: The scanning technique allowed the depth of the epidural space to be measured in all subjects. The depth measured in ultrasound was strongly correlated to the actual depth (R^2 = 0.8 and 95% limits of agreement of –14.8 to 5.2 mm), unlike patient biometrics (R^2 < 0.25), the depth of the neighboring transverse processes (R^2 = 0.35 and 95% limits of agreement of –13.8 to 19.1 mm), or the thickness of overlying fat (R^2 = 0.66). The duration of the ultrasound scan was 10 min at the beginning of the trial and 3 min for the last subjects.

CONCLUSIONS: Paramedian ultrasound can be used to estimate the midline depth to the epidural space. The surrogate measures are not sufficiently correlated with the depth to the epidural space to recommend them as a replacement for the actual depth to the epidural space measurement.

布比卡因与 Pegylated 脂质体结合

Bupivacaine Binding to Pegylated Liposomes

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Anesth Analg 2009 109: 678-682

背景：局麻药比如布比卡因过量可以造成严重毒性。脂质体乳液被提出用来治疗这类并发症。脂质体因为它的特殊结构和表面电荷使其有很高的亲和力，因此可以使布比卡因从溶剂中清除从而达到治疗局麻药过量的作用。
方法：我们研究了离体缓冲液中，单层、多层的阴离子聚合体外层包裹的脂质体结合布比卡因的能力，从而评估其药物亲和力。同时在人血清中进行该项结合试验，从而和能与药物分子结合的血清蛋白相比较。
结果：1.45 和 2.9 mg /mL 的单层脂质体分别从缓冲液种分离了 60%–65% 和 77%–85%的布比卡因。在各种浓度下，增加脂质负荷都可以增加药物的摄取。(在 5, 20, 35, and 50 μM 的 *P* 值分别= 0.001, 0.002, <0.001,和 0.003).多层脂质体每单位体积结合更多药物, 磷脂浓度为 1.45 mg /mL 时结合了 71%–90% 的布比卡因。我们比较了 1.45 mg/mL 浓度下的单层和多层脂质体,多层脂质体对于四种药物浓度中的三种有较好的作用(在浓度为 5, 20, 35 和 50 μM 时，*P* 分别= 0.002, 0.001, 0.001 和 0.08).在人血清样本中，在布比卡因的浓度为 5, 20, 35, and 50 μM 时,单层脂质体(2.9 mg /mL 浓度的脂质体)分别降低了未结合（游离）药物 36% (*P* = 0.037), 56% (*P* = 0.022), 47% (*P* = 0.042),和 50% (*P* = 0.018)。
结论：在缓冲液和人血清中，阴离子 pegylated 脂质体可以很好的结合布比卡因。这一结果提示，通过药物重分布，静脉注射脂质体可以用来治疗布比卡因中毒。
（陈珺珺译 薛张纲校）

BACKGROUND: Local anesthetic drugs, such as bupivacaine, can cause severe toxicity. Lipid emulsions have been proposed and used clinically for treating such cases. Liposomes may be an alternative for overdose treatment because of their unique structures and surface charges, which allows them to act as high affinity drug "sinks" and remove bupivacaine from solution.
METHODS: We conducted *in vitro* experiments with unilamellar and multilamellar anionic, polymer-coated liposomes to determine the amount of bupivacaine bound to liposomes in buffer solutions as a means of assessing the liposome-drug affinity. Binding experiments were also done in human serum to determine the liposomes' ability to compete with serum proteins for binding drug molecules.
RESULTS: Unilamellar liposomes sequestered 60%–65% and 77%–85% of bupivacaine from buffer at 1.45 and 2.9 mg lipid/mL, respectively. The increased lipid loading increased the drug uptake at all drug concentrations measured (*P* = 0.001, 0.002, <0.001, and 0.003 for 5, 20, 35, and 50 μM, respectively). Multilamellar liposomes bound more drug per unit mass, with 71%–90% of the total bupivacaine bound at a phospholipid concentration of 1.45 mg lipid/mL. When comparing unilamellar and multilamellar liposomes at 1.45 mg lipid/mL, the multilamellar liposomes were significantly better at 3 of the 4 drug concentrations measured (*P* = 0.002, 0.001, 0.001, and 0.08 for 5, 20, 35, and 50 μM, respectively). In human serum samples, unilamellar liposomes (2.9 mg lipid/mL) reduced the unbound (free) drug by 36% (*P* = 0.037), 56% (*P* = 0.022), 47% (*P* = 0.042), and 50% (*P* = 0.018) for bupivacaine concentrations of 5, 20, 35, and 50 μM, respectively.
CONCLUSIONS: The anionic, pegylated liposomes exhibit high binding for bupivacaine, both in buffer and in human serum. These results suggest that an IV

injection of liposomes could be useful for the treatment of bupivacaine toxicity through drug redistribution.

在体外循环期间血液稀释和红细胞输注与肾脏和脾脏损伤的生化标记的关系

The Association of Hemodilution and Transfusion of Red Blood Cells with Biochemical Markers of Splanchnic and Renal Injury During Cardiopulmonary Bypass

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背景：在体外循环期间血液稀释是低红细胞压积的主要原因。这种低红细胞压积可能不足以用于最佳的组织氧运输，常会导致血细胞输注。本文主要研究术中红细胞压积和异体输血之间的联系对术后肾脏和脾脏部位损伤标记释放的影响。

方法：50 例选择性在体外循环下行冠脉搭桥术的病人。用乳酸盐浓度评估全身组织缺氧情况。用尿 N-乙酰-β-D-氨基葡萄糖苷酶(NAG)和肠脂肪酸结合蛋白(IFABP)测定来评估肾脏和脾脏缺血状况。根据病人的最低红细胞压积回顾性分为两组(<24% or ≥24%)。

结果：术中乳酸和术后 NAG 和 IFABP 浓度在红细胞压积低于 24%时比红细胞压积高于 24%时高（$P < 0.05$）。低红细胞压积与高乳酸浓度（$R^2 = 0.150$, $P < 0.01$）、术后高 NAG 浓度($R^2 = 0.138$, $P < 0.01$) 和高 IFABP 浓度 ($R^2 = 0.107$, $P < 0.01$)都相关。体外循环期间血细胞输注与高乳酸($R^2 = 0.089$, $P < 0.05$)、高 NAG ($R^2 = 0.431$, $P < 0.01$)和高 IFABP ($R^2 = 0.189$, $P < 0.01$)相关。

结论：本研究结果支持术中血液稀释使术中血细胞比容低于 24%以及随后的输血都与肾脏和脾脏部位损伤标记的释放有关。

（彭中美 译 马皓琳 李士通 校）

BACKGROUND: Hemodilution is the main cause of a low hematocrit concentration during cardiopulmonary bypass. This low hematocrit may be insufficient for optimal tissue oxygen delivery and often results in packed cell transfusion. Our objective in this study was to find a relationship between intraoperative hematocrit and allogeneic blood transfusion on release of postoperative injury markers from the kidneys and the splanchnic area.

METHODS: Fifty consecutive patients undergoing coronary artery bypass grafting with cardiopulmonary bypass were included. Systemic tissue hypoxia was assessed by lactate concentrations. Kidney and splanchnic ischemia were assessed by the measurement of *N*-acetyl-β-d-glucosaminidase (NAG) and intestinal fatty acid binding protein (IFABP) in urine. Patients were retrospectively placed into groups according to their lowest hematocrit concentration on bypass (<24% or ≥24%).

RESULTS: The intraoperative lactate and the postoperative NAG and IFABP concentrations were higher in the low hematocrit group (<24%) than in the high hematocrit group (≥24%; $P < 0.05$). Low hematocrit correlated with higher lactate concentrations ($R^2 = 0.150$, $P < 0.01$) and with higher NAG concentrations ($R^2 = 0.138$, $P < 0.01$) and IFABP concentrations ($R^2 = 0.107$, $P < 0.01$) postoperatively. Transfusion of packed cells during cardiopulmonary bypass correlated with higher lactate ($R^2 = 0.089$, $P < 0.05$), NAG ($R^2 = 0.431$, $P < 0.01$), and IFABP concentrations ($R^2 = 0.189$, $P < 0.01$).

CONCLUSIONS: The results support the concept that hemodilution below an intraoperative hematocrit of 24% and consequently transfusion of red blood cells is related to release of injury markers of the kidneys and splanchnic area.

患婴儿神经元蜡样质脂褐质沉积症的儿童在麻醉期间低体温和心动过缓的风险增加

Children with Infantile Neuronal Ceroid Lipofuscinosis Have an Increased Risk of Hypothermia and Bradycardia During Anesthesia

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背景：神经元蜡样脂褐质沉积症（NCLs）是一组常染色体隐性遗传的神经变性疾病，其特征是在神经元和其它类型细胞的溶酶体内自身荧光物质蓄积。婴儿NCL（INCL）亚型是罕见的（超过一百万初生儿中有一例）、最具灾难性的儿童亚型，它是由编码棕榈酰蛋白硫酯酶-1 的 CLN1 基因突变引起。

方法：为研究 INCL 患儿在全麻期间低体温和心动过缓的发生率，我们使用病例对照研究检查 INCL 患儿和对照儿童接受麻醉进行诊断性研究的围麻醉过程。

结果：8 个 INCL 患儿（在接受首次麻醉时平均年龄 25 个月[范围：10-32 月]）和 25 个对照（平均年龄 44 个月[范围：18-92 月]）进行 62 次麻醉用于非手术性操作。INCL 患儿有包括发育延迟、肌阵挛和视觉障碍的神经病学缺陷。INCL 患儿的基础体温的较低(36.4 ± 0.1 比 36.8 ± 0.1, INCL 患儿相对于对照, $P < 0.007$)，且在麻醉期间尽管给予积极地保温技术， INCL 患儿仍然比对照出现明显更多的低体温(发生病例 18 比 0, $P < 0.001$)和窦性心动过缓（10 比 1，$P < 0.001$）。INCL 诊断显著地与麻醉期间体温降低相关($P < 0.001$)，而与年龄、性别和麻醉持续时间无相关性(P = NS)。

结论：我们报道 INCL 患儿的基础体温较低，且在全麻期间尽管给予复温干预，低体温和心动过缓的风险仍然增高。这提示是一个以前未知的 INCL 显型，具有受损的体温调节。因此，当麻醉这些儿童时，必须保证细心的监护和常规使用保温干预。

（王宏 译，马皓琳，李士通 校）

BACKGROUND: Neuronal ceroid lipofuscinoses (NCLs) are a group of autosomal recessive neurodegenerative diseases characterized by lysosomal accumulation of autofluorescent material in neurons and other cell types. The infantile NCL (INCL) subtype is rare (1 in >100,000 births), the most devastating of childhood subtypes, and is caused by mutations in the gene *CLN1*, which encodes palmitoyl-protein thioesterase-1.

METHODS: To investigate the incidence of hypothermia and bradycardia during general anesthesia in patients with INCL, we conducted a case-control study to examine the perianesthetic course of patients with INCL and of controls receiving anesthesia for diagnostic studies.

RESULTS: Eight children with INCL (mean age 25 mo [range, 10-32] at first anesthetic) and 25 controls (mean age 44 mo [range, 18-92]) underwent 62 anesthetics for nonsurgical procedures. Patients with INCL had neurologic deficits including developmental delay, myoclonus, and visual impairment. Patients with INCL had lower baseline temperature (36.4 ± 0.1 vs 36.8 ± 0.1, INCL versus controls, $P < 0.007$), and during anesthesia, despite active warming techniques, had significantly more hypothermia (18 vs 0 episodes, $P < 0.001$) and sinus bradycardia (10 vs 1, $P < 0.001$) compared with controls. INCL diagnosis was significantly associated with temperature decreases during anesthesia ($P < 0.001$), whereas age, sex, and duration of anesthesia were not (P = NS).
CONCLUSIONS: We report that patients with INCL have lower baseline body temperature and during general anesthesia, despite rewarming interventions, are at increased risk for hypothermia and bradycardia. This suggests a previously unknown INCL phenotype, impaired thermoregulation. Therefore, when anesthetizing these children, careful monitoring and routine use of warming interventions are warranted.

失血性休克对猪模型中异丙酚的脑动电流描记和止动效应的影响

The Influence of Hemorrhagic Shock on the Electroencephalographic and Immobilizing Effects of Propofol in a Swine Model

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背景：失血性休克增加了异丙酚的催眠作用，但失血性休克对异丙酚的止动效应的影响尚无定论。
方法：24 只用异氟烷吸入麻醉的猪(30.3 ± 3.6 kg)被随机分到对照组(n = 12)或失血性休克组(n = 12)。休克组的动物流血至平均动脉压达到 50mmHg，且维持在这一水平 60 分钟。在异氟烷吸入停止后，异丙酚以 50 mg · kg^{-1} · h^{-1} 输注直到每 2 分钟应用悬蹄钳夹法观察无体动。测量异丙酚浓度的动脉血样在每次钳夹悬蹄前收集，同时监测脑电双频指数(BIS)。用 BIS 比作用部位浓度的 S 形曲线抑制最大效应模型和体动的机率比作用部位浓度的对数回归分析进行药效动力学分析。
结果：达到比基础 BIS 值减少 50%及有害刺激后无体动所需要的异丙酚剂量因失血性休克分别减少 54%和 38%。失血性休克减少了产生 50%的 BIS 最大效应的作用部位浓度（从 11.6 ± 3.8 到 9.1 ± 1.7 μg/mL）及产生 50%体动的机率的作用部位浓度（从 26.8 ± 1.0 到 20.6 ± 1.0 μg/mL）。
结论：结果显示失血性休克增加了异丙酚的催眠和止动效应，是由于药代学和药效学的改变，其中两种效应的药效学变化程度相似。
（唐李隽 译 马皓琳 李士通 校）

BACKGROUND: Hemorrhagic shock increases the hypnotic effect of propofol, but the influence of hemorrhagic shock on the immobilizing effect of propofol is not fully defined.
METHODS: Twenty-four swine (30.3 ± 3.6 kg) were anesthetized by inhalation of isoflurane and randomly assigned to either a control (n = 12) or a hemorrhagic shock (n = 12) group. Animals in the shock group were bled to a mean arterial blood pressure of 50 mm Hg and maintained at this level for 60 min. After isoflurane inhalation was stopped, propofol was infused at 50 mg · kg^{-1} · h^{-1} until no movement was observed after application of a dewclaw clamp every 2 min. Arterial samples for measurement of the propofol concentration were collected just before each use of the dewclaw clamp

and the Bispectral Index (BIS) was also recorded. Analysis of the pharmacodynamics was performed using a sigmoidal inhibitory maximal effect model for BIS versus effect-site concentration and a logistic regression analysis for the probability of movement versus effect-site concentration.
RESULTS: The propofol doses needed to reach a 50% decrease from baseline BIS, and no movement after noxious stimuli were reduced by hemorrhagic shock by 54% and 38%, respectively. Hemorrhagic shock decreased the effect-site concentration that produced 50% of the maximal BIS effect from 11.6 ± 3.8 to 9.1 ± 1.7 μg/mL and that producing a 50% probability of movement from 26.8 ± 1.0 to 20.6 ± 1.0 μg/mL.
CONCLUSIONS: The results show that hemorrhagic shock increases both the hypnotic and immobilizing effects of propofol due to pharmacokinetic and pharmacodynamic alterations, with the changes in pharmacodynamics occurring to a similar extent for both effects.

阿瑞吡坦或其前体药物福沙吡坦对健康受试者 QTc 间期无影响

Lack of Effect of Aprepitant or Its Prodrug Fosaprepitant on QTc Intervals in Healthy Subjects

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背景：单次 115mg 剂量的福沙吡坦——NK_1 受体拮抗剂阿瑞吡坦前体药物的静脉制剂与 125mg 口服的阿瑞吡坦生物效价相等。迄今，福沙吡坦/阿瑞吡坦对 QTc 间期未显示有临床意义的作用。本研究旨在证实上述发现。
方法：本次双盲、有效对照、随机、三种治疗方案、3 阶段交叉研究是评估 200mg 福沙吡坦对年轻健康受试者 QTc 间期延长的作用。每阶段受试者按照随机顺序接受 400mg 莫西沙星口服、200mg 福沙吡坦静脉注射或安慰剂。通过 12 导联心电图（ECGs）评估福沙吡坦对 QTc 间期的作用。每位受试者在每个阶段的 QTc 间期基础值为从给药前 ECGs 中提取 5 个重复基础 QTc 间期的平均值。给药前、给药后 2、5、10、15、20、30、45 分钟及 1、1.5、2、3、4、6 和 8 小时测定采集 ECGs。通过一个适用于交叉研究设计的重复测定混合模型评估个体 QTc 间期相对于基础值的变化值。计算福沙吡坦对于安慰剂和莫西沙星对安慰剂在不同时点对于 QTc 间期与基础值的实际差值的双侧 90％可信限（CI）。
结果：给予福沙吡坦 200mg 后，在 T_{max} 平均（95％CI）QTc 间期与基础值差值为–1.45 (–4.67 到 1.77) ms，安慰剂校正平均（90％CI）QTc 间期与基础值差值为 s –1.37 (–4.78 to 2.05) ms。α= 0.05 时两者都不具有统计学意义。给予 400mg 莫西沙星后 2 小时平均（95％CI）QTc 间期与基础值差值为 9.71 (6.49–12.93) ms，给予莫西沙星 T_{max} 时安慰剂校正平均（90％CI）QTc 间期与基础值差值为 10.50 (7.09–13.92) ms。α= 0.05 时两者均具有统计学意义。给予福沙吡坦 200mg 后阿瑞吡坦的最高血药浓度为 6300 ng/mL（比历史上给予 115mg 福沙吡坦[3095 ng/mL]、125mg 阿瑞吡坦[1600 ng/mL]和 40mg 阿瑞吡坦[675 ng/mL]后测得的血药浓度分别高约 2 倍、4 倍和 9 倍）。
结论：在接受福沙吡坦 200mg 的受试者中未发现在任何时间点有任何有临床意义的 QTc 间期延长，而给予莫西沙星 400mg 后在接近莫西沙星 T_{max} 时和附加的时间点发现 QTc 间期延长。如此大剂量的福沙吡坦和随之而来的阿瑞吡坦高血浆浓度却未造成 QTc 延长，该现象支持临床剂量的福沙吡坦或阿瑞吡坦与 QTc 间期显著延长无关的预期。
（周雅春 译 李士通 马皓琳 校）

BACKGROUND: A single 115-mg dose of fosaprepitant, the IV prodrug of the NK_1 receptor antagonist aprepitant, is bioequivalent to a 125-mg dose of oral aprepitant. Thus far, fosaprepitant/aprepitant has not shown a meaningful effect on QTc intervals; in this study, we sought to confirm these findings.
METHODS: This double-blind, active-controlled, randomized, three-treatment, three-period, crossover study in healthy young subjects evaluated the effect of a 200-mg dose of fosaprepitant on QTc prolongation. In each period, subjects received 400 mg moxifloxacin *per os*, 200 mg fosaprepitant IV, or placebo in randomized sequence. The effect of fosaprepitant on QTc interval was assessed by 12-lead electrocardiograms (ECGs). The baseline value for QTc interval for each subject during each period was defined as the average of five replicate baseline QTc intervals extracted from predose ECGs. ECGs were performed at predose, 2, 5, 10, 15, 20, 30, 45 min; and 1, 1.5, 2, 3, 4, 6, and 8 h postinfusion. Values for individual QTc change from baseline were evaluated in a repeated-measures mixed model appropriate for a crossover design. A two-sided 90% confidence interval (CI) for the true difference in QTc interval change from baseline at each timepoint was calculated for fosaprepitant versus placebo and for moxifloxacin versus placebo.
RESULTS: After fosaprepitant 200-mg administration, the mean (95% CI) QTc interval change from baseline at T_{max} was –1.45 (–4.67 to 1.77) ms, and the placebo-corrected mean (90% CI) QTc interval change from baseline was –1.37 (–4.78 to 2.05) ms. Neither was statistically significant at $\alpha = 0.05$. After 400 mg moxifloxacin administration, the mean (95% CI) QTc interval change from baseline at 2 h was 9.71 (6.49–12.93) ms, and the placebo-corrected mean (90% CI) QTc interval change from baseline at moxifloxacin T_{max} was 10.50 (7.09–13.92) ms. Both were statistically significant at $\alpha = 0.05$. The maximum aprepitant concentration after fosaprepitant 200 mg administration was 6300 ng/mL (approximately twofold, fourfold, and ninefold higher than that observed historically with fosaprepitant 115 mg [3095 ng/mL], aprepitant 125 mg [1600 ng/mL], and aprepitant 40 mg [675 ng/mL]).
CONCLUSIONS: In subjects receiving fosaprepitant 200 mg, no clinically meaningful increases in QTc were seen at any timepoint, whereas after moxifloxacin 400 mg, increases were observed at the approximate T_{max} of moxifloxacin and additional timepoints. The lack of QTc increase at this high dose of fosaprepitant and resulting aprepitant plasma exposures support the expectation that clinical doses of fosaprepitant or aprepitant will not be associated with significant QTc prolongation.

在机器人辅助的根治性前列腺切除手术中倾斜度较大的头低脚高位对眼内压的影响

The Effects of Steep Trendelenburg Positioning on Intraocular Pressure During Robotic Radical Prostatectomy

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背景：眼内压在倾斜度较大的头低脚高体位时会增加，但是增加的幅度却没有人加以定量。而且在机器人辅助的前列腺切除手术中影响眼内压增加的因素也没有得到研究。在本次研究中，我们试着对在机器人械辅助前列腺切除术中处于倾斜

度较大的头低脚高位的病人眼内压变化进行定量并检测对这些变化影响大的术前因素。
方法：在本次前瞻性的研究中，我们对 30 位接受机器人辅助前列腺切除术的病人通过特大号的张力记录笔（Tono-pen®）测量了眼内压。我们测量了病人麻醉前清醒仰卧位时（基础值 T1）、麻醉后水平卧位时（T2）、麻醉后腹部充入二氧化碳（CO_2）后(T3)，麻醉后处于倾斜度较大的头低脚高位时（T4）、手术结束时位于倾斜度较大的头低脚高位时(T5)、苏醒前仰卧位时(T6)、苏醒后一小时位于仰卧位时 (T7)的眼内压。
结果：倾斜度较大的头低脚高位结束时（T5）的眼内压平均值比仰卧位 T1 值高了 13.3 ± 0.58 (平均值 ± 标准误) mm Hg($P < 0.0001$)，以 mm Hg 为单位的各时点眼内压值的最小二乘方评估值如下：T1 = 15.7, T2 = 10.7, T3 = 14.6, T4 = 25.2, T5 = 29.0, T6 = 22.2, T7 = 17.0。通过单变量混合效应模型来研究 T1–T5 的时间段，气道压峰值、平均动脉压、$ETco_2$ 和时间是眼内压增加的显著预测因子，而年龄、体重指数、失血量、静脉输液量、平均气道压和地氟醚麻醉药的浓度对眼内压没有预测性。从 T4 到 T5 时段，其中没有任何体位和围术期的介入，我们通过多变量分析评估了眼内压升高的预测因素。在较稳定并长时间的头低脚高体位时，手术持续时间（单位 min）和 $ETco_2$ 值是仅有的能显著预测眼内压升高的因素。校正手术时间后，$ETco_2$ 每升高 1mm Hg 眼内压平均增加 0.21 mm Hg。校正 $ETco_2$ 后，手术每用时 1min，眼内压平均增加 0.05 mm Hg。
结论：眼内压值在倾斜度较大的头低脚高位结束时（T5）达到峰值，比麻醉前诱导（T1）值平均高了 13 mm Hg。在头低脚高位时（T4 到 T5 时段），手术持续时间和 $ETco_2$ 值是眼内压升高的仅有的显著预测因素。
（姜旭晖译，马皓琳，李士通校）
BACKGROUND: Intraocular pressure (IOP) increases in steep Trendelenburg positioning, but the magnitude of the increase has not been quantified. In addition, the factors contributing to this increase have not been studied in robot-assisted prostatectomy cases. In this study, we sought to quantify the changes in IOP and examine perioperative factors responsible for these changes while patients are in the steep Trendelenburg position during robotic prostatectomy.
METHODS: In this prospective study, we measured IOP using a Tono-pen® XL in 33 patients undergoing robot-assisted prostatectomy. The IOP was measured before anesthesia while supine and awake (baseline T1), anesthetized and supine (T2), anesthetized after insufflation of the abdomen with carbon dioxide (CO_2) (T3), anesthetized in steep Trendelenburg (T4), anesthetized in steep Trendelenburg at the end of the procedure (T5), anesthetized supine before awakening (T6), and 1 hr after awakening in the supine position (T7).
RESULTS: On average, IOP was 13.3 ± 0.58 (mean ± se) mm Hg higher at the end of the period of steep Trendelenburg position (T5) compared with supine position T1 ($P < 0.0001$). The least square estimates for each time point in mm Hg were as follows: T1 = 15.7, T2 = 10.7, T3 = 14.6, T4 = 25.2, T5 = 29.0, T6 = 22.2, T7 = 17.0. Using univariate mixed effects models for the T1–T5 time periods, peak airway pressure, mean arterial blood pressure, $ETco_2$, and time were significant predictors of the IOP increase, whereas age, body mass index, blood loss, volume of IV fluid administered, mean airway pressure, and desflurane concentration were not predictive. In T4–T5, which involved no significant positional or perioperative interventions, we performed a multivariate analysis to evaluate predictors of IOP increases. Surgical duration (in minutes) and $ETco_2$ were the only significant variables predicting changes in IOP during stable and prolonged Trendelenburg positioning. On average, IOP increased 0.21 mm Hg per mm Hg increase in $ETco_2$ after adjusting for time. An increase of 0.05 mm Hg in IOP per minute of surgery on average was observed during this period in the Trendelenburg position after adjusting for $ETco_2$.

CONCLUSIONS: IOP reached peak levels at the end of steep Trendelenburg position (T5), on average 13 mm Hg higher than the preanesthesia induction (T1) value. Surgical duration and $ETco_2$ were the only significant predictors of IOP increase in the Trendelenburg position (T4–T5).

医院前气管插管和死亡率：1 级创伤中心的观察

Prehospital Intubations and Mortality: A Level 1 Trauma Center Perspective

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背景：Ryder 创伤中心是一个每年接受将近 3800 名急诊病人的 1 级创伤中心。在本研究中，我们希望测定医院前气管插管（PHI）的失败发生率、它和医院内死亡率的关系以及和 PHI 有关的可能危险因素。
方法：我们对 2003 年 8 月到 2006 年 6 月期间接受过紧急医院前气道管理且入院的创伤患者做了一项前瞻性观察研究。PHI 定义为尝试插管后初次评估确定气管内插管位置不正确或者需要采取其他气道管理设备来作为急救措施。
结果：1320 名患者一抵达创伤中心便由一位麻醉医生进行了紧急气道干预。其中 203 名最初是由急救医疗中心的人员在事发地点就进行气管插管的，203 名中的 74 名(36%)得以幸存到出院。评估气管插管的成功率时，203 名中有 63 名(31%)达到了医院前气管插管失败的标准，它们都需要再次气管插管，63 名中只有 18 名(29%)得以幸存到出院。这些病人通过双腔通气管（Combitube® ）(n = 28)、喉面罩导气管（Laryngeal Mask Airway® ）(n = 6),或者环甲膜切开 (n = 4)得到紧急的气道管理。63 名患者中的另外 25 名(12%)在到达创伤中心时进行的初次气道评估中才被发现导管在食道里。我们发现正确插管和没有正确插管的患者之间死亡率没有差别。其他指标包括年龄、性别、体重、受伤机制、有无面部损伤以及急救医疗服务都和气管插管失败发生率增加之间没有联系。
结论：这项前瞻性研究显示在一个大城市创伤中心中的医院前气管插管失败发生率为 31%。我们发现正确插管和没有正确插管的患者之间死亡率没有差别。我们支持在医院外的条件下不能迅速气管插管的重症创伤病人中使用皮囊活瓣面罩是适当的气道管理方法。
（黄佳佳译，马皓琳，李士通校）

BACKGROUND: Ryder Trauma Center is a Level 1 trauma center with approximately 3800 emergency admissions per year. In this study, we sought to determine the incidence of failed prehospital intubations (PHI), its correlation with hospital mortality, and possible risk factors associated with PHI.
METHODS: A prospective observational study was conducted evaluating trauma patients who had emergency prehospital airway management and were admitted during the period between August 2003 and June 2006. The PHI was considered a failure if the initial assessment determined improper placement of the endotracheal tube or if alternative airway management devices were used as a rescue measure after intubation was attempted.
RESULTS: One-thousand-three-hundred-twenty patients had emergency airway interventions performed by an anesthesiologist upon arrival at the trauma center. Of those, 203 had been initially intubated in the field by emergency medical services personnel, with 74 of 203 (36%) surviving to discharge. When evaluating the success of the intubation, 63 of 203 (31%) met the criteria for failed PHI, all of them requiring intubation, with only 18 of 63 (29%) surviving to discharge. These patients had rescue

airway management provided either via Combitube® (*n* = 28), Laryngeal Mask Airway® (*n* = 6), or a cricothyroidotomy (*n* = 4). An additional 25 of 63 patients (12%) had unrecognized esophageal intubations discovered upon the initial airway assessment performed on arrival. We found no difference in mortality between those patients who were properly intubated and those who were not. Several other variables, including age, gender, weight, mechanism of injury, presence of facial injuries, and emergency medical services were not correlated with an increased incidence of failed intubations. **CONCLUSION:** This prospective study showed a 31% incidence of failed PHI in a large metropolitan trauma center. We found no difference in mortality between patients who were properly intubated and those who were not, supporting the use of bag-valve-mask as an adequate method of airway management for critically ill trauma patients in whom intubation cannot be achieved promptly in the prehospital setting.

重症监护室内的持续脑电监测

Continuous Electroencephalogram Monitoring in the Intensive Care Unit

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因为近来技术的进步，目前已经可能同时连续记录和监测许多重症病人的脑电图（EEG）数据。连续 EEG（cEEG）监测可以提供脑功能的动态信息，早期检测到神经系统状态的变化，这在临床检查有限时特别有用。无抽搐性癫痫在昏迷的重症病人中是常见的，并且会对受伤的脑组织有很多不良影响。这种病人的大部分癫痫发作不用 cEEG 是不能检测出来的。cEEG 监测最常用于发现和指导无抽搐性癫痫的治疗，包括惊厥性癫痫持续状态。而且，cEEG 常用于指导治疗颅内高压药理性昏迷的管理。目前研究的 cEEG 一个新的应用是发现高危病人新发生的或恶化的脑缺血，尤其是蛛网膜下腔出血的病人。改良的定量 EEG 软件有助于 cEEG（覆盖整个头皮）能够可行性地提供床旁实时脑功能变化的持续信息，以提醒临床医生任何急性脑事件的发生，包括癫痫、缺血、颅内高压、出血甚至影响脑功能全身性疾病如缺氧、低血压、酸中毒及其他。监测仅需要几个电极或覆盖整个头皮，可是没有专家对原始的 EEG 的综述，监测时必须及其谨慎，因为假阳性和假阴性是很平常的。一些中心正在进行颅内 EEG 记录，以更好地发现癫痫、缺血和损伤周围去极化，所有这些均促使继发性损伤。当 cEEG 与经由多模式脑监测所得出的个性化和生理驱动的决策相结合，重症监护室的工作人员可以鉴别出何时大脑有损伤的风险或何时神经元损伤已经发生，并在产生永久性损伤前做出干预。当前 cEEG 的确切作用和成本效应仍不清楚，可是我们相信其在很多情况下有改善神经系统预后的显著潜力。
（黄丽娜 译 马皓琳 李士通 校）

Because of recent technical advances, it is now possible to record and monitor the continuous digital electroencephalogram (EEG) of many critically ill patients simultaneously. Continuous EEG monitoring (cEEG) provides dynamic information about brain function that permits early detection of changes in neurologic status, which is especially useful when the clinical examination is limited. Nonconvulsive seizures are common in comatose critically ill patients and can have multiple negative effects on the injured brain. The majority of seizures in these patients cannot be detected without cEEG. cEEG monitoring is most commonly used to detect and guide treatment of nonconvulsive seizures, including after convulsive status epilepticus. In addition, cEEG is used to guide management of pharmacological coma for treatment of increased intracranial pressure. An emerging application for cEEG is to detect new or worsening brain ischemia in patients at high risk, especially those with subarachnoid hemorrhage. Improving quantitative EEG software is helping to make it feasible for cEEG (using full

scalp coverage) to provide continuous information about changes in brain function in real time at the bedside and to alert clinicians to any acute brain event, including seizures, ischemia, increasing intracranial pressure, hemorrhage, and even systemic abnormalities affecting the brain, such as hypoxia, hypotension, acidosis, and others. Monitoring using only a few electrodes or using full scalp coverage, but without expert review of the raw EEG, must be done with extreme caution as false positives and false negatives are common. Intracranial EEG recording is being performed in a few centers to better detect seizures, ischemia, and peri-injury depolarizations, all of which may contribute to secondary injury. When cEEG is combined with individualized, physiologically driven decision making via multimodality brain monitoring, intensivists can identify when the brain is at risk for injury or when neuronal injury is already occurring and intervene before there is permanent damage. The exact role and cost-effectiveness of cEEG at the current time remains unclear, but we believe it has significant potential to improve neurologic outcomes in a variety of settings.

全麻中原始脑电图波形的实用性：艺术和科学

Practical Use of the Raw Electroencephalogram Waveform During General Anesthesia: The Art and Science

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我们常使用定量脑电图（qEEG）监测仪来评估全麻中的麻醉深度及术中知晓情况。与任何监测仪一样，加工的数值输出常产生误导而必须结合当时的临床环境来解释。为了安全地临床使用这些监测仪，我们有绝对的必要清楚地了解预测的原始脑电图(EEG)模式的清晰记忆图像以及一般的 EEG 伪像知识。这已提供了写这份个别指导的动机。我们描述并列举充分全麻下的典型 EEG 特征、伤害性刺激及辅助药物的作用。伪像常常遇到，并可分为来源于头外部、头内但脑外部（常为前额的肌电图）或脑内部（典型的或病理性的）。我们包括了临床解决问题过程的真实案例。尤其重要的是，我们须认识到伪像的高 qEEG 指数是相对常见的，可导致危险的麻醉药物过量。麻醉医生必须确信 qEEG 数值是与病人的表面状态、不同麻醉药物的剂量及外科手术刺激程度相一致的。任何不符合之处对于立即用所有可用的信息来关键性地检查病人状态都必须是一种刺激，而不要反应性地治疗来“处理”一个数值。

（裘毅敏译，马皓琳、李士通校）

Quantitative electroencephalogram (qEEG) monitors are often used to estimate depth of anesthesia and intraoperative recall during general anesthesia. As with any monitor, the processed numerical output is often misleading and has to be interpreted within a clinical context. For the safe clinical use of these monitors, a clear mental picture of the expected raw electroencephalogram (EEG) patterns, as well as a knowledge of the common EEG artifacts, is absolutely necessary. This has provided the motivation to write this tutorial. We describe, and give examples of, the typical EEG features of adequate general anesthesia, effects of noxious stimulation, and adjunctive drugs. Artifacts are commonly encountered and may be classified as arising from outside the head, from the head but outside the brain (commonly frontal electromyogram), or from within the brain (atypical or pathologic). We include real examples of clinical problem-solving processes. In particular, it is important to realize that an artifactually high qEEG index is relatively common and may result in dangerous anesthetic drug overdose. The anesthesiologist must be certain that the qEEG number is consistent with the apparent

state of the patient, the doses of various anesthetic drugs, and the degree of surgical stimulation, and that the qEEG number is consistent with the appearance of the raw EEG signal. Any discrepancy must be a stimulus for the immediate critical examination of the patient's state using all the available information rather than reactive therapy to "treat" a number.

七氟醚和地氟醚麻醉用于开颅幕上手术患者的比较

A Comparison Between Sevoflurane and Desflurane Anesthesia in Patients Undergoing Craniotomy for Supratentorial Intracranial Surgery

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背景：地氟醚由于其促进术后早期神经评分而在神经外科手术中使用是有益的。然而，它使大脑血管扩张的作用使其受到争论。七氟醚已在神经外科患者中广泛应用。在这个前瞻性的临床试验中，我们比较幕上广泛损害的开颅手术的患者接受地氟醚和七氟醚麻醉后的术后早期恢复和认知功能。
方法：选取 120 例患者，ASA 评分 I–III (其中 66 例男性),，Glascow 昏迷评分 15，行幕上广泛损害的开颅手术。患者随机分为两个麻醉组。S 组(60 例, 52 ± 16 岁)，使用呼气末 1.5%-2%七氟醚维持麻醉并按年龄调节至 1.2MAC。D 组(60 例, 60 ± 14 岁)，使用呼气末 6%-7%地氟醚维持麻醉并按年龄调节至 1.2MAC。苏醒时间记作从药物停止到患者睁眼的时间，拔管时间记作从麻醉药停止到拔管的时间。从麻醉药停止到患者能想起自己的姓名和生日的这段时间为恢复时间。由短定向-记忆-注意测试评估认知行为。在麻醉后监护室中，由不知分组的观察者监测患者 3 小时，记录血液动力学事件的发生率、疼痛、恶心及颤抖需要药物治疗。
结果：平均苏醒时间两组相似(S 组 12.2 ± 4.9 min 对 D 组 10.8 ± 7.2 min; P = ns)，但 S 组的平均拔管时间(S 组 15.2 ± 3.0 min 对 D 组 11.3 ± 3.9 min)和恢复时间（S 组 18.2 ± 2.3 min 对 D 组 12.4 ± 7.7 min，$P < 0.001$）较长。两组之间的短定向-记忆-注意测试评分只在最初的评估中（拔管后 15min）有差异。两组在疼痛、颤抖、恶心、呕吐和术后血液动力学事件的发生率方面均无差异。
结论：接受地氟醚麻醉的患者拔管时间和恢复时间较短，但术中和术后并发症的发生率与接受七氟醚麻醉的患者是相似的。
（朱 慧译 马皓琳 李士通校）

BACKGROUND: Desflurane in neurosurgery may be beneficial because it facilitates postoperative early neurologic evaluation. However, its use has been debated because of its capacity to promote cerebral vasodilatation. Sevoflurane has been extensively used in neurosurgical patients. In this prospective clinical trial, we compared early postoperative recovery and cognitive function in patients undergoing craniotomy for supratentorial expanding lesions and receiving sevoflurane or desflurane anesthesia.
METHODS: One hundred twenty patients, ASA physical status I–III (66 men), Glascow Coma Scale 15, undergoing craniotomy for supratentorial expanding lesions were enrolled in the study. Patients were randomly allocated to two anesthetic regimens. In Group S (60 patients, 52 ± 16 yr), anesthesia was maintained using sevoflurane with end-tidal of 1.5%–2% and was age adjusted to obtain approximately 1.2 minimum alveolar anesthetic concentration. In Group D (60 patients, 60 ± 14 yr), anesthesia was maintained using desflurane with end-tidal of 6%–7% and was age adjusted to obtain approximately 1.2 minimum alveolar concentration. Emergence time was measured as the time from drug discontinuation to the time at which patients opened their eyes;

tracheal extubation time was measured as the time from anesthetic discontinuation and tracheal extubation. Recovery time was measured as the time elapsing from discontinuation of anesthetic and the time when patients were able to recall their name and date of birth. Cognitive behavior was evaluated with the Short Orientation Memory Concentration Test. In the postanesthesia care unit, a blinded observer monitored the patients for 3 h; the incidence of hemodynamic events, pain, nausea, and shivering requiring rescue medication was recorded.

RESULTS: The mean emergence time (12.2 ± 4.9 min in Group S vs 10.8 ± 7.2 min in Group D; *P* = ns) was similar in the two groups, whereas the mean extubation time and recovery time were longer in Group S (15.2 ± 3.0 min in Group S vs 11.3 ± 3.9 min in Group D and 18.2 ± 2.3 min in Group S vs 12.4 ± 7.7 min in Group D, respectively; *P* < 0.001). The Short Orientation Memory Concentration Test score differed between the two groups only at the earliest assessment (15 min after extubation). No difference between the two groups was found in pain, shivering, nausea, vomiting, and incidence of postoperative hemodynamic events.

CONCLUSION: Patients who received desflurane had a shorter extubation and recovery time but similar intraoperative and postoperative incidence of complications compared with those who received sevoflurane.

灾难化想法是否可预测 I 型慢性复杂区域疼痛综合征患者行脊髓刺激治疗的预后？

Can the Outcome of Spinal Cord Stimulation in Chronic Complex Regional Pain Syndrome Type I Patients Be Predicted by Catastrophizing Thoughts?

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背景：在本研究中，我们探讨了疼痛灾难化是否可预测 I 型复杂区域疼痛综合征(CRPS-I)患者行脊髓刺激治疗(SCS)的预后。

方法：32 名慢性 CRPS-I 患者参与了此次前瞻性研究，对测试刺激有正响应后接受永久性脊髓刺激。测试刺激前先进行基线值评估，包括关于一般情况变量、疾病信息、疼痛强度、疼痛灾难化以及健康相关的生活质量(QOL)的问题。植入刺激器 9 个月后行随访评估，包括疼痛强度、感知的总效应(GPE)以及 QOL。成功的脊髓刺激定义为：视觉模拟评分得出疼痛强度至少降低 50%或 GPE 为“有很大改善”或“完全无痛”。

结果：9 个月后，38%和 53%的患者分别在疼痛强度降低和 GPE 方面有成功的预后。此外，QOL 有几项明显提高。尽管如此，我们没有发现疼痛灾难化对脊髓刺激在降低疼痛强度、GPE 或 QOL 方面的有效性有预测价值。

结论：这个研究显示疼痛灾难化不能预测脊髓刺激对定义明确的慢性 CRPS-I 患者在降低疼痛强度、GPE 和 QOL 方面的有效性。因此我们得出结论，CRPS-I 患者发生高水平的疼痛灾难化并不是脊髓刺激疗法的禁忌证。

（张莹译 马皓琳 李士通校）

BACKGROUND: In this study, we examined whether pain catastrophizing is a predictor of spinal cord stimulation (SCS) outcome in patients with complex regional pain syndrome type I (CRPS-I).

METHODS: Participants in this prospective cohort study were 32 patients with chronic CRPS-I, who received permanent SCS after a positive response to test stimulation. Baseline assessment was performed before test stimulation and included questions on

demographic variables, disease information, pain intensity, pain catastrophizing, and health-related quality of life (QOL). Follow-up assessment was performed 9 mo after final implantation and included pain intensity, global perceived effect (GPE), and QOL. Successful SCS outcome was defined as a reduction of pain intensity of at least 50% on a visual analog scale or "much improved" or "total pain relief" on GPE.
RESULTS: After 9 months, 38% of the patients had a successful outcome in reduced pain intensity and 53% of the patients in GPE. In addition, improvements were apparent on several of the domains of QOL. However, no evidence was found for the predictive value of pain catastrophizing on the efficacy of SCS in reduction of pain intensity, GPE, or QOL.
CONCLUSIONS: This study showed that the efficacy of SCS in reduction of pain intensity, GPE, and QOL in a well-defined chronic CRPS-I population was not predicted by pain catastrophizing. Therefore, we conclude that a high level of pain catastrophizing in patients with CRPS-I is not a contraindication for SCS treatment.

静脉注射右美托咪啶对大鼠结直肠扩张诱导的内脏痛的镇痛效应：阿片受体的作用

The Antinociceptive Effects of Intravenous Dexmedetomidine in Colorectal Distension-Induced Visceral Pain in Rats: The Role of Opioid Receptors

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背景：相对于皮肤痛而言，α2 肾上腺能受体（α2-AR）激动剂对内脏痛的作用尚未得到广泛研究。我们的目的在于观察静脉注射右美托咪啶对大鼠内脏痛的镇痛效应并确定这种效应的产生是否由阿片受体介导。
方法：雄性 SD 大鼠（250-300g），置入静脉导管用于药物注射并植入包漆的镍铬电极用于腹外斜肌的肌电图描记。结直肠扩张（CRD）被用作伤害性内脏刺激，并于给予右美托咪啶或可乐定前、后 5、15、30、60 和 120 min 时用肌电图定量对于 CRD 的内脏运动反应。在右美托咪啶静注前 10min 给予拮抗剂。在确定数据呈正态分布后，使用单因素方差分析和 Tukey-Kramer 事后检验进行多重比较。
结果：静脉注射右美托咪啶（2.5-20 μg/kg）和可乐定（10-80 μg/kg）可以剂量依赖地减少内脏运动反应，其 50%有效剂量分别为 10.5 和 37.6 μg/kg。非特异性 α2-AR 拮抗剂育亨宾（1mg/kg），而不是外周特异性 α2-AR 拮抗剂 MK-467（1mg/kg），抵消了右美托咪啶（10 μg/kg）的镇痛效应。此外，用纳络酮（1mg/kg）抑制阿片受体减弱了右美托咪啶的镇痛效应。
结论：我们的资料显示静脉注射右美托咪啶对 CRD 诱导的内脏痛具有明显的镇痛作用，并提示其作用部分通过阿片受体介导，但与外周性α_2-ARs 无关。
（黄施伟 译，马皓琳 李士通 校）

BACKGROUND: In comparison with cutaneous pain, the role of α_2-adrenoceptor (α_2-AR) agonists in visceral pain has not been extensively examined. We aimed to characterize the antinociceptive effect of IV dexmedetomidine on visceral pain in rats and to determine whether antinociception thus produced is mediated by opioid receptors.
METHODS: Male Sprague Dawley rats (250–300 g) were instrumented with a venous catheter for drug administration and with enameled nichrome electrodes for electromyography of the external oblique muscles. Colorectal distension (CRD) was used as the noxious visceral stimulus, and the visceromotor response to CRD was

quantified electromyographically before and 5, 15, 30, 60, 90, and 120 min after dexmedetomidine or clonidine administration. Antagonists were administered 10 min before dexmedetomidine. After confirmation of normal distribution of data, one-way analysis of variance with the Tukey-Kramer *post hoc* test was used for multiple comparison.
RESULTS: IV administration of dexmedetomidine (2.5–20 μg/kg) and clonidine (10–80 μg/kg) produced a dose-dependent reduction in visceromotor response with 50% effective dose values of 10.5 and 37.6 μg/kg, respectively. Administration of the nonspecific α_2-AR antagonist yohimbine (1 mg/kg), but not the peripherally restricted α_2-AR antagonist MK-467 (1 mg/kg), abolished the antinociceptive effect of dexmedetomidine (10 μg/kg). In addition, inhibition of opioid receptors by naloxone (1 mg/kg) attenuated the antinociceptive effect of dexmedetomidine.
CONCLUSION: Our data indicate that IV dexmedetomidine exerts pronounced antinociception against CRD-induced visceral pain and suggest that the antinociceptive effect of dexmedotimidine is mediated in part by opioid receptors, but peripheral α_2-ARs are not involved.

大鼠背角疼痛特异性神经元比广动态范围神经元对止动剂量挥发性麻醉剂的抑制作用更加敏感：一种可被阿片受体拮抗剂纳洛酮部分逆转的效应

Rat Dorsal Horn Nociceptive-Specific Neurons Are More Sensitive Than Wide Dynamic Range Neurons to Depression by Immobilizing Doses of Volatile Anesthetics: An Effect Partially Reversed by the Opioid Receptor Antagonist Naloxone

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背景：挥发性麻醉剂产生止动效应的机制和在脊髓内的作用部位未明。尚未有研究直接比较其对有脊髓内介导疼痛信息传递的特殊功能性特点的神经元的麻醉效应。
方法：成年雄性大鼠麻醉后行腰段脊髓背角细胞外单位记录。鉴别疼痛特异性（NS）和广动态范围（WDR）神经元，在 0.8 和 1.2 倍肺泡最低麻醉药有效浓度（MAC）的氟烷或异氟烷麻醉下评价热痛诱发的神经元尖峰频率。在另外的研究组，评价 0.8、1.2MAC 氟烷和 1.2MAC 氟烷加静脉纳洛酮（0.1mg/kg）时热痛诱发的 NS 神经元反应。
结果：将氟烷剂量从 0.8MAC 增加到 1.2MAC 使 NS 神经元（n=9）对热痛反应由 827 ± 122 次/分(均数 ± 标准误) 减至 343 ± 48 次/分 ($P < 0.05$)，但不减少热诱发的 WDR 神经元反应（n=9）（由 617 ± 79 次/分变为 547 ± 78 次/分）。将异氟烷剂量从 0.8MAC 增加到 1.2MAC 使 NS 神经元（n=9）对热痛反应由 890 ± 339 减到 188 ± 97 次/分 ($P < 0.05$)，而不改变 WDR 神经元（n=9）的反应（诱发棘波频率从 576 ± 132 次/分变为 601 ± 119 次/分）。在另外分开的一组中，当氟烷剂量从 0.8MAC 增加到 1.2MAC 时，NS 神经元反应由 282 ± 60 次/分减至 74 ± 32 次/分($P < 0.05$)。静注纳洛酮使其对热痛的反应增加至 155 ± 46 次/分($P < 0.05$)。
结论： 在 1MAC 左右增加氟烷和异氟烷的剂量能抑制脊髓腰段背角 NS 神经元而非 WDR 神经元。这种抑制作用（至少是氟烷）可部分被阿片拮抗剂纳洛酮所逆转。由于阿片受体不可能与挥发性麻醉药产生止动作用的机制有关，本结果提示，尽管神经元的抑制程度很大并且与止动作用同时发生，但它可能在麻醉最终效应的产生中并非起主要作用。
（颜涛 译， 马皓琳 李士通校）

BACKGROUND: The mechanism and site of action within the spinal cord by which volatile anesthetics produce immobility are not well understood. Little work has been done directly comparing anesthetic effects on neurons with specific functional characteristics that mediate transfer of nociceptive information within the spinal cord.
METHODS: Adult male rats were anesthetized and prepared for extracellular single-unit recordings from the lumbar dorsal horn. Nociceptive-specific (NS) and wide dynamic range (WDR) neurons were identified and noxious heat-evoked neuronal spike rates evaluated at 0.8 and 1.2 anesthetic minimum alveolar anesthetic concentration (MAC) halothane or isoflurane. In another group, noxious heat-evoked responses from NS neurons were evaluated at 0.8, 1.2 MAC halothane, and 1.2 MAC halothane plus IV naloxone (0.1 mg/kg).
RESULTS: Increasing halothane from 0.8 to 1.2 MAC reduced the heat-evoked neuronal responses of NS neurons (n = 9) from 827 ± 122 (mean ± se) to 343 ± 48 spikes/min (P < 0.05) but not WDR neurons (n = 9), 617 ± 79 to 547 ± 78 spikes/min. Increasing isoflurane from 0.8 to 1.2 MAC reduced the heat-evoked neuronal response of NS neurons (n = 9) from 890 ± 339 to 188 ± 97 spikes/min (P < 0.05) but did not alter the response of WDR neurons (n = 9) in which evoked spike rate went from 576 ± 132 to 601 ± 119 spikes/min. In a separate group, the response of NS neurons went from 282 ± 60 to 74 ± 32 spikes/min (P < 0.05) when halothane was increased from 0.8 to 1.2 MAC. IV administration of naloxone increased the heat-evoked response to 155 ± 46 spikes/min (P < 0.05).
CONCLUSIONS: NS but not WDR neurons in the lumbar dorsal horn are depressed by peri-MAC increases of halothane and isoflurane. This depression, at least with halothane, can be partially reversed by the opioid antagonist naloxone. Given that opioid receptors are not likely involved in the mechanisms by which volatile anesthetics produce immobility, this suggests that, although the neuronal depression is of substantial magnitude and occurs concurrent to the production of immobility, it may not play a major role in the production of this anesthetic end point.

超声引导下单次或三次注射技术的锁骨下阻滞的比较：一个前瞻性随机对照研究

A Comparison of a Single or Triple Injection Technique for Ultrasound-Guided Infraclavicular Block: A Prospective Randomized Controlled Study

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背景：超声引导下使用单次或多次注射局麻药进行锁骨下阻滞被报道有很好的成功率。我们假设在每个神经索上单独注射局麻药能增快完全感觉阻滞的起效。我们设计这个前瞻性随机研究来比较使用单次或三次注射局麻药达到完全感觉神经阻滞的比率。
方法：计划行手部、腕部或者肘部手术的患者列入研究范围内。所有的阻滞都在超声引导下进行。在 S 组（单次注射），30ml 的 1.5％甲哌卡因注射在腋动脉后部。在 T 组（三次注射），分别在腋动脉的后部、中部、侧部注射 10ml 的 1.5％的甲哌卡因。感觉神经阻滞的评估每 3 分钟一次，一直到阻滞后 30 分钟。主要终点为在 15 分钟时完全感觉阻滞的比率。

结果：49 例和 51 例患者随机分到 S 组和 T 组。在 15 分钟和每个时间间歇一直到 30 分钟时感觉阻滞完全的比率相当（15 分钟时 S 组 84%，T 组 78%，P＝0.61）。两组之间的并发症发生率在统计学上没有显著性差异。
结论：与在腋动脉后部单次注射比较，三次注射局麻药不能提高超声引导下锁骨下阻滞后完全感觉阻滞的成功率和增快起效。
（唐亮 译 马皓琳 李士通 校）

BACKGROUND: Good success rates have been reported with ultrasound-guided infraclavicular block using one or multiple injections of local anesthetic. We hypothesized that a separate injection of local anesthetics on each cord enhances the onset of complete sensory block. We designed this prospective randomized study to compare the rate of complete sensory block using one or three injections of local anesthetic.
METHODS: Patients scheduled for hand, wrist, or elbow surgery were included in this study. All blocks were performed under ultrasound guidance. In Group S (single injection), 30 mL of mepivacaine 1.5% was injected posterior to the axillary artery. In Group T (triple injections), 10 mL of mepivacaine 1.5% was injected on the posterior, medial, and lateral aspects of the axillary artery. Sensory block was evaluated every 3 min up to 30 min. The primary end point was the rate of complete sensory block at 15 min.
RESULTS: Forty-nine and 51 patients were randomized in Groups S and T, respectively. The rate of complete sensory block was comparable at 15 min (Group S: 84%, Group T: 78%, $P = 0.61$) and at each time interval up to 30 min. There was no statistically significant difference in the rate of complications between the two groups.
CONCLUSIONS: The success rate and the onset of complete sensory block after ultrasound-guided infraclavicular block are not enhanced by a triple injection of local anesthetic compared with a single injection posterior to the axillary artery.

在体外循环期间血液稀释和红细胞输注与肾脏和脾脏损伤的生化标记的关系

The Association of Hemodilution and Transfusion of Red Blood Cells with Biochemical Markers of Splanchnic and Renal Injury During Cardiopulmonary Bypass

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背景：在体外循环期间血液稀释是低红细胞压积的主要原因。这种低红细胞压积可能不足以用于最佳的组织氧运输，常会导致血细胞输注。本文主要研究术中红细胞压积和异体输血之间的联系对术后肾脏和脾脏部位损伤标记释放的影响。
方法：50 例选择性在体外循环下行冠脉搭桥术的病人。用乳酸盐浓度评估全身组织缺氧情况。用尿 N-乙酰-β-D-氨基葡萄糖苷酶(NAG)和肠脂肪酸结合蛋白(IFABP)测定来评估肾脏和脾脏缺血状况。根据病人的最低红细胞压积回顾性分为两组(<24% or ≥24%)。
结果：术中乳酸和术后 NAG 和 IFABP 浓度在红细胞压积低于 24%时比红细胞压积高于 24%时高（$P < 0.05$）。低红细胞压积与高乳酸浓度（$R^2 = 0.150$, $P < 0.01$）、术后高 NAG 浓度($R^2 = 0.138$, $P < 0.01$) 和高 IFABP 浓度 ($R^2 = 0.107$, $P < 0.01$)都相关。体外循环期间血细胞输注与高乳酸($R^2 = 0.089$, $P < 0.05$)、高 NAG ($R^2 = 0.431$, $P < 0.01$)和高 IFABP ($R^2 = 0.189$, $P < 0.01$)相关。
结论：本研究结果支持术中血液稀释使术中血细胞比容低于 24%以及随后的输血都与肾脏和脾脏部位损伤标记的释放有关。

（彭中美 译 马皓琳 李士通 校）

BACKGROUND: Hemodilution is the main cause of a low hematocrit concentration during cardiopulmonary bypass. This low hematocrit may be insufficient for optimal tissue oxygen delivery and often results in packed cell transfusion. Our objective in this study was to find a relationship between intraoperative hematocrit and allogeneic blood transfusion on release of postoperative injury markers from the kidneys and the splanchnic area.

METHODS: Fifty consecutive patients undergoing coronary artery bypass grafting with cardiopulmonary bypass were included. Systemic tissue hypoxia was assessed by lactate concentrations. Kidney and splanchnic ischemia were assessed by the measurement of *N*-acetyl-β-d-glucosaminidase (NAG) and intestinal fatty acid binding protein (IFABP) in urine. Patients were retrospectively placed into groups according to their lowest hematocrit concentration on bypass (<24% or ≥24%).

RESULTS: The intraoperative lactate and the postoperative NAG and IFABP concentrations were higher in the low hematocrit group (<24%) than in the high hematocrit group (≥24%; $P < 0.05$). Low hematocrit correlated with higher lactate concentrations ($R^2 = 0.150$, $P < 0.01$) and with higher NAG concentrations ($R^2 = 0.138$, $P < 0.01$) and IFABP concentrations ($R^2 = 0.107$, $P < 0.01$) postoperatively. Transfusion of packed cells during cardiopulmonary bypass correlated with higher lactate ($R^2 = 0.089$, $P < 0.05$), NAG ($R^2 = 0.431$, $P < 0.01$), and IFABP concentrations ($R^2 = 0.189$, $P < 0.01$).

CONCLUSIONS: The results support the concept that hemodilution below an intraoperative hematocrit of 24% and consequently transfusion of red blood cells is related to release of injury markers of the kidneys and splanchnic area.

患婴儿神经元蜡样质脂褐质沉积症的儿童在麻醉期间低体温和心动过缓的风险增加

Children with Infantile Neuronal Ceroid Lipofuscinosis Have an Increased Risk of Hypothermia and Bradycardia During Anesthesia

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背景：神经元蜡样脂褐质沉积症（NCLs）是一组常染色体隐性遗传的神经变性疾病，其特征是在神经元和其它类型细胞的溶酶体内自身荧光物质蓄积。婴儿 NCL（INCL）亚型是罕见的（超过一百万初生儿中有一例）、最具灾难性的儿童亚型，它是由编码棕榈酰蛋白硫酯酶-1 的 CLN1 基因突变引起。

方法：为研究 INCL 患儿在全麻期间低体温和心动过缓的发生率，我们使用病例对照研究检查 INCL 患儿和对照儿童接受麻醉进行诊断性研究的围麻醉过程。

结果：8 个 INCL 患儿（在接受首次麻醉时平均年龄 25 个月[范围：10-32 月]）和 25 个对照（平均年龄 44 个月[范围：18-92 月]）进行 62 次麻醉用于非手术性操作。INCL 患儿有包括发育延迟、肌阵挛和视觉障碍的神经病学缺陷。INCL 患儿的基础体温的较低(36.4 ± 0.1 比 36.8 ± 0.1, INCL 患儿相对于对照, $P < 0.007$)，且在麻醉期间尽管给予积极地保温技术， INCL 患儿仍然比对照出现明显更多的低体温(发生病例 18 比 0, $P < 0.001$)和窦性心动过缓（10 比 1，$P < 0.001$）。INCL 诊断显著地与麻醉期间体温降低相关($P < 0.001$)，而与年龄、性别和麻醉持续时间无相关性(P = NS)。

结论：我们报道 INCL 患儿的基础体温较低，且在全麻期间尽管给予复温干预，低体温和心动过缓的风险仍然增高。这提示是一个以前未知的 INCL 显型，具有受损的体温调节。因此，当麻醉这些儿童时，必须保证细心的监护和常规使用保温干预。

（王宏 译，马皓琳，李士通 校）

BACKGROUND: Neuronal ceroid lipofuscinoses (NCLs) are a group of autosomal recessive neurodegenerative diseases characterized by lysosomal accumulation of autofluorescent material in neurons and other cell types. The infantile NCL (INCL) subtype is rare (1 in >100,000 births), the most devastating of childhood subtypes, and is caused by mutations in the gene *CLN1*, which encodes palmitoyl-protein thioesterase-1.

METHODS: To investigate the incidence of hypothermia and bradycardia during general anesthesia in patients with INCL, we conducted a case-control study to examine the perianesthetic course of patients with INCL and of controls receiving anesthesia for diagnostic studies.

RESULTS: Eight children with INCL (mean age 25 mo [range, 10-32] at first anesthetic) and 25 controls (mean age 44 mo [range, 18-92]) underwent 62 anesthetics for nonsurgical procedures. Patients with INCL had neurologic deficits including developmental delay, myoclonus, and visual impairment. Patients with INCL had lower baseline temperature (36.4 ± 0.1 vs 36.8 ± 0.1, INCL versus controls, $P < 0.007$), and during anesthesia, despite active warming techniques, had significantly more hypothermia (18 vs 0 episodes, $P < 0.001$) and sinus bradycardia (10 vs 1, $P < 0.001$) compared with controls. INCL diagnosis was significantly associated with temperature decreases during anesthesia ($P < 0.001$), whereas age, sex, and duration of anesthesia were not (P = NS).

CONCLUSIONS: We report that patients with INCL have lower baseline body temperature and during general anesthesia, despite rewarming interventions, are at increased risk for hypothermia and bradycardia. This suggests a previously unknown INCL phenotype, impaired thermoregulation. Therefore, when anesthetizing these children, careful monitoring and routine use of warming interventions are warranted.