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老年血管外科手术患者身体质量指数与术后疾病结局间的相互关系：一反 J 曲线现象

The association of body mass index to postoperative outcomes in elderly vascular surgery patients: a reverse j-curve phenomenon.

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Anesth Analg January 2011 112:23-29

此项研究旨在测定接受血管外科手术的老年患者其身体质量指数（BMI）分级与术后早期疾病结局间是否存在相互关系。本研究假设超重或肥胖会增加手术风险。试验数据来源于美国外科医师学会全国外科质量改进计划共享数据库，共选取 2005 至 2007 年间年龄≥65 岁的血管外科手术患者 25337 例，分别测定其 BMI（kg/m^2）及术后 30 天的疾病结局。根据 BMI 计算值，患者被分为 6 个 BMI 等级：（1）体重过轻（BMI≤18.5 kg/m^2），（2）体重正常（BMI=18.6-24.9 kg/m^2），（3）超重（BMI=25-29.9 kg/m^2），（4）Ⅰ度肥胖（BMI=30-34.9 kg/m^2），（5）Ⅱ度肥胖（BMI=35-39.9 kg/m^2），（6）Ⅲ度肥胖（BMI≥40 kg/m^2）。各个 BMI 级别其术后并发症的发病率与死亡率均需行单因素及多因素的 Logistic 回归分析。不同 BMI 级别的死亡率均不相同：体重过轻组 9.4%，体重正常组 4.0%，超重及Ⅰ度肥胖组 3.0%，Ⅱ度肥胖组 3.3%，Ⅲ度肥胖组 4.6%（P＜0.001）。术后主要并发症的发病率与死亡风险相似。术前与死亡率相关的独立风险因素包括糖尿病、慢性阻塞性肺病、充血性心衰活跃期、近期体重下降、转移性癌及自立能力缺失。在判定手术风险时，上述因素中的每一项在统计学上均比单独考虑 BMI 更为重要。对这些接受血管外科手术的老年群体而言，仅仅 BMI 增加并不能成为预测术后 30 天死亡的主要依据；BMI 的效应主要表现为一非线性的反 J 曲线，即在体重过轻或正常患者中其疾病结局往往最差，而过度肥胖患者其死亡率却仅轻度增加。
（范羽译 薛张纲校）

The purpose of this investigation was to determine whether there is a relation between body mass index (BMI) classes and early postoperative outcomes in elderly patients undergoing vascular surgery. We hypothesized that being overweight or obese increases

the risks of surgery.Data from the American College of Surgeons' National Surgical Quality Improvement Program Participant Use Data File was used to identify the BMI (kg/m(2)) and 30-day outcomes of 25,337 patients aged ≥65 years undergoing vascular surgery from 2005 to 2007. Patients were stratified into 6 BMI classes: (1) underweight (BMI ≤18.5 kg/m(2)), (2) normal (BMI = 18.6-24.9 kg/m(2)), (3) overweight (BMI = 25-29.9 kg/m(2)), (4) obese class I (BMI = 30-34.9 kg/m(2)), (5) obese class II (BMI = 35-39.9 kg/m(2)), and (6) obese class III (BMI ≥40 kg/m(2)). Morbidity and mortality rates across all BMI classes were subjected to univariate and multiple logistic regression analyses.Mortality rates varied among the BMI classes: 9.4% underweight, 4.0% normal, 3.0 overweight and obese I, 3.3% obese II, and 4.6% obese III (P < 0.001). Major postoperative morbidity paralleled the risk of death. Independent preoperative factors associated with mortality included diabetes mellitus, chronic obstructive pulmonary disease, active congestive heart failure, recent weight loss, disseminated cancer, and an inability to function independently. Each of these factors was statistically more important than the BMI alone in defining an increased risk of surgery.Increased BMI alone was not a major factor predicting perioperative 30-day mortality in this cohort of elderly surgical patients; the effect was a nonlinear one with a reversed J-curve response documenting the poorest outcomes in underweight, normal, and a slight increase in excessively obese patients.

综述：高凝的病因和评估以及从肝素介导的血小板减少症中学到的经验教训

Review article: etiology and assessment of hypercoagulability with lessons from heparin-induced thrombocytopenia.

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高凝或者血栓形成过快是指一种血液不正常地过度趋向于凝集反应的状态。处于这种状态的患者容易发生静脉或者动脉血栓并且常需要预防血栓形成。高凝大体上可以分为两类：遗传性和获得性。遗传性高凝患者的基因片断有异常，使得与凝血有关的蛋白发生质或者量的异常。高凝也可以是获得性的，并且由组织损伤后机体的正常生理反应发展为过度反应，或者是对于多种致凝因子的不正常反应。对高凝应当进行细致地评估，从而可以制定出有效的处理对策，通常需要进行抗凝治疗。比如肝素介导的血小板减少症就是一种获得性高凝状态。对此人们已经进行了深入的研究并且能够采取有效的治疗措施。本文就血栓形成的病因、风险因素和血栓形成状态的评估进行综述，并且着重关注于从肝素介导的血小板减少症中学习到的临床经验和教训。

（黄剑译 薛张纲校）

Hypercoagulability, or thrombophilia, is a condition associated with an abnormally increased tendency toward blood clotting. Affected individuals are prone to developing venous or arterial thrombosis and often require thromboprophylaxis. Hypercoagulability can be generally classified as either an inherited or acquired condition. Patients with an

inherited thrombophilia have genetic variances that alter the quality or quantity of proteins involved with hemostasis. Hypercoagulability may also be acquired and develop as an exaggeration of normal physiologic responses to major tissue injury, or an abnormal response to various prothrombotic clinical factors. Careful assessment for hypercoagulability is important because effective management strategies, often involving anticoagulation, may be available. Heparin-induced thrombocytopenia is an example of an acquired hypercoagulable state that has been well studied and, when recognized, responds to appropriate therapy. In this article, we review the etiology, risks, and assessment of thrombophilia, with emphasis on the clinical lessons learned from heparin-induced thrombocytopenia.

呼吸变异与脉压差及体积描记波形：北美研究中心术中应用

Respiratory Variation in Pulse Pressure and Plethysmographic Waveforms: Intraoperative
Applicability in a North American Academic Cente

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Anesth Analg January 2011 112:94-96

血流动力学变化是对全麻机械通气病人液体负荷的最好预测；即呼吸变异对脉压差及体积描记波形的影响。然而这些变异存在潜在局限。我们的目的是评估术中应用价值。我们从研究所 2009 年全麻病例中收集资料，确认病历号，预先提出应用条件。在 12308 个病例中，39%符合体积描记无创监测标准，23%有动脉符合脉压差有创监测标准。
（毛慧译，薛张刚校）

Dynamic variables are the best predictors of fluid responsiveness in patients under general anesthesia and mechanical ventilation; namely, respiratory variations in pulse pressure and in the plethysmographic waveform. However, these variables have potential limitations. Our aim was to evaluate their intraoperative applicability. We extracted clinical data from all anesthesia procedures performed at our institution in 2009 and identified the number of cases that presented predetermined conditions of application. Among the 12,308 procedures, 39% met the criteria for the noninvasive monitoring of variations in the plethysmographic waveform of which 23% had arterial lines and met the criteria for the invasive monitoring of variations in pulse pressure. (Anesth Analg 2011;112:94–6)

睡眠呼吸暂停病人行非心脏手术后围术期肺相关预后

Perioperative pulmonary outcomes in patients with sleep apnea after noncardiac surgery

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Anesth Analg January 2011 112:113-121

背景：尽管合并睡眠呼吸暂停的病人被认为术后发生并发症风险增加，但围术期肺部并发症发病率增加的证据有限。本试验总结了合并睡眠呼吸暂停病人行矫形外科或普外科手术的总体病例，并基于此总体样本分析了术后肺相关预后。我们假设睡眠呼吸暂停是围术期肺部并发症的独立危险因素，这使可利用的资源有所增加，其中包括了重症监护和处理这些相关并发症策略的发展。
方法：我们分析了 1998 年到 2007 年的全美住院病人资料。行矫形科和普外科手术，并在出院时有睡眠呼吸暂停诊断的病人被记录。我们使用倾向分数方法，并基于人口统计变异值将有睡眠呼吸暂停诊断的病人与那些没有此疾病的病人配对。主要的并发症包括吸入性肺炎、成人呼吸窘迫综合症、肺栓塞和需要气管插管和机械通气。比值比和风险减少绝对值的 95%置信区间被报导。
结果：我们确认了在 1998 年到 2007 年间的 2610441 例矫形科手术和 3441262 例普外科手术。这其中分别有 2.52%和 1.40%的病人被诊断为睡眠呼吸暂停。在矫形或普外科手术后，合并呼吸睡眠暂停的病人发生肺部并发症的几率均比配对的对照组高(例如：吸入性肺炎 1.18% 比 0.84%，2.79%比 2.05%；成人呼吸窘迫综合症 1.06%比 0.45%，3.79%比 2.44%；气管插管/机械通气 3.99%比 0.79%，10.8%比 5.94%，所有 P 值均小于 0.0001)。相对而言，合并呼吸睡眠暂停病人在矫形术后发生肺栓塞机会更高(0.51%比 0.42%，P=0.0038)，但在普外科术后则不然(0.45%比 0.49%，P=0.22)。除外肺栓塞，在矫形科和普外科术后，呼吸睡眠暂停在术后肺部并发症方面，与一个显著增高的调整后比值比相关(比值比：吸入性肺炎 1.41[1.35，1.47]和 1.37 [1.33，1.41]；成人呼吸窘迫综合症 2.39[2.28，2.51]和 1.58[1.54，1.62]；肺栓塞 1.22 [1.15，1.29]和 0.90[0.84，0.97]；气管插管/机械通气 5.20[5.05，5.37]和 1.95[1.91，1.98])。
结论：睡眠呼吸暂停是围术期肺部并发症的独立危险因素。在与这种病人群体相关促进围术期预后的临床研究中，我们的结果可以被用于假设生成。
（任云译 薛张纲校）

BACKGROUND: Although patients with sleep apnea (SA) are considered to be at increased risk for postoperative complications, evidence supporting increased risk of perioperative pulmonary morbidity is limited. The objective of this study, therefore, was to analyze perioperative demographics and pulmonary outcomes of patients with SA after orthopedic and general surgical procedures using a population-based sample. We hypothesized that SA is an independent risk factor for perioperative pulmonary complications, thus providing a basis for an increase in the utilization of resources, including intensive monitoring and development of strategies to prevent and treat these events.
METHODS: National Inpatient Sample data for each year between 1998 and 2007 were accessed. Orthopedic and general surgical procedures were included and discharges with a diagnosis code for SA were identified. Patients with the diagnosis of SA were matched to those without the disease based on demographic variables using the propensity scoring method. Aspiration pneumonia, adult respiratory distress syndrome (ARDS), pulmonary

embolism (PE), and the need for intubation and mechanical ventilation were the primary outcomes. Odds ratio (OR) and absolute risk reduction along with 95% confidence interval were reported.

RESULTS: We identified 2,610,441 entries for orthopedic and 3,441,262 for general surgical procedures performed between 1998 and 2007. Of those, 2.52% and 1.40%, respectively, carried a diagnosis of SA. Patients with SA developed pulmonary complications more frequently than their matched controls after both orthopedic and general surgical procedures, respectively (i.e., aspiration pneumonia: 1.18% vs 0.84% and 2.79% vs 2.05%; ARDS: 1.06% vs 0.45% and 3.79% vs 2.44%; intubation/mechanical ventilation: 3.99% vs 0.79% and 10.8% vs 5.94%, all P values <0.0001). Comparatively, PE was more frequent in SA patients after orthopedic procedures (0.51% vs 0.42%, P = 0.0038) but not after general surgical procedures (0.45% vs 0.49%, P = 0.22). SA was associated with a significantly higher adjusted OR of developing pulmonary complications after both orthopedic and general surgical procedures, respectively, with the exception of PE (OR for aspiration pneumonia: 1.41 [1.35, 1.47] and 1.37 [1.33, 1.41]; for ARDS: 2.39 [2.28, 2.51] and 1.58 [1.54, 1.62]; for PE: OR 1.22 [1.15, 1.29] and 0.90 [0.84, 0.97]; for intubation/mechanical ventilation: 5.20 [5.05, 5.37] and 1.95 [1.91, 1.98]).

CONCLUSION: SA is an independent risk factor for perioperative pulmonary complications. Our results may be used for hypothesis generation for clinical studies targeted to improve perioperative outcomes in this patient population.

心脏手术第一个 24 小时内常规拍摄胸片的临床价值

The Clinical Value of Routine Chest Radiographs in the First 24 Hours After Cardiac Surgery

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背景：在重症监护室（ＩＣＵ）经常会拍摄胸片。但是应该常规拍摄胸片还是应该根据临床病情来拍摄胸片，这是受到争议的。本实验的目的是研究心脏手术后常规胸片对发现异常情况的机率和临床重要性，并研究如果严格地限制拍摄胸片是否会影响到这些重要情况的发现。

方法：我们的研究包括了所有在２个月内经历过心脏手术的病人。在进入ＩＣＵ的第一个２４小时内会拍摄２－３张胸片。进入ＩＣＵ后和引流管拔除后，在拍摄胸片之前都会进行临床评估。我们记录了所有的胸片，并且记录它是否带来进一步的干预治疗。对于进入ＩＣＵ后的胸片和引流管拔除后的胸片，我们比较了医生有临床指征拍的胸片和没有临床指征的胸片。

结果：总共有２４０名患者参加了我们的研究。其中６０％的患者接受了冠状动脉搭桥手术，２１％的病人接受了心脏瓣膜手术，有１４％的病人同时进行了两种手术。总共拍摄了５３４张胸片（平均每人２・５张）。１７９张胸片有异常问题

（占３３．５％），其中有１３张胸片导致了进一步的干预治疗（占２．４％）。有临床指征胸片与异常情况的发生率相关性比较低。在３２１张入ＩＣＵ的胸片和拔管后的胸片中有３２张是医生认为是有临床指征的。如果胸片没有被常规拍摄，可能会错失６８次异常情况，其中只有５次有干预措施。
结论：对大多数病人来说心脏手术后第一个２４小时内部分取消胸片是可以的，但是同时也限制了在临床评估中发现重要异常情况的敏感性，而这些异常情况本可以通过胸片发现。
（翁梅琳译 薛张纲校）

BACKGROUND: Chest radiographs (CXRs) are obtained frequently in the intensive care unit (ICU). Whether these CXRs should be performed routinely or on clinical indication only is often debated. The aim of our study was to investigate the incidence and clinical significance of abnormalities found on routine postoperative CXRs in cardiac surgery patients and whether a restricted use of CXRs would influence the number of significant findings.
METHODS: We prospectively included all consecutive patients who underwent cardiac surgery during a 2-month period. Two or three CXRs were performed in the first 24 hours of ICU stay. After ICU admission and after drain removal, a clinical assessment was performed before a CXR was obtained. All CXR abnormalities were noted and it was also noted whether they led to an intervention. For the admission CXR and the drain removal CXR, a comparison was made between CXRs clinically indicated by the physician and those not clinically indicated.
RESULTS: Two hundred fourteen patients were included. The majority of patients underwent coronary arterial bypass grafting (60%), heart valve surgery (21%), or a combination of these (14%). In total, 534 CXRs were performed (2.5 per patient). Abnormalities were found on 179 CXRs (33.5%) and 13 CXR results led to an intervention (2.4%). The association between clinically indicated CXRs and the presence of CXR abnormalities was poor. For 32 (10%) of the 321 admission and drain removal CXRs, clinical indications were stated by the physician beforehand. If these CXRs would not have been performed routinely, 68 abnormalities would have been missed, of which 5 led to an intervention.
CONCLUSIONS: Partial elimination of routine CXRs in the first 24 hours after cardiac surgery seems possible for the majority of patients, but it is limited by the insensitivity of clinical assessment in predicting clinically important abnormalities detectable by CXRs.

危重患者胶体复苏的有效性和安全性

The Efficacy and Safety of Colloid Resuscitation in the Critically Ill

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尽管有临床研究和 Meta 分析表明晶体液和胶体液在危重患者的复苏方面同样有效，且高质量的临床研究和 Meta 分析报告羟乙基（HES）液淀粉的肾毒性、出血风险和增加危重患者的死亡率趋势，胶体液仍然被广泛使用，且 HES 在全球范围内使用越来越多。

我们研究了使用胶体液的主要依据：胶体液是比晶体液更为有效的血浆扩容剂；合成胶体与白蛋白同样安全；在所有合成胶体中，HES 具有最佳的风险/收益比；第三代胶体 HES130/0.4 副作用更少。
临床试验的证据表明，通常小于推荐剂量的 1/2 的胶体液就能达到相似的复苏效果。
ICU 患者（闭合性颅脑损伤患者除外）使用白蛋白是安全的。所有的人工合成胶体（包括右旋糖苷、明胶和 HES）都具有剂量依赖性的副作用，包括凝血功能障碍、肾衰竭等。对于严重脓毒血症的患者，更高剂量的 HES 可能与死亡率增加有关。有关第三代 HES130/0.4 不良反应更少的说法并未获得证实。HES130/0.4 的临床试验存在一些明显的缺陷。其中，最重要的是，其并不是在 ICU 或急诊科进行的，观察时间仅有 24-48 小时，且累计剂量低于 1 天的限量（50ml/kg），并且对照组液体使用不当（如使用其他 HES 液体或明胶）。
总之，偏好使用胶体液对急性低血容量患者行液体复苏的证据尚未被临床试验证实。人工合成胶体对于重症成人和儿童患者并不更优，并且由于其累计剂量应考虑其有害性。安全剂量阈值应该在高危患者的临床研究中确定，其观察时间应长达 90 天。尽管 HES130/0.4 的临床应用日益增加，但其临床试验仍较匮乏。因为有更安全和同等有效的晶体液替代品，除了临床试验的适应证，合成胶体液的使用应避免过滥。
（吴少勇译 薛张纲校）
Despite evidence from clinical studies and meta-analyses that resuscitation with colloids or crystalloids is equally effective in critically ill patients, and despite reports from high-quality clinical trials and meta-analyses regarding nephrotoxic effects, increased risk of bleeding, and a trend toward higher mortality in these patients after the use of hydroxyethyl starch (HES) solutions, colloids remain popular and the use of HES solutions is increasing worldwide.
We investigated the major rationales for colloid use, namely that colloids are more effective plasma expanders than crystalloids, that synthetic colloids are as safe as albumin, that HES solutions have the best risk/benefit profile among the synthetic colloids, and that the third-generation HES 130/0.4 has fewer adverse effects than older starches.
Evidence from clinical studies shows that comparable resuscitation is achieved with considerably less crystalloid volumes than frequently suggested, namely, <2-fold the volume of colloids.
Albumin is safe in intensive care unit patients except in patients with closed head injury. All synthetic colloids, namely, dextran, gelatin, and HES have dose-related side effects, which are coagulopathy, renal failure, and tissue storage. In patients with severe sepsis, higher doses of HES may be associated with excess mortality. The assumption that third-generation HES 130/0.4 has fewer adverse effects is yet unproven. Clinical trials on HES 130/0.4 have notable shortcomings. Mostly, they were not performed in intensive care unit or emergency department patients, had short observation periods of 24 to 48 hours, used cumulative doses below 1 daily dose limit (50 mL/kg), and used unsuitable control fluids such as other HES solutions or gelatins.
In conclusion, the preferred use of colloidal solutions for resuscitation of patients with acute hypovolemia is based on rationales that are not supported by clinical evidence.

Synthetic colloids are not superior in critically ill adults and children but must be considered harmful depending on the cumulative dose administered. Safe threshold doses need to be determined in studies in high-risk patients and observation periods of 90 days. Such studies on HES 130/0.4 are still lacking despite its widespread and increasing use. Because there are safer and equally effective alternatives in the form of crystalloids, use of synthetic colloids should be avoided except in the context of clinical studies.

全麻气体和地球环境

General Anesthetic Gases and the Global Environment

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美国每年约有 5 千万人接受全身麻醉。麻醉气体也广泛用于牙科诊所、兽医门诊和实验室做动物实验。今年常用的挥发性麻醉药都是对臭氧层有破坏性的卤族化合物。这些卤族麻醉药可能对全球变暖有潜在的巨大影响。广泛使用的麻醉气体一氧化二氮是众所周知的温室气体且是重要的减少臭氧的气体。这些麻醉气体不被代谢分解而主要通过呼气排出人体，而且大部分麻醉机直接将这些气体当做废气以原形排入大气层。对于麻醉气体的生态毒理的关注很少。我们依据最近的数据来估算，显示在美国麻醉用氧化亚氮构成了总排放量的 3.0%。研究提示随着氯氟碳类的水平的降低卤代麻醉药对全球变暖的影响将变得相对重要了。除了麻醉时的这些不可忽略的污染效应，尚无这些气体在其他公共场所的产生和排放的数据。这篇文章的主要目的是严谨地回顾最近的有关全麻药对全球环境潜在影响的数据，同时描述出可能的选择和新的可能防止这些气体排入大气的技术。
（张玥琪译，薛张纲校）

General anesthetics are administered to approximately 50 million patients each year in the United States. Anesthetic vapors and gases are also widely used in dentists' offices, veterinary clinics, and laboratories for animal research. All the volatile anesthetics that are currently used are halogenated compounds destructive to the ozone layer. These halogenated anesthetics could have potential significant impact on global warming. The widely used anesthetic gas nitrous oxide is a known greenhouse gas as well as an important ozone-depleting gas. These anesthetic gases and vapors are primarily eliminated through exhalation without being metabolized in the body, and most anesthesia systems transfer these gases as waste directly and unchanged into the atmosphere. Little consideration has been given to the ecotoxicological properties of gaseous general anesthetics. Our estimation using the most recent consumption data indicates that the anesthetic use of nitrous oxide contributes 3.0% of the total emissions in the United States. Studies suggest that the influence of halogenated anesthetics on global warming will be of increasing relative importance given the decreasing level of chlorofluorocarbons globally. Despite these nonnegligible pollutant effects of the anesthetics, no data on the production or emission of these gases and vapors are publicly available. The primary goal of this article is to critically review the current data on the potential effects of general anesthetics on the global environment and to describe possible

alternatives and new technologies that may prevent these gases from being discharged into the atmosphere.

简要报道：客观结构化临床考试为基础的区域麻醉技术评估：以色列麻醉学经验国家考试委员会

Brief Report: Objective Structured Clinical Examination–Based Assessment of Regional Anesthesia Skills: The Israeli National Board Examination in Anesthesiology Experience

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仿真技术在麻醉训练计划中的应用逐渐增加，而在住院医师的评估中应用程度相对较低。我们记录了以色列麻醉学国家考试委员会 7 年来应用客观结构化临床考试为基础的区域麻醉技术评估的经验。我们相信这是第一次使用这种模拟场景对区域麻醉进行评估，以达到国家认证的重要目的。研究期间，308 名受试者分别用 8 种不同阻滞方法中的一种进行试验。总的通过率为 83%(308 名中的 257 名)，范围为 73%-91%。相互间相关总性、批判性、和全球化评分分别为 0.84、0.88 和 0.75。技术和成本限制区域麻醉的排除性实际评估。然而，测试使得更接近地反应临床实践成为传统考试相关潜在价值格式化。
(朱兰芳译，薛张纲校）
Simulation techniques are increasingly being used in anesthesia training programs and to a lesser extent in evaluation of residents. We describe 7 years of experience with Objective Structured Clinical Examination–based regional anesthesia assessment in the Israeli National Board Examinations in Anesthesiology. We believe this is the first use of such mock scenarios for the assessment of regional anesthesia for the important purpose of national accreditation. During the study period, 308 candidates were examined in 1 of 8 different blocks. The total pass rate was 83%(257 of 308), ranging from 73% to 91%. The interrater correlation for total, critical, and global scores were 0.84, 0.88, and 0.75, respectively. Technological and cost constraints preclude actual assessment of regional anesthesia. However, testing formats that more closely reflect clinical practice are potentially valuable adjuncts to traditional examinations.

体外循环心脏手术后凝血酶产生升高

Enhanced Thrombin Generation After Cardiopulmonary Bypass Surgery

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背景：凝血酶的生成在止血的病理生理中起了很关键的作用。以往研究着重于术中凝血，而对术后的凝血激活了解甚少。凝血酶生成的测定能对体外凝血酶生成的潜力进行定量，有利于发现高凝状态。凝血酶动力试验（TDT）评估凝血酶生成的初始动力学。我们假设在心脏手术后有凝血酶生成增加和功能的增加。
方法：有 220 例接受首次冠状动脉旁路移植术或主动脉瓣置换术（AVR）的患者入组前瞻性研究。行 AVR 手术的患者术后第二天开始接受华法林治疗。测定凝血酶原片段(F_{1+2})、TDT、D-二聚体以及肌钙蛋白 T。在术前、手术结束、术后 4 小时及术后第 1、3 和 5 天（PODs）早晨采集血液样本。主要观察指标是术后第一天（POD1）的凝血酶的动态变化。
结果：所有患者中，凝血酶原片段(F_{1+2})高峰在手术结束时，并一直持续显著升高至术后第五天（POD5）。TDT 一开始比基础水平有所下降，但在术后第一天显著升高。冠脉搭桥术后患者 TDT 持续显著升高，而 AVR 术后行华法林治疗患者 TDT 在术后第三和五天显著降低。
结论：心脏手术后，凝血酶继续产生，并伴有较高的凝血酶产生能力和纤维蛋白原水平的升高。本研究显示术后处于显著的预凝状态，潜在增加了血栓栓塞并发症的风险。AVR 术后华法林治疗明显降低了凝血酶的产生能力。
（滕凌雅 译 马皓琳 李士通 校）

BACKGROUND: Thrombin generation has a key role in the pathophysiology of hemostasis. Research has focused on the intraoperative course of hemostasis, while little is known about postoperative hemostatic activation. Thrombin generation assays quantify the potential for thrombin generation ex vivo and may be useful for determining hypercoagulability. The thrombin dynamics test (TDT) assesses the initial kinetics of thrombin formation. We hypothesized that there would be an increase in thrombin generation as well as thrombin capacity after cardiac surgery.
METHODS: Two hundred twenty patients undergoing primary coronary artery bypass grafting or aortic valve replacement (AVR) surgery were prospectively enrolled. Patients undergoing AVR received warfarin beginning on the second postoperative day. In addition to prothrombin fragment (F_{1+2}), TDT, D-dimer, and troponin T were assessed. Blood samples were obtained preoperatively, at the end of the operation, 4 hours postoperatively, and the morning of postoperative days (PODs) 1, 3, and 5. The primary end point was the change of thrombin dynamics on POD 1.
RESULTS: In all patients, F_{1+2} peaked at the end of the operation and remained significantly elevated until POD 5. Compared with baseline and after an initial decrease, TDT was found to be significantly elevated on POD 1. After coronary artery bypass graft, TDT remained significantly elevated, whereas in AVR patients with warfarin treatment, TDT was significantly reduced on PODs 3 and 5.
CONCLUSIONS: After cardiac surgery, thrombin generation continues, accompanied by a high thrombin-generating capacity and elevated fibrinogen levels. This constellation suggests a marked procoagulopathic state in the postoperative period with the potential to aggravate the risk of thromboembolic complications. Warfarin treatment after AVR significantly reduced thrombin-generating capacity.

使用体外恒流实验设备检测肺动脉热稀释导管的精度误差

Determination of the Precision Error of the Pulmonary Artery Thermodilution Catheter Using an In Vitro Continuous Flow Test Rig

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背景：使用肺动脉导管检测心输出量的热稀释法是判断所有心输出量测定新方法的参照方法。然而，热稀释法缺乏精度，且有±20%的引证精度误差。目前，并不清楚它的真实精度，这也给验证心输出量测定新方法带来了困难。我们在本研究中的目的是为了确定热稀释法的当前精度误差。
方法：安装试验台，水以不同的恒定流速循环通过此试验台，并且有孔插入导管到一个流动室。通过外置的超声流量探测器和量器检测流速。使用同步填充的量筒校准量器。将“Arrow”和“Edwards” 7Fr 热稀释导管连接到 Siemens SC9000 心输出量监测仪，对其进行测试。通过注射 5 mL 冰水来获取热稀释法的读数。精度误差分为随机和系统误差，两者分别测定。通过获取在不同的流速时的每组十个读数确定每个导管的读数间（随机）变异性。计算每组的变异系数并计算均值。对每套导管绘制校准线，得出导管间的系统（系统）变异性。用斜率评估系统误差的成分。比较以下三个心输出量监护仪的性能：Siemens SC9000、Siemens Sirecust 1261 和 Philips MP50.。
结果：使用 Siemens SC9000 监护仪测试 5 根 Arrow 和 5 根 Edwards 导管。研究的流速在 0.7 到 7.0 L/min 间。Arrow 的变异系数（随机误差）为 5.4%，Edwards 为 4.8%。随机精度误差为±10.0%（95%置信区间）。Arrow 和 Edwards 的变异系数（系统误差）分别为 5.8%和 6.0%。系统精度误差为±11.6%。单次热稀释法读数的总精度误差为±15.3%，三次热稀释法读数的总精度误差为±13.0%。使用 Sirecust 监护仪时，精度误差增加 45%；使用 Philips 监护仪，精度误差增加 100%。
结论：体外测试肺动脉导管使我们能检测热稀释法测定心输出量的随机和系统误差组分，并且因此能计算精度误差。使用 Siemens 监护仪，我们评估单次和三次读数的精度误差分别为±15.3%和±13.0%，这与以前的评估（±20%）接近。然而，使用 Sirecust 和 Philips 监护仪后，精度误差明显增加。临床医生应该意识到：心输出量热稀释法的精度误差依赖于导管和监测模型的选择。
（王海涛 译，马皓琳，李士通校）

BACKGROUND: Thermodilution cardiac output using a pulmonary artery catheter is the reference method against which all new methods of cardiac output measurement are judged. However, thermodilution lacks precision and has a quoted precision error of ±20%. There is uncertainty about its true precision and this causes difficulty when validating new cardiac output technology. Our aim in this investigation was to determine the current precision error of thermodilution measurements.
METHODS: A test rig through which water circulated at different constant rates with ports to insert catheters into a flow chamber was assembled. Flow rate was measured by an externally placed transonic flowprobe and meter. The meter was calibrated by timed filling

of a cylinder. Arrow and Edwards 7Fr thermodilution catheters, connected to a Siemens SC9000 cardiac output monitor, were tested. Thermodilution readings were made by injecting 5 mL of ice-cold water. Precision error was divided into random and systematic components, which were determined separately. Between-readings (random) variability was determined for each catheter by taking sets of 10 readings at different flow rates. Coefficient of variation (CV) was calculated for each set and averaged. Between-catheter systems (systematic) variability was derived by plotting calibration lines for sets of catheters. Slopes were used to estimate the systematic component. Performances of 3 cardiac output monitors were compared: Siemens SC9000, Siemens Sirecust 1261, and Philips MP50.

RESULTS: Five Arrow and 5 Edwards catheters were tested using the Siemens SC9000 monitor. Flow rates between 0.7 and 7.0 L/min were studied. The CV (random error) for Arrow was 5.4% and for Edwards was 4.8%. The random precision error was ±10.0% (95% confidence limits). CV (systematic error) was 5.8% and 6.0%, respectively. The systematic precision error was ±11.6%. The total precision error of a single thermodilution reading was ±15.3% and ±13.0% for triplicate readings. Precision error increased by 45% when using the Sirecust monitor and 100% when using the Philips monitor.

CONCLUSION: In vitro testing of pulmonary artery catheters enabled us to measure both the random and systematic error components of thermodilution cardiac output measurement, and thus calculate the precision error. Using the Siemens monitor, we established a precision error of ±15.3% for single and ±13.0% for triplicate reading, which was similar to the previous estimate of ±20%. However, this precision error was significantly worsened by using the Sirecust and Philips monitors. Clinicians should recognize that the precision error of thermodilution cardiac output is dependent on the selection of catheter and monitor model.

设计、执行并评估一个用于围术期与不能熟练掌握本国语言的病人进行交流的计算机系统

Design, Implementation, and Evaluation of a Computerized System to Communicate with Patients with Limited Native Language Proficiency in the Perioperative Period

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背景：在围术期与不能熟练掌握麻醉实施者本国语言的患者进行有效交流常常具有挑战性。我们描述了我们如何开发、执行并且评估一个计算机化系统，该系统把与围术期麻醉监护相关的常用且事先录音的短语用我们最常遇见的这些患者语种传达给这些患者。

方法：在麻醉科医生之间通过一个意见一致的程序选择短语。这些短语包括常用于告知病人将要发生的事、我们将要进行的干预以及他们如何配合等日常对话。还鉴定了需要回答“是”或“否”的普通问题。我们用了解医学知识并且熟悉病人的文化以提供精确翻译的讲本国语言的人将这些短语录音。我们开发了一种应用软件，将短语

明确分组，使麻醉实施者可以选择短语并且给病人播放相关的声音文件，并且在我们的触摸屏幕式麻醉信息管理系统工作站上展开该程序。我们对讲一种中国方言的产科病人中的便利样本运用了该语言程序，并要求填写翻译成中文的关于她们的感受的无记名调查表。计算 95%可信区间下限(LCLs)作为应答率。
结果：我们研究了 25 名英文理解水平不同的产妇，她们都同意使用该语言程序。每一个病人在阵痛和分娩时，与麻醉监护实施者交流的全过程使用了该程序，每一个病人都完成了调查。该程序的接受程度很高，所有病人表示假如她们要回来进行需要麻醉的其他操作，她们会愿意再一次使用该程序。88%（LCL = 73%）表明接受母语的指令使她们感到更放松，而其余病人的感受是中立的。表现的短语理解力很高，有 96%（LCL = 83%）的患者表示她们理解所有的指令。96%(LCL = 83%)的病人表示基于该设备的有效性，她们愿意介绍朋友或家人到我们机构。
结论：尽管病人的安全可能会因为使用交流设备（比如我们开发的这个设备）而改善，但是我们的研究还不足以能够做到度量这个潜在的改善程度。不论麻醉监护实施者在哪里，不能与病人用同样的语言交流时，我们描述的这个程序应该有用。
（瞿亦枫 译 马皓琳 李士通校）
BACKGROUND: Effective communication with patients having limited proficiency in the native language of anesthesia care providers during the perioperative period is often challenging. We describe how we developed, implemented, and evaluated a computerized system to convey frequently used prerecorded phrases related to perioperative anesthesia care in the languages we most often encounter in such patients.
METHODS: Phrases were chosen through a consensus process among anesthesia department members. These included routine sayings used to inform patients about what they should anticipate, what interventions we are performing, and how they can participate. Common questions requiring a “yes” or “no” answer were also identified. We recorded these phrases using native speakers who were both knowledgeable medically and familiar with the culture of the patients to provide accurate translations. We developed a software application that categorically grouped the phrases and allowed care providers to select a phrase and play the associated sound file to the patient and deployed the program on our touchscreen-enabled anesthesia information management system workstations. A convenience sample of obstetrical patients speaking a Chinese dialect with whom the language program was used were asked to complete an anonymous questionnaire, translated into Chinese, about their experience. Ninety-five percent lower confidence limits (LCLs) were calculated for response proportions.
RESULTS: We approached 25 parturients with varying levels of English comprehension, and all agreed to use the language program. Each used it throughout her interaction with the anesthesia care providers during labor and delivery, and all patients completed the survey. Acceptance of the process was high, with all patients indicating that they would like to use it again were they to return for another procedure requiring anesthesia. Eighty-eight percent (LCL = 73%) indicated that having instructions in their native language made them feel more relaxed, whereas the experience was neutral in the remainder. Comprehension of the phrases presented was high, with 96% (LCL = 83%) indicating that they understood all instructions. Ninety-six percent (LCL = 83%) of patients indicated that they would be likely to refer friends and family to our institution based on the availability of this device.

CONCLUSIONS: Although patient safety likely could be improved by use of a communication device such as the one we developed, our study was insufficiently powered to be able to measure this potential improvement. The process we describe should be useful wherever anesthesia care providers are not able to communicate in the same language as their patients.

多培沙明对于在腹部大型手术中进行液体靶控治疗的高危病人无额外益处

Dopexamine Has No Additional Benefit in High-Risk Patients Receiving Goal-Directed Fluid Therapy Undergoing Major Abdominal Surgery

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背景：研究表明作为围术期提高携氧能力的方法之一，多培沙明在大型外科手术中可减少病人的死亡率和并发症的发生率。欧洲一项多中心的研究验讫了多培沙明在行腹部大型手术的患者中的应用，该研究表明在高危病人中小剂量（0.5μg ·kg^{-1} ·min^{-1}）应用多培沙明有提高病人的存活率并减少并发症的趋势。已有研究显示无氧阈（AT）中携氧量的降低是影响腹部大型手术病人死亡率的显著危险因素，它也是评定高危手术病人的客观依据。在本次研究中，我们评估了小剂量应用多培沙明对于由于 AT 降低而增加了风险的腹部大型手术病人的并发症发生率的影响。
方法：我们招募了择期进行大型结直肠或泌尿外科手术的病人，他们的 AT <11 mL ·kg^{-1} ·min^{-1} 或者 AT 处于 11-14 mL ·kg^{-1} ·min^{-1} 但有缺血性心脏病病史。术前我们进行桡动脉置管，将其与爱德华生命科学 FloTrac/Vigileo™系统连接以测定心输出量。我们给病人单次注射 250 毫升万汶（0.9%氯化钠中含 6%羟乙基淀粉 130/0.4）直至每博量不再升高 10%，然后予以 24 小时多培沙明或者生理盐水的输注。术中如果出现每博量变异度>10%则予以万汶输注，术中不输注晶体液。医嘱用含 Hartmann 溶液 1.5 mL ·kg^{-1} ·h^{-1} 的标准化术后液体方案持续 24 小时。我们主要的测定结果是由术后发病率调查测得的术后发病率。
结果：我们随访了 124 名病人术后 23 个月的情况。我们通过术后发病率调查表统计到术后第 5 天对照组的发病率为 55%，而多培沙明组为 47%（P=0.14）。在术后任意一个观察天数均无发病率的显著下降。两组之间的并发症的程度、死亡率和住院天数是类似的；但是多培沙明组的病人可更早地恢复对肠内营养的耐受。
结论：通过液体靶向治疗在择期手术病人中的有效应用，常规应用多培沙明不能提供额外的临床益处。
（毛祖旻 译 马皓琳 李士通 校）

BACKGROUND: Dopexamine has been shown to reduce both mortality and morbidity in major surgery when it is used as part of a protocol to increase oxygen delivery in the perioperative period. A European multicenter study has examined the use of dopexamine in patients undergoing major abdominal surgery, showing a trend toward improved survival

and reduced complications in high-risk patients when receiving low-dose dopexamine (0.5 $\mu g \cdot kg^{-1} \cdot min^{-1}$). A reduced oxygen uptake at the anaerobic threshold (AT) has been shown to confer a significant risk of mortality in patients undergoing major abdominal surgery and allows objective identification of a high-risk operative group. In this study, we assessed the effects of low-dose dopexamine on morbidity after major abdominal surgery in patients who were at increased risk by virtue of a reduced AT.

METHODS: Patients undergoing elective major colorectal or urological surgery who had an AT of <11 mL $\cdot kg^{-1} \cdot min^{-1}$ or an AT of 11 to 14 mL $\cdot kg^{-1} \cdot min^{-1}$ with a history of ischemic heart disease were recruited. Before surgery, a radial arterial cannula was placed and attached to an Edwards Lifesciences FloTrac/Vigileo™ system for measuring cardiac output. Patients were given a 250-mL bolus of Voluven® (6% hydroxyethyl starch 130/0.4 in 0.9% sodium chloride) until the stroke volume no longer increased by 10%, then received either dopexamine ($0.5 \mu g \cdot kg^{-1} \cdot min^{-1}$) or saline 0.9% for 24 hours. During surgery, fluid boluses of Voluven were given if the stroke volume variation was >10%. No crystalloid was given during surgery. A standardized postoperative fluid regime with Hartmann solution was prescribed at 1.5 mL $\cdot kg^{-1} \cdot h^{-1}$ for 24 hours. The primary outcome measure was postoperative morbidity measured by the Postoperative Morbidity Survey.

RESULTS: One hundred twenty-four patients were recruited over a 23-month period. The incidence of morbidity as measured by the Postoperative Morbidity Survey on day 5 was 55% in the control group versus 47% in the dopexamine group (P = 0.14). There was no significant reduction in morbidity on any measured postoperative day. Complication rates, mortality, and hospital length of stay were similar between the 2 groups; however, administration of dopexamine was associated with earlier return of tolerating an enteral diet.

CONCLUSION: With the effective use of goal-directed fluid therapy in elective surgical patients, the routine use of dopexamine does not confer an additional clinical benefit.

危重病人针刺治疗可改善胃排空延迟：一项随机对照试验

Acupuncture in Critically Ill Patients Improves Delayed Gastric Emptying: A Randomized Controlled Trial

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背景：营养不良仍是影响危重病人恢复的严重问题，并可导致住院期间死亡率和住院天数的增加。即使已有研究显示早期肠内营养可改善重症监护室（ICU）中总的病人的预后，给予管饲仍会伴随胃排空延迟及胃食管反流的并发症。针刺治疗已经成功

用于防治术后恶心呕吐。在本项研究中，我们在接受肠内营养的危重病人中，对针刺治疗与标准促胃动力药相比是否改善胃排空进行了研究。

方法：30 例机械通气下神经外科 ICU 胃排空延迟的病人入选本研究。我们将胃排空延迟定义为胃残余量（GRV）大于 500ml 持续超过 2 天，将此 30 例病人前瞻性地随机分为两组：针刺穴位刺激组（ASG：双向经皮穴位电刺激内关穴，PC-6）和服用常规促胃动力药组（DTG：服用胃复安、西沙必利或红霉素）持续 6 天。ASG 组不服用任何促胃动力药。治疗成功（肠内营养耐受）的定义为 GRV 小于 200ml 每 24 小时。

结果：人口统计学和血流动力学数据两组相似。治疗 5 天后，ASG 组肠内营养耐受的病人为 80%，而服用常规促胃动力药组的病人为 60%。在治疗的第一天，ASG 组病人经穴位刺激后 GRV 从 970 ± 87 mL 下降至 346 ± 71 mL (P = 0.003)，而 DTG 组病人 GRV 从 903 ± 60 mL 显著上升至 1040 ± 211 mL (P = 0.015)。此外 ASG 组中 GRV 下降且喂养平衡（定义为肠饲量减去 GRV）增加的病人数量（15 人中有 14 人）大于 DTG 组（15 人中有 7 人）（P = 0.014）。在治疗的第一天， ASG 组病人的平均喂养平衡（121 ± 128 mL）显著大于 DTG 组 (−727 ± 259 mL) (P = 0.005)。总体来看，与 DTG 组相比，ASG 组病人的喂养平衡在治疗全程中显著改善。DTG 组病人的喂养平衡在治疗第六天前没有增加。

结论：我们将针刺作为一种新的治疗措施引入重症监护管理中，并证明了此项措施与标准的促胃动力药相比，在治疗危重病人胃排空延迟方面更加有效。对危重病人营养不良的防治，内关穴（PC-6）的针刺穴位刺激可能是一种方便且廉价（副作用少）的选择。

（刘伍 译 马皓琳 李士通 校）

BACKGROUND: Malnutrition remains a severe problem in the recovery of critically ill patients and leads to increased in-hospital morbidity and in-hospital stay. Even though early enteral nutrition has been shown to improve overall patient outcomes in the intensive care unit (ICU), tubefeed administration is often complicated by delayed gastric emptying and gastroesophageal reflux. Acupuncture has been successfully used in the treatment and prevention of perioperative nausea and vomiting. In this study we evaluated whether acupuncture can improve gastric emptying in comparison with standard promotility drugs in critically ill patients receiving enteral feeding.

METHODS: Thirty mechanically ventilated neurosurgical ICU patients with delayed gastric emptying, defined as a gastric residual volume (GRV) >500 mL for ≥2 days, were prospectively and randomly assigned to either the acupoint stimulation group (ASG; bilateral transcutaneous electrical acupoint stimulation at Neiguan, PC-6) or the conventional promotility drug treatment group (DTG) over a period of 6 days (metoclopramide, cisapride, erythromycin). Patients in the ASG group did not receive any conventional promotility drugs. Successful treatment (feeding tolerance) was defined as GRV <200 mL per 24 hours.

RESULTS: Demographic and hemodynamic data were similar in both groups. After 5 days of treatment, 80% of patients in the ASG group successfully developed feeding tolerance versus 60% in the DTG group. On treatment day 1, GRV decreased from 970 ± 87 mL to 346 ± 71 mL with acupoint stimulation (P = 0.003), whereas patients in the DTG group showed a significant increase in GRV from 903 ± 60 mL to 1040 ± 211 mL (P = 0.015). In addition, GRV decreased and feeding balance (defined as enteral feeding volume minus

GRV) increased in more patients in the ASG group (14 of 15) than in the DTG group (7 of 15; P = 0.014). On treatment day 1, the mean feeding balance was significantly higher in the ASG group (121 ± 128 mL) than in the DTG group (−727 ± 259 mL) (P = 0.005). Overall, the feeding balance improved significantly on all days of treatment in comparison with the DTG group. Patients in the DTG group did not show an increase in feeding balance until day 6.

CONCLUSIONS: We introduce a new protocol for acupuncture administration in the critical care setting. We demonstrated that this protocol was more effective than standard promotility medication in the treatment of delayed gastric emptying in critically ill patients. Acupoint stimulation at Neiguan (PC-6) may be a convenient and inexpensive option (with few side effects) for the prevention and treatment of malnutrition in critically ill patients.

对插管型喉导气管作为儿童气管导管插管的管道的临床评价

A Clinical Evaluation of the Intubating Laryngeal Airway as a Conduit for Tracheal Intubation in Children

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背景：空气- Q ™插管型喉导气管（ILA）(Cookgas LLC，Mercury Medical, Clearwater, FL)是有小儿型号的声门上通气装置，其设计特点是为了在引导气管插管时方便带套囊的气管导管通过。我们设计了这个 ILA 的前瞻性观察研究，以评估其在瘫痪的儿科病人中放置是否更容易，确定其位置并用光学纤维支气管镜调整到喉部，评估它作为用带套囊气管导管进行纤维光学插管的管道的有效性，以及在成功气管插管后，评估移除 ILA 后不发生气管导管移位的能力。

方法：100 例健康的年龄 6 个月至 8 岁，ASA I 至 II 级并需要在气管内全身麻醉下行择期手术的儿童入选本前瞻性研究。基于制造商的指导，每个患者根据体重使用 1.5 号或 2.0 号的 ILA。记录成功插入的尝试次数、漏气压力、视野的纤维光学分级、气管插管的尝试次数和时间、ILA 移除的时间以及并发症。

结果：ILA 的放置、纤维光学气管插管和 ILA 的移除在所有患者中成功完成。尽管有足够的通气参数，但是 1.5 号 ILA 组较 2.0 号 ILA 年龄组有显着较高的会厌塌陷的发生率（P < 0.001）。当比较纤维光学分级与体重的关系时，发现它们呈中等负相关(r = −0.41, P < 0.001)，说明较大的患者可能有更好的纤维光学视野分级。相比 2.0 号 ILA 组，1.5 号 ILA 组插管时间显著较长（P = 0.04）。但是，这种差异可能不会有重大的临床意义，因为 1.5 号 ILA 平均时间（27.0 ± 13.0 秒）和 2.0 号 ILA 平均时间（22.7 ± 6.9 秒）的可信区间有一个较大的重叠。当比较体重和气管插管时间的关系时，发现它们相关性较弱，并不具有统计学意义（r = -0.17，P＝0.09），显示按体重分级时，尽管体重较小的患者有较高的镜下分级，但是插管时间没有明显差异。

结论：ILA 很容易放置，为在气道正常的儿童用带套囊的气管导管进行气管插管提供了一个有效的通道。此外，插管成功后移除 ILA 可以快速达到，并无气管导管移

位。由于在较小的患者中会厌塌陷有较高的发生率，所以推荐使用光学纤维支气管镜以协助气管插管通过该装置。
（唐亮 译 马皓琳 李士通 校）

BACKGROUND: The air-Q™ Intubating Laryngeal Airway (ILA) (Cookgas LLC, Mercury Medical, Clearwater, FL) is a supraglottic airway device available in pediatric sizes, with design features to facilitate passage of cuffed tracheal tubes when used to guide tracheal intubation. We designed this prospective observational study of the ILA to assess the ease of its placement in paralyzed pediatric patients, determine its position and alignment to the larynx using a fiberoptic bronchoscope, gauge its efficacy as a conduit for fiberoptic intubation with cuffed tracheal tubes, and evaluate the ability to remove the ILA without dislodgement of the tracheal tube after successful tracheal intubation.
METHODS: One hundred healthy children, aged 6 months to 8 years, ASA physical status I to II, and scheduled for elective surgery requiring general endotracheal anesthesia were enrolled in this prospective study. Based on the manufacturer's guidelines, each patient received either a size 1.5 or 2.0 ILA according to their weight. The number of attempts for successful insertion, leak pressures, fiberoptic grade of view, number of attempts and time for tracheal intubation, time for ILA removal, and complications were recorded.
RESULTS: ILA placement, fiberoptic tracheal intubation, and ILA removal were successful in all patients. The size 1.5 ILA cohort had significantly higher rates of epiglottic downfolding compared with the size 2.0 ILA cohort ($P < 0.001$), despite adequate ventilation variables. When comparing fiberoptic grade of view to weight, a moderate negative correlation was found ($r = -0.41$, $P < 0.001$), indicating that larger patients tended to have better fiberoptic grades of view. The size 1.5 ILA cohort had a significantly longer time to intubation ($P = 0.04$) compared with the size 2.0 ILA cohort. However, this difference may not be clinically significant because there was a large overlap of confidence bounds in the average times of the size 1.5 ILA (27.0 ± 13.0 seconds) and size 2.0 ILA cohorts (22.7 ± 6.9 seconds). When comparing weight to time to tracheal intubation, a weak correlation that was not statistically significant was found ($r = -0.17$, $P = 0.09$), showing that time to intubation did not differ significantly according to weight, despite higher fiberoptic grades in smaller patients.
CONCLUSIONS: The ILA was easy to place and provided an effective conduit for tracheal intubation with cuffed tracheal tubes in children with normal airways. Additionally, removal of the ILA after successful intubation could be achieved quickly and without dislodgement of the tracheal tube. Because of the higher incidence of epiglottic downfolding in smaller patients, the use of fiberoptic bronchoscopy is recommended to assist with tracheal intubation through this device.

鞘内注射 A 型肉毒杆菌神经毒素减弱福尔马林所致的小鼠感受性伤害反应

Intrathecal Administration of Botulinum Neurotoxin Type A Attenuates Formalin-Induced Nociceptive Responses in Mice

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背景：A 型肉毒杆菌神经毒素(BoNT/A)已作为镇痛剂用于肌筋膜疼痛综合征、偏头痛以及其他类型头痛。尽管中枢或外周使用 BoNT/A 的镇痛效果确切，但是其在脊柱水平的作用还不甚明朗。本研究中，我们评估了福尔马林试验中的 ICR 小鼠鞘内注射 BoNT/A 的镇痛作用。
方法：每只 ICR 小鼠鞘内注射 0.01 单位 BoNT/A，且观察注射后第 1、4、7、10、14、21 和 28 天福尔马林所致炎症性疼痛行为。同时，我们采用免疫印记或免疫组织化学分析方法检测鞘内注射 BoNT/A 前后的降钙素基因相关肽(CGRP)、磷酸化的细胞外信号调节激酶(p-ERK)以及磷酸化的 2 型钙/钙调蛋白依赖性蛋白激酶(p-CaMK-II)的水平。
结果：即使单次鞘内注射 BoNT/A 也能明显减轻 1、4、7、10 和 14 天后福尔马林试验第一相（10 和 14 天后）和第二相中的感受性伤害反应($P < 0.05$)，且不伴有运动改变。有趣的是，与对照组相比，鞘内注射 BoNT/A 后第 10 天，第 4 和第 5 腰椎脊髓背侧角中 CGRP、p-ERK 和 p-CaMK-II 的表达水平有所降低。
结论：我们的研究显示，鞘内注射 BoNT/A 可能是通过中枢敏感化调节作用对炎症性疼痛产生中枢性镇痛作用。具有长效镇痛作用的 BoNT/A 或许是一种有效的炎性痛镇痛剂。
(江继宏 译 马皓琳 李士通 校）

BACKGROUND: Botulinum neurotoxin type A (BoNT/A) has been used as an analgesic for myofascial pain syndromes, migraine, and other types of headaches. Although an antinociceptive effect of central or peripheral administration of BoNT/A is suggested, the effect at the spinal level is still unclear. In this study, we evaluated the antinociceptive effect of intrathecally administered BoNT/A on the ICR mice during the formalin test.
METHODS: BoNT/A (0.01 U/mouse) was injected intrathecally in ICR mice, and we observed formalin-induced inflammatory pain behaviors at days 1, 4, 7, 10, 14, 21, and 28 after the injection. We also examined the level of calcitonin gene-related peptide (CGRP), phosphorylated extracellullar signal-regulated kinases (p-ERK), and phosphorylated Ca^{2+}/calmodulin-dependent protein kinase type 2 (p-CaMK-II) using immunoblot or immunohistochemical analyses before and after BoNT/A intrathecal injection.
RESULTS: Even a single intrathecal injection of BoNT/A significantly decreased the nociceptive responses in the first phase (10 and 14 days later) and in the second phase of the formalin test at 1, 4, 7, 10, and 14 days later ($P < 0.05$) without any locomotor changes. Interestingly, intrathecal BoNT/A attenuated the expression level of CGRP, p-ERK, and p-CaMK-II in the 4th and 5th lumbar spinal dorsal horn at 10 days after injection in comparison with control.
CONCLUSIONS: We showed that intrathecally administered BoNT/A may have a central analgesic effect on inflammatory pain through the modulation of central sensitization. BoNT/A, with its long-lasting antinociceptive effect, may be a useful analgesic in inflammatory pain.

电流-距离关系用于周围神经刺激仪定位

Current-Distance Relationships for Peripheral Nerve Stimulation Localization

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背景：成功的外周神经阻滞需要在使用局麻药前准确放置注射器针尖。此项研究中，我们使用动物体外和体内模型实验性地重建了极性依赖（阳性和阴性）刺激图。
方法：一种新型的体外装置（神经-肌肉复合型）被首次用于探测阴极和阳极的刺激特性。记录不同的刺激（单极电极）距离和强度下大鼠坐骨神经电生理（神经复合动作电位，CAP）。我们在更接近于临床状态下的开放的解剖大鼠模型上重复了此方法。将从电流扫描得到的合成数据绘制成一个 3 维的距离-刺激-CAP 图。这些图描绘了神经激活所需的最小刺激电流，并描述了距离函数和输入刺激强度的预期电生理结果。刺激图提供临床上操作（如区域麻醉中的神经定位）相关的位置信息。
结果：阴极刺激产生了复杂的双向电生理反应。CAP 的幅度（电流固定）在电极移近神经时增大，但在接近或与神经接触后反而降低。这种现象依赖于刺激强度，并且在体内和体外模型中均被观察到。阳极刺激产生了一个单一的关系，即电极-神经距离减小时 CAP 增大。研究发现外周神经对阴极和阳极的刺激最低激活阈值被认为分别是 0.34 ± 0.11 mA (均值±标准差)和 0.63 ± 0.12 mA。对阴极和阳极刺激的神经内阈值均明显降低，分别为 0.12 ± 0.03 mA 和 0.32 ± 0.09 mA。
结论：阴极刺激在针尖靠近神经时可能产生传导阻滞。与此相反，阳极刺激引起的输出特性是可预测性的，且更适合于神经定位。我们相信，在近神经距离阳极刺激是可行的选择，尽管需要的电流增强。这是一个对以阴极为基础的传统的神经刺激定位的转变的假说。对该假说应该进行临床验证。
（杨秀娟 译 马皓琳 李士通 校）

BACKGROUND: Successful peripheral nerve blocks require accurate placement of the injection needle tip before local anesthetic application. In this investigation, we experimentally reconstructed polarity-dependent (anode and cathode) stimulation maps using ex vivo and in vivo animal models.
METHODS: A novel ex vivo configuration (muscle–nerve composite) was first used to probe both cathodic and anodic stimulation characteristics. The electrophysiology (compound nerve action potential, CAP) of rat sciatic nerve was recorded at varying stimulation (monopolar electrode) distances and intensities. We repeated this methodology with an open dissection rat model that was more analogous to the clinical setting. Resultant data from the current sweeps were plotted as a 3-dimensional distance–stimulus–CAP map. These plots depict the minimum stimulation currents required for nerve activation and describe the expected electrophysiological outcomes as a function of distance and input stimulus intensity. The stimulation maps provide positional information relevant to clinical procedures such as nerve localization during regional anesthesia.
RESULTS: Cathodic stimulation produced a complex biphasic electrophysiological response. The CAP amplitude (with fixed current) increased as the electrode moved closer

towards the nerve, but decreased upon close proximity or nerve contact. This phenomenon was dependent upon stimulation intensity and was observed in both ex vivo and in vivo models. Anodic stimulation produced a monotonic relationship, with the CAP increasing with closer electrode-to-nerve distances. Minimum extraneural activation thresholds were found to be 0.34 ± 0.11 mA (mean ± SD) and 0.63 ± 0.12 mA for cathode and anode stimulation, respectively. Intraneural thresholds were substantially lower, 0.12 ± 0.03 mA and 0.32 ± 0.09 mA, for cathode and anode, respectively.
CONCLUSION: Cathodic stimulation may produce conduction block at close tip-to-nerve distances. In contrast, anodic stimulation elicited output characteristics that were predictable and more suitable for nerve localization. We believe anodic stimulation is a viable option at near-nerve distances, despite the increased current requirements. This hypothesis is a paradigm shift in stimulation nerve localization, which conventionally has been cathode based. The hypothesis should be clinically validated.

小儿心脏手术应用血栓弹力图可减少输血

Intraoperative Thromboelastometry Is Associated with Reduced Transfusion Prevalence in Pediatric Cardiac Surgery

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背景：大多数小儿心脏手术患者术中需输血。作者假设术中常规使用血栓弹力图指导输血将减少心脏手术患儿接受输血的总比例。
方法：本研究包括 100 例心脏手术患儿。其中 50 例前瞻性入选为研究组，另 50 例程序与年龄相匹配的患者作为对照组。研究组在体外循环期间应用血栓弹力图来指导术中输血。比较两组的术中和术后所输的浓缩红细胞，新鲜冰冻血浆，血小板和纤维蛋白原凝集物，并比较两组的术后出血量和血红蛋白水平。
结果：术中或术后接受任何血制品（包括浓缩红细胞，新鲜冰冻血浆，血小板，纤维蛋白原凝集物）的输注比例，研究组（32/50,64%）明显低于对照组（46/50,92%），*P* 值< 0.001。研究组输注浓缩红细胞 (58% 比 78%, *P* = 0.032) 以及血小板(14% 比 78%, *P* < 0.001)的比例也明显较低。然而，研究组输注血小板 (38% 比 12%, *P* = 0.002) 和纤维蛋白原凝集物 (16% 比 2%, *P* = 0.015）的比例更高。无论研究组还是对照组，术后出血量与血红蛋白水平没有明显差异。
结论：研究结果表明，小儿心脏手术中常规应用血栓弹力图指导输血可以减少输血比例，并改变输血模式。
(邹巧群　译　陈杰　校)

BACKGROUND: The majority of pediatric cardiac surgery patients receive blood transfusions. We hypothesized that the routine use of intraoperative thromboelastometry to guide transfusion decisions would reduce the overall proportion of patients receiving transfusions in pediatric cardiac surgery.
METHODS: One hundred pediatric cardiac surgery patients were included in the study. Fifty patients (study group) were prospectively included and compared with 50 procedure- and age-matched control patients (control group). In the study group, thromboelastometry, performed during cardiopulmonary bypass, guided intraoperative transfusions. Intraoperative and postoperative transfusions of packed red blood cells, fresh frozen plasma, platelets, and fibrinogen concentrates, and postoperative blood loss and hemoglobin levels were compared between the 2 groups.
RESULTS: The proportion of patients receiving any intraoperative or postoperative transfusion of packed red blood cells, fresh frozen plasma, platelets, or fibrinogen concentrates was significantly lower in the study group than in the control group (32 of 50 [64%] vs 46 of 50 [92%], respectively; $P < 0.001$). Significantly fewer patients in the study group received transfusions of packed red blood cells (58% vs 78%, $P = 0.032$) and plasma (14% vs 78%, $P < 0.001$), whereas more patients in the study group received transfusions of platelets (38% vs 12%, $P = 0.002$) and fibrinogen concentrates (16% vs 2%, $P = 0.015$). Neither postoperative blood loss nor postoperative hemoglobin levels differed significantly between the study group and the control group.
CONCLUSIONS: The results suggest that routine use of intraoperative thromboelastometry in pediatric cardiac surgery to guide transfusions is associated with a reduced proportion of patients receiving transfusions and an altered transfusion pattern.

四个成串刺激中可见两个抽颤搐时给予新斯的明或 Sugammadex 后的肌松药残余时间

The Duration of Residual Neuromuscular Block After Administration of Neostigmine or Sugammadex at Two Visible Twitches During Train-of-Four Monitoring

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背景：患者神经肌肉阻滞（NMB）的充分恢复对充分掌控咽部及呼吸肌功能是必要的。TOF 比率至少应恢复到 0.90，以排除临床潜在的术后肌松药残余。使用周围神经刺激仪(PNS)时当 TOF 比率> 0.4 无法可靠地检测出衰减。从使用 PNS 时观察到的衰减消失到客观的 TOF 比率恢复> 0.90 的这段间隔被认为是“潜在不安全恢复期”。依此作者假设，使用 sugammadex 相比于新斯的明这一间隔将大大缩短。
方法：50 例患者接受吸入麻醉药、阿片类药物及罗库溴铵诱导。使用 TOF-Watch® 非预载模式，麻醉医师仅依靠视觉评价 TOF 刺激反应。手术结束时，最后一次给予罗库溴铵后出现 TOF 中两个颤搐刺激时，患者随机接受新斯的明 50

μg/kg 或 sugammadex 2 mg/kg。根据 PNS 和临床数据来决定气管拔管时间。并对由新斯的明或 sugammadex 拮抗后的潜在不安全期进行了 Mann–Whitney U 检验和 Pearsonχ2 检验的统计分析。

结果：观察到衰减消失至 TOF 比> 0.90 间隔 [平均值±标准差（范围）] 在新斯的明组和 sugammadex 组分别为 10.3 ± 5.5（1.3～26.0）min 和 0.3 ± 0.3（0.0 到 1.0）min($P < 0.001$)。新斯的明或 sugammadex 拮抗至 TOF 比率> 0.90 的时间分别为 13.3 ± 5.7（3.5 至 28.9）和 1.7 ± 0.7（0.7 至 3.5）min，（P<0.001）。当观察到衰减消失时，新斯的明组和 sugammadex 组的 TOF 比率分别为 0.34 ± 0.14（0.00～0.56）和 0.86 ± 0.11 (0.64 to 1.04) ($P < 0.001$)。

结论：用新斯的明拮抗罗库溴铵后，主观视觉评估神经肌肉功能的衰减消失与实际 TOF 比率> 0.90 之间有明显差距。仅仅依赖主观视觉评估 TOF 刺激反应时，运用 Sugammadex 相比于新斯的明更安全。

(陈毓雯　译　陈杰　校)

BACKGROUND: Adequate recovery from neuromuscular block (NMB) is imperative for the patient to have full control of pharyngeal and respiratory muscles. The train-of-4 (TOF) ratio should return to at least 0.90 to exclude potentially clinically significant postoperative residual block. Fade cannot be detected reliably with a peripheral nerve stimulator (PNS) at a TOF ratio >0.4. The time gap between loss of visual fade by using a PNS until objective TOF ratio has returned to >0.90 can be considered "the potentially unsafe period of recovery." According to our hypothesis the duration of this period would be significantly shorter with sugammadex than with neostigmine.

METHODS: Fifty patients received volatile anesthetics, opioids, and a rocuronium-induced NMB. TOF-Watch® without a preload was used, but the anesthesiologist relied on visual evaluation of the TOF responses only. At end of operation, patients were randomized to receive either neostigmine 50 μg/kg or sugammadex 2 mg/kg, when 2 twitch responses were detected after the last dose of rocuronium. Timing of tracheal extubation was based on PNS and clinical data. Duration of the potentially unsafe period of recovery after reversal by either neostigmine or sugammadex was analyzed. Mann–Whitney *U* test and Pearson χ^2 test were used for statistical analysis.

RESULTS: The times [mean ± SD (range)] from loss of visual fade to TOF ratio >0.90 were 10.3 ± 5.5 (1.3 to 26.0) minutes and 0.3 ± 0.3 (0.0 to 1.0) minutes in the neostigmine and sugammadex groups, respectively ($P < 0.001$). The times from reversal by neostigmine or sugammadex to TOF ratio >0.90 were 13.3 ± 5.7 (3.5 to 28.9) and 1.7 ± 0.7 (0.7 to 3.5) minutes, respectively ($P < 0.001$). The values of TOF ratios at the time of loss of visual fade were 0.34 ± 0.14 (0.00 to 0.56) in patients given neostigmine and 0.86 ± 0.11 (0.64 to 1.04) in patients given sugammadex ($P < 0.001$).

CONCLUSIONS: There is a significant time gap between visual loss of fade and return of TOF ratio >0.90 after reversal of a rocuronium block by neostigmine. Sugammadex in comparison with neostigmine allows a safer reversal of a moderate NMB when relying on visual evaluation of the TOF response.

麻醉操作人员的手部污染是术中细菌传播的重要危险因子

Hand Contamination of Anesthesia Providers Is an Important Risk Factor for Intraoperative Bacterial Transmission

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背景：作者近期了解到术中通过静脉活塞装置将细菌传播给患者会增加患者的死亡率。本研究中作者假设麻醉操作人员在接触病人之前的手部细菌污染将成为一个直接术中细菌污染的风险因素。
方法：Dartmouth–Hitchcock 是三级综合医疗和一级创伤治疗中心，有 400 个床位和 28 个手术区。随机选取 92 个手术室中的一类和二类手术进行分析。一共挑选了 82 对案例进行分析。有 10 对案例由于标本被破坏或丢失，或者违反草案而剔出研究。根据草案确定术中通过静脉活塞装置发生的细菌传播及通过麻醉环境（可调节压力控制阀和刻度盘）的细菌传播。然后每个案例开始前我们对装置及环境分离的污染微生物和每个麻醉实施者的双手分离出的微生物的生物型进行分析比较。麻醉者来源的微生物传播的定义是：麻醉实施者双手分离出的传染源病原体与患者静脉装置或麻醉环境分离出的病原体有相同的生物型。同时通过在方案开始时是否有潜在病原体来评估术中的清洁程度。术中清洁不良的定义为：方案开始时麻醉环境中发现 1 个甚至更多病原体存在，列为二类手术，而一类手术则在方案开始时未发现有病原体存在。将所有案例中符合临床逻辑的案例收集起来分析污染的风险因素。
结果：共研究了 164 例（82 对）病案。11.5%（19/164）患者静脉活塞装置在术中感染细菌，其中 47%（9/19）由麻醉实施者传播。89%（146/164）例术中细菌传播到麻醉外环境中，其中 12%（17/146）是麻醉实施者传播。主治麻醉医生同时管理的房间数、患者年龄和患者从手术室出来至重症监护室都是细菌传播事件独立的预测因素，而麻醉实施者自身并非为直接因素。
结论：在手术室中麻醉实施者双手的细菌污染是患者周围环境和静脉装置污染的重要原因。其他的手术细菌传播来源，包括术后周围环境的清洁，值得深入研究。
(杨秋娟　译　陈杰　校)
BACKGROUND: We have recently shown that intraoperative bacterial transmission to patient IV stopcock sets is associated with increased patient mortality. In this study, we hypothesized that bacterial contamination of anesthesia provider hands before patient contact is a risk factor for direct intraoperative bacterial transmission.
METHODS: Dartmouth–Hitchcock Medical Center is a tertiary care and level 1 trauma center with 400 inpatient beds and 28 operating suites. The first and second operative cases in each of 92 operating rooms were randomly selected for analysis. Eighty-two paired samples were analyzed. Ten pairs of cases were excluded because of broken or missing sampling protocol and lost samples. We identified cases of intraoperative bacterial transmission to the patient IV stopcock set and the anesthesia environment (adjustable pressure-limiting valve and agent dial) in each operating room pair by using a previously validated protocol. We then used biotype analysis to compare these transmitted organisms to those organisms isolated from the hands of anesthesia providers obtained before the start of each case. Provider-origin transmission was defined as potential pathogens isolated in the patient stopcock set or environment that had an identical biotype to the same organism isolated from hands of providers. We also assessed the efficacy of the current intraoperative cleaning protocol by evaluating

isolated potential pathogens identified at the start of case 2. Poor intraoperative cleaning was defined as 1 or more potential pathogens found in the anesthesia environment at the start of case 2 that were not there at the beginning of case 1. We collected clinical and epidemiological data on all the cases to identify risk factors for contamination.
RESULTS: One hundred sixty-four cases (82 case pairs) were studied. We identified intraoperative bacterial transmission to the IV stopcock set in 11.5 % (19/164) of cases, 47% (9/19) of which were of provider origin. We identified intraoperative bacterial transmission to the anesthesia environment in 89% (146/164) of cases, 12% (17/146) of which were of provider origin. The number of rooms that an attending anesthesiologist supervised simultaneously, the age of the patient, and patient discharge from the operating room to an intensive care unit were independent predictors of bacterial transmission events not directly linked to providers.
CONCLUSION: The contaminated hands of anesthesia providers serve as a significant source of patient environmental and stopcock set contamination in the operating room. Additional sources of intraoperative bacterial transmission, including postoperative environmental cleaning practices, should be further studied.

初学者使用 Airtraq 喉镜和 Macintosh 喉镜进行气管插管的学习曲线：一项临床研究

Learning Curves of the Airtraq and the Macintosh Laryngoscopes for Tracheal Intubation by Novice Laryngoscopists: A Clinical Study

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背景：Macintosh 在 1943 年发明的弧形喉镜片仍然是临床上最广泛使用的气管插管设备。Airtraq 喉镜是一种新的一次性使用的气管插管设备。一些研究比较了 Airtraq 喉镜和 Macintosh 喉镜在人体模型上模拟气管插管的使用。作者在一项临床随机对照试验中评估了初学者使用 Airtraq 喉镜或 Macintosh 喉镜进行气管插管的学习曲线和表现。
方法：108 例手术过程中需要气管插管的病人随机分配接受使用 Macintosh 喉镜（n=54）或 Airtraq 喉镜（n=54）气管插管。由第一年且没有使用过任何一种喉镜的住院医师进行气管插管。重点记录使用这两种喉镜进行气管插管的持续时间和插管困难评分。
结果：18 名住院医生参加了这项研究，每组 9 名。每个参与者使用相同的设备至少进行 6 次气管插管。作者观察到使用 Airtraq 喉镜比 Macintosh 喉镜更快掌握技能且插管时间更短。t 检验的数据分析显示两组有显著差异（$p<0.001$）。
结论：在新手进行临床应用时，Airtraq 喉镜相对于 Macintosh 喉镜显示了一个更快的学习曲线。Airtraq 喉镜更易于初学者使用。
(唐颖　译　陈杰　校)
BACKGROUND: The curved laryngoscope blade described by Macintosh in 1943 remains the most widely used device to facilitate tracheal intubation. The Airtraq

laryngoscope is a new, single-use device for tracheal intubation. Several studies compared the use of Airtraq and Macintosh laryngoscopes in simulated intubation scenarios on manikins. We evaluated learning and performance of tracheal intubation by novice laryngoscopists using the Airtraq or Macintosh laryngoscopes in a randomized controlled clinical trial.

METHODS: One hundred eight consecutive patients scheduled for surgical procedures requiring tracheal intubation were enrolled. Patients were randomly allocated to undergo tracheal intubation using a Macintosh (n = 54) or an Airtraq (n = 54) laryngoscope. Tracheal intubation was performed by first-year residents who had no prior experience with the use of either laryngoscope. Primary end points were duration of tracheal intubation and intubation difficulty scale score for both devices.

RESULTS: Eighteen residents participated in the protocol; 9 were allocated to each study group. Each participant performed at least 6 tracheal intubations with the same device. We observed a more rapid skill acquisition with the Airtraq than with the Macintosh laryngoscope, as demonstrated by the shorter duration of intubation with the Airtraq laryngoscope. Data analysis with the Student t test revealed a significant difference between the groups ($P < 0.001$).

CONCLUSION: The Airtraq laryngoscope facilitates a more rapid learning curve compared with the Macintosh laryngoscope when used in a clinical setting by novice laryngoscopists. The Airtraq laryngoscope was judged easier to use by novice users.

环氧合酶抑制剂在机械通气肺损伤中的作用

Cyclooxygenase Inhibition in Ventilator-Induced Lung Injury

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背景：作者在一所大学附属实验室进行了一项前瞻性、随机对照的动物研究来验证环氧合酶（COX）抑制剂是否可以减少机械通气肺损伤的发生率。成年雄性大鼠麻醉后行创伤性机械通气（PEEP=0，吸气压峰值 21mmHg），随机分成两组：给予非选择性 COX 抑制剂（布洛芬）组和不予 COX 抑制剂组。

方法：本试验中收集了实验组和空白对照组创伤性机械通气的相关数据（呼吸力学，细胞因子，花生四烯酸类物质），环氧合酶的表达，细胞核因子（NF-κB）的活性等。创伤性的机械通气会导致肺损伤（顺应性下降，组织水肿，炎症因子、花生四烯酸和环氧合酶-2 表达增加）。

结果：布洛芬可以有效抑制花生四烯酸的合成和 COX-2 的活性，因而给予布洛芬预处理后能够提高生存率、减少肺水肿。然而对于机械通气引起的 NF-κB 和炎症因子（肿瘤坏死因子-α，白介素-1β，白介素-6，生长相关原癌基因/角化细胞化学引诱物）的激活，布洛芬是无调节作用。在体大鼠研究中发现，机械通气肺损伤的

发病机理中，COX 的活性是起着重要作用。抑制 COX 活性对机械通气肺损伤有保护作用（包括生存率，肺功能等），但未影响到重要介质的浓度（肿瘤坏死因子-α，白介素-1β，白介素-6，生长相关原癌基因/角化细胞化学引诱物）或 NF-κB 的活性，

结论：以上数据表明非选择性 COX 抑制剂对机械性通气肺损伤有一定的保护作用，而 NF-kB 的信号通道并非是花生四烯酸完全依赖的。多模式靶向研究包括对炎症因子和 NF-kB 作用的综合考虑对有关 COX 抑制剂在机械通气肺损伤中作用的研究可能有益。

(张婷　译　陈杰　校)

BACKGROUND: We tested the hypothesis that inhibition of cyclooxygenase (COX) attenuates in vivo ventilator-induced lung injury (VILI) in a prospective, randomized laboratory investigation in a university-affiliated laboratory. Adult male rats were anesthetized and randomized with or without nonselective COX inhibition (ibuprofen) and were subjected to injurious mechanical ventilation (positive end-expiratory pressure = 0; peak inspiratory pressure = 21 mm Hg).

METHODS: We investigated the profile of VILI (respiratory mechanics, cytokines, eicosanoids), expression of COX enzymes, and activation of nuclear factor (NF)-κB in ibuprofen- versus vehicle-treated animals. Injurious ventilation caused lung injury (i.e., decrement in compliance, tissue edema, and elevated inflammatory cytokines, eicosanoids, and COX-2).

RESULTS: Pretreatment with ibuprofen that effectively inhibited eicosanoid synthesis and COX-2 activity increased survival and attenuated lung edema and decrement in respiratory mechanics. Ibuprofen had no modulatory effect on ventilator-induced activation of NF-κB or inflammatory cytokines (tumor necrosis factor-α, interleukin [IL]-1β, IL-6, GRO/KC [growth-related oncogene/keratinocyte chemoattractant]). COX activity seems important in the pathogenesis of VILI in the in vivo rat. Inhibition of COX provides significant protection (i.e., survival, pulmonary function) in VILI, but without affecting levels of important mediators (tumor necrosis factor-α, IL-1β, IL-6, GRO/KC) or activation of NF-κB.

CONCLUSIONS: These data confirm that nonselective COX inhibition provides partial protection against VILI and that the NF-κB signaling pathway is not exclusively eicosanoid dependent. Studies of COX inhibition in ventilator-associated lung injury might benefit from multimodal targeting that includes a comprehensive focus on inflammatory cytokines and NF-κB.

加巴喷丁改善剖腹产术后疼痛管理：一个随机，安慰剂对照试验

Gabapentin Improves Postcesarean Delivery Pain Management: A Randomized, Placebo-Controlled Trial

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背景:加巴喷丁对预防和治疗急性和慢性术后疼痛有效。但尚未用于剖腹产。作者假设术前应用加巴喷丁能减少剖腹产术后的疼痛。

方法：择期剖腹产病人随机分成术前应用加巴喷丁 600mg，或者安慰剂。用 0.75%高比重布比卡因 12mg，芬太尼 10ug，吗啡 100ug 施行腰麻。术后镇痛处理包括在手术中即开始应用酮洛酸和对乙酰氨基酚，直到手术后应用双氯酚酸，对乙酰氨基酚，吗啡。通过在腰麻后 6, 12, 24, 和 48 小时分别在休息和活动情况下应用视觉模拟量表(0 to 100 mm)、满意度、鸦片类药消耗量和副作用指标评估病人。同时评估的指标还有新生儿干预，Apgar 评分，脐动脉血气，母乳喂养难度。在剖腹产术后 3 个月评估慢性疼痛程度。设立亚组监测母体和脐静脉加巴喷丁血药浓度。使用复合模型分析比较 24h 时主要预后（视觉模拟疼痛评分分数）。

结果：随机分配 46 名病人，2 个被排除分析。活动状态下 24 小时(95% 可信区间, CI)加巴喷丁组平均疼痛评分是 21 mm (CI = 13–28) ，而安慰剂组(*P* = 0.001)是 41mm(CI = 31–50)。母亲的满意度在加巴喷丁组更高。鸦片类药的消耗量没有区别。在加巴喷丁组有更严重的母亲镇静作用 19% vs. 0%, *P* = 0.04)。新生儿的 Apgar 评分，干预，或者脐动脉的 pH 值没有区别。平均母体静脉血和脐静脉血浆加巴喷丁药物浓度之比是 0.86 (0.12)。两组产妇在术后 3 个月的疼痛发生率是相似的。

结论：和安慰剂比较，包括术前给予加巴喷丁 600mg 的多模式镇痛可减少剖腹产术后疼痛并增加母亲满意率

(陈灵科　译　陈杰　校)

BACKGROUND: Gabapentin is effective for preventing and treating acute and chronic postoperative pain; however, it has not been described for use in cesarean delivery. We hypothesized that preoperative gabapentin would reduce postcesarean delivery pain.

METHODS: Women undergoing scheduled cesarean delivery were randomized to receive preoperative gabapentin 600 mg, or placebo. Spinal anesthesia was achieved with 0.75% hyperbaric bupivacaine 12 mg, fentanyl 10 μg, and morphine 100 μg. Postoperative analgesia was initiated with intraoperative ketorolac and acetaminophen, and continued with postoperative diclofenac, acetaminophen, and morphine. Patients were assessed at 6, 12, 24, and 48 hours after spinal anesthesia for pain at rest and on movement using a visual analog scale (0 to 100 mm), satisfaction, opioid consumption, and side effects. Neonatal interventions, Apgar scores, umbilical artery blood gases, and breastfeeding difficulties were assessed. Chronic pain was assessed 3 months after delivery. Maternal and umbilical vein gabapentin plasma concentrations were measured in a subgroup of patients. Mixed-model analysis was used to compare the primary outcome of visual analog scale pain scores at 24 hours between groups.

RESULTS: Forty-six patients were randomized, and 2 were excluded from analysis. The mean (95% confidence interval, CI) pain scores on movement at 24 hours were 21 mm (CI = 13–28) in the gabapentin and 41 mm (CI = 31–50) in the placebo group (*P* = 0.001). Maternal satisfaction was higher in the gabapentin group. There was no difference in opioid consumption. Severe maternal sedation was more common in the gabapentin group (19% vs. 0%, *P* = 0.04). There was no difference in neonatal Apgar scores, interventions, or umbilical artery pH. The mean (SD) maternal vein:umbilical vein

plasma gabapentin ratio was 0.86 (0.12). The incidence of pain at 3 months was similar in both groups.
CONCLUSION: Preoperative gabapentin 600 mg in the setting of multimodal analgesia reduces postcesarean delivery pain and increases maternal satisfaction in comparison with placebo.

高位完全性脊髓损伤患者行经尿道碎石术中，瑞芬太尼可减少阻滞自主神经亢进的七氟醚的需要量，

Remifentanil Decreases Sevoflurane Requirements to Block Autonomic Hyperreflexia During Transurethral Litholapaxy in Patients with High Complete Spinal Cord Injury

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背景：在高位脊髓损伤患者中，应用吸入麻醉药达到阻滞自主神经反射亢进的浓度会引起严重的低血压。作者研究了瑞芬太尼对于七氟醚在脊髓损伤患者中达到阻滞高自主神经反射的浓度的影响。
方法：该研究包含 96 例慢性、完全性脊髓损伤患者计划在全身麻醉下行经尿道碎石术。麻醉诱导使用硫喷妥钠、50%笑气混合七氟醚吸入，调整七氟醚浓度维持 BIS 值在 40-50。首先找出在用甘氨酸溶液扩充膀胱时发生了自主神经发射亢进的病人（收缩压增加 20-40mmHg）（第一试验）。接着这些病人被分配成三个组：不接受瑞芬太尼注射（对照组，n=31），靶控输注血浆药物浓度为 1ng/mL（n=25）或者是 3ng/mL（n=24）。在血流动力学恢复至基线后，七氟醚和瑞芬太尼的目标浓度下至少维持 20 分钟，并重复这个步骤（第二试验）。根据收缩压对于膀胱扩充的反应（增减幅度 15%以上）来设定七氟醚目标浓度的上下调整。在试验中测量膀胱扩充之前和期间的收缩压，心率，BIS 指数在，并且在第一试验期间测量儿茶酚胺的血浆浓度。
结果：96 例患者中有 82 例（85.4%）在第一试验中发生了自主神经反射亢进，其中有 2 例在靶控药物输注中因为发生了低血压（动脉血压<50mmHg）而被排除。在第二试验中，与对照组 3.1%(2.9% to 3.3%)相比，接受 1 和 3 ng/mL 瑞芬太尼组抑制自主神经亢进的呼气末七氟醚浓度分别减少到 2.6%（95%置信区间为 2.5%-2.8%，p<0.01）和 2.2%（2.1% t- 2.4%, *P* < 0.0001）。再分别综合了最低麻醉浓度值和 50%笑气（0.48MAC）的作用，合并后的 MAC 值分别为 2.27（对照组）,1.98（1 ng/mL 瑞芬太尼组）和 1.75（3 ng/mL 瑞芬太尼组）。
结论：在脊髓损伤病人行经尿道碎石术中，为了阻滞自主神经反射亢进， 瑞芬太尼靶控浓度 1 ng/mL 和 3 ng/mL 可以减少七氟醚的浓度（混合 50%笑气）16%和 29%。

(张蕾　译　陈杰　校)

BACKGROUND: An inhaled anesthetic concentration required to block autonomic hyperreflexia (AHR) is high enough to cause severe hypotension in patients with high spinal cord injury (SCI). We determined the effects of remifentanil on the sevoflurane requirement to block AHR in SCI.

METHODS: The study involved 96 patients with chronic, complete SCI scheduled to undergo transurethral litholapaxy during general anesthesia. Anesthesia was induced with thiopental, and sevoflurane concentrations in 50% nitrous oxide were adjusted to maintain a bispectral index of 40 to 50. Whether the patient develops an AHR [an increase of systolic blood pressure (SBP) >20 to 40 mm Hg] was first examined by distending the bladder with glycine solution (the first trial). Patients who developed AHR were then allocated to receive no remifentanil infusion (control, $n = 31$), a target-controlled plasma concentration of 1 ng/mL ($n = 25$), or 3 ng/mL remifentanil ($n = 24$). After baseline hemodynamics had recovered, the target sevoflurane and remifentanil concentrations were maintained for at least 20 minutes and the procedure was resumed (the second trial). Each target sevoflurane concentration was determined by the up-and-down method based on changes (15% increase or more) of SBP in response to the bladder distension. SBP, heart rate, and bispectral index were measured before and during the bladder distension during the trials, and plasma concentrations of catecholamines during the first trial.

RESULTS: Eighty-two (85.4%) of 96 patients developed AHR during the first trial, in which 2 were excluded because of hypotension (mean arterial blood pressure <50 mm Hg) developed during target-controlled drug administration. During the second trial, the end-tidal concentrations of sevoflurane to prevent AHR were reduced to 2.6% (95% confidence interval 2.5% to 2.8%, $P < 0.01$) and 2.2% (2.1% to 2.4%, $P < 0.0001$) in the groups receiving 1 and 3 ng/mL remifentanil, respectively, in comparison with 3.1% (2.9% to 3.3%) in the control. When considering minimum anesthetic concentration (MAC) values and the contribution of 50% nitrous oxide (0.48 MAC), the combined MAC values, expressed as multiples of MAC, were 2.27, 1.98, and 1.75 in the control, 1 ng/mL remifentanil, and 3 ng/mL remifentanil groups, respectively.

CONCLUSIONS: Target-controlled concentrations of 1 and 3 ng/mL remifentanil would reduce the requirement of sevoflurane combined with 50% nitrous oxide to block AHR by 16% and 29%, respectively, in SCI patients undergoing transurethral litholapaxy.

术中用美沙酮可改善复杂脊椎手术病人的术后镇痛

Intraoperative Methadone Improves Postoperative Pain Control in Patients Undergoing Complex Spine Surgery

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背景：进行复杂脊椎手术的病人常会遭受严重术后疼痛。对这些病人而言，美沙酮作为阿片受体激动剂与 N -甲基- D -天冬氨酸受体拮抗剂的结合，是一种较适用的药物，因为 N-甲基- D-天门冬氨酸系统参与阿片耐受与痛觉过敏机制。

方法：本前瞻性研究入选 29 例行器械植入及椎体融合的多节段胸椎手术患者，随机分组，一组在划皮前接受 0.2 mg/kg 的美沙酮，对照组则以 0.75 μg/kg 舒芬太尼为负荷剂量，并以 0.25 μg/kg/h 的速度持续输注。术后均采用静脉用阿片类药物进行病人自控镇痛。同时对患者术后 24h，48h，72h 的疼痛评分（视觉模拟评分从 0 到 10），累积阿片类药物需求量以及副作用等方面进行评估。

结果： 两组的人口数据，持续时间，手术类型都相似。用美沙酮可以减少术后 50%阿片类药物需求量（数据对应为美沙酮组比舒芬太尼组，各自的中位数 [25%/75%区间距]）。术后 48 h 为 63 mg （27.3/86.1）比 25 mg （16.5/31.5 ）吗啡等值量, $P = 0.023$; 术后 72 h: 34 mg（19.9/91.5）比 15 mg （8.8/27.8） 吗啡等值量, $P = 0.024$. 并且，术后 48h 美沙酮组术后疼痛评分约低 50% (其[均值 ± SD] ，舒芬太尼为 4.8 ± 2.4 ，美沙酮为 2.8 ± 2.0, $P = 0.026$)。不良反应两组发生率相似。

结论：术中单次注射美沙酮可改善复杂脊椎手术患者的术后疼痛。

(舒慧刚　译　陈杰　校)

BACKGROUND: Patients undergoing complex spine surgery frequently experience severe pain in the postoperative period. The combined opiate receptor agonist/*N*-methyl-D-aspartate receptor antagonist methadone may be an optimal drug for these patients given the probable involvement of *N*-methyl-D-aspartate systems in the mechanism of opioid tolerance and hyperalgesia.

METHODS: Twenty-nine patients undergoing multilevel thoracolumbar spine surgery with instrumentation and fusion were enrolled in this prospective study and randomized to receive either methadone (0.2 mg/kg) before surgical incision or a continuous sufentanil infusion of 0.25 μg/kg/h after a load of 0.75 μg/kg. Postoperative analgesia was provided using IV opioids by patient-controlled analgesia. Patients were assessed with respect to pain scores (visual analog scale from 0 to 10), cumulative opioid requirement, and side effects at 24, 48, and 72 hours after surgery.

RESULTS: Demographic data, duration, and type of surgery were comparable between the groups. Methadone reduced postoperative opioid requirement by approximately 50% at 48 hours (sufentanil versus methadone group, median [25%/75% interquartile range]: 63 mg [27.3/86.1] vs 25 mg [16.5/31.5] morphine equivalents, $P = 0.023$; and 72 hours: 34 mg [19.9/91.5] vs 15 mg [8.8/27.8] morphine equivalents, $P = 0.024$) after surgery. In addition, pain scores were lower by approximately 50% in the methadone group at 48 hours after surgery (sufentanil versus methadone group [mean ± SD] 4.8 ± 2.4 vs 2.8 ± 2.0, $P = 0.026$). The incidence of side effects was comparable in both groups.

CONCLUSION: Perioperative treatment with a single bolus of methadone improves postoperative pain control for patients undergoing complex spine surgery.