目标导向的心脏超声在小儿围手术期的应用

Focused Cardiac Ultrasound in the Pediatric Perioperative Setting

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目标导向的心脏超声检查（FoCUS）已成为急诊医师的重要诊断工具。 FoCUS 可以对心脏进行实时可视化，并与体格检查相结合，可以在紧急情况下作为血液动力学监测项目对患者进行管理。大多数 FoCUS 的围术期应用文献集中在成年患者，关于其在儿科患者的应用报道很少。本文概述了儿科麻醉医师在床旁使用的 FoCUS。对儿童 FoCUS 的不同临床应用、技术方面和 FoCUS 结果的解释进行了描述。也包括对相关培训和能力的讨论。儿科医师和急诊医学医师实施儿科 FoCUS 的障碍包括对其适应症缺乏了解及缺乏培训的机会。儿科麻醉学中可能也存在类似的障碍，导致 FoCUS 的应用不足。然而，在儿科手术室中使用 FoCUS 可能会对婴儿和儿童的监护产生积极影响，应予以鼓励。

（高盼 译 陈杰 校）

Focused cardiac ultrasonography (FoCUS) has become an important diagnostic tool for acute care physicians. FoCUS allows real-time visualization of the heart and, in combination with the physical examination, acts as a hemodynamic monitor to manage patient care in acute situations. Most of the available perioperative literature has focused on adult patients. Little has been published on the perioperative application of FoCUS for pediatricpatients. This article provides an overview of FoCUS used at the bedside by pediatric anesthesiologists. Variations in clinical applications, technical aspects, and interpretation of FoCUS findings in children are described. Discussion of training and competency is included. Barriers to implementation by pediatricintensivists and emergency medicine physicians include a lack of understanding of indications and training opportunities in pediatric FoCUS. It is likely that similar barriers exist in pediatric anesthesiology resulting inunderutilization of FoCUS. The use of FoCUS in the pediatric operating room, however, may positively impact care of infants and children and should be encouraged.

影响病人对麻醉医师满意度的因素：来自大型综合医院的 51，676 份调查分析

Factors Affecting Patient Satisfaction With Their Anesthesiologist: An Analysis of 51,676 Surveys From a Large Multihospital Practice

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背景：卫生保健质量日益受到关注的是对患者报告的结果(包括满意度)的评估。由于麻醉监护是在围术期监护背景下的，因此麻醉管理和患者体验之间的直接关联可能很难确定。作者分析了来自大型私人执业团体的麻醉特定患者满意度调查

数据，通过一项经验证的患者满意度调查工具来确认患者对麻醉医师满意度的患者、手术和麻醉特定的预测因素。作者假设某些决定麻醉人员满意度的因素无法控制。

方法：作者回顾性地审查了麻醉患者满意度调查表（APSQ）的回复，该调查表是对由美国麻醉合作者（一个覆盖多个州的麻醉团体）所监护的患者进行在线管理的。APSQ 关注患者对麻醉医师的满意度和患者报告的结局，管理发生在出院后。汇总了 2016 年 5 月至 2016 年 11 月的回复，并使用多变量 Logistic 回归评估了回复与患者、手术和临床相关因素之间的关系。

结果：在研究期间接受监护的 629,220 名成年患者中，有 51,676 名回复了调查要求，患者总回复率为 9.3%。与反馈者相比，未反馈者年龄稍大且更多是是男性。多变量回归后，患者或操作因素与麻醉医师的患者评分无关。但是在其他满意度问题方面，≥55 岁，住院（相对于门诊）和夜间手术（下午 6 点至凌晨 6 点之间）的评分较低。

结论：数据表明，影响麻醉医师满意度评价的一些因素无法控制。需要进一步的工作来确定患者对其麻醉医师满意度评价的要素，并优化围术期监护的这些方面。（高盼 译　陈杰 校）

Background: An increasing focus of health care quality is the assessment of patient-reported outcomes, including satisfaction. Because anesthesia care occurs in the context of perioperative surgical care, direct associations between anesthetic management and patient experience may be difficult to identify. We analyzed anesthesia-specific patient satisfaction survey data from a large private practice group to identify patient, procedure, and anesthetic-specific predictors of patient satisfaction with their anesthesiologist, measured via responses to a validated patient satisfaction survey instrument. We hypothesized that some factors governing satisfaction with an anesthesia provider are beyond their ability to control.

Methods: We retrospectively reviewed responses to the Anesthesia Patient Satisfaction Questionnaire (APSQ), administered online to patients cared for by US Anesthesia Partners, a multistate anesthesia group practice. The APSQ focuses on patient satisfaction with their anesthesiologist and patient-reported outcomes and is administered after discharge. Responses from May to November 2016 were aggregated, and relationships between responses and patient, procedural, and clinician-related factors were assessed using multivariable logistic regression.

Results: Out of 629,220 adult patients cared for during the study period, 51,676 responded to the survey request for a 9.3% overall response rate for patients. Nonresponders were slightly older and more likely to be male than responders. After multivariable regression, no patient or procedural factor was associated with patient rating of their anesthesiologist. However, ≥55 years of age, inpatient (versus

outpatient) setting, and nighttime surgery (between 6 PM and 6 AM) were associated with lower scores on other satisfaction questions.
Conclusions: Our data suggest that some factors governing satisfaction with an anesthesia provider are beyond their ability to control. Further work is needed to identify elements of patient satisfaction with their anesthesiologist and to optimize these aspects of perioperative care.

使用改良的超声波飞行时间麻醉气体流量计实时测量二元混合气体中氙浓度：一项技术可行性研究

Real-Time Measurement of Xenon Concentration in a Binary Gas Mixture Using a Modified Ultrasonic Time-of-Flight Anesthesia Gas Flowmeter: A Technical Feasibility Study

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背景：氙气（Xe）是一种许可在某些国家使用的麻醉气体。 Xe：氧气（O2）混合物中气体的分数浓度（%）通常分别使用热导率仪和燃料电池进行测量。在这种二元混合气体中的声速与组分气体的分数浓度、温度、压力和摩尔质量有关。因此，作者进行了一项研究以评估开发一种新颖的可消毒设备的可行性，该设备使用超声飞行时间来测量 O2 中 Xe 的实时流量和部分气体浓度。
方法：出于可行性研究的目的，作者从传统的麻醉机上改装了超声波飞行时间流量计，以另外测量氧气中 Xe 的实时分数浓度。在 5%-95%的范围内，总共获得了 5095 个 Xe%的读数，并与金标准--商品化热导率 Xe 分析仪同时测量的数值进行了比较。
结果：Xe（%）的超声测量结果与热导仪的测量结果一致，但是在测量范围的中存在明显的不连续性。 Bland-Altman 分析（括号内为 95%置信区间）得出：平均差(偏倚)3.1%(2.9%-3.2%);协议下限的 95%为-4.6%(-4.8%至-4.4%);协议上限的 95%为 10.8%（10.5%-11.0%）。
结论：改良后的超声波流量计可估算 Xe（%），但准确度水平不足以用于临床。通过进一步的工作，有可能开发出一种能够在临床上可接受准确度范围内执行流量计和二元气体浓度测量的设备。
（高盼 译 陈杰 校）
Background: Xenon (Xe) is an anesthetic gas licensed for use in some countries. Fractional concentrations (%) of gases in a Xe:oxygen (O2) mixture are typically measured using a thermal conductivity meter and fuel cell, respectively. Speed of sound in such a binary gasmixture is related to fractional concentration, temperature, pressure, and molar masses of the component gases. We therefore performed a study to assess the feasibility of developing a novel single sterilizable device that uses ultrasound time-of-flight to measure both real-timeflowmetry and fractional gas concentration of Xe in O2.

Methods: For the purposes of the feasibility study, we adapted an ultrasonic time-of-flight flowmeter from a conventional anesthetic machine to additionally measure real-time fractional concentration of Xe in O2. A total of 5095 readings of Xe % were taken in the range 5%-95%, and compared with simultaneous measurements from the gold standard of a commercially available thermal conductivity Xe analyzer.
Results: Ultrasonic measurements of Xe (%) showed agreement with thermal conductivity meter measurements, but there was marked discontinuity in the middle of the measurement range. Bland-Altman analysis (95% confidence interval in parentheses) yielded: mean difference (bias) 3.1% (2.9%-3.2%); lower 95% limit of agreement -4.6% (-4.8% to -4.4%); and upper 95% limit of agreement 10.8% (10.5%-11.0%).
Conclusions: The adapted ultrasonic flowmeter estimated Xe (%), but the level of accuracy is insufficient for clinical use. With further work, it may be possible to develop a device to perform both flowmetry and binary gas concentration measurement to a clinically acceptable degree of accuracy.

评价癌症患者术后留观一夜的快速康复

Assessing Rapidity of Recovery After Cancer Surgeries in a Single Overnight Short-Stay Setting

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背景：短期住院手术患者在医院最多留观一夜，尚不明确术后留观时间是否是一项较好的评价快速康复的替代指标。作者假设：留观时间可以作为手术后康复时间指标但不如出院时间指标更有价值。
方法：该队列研究纳入一所日间手术医院 2016 年期间术后留观一夜的患者，其中乳房切除术 891 例和前列腺切除术 538 例。评估手术开始时间和术后留观时间或出院时间之间的关系。
结果：接受乳房切除术和前列腺切除术的患者中，75%患者在上午 10 点到中午 12 点出院，术后留观时间中位数为 20 小时。手术时间和留观时间有显著相关性。接受乳房切除术的患者，和上午 8 点手术相比，下午 6 点手术能预计减少 8.8 小时的术后留观时间（95%置信区间， 8.3-9.3），然而出院时间仅延长 1.2 小时 (95%置信区间, 0.77-1.6)。接受前列腺切除术的患者，估计差异为术后留观时间减少 6.9 小时 (95%置信区间, 6.4-7.4)，出院时间延长 2.5 小时 (95% 置信区间, 2.0-3.0) 。
结论：短期住院背景下，用术后留观时间评估预后效果不佳。评估留观一夜的患者康复速度时，作者提倡使用经手术开始时间校正的出院时间。还应研究手术开始时间对术后留观时间和出院时间的影响，以确定当其他日间手术术后需要留观一夜时哪个指标更适合用于评价康复时间。
（梁俊 译 陈杰 校）

BACKGROUND: In the short-stay surgery setting, where patients remain in hospital for a single overnight at most, it is unclear as to whether postoperative length of stay is a good surrogate for assessing rapidity of recovery. We hypothesized that length of stay would be a function of time of surgery and would be a poorer marker of recovery than time of discharge.
METHODS: A cohort of 891 mastectomy and 538 prostatectomy patients had a planned single overnight stay after surgery at an ambulatory surgical hospital during 2016. The relationship between surgical start time and postoperative length of stay or discharge time was assessed.
RESULTS: For both mastectomy and prostatectomy patients, 75% of patients were discharged between 10 AM and 12 noon and the median postoperative length of stay was 20 hours. There was a strong association between time of surgery and calculated length of stay. For mastectomies, having a surgery which begins at 6 PM vs 8 AM results in an estimated decrease of 8.8 hours (95% CI, 8.3-9.3) in postoperative length of stay but only 1.2 hours (95% CI, 0.77-1.6) later time of discharge. For prostatectomies, the estimated difference is a decrease of 6.9 hours (95% CI, 6.4-7.4) for postoperative length of stay and 2.5 hours (95% CI, 2.0-3.0) later discharge time.
CONCLUSIONS: Postoperative length of stay is a poor outcome measure in a short-stay setting. When assessing rapidity of recovery for single overnight stay patients, we advocate the use of discharge time with adjustment for surgery start time. The effect of surgery start time on both postoperative length of stay and discharge time should be investigated to ascertain which is best to assess rapidity of recovery in other ambulatory care settings where recovery involves a single overnight stay.

危重心脏移植患者术后管理的争议

Controversies in the Postoperative Management of the Critically Ill Heart Transplant Patient

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心脏移植受体在术后近期内极易发生一系列并发症。尽管手术技术、机械辅助循环（MCS）和免疫抑制的发展，仍有证据表明危重移植患者的最佳管理措施在很多方面是欠缺的。这篇综述指出了在这些灰色领域中的一些争议之处，以促进更好的讨论和发展。
（梁俊 译 陈杰 校）

Heart transplant recipients are susceptible to a number of complications in the immediate postoperative period. Despite advances in surgical

techniques, mechanical circulatory support (MCS), and immunosuppression, evidence supporting optimal management strategies of the critically ill transplant patient is lacking on many fronts. This review identifies some of these controversies with the aim of stimulating further discussion and development into these gray areas.

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确认在三级医疗中心实施国家孕产妇安全联盟的产科出血方案过程中的阻碍：德尔菲评价方法的应用

Identifying Barriers to Implementation of the National Partnership for Maternal Safety Obstetric Hemorrhage Bundle at a Tertiary Center: Utilization of the Delphi Method

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背景：2015 年，国家孕产妇安全联盟(NPMS)在美国开展了产科出血治疗方案，为分娩场所提供持续、确定的产后出血管理实践指南。由于缺乏对大型三级分娩中心每个方案项目实施过程的描述，作者寻找多学科提供的治疗方案实施过程中的执行缺陷和认识障碍。

方法：作者在德尔菲评价方法的基础上开展了一项前瞻性、横断面、基于共识的研究。一个多学科专业小组由麻醉医生、产科医生、护士、手术技术人员组成，并参与了四项序列问卷调查。第一轮，确认小组成员决定的方案项目在目前是不充分且存在认识障碍。第二轮，在每个小组中建立项目的优先级。第三轮在实施可行性和对患者积极的治疗效果方面至少获得 60%同意并对符合要求的项目进行排序。最后一轮揭示 4 个专业小组的全部意见，达成最后的共识。并作了描述性统计分析。

结果：总共有 38 名专家完成了这项研究（11 位麻醉医生，11 位产科医生，10 位护士和 6 位手术技术人员）。然而在作者分娩中心至少一个学科的专家认为所有 13 项 NPMS 产科出血治疗方案的项目都是有缺陷的，4 个学科中至少有 3 个对于 6 个项目缺陷达成共识。确认实施障碍是存在的。被公认具有积极治疗意义且存在可行性的项目如下：协定指导下的管理，中心为基础的仿真训练，失血定量化、团队集结和任务汇报。

结论：NPMS 产科出血治疗方案的建立是为了帮助美国分娩场所指导实践和系统改进。德尔菲评价方法能确认存在缺陷的项目及对其实施的认识障碍，患者最为受益和可行性最高的项目达成小组共识。多学科小组共识能指出缺陷并且促进有形转化，提高大型、三级医疗分娩中心的分娩质量。许多机构也许会采用作者提出的技术来指导未来治疗方案的实施。

（梁俊 译　陈杰 校）

BACKGROUND: In 2015, the National Partnership for Maternal Safety (NPMS) developed an obstetric hemorrhage consensus bundle to provide birthing facilities in the United States with consistent, validated practice guidelines for postpartum hemorrhage management. The process of implementing each bundle element at a large tertiary labor and delivery

unit has not been described; we sought to identify practice deficiencies and perceived barriers to bundle implementation among multidisciplinary providers.

METHODS: We conducted a prospective, cross-sectional, consensus-building study based on the Delphi method. A multidisciplinary expert panel comprised of anesthesiologists, obstetricians, nurses, and surgical technicians was assembled and participated in 4 sequential questionnaires. The first round identified bundle elements that experts determined as not currently adequate and perceived barriers to implementation. The second round established prioritization of elements within each professional group; and the third round ranked the elements with at least 60% agreement on feasibility of implementation and positive impact on patient care. The last round revealed responses across all 4 professional groups to derive a final consensus. Descriptive statistics were performed.

RESULTS: A total of 38 experts completed the study (11 anesthesiologists, 11 obstetricians, 10 nurses, and 6 surgical technicians). While all 13 (100%) NPMS obstetric bundle elements were described as deficient in our labor and delivery unit by a provider in at least 1 discipline, consensus among at least 3 of the 4 disciplines was achieved for 6 element deficiencies. Barriers to implementation were determined. The initiatives that achieved consensus as possessing high patient impact and implementation feasibility were protocol-driven management, unit-based simulation drills, blood loss quantification, and team huddles and debriefings.

CONCLUSIONS: The NPMS obstetric hemorrhage bundle was created to help guide practice and systems improvement for US birthing facilities. The Delphi method enabled identification of deficient elements and perceived barriers to element implementation, as well as group consensus on elements with highest patient impact and feasibility. Multidisciplinary group consensus can identify deficiencies and promote tangible, quality improvements in a large, tertiary-care labor and delivery unit. Institutions may utilize our described technique to guide implementation of future care bundles.

小儿先天性心脏病手术气管插管部位操作行为的研究：气管插管部位对围术期预后的影响-胸外科医师协会先天性心脏病麻醉分会的数据库分析

A Study of Practice Behavior for Endotracheal Intubation Site for Children With Congenital Heart Disease Undergoing Surgery: Impact of Endotracheal Intubation Site on Perioperative Outcomes—An Analysis of the Society of Thoracic Surgeons Congenital Cardiac Anesthesia Society Database

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背景：在接受体外循环手术的成年人中，由于鼻窦炎和感染风险更低，因此口插管比鼻插管更有优势。在儿童中，由于术后镇静需求和意外拔管的风险更低，鼻插管是更常见的方法，有时是首选方法。这项研究旨在描述接受体外循环手术的儿科人群鼻插管现状，并评估鼻插管相对于口插管的风险/收益。
方法：纳入2010年1月至2015年12月期间胸外科医师协会先天性心脏病手术数据库中<18岁的患者。排除术前气管插管，气管切开术或已知气道异常的患者。多变量模型用于评估气管插管途径与感染风险（伤口感染，纵隔炎，败血症，肺炎和心内膜炎)的综合指标之间的相关性。纳入协变量以调整重要的患者特征(例如体重，年龄，合并症)，病例复杂性和中心效应。次要结果包括插管时间，住院时间和气道并发症（包括意外拔管)。作者还对大型中心（>100例/年）中<12个月的儿童进行了亚组分析，以检验手术时感染风险如何随年龄变化。
结果：新生儿的鼻插管手术占41%，婴儿为38%，学龄儿童为15%，青少年为2%。仅在新生儿中，鼻插管对意外拔管具有保护作用（P = 0.02)。婴儿和新生儿的多变量分析表明，经鼻插管的途径与各种感染的发生（相对危险度[RR]为0.84； 95%CI为0.59-1.18）或住院时间减少无关（RR为0.992； 95%CI）（0.947-1.039)，但与插管时间减少有关(RR，0.929； 95%CI，0.869-0.992)。仅限于大型中心的结果显示约在6至12个月之间的年龄与插管途径之间存在显著A的相互作用，发生感染的风险有差异（P = 0.003)。
结论：虽然大龄儿童与成人人群的鼻插管趋势相似，感染风险都会增加，但新生儿和婴儿的鼻插管似乎没有类似的风险。新生儿和婴儿的鼻插管也可能与插管时间减少有关，但与住院时间无关。需要进行前瞻性研究以更好地理解这些复杂的关联。
（沈悦 译 陈杰 校）

BACKGROUND: In adults undergoing cardiopulmonary bypass surgery, oral intubation is typically preferred over nasal intubation due to reduced risk of sinusitis and infection. In children, nasal intubation is more common and sometimes preferred due to perceived benefits of less postoperative sedation and a lower risk for accidental extubation. This study sought to describe the practice of nasal intubation in the pediatric population undergoingcardiopulmonary bypass surgery and assess the risks/benefits of a nasal route against an oral one.

METHODS: Patients<18 years of age in the Society of Thoracic Surgeons Congenital Heart Surgery Databasebetween January 2010 and December 2015 were included. Patients with a preoperative endotracheal tube, tracheostomy, or known airway anomalies were excluded. Multivariable modeling was used to assess theassociation between route of tracheal intubation and a composite measure of infection risk (wound infection, mediastinitis, septicemia,

pneumonia, and endocarditis). Covariates were included to adjust for important patient characteristics (eg, weight, age, comorbidities), case complexity, and center effects. Secondary outcomes included length of intubation, hospital length of stay, and airway complications including accidental extubations. We also performed a subanalysis in children <12 months of age in high-volume centers (>100 cases/y) examining how infection risk may change with age at the time of surgery.

RESULTS: Nasal intubation was used in 41% of operations in neonates, 38% in infants, 15% in school-aged children, and 2% in adolescents. Nasal intubation appeared protective for accidental extubation only in neonates (P = 0.02). Multivariable analysis in infants and neonates showed that the nasal route of intubation was not associated with the infection composite (relative risk [RR], 0.84; 95% CI, 0.59–1.18) or a shorter length ofstay (RR, 0.992; 95% CI, 0.947–1.039), but was associated with a shorter intubation length (RR, 0.929; 95% CI, 0.869–0.992). Restricting to high-volume centers showed a significant interaction between age and intubationroute with a risk change for infection occurring between approximately 6–12 months of age (P = 0.003).

CONCLUSIONS: While older children undergoing nasal intubation trend similar to the adult population with an increased risk of infection, nasal intubation in neonates and infants does not appear to carry a similar risk. Nasal intubation in neonates and infants may also be associated with a shorter intubation length but not a shorter length of stay. Prospective studies are required to better understand these complex associations.

8. 红细胞输注在小儿原位肝移植中的应用：几十年来的不同之处

Red Blood Cell Transfusion in Pediatric Orthotopic Liver Transplantation: What a Difference a Few Decades Make

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Anesthesia & Analgesia: 2019 129 1087-1092

背景：儿童肝移植通常与凝血病和大量失血有关。相关数据有限。在这项观察性回顾性研究中，作者评估了 9 年期间在单中心进行肝移植的小儿患者的输血相关实践。

方法：回顾性收集匹兹堡大学医学中心匹兹堡儿童医院的患者数据。纳入所有从 2008 年 1 月至 2017 年 6 月进行肝移植的患者。主要和次要预后指标分别是输注的红细胞（RBC）量和死亡率。

结果：从 2008 年 1 月到 2017 年 6 月，纳入 271 例患者的 278 例肝移植。初次移植 259 例，二次移植 15 例，三次移植 4 例。移植时的平均年龄为 6.9 岁。胆道

闭锁，枫糖尿症，尿素循环缺陷和肝肿瘤是主要适应症，分别占移植的66（23.7％），45（16.2％），24（8.6％）和23（8.3％）。76例（27.3％）未进行RBC输血。在输血者中，有181例(89.6％)需要的输血量小于1个单位血量(BV)。所有病例输血量中位数为0.21个BV（范围，0-9； Q1，0； Q3，0.45)。与大于12个月大的儿童(0.12 BV)相比，婴儿输血量的趋势更大(中位数为0.46 BV)。根据诊断，需要最高中位数输血量的是全肠胃外营养相关的肝衰竭患者（3.41 BV)，其次是重复移植患者（0.6 BV)。与二次移植（0.43 BV）和一次移植（0.18 BV）相比，三次移植（中位数为2.71 BV）对初次移植与重复移植的比较显示出更高的输血量。 271例患者中有4例（1.5％）在入院期间因肝移植死亡。 271名患者中有9名（3.3％）死于移植后。总死亡率为4.8％。
结论：与以往报道的趋势相反，对当前输血方法的评估表明，大多数接受肝移植的患者接受的红细胞悬浮液＜1 BV。四分之一以上的移植根本不需要输血。大量输血需求的风险因素包括年龄较小，与肠全胃外营养相关的肝衰竭和多次移植。
（沈悦 译　陈杰 校）

BACKGROUND: Liver transplantation in children is often associated with coagulopathy and significant bloodloss. Available data are limited. In this observational retrospective study, we assessed transfusion practices inpediatric patients undergoing liver transplantation at a single institution over the course of 9 years.

METHODS: Data were retrospectively collected from patient medical records at the Children's Hospital of Pittsburgh of University of Pittsburgh Medical Center. All patients who underwent liver transplantation from January 2008 to June 2017 were included. Primary and secondary outcomes were volume of red blood cells (RBCs) transfused and mortality, respectively.
RESULTS: From January 2008 to June 2017, there were 278 liver transplants in 271 patients. The number of primary transplants were 259, second retransplants 15, and third retransplants. Average age at transplantation was 6.9 years. Biliary atresia, maple syrup urine disease, urea cycle defect, and liver tumor were the leading indications accounting for 66 (23.7%), 45 (16.2%), 24 (8.6%), and 23 (8.3%) of transplants, respectively. Seventy-six cases (27.3%) did not require RBC transfusions. Among those transfused, 181 (89.6%) of the cases required <1 blood volume (BV). The median BV transfused among all cases was 0.21 (range, 0－9; Q1, 0; Q3, 0.45). There is a trend toward higher volume transfusions among infants (median, 0.46 BV) compared to children >12 months of age (0.12 BV). By diagnosis, the group requiring the highest median volume transfusion was patients with total parenteral nutrition－related liver failure (3.41 BV) followed by patients undergoing repeat transplants (0.6 BV). Comparison of primary versus repeat transplants shows atrend toward higher volume

transfusions in third transplants (median, 2.71 BV), compared to second transplants (0.43 BV) and primary transplants (0.18 BV). Four of 271 patients (1.5%) died during admission involving livertransplantation. Nine of 271 patients (3.3%) died subsequently. Total mortality was 4.8%.

CONCLUSIONS: In contrast to historically reported trends, evaluation of current transfusion practices reveals that most patients undergoing liver transplantation receive <1 BV of packed RBCs. More than 1 in 4 transplantations require no transfusion at all. Risk factors for greater transfusion need include younger age, total parenteral nutrition–related liver failure, and repeat transplantation.

小儿麻醉中黑人儿童的成人化

Adultification of Black Children in Pediatric Anesthesia

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Anesthesia & Analgesia: 2019 129 1118-1123

背景：麻醉监护中存在无意识的种族偏倚。作者假设黑人儿童接受吸入诱导的频率更低，从儿童生活中获得的支持更少，有家人陪同诱导的机会更少，口服咪达唑仑的处方药更少。

方法：作者回顾性收集了 2012 年 1 月 1 日至 2018 年 1 月 1 日年龄在 18 岁以下患者的数据，包括年龄、性别、种族、身高、体重、ASA 分级、手术和身份去识别的麻醉主治医师。预后指标包括面罩与静脉诱导、咪达唑仑术前用药、童年生活访视和家人陪伴情况。使用多变量 logistic 回归模型评估队列中所有预后之间的种族差异。

结果：共有 33,717 名白种人和 3901 名黑人儿童符合研究条件。对于主要预后指标，10-14 岁的黑人儿童接受面罩诱导的可能性是高加索儿童的 1.3 倍（调整后的优势比[AOR]为 1.3； 95％置信区间[CI]为 1.1-1.6； P = .001） 。童年生活访视相关的文献很少（<0.5％），无法进行分析。 <15 岁的黑人儿童有家人陪伴进行诱导的可能性比高加索人至少低 31％（AOR 范围为 0.4-0.6； 95％CI 范围为 0.31-0.84； P <.010）。 <5 岁的黑人儿童术前接受咪达唑仑的可能性比高加索人低 13％（AOR，0.9； 95％CI，0.8-0.9； P = 0.012）。

结论：这项研究表明，在诱导期缓解焦虑的策略存在差异，成人化可能是造成这种偏倚的原因之一。 10 至 14 岁的黑人儿童接受吸入诱导以减轻焦虑的可能性是白种人的 1.3 倍。但黑人儿童在围术期接受咪达唑仑术前用药或者家人陪伴诱导的可能性更小。造成这种差异的原因尚不清楚，需要进一步的前瞻性研究以充分理解这种差异。

（沈悦 译 陈杰 校）

BACKGROUND: Unconscious racial bias in anesthesia care has been shown to exist. We hypothesized that black children may undergo inhalation induction less often, receive less support from child life,

have fewer opportunities to have a family member present for induction, and receive premedication with oral midazolam less often.

METHODS: We retrospectively collected data on those <18 years of age from January 1, 2012 to January 1, 2018 including age, sex, race, height, weight, American Society of Anesthesiologists (ASA) physical status, surgical service, and deidentified anesthesiology attending physician. Outcome data included mask versus intravenous induction, midazolam premedication, child life consultation, and family member presence. Racial differences between all outcomes were assessed in the cohort using a multivariable logistic regression model.

RESULTS: A total of 33,717 Caucasian and 3901 black children were eligible for the study. For the primary outcome, black children 10-14 years were 1.3 times more likely than Caucasian children to receive mask induction (adjusted odds ratio [AOR], 1.3; 95% confidence interval [CI], 1.1-1.6; $P = .001$). Child life consultation was poorly documented (<0.5%) and not analyzed. Black children <15 years of age were at least 31% less likely than Caucasians to have a family member present for induction (AOR range, 0.4-0.6; 95% CI range, 0.31-0.84; $P < .010$). Black children <5 years of age were 13% less likely than Caucasians to have midazolam given preoperatively (AOR, 0.9; 95% CI, 0.8-0.9; $P = .012$).

CONCLUSIONS: This study suggests that disparities in strategies for mitigating anxiety in the peri-induction period exist and adultification may be 1 cause for this bias. Black children 10 to 14 years of age are 1.3 times as likely as their Caucasian peers to be offered inhalation induction to reduce anxiety.

However, black children are less likely to receive premedication with midazolam in the perioperative period or to have family members present at induction. The cause of this difference is unclear, and further prospective studies are needed to fully understand this difference.

活动追踪器监测步行是评价术后恢复质量的准确、可靠的方式吗？一项前瞻性队列效度研究

Is Activity Tracker-Measured Ambulation an Accurate and Reliable Determinant of Postoperative Quality of Recovery? A Prospective Cohort Validation Study

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背景：恢复质量（quality of recovery, QOR）测试工具是用以评估病人术后恢

复至基线健康水平的能力。术后步行对恢复质量是否有影响、有多大影响仍不清楚，一部分原因是临床条件下缺少有效的工具来评价步行活动。本队列研究以剖宫产产妇为研究对象，判断活动追踪器对于早期术后步行活动监测的准确性和可靠性，并且探究术后步行和恢复质量间的联系。

方法：该前瞻性队列研究纳入了 2015 年 7 月至 2017 年 6 月行剖宫产的产妇 200 例，产后立即佩戴腕式活动追踪器。追踪器 24 小时后回收，同时进行恢复质量评估（QoR-15 量表）。采用多变量线性回归和 Spearman 相关性（ρ）来分析恢复质量和不同协变量（包括步行）之间的关系。共 48 名产妇，每人佩戴两个追踪器且同时使用计步器计步完成行走活动，用组内相关系数（ICC）评估准确度和设备间、设备内的可靠性。

结果：与计步器相比，活动追踪器准确度更高（ICC=0.93），且设备间、设备内的可靠性更高（ICC 分别为 0.98 和 0.96）。相关性分析显示，早期步行与剖宫产后 QoR-15 评分中等程度相关，ρ 值（95%置信区间）为 0.56（0.328-0.728）。回归分析表明步行活动是剖宫产后 QoR-15 评分的决定性因素，其效果估计值（95%置信区间）相当于 0.002（0.001-0.003）。步行活动也和 QoR-15 量表中除心理支持外的其他部分有关。病人能接受的状态（行走良好的主观阈值）是 24 小时内 287 步。

结论：本研究证实了活动追踪器在临床条件下评估步行情况的准确性和可靠性，并且提出术后步行活动是术后恢复质量的决定因素。此研究也表明，能够提高步行质量的干预手段或能提升恢复质量，但是还需更多研究来探究其中的因果关系。

（邹沅芫 译　陈杰 校）

BACKGROUND: Quality of recovery (QOR) instruments measure patients' ability to return to baseline health status after surgery. Whether, and the extent to which, postoperative ambulation contributes to QOR is unclear, in part due to the lack of valid tools to measure ambulation in clinical settings. This cohort study of the cesarean delivery surgical model examines the accuracy and reliability of activity trackers in quantifying early postoperative ambulation and investigates the correlation between ambulation and QOR.

METHODS: A prospective cohort of 200 parturients undergoing cesarean delivery between July 2015 and June 2017 was fitted with wrist-worn activity trackers immediately postpartum. The trackers were collected 24 hours later, along with QOR assessments (QoR-15 scale). The relationship between QOR and various covariates, including ambulation, was explored using multivariable linear regression and Spearman correlation (ρ). Forty-eight parturients fitted with 2 trackers also completed a walk exercise accompanied by a step-counting assessor, to evaluate accuracy, inter-, and intradevice reliability using interclass correlation (ICC).

RESULTS: Compared to step counting, activity trackers had high accuracy (ICC = 0.93) and excellent inter- and intradevice reliability (ICC = 0.98 and 0.96, respectively). Correlation analysis suggested that early ambulation is moderately correlated with postcesarean QoR-15 scores, with a ρ (95% confidence interval) equivalent to 0.56 (0.328-0.728). Regression analysis suggested that ambulation is a determinant of

postcesarean QoR-15 scores, with an effect estimate (95% confidence interval) equivalent to 0.002 (0.001-0.003). Ambulation was also associated with all QoR-15 domains, except psychological support. The patient's acceptable symptom state (subjective threshold for good ambulation) in the first 24 hours was 287 steps.
CONCLUSIONS: This study demonstrated the accuracy and reliability of activity trackers in measuring ambulation in clinical settings and suggested that postoperative ambulation is a determinant of postoperative QOR. A hypothetical implication of our findings is that interventions that improve ambulation may also help to enhance QOR, but further research is needed to establish a causal relationship.

全身麻醉改变了小鼠肠道菌群的多样性和构成

General Anesthesia Alters the Diversity and Composition of the Intestinal Microbiota in Mice

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有研究表明肠道菌群失调可导致免疫反应改变，增加感染的可能性；同样肠道菌群的状态可能对围术期情况有重要的提示作用。作为同类中的首个研究，作者对全麻小鼠模型 16s rRNA（核糖体 RNA）进行了测序和分析，以探究挥发性麻醉药对肠道菌群的多样性和构成产生的影响。异氟烷暴露 4 小时后，作者观察到菌群多样性下降。分类改变包括几种共生细菌（包括梭菌）的消失。这些数据证实，挥发性麻醉药可能会导致术后肠道菌群失调。
（邹沅芫 译　陈杰 校）
Dysbiosis of the intestinal microbiota has been shown to result in altered immune responses and increased susceptibility to infection; as such, the state of the intestinal microbiome may have profound implications in the perioperative setting. In this first-in-class study, we used 16s ribosomal RNA sequencing and analysis in a mouse model of general anesthesia to investigate the effects of volatile anesthetics on the diversity and composition of the intestinal microbiome. After 4-hour exposure to isoflurane, we observed a decrease in bacterial diversity. Taxonomic alterations included depletion of several commensal bacteria including Clostridiales. These data identify volatile anesthetics as potential contributors to microbial dysbiosis in the postoperative patient.

关于幽门狭窄婴儿胃管/鼻胃管置入最佳时机的回顾性队列研究

Retrospective Cohort Study on

the Optimal Timing of Orogastric Tube/Nasogastric Tube Insertion in Infants Wi th Pyloric Stenosis.

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背景：婴儿肥厚性幽门狭窄可引起胃内容物聚积。幽门狭窄的患者经常在术前放置胃管（OGT）或鼻胃管（NGT）以防止反流误吸。然而，胃内容物流失的加剧可能导致水电解质紊乱，从而延误手术时间，此外，胃管的放置会增加术后呕吐的风险。目前，没有关于这些患者放置胃管/鼻胃管的循证指南。本研究探索了进入手术室前放置胃管/鼻胃管是否与为了纠正电解质紊乱而延长手术时间有关。次要研究结果包括有无早期放置胃管/鼻胃管的患者从手术到出院的时间，以及术后 6 小时能进食的概率。

方法：在这项多中心回顾性队列研究中，数据摘自 2013 年 3 月至 2016 年 6 月因肥厚性幽门狭窄行幽门切开的 481 例患儿病例。本研究构建了多变量线性回归和 Cox 比例风险模型，以研究胃管/鼻胃管放置时机与术前准备时间增加（定义为从住院到第一次实验室指标正常的时间）之间的相关性，以及从手术到出院增加的时间。多变量 logistic 回归用于评估早期胃管/鼻胃管放置与术后 6 小时进食之间的关系。本研究针对地点差异分析进行了调整。

结果：通过回归分析，根据地点差异进行调整，在所有电解质异常的患者中，放置胃管/鼻胃管的患者需要更长的时间使血清电解质的水平达到可接受手术的水平（两组相差 19.2 小时；95%可行区间为 10.05-28.41；P<.001）。总体而言，经过地点差异调整后，进入手术室前就放置胃管/鼻胃管的患者从手术到出院的时间长于术前未放置胃管/鼻胃管的患者（两组相差 38.8 小时；95%可行区间为 25.35-52.31）。经过地点差异、校正胎龄和基线血清电解质水平调整后，术前放置胃管/鼻胃管与术后 6 小时进食不耐受无关。

结论：幽门狭窄的患者入院时放置胃管/鼻胃管需要更长的时间纠正术前电解质紊乱，因此，术前准备的时间更长。术前放置胃管/鼻胃管还与术后住院时间延长有关，但不增加术后 6 小时进食不耐受的风险。

（刘施雯 译 潘艳、薛张纲校）

BACKGROUND: Hypertrophic pyloric stenosis in infants can cause a buildup of gastric contents. Orogastric tubes (OGTs) or nasogastric tubes (NGTs) are often placed in patients with pyloric stenosis before surgical management to prevent aspiration. However, exacerbation of gastric losses may lead to electrolyte abnormalities that can delay surgery, and placement has been associated with increased risk of postoperative emesis. Currently, there are no evidence-based guidelines regarding OGT/NGT placement in these patients. This study examines whether OGT/NGT placement before arrival in the operating room was associated with a longer time to readiness for surgery as defined by normalization of electrolytes. Secondary outcomes included time from surgery to discharge and ability to tolerate feeds by 6 hours postoperatively in patients with and without early OGT/NGT placement.

METHODS: In this multicenter retrospective cohort study, data were extracted from the medical records of 481 patients who underwent pyloromyotomy for infantile hypertrophic pyloric stenosis from March 2013 to June 2016. Multivariable linear regression and Cox proportional hazard models were constructed to evaluate the association between placement of an OGT/NGT at the time of admission with increased time to readiness for surgery (defined as the time from admission to the first set of normalized laboratory values) and increased time from surgery to discharge. Multivariable logistic regression was used to evaluate the association between early OGT/NGT placement and the ability to tolerate oral intake at 6 hours postsurgery. Analyses were adjusted for site differences.
RESULTS: Among patients admitted with electrolyte abnormalities, those with an OGT/NGT placed on presentation required more time until their serum electrolytes were at acceptable levels for surgery by regression analysis (19.2 hours difference; 95% confidence interval, 10.05-28.41; P < .001), after adjusting for site. Overall, patients who had OGTs/NGTs placed before presentation in the operating room had a longer length of stay from surgery to discharge than those without (38.8 hours difference; 95% confidence interval, 25.35-52.31; P < .001), after adjusting for site. OGT/NGT placement before surgery was not associated with failure to tolerate oral intake within 6 hours of surgery after adjusting for site, corrected gestational age, and baseline serum electrolytes.
CONCLUSIONS: OGT/NGT placement on admission for pyloric stenosis is associated with a longer time to electrolyte correction in infants with abnormal laboratory values on presentation and, subsequently, a longer time until they are ready for surgery. It is also associated with longer postoperative hospital stay but not an increased risk of feeding intolerance within 6 hours of surgical repair.

高流量鼻氧可提高接受全身麻醉的病态肥胖患者的安全呼吸暂停时间：一项随机对照试验

High-Flow Nasal Oxygen Improves Safe Apnea Time in Morbidly Obese Patients Undergoing General Anesthesia: A Randomized Controlled Trial

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背景：全身麻醉的病态肥胖患者在麻醉诱导过程中有低氧血症的风险。在麻醉诱导过程中使用高流量鼻氧可以延长非肥胖外科患者的安全呼吸暂停时间。本研究的主要目的是比较在麻醉诱导过程中给予高流量鼻氧或常规面罩氧合的病态肥胖手术患者的安全呼吸暂停时间。
方法：获得研究伦理委员会的批准。纳入年龄≥18 岁、体重指数≥40 $kg \cdot m^{-2}$ 的择期手术患者。有严重合并症、胃反流疾病、已知的困难气道或鼻塞患者被排除在外。获得知情同意后，对患者进行随机分组。干预组(高流量鼻氧)以 40 $L \cdot min^{-1}$ 的 100%鼻氧预充氧 3 分钟；对照组使用 100%氧通过面罩进行预充氧，目标为呼末 O_2 >85%。麻醉诱导采用异丙酚、瑞芬太尼和罗库溴铵。未进行面罩通气。

予罗库溴铵 2 分钟后，行可视喉镜检查。如果喉镜分级为 I 级或 II 级，则保持喉镜并继续研究；如为 III 级或 IV 级，则该患者被排除研究。在呼吸暂停期间，高流量鼻氧患者以 60 L·min^{-1} 吸入鼻氧；对照组患者不接受补充氧气。当脉搏血氧饱和度(SpO_2)下降到 95%或呼吸暂停时间为 6 分钟时，达到安全的呼吸暂停时间，为主要结果。然后给病人插管。组间比较采用 T 检验和 χ^2 分析。P <0 .05 被认为具有显著差异。

结果：40 名患者完成了这项研究。各组间基线参数具有可比性。与对照组比较，高流量鼻氧组安全呼吸暂停时间明显延长(261.4±77.7 秒 vs 185.5± 52.9 秒；均值差[95% CI] 75.9 [33.3-118.5]；P = 0.001)，插管前后最低动脉血氧饱和度更高(91.0± 3.5 vs 88.0± 4.8；均值差[95% CI]， 3.1 [0.4-5.7]；P =0 .026)。

结论：与常规氧合相比，高流量鼻氧合可使麻醉诱导过程中病态肥胖患者的安全呼吸暂停时间延长 76 秒(40%)，最低动脉血氧饱和度提高。对于病态肥胖的外科病人，应该考虑高流量给氧治疗。

(刘配配 译潘艳、薛张纲校)

BACKGROUND: Morbidly obese patients undergoing general anesthesia are at risk of hypoxemia during anesthesia induction. High-flow nasal oxygenation use during anesthesia induction prolongs safe apnea time in nonobese surgical patients. The primary objective of our study was to compare safe apnea time, between patients given high-flow nasal oxygenation or conventional facemask oxygenation during anesthesia induction, in morbidly obese surgical patients.

METHODS: Research ethics board approval was obtained. Elective surgical patients ≥18 years with body mass index ≥40 kg·m^{-2} were included. Patients with severe comorbidity, gastric reflux disease, known difficult airway, or nasal obstruction were excluded. After obtaining informed consent patients were randomized. In the intervention (high-flow nasal oxygenation) group, preoxygenation was provided by 100% nasal oxygen for 3 minutes at 40 L·minute^{-1}; in the control group, preoxygenation was delivered using a facemask with 100% oxygen, targeting end-tidal O_2 >85%. Anesthesia was induced with propofol, remifentanil, and rocuronium. Bag-mask ventilation was not performed. At 2 minutes after rocuronium, videolaryngoscopy was performed. If the laryngoscopy grade was I or II, laryngoscope was left in place and the study was continued; if grade III or IV was observed, the patient was excluded from the study. During the apnea period, high-flow nasal oxygenation patients received nasal oxygen at 60 L·minute^{-1}; control group patients received no supplemental oxygen. The primary outcome, safe apnea time, was reached when oxygen saturation measured by pulse oximetry (SpO_2) fell to 95% or maximum 6 minutes of apnea. The patient was then intubated. T tests and χ^2 analyses were used to compare groups. P < .05 was considered significant.

RESULTS: Forty patients completed the study. Baseline parameters were comparable between groups. Safe apnea time was significantly longer (261.4 ± 77.7 vs 185.5 ± 52.9 seconds; mean difference [95% CI], 75.9 [33.3–118.5]; P = .001) and the minimum peri-intubation Spo2 was higher (91.0 ± 3.5 vs 88.0 ± 4.8; mean difference [95% CI], 3.1 [0.4–5.7]; P = .026) in the high-flow nasal oxygenation group compared to the control group.

CONCLUSIONS: High-flow nasal oxygenation, compared to conventional

oxygenation, provided a longer safe apnea time by 76 seconds (40%) and higher minimum SpO_2 in morbidly obese patients during anesthesia induction. High-flow oxygenation use should be considered in morbidly obese surgical patients.

血浆催产素个体差异与剖宫产术后切口疼痛的关系

Association of Interindividual Variation in Plasma Oxytocin With Postcesarean Incisional Pain

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已知催产素具有镇痛作用且其含量在围产期被上调。这项初步研究调查了血浆催产素与剖宫产术后切口疼痛的关系。在术前 1 小时以及术后 1 小时和 24 小时，从 18 例择期剖宫产的患者分别抽取血浆样品，通过酶联免疫吸附试验进行检测分析。在术后 1 天、8 周、3 个月以及 6 个月评估疼痛情况。结果显示，术后 24 小时的切口疼痛程度与术后 1 小时和 24 小时血浆催产素水平成反比，较低的疼痛与较高的血浆催产素水平相关(p -0.52 and -0.66; P < .05)。

（高璇 译 潘艳、薛张纲校）

Oxytocin has known antinociceptive effects and is upregulated perinatally. This pilot study investigated the association of plasma oxytocin and postcesarean incisional pain. Plasma samples from 18 patients undergoing elective cesarean delivery were drawn at 1 hour preoperatively and 1 and 24 hours postoperatively and analyzed by using enzyme-linked immunosorbent assay. Pain was assessed at 1 day, 8 weeks, 3 months, and 6 months postoperatively. Incisional pain at 24 hours was inversely correlated with 1- and 24-hour oxytocin levels, with higher plasma oxytocin associated with lower pain (p -0.52 and -0.66; P < .05).

手术室无线电心电图监测器的设计与评估：一项初步研究

Design and Evaluation of a Wireless Electrocardiogram Monitor in an Operating Room: A Pilot Study.

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背景:有线心电图监护仪是当前围术期监护的重要组成部分。无线监控装置可以减少病人身上的电线数量，从而改善麻醉中病人的管理。然而，人们担心电刀产生的电磁场可能会干扰手术室中的无线信号。为了评估这个问题的严重程度，我们开发了一个蓝牙心电图仪，并将其心电图轨迹与我们手术室中标准有线心电图仪进行对比。

方法:我们捕捉了 10 例接受手术患者的蓝牙心电图和标准心电图轨迹，并分析比较了 P 波，QRS 波，T 波，以及 ST 段距基线水平。同时还评估了电刀对蓝牙心电图和标准心电图记录的影响。

结果:蓝牙心电图与标准心电图在 P 波，QRS 波，T 波持续时间(差值分别为 0.006、0.004、0.017 秒)，ST 段距基线水平(0.02 mV)方面无临床相关差异。P 波，QRS 波和 T 波持续时间差值分别为-0.035 ~ 0.047 秒、-0.03 ~ 0.038 秒和-0.112 ~ 0.078

秒，ST 段距基线水平为-0.13 ~ 0.17 mV，平均差值接近于零。电刀的使用均能中断蓝牙心电图和标准的心电图信号，但对蓝牙心电图信号没有电磁干扰作用。
结论:蓝牙无线心电图用于手术室是可靠的。电刀产生的是电伪影，而不是电磁伪影，从而对有线和无线心电图的影响是相似的。
（陈聿同 译 潘艳、薛张纲校）

BACKGROUND: Wired electrocardiogram monitors are an important component of current perioperative monitoring. Wireless monitoring units could help reduce the number of cables attached to patients and thus improve anesthesia ergonomics and patient management. However, there is concern that electromagnetic interference generated by electrosurgical units may prevent effective wireless signals in the operating room. To evaluate the extent of this problem, we developed a Bluetooth electrocardiogram prototype monitor and compared its electrocardiogram traces to those captured with a standard wired electrocardiogram monitor in our operating room.
METHODS: Bluetooth electrocardiogram and standard electrocardiogram traces captured from 10 patients undergoing surgical procedures that required use of an electrosurgical unit were compared by analysis of the durations of the P wave, QRS complex, and T wave and the position of the ST segment from the isoelectric line. The impact of the electrosurgical units on the Bluetooth electrocardiogram and S-electrocardiogram recordings was also assessed.
RESULTS: There were no clinically relevant differences in P wave, QRS complex, or T-wave durations (0.006, 0.004, and 0.017 seconds, respectively) between Bluetooth electrocardiogram and standard electrocardiogram or in the position of the ST segment from the isoelectric line (0.02 mV). Mean differences were near zero, and Bland-Altman limits of agreement for individual differences were narrow (-0.035 to 0.047, -0.03 to 0.038, and -0.112 to 0.078 seconds for P wave, QRS complex, and T-wave durations, respectively, and -0.13 to 0.17 mV for ST segment position). Electrosurgical units use electrically disrupted Bluetooth electrocardiogram and standard electrocardiogram signals, but there was no electromagnetic interference effect on the Bluetooth electrocardiogram signals.
CONCLUSIONS: Wireless electrocardiogram using Bluetooth can be reliably used in the operating room. The electrosurgical unit induces electric rather than electromagnetic artifacts, thus affecting wired and wireless electrocardiogram in a similar fashion.

脊髓星形胶质细胞中的 GCs-SGK1-ATP 信号通路影响术前焦虑引起的术后痛觉过敏

The GCs-SGK1-ATP Signaling Pathway in Spinal Astrocytes Underlied Presurgical Anxiety-Induced Postsurgical Hyperalgesia

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背景：接受手术治疗的患者通常会感到焦虑。越来越多的证据表明，术前焦虑与更严重的术后疼痛有关。通过建立一个动物模型，即将 Sprague-Dawley 大鼠暴

露于单次长时间应激（SPS）程序中，以诱发类似术前焦虑的行为。实验表明术前焦虑不仅会加剧且延长了术后痛苦，但其潜在机制尚不清楚。
方法：给 C + Cort 组、I + Cort 组、A + Cort 组和 AI + Cort 组的大鼠注射皮质酮。给 C + RU486 组、I + RU486 组、A + RU486 组和 AI + RU486 组的大鼠注射米非司酮（RU486）。给 C + GSK650394 组和 AI + GSK650394 组的大鼠注射 GSK650394。C + FC1 组和 AI + FC1 组的大鼠在 SPS 前 30 分钟、切开前 30 分钟以及术后第 1、2、3、4 和 5 天均注射氟柠檬酸（FC）。术后第 7、8、9、10、11、12 和 13 天向 FC2 和 AI + FC2 组注射 FC。在 SPS 手术前 24 小时和术后 1 至 28 天评估足爪退缩的机械阈值。通过酶联免疫吸附测定法测定皮质酮。通过 Western 印迹观察血清/糖皮质激素调节激酶 1（SGK1），白介素-1β 和肿瘤坏死因子-α 的表达。用 ATP 测定试剂盒测定三磷酸腺苷（ATP）的浓度。
结果：这项研究表明，SPS 升高了星形胶质细胞的血浆糖皮质激素和 ATP 释放，意味着术前焦虑引起的术后痛觉过敏的机械性疼痛超敏反应依赖于 GCs-SGK1-ATP 信号通路。星形胶质细胞中 SGK1 蛋白水平随着糖皮质激素的刺激而增加，并增强了 ATP 的细胞外释放。此外，脊髓星形胶质细胞在痛敏持续状态中起到关键作用。在持续阶段靶向脊髓星形胶质细胞可阻止病理性进展。
结论：这些数据表明一个重要的信号通路影响了术前焦虑引起的术后疼痛敏感性。
（李玮珊 译 潘艳、薛张纲校）

BACKGROUND: Patients undergoing surgery often feel anxious. Accumulating evidence indicated that presurgical anxiety was related to the more severe postsurgical pain. An animal model was established that exposed Sprague-Dawley rats to a single-prolonged stress (SPS) procedure to induce presurgical anxiety-like behaviors. The experiment revealed that presurgical anxiety not only aggravated but also prolonged postsurgical pain. However, the underlying mechanisms were unknown.
METHODS: The rats in group C + Cort, group I + Cort, group A + Cort, and group AI + Cort were injected with corticosterone. The rats in group C + RU486, group I + RU486, group A + RU486, and group AI + RU486 were injected with mifepristone (RU486). The rats in group C + GSK650394 and group AI + GSK650394 were injected with GSK650394. The rats in group C + FC1 and group AI + FC1 were injected with fluorocitrate (FC) 30 minutes before SPS, 30 minutes before incision, and on postoperative days 1, 2, 3, 4, and 5. The rats in group C + FC2 and group AI + FC2 were injected with FC on postoperative days 7, 8, 9, 10, 11, 12, and 13. The paw withdrawal mechanical threshold was assessed 24 hours before SPS and from postoperative days 1 to 28. The level of corticosterone was determined by enzyme-linked immunosorbent assay. The expression of serum/glucocorticoid regulated kinase 1 (SGK1), interleukin-1β, and tumor necrosis factor-α was visualized by Western blot. The concentrations of adenosine triphosphate (ATP) were measured by ATP assay kit.
RESULTS: This study showed SPS elevated plasma glucocorticoids and ATP release from astrocytes, which meant the mechanical pain hypersensitivity in presurgical anxiety-induced postsurgical hyperalgesia was dependent on GCs-SGK1-ATP signaling pathway. SGK1 protein level in astrocytes was increased in response to the glucocorticoid stimuli and enhanced the extracellular release of ATP. Furthermore,

spinal astrocytes played a key role in the maintenance. Targeting spinal astrocytes in maintenance phase prevented the pathological progression.
CONCLUSIONS: These data suggested an important signaling pathway that affected the pain sensitivity after operation caused by presurgical anxiety.

安大略省痴呆患者机械通气率：一项基于人群的队列研究

Rates of Mechanical Ventilation for Patients With Dementia in Ontario: A Population-Based Cohort Study

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背景：在美国，接受有创性机械通气的老年痴呆症患者的数量正在增加，而在这一人群中，重症监护干预措施的潜在益处和危害的平衡尚不清楚。在本报告中，我们描述了加拿大安大略省痴呆和非痴呆老年人使用侵入性机械通气的趋势，并提供了到 2025 年使用侵入性机械通气的预测。我们发现，老年痴呆患者的侵入性机械通气率的增长速度快于其他老年人(非痴呆)人群。

痴呆发生率随年龄呈指数增长。目前，加拿大估计有 564,000 人患有痴呆，并且预测这一数字将在 15 年内加倍。这种进行性的、经常被忽视的终末期疾病以重要的认知和功能损害为特征，经常导致住院和进入重症监护病房，并且这些措施不会显著改善存活率。在重症监护病房中进行的干预，例如有创性机械通气，往往是可以挽救患者生命的。但是在许多患有痴呆的个体中，这些措施的益处上不明确，并且可能是患者转归的障碍。急性呼吸衰竭需要有创性机械通气是进入重症监护病房的常见原因。我们试图确定加拿大痴呆患者的有创性机械通气率是否在以与美国相同的速率增加，或者有创性机械通气的模式是否有所不同。我们还对 2025 年的这些速率进行了预测，以提供对该人群中有创性机械通气的预期用途的估计。

方法：对加拿大安大略省年龄高于 65 岁的患者的住院人数进行统计，采用 2005 年至 2014 年间安大略省医疗保险计划提交的医生账单，排除了确定的慢性机械通气诊断患者。然后，我们使用了一种已经验证用于安大略省人口级健康管理数据集的算法来识别先前诊断为痴呆症的患者。根据该算法，痴呆的诊断标准是两年时间至少 30 天内，对 1 次入院或 3 名医生提出的相关诊断，或者是应用过任何胆碱酯酶抑制剂的配方药。这项研究得到了 Sunnybrook 健康科学中心的研究伦理委员会的批准，其中包括征得患者个人同意。利用加拿大统计局和安大略省财政部获得的人口估计和预测，我们计算了 2005 年至 2014 年所有年龄大于 65 岁患者的有创性机械通气人口比率，并根据痴呆诊断结果将其分层。根据 2005 至 2014 年观察到的比率趋势和人口预测，我们估计了 2015 年至 2025 年期间需要有无痴呆的侵入性机械通气患者的人数。本文在流行病学指南中加强对观察性研究的报道。

结果：该队列由 199016 名年龄高于 65 岁的患者组成，他们于 2005 年至 2014 年在安大略省住院并接受了有创性机械通气。在这些病人中，有 17065 人(8.6%)曾被诊断为痴呆。痴呆患者的平均机械通气时间(SD)稍长，非痴呆组为 7.0 天(22.2 天)，6.1 天(16.0 天)，P<0.001。接受气管切开术的痴呆患者和非痴呆患者的比例

相当(分别为 6.2%和 6.3%，p=0.75)。在所有痴呆症患者中，44.3%在医院死亡，25.0%出院，29.3%在长期护理或复杂的继续护理设施中出院。接受有创性机械通气的老年患者住院的绝对人数增加了 33.7%(从 2005 年的 17612 人增加到 2014 年的 23540 人)，这一人口的平均绝对年增长率为 3.3%。接受有创性机械通气治疗的痴呆患者人数几乎翻了一番，从 2005 年的 1181 人增至 2014 年的 2329 人，平均绝对年增长率为 7.8%。非痴呆患者的绝对年增长率为 2.9%。

结论：预计到 2025 年，接受无痴呆的侵入性机械通气的老年患者将是 2005 年的 2 倍(30866 比 16431)，而接受有创性机械通气的老年痴呆患者将是 2005 年的 4 倍(5043 比 1181)。2005 年，所有有创机械通气痴呆患者的比例为 6.7%，2014 年增至 9.9%。到 2025 年，估计痴呆症患者将占所有接受有创机械通气(表)的老年患者的 14.0%。

(卢旭 译 潘艳、薛张纲校)

BACKGROUND: Rates of dementia increase exponentially with age. Currently, there are an estimated 564,000 individuals in Canada living with dementia, and projections suggest that this number will double within 15 years.1 The trajectory of this progressive, and sometimes underrecognized, terminal disease is characterized by important cognitive and functional impairment, leading to complications that frequently result in hospitalizations and admission to intensive care units, without substantial improvement in survival.2 Interventions performed in an intensive care unit environment, such as invasive mechanical ventilation, can be lifesaving. But in many individuals with dementia, these procedures have unclear benefit and may be a barrier to providing quality end-of-life care.2,3 Acute respiratory failure requiring invasive mechanical ventilation is a common cause of admission to intensive care unit.4 A previous study in the United States demonstrated that the use of invasive mechanical ventilation by those age 65 and older is increasing over time, especially in patients with a previous diagnosis of dementia.5 In the present study, we sought to determine whether the rates of invasive mechanical ventilation in patients with dementia in Canada are increasing at the same rate as in the United States or whether patterns of invasive mechanical ventilation are different in a health care system with more constrained critical care resources.5,6 We also generated projections of these rates through 2025 to provide estimates of the expected use of invasive mechanical ventilation in this population.

METHODS We identified the number of hospitalizations for patients ≥65 years of age that included receipt of invasive mechanical ventilation in Ontario, Canada, using physician billing codes submitted to the Ontario Health Insurance Plan for invasive mechanical ventilation from 2005 to 2014.7 We excluded patients with a diagnosis of chronic mechanical ventilation, identified by the International Classification of Diseases, Tenth Revision, Clinical Modification code (Z99.11). We then used an algorithm that has been validated for use with Ontario population-level health administrative datasets to identify patients with a prior diagnosis of dementia.8 According to this algorithm, a diagnosis of dementia was based on having a relevant diagnosis from 1 hospital encounter or 3 physician billing claims within a 2-year period separated by at least 30 days, or a filled prescription for any cholinesterase inhibitor. The study was approved by the research ethics board of Sunnybrook Health

Sciences Centre, including a waiver for individual patient consent because the data sets were linked using unique encoded identifiers and analyzed at the Institute for Clinical Evaluative Sciences. Using population estimates and projections obtained from Statistics Canada and the Ontario Ministry of Finance, we calculated population rates of invasive mechanical ventilation from 2005 to 2014 for all patients ≥65 years of age and stratified these according to the presence of a diagnosis of dementia. Using the observed rate trends for 2005 to 2014 and population projections, we estimated the number of patients requiring invasive mechanical ventilation with and without dementia from 2015 out to 2025. This article adheres to Strengthening the Reporting of Observational studies in Epidemiology guidelines.

RESULTS The cohort consisted of 199,016 patients ≥65 years of age who were hospitalized and received invasive mechanical ventilation from 2005 to 2014 in Ontario. Of these patients, 17,065 (8.6%) had a previous diagnosis of dementia. The mean (SD) duration of mechanical ventilation was slightly longer among patients with dementia: 7.0 days (22.2 days) vs 6.1 days (16.0 days) among those without dementia, P < .001. The proportions of dementia and nondementia patients who received a tracheostomy were comparable (6.2% vs 6.3%, respectively, P = .75). Among all patients with dementia, 44.3% died in the hospital, 25.0% were discharged home, and 29.3% were discharged to either longterm care or complex continuing care facilities. The absolute number of hospitalizations in elderly patients receiving invasive mechanical ventilation increased 33.7% (from 17,612 in 2005 to 23,540 in 2014 in Ontario), at an average absolute annual growth rate of 3.3% in this population. The number of patients with dementia who received invasive mechanical ventilation nearly doubled, from 1181 in 2005 to 2329 in 2014, at an average absolute annual growth rate of 7.8% (Figure). For nondementia patients, the absolute annual growth rate was 2.9%. Projecting to 2025, 2 times as many elderly patients will receive invasive mechanical ventilation without dementia compared with 2005 (30,866 vs 16,431), and >4 times as many patients with dementia will receive invasive mechanical ventilation compared with 2005 (5043 vs 1181).

CONCLUSIONS: The percentage of all invasive mechanical ventilation patients with dementia was 6.7% in 2005, and it increased to 9.9% in 2014 (Table). By 2025, it is estimated that patients with dementia will account for 14.0% of all elderly patients who receive invasive mechanical ventilation (Table).

为实行小儿喉裂修补术提供儿科围手术期家庭医疗模式综合护理协调途径

Implementing a Pediatric Perioperative Surgical Home Integrated Care Coordination Pathway for Laryngeal Cleft Repair.

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背景：小儿围手术期家庭医疗模式(PPSH)是一种综合护理模式，其目的是通过将注意力从患者接触水平转移到总体的外科护理阶段，从而提供更好的患者护理和

价值。到目前为止，还没有针对复杂气道疾病的 PPSH 模型。据推测，发展一种用于喉裂修复的 PPSH 将降低该人群术后较高的医疗资源占用率。
方式：该研究获得了机构审查委员会的批准，以便进行数据收集和分析。在 PPSH 开发阶段，聚集了由麻醉师、外科医生、护理人员、信息技术专家和财务管理人员组成的多学科团队。制定了标准化的围手术期(术前、术中和术后)方案，重点关注术前风险分层。术前出现共病≥1 例的患者术后转至重症监护病房(ICU)，未出现严重全身性疾病的患者转至低危监护区过夜观察。PPSH 协议的成功是通过质量结果和价值测量来定义的。
结果：PPSH 计划包括 120 例患者，PPSH 前期组包括 115 例在实施新方法之前进行喉裂修复的患者。对 PPSH 前期组患者进行回顾性分析，将施行 PPSH 后的患者分为 ICU 候选人或低危监护候选人。在 79 例 PPSH 前期患者中，有 70 例(89%)被转至 ICU (P <0 .001)。回顾性分析发现，采用 PPSH 风险分层，PPSH 前期组可缩短 143 天的 ICU 床位占用。PPSH 前期组观察到的手术时间(P =0 .034)和住院时间(P =0 .015)稍长。30 天的意外再入院率与新的 PPSH 计划无关(P = .093)。两组患者均未出现紧急插管或其他预期的并发症。PPSH 观察组患者的总住院费用与 PPSH 前观察组患者相比没有降低(差异= 8%;95% ，置信区间，-7%~23%)。
结论：明确的喉裂修补术前筛查方案可以减少术后 ICU 的入住率，而不影响患者的安全。而这些发现是否适用于其他复杂的气道手术还需要进一步的研究。
（何黄威 译 潘艳、薛张纲校）
BACKGROUND: The Pediatric Perioperative Surgical Home (PPSH) model is an integrative care model designed to provide better patient care and value by shifting focus from the patient encounter level to the overarching surgical episode of care. So far, no PPSH model has targeted a complex airway disorder. It was hypothesized that the development of a PPSH for laryngeal cleft repair would reduce the high rates of postoperative resource utilization observed in this population.
METHODS: Institutional review board approval was obtained for the purpose of data collection and analysis. A multidisciplinary team of anesthesiologists, surgeons, nursing staff, information technology specialists, and finance administrators was gathered during the PPSH development phase. Standardized perioperative (preoperative, intraoperative, and postoperative) protocols were developed, with a focus on preoperative risk stratification. Patients presenting before surgery with ≥1 predefined medical comorbidity were triaged to the intensive care unit (ICU) postoperatively, while patients without severe systemic disease were triaged to a lower-acuity floor for overnight observation. The success of the PPSH protocol was defined by quality outcome and value measurements.
RESULTS: The PPSH initiative included 120 patients, and the pre-PPSH period included 115 patients who underwent laryngeal cleft repair before implementation of the new process. Patients in the pre-PPSH period were reviewed and classified as ICU candidates or lower acuity floor candidates had they presented in the post-PPSH period. Among the 79 patients in the pre-PPSH period who were identified as candidates for the lower-acuity floor transfer, 70 patients (89%) were transferred to the ICU (P < .001). Retrospective analysis concluded that 143 ICU bedded days could have been avoided in the pre-PPSH group by using PPSH risk stratification. Surgery duration (P = .034) and hospital length of stay (P = .015) were found to be slightly

longer in the group of pre-PPSH observation unit candidates. Rates of 30-day unplanned readmissions to the hospital were not associated with the new PPSH initiative (P = .093). No patients in either group experienced emergent postoperative intubation or other expected complications. Total hospital costs were not lower for PPSH observation unit patients as compared to pre-PPSH observation unit candidates (difference = 8%; 95% confidence interval, -7% to 23%).
CONCLUSIONS:A well-defined preoperative screening protocol for patients undergoing laryngeal cleft repair can reduce postoperative ICU utilization without affecting patient safety. Further research is needed to see if these findings are applicable to other complex airway surgeries.

一款电子术后出院评分系统的研发与验证

Development and Validation of an Electronic Postoperative Morbidity Score.

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背景：鉴于电子病历的众多潜在优势，它被广泛应用于各大医学中心。这需要开发客观的指标来判断患者术后是否可出院，类似于在没有电子病历的医学中心进行的研究。我们研发了一款电子术后出院评分系统，以纳入我们的电子病历。
方法：我们回顾性地分析了 203 例接受择期手术的体弱患者，并对其术后第 3 天是否可以出院进行了评分。同时我们还对很难用客观指标描述的非电子评分系统进行了记录。我们采用受试者曲线下面积比较了他们对需要延长住院时间或有复杂出院需求病人的辨别能力。
结果：在电子术后出院评分系统≥1 分的患者中，有 139 例(68%)出院。而原始的非电子评分系统则更加敏感，有 173 例(84%)出院。对比术后出院“金标准”评分系统，我们采用逆向逻辑回归对我们的指标进行了完善，最终版电子术后出院评分系统与最初版本在心脏科和神经科出院率的定义上有所不同。术后电子出院评分系统与非电子评分系统对需要延长住院时间（受试者曲线下面积:0.66 vs . 0.67）和有复杂出院需求病人（受试者曲线下面积:0.66 vs . 0.66）的辨别能力均无显著差异（P > 0.05）。患者在术后第 3 天被评有电子术后评分或非电子评分均增加了延长住院时间的风险(P < 0.001)。
结论：我们提出了一种基于客观电子指标的术后出院评分系统。其辨别能力似乎可与金标准的出院结果相媲美。电子术后出院评分可以在我们的电子病历中对出院率进行定义，但还需要进一步的研究来评估其外部有效性。
(张森 译 潘艳、薛张纲校)
BACKGROUND: Electronic health records are being adopted due to numerous potential benefits. This requires the development of objective metrics to characterize morbidity, comparableto studies performed in centers without an electronic health record. We outline the developmentof an electronic version of the postoperative morbidity score for integration into our electronichealth record.
METHODS: Two hundred and three frail patients who underwent elective surgery were reviewed. We retrospectively defined postoperative morbidity score on

postoperative day 3. We also recorded potential electronic surrogates for morbidities that could not be easily extracted in an objective format. We compared discriminative capability (area under the receiver operator curve) for patients having prolonged length of stay or complex discharge requirements.
RESULTS: One hundred thirty-nine patients (68%) had morbidity in ≥1 postoperative morbidity score domain. Initial electronic surrogates were overly sensitive, identifying 173 patients (84%) as having morbidity. We refined our definitions using backward logistic regression against "goldstandard" postoperative morbidity score. The final electronic postoperative morbidity score differed from the initial version in its definition of cardiac and neurological morbidity. There was no significant difference in the discriminative capability between electronic postoperative morbidity score and postoperative morbidity score for either outcome (area under the receiver operator curve: 0.66 vs 0.66 for complex discharge requirement, area under the receiver operator curve: 0.66 vs 0.67 for a prolonged length of stay; P > .05 for both). Patients with postoperative morbidity score or electronic postoperative morbidity score–defined morbidity on day 3 had ncreased risk of prolonged length of stay (P < .001 for both).
CONCLUSIONS: We present a variant of postoperative morbidity score based on objective electronic metrics. Discriminative performance appeared comparable to gold-standard definitionsfor discharge outcomes. Electronic postoperative morbidity score may allow characterization ofmorbidity within our electronic health record, but further study is required to assess externalvalidity.

局麻药通过多种机制抑制 TWIK 相关的双控钾通道

Polymodal Mechanism for TWIK-Related K+ Channel Inhibition by Local Anesthetic.

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背景：局麻药可以可逆地阻滞疼痛，并且可以抑制 TWIK 相关的双控钾通道（TREK-1）的电流。在局麻起效前，注射局麻药会引起短暂的疼痛。TREK-1 是一种与麻醉剂有关的钾通道，参与抑制疼痛调节，而 TREK-1 蛋白的 C 末端可能参与其中机制。但是局麻药抑制 TREK-1 的分子机制尚未清楚。磷脂酶 D2（PLD2）可以与 TREK-1 的 C 末端结合，参与生成磷脂酸（PA），这个过程与 TREK-1 的激活有关。
方法：我们将采用生理和细胞学方法分别对脂质介导的 TREK-1 直接抑制和间接抑制进行实验。将纯化的通道蛋白和人工膜重组，并检测离子流，通过这种方法检测局麻药和 TREK-1 通道的直接结合作用。运用 PDL2 荧光产物生成的方法，检测活细胞脂质的生成，再通过膜片钳技术检测活细胞离子通道的离子流，通过这两种方法检测 PA 介导的 TREK-1 通道抑制。最后，通过超分辨成像技术，在纳米水平检测麻醉药诱导的 PLD2 往 TREK-1 通道的转位。
结果：结果显示，丁卡因、利多卡因和布比卡因直接结合并抑制 PLD2 的酶活性。PLD2 的失活间接抑制 TREK-1 的离子流。一些局麻药还可以与 TREK-1 通道直

接结合，部分阻挡开放的通道，相对于布比卡因和利多卡因，丁卡因的这种阻滞作用相对较强。另外，局麻药还可以破坏脂筏结构，如果不是因为局麻药直接抑制酶的催化活性，破坏脂筏结构本应该可以激活 PLD2。

结论：我们由实验提出局麻药抑制 TREK-1 通道包括：（1）主要抑制 PLD2 介导的脂质水解;（2）一些局麻药可以部分阻滞开放的离子通道起到一定的抑制效果。通过对 PLD2 的抑制可以解释 TREK-1 的 C 末端是如何在没有与局麻药相关的结构或结合位点的情况下，参与调节离子通道。

（周修适 译 潘艳、薛张纲校）

BACKGROUND: Local anesthetics cause reversible block of pain and robustly inhibit TWIK-related K channel (TREK-1) currents. Before local anesthesia onset, injection of local anesthetics can cause unwanted transient pain. TREK-1 is an anesthetic-sensitive potassium channel that when inhibited produces pain. A disordered C-terminal loop of TREK-1 is thought to contribute to anesthetic sensitivity, but the molecular basis for TREK-1 inhibition by local anesthetics is unknown. Phospholipase D2 (PLD2) is an enzyme that produces phosphatidic acid (PA) required for TREK-1 activation and also binds to the channel's C terminus.

METHODS: Here, we use biophysical and cellular techniques to characterize direct and indirect lipid-mediated mechanism for TREK-1 inhibition (respectively). We characterized direct binding of local anesthetic to TREK-1 by reconstituting the purified channel into artificial membranes and measuring ion flux. We characterized indirect PA-mediated inhibition of TREK-1 by monitoring lipid production in live whole cells using a fluorescent PLD2 product release assay and ion channel current using live whole-cell patch-clamp electrophysiology. We monitored anesthetic-induced nanoscale translocation of PLD2 to TREK-1 channels with super-resolution direct stochastic reconstruction microscopy (dSTORM).

RESULTS: We find local anesthetics tetracaine, lidocaine, and bupivacaine directly bind to and inhibit PLD2 enzymatic activity. The lack of PLD2 activity indirectly inhibited TREK-1 currents. Select local anesthetics also partially blocked the open pore of TREK-1 through direct binding. The amount of pore block was variable with tetracaine greater than bupivacaine and lidocaine exhibiting a minor effect. Local anesthetics also disrupt lipid rafts, a mechanism that would normally activate PLD2 were it not for their direct inhibition of enzyme catalysis.

CONCLUSIONS: We propose a mechanism of TREK-1 inhibition comprised of (1) primarily indirect PLD2-dependent inhibition of lipid catalysis and (2) limited direct inhibition for select local anesthetics through partial open pore block. The inhibition through PLD2 explains how the C terminus can regulate the channel despite being devoid of structure and putative binding sites for local anesthetics.

围手术期葡萄糖输注与术后恶心呕吐的荟萃分析

Perioperative Dextrose Infusion and Postoperative Nausea and Vomiting: A

Meta-analysis of Randomized Trials

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背景：围手术期静脉注射葡萄糖有可能降低术后恶心和呕吐的风险。在这项荟萃分析中，我们研究了术中或术后输注葡萄糖预防术后恶心和呕吐的作用。

方法：我们的研究小组检索了 pubmed、embase、cochrane 图书馆和 google 学者数据库，寻找相关的随机对照试验，检查围手术期静脉注射葡萄糖预防术后恶心和呕吐的应用。主要结果是术后恶心和呕吐的发生率（在麻醉后复苏室和术后 24 小时内）。次要结果包括术后止吐药物的使用和血糖水平。

结果：我们的研究共纳入 10 个随机对照试验（n=987 名患者），比较了围手术期葡萄糖输注（n=465）和安慰剂（n=522）使用情况。无论在术后恢复室（风险比为 0.91，95%可信区间为 0.73-1.15；p=0.44）还是术后 24 小时内（风险比为 0.76，95%可信区间为 0.55-1.04；p=0.09），围术期外源性葡萄糖输注均与术后恶心和呕吐的显著减少无关。尽管在最初的 24 小时内使用右旋葡萄糖可显著减少止吐药的使用（风险比为 0.55，95%CI 为 0.45-0.69；P<0.001），但与对照组相比，术后血糖水平有所升高。

结论：围手术期使用葡萄糖与术后恶心和呕吐没有统计学上的显著相关性。使用时，建议进行血糖监测以评估术后高血糖。有必要进行进一步的前瞻性试验，以检测输注葡萄糖的时机对术后恶心呕吐发生率和抗呕吐补救药物使用的潜在影响。

（吴洁译 李士通校）

BACKGROUND: Perioperative IV dextrose infusions have been investigated for their potential to reduce the risk of postoperative nausea and vomiting. In this meta-analysis, we investigated the use of an intraoperative or postoperative infusion of dextrose for the prevention of postoperative nausea and vomiting.

METHODS: Our group searched PubMed, Embase, Cochrane library, and Google Scholar for relevant randomized controlled trials examining the use of perioperative IV dextrose for prevention of postoperative nausea and vomiting. The primary outcome was the incidence of postoperative nausea and vomiting (both in the postanesthesia care unit and within the first 24 h of surgery). Secondary outcomes included postoperative antiemetic administration and serum glucose level.

RESULTS: Our search yielded a total of 10 randomized controlled trials (n = 987 patients) comparing the use of a perioperative dextrose infusion (n = 465) to control (n = 522). Perioperative dextrose infusion was not associated with a significant reduction in postoperative nausea and vomiting in the postanesthesia care unit (risk ratio = 0.91, 95% CI, 0.73-1.15; P = .44) or within the first 24 h (risk ratio = 0.76, 95% CI, 0.55-1.04; P = .09) of surgery. Although the use of dextrose was associated with a significant reduction in antiemetic administration within the first 24 h (risk ratio = 0.55, 95% CI, 0.45-0.69; P < .001), it also increased postoperative plasma glucose levels compared to controls.

CONCLUSIONS: The use of perioperative dextrose did not result in a statistically significant association with postoperative nausea and vomiting.

When utilized, plasma glucose monitoring is recommended to assess for postoperative hyperglycemia. Further prospective trials are necessary to examine the potential impact of timing of administration of a dextrose infusion on incidence of postoperative nausea and vomiting and rescue antiemetic requirements.

腹腔内手动推注与微量泵入布比卡因与吗啡需要量在幼儿体内的群体药代动学研究

Population Pharmacokinetics of Intraperitoneal Bupivacaine Using Manual Bolus Atomization Versus Micropump Nebulization and Morphine Requirements in Young Children

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背景：成人和儿童在腹腔镜手术后均采用腹腔内注射局部麻醉药进行术后镇痛。布比卡因在儿童中的群体药代动力学（PK）尚未确定。本研究的目的是（1）建立一个群体 PK 模型，比较通过手动推注和微量泵注方式给予布比卡因和（2）评估术中给予布比卡因的术后吗啡需要量。我们假设两种给药方法的 PK 值和吗啡需求量相似。

方法：这是一项前瞻性、连续性、观察性研究。在机构审查委员会（IRB）批准和家长书面知情同意后，67 名 6 个月至 6 岁接受机器人辅助腹腔镜泌尿外科手术的儿童在手术开始时接受了腹腔内布比卡因注射治疗。所有患儿接受了总剂量为 1.25 mg/kg 的布比卡因，用 30 毫升生理盐水稀释，手动大于 30 秒一次性推注或未经稀释的 0.5%布比卡因通过微泵由二氧化碳（CO2）气腹针雾化后大于 10-17.4 分钟吹入腹腔。术中 1～120min 选取 4 个时间点采集静脉血样。采用液相色谱-质谱联用技术对样品进行分析。采用非室模型和房室模型分析受访者计算 PK 参数。用非线性回归模型估算 PK 参数（主要结果）和用 mann-whitney u 检验吗啡需求量（次要结果）。

结果：两种用药方式的患者特征具有可比性。没有观察到神经毒性或心脏毒性的临床症状。手动推注的血浆药物浓度峰值范围为 0.39-2.44 微克/毫升，而微量泵雾化吹入的血浆药物浓度峰值范围为 0.25-1.07 微克/毫升。两种给药方法均采用 1 室模型描述腹腔内布比卡因 PK 值。手动推注相比，微泵雾化吹入给药所致布比卡因最高血浆药物浓度（Cmax）显著降低，而且达到此 Cmax（Tmax）浓度所需时间较短（P<0.001）。用微泵雾化吹入的 PK 模型观察和预测到的血浆药物浓度较低和患者间变异性较少（p<0.001）。年龄、体重和性别等协变量校正后，微泵雾化吹入布比卡因的 Cmax 和 PK 曲线下面积（AUC）显著较低（p<0.001）。无论采用何种布比卡因给药方式，在所有时间点吗啡的需求量都很低。术后 24 小时内无论手动推注还是微泵雾化吹入布比卡因，患儿静脉注射/口服吗啡（0.14 与 0.17 mg/kg，p=0.85）的累积需求量无差异。

结论：与手动腹腔内推注布比卡因相比，用微泵雾化腹腔内吹入布比卡因在获得相似的临床疗效的同时，血浆浓度较低，患者间变异性较少，并可降低毒性反应风险。这是首次在儿童中进行腹腔内布比卡因的人群药代动力学研究，未来仍需随机对照试验来确定疗效。

（吴洁译 李士通校）

BACKGROUND: Intraperitoneal (IP) administration of local anesthetics is used in adults and children for postoperative analgesia after laparoscopic surgery. Population pharmacokinetics (PK) of IP bupivacaine has not been determined in children. Objectives of this study were (1) to develop

a population PK model to compare IP bupivacaine administered via manual bolus atomization and micropump nebulization and (2) to assess postoperative morphine requirements after intraoperative administration. We hypothesized similar PK profiles and morphine requirements for both delivery methods.

METHODS: This was a prospective, sequential, observational study. After institutional review board (IRB) approval and written informed parental consent, 67 children 6 months to 6 years of age undergoing robot-assisted laparoscopic urological surgery received IP bupivacaine at the beginning of surgery. Children received a total dose of 1.25 mg/kg bupivacaine, either diluted in 30-mL normal saline via manual bolus atomization over 30 seconds or undiluted bupivacaine 0.5% via micropump nebulization into carbon dioxide (CO2) insufflation tubing over 10-17.4 minutes. Venous blood samples were obtained at 4 time points between 1 and 120 minutes intraoperatively. Samples were analyzed by liquid chromatography with mass spectrometry. PK parameters were calculated using noncompartmental and compartmental analyses. Nonlinear regression modeling was used to estimate PK parameters (primary outcomes) and Mann-Whitney U test for morphine requirements (secondary outcomes).

RESULTS: Patient characteristics between the 2 delivery methods were comparable. No clinical signs of neurotoxicity or cardiotoxicity were observed. The range of peak plasma concentrations was 0.39-2.44 μg/mL for the manual bolus atomization versus 0.25-1.07 μg/mL for the micropumpnebulization. IP bupivacaine PK was described by a 1-compartment model for both delivery methods. Bupivacaine administration by micropump nebulization resulted in a significantly lower Highest Plasma Drug Concentration (Cmax) and shorter time to reach Cmax (Tmax) ($P < .001$) compared to manual bolus atomization. Lower plasma concentrations with less interpatient variability were observed and predicted by the PK model for the micropump nebulization ($P < .001$). Adjusting for age, weight, and sex as covariates, Cmax and area under the curve (AUC) were significantly lower with micropump nebulization ($P < .001$). Regardless of the delivery method, morphine requirements were low at all time points. There were no differences in cumulative postoperative intravenous/oral morphine requirements between manual bolusatomization an d micropump nebulization (0.14 vs 0.17 mg/kg; $P = .85$) measured up to 24 hours postoperatively.

CONCLUSIONS: IP bupivacaine administration by micropump nebulization demonstrated lower plasma concentrations, less interpatient variability, low risk of toxicity, and similar clinical efficacy compared to manual bolus atomization. This is the first population PK study of IP bupivacaine in children, motivating future randomized controlled trials to determine efficacy.

标准型和增强型脉搏血氧饱和度仪对血氧饱和状态的显示比较：临床医生和非临床医师的

实验研究

Comparison of Standard and Enhanced Pulse Oximeter Auditory Displays of Oxygen Saturation: A Laboratory Study With Clinician and Nonclinician Participants

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背景：当从事需要高度注视的任务时，麻醉师依靠脉搏血氧饱和度仪（PO）的不同声音提示患者的血氧饱和度（Sp02）信息。目前的听觉提示在提供 Sp02 信息方面并不总是有效的。在本实验室研究中，在执行干扰注意力的任务和背景噪声存在的情况下，临床医生和非临床医生参与者使用标准听觉显示或具有额外的声学特性的增强听觉显示识别 Sp02 参数。

方法：在平衡交叉设计中，专业麻醉医师或实习麻醉医师（n=25）和非临床医师（n=28）使用标准显示器和增强型听觉显示器识别 Sp02 参数。参与者执行两项干扰注意力的任务：（1）算术验证和（2）关键词检测。整个实验过程中播放模拟手术室背景噪声。主要结果是：（1）检测到 Sp02 目标范围的转换和（2）识别 Sp02 范围（目标值、降低或危急值）。次要结果包括参与者检测目标转换的延迟、确定绝对 Sp02 值的准确性、干扰注意力任务的准确性和延迟以及对任务的主观判断。

结果：与使用标准显示相比，参与者使用增强显示可以更准确地检测到目标值的变化（57%对 87%；优势比为 7.3[95%可信区间{CI}为 4.4-12.3]；p<0.001）；并更准确的区分出 Sp02 的 范围（76%对 86%；优势比，2.7[95%置信区间，1.6-4.6]；p<0.001）。次要结果分析表明，临床医生和非临床医生在目标值转换的检测准确度和时间延迟、Sp02 范围识别准确度或 Sp02 绝对值识别方面的表现没有差异。

结论：增强型听觉显示器为临床医生和非临床医生提供更精确的目标值转换检测和 Sp02 范围识别。尽管他们以前有使用听觉提示的经验，但在这项实验室研究中，临床医生在识别 Sp02 结果的准确度方面并不优于非临床参与者。

（吴洁译 李士通校）

BACKGROUND: When engaged in visually demanding tasks, anesthesiologists depend on the auditory display of the pulse oximeter (PO) to provide information about patients' oxygensaturation (Sp02). Current auditory displays are not always effective at providing Sp02 information. In this laboratory study, clinician and nonclinician participants identified Sp02 parameters using either a standard auditory display or an auditory display enhanced with additional acoustic properties while performing distractor tasks and in the presence of background noise.

METHODS: In a counter balanced crossover design, specialist or trainee anesthesiologists (n = 25) and nonclinician participants (n = 28) identified Sp02 parameters using standard and enhancedPO auditory displays. Participants performed 2 distractor tasks: (1) arithmetic verification and (2) keyword detection. Simulated background operating room noise played throughout the experiment. Primary outcomes were accuracies to (1) detect transitions to and from an Sp02 target range and (2) identify Sp02 range (target, low, or critical). Secondary outcomes included participants' latency to detect target transitions, accuracy to identify absolute Sp02 values, accuracy and latency of distractor tasks, and subjective

judgments about tasks.

RESULTS: Participants were more accurate at detecting target transitions using the enhanceddisplay (87%) than the standard display (57%; odds ratio, 7.3 [95% confidence interval {CI}, 4.4-12.3]; P < .001). Participants were also more accurate at identifying SpO2 range using the enhanced display (86%) than the standard display (76%; odds ratio, 2.7 [95% CI, 1.6-4.6]; P < .001). Secondary outcome analyses indicated that there were no differences in performance between clinicians and nonclinicians for target transition detection accuracy and latency, SpO2 range identification accuracy, or absolute SpO2 value identification.

CONCLUSIONS: The enhanced auditory display supports more accurate detection of target transitions and identification of SpO2 range for both clinicians and nonclinicians. Despite their previous experience using PO auditory displays, clinicians in this laboratory study were no more accurate in any SpO2 outcomes than nonclinician participants.

儿童风险评估评分预测非心脏手术患儿围手术期死亡率的前瞻性外部验证 Prospective External Validation of the Pediatric Risk Assessment Score in Predicting Perioperative Mortality in Children Undergoing Noncardiac Surgery

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背景：尽早确定高危儿童围手术期死亡率可改善预后，但缺乏有效的风险预测工具。儿科风险评估（PRAm）评分是一种新的预测正在接受非心脏手术的儿科患者围手术期死亡风险的模型。它来自美国外科学院（ACS）国家外科质量改进计划（NSQIP）儿科数据库。在这项研究中，我们的目的是从一个大型机构外部验证 PRAm 评分。

方法： PRAm 评分由初级麻醉小组前瞻性地分配给 2017 年 7 月至 2018 年 7 月间在一所三级儿科医院接受非心脏手术的 18 岁以下儿童。主要结果是 PRAm 评分预测 30 天死亡率的能力。受试者工作特性（ROC）曲线下的面积用于确定识别能力。考虑了不同截止点的敏感性和特异性。应用正确诊断指数和灰色地带法（弱阳性法）确定预测 30 天死亡率的最佳 PRAm 临界值。

结果：纳入“外部验证”队列的 13530 例患者中，30 天死亡率的发生率为 0.21%（29/13530）。PRAm 评分预测 30 天死亡率，曲线下面积（AUC）为 0.956（95%可信区间[CI]为 0.938-0.974；p<0.001）。约登诊断指数确定最佳 PRAm 评分阈值≥5，敏感性为 86%，特异性为 91%。灰色地带法确定了 6.93%（938/13530）的 PRAm 评分为 4 或 5（敏感性或特异性分别小于 90%）的患者的死亡风险，因此优化了最佳临界点为 PRAm 评分≥6。ASA 分级（ASA PS）≤3（0.06%，8/13530）的患者比 ASA PS≤3 同时 PRAm 评分≥6 的患儿死亡率增加了 8 倍。

结论：PRAm 评分是一种简单、客观的工具，它能很好地预测正在进行非心脏手术的患儿围手术期死亡风险，且易于临床应用。PRAm 评分的应用可能对提高婴儿和儿童的安全和护理质量以及儿童保健系统的资源利用产生重要影响。

（吴洁译 李士通校）

BACKGROUND: Early identification of children at high risk for perioperative mortality could lead to improved outcomes; however, there is a lack of well-validated risk prediction tools.

The PediatricRisk Assessment (PRAm) score is a new model to prognosticate perioperative risk of mortality in pediatric patients undergoing noncardiac surgery. It was derived from the American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP) Pediatric database. In this study, we aimed to externally validate the PRAm score at 1 large institution.

METHODS: A PRAm score was prospectively assigned by the primary anesthesia team to children≤18 years of age undergoing noncardiac surgery between July 2017 and July 2018 at a tertiary care pediatric hospital. The primary outcome was the PRAm score's ability to predict 30-day mortality. The area under the receiver operating characteristic (ROC) curve was utilized to determine discriminative ability. Sensitivity and specificity at varying cutoffs were considered. Youden J index and the gray zone approach were applied to determine the optimal PRAm cutoff for predicting 30-day mortality.

RESULTS: Among the 13,530 cases included in the external validation cohort, the incidence of 30-day mortality was 0.21% (29/13,530). The PRAm score was found to predict 30-day mortality with an area under the curve (AUC) of 0.956 (95% confidence interval [CI], 0.938-0.974; P < .001). Youden J index determined the optimal PRAm score threshold to be ≥5 with a sensitivity of 86% and a specificity of 91%. The gray zone identified an inconclusive risk of mortality in 6.93% (938/13,530) of patients who had PRAm scores of 4 or 5 (sensitivity or specificity <90%, respectively), therefore refining the optimal cutoff point to be a PRAm score of ≥6. The incidence of mortality for patients with an American Society of Anesthesiologists Physical Status (ASA PS) ≤3 (0.06%, 8/13,530) increased 8-fold for those with an ASA PS of ≤3 and a PRAm score of ≥6.

CONCLUSIONS: The PRAm score is a simple and objective tool that has excellent ability to predict perioperative risk of mortality in pediatric patients undergoing noncardiac surgery and can be easily used by clinicians. The application of the PRAm score could have important implications on the safety and quality of care delivered to infants and children and on the resource utilization in the pediatric health care system.

麻醉类型与下肢外伤性骨折术后并发症无关

Anesthesia Type Is Not Associated With Postoperative Complications in the Care of Patients With Lower Extremity Traumatic Fractures

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背景：军事麻醉受独特的后勤、技术、战术和人员限制，迄今为止，在军事活动期间战伤手术麻醉管理方面公布的数据有限。

目标：这项研究旨在描述和分析法国在一个已部署的军事环境中的麻醉活动。

方法：2015 年 10 月至 2018 年 2 月间，所有由圣安妮军队医院（Sainte Anne Military

Hospital）指派任务的麻醉医师所管理的患者全部包括在内。对同一麻醉团队在法国施行相同手术（疝气修补、下肢和上肢手术）的麻醉管理进行了描述和比较。人口统计学，手术类型和手术活动也被描述。主要终点是描述前方手术团队（FST）执行任务期间的麻醉管理。次要终点是比较 FST 执行任务期间的麻醉方式与通常在军队教学医院使用的麻醉方式。

结果：在研究期间，11 名麻醉师在 20 次任务中实施了 1547 例麻醉，总共在 9 个不同的据点部署了 1237 天。多数为局部麻醉，单纯局部麻醉（43.5%）或联合全身麻醉（21%）。与法国国内相比，在疝修补术、下肢和上肢手术中使用区域阻滞麻醉的情况在统计学上显著增加。作为对地方医疗支持的一部分，大多数病人是平民。

结论：在严峻的医疗环境下，应该尽可能使用区域麻醉技术。这些结果表明，军队麻醉医师的培训必须是完整的，包括麻醉、重症监护、儿科和区域阻滞麻醉。

（吴洁译 李士通校）

BACKGROUND: Military anesthesia meets unique logistical, technical, tactical, and human constraints, but to date limited data have been published on anesthesia management during military operations.

OBJECTIVE: This study aimed to describe and analyze French anesthetic activity in a deployed military setting.

METHODS: Between October 2015 and February 2018, all patients managed by Sainte-Anne Military Hospital anesthesiologists deployed in mission were included. Anesthesia management was described and compared with the same surgical procedures in France performed by the same anesthesia team (hernia repair, lower and upper limb surgeries). Demographics, type of surgical procedure, and surgical activity were also described. The primary endpoint was to describe anesthesia management during the deployment of forward surgical teams (FST). The secondary endpoint was to compare anesthesia modalities during FST deployment with those usually used in a military teaching hospital.

RESULTS: During the study period, 1547 instances of anesthesia were performed by 11 anesthesiologists during 20 missions, totaling 1237 days of deployment in nine different theaters. The majority consisted of regional anesthesia, alone (43.5%) or associated with general anesthesia (21%). Compared with France, there was a statistically significant increase in the use of regional anesthesia in hernia repair, lower and upper limb surgeries during deployment. The majority of patients were civilians as part of medical support to populations.

CONCLUSION: In the context of an austere environment, the use of regional anesthesiatechniques predominated when possible. These results show that the training of military anesthetists must be complete, including anesthesia, intensive care, pediatrics, and regional anesthesia.

冲突管理策略在儿科手术室的应用

Applying Conflict Management Strategies to the Pediatric Operating Room

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在当今的医疗环境下，有效的沟通是必不可少的，沟通不良会导致医疗服务提供者之间

的冲突。文化和信仰的差异会进一步激发医疗团队成员、家庭和患者之间的“冲突”。 因为患者、父母/监护人和临床医生共同承担决策责任，使“儿科”患者护理具有更高的发生“冲突”可能性。因为每种冲突情况都需要不同的方法来优化管理，因此了解冲突的阶段和类型非常重要。同样重要的是理解个人处理冲突风格的不同。thomas kilmann 冲突模式工具和冲突处理荷兰测试问卷是评估冲突管理风格的两个有效工具。不同的风格包括竞争/强迫、合作/解决问题、妥协、回避和让步/迁就。一个成功的医生应该能够识别冲突的不同阶段和类型，以便使用最适合的特定冲突管理方法。在儿科手术室有几种管理冲突的技术。在冲突中承认和管理自己的情绪是避免向扩散局势迈出的关键的第一步。积极倾听是提高团队活力的重要沟通技巧。协调冲突各方的利益将有利于合作解决问题。文化胜任力（有效应对多文化情境的能力）培训可以提高沟通和冲突管理技能。通过对所有围手术期团队成员的正式教育，有效的冲突管理可以改善沟通与团队合作，改善患者的预后。

（吴洁译 李士通校）

Effective communication is essential in today's health care environment, and poor communication can lead to conflict among health care providers. Differences in cultures and beliefs can further incite conflict among health care team members, families, and patients. Pediatric patient care has a higher potential for conflict because decision-making responsibilities are shared among patients, parents/guardians, and clinicians. It is important to understand the phases and types of conflictbecause each conflict situation requires a different approach to optimize management. Equally important is an understanding of styles used by individuals to manage conflict. The Thomas-Kilmann Conflict Mode Instrument and the Dutch Test for Conflict Handling are 2 validated tools used to assess conflict management styles. The different styles include competing/forcing, collaborating/problem solving, compromising, avoiding, and yielding/accommodating. A successful physician should be able to identify the phases and types of conflict to use the conflictmanagement approach most suitable for the given conflict.There are several techniques for managing conflict in the pediatric operating room. Acknowledging and managing one's own emotions during conflict is a pivotal first step toward diffusing the situation. Active listening is an important communication skill that improves team dynamics. Aligning the interests of the parties involved in conflict will encourage collaborative problem solving. Cultural competency training can improve communication and conflict management skills. Effective conflict management through formal education of all perioperative team members can lead to improved communication and teamwork and better patient outcomes.

儿童复杂颅穹窿重建术围术期结局及手术病例量：来自儿童颅面协作组织的多中心观察研究

Perioperative Outcomes and Surgical Case Volume in Pediatric Complex Cranial Vault Reconstruction: A Multicenter Observational Study From the Pediatric Craniofacial Collaborative Group

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Hubert; Binstock, Wendy; Brzenski, Alyssa; Budac, Stefan; Busso, Veronica; Chhabada, Surendrasingh; Cladis, Franklyn; Claypool, Danielle; Collins, Michael; Dabek, Rachel; Dalesio, Nicholas; Falcon, Ricardo; Fernandez, Patrick; Fiadjoe, John; Gangadharan, Meera; Gentry, Katherine; Glover, Chris; Goobie, Susan M.; Gosman, Amanda; Grap, Shannon; Gries, Heike; Griffin, Allison; Haberkern, Charles; Hajduk, John; Hall, Rebecca; Hansen, Jennifer; Hetmaniuk, Mali; Hsieh, Vincent; Huang, Henry; Ingelmo, Pablo; Ivanova, Iskra; Jain, Ranu; Kars, Michelle; Kowalczyk-Derderian, Courtney; Kugler, Jane; Labovsky, Kristen; Lakheeram, Indrani; Lee, Andrew; Masel, Brian; Medellin, Eduardo; Meier, Petra; Mitzel Levy, Heather; Muhly, Wallis T.; Nelson, Jonathon; Nicholson, Julie; Nguyen, Kim-Phuong; Nguyen, Thanh; Olutuye, Olutoyin; Owens-Stubblefield, Margaret; Ramesh Parekh, Uma; Petersen, Timothy; Pohl, Vanessa; Post, Julian; Poteet-Schwartz, Kim; Prozesky, Jansie; Reid, Russell; Ricketts, Karene; Rubens, Daniel; Ryan, Laura; Skitt, Rochelle; Soneru, Codruta; Spitznagel, Rachel; Singh, Davinder; Singhal, Neil R.; Sorial, Emad; Staudt, Susan; Stubbeman, Bobbie; Sung, Wai; Syed, Tariq; Szmuk, Peter; Taicher, Brad M.; Thompson, Douglas; Tretault, Lisa; Ungar-Kastner, Galit; Watts, Rheana; Wieser, John; Wong, Karen; Zamora, Lillian; on behalf of The Pediatric Craniofacial Collaborative Group
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背景：用于治疗颅缝早闭或颅缝骨化症的复杂颅底重建手术（CCVR）常伴随大量的失血、输血和围术期性并发症。本研究的目的是检验 CCVR 外科病例量对围术期后果的影响。我们假定外科病例数量与围术期结果的差异无关。本项研究的主要结果是整个围术期献血者的总暴露量。次要结果包括围术期总输血量、严重并发症、以及在重症监护室和医院停留时长。

方法：查询了 2012 年 6 月至 2016 年 9 月期间，在多中心小儿外科手术围术期登记进行了 CCVR 手术的儿童和少年。依据每个月平均手术例数，医疗机构被分类为低、中、高量手术病例组。对这些群体的主要结果和次要结果进行了分析。

结果：查询结果显示，共有来自 33 所医疗机构的 1814 例 CCVR 病例，三个研究组的人口统计学特征相似。观察到外科病例数量与整个围术期献血者的总暴露量的逆向关系(<p.001>)。低病例数量组具有高围术期输血量（与中等病例数量组相比 P=0.02；与大量病例数量组相比 P=0.01）。手术病例数量与严重术后并发症发生率或住院时长没有显著关系。

结论：在本研究中，低手术病例组与增加的整个围术期献血者的总暴露量和围术期输血量相关。住院时长在三组中是均匀的，表明观察到的输血结果差异的总体临床影响有限。

（吴洁译 李士通校）

BACKGROUND: Complex cranial vault reconstruction (CCVR) performed to treat craniosynostosis can be associated with significant blood loss, transfusion, and perioperative complications. The aim of this study was to examine the effect of CCVR surgical case volume on perioperative outcomes. We hypothesized that surgical case volume is not associated with differences in perioperative outcomes. The study primary outcome was total perioperative blood donor exposures. Secondary outcomes included the total perioperative transfusion volume, major complications, and intensive care unit and hospital length of stay.

METHODS: The multicenter Pediatric Surgery Perioperative Registry was

queried for infants and children undergoing CCVR between June 2012 and September 2016. Institutions were categorized into low, middle, or high surgical case volume groups based on tertiles of the average number of cases performed per month. Primary and secondary outcomes were analyzed with respect to these groupings.

RESULTS: The query yielded 1814 CCVR cases from 33 institutions. Demographics were similar among the 3 study groups. An inverse relationship between surgical case volume and total perioperative blood donor exposures was observed ($P < .001$). The low-volume group had higher perioperative transfusion volumes ($P = .02$ versus middle; $P = .01$ versus high). There was no significant relationship between surgical case volume and the incidence of major postoperative complications or hospital length of stay.

CONCLUSIONS: In this study, low surgical case volumes were associated with increased total blood donor exposures and increased perioperative transfusion volumes. Hospital length of stay was homogeneous in the 3 groups, suggesting a limited overall clinical impact of the observed transfusion outcome differences.

右美托咪定对全麻患儿血糖和血钾水平的影响：随机对照试验中安全性指标的二次分析

Effects of Dexmedetomidine on Blood Glucose and Serum Potassium Levels in Children Undergoing General Anesthesia: A Secondary Analysis of Safety Endpoints During a Randomized Controlled Trial

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背景：右美托咪啶是一种高选择性 α 2 肾上腺素能激动剂，在小儿麻醉和重症监护中的应用日益广泛。尚未对儿童的潜在不良影响进行严格评估的，包括其对血糖和血清钾浓度的影响，这与两个参数的紊乱和不期望的结果有关。我们在一项随机对照试验中，研究了 3 种不同剂量的右美托咪啶（dexmedetomidine）对儿童择期手术结果的影响。

方法：64 名 ASA I-II 级儿童麻醉诱导后随机接受 0.25 μg/kg、0.5 μg/kg、0.75 μg/kg 或 0 μg/kg（对照）右美托咪啶大于 60 秒静脉推注。在给药前、给药后 15 分钟和 30 分钟，测量静脉血中血浆葡萄糖和血清钾浓度的变化。记录组内和组间数据，并使用有限定的纵向数据方法进行分析。

结果：共有 49 名儿童完成了这项研究。给药后 15 分钟和 30 分钟的平均血糖水平分别从基线水平 0.37 mmol/L（95%CI 为 0.29-0.45 mmol/L）和 0.05 mmol/L（95%CI 为 0.00-0.10 mmol/L）升高。在 15 分钟时，存在线性剂量-反应关系（1.07 mmol/L/μg/kg[95%可信区间为 0.57-1.58 mmol/L/μg/kg]），但在 30 分钟时（0.15 mmol/L/μg/kg[95%可信区间为 -0.40-0.70 mmol/L/μg/kg]）没有明显的影响。血钾水平相对于基线水平有所下降，均差在 15 分钟时为-0.20 mEq/L（95%置信区间为-0.28 至-0.12 mEq/L），在 30 分钟时为-0.12 mEq/L（95%置信区间为-0.15 至-0.08 mEq/L），但在两个时点右美托咪啶对血钾均无明显影响。

结论：麻醉诱导后，观察到儿童血糖轻度升高，血钾降低。给药 15 分钟时血糖升高取决于右美托咪啶的给药剂量。这些初步数据有待进一步研究。

（吴洁译 李士通校）

BACKGROUND: Dexmedetomidine is a highly selective α2-adrenergic agonist, which is increasingly used in pediatric anesthesia and intensive care. Potential adverse effects that have not been rigorously evaluated in children include its effects on blood glucose and serumpotassium concentrations, which are relevant due to the associations of derangements of both parameters with undesired outcomes. We investigated the effects of 3 different doses of dexmedetomidine on these outcomes in a randomized controlled trial in children undergoing elective surgery.
METHODS: Sixty-four American Society of Anesthesiologists I-II children were randomized to receive either dexmedetomidine 0.25 μg/kg, dexmedetomidine 0.5 μg/kg, dexmedetomidine 0.75 μg/kg, or 0 μg/kg (control), as a bolus administered over 60 seconds after induction of anesthesia. Changes in plasma glucose and serum potassium concentrations were measured in venous bloodsampled before and at 15 and 30 minutes after study drug administration. Data were plotted within and between groups and analyzed using a constrained longitudinal data approach.
RESULTS: Forty-nine children completed the study. Mean glucose levels at 15 and 30 minutes were elevated with estimated changes from baseline of 0.37 mmol/L (95% CI, 0.29-0.45 mmol/L) and 0.05 mmol/L (95% CI, 0.00-0.10 mmol/L), respectively. At 15 minutes, there was a linear dose-response relationship (1.07 mmol/L/μg/kg [95% CI, 0.57-1.58 mmol/L/μg/kg]), but there was no appreciable effect of dexmedetomidine at 30 minutes (0.15 mmol/L/μg/kg [95% CI, -0.40 to 0.70 mmol/L/μg/kg]). Potassium levels were depressed relative to baseline, with a mean difference at 15 minutes of -0.20 mEq/L (95% CI, -0.28 to -0.12 mEq/L) and at 30 minutes of -0.12 mEq/L (95% CI, -0.15 to -0.08 mEq/L), but there was no appreciable effect of dexmedetomidine at either time.
CONCLUSIONS: Small elevations in glucose and decreases in potassium were observed after induction of anesthesia in children. The elevation in glucose at 15 minutes depended on the dose of dexmedetomidine administered. These preliminary data warrant further investigation.

布瑞亭和新斯的明逆转小儿神经肌肉阻滞的安全性和有效性回顾性分析 Retrospective Analysis of the Safety and Efficacy of Sugammadex Versus Neostigmine for the Reversal of Neuromuscular Blockade in Children

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背景：舒更葡糖钠是新型包裹性、非竞争性结合的氨基甾类神经肌肉阻断剂（罗库溴铵和维库溴铵），可能对于残余神经肌肉阻滞耐受性较差的儿童患者优势明显。现今描述其在儿科人群中的应用数据有限，没有大规模的研究可用于评估各个年龄段不良事件的发生。我们试图通过调查不良事件的发生率，评估这些事件的严重性和临床意义，与成人人群和各个年龄段儿童中使用新斯的明相比较，并量化舒更葡糖钠的替代疗效。
方法：从 2016 年 9 月开始，通过数据收集，我们从我们的数据仓库中确定，从出生到青春

期，按病例类型和年龄组进行回顾性配对，再到历史上接受新斯的明治疗的对照组，所有患者均使用舒更葡糖钠拮抗神经肌肉阻滞剂作用。在随后的图表回顾中，我们量化了不良事件的发生率和治疗不良事件的药物使用。在最初确定的队列中，如果在病例匹配后没有捕捉到罕见的事件，则在给予舒更葡糖钠后用肾上腺素治疗的所有病例都要进行图表审查以找出原因。“结束间隔时间”是指从使用逆转剂到离开手术室的时间，作为疗效的间接评估。“结束间隔时间”指从使用肌松拮抗剂到离开手术室的时间，作为疗效的间接评价。

结果：在整个队列中，与新斯的明组（$p<0.001$）和年龄较大的儿童（$p<0.001$）及青少年（$p<0.001$）亚组相比，舒更葡糖钠组的发生心动过缓病例较少。结束间隔时间，即从给予神经肌肉阻滞(NMB)逆转剂到离开手术室的时间，舒更葡糖钠组在整个队列中(均差为 2.8；95%CI 为 1.85-3.77；$P<0.001$）和除新生儿（31 天到 12 个月）以外的所有年龄组均显著缩短。这一观察结果在新生儿亚组中最为明显(均差为 11.94 分钟;95%可信区间为 4.79-19.1；$p<0.001$)。未发现治疗组之间的其他不良事件存在差异。

结论：这项研究为舒更葡糖钠在各个年龄段儿科患者人群中安全有效地用于拮抗神经肌肉阻滞提供了数据支持。在年龄组内，与新斯的明相比，舒更葡糖钠显示出手术完成速度更快，尤其在新生儿人群中观察到最大的差异。

（吴洁译 李士通校）

BACKGROUND: Sugammadex, with its novel mechanism of action of encapsulation and noncompetitive binding of aminosteroid neuromuscular-blocking agents (rocuronium and vecuronium), may offer distinct advantage to pediatric patients where residual neuromuscularblockade may be poorly tolerated. Data describing its use in the pediatric population are limited, and no large-scale studies are available evaluating the occurrence of adverse event across the full spectrum of ages. We sought to measure the occurrence of adverse events, assess the severity and clinical significance of the events, and quantify a surrogate measure of efficacy of sugammadex compared to neostigmine in a large population and in the full age range of children.

METHODS: Beginning in September 2016 through initiation of data collection, we identified from our data warehouse that all patients were treated with sugammadex for reversal of neuromuscularblockade, from birth through adolescence, and retrospectively matched, by case type and age group, to historical neostigmine-treated controls. From subsequent chart review, we quantified occurrence of adverse events and administration of medications to treat adverse events. All cases in the originally identified cohort treated with epinephrine after administration of sugammadex underwent chart review to elicit the cause, in the event that an infrequently occurring event was not captured after the case-matching process. "End-Interval Time," the time from administration of reversal agent to time out of the procedure room, was measured as an indirect assessment of efficacy.

RESULTS: Fewer cases of bradycardia were observed in the sugammadex group compared to the neostigmine group in the overall cohort ($P < .001$) and in the subgroups of older children ($P < .001$) and adolescents ($P < .001$). End-interval time, the time measured from administration of neuromuscular blockade (NMB) reversal agent to time out of the operating room, was significantly shorter in sugammadex-treated groups in the overall cohort

(mean difference, 2.8; 95% CI, 1.85-3.77; P < .001) and all age groups except for first year (31 days through 12 months). This observation was most pronounced in the neonatal subgroup (mean difference, 11.94 minutes; 95% CI, 4.79-19.1; P < .001). No other adverse events measured were found to be different between treatment groups.
CONCLUSIONS: This study provides data supporting the safe and effective use of sugammadexfor reversal of neuromuscular blockade throughout the entire range of ages in the pediatric population. Within age groups, sugammadex demonstrates faster completion of operation compared with neostigmine, with the greatest difference observed in the neonatal population.

静脉自控镇痛的阿片类药物等效镇痛剂量副作用发生率的系统评价及网络荟萃分析

Side Effect Rates of Opioids in Equianalgesic Doses via Intravenous Patient-Controlled Analgesia: A Systematic Review and Network Meta-analysis

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背景：用于治疗急性疼痛的阿片类药物的副作用常常限制其镇痛质量。许多研究都比较了阿片类药物在病人自控镇痛（PCA）中的副作用，但仍不清楚在为病人选择阿片类药物时是否存在可利用的特定副作用。在这篇综述中，我们想确定在使用等效镇痛剂量的不同阿片类药物进行静脉 PCA 时最常见的副作用的风险比（RRS），并对这些药物进行相应的排序。

方法：通过对 medline、embase、cochrane 图书馆（中心）和科学网的检索，确定了 63 个随机对照试验，比较了在同等镇痛条件下的阿片类药物。纳入标准为两组间可比较的疼痛刺激、同等的镇痛治疗和可比较的疼痛评分。使用 Cochrane 偏倚风险评估工具共 6 项对研究质量进行评估。以吗啡为对照，进行频率网络荟萃分析。这种方法不仅总结了来自不同干预的直接比较的所有估计效果，而且还允许通过共同比较器链接的干预措施之间的间接比较，在这种情况下，间接证据可以用来提高直接比较的精度。本研究的主要终点是恶心呕吐、瘙痒和镇静事件的风险比，以及镇静评分的平均差异。计算呼吸抑制事件发生。次要终点是患者满意度（平均差异）。研究方案在 PROSPERO 注册（CRD42017062355）。

结果：在最大网络中比较了 16 种阿片类药物干预（恶心呕吐发生）和在最小网络中比较了 7 种阿片类药物干预（镇静事件发生）的效果。大多数干预措施在主要结果（副作用）上与吗啡没有区别，但有些例外。丁丙诺啡的恶心和呕吐发生率显著高于芬太尼，而芬太尼的恶心和呕吐发生率较低。纳布芬、布托啡诺、美沙酮和哌替啶等等发生瘙痒的风险较低。呼吸抑制很少见（2452 例中有 22 例）。哌替啶、芬太尼和氧吗啡酮可使镇静评分显著降低。曲马多的满意度得分明显较低，而羟考酮、芬太尼、瑞芬太尼、芬太尼和哌替啶的满意度得分明显较高。

结论：选择用于治疗的阿片类药物最有可能对瘙痒和恶心呕吐的发生几乎没有影响，尽管在所提出的排名中，不同阿片类药物的优劣越来越大。不同药物在镇静和患者满意度方面存在较大差异，选择适当的阿片类药物可能有助于改善这方面的 PCA 效果。

（吴洁译 李士通校）

BACKGROUND: Side effects of opioids used for the treatment of acute pain

frequently limit their analgesic quality. Many studies have compared opioid side effects in patient-controlled analgesia(PCA), but it remains unclear whether there are specific side effect profiles that can be exploited when choosing an opioid for a patient. In this review, we wanted to determine the risk ratios (RRs) for the most common side effects when using different opioids for intravenous PCA in equianalgesic doses and rank the substances accordingly.

METHODS: A search of MEDLINE, EMBASE, the Cochrane Library (CENTRAL), and Web of Science identified 63 randomized controlled trials comparing opioids under equianalgesic conditions. Inclusion criteria were comparable pain stimulus between groups, equal coanalgesic treatment, and comparable resulting pain scores. Quality of studies was assessed using the Cochrane risk of bias tool with 6 items. Frequentistic network meta-analysis was conducted with morphine as the comparator. This method not only summarizes all estimated effects from direct comparisons of different interventions but also allows for indirect comparisons between interventions that can be linked via the common comparator, in which case the indirect evidence can be used to enhance the precision of the direct comparisons. Primary end points of this study were RRs for nausea and vomiting, pruritus, and events of sedation, as well as mean differences for scores of sedation. Events of respiratory depression were counted. Secondary end point was patient satisfaction (mean difference). The study protocol was registered at PROSPERO (CRD42017062355).

RESULTS: Sixteen opioid interventions were compared in the largest network (nausea and vomiting outcome) and 7 opioid interventions in the smallest network (sedation events outcome). Most interventions did not differ from morphine on the primary outcomes (side effects), with some exceptions. Buprenorphine had a significantly higher RR of nausea and vomiting, whereas fentanyl had a lower RR of nausea and vomiting. Nalbuphine, butorphanol, methadone, and pethidine/meperidine had a lower risk of pruritus. Respiratory depression was rare (22 of 2452 patients). Pethidine/meperidine, fentanyl, and oxymorphone caused significantly lower sedation scores. Tramadol caused significantly lower satisfaction scores, whereas oxycodone, alfentanil, remifentanil, fentanyl, and pethidine/meperidine caused significantly higher satisfaction scores.

CONCLUSIONS: The opiate chosen for treatment most likely has little effect on the incidence of pruritus and nausea/vomiting, although considerable differences exist in terms of better and worse opioids in the presented rankings. Larger differences between drugs were observed with regard to sedation and patient satisfaction, and choosing the appropriate opioid may help to improve PCA in this regard.