超声引导下腰方肌神经阻滞对剖宫产术后患者的镇痛作用：一项随机对照实验

The Analgesic Effect of Ultrasound-Guided Quadratus Lumborum Block After Cesarean Delivery：A Randomized Clinical Trial

Anders Krohg,MD,*Kyrre Ullenvang,MD,*Leiv Arne Rosseland,PHD,MD*
From*Division of Emergencies and Critical Care, Department of Anesthesiology, Oslo University Hospital Rikshospitalet, Oslo, Norway;
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背景：超声定位腹横筋膜平面神经阻滞已被证实在剖宫产术后能减少阿片类药物使用。腰方肌位置靠后，可能能使局麻药物更好地渗透进胸腰筋膜及椎旁。本研究拟评估腰方肌阻滞在剖宫产术后的镇痛作用。

方法：本实验为随机、双盲、对照实验，纳入 40 名临产患者，所有受试对象均接受腰方肌神经阻滞，实验组予 2mg/ml 罗哌卡因，对照组予生理盐水。所有实验对象均蛛网膜下隙予布比卡因和舒芬太尼，术后均接受标准镇痛流程，使用扑热息痛、布洛芬和内有凯托米酮的自控镇痛泵。凯托米酮的用量以及自控镇痛的时间均被记录下来。主要结局指标为术后 24 小时凯托米酮用量。次要指标为疼痛评分、恶心、乏力及能够站立和行走 5 米以上的恢复时间的重复测量值、有镇痛评分和时间之间关系。

结果：40 名实验对象均完成实验，每组 20 人。实验组术后 24 小时凯托米酮使用量与对照组相比减少（P=.04;95%可信区间：0.37-0.97）。实验组有效镇痛评分在平静状态（p＜.01）和咳嗽(p＜.01）时均优于对照组。

结论：腰方肌罗哌卡因神经阻滞作为多模式镇痛模式（不包含椎管内吗啡使用）中的一部分能够降低凯托米酮的使用及剖宫产术后疼痛的强度。

（曹雪 译 薛张刚，潘艳校）

BACKGROUD:Landmark and ultradound transversus abdominis plane blocks have demonstrated an opioid-sparing effect postoperatively after cesarean delivery.The more posterior quadratus lumborum(QL) might provide superior local anesthetic spread to the thoracolumbar fascia and paravertebral space .The aim of our study was to evaluate the efficacy of the QL block after cesarean delivery.

METHODS:A Randomized ,double-blind ,controlled trial was performed .Forty parturients undergoing cesarean delivery received bilateral ultrasound-guided OL blocks with either 2mg /mlropivacaine or saline postoperatively.All patients received spinal anesthesia with bupivacaine and sufentanil and a postoperative analgesic regimen of paracetamol,ibuprofen ,and ketobemidone administered by a patient-controlled analgesic pump.The ketomidone consumption during the first 24 hours postoperatively.Secondary and exploratory analyses compared repeated measures of pain scores ,nausea,and fatigue and total differences in time until patients were able to stand and able to walk 5m,and the interaction between the effective analgesic score and time.

RESULTS:All 40 patients completed the trial,20 in each group.The cumulative ketobemidone consumption in 24 hours was reduced in the active group compared with the control group(p=.04;ratio of

means=0.60;95%confidence interval ,0.37-0.97).The effective analgesic scores were significantly better in the treatment group compared with the placebo group both at rest(p＜.01)and during coughing(p＜.01).
CONCLUSIONS:QL block with ropivacaine reduces the postoperative ketomidone consumption and pain intensity as a part of a multimodal analgesic regimen that exclude neuraxial morphine.

亨廷顿小鼠在炎症疼痛模型中表现出疼痛反应减少

Huntington Mice Demonstrate Diminished Pain Response in Inflammatory Pain Model

Lin, Ya-Chi MSc; Hsiao, Hung-Tsung MD; Wu, Sheng-Nan MD, PhD; Liu, Yen-Chin MD, PhD
From the *Department of Physiology and †Department of Anesthesiology, National Cheng Kung University Hospital, College of Medicine, National Cheng Kung University, Tainan City, Taiwan.
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背景：亨廷顿舞蹈病（HD）影响神经系统，可以导致精神及运动功能障碍。之前的研究显示 HD 是由亨廷顿（HTT）基因的外显子 1 片段中 CAG 三核苷酸广泛重复引起。然而，很少有研究关注 HD 与疼痛之间的关系。本研究的目的就是要探究一下 HD 与疼痛反应之间的关系。
方法：我们使用临床相似的转基因 HD 小鼠来评估 HD 与疼痛的关系，这些小鼠携带包含 84 个 CAG 三核苷酸重复序列的 HTT 外显子突变基因。通过福尔马林或全弗氏佐剂注射到小鼠的后爪上诱发炎症疼痛模型。在炎症疼痛研究行为学研究后获取小鼠的脊髓，背根神经节及后爪的皮肤组织。使用免疫荧光，蛋白质印迹法和酶联免疫吸附法去测定细胞及细胞因子的变化。
结果：我们的数据证实在年幼及老年小鼠中预处理的 HD 小鼠都较野生型小鼠表现出更少的疼痛行为。蛋白质印迹法和免疫组织法检测腰段脊髓组织和背根神经节显示年幼小鼠中 HD 小鼠较野生型小鼠激活的胶质细胞及星形胶质细胞更少。肿瘤坏死因子-α，白细胞介素-1β 和 P 物质的产生水平也较低。
结论：我们的数据表明，与野生型小鼠相比，HD 小鼠脊髓水平的疼痛行为和疼痛相关细胞因子反应较少。还需要进一步的实验去确定 HTT 突变造成疼痛行为及疼痛相关细胞因子反应改变的具体机制。
（胡翔翔 译 薛张刚，潘艳校）
BACKGROUND: Huntington disease (HD) affects the nervous system and leads to mental and motor dysfunction. Previous studies have shown that HD is caused by the exon 1 region of the huntingtin (HTT) gene having expanded CAG trinucleotide repeats. However, few studies have focused on the relationship between HD and pain. The purpose of this study is to investigate the relationship between HD and pain response.
METHODS: We used clinical similar transgenic HD mice carrying a mutant HTT exon 1 containing 84 CAG trinucleotide repeats to evaluate the relationship between HD and pain. Inflammatory pain models were induced by either formalin or complete Freund adjuvant injection over the hind

paw. Spinal cord, dorsal root ganglion, and paw skin tissues were harvested at the end of the behavioral inflammatory pain studies. Immunofluorescence assay, Western blotting, and enzyme-linked immunosorbent assay were used to identify changes in cells and cytokines.
RESULTS: Our data demonstrate that preonset HD mice exhibited less pain behavior than wild-type (WT) mice in both young (n = 11 [WT], 13 [HD]) and aged (n = 8 [WT], 9 [HD]) mice. Western blotting and immunohistological examination of lumbar spinal cord tissue and dorsal root ganglion indicate less activation of glial cells and astrocytes in young HD mice (n = 6–7) compared to that in WT mice (n = 6–7). The production levels of tumor necrosis factor-α, interleukin-1β, and substance P were also lower in young HD mice (n = 6–7).
CONCLUSIONS: Our data demonstrate less pain behavior and pain-related cytokine response at the spinal cord level for HD mice compared to those for WT mice. Further studies are needed for determining the mechanism as to how mutant HTT leads to altered pain behavior and pain-related cytokine response.

显著性、错误、功效和样本量：统计区组和处理

Significance, Errors, Power, and Sample Size: The Blocking and Tackling of Statistics

Mascha, Edward J. PhD*; Vetter, Thomas R. MD, MPH†
From the *Departments of Quantitative Health Sciences and Outcomes Research, Cleveland Clinic, Cleveland, Ohio; and †Department of Surgery and Perioperative Care, Dell Medical School at the University of Texas atAustin, Austin, Texas.
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推断统计主要依赖于中心极限和大数据定律。根据中心极限定理，当样本足够大时，无论来源人口的分布如何，样本估计的人口都将具有正态分布。相关大数定律认为，当随机样本变足够大时，中心极限定理是有效的，一般样本量为n≥30。在研究相关的假设检验中，“统计显著性”一词用来描述观察到的差异或关联何时达到某个阈值。这个显著性阈值或切点定义为为 α（α），通常设置为0.05。当观察到的P值小于 α 时，拒绝零假设（Ho）并接受替换假设。临床意义比统计意义更重要，因此应定期报告治疗效果估计值和置信区间。当Ho无差别或者无关联时而被拒绝，就发生I类错误，而实际上Ho是真实的。当Ho没有被拒绝，而事实上存在真实人口影响，则发生II型错误。统计功效是指真正存在的真正差异，效果或关联的概率。合理的样本量和功效分析是研究设计的关键要素。当研究计划不周或功效不足时，就会出现伦理问题。当计算比较组的样本量时，需要4个数量：α，II类错误，利益差异或效应以及结果变量的估计变异性。样本量随着变异性和功效的增加而增加，并且通过减少 α 和减少差异来检测。给定比例相对减少的样本量在很大程度上取决于对照组本身的比例，随着比例的减小而增大。估计未知参数的单组研究的样本量基于期望的估计精度。评估疗效和/或无效的中期分析是节省时间和金钱的良好工具，也使得科学快速

进步，但只有在决定停止或继续试验时才考虑到 1 个组成部分。
（吴俊梅 译 薛张刚，潘艳校)）
Inferential statistics relies heavily on the central limit theorem and the related law of large numbers.
According to the central limit theorem, regardless of the distribution of the source population, a sample estimate of that population will have a normal distribution, but only if the sample is large enough.The related law of large numbers holds that the central limit theorem is valid as random samples become large enough, usually defined as an n ≥ 30. In research-related hypothesis testing, the term ″statistically significant″ is used to describe when an observed difference or association has met a certain threshold.This significance threshold or cut-point is denoted as alpha (α) and is typically set at .05.When the observed P value is less than α, one rejects the null hypothesis (Ho) and accepts the alternative. Clinical significance is even more important than statistical significance, so treatment effect estimates and confidence intervals should be regularly reported. A type I error occurs when the Ho of no difference or no association is rejected, when in fact the Ho is true. A type II error occurs when the Ho is not rejected, when in fact there is a true population effect.Power is the probability of detecting a true difference, effect, or association if it truly exists. Sample size justification and power analysis are key elements of a study design. Ethical concerns arise when studies are poorly planned or underpowered.When calculating sample size for comparing groups, 4 quantities are needed: α, type II error, the difference or effect of interest, and the estimated variability of the outcome variable. Sample size increases for increasing variability and power, and for decreasing α and decreasing difference to detect.Sample size for a given relative reduction in proportions depends heavily on the proportion in the control group itself, and increases as the proportion decreases. Sample size for single-group studies estimating an unknown parameter is based on the desired precision of the estimate. Interim analyses assessing for efficacy and/or futility are great tools to save time and money, as well as allow science to progress faster, but are only 1 component considered when a decision to stop or continue a trial is made.

右美托咪定对高血压肥厚性心肌缺血/再灌注损伤具有直接的心肌保护作用
Dexmedetomidine Maintains Its Direct Cardioprotective Effect Against Ischemia/Reperfusion Injury in Hypertensive Hypertrophied Myocardium
Yoshikawa, Yusuke MD; Hirata, Naoyuki MD, PhD; Kawaguchi, Ryoichi MD, PhD; Tokinaga, Yasuyuki MD, PhD; Yamakage, Michiaki MD, PhD
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背景：右美托咪定（DEX）通过 α2-肾上腺素受体（α2-AR）通过内皮型一氧化

氮合酶（eNOS）磷酸化对缺血/再灌注损伤具有直接的心脏保护作用。 采用自发性高血压大鼠（SHR）和 Wistar-Kyoto（WKY）大鼠模型，观察 DEX 对肥厚性心肌的保护作用及心脏 α2-AR 和 I1 咪唑啉受体（I1R）的差异性。

方法：Langendorff 灌注的大鼠心脏在缺血前存在或不存在 DEX 的情况下进行 40 分钟的全心脏缺血，然后再灌注 120 分钟。 测量梗塞面积，并通过 Western 蛋白印迹评估 eNOS 磷酸化。 通过免疫组织化学，实时逆转录酶聚合酶链式反应和 Western 蛋白印迹来评估受体的存在和表达。

结果：在 WKY 大鼠模型中，DEX 显着降低了梗塞面积并增加了磷酸化的 eNOS / eNOS。这些作用被育亨宾（α2-AR 拮抗剂）和 efaroxan（α2-AR 和 I1R 拮抗剂）抵消。在 SHR 大鼠模型中，DEX 显着降低梗塞面积，效果被 efaroxan 而不是育亨宾所抵消。 SHX 大鼠模型中 DEX 没有改变磷酸化的 eNOS / eNOS。 在 WKY 和 SHR 大鼠模型心脏中观察到 α2-AR 和 I1R。尽管在 SHR 大鼠模型中 α2A-AR 和 α2B-AR 信使 RNA 和蛋白质水平上调，但 I1R 表达在两种物种之间相当。

结论：在肥厚性心脏病中，尽管 α2-AR 上调，但 DEX 通过 I1R 以非依赖 eNOS 的方式维持其对缺血/再灌注损伤的直接心脏保护作用。

（杨振 译 薛张刚，潘艳校))

BACKGROUND: Dexmedetomidine (DEX)has direct cardioprotective effect against ischemia/reperfusion injury through endothelial nitric oxide synthase (eNOS) phosphorylation via α2-adrenoreceptor (α2-AR). By using spontaneously hypertensive rat (SHR) and Wistar-Kyoto (WKY) rat models, the cardioprotective effect of DEX in hypertrophied myocardium and the differential characteristics of cardiac α2-AR and the I1 imidazoline receptor (I1R) were examined.

METHODS: Langendorff-perfused rat hearts underwent 40 minutes of global ischemia followed by 120 minutes of reperfusion in the presence or absence of DEX before ischemia. Infarct size was measured, and eNOS phosphorylation was assessed by Western blotting. The presence and expression of the receptors were assessed by immunohistochemistry, real-time reverse transcriptase polymerase chain reaction, and Western blotting.

RESULTS: In WKY, DEX significantly decreased infarct size and increased phosphorylated-eNOS/eNOS. These effects were counteracted by yohimbine (α2-AR antagonist) and efaroxan (α2-AR and I1R antagonist). In SHR, DEX significantly decreased infarct size, and the effect was counteracted by efaroxan but not yohimbine. DEX did not alter phosphorylated-eNOS/eNOS in SHR. α2-AR and I1R were observed in WKY and SHR hearts. Although alpha2A-AR and alpha2B-AR messenger RNA and protein levels were upregulated in SHR, I1R expression was comparable between the 2 species.

CONCLUSIONS: In the hypertrophied heart, DEX maintains its direct cardioprotective effect against ischemia/reperfusion injury via I1R in an eNOS-nondependent manner despite upregulation of α2-AR.

硬膜外无痛分娩术中硬膜外间隙突破感的识别--使用空气或盐水进行比较的随

机对照研究--旧争议的新论证。

Epidural Space Identification With Loss of Resistance Technique for Epidural Analgesia During Labor: A Randomized Controlled Study Using Air orSaline—New Arguments for an Old Controversy

Brogly, Nicolas MD, PhD, DESAR, DESA*; Guasch, Emilia MD, PhD*; Alsina, Estibaliz MD, PhD*; García, Carla MD, PhD*; Puertas, Laura MD, PhD*†; Dominguez, Ana MD, PhD*; Diez, Jesús MD, PhD†; Gómez, Jorge MD‡; Gilsanz, Fernando MD, PhD*

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背景：尽管发表了各种随机对照研究和Meta分析，但仍不清楚用在无痛分娩中硬膜外间隙识别的最佳技术。我们的目的是评估在阻滞效果方面盐水阻力损失(SLOR)技术优于空气阻力损失(ALOR)技术。

方法：我们将顺产或引产的产妇随机分为硬膜外镇痛的SLOR组和ALOR组。我们的主要结果是比较SLOR组和ALOR组技术对硬膜外阻滞30分钟后疼痛评分的影响。我们的次要结果包括30分钟时的运动阻滞的程度和镇痛效果。采用t检验和曼-惠特尼U检验对主要和次要结果进行比较。根据邦弗朗尼多重校正，在主要和次要结果中，p＜017为有统计学意义，其他结果认为是探索性的。

结果：包括400名产妇，其中24名被排除在最后分析之外。30分钟后，疼痛评分减少(ALOR，4.7±2.9/10；SLOR，4.9±3.0/10；P=.49)，运动阻滞(ALOR，1.4±0.8；SLOR，1.3±0.8；P=.27)，镇痛效果(ALOR，1.0±0.7；SLOR，1.0)，两组间差异无显着意义(P=.87)。

结论：硬膜外阻滞30分钟后疼痛评分降低和阻滞开始不受硬膜外间隙定位技术的影响。

（叶志祥 译 薛张刚，潘艳校））

BACKGROUND: The best technique to identify the epidural space for labor analgesia is still unclear despite the publication of variousrandomized controlled studies and meta-analyses. Our aim was to assess the superiority of the saline loss of resistance (SLOR)technique over the air loss of resistance (ALOR) technique with respect to the quality of the block.

METHODS: Consenting parturients admitted to our obstetric suite for spontaneous or induced labor were randomized to receiveepidural analgesia using either the ALOR or technique. Our primary outcome was to compare the impact of the SLOR and ALOR technique on pain score improvement measured 30 minutes after administration of epidural block. Our secondary outcomes included the density of motor blockade and analgesic efficacy measured at 30 minutes. Primary and secondary outcomes were compared using the Student t test and Mann-Whitney U test. Statistical significance was set at P < .017 for primary and secondary outcomes, considering Bonferroni correction for multiple comparisons. Other comparisons were considered exploratory.

RESULTS: Four hundred parturients were included; 24 were excluded from the

final analysis. After 30 minutes, pain score reduction (ALOR, 4.7 ± 2.9/10; SLOR, 4.9 ± 3.0/10; P = .49), motor block (ALOR, 1.4 ± 0.8; SLOR, 1.3 ± 0.8; P = .27), and efficacy of the block (ALOR, 1.0 ± 0.7; SLOR, 1.0 ± 0.6; P = .87) did not differ significantly between groups.
CONCLUSIONS:Pain score reduction after 30 minutes and onset of the block were not affected by the technique used to locate theepidural space.

老年患者非心脏手术术后的知情同意和认知功能障碍

Informed Consent and Cognitive Dysfunction After Noncardiac Surgery in the Elderly

Hogan, Kirk J. MD, JD*; Bratzke, Lisa C. RN, PhD†; Hogan, Kendra L. JD, MPH‡

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在行非心脏手术的老年患者中，术后 3 个月发生的认知功能障碍与 10%-15%患者的可预见知情同意阈值相匹配，并且与事先接受正常行为测试患者新发生的记忆和行为能力缺陷有关。目前，唯一能避免术后认知功能障碍发生的方法是放弃手术，因此需要充分权衡手术的得益，如解除创伤和炎症、正常营养、体力活动及睡眠的恢复。为了确保手术知情同意书被合理地告知，手术团队在术前应该与患者充分沟通术后发生认知功能障碍的可能性和替代治疗方案的选择。
（赵明晔 译 薛张刚，潘艳校））

Cognitive dysfunction 3 months after noncardiac surgery in the elderly satisfies informed consent thresholds of foreseeability in 10%-15% of patients, and materiality with new deficits observed in memory and executive function in patients with normal test performance beforehand. At present, the only safety step to avoid cognitive dysfunction after surgery is to forego surgery, thereby precluding the benefits of surgery with removal of pain and inflammation, and resumption of normal nutrition, physical activity, and sleep. To assure that consent for surgery is properly informed, risks of both cognitive dysfunction and alternative management strategies must be discussed with patients by the surgery team before a procedure is scheduled.

经颅多普勒和超声标记近红外光谱法比较人类受试者脑血流的相对变化。

Comparison of Transcranial Doppler and Ultrasound-Tagged Near Infrared Spectroscopy for Measuring Relative Changes in Cerebral Blood Flow in Human Subjects.

Lipnick, Michael S. MD*; Cahill, Elizabeth A. MD†; Feiner, John R. MD*; Bickler, Philip E. MD, PhD*

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背景:目前尚无可靠的方法来测量绝对脑血流(CBF)的连续、无创测量。我们试图确定超声标记近红外光谱(UT-NIRS)测量的变化与在深度低碳酸血症和高碳酸血症期间健康志愿者中经颅多普勒(TCD)测量的 CBF 变化。

方法:10 名健康的志愿者通过 TCD, UT-NIRS (c-FLOW, Ornim Medical)，以及心率、血压、末端潮汐 PCO2 (PEtCO2)、末潮 O2 和激发 O2 的组合进行监测。在 15-20、25-30、35-40、45-50 和 55-60 毫米汞柱的基础上，控制二氧化碳和微小的通风，以达到 5 个稳定的目标。CBF 被评估为稳定状态，TCD 被指定为参考标准。主要的分析是 TCD 和 UT-NIRS 流与 PEtCO2 的线性混合效应模型，该模型解释了重复测量。为检测 CBF 的变化，确定了接收机的工作特性曲线。

结果:换气过度(最低点 PEtCO2 17.1±2.4)导致显著降低大脑中动脉的平均流速基线(79%±22%),但没有一个一致的降低 UT-NIRS 脑流速指数(n = 10;基线的 101%±6%)。血碳酸过多症 PEtCO2 峰值(59.3±3.3)从基线导致显著增加大脑中动脉的平均流速(153%±25%)和 UT-NIRS(119%±11%)。比较斜坡和 PEtCO2 作为 TCD 基线的百分比(1.7%[1.5%-2%])和 UT-NIRS(0.4%[0.3%-0.5%])表明,UT-NIRS 斜率明显平坦，P < 0.0001。在 TCD 下，TCD 的面积显著高于 UT-NIRS, 0.97(95%置信区间，0.92-0.99)和 0.75(95%置信区间，0.66-0.82)。

结论:我们的数据表明，UT-NIRS 脑血流速度指数仅在高碳酸血症的时候检测到 CBF 的变化，而在健康的受试者中并不是低卡的，其敏感性远低于 TCD。在广泛的临床应用 UT-NIRS 之前需要额外的改良和验证。

（曹雨枫 译 薛张刚，潘艳校）)

BACKGROUND: Currently, no reliable method exists for continuous, noninvasive measurements of absolute cerebral blood flow (CBF). We sought to determine how changes measured by ultrasound-tagged near-infrared spectroscopy (UT-NIRS) compare with changes in CBF as measured by transcranial Doppler (TCD) in healthy volunteers during profound hypocapnia and hypercapnia.

METHODS: Ten healthy volunteers were monitored with a combination of TCD, UT-NIRS (c-FLOW, Ornim Medical), as well as heart rate, blood pressure, end-tidal PCO2 (PEtCO2), end-tidal O2, and inspired O2. Inspired CO2 and minute ventilation were controlled to achieve 5 stable plateau goals of EtCO2 at 15-20, 25-30, 35-40, 45-50, and 55-60 mm Hg, for a total of 7 measurements per subject. CBF was assessed at a steady state, with the TCD designated as the reference standard. The primary analysis was a linear mixed-effect model of TCD and UT-NIRS flow with PEtCO2, which accounts for repeated measures. Receiver operating characteristic curves were determined for detection of changes in CBF.

RESULTS: Hyperventilation (nadir PEtCO2 17.1 ± 2.4) resulted in significantly decreased mean flow velocity of the middle cerebral artery from baseline (to 79% ± 22%), but not a consistent decrease in UT-NIRS cerebral flow velocity index (n = 10; 101% ± 6% of baseline). Hypercapnia (peak PEtCO2 59.3 ± 3.3) resulted in a significant increase from baseline in both mean flow velocity of the middle cerebral artery (153% ± 25%) and UT-NIRS (119% ± 11%). Comparing slopes versus PEtCO2 as a percent of baseline for the TCD (1.7% [1.5%-2%]) and UT-NIRS (0.4% [0.3%-0.5%]) shows that the UT-NIRS slope is significantly flatter, P < .0001. Area under the receiver operating characteristic curve was significantly higher for the TCD than for UT-NIRS, 0.97 (95% confidence interval,

0.92-0.99) versus 0.75 (95% confidence interval, 0.66-0.82).
CONCLUSIONS:Our data indicate that UT-NIRS cerebral flow velocity index detects changes in CBF only during hypercarbia but not hypocarbia in healthy subjects and with much less sensitivity than TCD. Additional refinement and validation are needed before widespread clinical utilization of UT-NIRS.

根据国家质量程序报告要求（运用麻醉信息管理系统数据库）来探讨围术期体温测量注意事项

Perioperative Temperature Measurement Considerations Relevant to Reporting Requirements for National Quality Programs Using Data From Anesthesia Information Management Systems

Epstein, Richard H. MD*; Dexter, Franklin MD, PhD†; Hofer, Ira S. MD‡; Rodriguez, Luis I. MD*; Schwenk, Eric S. MD§; Maga, Joni M. MD*; Hindman, Bradley J. MD†

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背景：围术期低温可增加伤口感染、失血、输血以及心血管事件的发生率。美国国家质量程序将围术期正常体温定义为于术前30分钟至术后15分钟这一段麻醉时间内至少高于35.5℃。通过采用4个学术性医院的数据，我们根据当下需求，评估了检测时间测体温时的注意事项，以引导医院报告围术期体温时使用电子数据源。

方法：从4个学术性医院的麻醉信息管理系统数据库中获取围术期体温以及测量时间间隔（体温监测停止时、手术结束时以及拔除气管导管时）。入选标准为年龄>16岁；使用气管导管或声门上通气道的患者；手术时间≥60min。麻醉结束前30min内测得的最大术中体温作为事件末体温（即用以研究报告的体温）。测量时间间隔大于30min的那一部分（的事件末体温）由最终术中体温和麻醉结束时体温决定（这句实在不会翻!!!）。

结果：在这些医院的数据中，34.5%至59.5%的病例中的平均数存在麻醉结束前体温监测事件中断30分钟以上的情况。虽然直至拔除气管导管都在测量体温，5.9%至20.8%的病例都超出了可接受的30min-窗。平均8.9%至21.3%病例中的事件末术中体温<35.5℃（测量质量问题）

结论：考虑到有关检测时间的一些注意事项，大部分病例使用的事件末术中体温对于国家质量程序报告来说都是不合格的。因此，在复苏室期间的温度测量就显得很有必要。大部分病例都存在事件末术中体温低于35.5℃这个阈值，也表示术后体温测量的必要性，从而判断测量质量是否有保障。那些思考着围术期体温国家测量质量报告的机构，应该更多考虑技术和后勤问题，如此在规定管理语言的基础上才能达到一个较高水平的依从性。

（依明江 译 薛张刚，潘艳校））

BACKGROUND:Perioperative hypothermia may increase the incidences of wound infection, blood loss, transfusion, and cardiac morbidity. US national quality programs for perioperative normothermia specify the presence of at least 1 "body temperature" ≥35.5° C during the interval from 30 minutes before to 15 minutes after the anesthesia end time. Using

data from 4 academic hospitals, we evaluated timing and measurement considerations relevant to the current requirements to guide hospitals wishing to report perioperative temperature measures using electronic data sources.

METHODS: Anesthesia information management system databases from 4 hospitals were queried to obtain intraoperative temperatures and intervals to the anesthesia end time from discontinuation of temperature monitoring, end of surgery, and extubation. Inclusion criteria included age >16 years, use of a tracheal tube or supraglottic airway, and case duration ≥60 minutes. The end-of-case temperature was determined as the maximum intraoperative temperature recorded within 30 minutes before the anesthesia end time (ie, the temperature that would be used for reporting purposes). The fractions of cases with intervals >30 minutes between the last intraoperative temperature and the anesthesia end time were determined.

RESULTS: Among the hospitals, averages (binned by quarters) of 34.5% to 59.5% of cases had intraoperative temperature monitoring discontinued >30 minutes before the anesthesia end time. Even if temperature measurement had been continued until extubation, averages of 5.9% to 20.8% of cases would have exceeded the allowed 30-minute window. Averages of 8.9% to 21.3% of cases had end-of-case intraoperative temperatures <35.5° C (ie, a quality measure failure).

CONCLUSIONS: Because of timing considerations, a substantial fraction of cases would have been ineligible to use the end-of-case intraoperative temperature for national quality program reporting. Thus, retrieval of postanesthesia care unit temperatures would have been necessary. A substantive percentage of cases had end-of-case intraoperative temperatures below the 35.5° C threshold, also requiring postoperative measurement to determine whether the quality measure was satisfied. Institutions considering reporting national quality measures for perioperative normothermia should consider the technical and logistical issues identified to achieve a high level of compliance based on the specified regulatory language.

全麻中应用保护性机械通气策略的多样性

Variability in the Use of Protective Mechanical Ventilation During General Anesthesia.

Ladha KS, Bateman BT, Houle TT, De Jong MAC, Vidal Melo MF, Huybrechts KF, Kurth T, Eikermann M.

Anesthesia & Analgesia 2018 126 503-512.

背景：本研究旨在探讨不同麻醉医生实施保护性肺通气策略是否会有显著不同，以及这些策略上的差异是否与患者、手术方式或麻醉医生人口学特征有关。

方法：本队列研究纳入三级医院 262 位麻醉医生与 2007 年至 2014 年共 57372

名患者作为研究对象。保护性肺通气是指保持呼气末正压 5 cm H_2O 或以上，潮气量小于 10 mL/kg（预计体重），气道平台压小于 30 cm H_2O。倾向指数校正协变量后用多因素回归分析来分析结果。在敏感性分析中使用的是改良的保护性肺通气概念。

结果：在未校正的分析中，实施保护性通气的平均概率为 53.8%（第 2.5 百分位为 19.9%，第 97.5 百分位为 80.8%）。经大量协变量校正后，实施保护性通气的平均概率为 51.1%，变化并不大（第 2.5 百分位为 24.7%，第 97.5 百分位为 77.2%）。当保护性肺通气的范畴发生改变，实施保护性肺通气策略仍然有显著的不同。

结论：不同麻醉医生术中实施保护性机械通气策略有显著的不同。本研究表明这种差异性与个人倾向高度相关，而与患者、手术方式、麻醉医生的人口学特征无关。

（潘波 译 薛张刚，潘艳校））

BACKGROUND: The purpose of this study was to determine whether significant variation exists in the use of protective ventilation across individual anesthesia providers and whether this difference can be explained by patient, procedure, and provider-related characteristics.

METHODS: The cohort consisted of 262 anesthesia providers treating 57,372 patients at a tertiary care hospital between 2007 and 2014. Protective ventilation was defined as a median positive end-expiratory pressure of 5 cm H20 or more, tidal volume of <10 mL/kg of predicted body weight and plateau pressure of <30 cm H20. Analysis was performed using mixed-effects logistic regression models with propensity scores to adjust for covariates. The definition of protective ventilation was modified in sensitivity analyses.

RESULTS: In unadjusted analysis, the mean probability of administering protective ventilation was 53.8% (2.5th percentile of provider 19.9%, 97.5th percentile 80.8%). After adjustment for a large number of covariates, there was little change in the results with a mean probability of 51.1% (2.5th percentile 24.7%, 97.5th percentile 77.2%). The variations persisted when the thresholds for protective ventilation were changed.

CONCLUSIONS: There was significant variability across individual anesthesia providers in the use of intraoperative protective mechanical ventilation. Our data suggest that this variability is highly driven by individual preference, rather than patient, procedure, or provider-related characteristics.

氨甲环酸不会影响缺血预处理及远程缺血预处理的心肌保护作用

Tranexamic Acid Does Not Influence Cardioprotection by Ischemic Preconditioning and Remote Ischemic Preconditioning

van Caster, Patrick MD*; Eiling, Sandra VMD*; Boekholt, Yvonne VMD*; Behmenburg, Friederike MD*; Dorsch, Marianne MD*; Heinen, André MD, PhD†; Hollmann, Markus W. MD, PhD‡; Huhn, Ragnar MD, PhD*

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先前的研究表明，抗纤溶药物抑酶肽（aprotinin）在缺血再灌注后会增加梗死面积，并减弱缺血预处理(IPC)的作用。在临床中，抑酶肽被氨甲环酸（TXA）所取代。作者研究了氨甲环酸是否影响缺血再灌注损伤及由缺血预处理、远程缺血预处理(RIPC)产生的心脏保护作用。将被麻醉的雄性Wistar大鼠随机分为6组。对照组大鼠不做进一步的治疗，治疗组分别为只予氨甲环酸治疗，只予缺血预处理，只予远程缺血预处理，氨甲环酸联合缺血预处理与氨甲环酸联合远程缺血预处理。预估治疗效果为20%。与对照组相比(56%±11%)，IPC使梗死面积减少46%(30%±6%；平均差26%；95%可信区间19-33；P < 0.0001)，RIPC使梗死面积减少29%(40%±8%；平均差16%；95%可信区间9-24；P < 0.011)。使用氨甲环酸对缺血再灌注损伤以及由缺血预处理、远程缺血预处理(RIPC)产生的心脏保护作用均无影响。氨甲环酸不会影响缺血预处理与远程缺血预处理减少的梗死面积。

（张金源 译　陈杰 校）

Prior studies have suggested that the antifibrinolytic drug aprotinin increases the infarct size after ischemia and reperfusion (I/R) and attenuates the effect of ischemic preconditioning (IPC). Aprotinin was replaced by tranexamic acid (TXA) in clinical practice. Here, we investigated whether TXA influences I/R injury and/or cardioprotection initiated by IPC and/or remote ischemic preconditioning (RIPC). Anesthetized Wistar male rats were randomized to 6 groups. Control animals were not further treated. Administration of TXA was combined with and without IPC and RIPC. Estimated treatment effect was 20%. Compared to control group (56% ± 11%), IPC reduced infarct size by 46% (30% ± 6%; mean difference, 26%; 95% confidence interval, 19-33; P < .0001), and RIPC reduced infarct size by 29% (40% ± 8%; mean difference, 16%; 95% confidence interval, 9-24; P < .011). Additional application of TXA had no effect on I/R injury and cardioprotection by IPC or RIPC. TXA does not abolish infarct size reduction by IPC or RIPC.

围术期神经肌肉监测

Neuromuscular Monitoring in the Perioperative Period

Murphy, Glenn S. MD

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神经肌肉监测装置在20世纪70年代被引入临床实践。定性的神经肌肉监视器或周围神经刺激器给予运动神经电刺激，并主观地评估相应肌肉的响应。标准

的周围神经刺激器提供了几种神经刺激模式，包括四个成串刺激（TOF），双脉冲，强直和强直后计数。定性（和定量）监测装置对于确定神经肌肉阻滞的起效，维持手术过程中所需的肌肉松弛深度，评估拮抗药物的合适剂量是必需的。然而，用周围神经刺激器测量到的（阻滞作用）消退不存在并不能够排除神经肌肉阻滞残余；当（阻滞作用）消退不能再观察到时，TOF 比率可能低至 0.4-0.6。另外，监测部位也可能会影响神经肌肉恢复不完全的风险。拇内收肌对神经阻滞药物的作用更敏感（相对于眼周肌肉），在这个位点监测可以更准确地反映咽部肌肉（阻滞后的）恢复（神经肌肉阻断剂作用后最后恢复的肌肉，其功能障碍甚至可能会持续到 TOF 比值为 1.0 时）。定量监测装置是测量和量化肌肉无力程度并以数值方式显示结果的装置。已开发了几种不同的技术，包括肌动图、肌电图、加速度法、运动描记法和肌音描记法。低剂量的阿替普酶可用于在 TOF 比值为 0.4-0.6 时，有效逆转神经肌肉阻滞；需要定量监测来确定这种程度的神经肌肉恢复已经发生。作为肌肉力量的临床测试，外周神经刺激器无法确定在手术结束时神经肌肉功能完全恢复。使用定量监测装置排除临床上重要的肌无力（TOF 比值<0.到 1.0），在拔除气管导管时是必不可少的。

（姚雪雅 译 陈杰 校）

Neuromuscular monitoring devices were introduced into clinical practice in the 1970s. Qualitative neuromuscular monitors, or peripheral nerve stimulators, provide an electrical stimulus to a motor nerve and the response of corresponding muscle subjectively evaluated. A standard peripheral nerve stimulator provides several patterns of nerve stimulation, including train-of-four (TOF), double-burst, tetanic, and post-tetanic count. Qualitative (and quantitative) monitors are needed to determine onset of neuromuscular blockade, maintain the required depth of muscle relaxation during the surgical procedure, and assess an appropriate dose of reversal agent. However, absence of fade measured with a peripheral nerve stimulator does not exclude residual neuromuscular block; TOF ratios as low as 0.4-0.6 may be present when fade is no longer observed. In addition, the risk of incomplete neuromuscular recovery may be influenced by monitoring site. The adductor pollicis is more sensitive to the effects of neuromuscular blocking agents (compared to the muscles surrounding the eye), and monitoring at this site may more accurately reflect recovery of pharyngeal muscles (the last muscles to recover from the effects of neuromuscular blocking agents, in which dysfunction may persist even at a TOF ratio of 1.0). Quantitative monitors are devices that measure and quantify the degree of muscle weakness and display the results numerically. Several different technologies have been developed, including mechanomyography, electromyography, acceleromyography, kineograph, and phonomyography. Lower doses of anticholinesterases may be used to effectively reverse neuromuscular blockade at TOF ratios of 0.4-0.6; quantitative monitoring is required to determine that this level of neuromuscular recovery has occurred. As clinical tests of muscle strength, peripheral nerve stimulators are unable to determine

whether full recovery of neuromuscular function is present at the end of the surgical procedure. The use of quantitative monitors is essential in excluding clinically important muscle weakness (TOF ratios <0.9 to 1.0) at the time of tracheal extubation.

单肺通气的管理-临床实践的变化和趋势：一项多中心围术期结局的报道

Management of 1-Lung Ventilation—Variation and Trends in Clinical Practice: A Report From the Multicenter Perioperative Outcomes Group

Colquhoun, Douglas A. MB ChB, MSc, MPH*; Naik, Bhiken I. MBBCh†; Durieux, Marcel E. MD, PhD‡; Shanks, Amy M. PhD*; Kheterpal, Sachin MD, MBA*; Bender, S. Patrick MD, MPH§; Blank, Randal S. MD, PhD‡on behalf of the MPOG Investigators

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背景：肺保护性通气（LPV）已被证明可以改善手术患者的临床预后。尽管证据表明单肺通气（1LV）可能是 LPV 的一种极为重要的方式，但是对于进行 1LV 的患者来说，目前关于应用 LPV 的研究非常有限。在这项多中心研究中，作者报道了 1LV 患者的通气策略变化趋势。

方法：多中心围手术期结局数据库被用来识别接受 1LV 的患者。检索并计算了队列和高风险亚组（女性、肥胖[体重指数> 30 kg / m2]、身材矮小）的初始和总潮气量（VT）的中位数，应用呼气末正压（PEEP）≥5cm H2O 的患者比例，1LV 时的 LPV（VT≤6 mL/kg 预测体重[PBW]、PEEP≥5 cm H2O）和呼吸机驱动压力（ΔP;平台气道压力 - PEEP）。

结果：本研究分析了 4 个机构共 5609 名患者的数据。计算每个病例的平均 VT，由于数据呈正态分布，整个队列和亚组均报告了平均值。1LV 时 VT 的平均值为 6.49±1.82 mL/kg PBW。高风险亚组的 VT（mL/kg PBW）显着升高；体重指数≥30kg/m 时，VT 为 6.86±1.97，女性为 7.05±1.92，矮小患者为 7.33±2.01。在研究期间，中位 VT 的平均值显着下降（6.88-5.72; P <0.001），接受 LPV 的患者比例在研究期间显着增加（9.1%-54.6%; P <0.001）。这些变化与研究期间 ΔP 的显着下降相吻合，从第 1 期的 19.4 cm H2O 到第 12 期的 17.3 cm H2O（P = 0.003）。

结论：尽管人们逐渐意识到肺保护性通气的重要性，但接受 1LV 治疗的患者中，大部分患者继续接受超出推荐阈值的 VT PEEP 水平。此外在高风险亚组中，由于高 VT 和 LPV 应用较少，使得医源性肺损伤的风险增高。

（翟小竹 译 陈杰 校）

BACKGROUND：Lung-protective ventilation (LPV) has been demonstrated to improve clinical outcomes in surgical patients. There are very limited data on the current use of LPV for patients undergoing 1-lung ventilation (1LV) despite evidence that 1LV may be a particularly important setting for its use. In this multicenter study, we report trends in ventilation practice for patients undergoing 1LV.

METHODS：The Multicenter Perioperative Outcomes Group database was used to identify patients undergoing 1LV. We retrieved and calculated median initial and overall tidal volume (VT) for the cohort and for high-risk

subgroups (female sex, obesity [body mass index >30 kg/m], and short stature), percentage of patients receiving positive end-expiratory pressure (PEEP) ≥5 cm H2O, LPV during 1LV (VT ≤ 6 mL/kg predicted body weight [PBW] and PEEP ≥5 cm H2O), and ventilator driving pressure (ΔP; plateau airway pressure - PEEP).

RESULTS: Data from 5609 patients across 4 institutions were included in the analysis. Median VT was calculated for each case and since the data were normally distributed, the mean is reported for the entire cohort and subgroups. Mean of median VT during 1LV for the cohort was 6.49 ± 1.82 mL/kg PBW. VT (mL/kg PBW) for high-risk subgroups was significantly higher; 6.86 ± 1.97 for body mass index ≥30 kg/m, 7.05 ± 1.92 for female patients, and 7.33 ± 2.01 for short stature patients. Mean of the median VT declined significantly over the study period (from 6.88 to 5.72; P < .001), and the proportion of patients receiving LPV increased significantly over the study period (from 9.1% to 54.6%; P < .001). These changes coincided with a significant decrease in ΔP during the study period, from 19.4 cm H2O during period 1 to 17.3 cm H2O in period 12 (P = .003).

CONCLUSIONS: Despite a growing awareness of the importance of protective ventilation, a large proportion of patients undergoing 1LV continue to receive VT PEEP levels outside of recommended thresholds. Moreover, VT remains higher and LPV less common in high-risk subgroups, potentially placing them at elevated risk for iatrogenic lung injury.

创伤患者入院前使用氨甲环酸对凝血功能的影响

The Impact of Prehospital Tranexamic Acid on Blood Coagulation in Trauma Patients

Stein, Philipp MD[*†]; Studt, Jan-Dirk MD[‡]; Albrecht, Roland MD[†]; Müller, Stefan MD[§∥]; von Ow, Dieter MD[∥¶]; Fischer, Simon MD[&]; Seifert, Burkhardt PhD[**]; Mariotti, Sergio MD[§∥]; Spahn, Donat R. MD, FRCA[*]; Theusinger, Oliver M. MD[*]

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背景：目前仅有有限的数据关于创伤患者入院前 TXA 的应用。本文将从受伤现场到入院后应用 TXA 的严重创伤患者与以往研究中未应用 TXA 的创伤患者进行对比，评估其凝血功能的变化。

方法：该研究方案已在 ClinicalTrials.gov (NCT02354885)上注册。为一项前瞻的，多中心，观察性研究。研究将 70 个受伤即刻应用 TXA（静注 1g）的创伤患者与之前发表的研究中未用药的 38 名创伤患者进行对比。为了阐明患者因素，创伤流行病学，晶胶体复苏的差异，设立了倾向得分匹配的两组（n=24/每组）。检测受伤即刻和入急诊室后的旋转血栓弹力图（ROTEM），出凝血，血气分析。结果用平均数，标准差，均数差和 95%置信区间表示。

结果：两组患者流行病学无明显差异。两组出凝血检测有可比性。在 TXA 组全部的 4 名患者中入院前纤溶亢进表现减弱。血栓弹力图 FIBTEM-MCF（MCF：最大血块稳定性）代表纤维蛋白原功能水平，在 TXA 组受伤即刻到入急诊室并无变化，

而对照组 MCF 下降-3.7[1.8]mm。TXA 组的 EXTEM-MCF 明显下降 9.2（7.2-11.2）mm（P<0.001）和 INTEM-MCF 明显下降 6.8 (4.7-9.0) mm (P < .001)，与对照组相比，TXA 组纤维蛋白降解产物（用 D2 聚体代表）明显下降。
结论：入院前早期 TXA 的应用可稳定凝血快，降低纤溶活性，从而减少纤维蛋白降解产物（D2 聚体）的生成。
（崔璀 译　陈杰 校）

BACKGROUND: There is limited data on prehospital administration of tranexamic acid (TXA) in civilian trauma. The aim of this study was to evaluate changes in coagulation after severe trauma from on-scene to the hospital after TXA application in comparison to a previous study without TXA.
METHODS: The study protocol was registered at ClinicalTrials.gov (NCT02354885). A prospective, multicenter, observational study investigating coagulation status in 70 trauma patients receiving TXA (1 g intravenously) on-scene versus a control group of 38 patients previously published without TXA. To account for potential differences in patient and trauma epidemiology, crystalloid and colloidal resuscitation fluid, 2 propensity score matched groups (n = 24 per group) were created. Measurements included ROTEM, standard coagulation tests and blood gas analyses on-scene and emergency department admission. Presented values are mean and [standard deviation], and difference in means and 95% confidence intervals.
RESULTS: Patient epidemiology was not different between groups. Coagulation assays on-scene were comparable between the TXA and C. Prehospital hyperfibrinolysis was blunted in all 4 patients in the TXA group. Viscoelastic FIBTEM maximum clot firmness (MCF), representing functional fibrinogen levels, did not change from on-scene to the emergency department in the TXA group, whereas MCF decreased -3.7 [1.8] mm in the control group. Decrease of MCF was significantly reduced in the TXA group in EXTEM by 9.2 (7.2-11.2) mm (P < .001) and INTEM by 6.8 (4.7-9.0) mm (P < .001) in favor of the TXA group. Production of fibrinogen fragments (represented by D-dimers) was significantly lower in the TXA group compared to group C.
CONCLUSIONS: Early prehospital administration of TXA leads to clot stabilization and a reduction of fibrinolytic activity, causing a decrease in fibrin degradation products buildup (D-dimer).

使用 26G 的 Whitacre 针和 0.125% 布比卡因单次注射，硬膜穿破硬膜外麻醉技术与传统硬膜外麻醉用于分娩镇痛：一项随机临床试验

Labor Analgesia Onset With Dural Puncture Epidural Versus Traditional Epidural Using a 26-Gauge Whitacre Needle and 0.125% Bupivacaine Bolus: A Randomized Clinical Trial

Wilson, Sylvia H. MD; Wolf, Bethany J. PhD; Bingham, Kayla BS; Scotland, Quiana S. MD; Fox, John M. MD; Woltz, Erick M. BS; Hebbar, Latha MD, FRCA

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腰硬膜外麻醉(LEs)能提供良好的镇痛。腰硬膜外麻醉联合硬膜穿破技术(DPE)是一种加速神经镇痛的方法。在DPE中，硬膜被穿刺，但在脑脊液中没有药物治疗。采用DPE法，用0.25%的布比卡因进行快速镇痛。然而，这种浓度可能会阻碍非辅助阴道分娩，目前还没有确定的分娩镇痛的诱导和维持方法。本研究的主要目的是比较DPE与LE单次硬膜外(0.125% bupivacaine)的患者中获得适当的分娩镇痛患者的百分比。适当的分娩镇痛定义为硬膜外麻醉开始后10分钟视觉模拟量表测量≤10mm（100mm范围内）。随机分配病人接受LE或DPE。在硬膜外置入前，受试者在子宫收缩过程中测定VAS评分，而VAS < 50 mm的产妇除外。硬膜外间隙通过对生理盐水(17G Tuohy针[Arrow International, Inc, Redding, PA])的抵抗技术确定。在DPE组，dura被一个26G的Whitacre针扎穿(Arrow International, Inc)。在所有的参与者中，置入19G的硬膜外导管(Arrow International, Inc)。单次硬膜外给予0.125% 布比卡因 +50μg芬太尼12ml，3分钟后给予0.1%布比卡因+2μg /ml芬太尼液体。在硬膜外一次性给药(时间为0)开始后，每2分钟测量VAS，至给药后20分钟。采用kaplanmeier分析方法对治疗组获得适当镇痛的中位时间进行评估。使用Cox回归模型评估获得足够的镇痛时间。所有分析均在SAS版本9.4中进行(SAS研究所，Cary, NC)。结果:数据来自80个参与者(每组40人)。在10分钟内不同技术镇痛评分无差异(DPE = 55.3% vs = 44.7%;P = .256)。然而，接受DPE的产妇达到足够镇痛的中位时间较短(中值[95%置信区间]，8分钟[6-10]和10分钟[8-14])，而相对于LE(相对危险度= 1.67)，获得充分镇痛加快了67%(95%置信区间,1.02 – –2.64;P = .042)。虽然产妇在硬膜外单次给药后10min获得足够分娩镇痛比例在两种技术之间无差异，但DPE较LE达到VAS ≤ 10 mm更快。

（陈聪 译 陈杰 校）

Lumbar epidurals (LEs) provide excellent analgesia. Combined spinal epidural and dural puncture epidural (DPE) are 2 techniques to expedite neuraxial analgesia onset. In DPE, dura is punctured but medication is not administered in the cerebrospinal fluid. Expedited analgesia onset has been demonstrated with DPE, using 0.25% bupivacaine; however, this concentration may impede an unassisted vaginal birth and is not currently used for induction and maintenance of labor analgesia. The primary goal of this study was to compare the percentage of patients who achieved adequate labor analgesia following DPE or LE with an epidural bolus of 0.125% bupivacaine. Adequate labor analgesia was defined as Visual Analog Scale (VAS) measurement ≤ 10 mm on a 100-mm scale during active contractions, measured 10 minutes after epidural bolus initiation.Laboring patients were randomly assigned to receive LE or DPE. Immediately before epidural placement, subjects marked a VAS score during an active contraction and parturients with VAS < 50 mm were excluded. The epidural space was identified by a loss of resistance technique to saline (17G Tuohy needle [Arrow International, Inc, Redding, PA]). In the DPE group, dura was punctured with a 26G Whitacre needle (Arrow International, Inc). In all participants, a 19G epidural catheter (Arrow International,

Inc) was inserted. An epidural bolus was then administered over 3 minutes (12 mL, 0.125% bupivacaine, 50 μg fentanyl) followed by infusion (0.1% bupivacaine, 2 μg/mL fentanyl). After initiation of epidural bolus (time zero), VAS measurements were collected at 2-minute intervals for up to 20 minutes. Median time to achieve adequate analgesia by treatment group was assessed by Kaplan-Meier analysis. Time to achieving adequate analgesia was evaluated using a Cox regression model. All analyses were conducted in SAS version 9.4. (SAS Institute, Cary, NC) RESULTS:: Data were analyzed from 80 participants (40 per group). Adequate analgesia at 10 minutes did not differ by neuraxial technique (DPE = 55.3% vs LE = 44.7%; P= .256). However, parturients receiving DPE had shorter median times to adequate analgesia (median [95% confidence interval], 8 minutes [6-10] vs 10 minutes [8-14]) and a 67% increase in the relative risk of achieving adequate analgesia compared to LE (relative risk = 1.67; 95% confidence interval, 1.02-2.64; P= .042).Although the percentage of parturients achieving adequate labor analgesia at 10 minutes after epidural bolus did not differ by technique, DPE was associated with faster time to VAS ≤ 10 mm compared with LE.

一份关于从事儿科亚专科麻醉医生的人力调查： 2015-2035 年需求和趋势

The Pediatric Anesthesiology Workforce: Projecting Supply and Trends 2015 - 2035

Muffly, Matthew K. MD*; Singleton, Mark MD*; Agarwal, Rita MD, FAAP*; Scheinker, David PhD†; Miller, Daniel BS†; Muffly, Tyler M. MD‡; Honkanen, Anita MD, MS, FAAP*

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背景：实施人力调查用以预测未来从事儿科亚专科麻醉医生的供应是否与儿科住院患者保持平衡。作者分析的具体目标是（1）预测未来（2035 年）从事儿科亚专科麻醉医生的数目；（2）预测到 2035 年从事儿科亚专科麻醉医生-儿科患者比例（0-17 岁）；（3）计算到 2035 年，每名从事儿科亚专科麻醉医生需要诊疗儿科患者的平均人数；（4）评估到 2035 年替代个别变量对模型预测的影响。
方法：未来从事儿科亚专科麻醉医生数量取决于当前的供应情况，人员的增加情况和离职人员情况。作者在 2015 年编制了美国儿科麻醉医师数据库。使用 2002 年到 2016 年 Accreditation Council for Graduate Medical Education Data 确定儿科麻醉医生出现历史性线性增长。考虑到儿科麻醉医生以历史性线性增长，预计将由 75%住院医生毕业后选择从事儿科麻醉工作，麻醉医师的退休年龄以目前的平均退休年龄 64 岁为基准。在基线模型预测中，伴随着年龄和性别调整的麻醉医生的供应，以及关于职位增长，退休，儿科住院患者，住院手术和市场份额的敏感性分析评估单模型变量对基线模型的影响。使用 2012 年美国儿童人口普查预测儿科麻醉医生与儿科患者的比率。依据 the Kids' Inpatient Database historical 数据确定每名儿科麻醉医生需要照看多少住院患者，以及住院患者数量（包括门诊手术数量）。

结果：2015 年，每 100000 名儿科患者中有 5.4 名儿科专科麻醉医生，每名儿科专科医师需要处理 262±8 名患者。依此趋势，到 2035 年每 100000 名儿科患者将有大约 7.4 名儿科专科麻醉医师，每名儿科专科医师需要诊断 193±6 名患者。如果儿科专科麻醉住院医师在 2015 年达到稳定平台期，那么在 2035 年每 100000 名患者将有 5.7 名儿科专科麻醉医师，每名医师需要诊断 248±7 名儿童患者。
结论：如果照此趋势发展下去，那么在 2015 年到 2035 年 20 年间，儿科麻醉医师供应的增长可能超过儿科住院患者和手术的增长。
（丁曦冰 译　陈杰 校）

BACKGROUND: A workforce analysis was conducted to predict whether the projected future supply of pediatric anesthesiologists is balanced with the requirements of the inpatient pediatric population. The specific aims of our analysis were to (1) project the number of pediatric anesthesiologists in the future workforce; (2) project pediatric anesthesiologist-to-pediatric population ratios (0-17 years); (3) project the mean number of inpatient pediatric procedures per pediatric anesthesiologist; and (4) evaluate the effect of alternative projections of individual variables on the model projections through 2035.
METHODS: The future number of pediatric anesthesiologists is determined by the current supply, additions to the workforce, and departures from the workforce. We previously compiled a database of US pediatric anesthesiologists in the base year of 2015. The historical linear growth rate for pediatric anesthesiology fellowship positions was determined using the Accreditation Council for Graduate Medical Education Data Resource Books from 2002 to 2016. The future number of pediatric anesthesiologists in the workforce was projected given growth of pediatric anesthesiology fellowship positions at the historical linear growth rate, modeling that 75% of graduating fellows remain in the pediatric anesthesiology workforce, and anesthesiologists retire at the current mean retirement age of 64 years old. The baseline model projections were accompanied by age- and gender-adjusted anesthesiologist supply, and sensitivity analyses of potential variations in fellowship position growth, retirement, pediatric population, inpatient surgery, and market share to evaluate the effect of each model variable on the baseline model. The projected ratio of pediatric anesthesiologists to pediatric population was determined using the 2012 US Censuspediatric population projections. The projected number of inpatient pediatric procedures per pediatric anesthesiologist was determined using the Kids' Inpatient Database historical data to project the future number of inpatient procedures (including out of operating room procedures).
RESULTS: In 2015, there were 5.4 pediatric anesthesiologists per 100,000 pediatric population and a mean (±standard deviation [SD]) of 262 ±8 inpatient procedures per pediatric anesthesiologist. If

historical trends continue, there will be an estimated 7.4 pediatricanesthesiologists per 100,000 pediatric population and a mean (±SD) 193 ±6 inpatient procedures per pediatric anesthesiologist in 2035. If pediatric anesthesiology fellowship positions plateau at 2015 levels, there will be an estimated 5.7 pediatric anesthesiologists per 100,000pediatric population and a mean (±SD) 248 ±7 inpatient procedures per pediatric anesthesiologist in 2035.
CONCLUSIONS: If historical trends continue, the growth in pediatric anesthesiologist supply may exceed the growth in both the pediatric population and inpatient procedures in the 20-year period from 2015 to 2035.

一种新型图像处理装置用以体外评估吸引器中的手术失血量

In Vitro Evaluation of a Novel Image Processing Device to Estimate Surgical Blood Loss in Suction Canisters

Konig, Gerhardt MD*; Waters, Jonathan H. MD†‡; Hsieh, Eric BS§; Philip, Bridget MD∥; Ting, Vicki MD¶; Abbi, Gaurav MD#; Javidroozi, Mazyar MD, PhD**; Tully, Griffeth W. MD§; Adams, Gregg MD††
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背景：临床医师的任务之一是监测手术失血。不幸的是，没有可靠的方法来确保结果的准确。手术过程中大部分丢失的血液最终是存在于手术海绵和吸引器内。先前已经描述了一种新型食品和药物管理局批准的装置（Triton 系统; Gauss Surgical，Inc，Los Altos，CA），它是利用计算机图像分析来测量海绵上存在的血液量。本研究报告了补充食品和药物管理局批准的设备（Triton Canister System; Gauss Surgical，Inc，Los Altos，CA）的性能，该设备使用类似的图像分析来测量吸引器中的血液量。
方法：过期的捐献全血，包装的红细胞和血浆以及不同量的生理盐水被用于制造207 个样品，这些样品代表了吸引器中常见的各种血液稀释度。在 3 个手术室照明条件（明亮，中等和黑暗）下通过 Triton 设备测量每个样品，以表示合理范围，共进行 621 次测量。使用 Bland-Altman 方法，将每个样品中测量的血红蛋白（Hb）质量与使用标准实验室测定获得的结果作为参考值进行比较。在每种照明条件下测量的样品分别进行分析。预计在每个独立照明条件下，该设备将在预先规定的临床显著 Hb 质量范围内（每个吸引器±30g）测量各种样品。
结果：设备与参考方法之间的一致性限值，其中黑暗照明条件下（偏差：4.7 g [95％置信区间{CI}，3.8 至 5.6 g]；LOA：-8.1 g [95% CI, -9.7 至-6.6 g]至 17.6 g [95% CI, 16.0 至 19.1 g]），中值（偏差：3.4g [95％CI，2.6 至 4.1g]；LOA：-7.4 g [95% CI, -8.7 至-6.1 g] 至 14.2 g [95% CI, 12.9 至 15.5 g]）；明亮光照条件下（偏差：4.1 g [95% CI, 3.2 至 4.9 g]；LOA: -7.6 g [95% CI, -9.0 至-6.2 g] 至 15.7 g [95% CI, 14.3 至 17.1 g]）完全落入临床预定的显著差异限值±30g 内。在不同照明条件下重复测量样本与组内相关系数为 0.995（95％CI，0.993-0.996; P <0.001）高度相关，表明照明条件对测量没有显着影响。

Hb质量偏差与溶血水平（Spearman ρ 相关系数，-0.137; P = .001）和总容器体积（Spearman ρ 相关系数，0.135; P = .001）显著相关，但与环境照度无关。
结论：Triton滤罐系统能够可靠地测量血红蛋白的质量，具有临床可接受的准确性，可用于代表各种血红蛋白浓度，稀释度，溶血和环境照明。
（黄莉莉 译　陈杰 校）

BACKGROUND: Clinicians are tasked with monitoring surgical blood loss. Unfortunately, there is no reliable method available to assure an accurate result. Most blood lost during surgery ends up on surgical sponges and within suction canisters. A novel Food and Drug Administration-cleared device (Triton system; Gauss Surgical, Inc, Los Altos, CA) to measure the amount of blood present on sponges using computer image analysis has been previously described. This study reports on performance of a complementary Food and Drug Administration-cleared device (Triton Canister System; Gauss Surgical, Inc, Los Altos, CA) that uses similar image analysis to measure the amount of blood in suction canisters.

METHODS: Known quantities of expired donated whole blood, packed red blood cells, and plasma, in conjunction with various amounts of normal saline, were used to create 207 samples representing a wide range of blood dilutions commonly seen in suction canisters. Each sample was measured by the Triton device under 3 operating room lighting conditions (bright, medium, and dark) meant to represent a reasonable range, resulting in a total of 621 measurements. Using the Bland-Altman method, the measured hemoglobin (Hb) mass in each sample was compared to the results obtained using a standard laboratory assay as a reference value. The analysis was performed separately for samples measured under each lighting condition. It was expected that under each separate lighting condition, the device would measure the various samples within a prespecified clinically significant Hb mass range (±30 g per canister).

RESULTS: The limits of agreement (LOA) between the device and the reference method for dark (bias: 4.7 g [95% confidence interval {CI}, 3.8-5.6 g]; LOA: -8.1 g [95% CI, -9.7 to -6.6 g] to 17.6 g [95% CI, 16.0-19.1 g]), medium (bias: 3.4 g [95% CI, 2.6-4.1 g]; LOA: -7.4 g [95% CI, -8.7 to -6.1 g] to 14.2 g [95% CI, 12.9-15.5 g]), and bright lighting conditions (bias: 4.1 g [95% CI, 3.2-4.9 g]; LOA: -7.6 g [95% CI, -9.0 to -6.2 g] to 15.7 g [95% CI, 14.3-17.1 g]) fell well within the predetermined clinically significant limits of ±30 g. Repeated measurements of the samples under the various lighting conditions were highly correlated with intraclass correlation coefficient of 0.995 (95% CI, 0.993-0.996; P < .001), showing that lighting conditions did not have a significant impact on measurements. Hb mass bias was significantly associated with hemolysis level (Spearman ρ correlation coefficient, -0.137; P = .001) and total canister volume (Spearman ρ correlation coefficient, 0.135; P = .001), but not ambient illuminance.

CONCLUSIONS: The Triton Canister System was able to measure the Hb mass reliably with clinically acceptable accuracy in reconstituted blood samples representing a wide range of Hb concentrations, dilutions, hemolysis, and ambient lighting settings.

吗啡消耗基线可能解释辅助镇痛药荟萃分析的对照研究异质性，并提高功效评估的精度与准度

Baseline Morphine Consumption May Explain Between-Study Heterogeneity in Meta-analyses of Adjuvant Analgesics and Improve Precision and Accuracy of Effect Estimates

Doleman, Brett PhD*; Sutton, Alex J. PhD†; Sherwin, Matthew BMBS*; Lund, Jonathan N. MD*; Williams, John P. PhD*

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背景：统计学异质性会增加结果的不确定性，并降低系统评价所得证据的质量。目前，还不确定是什么主要因素导致了镇痛药物荟萃分析的异质性。因此，这次审查的目的是确定是否各种协变量可以解释统计学异质性，并在报告镇痛药的功效时使用它来提高准确性。

方法：作者使用 MEDLINE，EMBASE，CINAHL，AMED 和 Cochrane 系统评价数据库搜索评价。首先，作者确定存在相当大的统计学异质性（I> 75％）。其次，使用基线风险（对照组吗啡消耗）和其他临床学和方法学的协变量对 24 小时吗啡消耗的结果进行荟萃回归分析。最后，使用报告效应估计的新方法构建了辅助镇痛药的联盟表，假设术后固定消耗 50mg 吗啡。

结果：包括 344 个随机对照试验，28,130 名参与者。91%的分析显示出相当大的统计学异质性。基线风险是对乙酰氨基酚，非类固醇类抗炎药和环加氧酶-2 抑制剂，曲马多，氯胺酮，α 2 受体激动剂，加巴喷丁，普瑞巴林，利多卡因，镁和地塞米松之间对照研究异质性的重要原因（R = 21％-100 ％; P <.05）。有证据表明，试验中的方法学限制解释了一些残余的异质性。手术类型与镇痛效果并不独立相关。加巴喷丁，对乙酰氨基酚，α 2-激动剂，非甾体抗炎药和环加氧酶-2 抑制剂，普瑞巴林，曲马多，镁和利多卡因的固定基线风险假设为 50mg（按功效顺序），表现出中等的临床显着减少（> 10 毫克）。不能排除氯胺酮临床上显着的中度影响。地塞米松表现出小的临床益处（> 5mg）。

结论：根据经验将吗啡消耗基线确定为所有手术干预中辅助镇痛药荟萃分析异质性的主要来源。通过控制基线吗啡消耗，不管当地人群接受哪种手术，临床医生都可以使用审核数据来估计添加任何佐剂对他们的吗啡使用减少的效果。此外，作者利用这些研究结果提出了一种新的报告方法和图形显示效果估计的修正方法，既减少了纳入试验中变量基线风险的混淆，又能够调整其他临床和方法混杂变量。作者建议在临床实践和对未来术后镇痛药的评价中使用这些方法。

（俞苏洋 译　陈杰 校）

BACKGROUND： Statistical heterogeneity can increase the uncertainty of results and reduce the quality of evidence derived from systematic reviews. At present, it is uncertain what the major factors are that account for heterogeneity in meta-analyses of analgesic adjuncts. Therefore, the aim of this review was to identify whether various covariates could explain

statistical heterogeneity and use this to improve accuracy when reporting the efficacy of analgesics.
METHODS: We searched for reviews using MEDLINE, EMBASE, CINAHL, AMED, and the Cochrane Database of Systematic Reviews. First, we identified the existence of considerable statistical heterogeneity ($I > 75\%$). Second, we conducted meta-regression analysis for the outcome of 24-hour morphine consumption using baseline risk (control group morphine consumption) and other clinical and methodological covariates. Finally, we constructed a league table of adjuvant analgesics using a novel method of reporting effect estimates assuming a fixed consumption of 50 mg postoperative morphine.
RESULTS: We included 344 randomized controlled trials with 28,130 participants. Ninety-one percent of analyses showed considerable statistical heterogeneity. Baseline risk was a significant cause of between-study heterogeneity for acetaminophen, nonsteroidal anti-inflammatory drugs and cyclooxygenase-2 inhibitors, tramadol, ketamine, α2-agonists, gabapentin, pregabalin, lidocaine, magnesium, and dexamethasone ($R = 21\%-100\%$; $P < .05$). There was some evidence that the methodological limitations of the trials explained some of the residual heterogeneity. Type of surgery was not independently associated with analgesic efficacy. Assuming a fixed baseline risk of 50 mg (in order of efficacy), gabapentin, acetaminophen, α2-agonists, nonsteroidal anti-inflammatory drugs and cyclooxygenase-2 inhibitors, pregabalin, tramadol, magnesium, and lidocaine demonstrated moderate clinically significant reductions (>10 mg). We could not exclude a moderate clinically significant effect with ketamine. Dexamethasone demonstrated a small clinical benefit (>5 mg).
CONCLUSIONS: We empirically identified baseline morphine consumption as the major source of heterogeneity in meta-analyses of adjuvant analgesics across all surgical interventions. Controlling for baseline morphine consumption, clinicians can use audit data to estimate the morphine-reducing effect of adding any adjuvant for their local population, regardless which surgery they undergo. Moreover, we have utilized these findings to present a novel method of reporting and an amended method of graphically displaying effect estimates, which both reduces confounding from variable baseline risk in included trials and is able to adjust for other clinical and methodological confounding variables. We recommend use of these methods in clinical practice and future reviews of analgesics for postoperative pain.

用于人口健康的围手术期医学模型:一种发展中临床科学的综合方法

A Perioperative Medicine Model for Population Health: An Integrated Approach for an Evolving Clinical Science

Aronson, Solomon MD, MBA, FASA, FACC, FCCP, FAHA, FASE*; Westover, Julie BS*; Guinn, Nicole MD*; Setji, Tracy MD, MHS†; Wischmeyer, Paul MD*; Gulur, Padma MD*; Hopkins, Thomas MD*; Seyler, Thorsten M. MD, PhD‡; Lagoo-Deendayalan, Sandhya MD, PhD§; Heflin, Mitchell T. MD, MHS†; Thompson, Annemarie MD*; Swaminathan, Madhav MD*; Flanagan, Ellen MD*
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美国的医疗保健服务在连接其从数量到价值的紧密绳索上继续保持平衡。经济术语中的价值可以被定义为超出其商品价格，由卓越的声誉、质量和/或服务决定，而其破坏可能是管理不善、政策不佳、需求减少和/或竞争加剧的结果。今后，卫生保健服务的费用将越来越多地基于提高个人和/或群体健康价值的服务，而支付卫生保健服务的资金将越来越容易受到竞争性市场力量的影响。因此，可持续的人口健康战略需要做到全面，因此包括围手术期药物作为以病人为中心的护理的完整循环的一个重要组成部分。作者描述了一个多学科综合计划，以支持围手术期药物服务，这些服务是综合人口健康战略的组成部分。
（杨柳 译　陈杰 校）
Health care delivery in the United States continues to balance on the tight rope that connects its transition from volume to value. Value in economic terms can be defined as the amount something exceeds its commodity price and is determined by extraordinary reputation, quality, and/or service, whereas its destruction can be a consequence of poor management, unfavorable policy, decreased demand, and/or increased competition. Going forward, payment for health care delivery will increasingly be based on services that contribute to improvements in individual and/or population health value, and funds to pay for health care delivery will become increasingly vulnerable to competitive market forces. Therefore, a sustainable population health strategy needs to be comprehensive and thus include perioperative medicine as an essential component of the complete cycle of patient-centered care. We describe a multidisciplinary integrated program to support perioperative medicine services that are integral to a comprehensive population health strategy.

体外循环术后急性心内血栓形成和肺血栓栓塞:系统回顾报告

Acute Intracardiac Thrombosis and Pulmonary Thromboembolism After Cardiopulmonary Bypass: A Systematic Review of Reported Cas

Williams, Brittney MD[*]; Wehman, Brody MD[†]; Mazzeffi, Michael A. MD, MPH[*]; Odonkor, Patrick MB ChB[*]; Harris, Ryan L. MLIS[‡]; Kon, Zachary MD[†]; Tanaka, Kenichi A. MD, MSc[*]

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心脏体外循环(CPB)后的心内血栓形成(ICT)和肺血栓栓塞(PE)是危及生命的严重事件，但病理机制尚未明确。本篇综述的目的是提供一个有关体外循环后高凝状态病例文献的知识更新。在 48 例 ICT/PE 事件中，病例的共同特征包括充血性心力衰竭(50%)、血小板输注(37.5%)、CPB 持续时间大于 3 小时(37.5%)和主动脉损伤(27.1%)。术前存在血栓形成倾向少有报道,16.7%存在低激活凝血时间（ACT）,CPB 期间≤400 秒。尽管进行了血栓取除术和支持性治疗，死亡率仍然很高(85.4%)。溶栓治疗不常使用(48 例病人中有 5 例使用)，但由于常用的抗纤溶疗法(77.1%)使其疗效存疑。急性 ICT/PE 事件似乎很少发生，但常见的特征包括长时间的 CPB、心肌功能受抑制、大血管损伤和止血干预。进一步阐明体外循环中的病理机制和优化抗凝治疗，并对 CPB 后进行止血干预是必要的。
（吴洁译 李士通校）

Intracardiac thrombosis (ICT) and pulmonary thromboembolism (PE) after cardiopulmonary bypass (CPB) are life-threatening events, but pathological mechanisms are not yet well defined. The aim of this review is to provide an update of case literature of a postbypass hypercoagulable state. Case commonalities among 48 ICT/PE events included congestive heart failure (50%), platelet transfusion (37.5%), CPB duration greater than 3 hours (37.5%), and aortic injury (27.1%). Preexisting thrombophilia was rarely reported, and 16.7% had low activated clotting time, ≤400 seconds during CPB. Mortality rate was very high (85.4%), despite attempted thrombectomy and supportive therapy. Thrombolytic therapy was infrequently used (5 of 48 times), but its efficacy is questionable due to common use of antifibrinolytic therapy (77.1% of cases). Acute ICT/PE events appear to rarely occur, but common features include prolonged CPB, depressed myocardial function, major vascular injury, and hemostatic interventions. Further efforts to elucidate pathomechanisms and optimize anticoagulation during CPB and hemostatic interventions after CPB are warranted.

基于血管卸载技术(CNAP 系统)的连续无创动脉压力监测在腹腔镜减肥手术中应用

Continuous Noninvasive Arterial Pressure Monitoring Using the Vascular Unloading Technique (CNAP System) in Obese Patients During Laparoscopic Bariatric Operations

Rogge, Dorothea E. MD; Nicklas, Julia Y. MD; Haas, Sebastian A. MD; Reuter, Daniel A. MD; Saugel, Bernd MD

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背景：肥胖发生率的增加为围术期的血流动力学监测带来了新的挑战。因为存在心血管并发症的特定风险，持续监测动脉压(AP)对极度肥胖患者极为重要。现在可以获得持续的无创性 AP 监测的创新技术。在本研究中，我们的目的是比较使用血管卸载技术(CNAP 系统的连续无创性 AP 测量(CNAP systems, Graz，奥地利)与有创性 AP 测量(桡动脉导管)在极度肥胖患者腹腔镜减肥手术治疗中的应用。
方法：在 29 例重度肥胖患者(平均体重指数为 48.1 kg/ m2)中，我们在 45 分钟内同时记录了无创性和有创性的 AP 测量值，并每 10 秒取一平均值。我们比较了无创性(测试方法)和有创性(参考方法)AP 测量值，使用 Bland-Altman 分析和 4 象限图/一致性分析(2 分钟间隔)。
结果：我们观察到通过 CNAP 系统获得的 AP 测量值与有创性评估 AP 值之间的差异的平均值(±SD,95%可信区间)分别是，平均动脉压 7.9mmHg(±9.6mmHg,−11.2 到 27.0mmHg),收缩压 4.8mmHg(±15.8mmHg,−26.5 到 36.0mmHg),舒张压 9.5mmHg (±10.3mmHg,−10.9 到 29.9mmHg)。一致率分别为平均 AP 97.5%，收缩压 95.0%，舒张期 AP 96.7%。
结论：在腹腔镜减肥手术中，使用 CNAP 系统进行连续的无创 AP 监测与通过桡动脉导管获得的连续有创 AP 监测相比，具有良好的趋势能力。然而，绝对的通过 CNAP 系统和通过动脉导管衍生获得的 AP 值不能互换。
（吴洁译 李士通校）

BACKGROUND: Increasing rates of obesity create new challenges for hemodynamic monitoring in the perioperative phase. Continuous monitoring of arterial pressure (AP) is important in severely obese patients who are at particular risk for cardiovascular complications. Innovative technologies for continuous noninvasive AP monitoring are now available. In this study, we aimed to compare continuous noninvasive AP measurements using the vascular unloading technique (CNAP system; CNSystems, Graz, Austria) compared with invasive AP measurements (radial arterial catheter) in severely obese patients during laparoscopic bariatric surgery。
METHODS: In 29 severely obese patients (mean body mass index 48.1 kg/m ^{2}), we simultaneously recorded noninvasive and invasive AP measurements over a period of 45 minutes and averaged the measurements using 10-second episodes. We compared noninvasive (test method) and invasive (reference method) AP measurements using Bland-Altman analysis and 4-quadrant plot/concordance analysis (2-minute interval).
RESULTS: We observed a mean of the differences (±SD, 95% limits of agreement) between the AP values obtained by the CNAP system and the invasively assessed AP values of 7.9 mm Hg (±9.6 mm Hg, −11.2 to 27.0 mm Hg) for mean AP, 4.8 mm Hg (±15.8 mm Hg, −26.5 to 36.0 mm Hg) for systolic AP, and 9.5 mm Hg (±10.3 mm Hg, −10.9 to 29.9 mm Hg) for diastolic AP, respectively. The concordance rate was 97.5% for mean AP, 95.0% for systolic AP, and 96.7% for diastolic AP, respectively.
CONCLUSIONS: In the setting of laparoscopic bariatric surgery, continuous noninvasive AP monitoring with the CNAP system showed good trending capabilities compared with continuous invasive AP measurements obtained with a radial arterial catheter. However, absolute CNAP- and arterial catheter–derived AP values were not interchangeable.

3. 普通外科术后机械通气的发生率及手术因素

Incidence and Operative Factors Associated With Discretional Postoperative Mechanical Ventilation After General Surgery

Ray, Juliet J. MD, MSPH[*]; Degnan, Meredith MD[†]; Rao, Krishnamurti A. MD, MPH[*]; Meizoso, Jonathan P. MD, MSPH[*]; Karcutskie, Charles A. MD, MA[*]; Horn, Danielle B. MD[†]; Rodriguez, Luis MD[†]; Dutton, Richard P. MD, MBA[‡]; Schulman, Carl I. MD, PhD, MSPH, FACS[*]; Dudaryk, Roman MD[†]

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背景：普外术后的机械通气会导致更糟的结果，延长住院时间，增加医疗费用。手术后，需接受重症监护病房(ICU)治疗的患者可分为 3 组:拔管患者(EXT)，有客观医学指征需保持机械通气的患者 (MED)，患者不符合这些标准，称为“离散术后机械通气”(DPMV)。本研究的目的是确定 DPMV 在普外科手术患者中的发生率，并确定相关的手术因素。

方法：在一个大型的三级医疗中心，我们回顾了从 2008 年 4 月 1 日至 2015 年 2 月 28 日在全身麻醉下进行的并在术后接受 ICU 治疗的所有手术病例。患者被分为 3 组，包括:EXT 组, MED 组，和 DPMV 组。手术因素包括美国麻醉医师协会定义的身体一般状况(ASA PS)、手术持续时间、手术结束时间、困难气道管理、术中血液和液体管理、血管收缩药物的使用、术中动脉血气、通气参数等。此外，还检查了麻醉记录，说明术后通气治疗的原因或合理性。分类变量比较使用卡方 $\chi 2$ 检验,连续变量使用方差分析或克鲁斯卡尔-沃利斯 H 测试。分类变量表示为 n(%), 连续变量表示为均值±标准差或中位数(四分位范围)。显著性水平设定为 $P \leq 0.05$。

结果：3555 名患者中 16%被分入 DPMV 组， 12.2%分入 EXT 组。与 EXT 组患者相比，DPMV 组患者补液量明显较少(2757±2728 毫升对 3868±1885 毫升;P <0.001),术中失血量也较少(150ml(20 - 625)对 300ml[150 - 600]; P <0.001), 手术时间较短(199±215 分钟对 276±143 分钟;P <0.001), 但输注了更多的血液制品, 900ml(600 - 1800)对 600ml(300 – 900ml)。DPMV 组比 EXT 组包含更多高 ASA PS(ASA III-V) 的患者: 508 例(90.4%)对 1934 例(75.6%);P <0.001。急诊手术(ASA E 级)在 DPMV 组较 EXT 组更常见:分别是 145 例(25.8%)和 306 例(12%)，P < 0.001。手术结束后常规工作时间 DPMV 组并没有明显高于 EXT 组。与 EXT 组和 MED 组相比，DPMV 组困难气道发生例数更少。与 MED 组病人相比，DPMV 组患者补液量较少(2757±2728ml 对 4499±2830ml; P <0.001), 失血量也较少 (150ml[20 – 625]对 500ml [200 - 1350]; P <0.001), 但在输注血液制品和手术持续时间方面没有差别。

结论：在我们的三级医疗中心，患者经常在没有客观医学指征的情况下，进入 ICU 进行机械辅助通气治疗。与进入 ICU 拔管的患者相比，那些机械通气但没有客观指征的患者 ASA PS 分级更高，更有可能转为 ASA E 级。在常规操作或困难气道管理后的手术结束时间与 DPMV 的高发生率无关。

(吴洁译 李士通校)

BACKGROUND: Mechanical ventilation after general surgery is associated with worse outcomes, prolonged hospital stay, and increased health care cost. Postoperatively, patients admitted to the intensive care unit (ICU) may be categorized into 1 of 3 groups: extubated patients (EXT), patients with objective medical indications to remain ventilated (MED), and patients not meeting these criteria, called

"discretional postoperative mechanical ventilation" (DPMV). The objectives of this study were to determine the incidence of DPMV in general surgery patients and identify the associated operative factors.

METHODS: At a large, tertiary medical center, we reviewed all surgical cases performed under general anesthesia from April 1, 2008 to February 28, 2015 and admitted to the ICU postoperatively. Patients were categorized into 1 of 3 cohorts: EXT, MED, or DPMV. Operative factors related to the American Society of Anesthesiologists Physical Status (ASA PS), duration of surgery, surgery end time, difficult airway management, intraoperative blood and fluid administration, vasopressor infusions, intraoperative arterial blood gasses, and ventilation data were collected. Additionally, anesthesia records were reviewed for notes indicating a reason or rationale for postoperative ventilation. Categorical variables were compared by χ^2 test, and continuous variables by analysis of variance or Kruskal-Wallis *H* test. Categorical variables are presented as n (%), and continuous variables as mean ± standard deviation or median (interquartile range) as appropriate. Significance level was set at $P \leq .05$

RESULTS: Sixteen percent of the 3555 patients were categorized as DPMV and 12.2% as MED. Compared to EXT patients, those classified as DPMV had received significantly less fluid (2757 ± 2728 mL vs 3868 ± 1885 mL; $P < .001$), lost less blood during surgery (150 [20–625] mL vs 300 [150–600] mL; $P < .001$), underwent a shorter surgery (199 ± 215 minutes vs 276 ± 143 minutes; $P < .001$), but received more blood products, 900 (600–1800) mL vs 600 (300–900) mL. The DPMV group had more patients with high ASA PS (ASA III–V) than the EXT group: 508 (90.4%) vs 1934 (75.6%); $P < .001$. Emergency surgery (ASA E modifier) was more common in the DPMV group than the EXT group: 145 (25.8%) vs 306 (12%), $P < .001$, respectively. Surgery end after regular working hours was not significantly higher with DPMV status compared to EXT. DPMV cohort had fewer cases with difficult airway when compared to EXT or MED. When compared to MED patients, those classified as DPMV received less fluid (2757 ± 2728 mL vs 4499 ± 2830 mL; $P < .001$), lost less blood (150 [20–625] mL vs 500 [200–1350] mL; $P < .001$), but did not differ in blood products transfused or duration of surgery.

CONCLUSIONS: In our tertiary medical center, patients often admitted to the ICU on mechanical ventilation without an objective medical indication. When compared to patients admitted to the ICU extubated, those mechanically ventilated but without an objective indication had a higher ASA PS class and were more likely to have an ASA E modifier. A surgery end time after regular working hours or difficult airway management was not associated with higher incidence of DPMV.

低或高氯含量静脉注射液用于危重及围术期成年患者的系统回顾和荟萃分析

Low- Versus High-Chloride Content Intravenous Solutions for Critically Ill and Perioperative Adult Patients: A Systematic Review and Meta-analysis

Kawano-Dourado, Leticia MD[*†]; Zampieri, Fernando G. MD[*‡]; Azevedo, Luciano C. P. MD[§‖]; Corrêa, Thiago D. MD[¶]; Figueiró, Mabel BLS[*]; Semler, Matthew W. MD[#]; Kellum, John A. MD[**]; Cavalcanti, Alexandre B. MD[*]

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背景：评估对比在非选择危重病人或围术期的成年患者中使用低氯或高氯溶液是否能降低死亡率和肾脏替代疗法(RRT)的比率。
方法：系统回顾和 meta 分析随机效应的逆方差模型。搜索至 2016 年 10 月来自 PubMed、Cochrane 图书馆、EMBASE、LILACS 和科学网的文献。任何语言涉及危重病人和/或围手术期成人患者的发表和未发表的随机对照研究，比较低或高含氯化物溶液用于容量维持或液体复苏。主要的结果是死亡率和 RRT 的使用。我们进行了逐次分析，并评估了个体试验的偏差风险和证据的整体质量。对涉及 4067 例患者的 15 个研究进行了分析，多数为低偏倚风险。其中，只有 11 项和 10 项试验分别有关于死亡率和 RRT 使用的数据。在 RRT 分析中，共有 3710 名患者参与了死亡率分析，3724 名患者参与了 RRT 使用分析。
结果：死亡率(优势比，0.90; 95%可信区间为 0.69-1.17;P = .44; I^2 = 0%)或 RRT 使用(优势比，1.12; 95%可信区间，0.80-1.58;P =0.52; I^2 = 0%)均无统计学显著性差异。总的来说，针对主要结果的证据质量都很低。试验顺序分析强调，所需的样本量远远大于用于适当的结果评估的可获得的样本量。
结论：目前的证据表明，对于未选择的重症患者或围手术期的成人患者，低氯和高氯化物的液体均无任何好处，但却存在相当大的不准确性。我们注意到，用于液体研究的涉及容量有限，每个研究人群的风险相对较低。这些数据和相对较小的混合样本容量一起，让我们无力去发现潜在的重要差异。从良好的，充分的随机对照试验研究足够大的液体使用获得结果是必要的。
（吴洁译 李士通校）

BACKGROUND: To assess whether use of low-chloride solutions in unselected critically ill or perioperative adult patients for maintenance or resuscitation reduces mortality and renal replacement therapy (RRT) use when compared to high-chloride fluids.
METHODS: Systematic review and meta-analysis with random-effects inverse variance model. PubMed, Cochrane library, EMBASE, LILACS, and Web of Science were searched from inception to October 2016. Published and unpublished randomized controlled trials in any language that enrolled critically ill and/or perioperative adult patients and compared a low- to a highchloride solution for volume maintenance or resuscitation. The primary outcomes were mortality and RRT use. We conducted trial sequential analyses and assessed risk of bias of individual trials and the overall quality of evidence. Fifteen trials with 4067 patients, most at low risk of bias, were identified. Of those, only 11 and 10 trials had data on mortality and RRT use, respectively. A total of 3710 patients were included in the mortality analysis and 3724 in the RRT analysis.
RESULTS: No statistically significant impact on mortality (odds ratio, 0.90; 95% confidence interval, 0.69–1.17; P = .44; I^2 = 0%) or RRT use (odds ratio, 1.12; 95% confidence interval, 0.80–1.58; P = .52; I^2 = 0%) was found. Overall quality of evidence was low for both primary outcomes. Trial sequential analyses highlighted that the sample size needed was much larger than that available for properly powered outcome assessment.

CONCLUSIONS: The current evidence on low- versus high-chloride solutions for unselected critically ill or perioperative adult patients demonstrates no benefit, but suffers from considerable imprecision. We noted a limited exposure volume for study fluids and a relatively low risk of the populations in each study. Together with the relatively small pooled sample size, these data leave us underpowered to detect potentially important differences. Results from well-conducted, adequately powered randomized controlled trials examining sufficiently large fluid exposure are necessary

多腔和单腔弹簧导管用于硬膜外分娩镇痛临床疗效的随机对照试验

Randomized Controlled Trial of the Clinical Efficacy of Multiport Versus Uniport Wire-Reinforced Flexible Catheters for Labor Epidural Analgesia

Philip, John MD[*]; Sharma, Shiv K. MD[†]; Sparks, Timothy J. CRNA[*]; Reisch, Joan S. PhD[‡]

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背景：这个前瞻性随机对照研究的目的是明确使用多腔弹簧管进行硬膜外分娩镇痛（LEA）是否会改善镇痛效果。
方法：650 名产妇随机分为两组：分别使用多腔弹簧管接受硬膜外镇痛和使用单腔弹簧管进行硬膜外镇痛。主要结果是成功镇痛，评估给予初始剂量开始实施硬膜外镇痛后充分镇痛的发生率。次要结果包括硬膜外镇痛维持过程中需要临床干预的病人数；麻醉成功定义为给予初始剂量后到建立可以实施剖宫产手术麻醉的适当麻醉的发生率；以及整个硬膜外分娩镇痛过程中产妇的满意度。
结果：使用多腔和单腔弹簧管在硬膜外分娩镇痛的初始阶段成功镇痛的发生率没有显著性差异（分别为 93.6%和 89.5%，差异为 4.1% [95%的可信区间为 -0.4%-8.5%]；P=0.077）。这两种类型的导管在硬膜外分娩镇痛维持过程中需要临床干预的病人数及实施剖宫产手术的麻醉成功率方面没有显著差异。
结论：多腔设计并不能改善钢丝弹簧管用于硬膜外分娩镇痛的镇痛效果。
（周宇译 李士通校）

BACKGROUND: The purpose of this prospective, randomized, controlled trial was to determine whether multiple ports improve the analgesic efficacy of wire-reinforced flexible catheters used for labor epidural analgesia (LEA).
METHODS: Six hundred fifty laboring patients were randomized to receive epidural analgesia using either a multiport or uniport wire-reinforced flexible catheter. The primary outcome was analgesic success, defined as the incidence of adequate analgesia following the initial bolus given to initiate LEA. Secondary outcomes included the number of patients requiring clinician interventions during maintenance of LEA; anesthetic success, defined as the incidence of adequate anesthesia following the initial bolus given to establish surgical anesthesia for cesarean delivery; and maternal satisfaction with the overall quality of LEA.
RESULTS: There was no significant difference in analgesic success at initiation of LEA between the uniport and the multiport wire-reinforced flexible catheter (93.6% vs 89.5%, respectively; difference of 4.1% [95% confidence interval, −0.4% to 8.5%]; P = .077). There was also no difference in the number of patients requiring clinician interventions during maintenance of LEA and in anesthetic success at the

establishment of surgical anesthesia for cesarean delivery between the 2 catheter types.
CONCLUSIONS: Multiple ports do not appear to improve the analgesic efficacy of wire-reinforced flexible catheters used for LEA.

剖宫产手术椎管内麻醉过程中格隆溴铵对低血压发生率及血管收缩药需求影响的 Meta 分析

The Effect of Glycopyrrolate on the Incidence of Hypotension and Vasopressor Requirement During Spinal Anesthesia for Cesarean Delivery: A Meta-analysis

Patel, Selina D. BMedSci, MBBS, FRCA[*]; Habib, Ashraf S. MBBCh, MSc, MHSc, FRCA[†]; Phillips, Sioned MBBS, FRCA[‡]; Carvalho, Brendan MBBCh, FRCA, MDCH[§]; Sultan, Pervez MBChB, FRCA, MD(Res)[‡]
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背景：这项 meta 分析的目标是确定格隆溴铵减少剖宫产手术腰麻过程中低血压的疗效。
方法：收集研究格隆溴铵对剖宫产手术腰麻所致低血压疗效方面的随机对照试验相关文献。主要结果是手术过程中的低血压和对血管加压药的需求量（去氧肾上腺素类似物）。次要结果包含心率，恶心呕吐，口干及新生儿 Apgar 评分。用随机效应模型来计算风险比（RRs）和平均差（MDs），95%置信区间为主要结果，99%置信区间为次要结果。
结果：5 个随机对照试验符合我们的纳入标准。共纳入 311 名患者：153 名为格隆溴铵组，158 名为对照组。预防性应用格隆溴铵与对照组相比并没有降低椎管内麻醉过程中低血压的发生率（RR, 0.93 [0.71–1.21]; P =0 .59），但是格隆溴铵组显著减少了去氧肾上腺素的总需求量（MD, −62.64 μg [−107.61 到 −17.66 μg]; P =0 .006）。格隆溴铵组最高心率显著高于对照组（MD, 15.85 bpm [5.40–26.31]; P < .0001）；但是心动过缓的发生率并没有显著差异。两组患者术中恶心呕吐的发生率没有显著差异；但是格隆溴铵增加口腔干燥的风险（RR, 5.15 [1.82–14.57]; P < .0001）。新生儿 Apger 评分在 1 分钟和 5 分钟时两组没有差异。
结论：预防性应用格隆溴铵并不能降低腰麻所致的低血压，但是在加快母亲心率的同时一定程度上减少了血管收缩药的需求量。
（周宇译　李士通校）

BACKGROUND: The objective of this meta-analysis was to determine the efficacy of glycopyrrolate at reducing spinal hypotension during cesarean delivery.
METHODS: A literature search was performed to identify randomized controlled trials investigating the effect of glycopyrrolate on spinal-induced hypotension during cesarean delivery. Primary outcomes were intraoperative hypotension and vasopressor requirement (phenylephrine equivalents). Secondary outcomes included heart rate (HR), nausea and vomiting, dry mouth, and Apgar scores. Risk ratios (RRs), and mean differences (MDs) were calculated using random-effects modeling with 95% confidence intervals for primary outcomes and 99% confidence intervals for secondary outcomes.
RESULTS: Five randomized controlled trials met our inclusion criteria. A total of 311 patients were included: 153 received glycopyrrolate and 158 placebo. The

incidence of spinal-induced hypotension was no different with prophylactic glycopyrrolate compared to control (RR, 0.93 [0.71–1.21]; P = .59), but the total phenylephrine dose required was significantly reduced with glycopyrrolate (MD, −62.64 μg [−107.61 to −17.66 μg]; P = .006). The maximal HR achieved in the glycopyrrolate group was significantly higher compared to controls (MD, 15.85 bpm [5.40–26.31]; P <0.0001); however, the incidence of bradycardia was not statistically different. The incidence of intraoperative nausea and vomiting was not different between groups; however, glycopyrrolate increased the risk of dry mouth (RR, 5.15 [1.82–14.57]; P < .0001). Apgar scores at 1 and 5 minutes did not differ between groups.
CONCLUSIONS: Prophylactic glycopyrrolate does not reduce the incidence of spinal-induced hypotension but results in a modest reduction in vasopressor requirements while increasing maternal HR.

碱化利多卡因预充气管导管套囊减少短小手术后出现的呛咳反应的前瞻性随机对照试验

Alkalinized Lidocaine Preloaded Endotracheal Tube Cuffs Reduce Emergence Cough After Brief Surgery: A Prospective Randomized Trial

Nath, Papu MD, FRCPC; Williams, Stephan MD, PhD; Herrera Méndez, Luis Fernando MD, FRCPC; Massicotte, Nathalie MD, FRCPC; Girard, François MD, FRCPC; Ruel, Monique RN, CCRP
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背景:气管导管套囊中注射碱化利多卡因可减少时间超过 2 小时的手术出现的咳嗽和咽喉疼痛的发生率。 然而，碱化利多卡因需要 60-120 分钟穿透气管导管套囊；因此，它在短小手术中的作用是未知的。 此前瞻性随机对照双盲试验测试了碱化利多卡因可减少时间<120 分钟的手术出现咳嗽的发生率的这一假设。
方法:经当地伦理委员会批准后，ASA I-III 级患者随机分为两组，分别应用碱化利多卡因（AL 组）或生理盐水（S 组）注入套囊。气管插管之前用 2%利多卡因 2ml 和 8.4%碳酸氢盐 8ml（AL 组）或生理盐水 10ml（S 组）将套囊预填充> 90 分钟。气管插管前立即抽空套囊。气管插管后，将 2%利多卡因 2ml（AL）或生理盐水 2ml（S）注入套囊。额外的 8.4%碳酸氢盐（AL）或生理盐水（S）注入套囊，直至无空气泄漏。使用地氟醚，罗库溴铵以及芬太尼或舒芬太尼维持麻醉，保证患者在麻醉状态下生命体征变化在其基础值 20%以内。禁止应用阿片类药物预防拔管呛咳。采用标准化的“无接触”技术。一位不知情的评估者记录苏醒期患者地氟醚最低肺泡浓度（MAC）>0.2 出现的呛咳。在 MAC 为 0.2 时，每 30 秒一次，指示患者睁开眼睛，一旦有定向反应即可拔管。
结果:共计 213 名患者进行随机分组，每组 100 名患者完成了实验方案。 AL 组拔管呛咳发生率为 12%，显着低于 S 组 22%的发生率（单侧 P = 0.045）。AL 组呛咳的单尾风险比为 0.55（0-0.94， P = 0.045）。各组间阿片类药物总量（P = 0.194），气管导管套囊预充时间（P = 0.259）和拔管时间（P = 0.331）无显着差异。平均手术时间 AL 组为 59±28 分钟，S 组为 52±29 分钟（P = 0.057）。
结论:气管导管套囊注入碱化利多卡因显著降低平均持续时间略短于 1 小时的手术全麻出现的呛咳反应。

（张霄迪译 李士通校）

BACKGROUND: Alkalinized lidocaine in the endotracheal tube (ETT) cuff decreases the incidence of cough and throat pain on emergence after surgery lasting more than 2 hours. However, alkalinized lidocaine needs 60–120 minutes to cross the ETT cuff membrane; therefore, its usefulness in shorter duration surgery is unknown. This prospective double-blind randomized controlled trial tested the hypothesis that alkalinized lidocaine would reduce the incidence of emergence cough after surgeries lasting <120 minutes.

METHODS: After local ethics board approval, American Society of Anesthesiologists I–III patients consented to be randomized into 1 of 2 groups receiving either alkalinized lidocaine (group AL) or saline (group S) to inflate the ETT cuff. Cuffs were prefilled >90 minutes before intubation with either 2 mL of 2% lidocaine and 8 mL of 8.4% bicarbonate (group AL) or 10 mL of normal saline (group S). Cuffs were emptied immediately before intubation. After intubation, either 2 mL of 2% lidocaine (AL) or 2 mL of saline (S) were injected into the cuff. Additional 8.4% bicarbonate (AL) or saline (S) was injected into the cuff until there was no air leak. Anesthesia was maintained using desflurane, rocuronium, and either fentanyl or sufentanil to maintain vital signs within 20% of baseline values. Opioids administered in prophylaxis of extubation cough were proscribed. A standardized “no touch” emergence technique was used. A blinded assessor noted any cough above 0.2 minimum alveolar concentration (MAC) of expired desflurane. At 0.2 MAC, once every 30 seconds, the patient was instructed to open his eyes and extubation occurred once a directed response was noted.

RESULTS: A total of 213 patients were randomized and 100 patients in each group completed the experimental protocol. The incidence of extubation cough in group AL was 12%, significantly lower (1-sided $P = .045$) than the 22% incidence in group S. The 1-tailed risk ratio for cough in group AL was 0.55 (0–0.94, $P = .045$). Total amount of opioids administered ($P = .194$), ETT cuff preloading times ($P = .259$), and extubation times ($P = .331$) were not significantly different between groups. The average duration of surgery was 59 ± 28 minutes in group AL and 52 ± 29 minutes in group S ($P = .057$).

CONCLUSIONS: Alkalinized lidocaine in the ETT cuff significantly decreased general anesthesia emergence cough after surgeries with an average duration of slightly <1 hour.

通过监测周围神经阻滞的成功率来提高性能

Improving Performance by Monitoring the Success Rate of Peripheral Nerve Blocks

Bakker, Sietske M. K. MD; Stienstra, Rudolf MD, PhD

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我们引入了一个系统来测量臂丛和腘神经阻滞的集体和个体效能，目的是为了提高其作为监测和改善工具的透明度。最初，个体的结果是匿名的，但是在 1 年之后，麻醉师团队中的匿名性被提升并且进行季度性结果讨论。随着时间的推移，

肌间沟、锁骨上和腘窝阻滞的集体表现显著改善。分享和讨论集体和个人的表现实现了批判性的自我评价，并增加了相互学习的意愿，增强了团队进一步改进的雄心。
（王子钰译 李士通校）
In our hospital, we introduced a system to measure the collective and individual efficacy of brachial plexus and popliteal nerve blocks with the objective to create transparency as an instrument for monitoring and improvement. Initially, individual results were anonymous, but after 1 year anonymity was lifted within the team of anesthesiologists and results are now discussed quarterly. Collective performance of interscalene, supraclavicular, and popliteal blocks improved significantly over time. Sharing and discussing collective and individual performance has resulted in critical self-appraisal and increased willingness to learn from each other and strengthened the team's ambition for further improvement.

MicroRNAs 作为围手术期医学的临床生物标志物和治疗手段
MicroRNAs as Clinical Biomarkers and Therapeutic Tools in Perioperative Medicine
Kreth, Simone MD, PhD[*†]; Hübner, Max MD[*†]; Hinske, Ludwig Christian MD[*]
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在过去的十年里，进化保守的、不编码的小 RNA 即所谓的 microRNAs (miRNAs) -已经成为几乎所有细胞过程的重要调节者。microRNA 通过绑定 3′非编码区的 RNA 来影响基因表达,导致其降解和转录后抑制。在医学上，miRNAs 被揭示为新颖的、极具潜力的生物标志物，是极具吸引力的新颖治疗方法的工具和靶点。miRNAs 目前正在进入围手术期医学领域，他们可能在麻醉、重症监护和止痛药方面开辟新的前景。在这篇综述中，我们概述了 miRNAs 的生物学特性及其在人类疾病中的潜在作用。我们重点介绍 miRNA 介导的围手术期药物作用的当前模式，并对目前已知的 miRNA 生物标志物进行了调查。最后，我们提供了一个基于 miRNA 的治疗机会和视角。
(王子钰译 李士通校)
Over the past decade, evolutionarily conserved, noncoding small RNAs—so-called microRNAs (miRNAs)—have emerged as important regulators of virtually all cellular processes. miRNAs influence gene expression by binding to the 3′-untranslated region of protein-coding RNA, leading to its degradation and translational repression. In medicine, miRNAs have been revealed as novel, highly promising biomarkers and as attractive tools and targets for novel therapeutic approaches. miRNAs are currently entering the field of perioperative medicine, and they may open up new perspectives in anesthesia, critical care, and pain medicine. In this review, we provide an overview of the biology of miRNAs and their potential role in human disease. We highlight current paradigms of miRNA-mediated effects in perioperative medicine and provide a survey of miRNA biomarkers in the field known so far. Finally, we provide a perspective on miRNA-based therapeutic opportunities and perspectives.