儿童中比伐芦定的抗凝过程

Bivalirudin for Pediatric Procedural Anticoagulation

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比伐芦定（新泽西州帕西帕尼，Angiomax）是凝血酶的直接抑制剂，由于儿童中存在肝素诱导的继发性血小板减少症，比伐芦定越来越多应用于替代肝素。肝素诱导的血小板减少症相对罕见，而且食品和药物管理局尚未批准其对儿童的使用，因此关于比伐卢定在儿童中的药代动力学和药效学多是由成人数据推算出来。通过回顾既往发表的相关文献，本篇叙述性综述将给出儿童中使用比伐芦定抗凝的建议。

（杨雨迎 译 潘艳、薛张纲校）

Bivalirudin (Angiomax; The Medicines Company, Parsippany, NJ), a direct thrombin inhibitor, has found increasing utilization as a heparin alternative in the pediatric population, most com- monly for the treatment of thrombosis secondary to heparin-induced thrombocytopenia. Due to the relative rarity of heparin-induced thrombocytopenia as well as the lack of Food and Drug Administration–approved indications in this age group, much of what is known regarding the pharmacokinetics and pharmacodynamics of bivalirudin in this population has been extrapo- lated from adult data. This narrative review will present recommendations regarding the use of bivalirudin for procedural anticoagulation in the pediatric population based on the published literature. (Anesth Analg 2019;128:43–55)

重复应用吗啡延长雄鼠术后疼痛

Repeated Morphine Prolongs Postoperative Pain in Male Rats

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背景:阿片类药物是有效的术后镇痛药。然而，我们曾经报道过吗啡一类的阿片类药物会加剧炎性疼痛以及外周和中枢的神经性疼痛。这一不良的效应是由能促进脊髓背角的神经高兴奋性的炎症介质引起的。由此，我们检验了围术期吗啡的应用在雄鼠中是否能类似的延长术后疼痛。

方法：剖腹手术后，老鼠立即被吗啡处理了七天，其中第二组吗啡的用量递减。脊髓背角表达炎性介质的基因被量化。在最终实验中，剖腹手术前老鼠应用了七天的吗啡。

结果:我们发现剖腹手术后应用吗啡延长了术后三周的疼痛。（时间*用量：p 小于 0.001；时间：p 小于 0.001；用量：p 小于 0.5）术后疼痛延长和吗啡撤量无关，所以它不会由剂量递减而预防。（时间*用量：p=0.8；时间：p 小于 0.001；用量：p=0.9）。延长的术后疼痛和炎症基因的表达增加相关，包括表达 toll 样受体 4，NLRP3，NFkB，caspase-1，干扰素 1，肿瘤坏死因子（p 小于 0.05）。最后我们展示了术前应用吗啡，包括剖腹术前立刻应用吗啡，相似的延长了疼痛。（时间*

用量：p 小于 0.001；时间：p 小于 0.001；用量：p 小于 0.001）吗啡潜在引起疼痛有效应窗，在术前一周应用七天吗啡不会延长术后疼痛。
结论：这些研究表明吗啡对术后疼痛有一定不良效应。这些研究提示临床应进一步研究阿片类药物是否延长术后疼痛。
（刘璐萍 译 潘艳、薛张纲校）

BACKGROUND: Opioids are effective postoperative analgesics. Disturbingly, we have previously reported that opioids such as morphine can worsen inflammatory pain and peripheral and central neuropathic pain. These deleterious effects are mediated by immune mediators that promote neuronal hyperexcitability in the spinal dorsal horn. Herein, we tested whether perioperative morphine could similarly prolong postoperative pain in male rats.
METHODS: Rats were treated with morphine for 7 days, beginning immediately after laparotomy, while the morphine was tapered in a second group. Expression of genes for inflammatory mediators was quantified in the spinal dorsal horn. In the final experiment, morphine was administered before laparotomy for 7 days.
RESULTS: We found that morphine treatment after laparotomy extended postoperative pain by more than 3 weeks (time × treatment: $P < .001$; time: $P < .001$; treatment: $P < .05$). Extension of postoperative pain was not related to morphine withdrawal, as it was not prevented by dose tapering (time × treatment: $P = .8$; time: $P < .001$; treatment: $P = .9$). Prolonged postsurgical pain was associated with increased expression of inflammatory genes, including those encoding Toll-like receptor 4, NOD like receptor protein 3 (NLRP3), nuclear factor kappa B (NFκB), caspase-1, interleukin-1β, and tumor necrosis factor ($P < .05$). Finally, we showed that of preoperative morphine, concluding immediately before laparotomy, similarly prolonged postoperative pain (time × treatment: $P < .001$; time: $P < .001$; treatment: $P < .001$). There is a critical window for morphine potentiation of pain, as a 7-day course of morphine that concluded 1 week before laparotomy did not prolong postsurgical pain.
CONCLUSIONS: These studies indicate the morphine can have a deleterious effect on postoperative pain. These studies further suggest that longitudinal studies could be performed to test whether opioids similarly prolong postoperative pain in the clinic.

认识到中国神经轴突分娩镇痛的先驱张广博博士和她半个多世纪前未发表的手稿

Recognizing the Chinese Pioneer of Neuraxial Labor Analgesia Dr Guang-Bo Zhang and Her Unpublished Manuscript From More Than a Half-Century Ago

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张广博医生是中国第一个管理和研究分娩硬膜外镇痛效果的麻醉医生。1963 年 9 月至 1964 年 3 月，她进行了一项观察性研究，评估神经轴系镇痛对分娩妇女的影响。她展示了她的研究并准备了一篇文章;然而，由于 1966 年开始的无产阶级文化大革命，她的作品没有出版。文革期间，她成功地将未发表的文章、笔记和幻灯片保存在北京附近的一个乡村。这些 54 岁以前未发表的文献是中国已知的第一例神经轴突分娩镇痛临床试验。
(高华塬 译 潘艳、薛张纲校)
Dr Guang-Bo Zhang was the first anesthesiologist to administer and study the effects of labor epidural analgesiain China. Between September 1963 and March 1964, she conducted an observational study evaluating the effects of neuraxial analgesia for laboring women. She presented her research and prepared an article; however, due to the Great Proletarian Cultural Revolution (Cultural Revolution), which began in 1966, her work went unpublished. She successfully preserved her unpublished article, notes, and slides throughout the Cultural Revolution by hiding them in a countryside location near Beijing. These 54-year-old, previously unpublished documents represent the first known clinical trial of neuraxial labor analgesia conducted in China.

胃超声检测“满胃”的准确性

Diagnostic Accuracy of Point-of-Care Gastric Ultrasound

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背景： 肺吸入式胃内容物与术后发病率和死亡率有着显著的联系。 先前的研究已经调查了胃超声评估床边胃内容物的有效性、可靠性和可能存在的临床影响。在本研究中，我们检查了护理胃超声检测“满胃”的准确性(作为敏感性、特异性和似然比的评估)。
方法: 40 名健康志愿者在禁食至少 8 小时后，按 1：1 的比例随机被分为两组，一组保持禁食另一组志愿者摄入标准数量的透明液体或固体食物。 每个受试者被随机分为两组，每组 24 小时内至少进行两次独立的研究。胃超声检查是由一位失明的超声检查人员按照标准扫描方案进行的。采用定性和定量相结合的方法，将结果归纳为阳性(任何固体或>1.5ml/kg 清液)或阴性(无固体和≤1.5ml/kg 清液)。
结果: 本研究对 80 个研究阶段的数据进行了分析。 在这个预先测试概率为 50%的模拟临床场景中，注意点胃超声的敏感性为 1.0(95%可信区间[CI]，0.925~1.0)，特异性为 0.975(95%CI，0.95-1.0)。阳性似然比为 40.0(95%CI，10.33-∞)，负似然比为 0(95%CI，0~0.072)，阳性预测值为 0.976(95%CI，0.878~1.0)，阴性预测值为 1.0(95%CI，0.92-1.0)。
结论: 结果表明，床边胃超声是高度敏感和特异的，在不确定是否存在胃内容物的临床案例中，专门用于检测或排除饱胃。
（符奕青 译 潘艳、薛张纲校）

Background: Pulmonary aspiration of gastric contents is associated with significant perioperative morbidity and mortality. Previous studies have investigated the validity, reliability, and possible clinical impact of gastric ultrasound for the assessment of gastric content at the bedside. In the present study, we examined the accuracy (evaluated as sensitivity, specificity, and likelihood ratios) of point-of-care gastric ultrasound to detect a "full stomach" in a simulated scenario of clinical equipoise.
Methods: After a minimum fasting period of 8 hours, 40 healthy volunteers were randomized in a 1:1 ratio to either remain fasted or ingest a standardized quantity of clear fluid or solid. Each subject was randomized twice on 2 independent study sessions at least 24 hours apart. A gastric ultrasound examination was performed by a blinded sonographer following a standardized scanning protocol. Using a combination of qualitative and quantitative findings, the result was summarized in a dichotomous manner as positive (any solid or >1.5 mL/kg of clear fluid) or negative (no solid and ≤1.5 mL/kg of clear fluid) for full stomach.
Results: Data from 80 study sessions were analyzed. In this simulated clinical scenario with a pretest probability of 50%, point-of-care gastric ultrasound had a sensitivity of 1.0 (95% confidence interval [CI], 0.925-1.0), a specificity of 0.975 (95% CI, 0.95-1.0), a positive likelihood ratio of 40.0 (95% CI, 10.33-∞), a negative likelihood ratio of 0 (95% CI, 0-0.072), a positive predictive value of 0.976 (95% CI, 0.878-1.0), and a negative predictive value of 1.0 (95% CI, 0.92-1.0). **Conclusions:** Our results suggest that bedside gastric ultrasound is highly sensitive and specific to detect or rule out a full stomach in clinical scenarios in which the presence of gastric content is uncertain.

女性在麻醉学术界的地位：最近 10 年

Status of Women in Academic Anesthesiology: A 10-Year Update

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背景：性别不平等在当今的医疗行业中仍然普遍存在。 过去的研究已调查了女性在麻醉学术界的地位。本研究的目的则是提供有关女性麻醉医师在麻醉学术界地位的最新信息。 过去 10 年中女性麻醉医师的人数虽然有所增加，但性别差异仍然存在，尤其是在领导阶层方面。
方法：医学生，住院医师和医务人员的数据来自美国医学院协会。 在 2006 年至 2016 年期间，比较了在麻醉科住院医师和医务人员这个级别的女性人数，以及麻醉部门女性主席的数量。在其他的领导角色中，麻醉学期刊编辑委员会成员的性别分布和麻醉研究获奖者的数据，主要来自互联网，并与 2005 年和 2006 年的数据进行比较。
结果：在 2006 年，女性麻醉科住院医师/医务人员的数量从 1570（32％）/ 1783（29％）增加到 2145（35％）/ 2945（36％）（P = .004 和 P <.001）。 自 2006 年以来，女性麻醉科医师每年增加的几率约 2％，比值比约为 1.02（95％置信区间，1.014-1.025; P <.001）。 2015 年，麻醉科女性正教授的比例（7.4％）低于男性正教授（17.3％）（差值，-9.9％; 95％的置信区间差异，-8.5％—-11.3％; P <.001）。从 2006 年到 2016 年，麻醉科女性主席的比例保持不变（12.7％对 14.0％）（P = 0.75）。 到目前为止，无论是《麻醉和镇痛》还是《麻醉学》杂志都没有一位女

主编。 麻醉科女性研究获奖者人数百分比从 1997-2007 年的 21.1％显着增加到 2007-2016 年的 31.5％（P = .02）。
结论：麻醉学术界领导层及以上的阶层仍然存在性别差异，主要是正教授，部门主任和期刊编辑。 然而，有一些迹象表明，女性可能正在走向领导平等的道路，最值得注意的是，女性在麻醉住院医师和其他医务人员中的数量在增长以及获得研究奖项的女性数量在增长。
（潘艳 译 薛张纲校）
BACKGROUND: Gender inequity is still prevalent in today's medical workforce. Previous studies have investigated the status of women in academic anesthesiology. The objective of this study is to provide a current update on the status of women in academic anesthesiology. We hypothesized that while the number of women in academic anesthesiology has increased in the past 10 years, major gender disparities continue to persist, most notably in leadership roles.
METHODS: Medical student, resident, and faculty data were obtained from the Association of American Medical Colleges. The number of women in anesthesiology at the resident and faculty level, the distribution of faculty academic rank, and the number of women chairpersons were compared across the period from 2006 to 2016. The gender distribution of major anesthesiology journal editorial boards and data on anesthesiology research grant awards, among other leadership roles, were collected from websites and compared to data from 2005 and 2006.
RESULTS: The number (%) of women anesthesiology residents/faculty has increased from 1570 (32%)/1783 (29%) in 2006 to 2145 (35%)/2945 (36%) in 2016 (P = .004 and P < .001, respectively). Since 2006, the odds that an anesthesiology faculty member was a woman increased approximately 2% per year, with an estimated odds ratio of 1.02 (95% confidence interval, 1.014-1.025; P < .001). In 2015, the percentage of women anesthesiology full professors (7.4%) was less than men full professors (17.3%) (difference, -9.9%; 95% confidence interval of the difference, -8.5% to -11.3%; P < .001). The percentage of women anesthesiology department chairs remained unchanged from 2006 to 2016 (12.7% vs 14.0%) (P = .75). To date, neither Anesthesia & Analgesia nor Anesthesiology has had a woman Editor-in-Chief. The percentage of major research grant awards to women has increased significantly from 21.1% in 1997-2007 to 31.5% in 2007-2016 (P = .02).
CONCLUSIONS: Gender disparities continue to exist at the upper levels of leadership in academic anesthesiology, most importantly in the roles of full professor, department chair, and journal editors. However, there are some indications that women may be on the path to leadership parity, most notably, the growth of women in anesthesiology residencies and faculty positions and increases in major research grants awarded to women.

麻醉相关的项目依从性对于住院时间的影响：结果来自一项结直肠手术开展 ERAS 的队列研究

The Impact of Anesthesia-Influenced Process Measure Compliance on Length of Stay：Results From an Enhanced Recovery After Surgery for Colorectal Surgery Cohort

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背景：在加速康复外科（ERAS）中，患者的项目依从性与 ERAS 的结局改善相关。由此，我们试图在一项关于结直肠手术开展 ERAS 项目的队列研究中，评估与麻醉直接相关的项目依从性的影响。
方法：从 2013 年 1 月到 2015 年 4 月，我们收集了 1140 名连续的患者的数据，包括实施 ERAS 之前的和 ERAS 开展之后的。我们分析了直接受麻醉师或急性疼痛服务影响的 9 项特定项目措施的依从性，以评估其对住院时间(LOS)的影响。
结果：项目措施依从性与住院时间的逐步减少相关。能够接受多于 4 项项目措施(高依从性)患者与低依从性(0-2 项项目措施)的患者相比，住院时间显著缩短(发病率比值[IRR]，0.77; 95%可信区间[CI],0.70 -0.85;P < 0.001)。多变量回归表明，多模式恶心呕吐预防措施的使用(IRR, 0.78;95%CI,0.68 -0.89;P < 0.001)、术后非甾体类镇痛药的定时使用(IRR, 0.76;95%CI,0.67 -0.85;P < 0.001)以及对于爆发痛严格遵守术后阿片类药物的给药方案(IRR, 0.58；95%CI, 0.51-0.67; P < 0.001)都与住院时间降低独立相关。
结论：我们的研究结果表明，在麻醉师的直接作用下以及在一个正式的麻醉方案的配合下，患者项目依从性的增加与住院时间降低有关。麻醉同事在整个手术过程中的参与增加了围术期监管的整体价值。
(李艾伦 译 潘艳、薛张纲校)

BACKGROUND: Process measure compliance has been associated with improved outcomes in enhanced recovery after surgery (ERAS) programs. Herein, we sought to assess the impact of compliance with measures directly influenced by anesthesiology in an ERAS for colorectal surgery cohort.
METHODS: From January 2013 to April 2015, data from 1140 consecutive patients were collected for all patients before (pre-ERAS) and after (ERAS) implementation of an ERAS program. Compliance with 9 specific process measures directly influenced by the anesthesiologist or acute pain service was analyzed to determine the impact on hospital length of stay (LOS).
RESULTS: Process measure compliance was associated with a stepwise reduction in LOS. Patients who received >4 process measures (high compliance) had a significantly shorter LOS (incident rate ratio [IRR], 0.77; 95% CI, 0.70–0.85); P < .001) compared to low compliance (0–2 process measures) counterparts. Multivariable regression suggests that utilization of multimodal nausea and vomiting prophylaxis (IRR, 0.78; 95% CI, 0.68–0.89; P < .001), scheduled postoperative nonsteroidal pain medication use (IRR, 0.76; 95% CI, 0.67–0.85; P < .001), and strict adherence to a postoperative opioid administration (IRR, 0.58; 95% CI, 0.51–0.67; P < .001) protocol for breakthrough pain were independently associated with reduced LOS.

CONCLUSIONS: Our findings suggest that increased compliance with process measures directly influenced by the anesthesiologists and in concert with a formal anesthesia protocol is associated with reduced LOS. Engaging anesthesiology colleagues throughout the surgical encounter increases the overall value of perioperative care.

终末期肾病患者的七氟醚最低肺泡苏醒浓度降低

Minimum Alveolar Concentration-Awake of Sevoflurane Is Decreased in Patients With End-Stage Renal Disease.

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背景：终末期肾病(ESRD)已被证实与神经功能异常有关。临床上使用的吸入麻醉药通常通过中枢神经系统中的多个靶受体发挥作用。大脑的病理性变化可能改变机体对吸入麻醉药的敏感性。本研究旨在比较 ESRD 患者与肾功能正常的患者的七氟醚的最低肺泡苏醒浓度(MAC-awake)。
方法：根据改进的 Dixon 序贯法，患者以预先选择的七氟醚浓度进行吸入诱导，起始浓度为 1.0%，间隔 0.2%。在接下来的每一个病人中，七氟醚的浓度将根据前一病人是否对口头指令做出积极反应而增加或减少。我们还检测了血清神经元特异性烯醇化酶浓度，它是神经元受损的的生物标志物。
结果：本研究共纳入患者 41 例：其中 ESRD 患者 20 例，对照组 21 例。在 ESRD 患者中，七氟醚的 MAC-awake 明显低于对照组(0.56%[标准差{SD} = 0.10%] vs 0.67% [SD = 0.08%];P = .031)。ESRD 患者的血清神经元特异性烯醇化酶浓度高于对照组(16.4 ng/mL [SD = 5.0] vs 8.7 ng/mL [SD = 2.9]);P <0.01)。
结论：与肾功能正常的患者相比，ESRD 患者的七氟醚 MAC-awake 较肾功能正常的患者低。脑功能受损可能是导致其降低的部分原因。
（陈莹 译 潘艳、薛张纲校）

BACKGROUND : End-stage renal disease (ESRD) has been shown to be associated with abnormal neural function. Clinically used inhaled anesthetic agents typically exert their effect through multiple target receptors in the central nervous system. Pathological changes in the brain may alter sensitivity to inhaled anesthetic agents. This study aimed to determine the minimum alveolar concentration-awake (MACawake) of sevoflurane in patients with ESRD compared to patients with normal renal function.
METHODS: Patients underwent inhalational induction of anesthesia and received sevoflurane at a preselected concentration according to a modified Dixon "up-and-down" method starting at 1.0% with a step size of 0.2%. The concentration of sevoflurane used for each consecutive patient was increased or decreased based on a positive or negative response to verbal command in the previous patient. Serum

neuron-specific enolase, a biomarker of impaired neurons, was also measured.
RESULTS: Forty-one patients were enrolled: 20 with ESRD and 21 as controls. The MACawake of sevoflurane in patients with ESRD was significantly lower than that observed in the control group (0.56% [standard deviation {SD} = 0.10%] vs 0.67% [SD = 0.08%]; P = .031). Patients with ESRD exhibited higher serum neuron-specific enolase levels compared to the control group (16.4 ng/mL [SD = 5.0] vs 8.7 ng/mL [SD = 2.9]; P < .001).
CONCLUSIONS: MACawake of sevoflurane is somewhat lower in patients with ESRD compared to those with normal renal function. Impaired cerebral function may partly contribute to the reduction in anesthetic requirement.

术中血流动力学和超声心动图监测左心室辅助装置植入后并发的严重右室衰竭
Intraoperative Hemodynamic and Echocardiographic Measurements Associated with Severe Right Ventricular Failure After Left Ventricular Assist Device Implantation
Gudejko MD, Gebhardt BR, Zahedi F, Jain A, Breeze JL, Lawrence MR, Shernan SK, Kapur NK, Kiernan MS, Couper G, Cobey FC.
Anesthesia & Analgesia: 2019 128 25–32

背景：左心室辅助装置（LVAD）植入后发生的严重右室衰竭（RVF）可导致并发症发生率和死亡率增高。作者研究术中右心血流动力学数据、超声心动图参数与是否发生严重右室衰竭的关系。
方法：此综述回顾了 2013 年 5 月至 2016 年 5 月接受 LVAD 植入的患者。严重 RVF 定义为需要右室机械支持装置、强心药物、和/或吸入性肺血管扩张剂持续应用大于 14 天。根据病例回顾计算右室心衰危险度评分及收集右心血流动力学数据。在两个时期测量肺动脉搏动指数(PAPi)[（肺动脉收缩压－肺动脉舒张压）/中心静脉压]（1）体外循环(CPB)开始前 30 分钟；以及（2）关胸后。在体外循环前后由不知情人员测量超声心动图数据。采用单变量回归模型测量血流动力学和超声心动图情况。
结果：共收集 110 位 LVAD 植入患者。其中 25 位不符合右心衰标准。剩下 85 位患者，28 名（33%）符合严重 RVF 诊断。严重 RVF 相关的血流动力学数据表现为：除了 CPB 开始前(18 ± 9 vs 13 ± 5 mm Hg; P = .0008)和关胸后(0.9 ± 0.5 vs 1.5 ± 0.8; P = .0008) PAPi 更低以外，关胸时中心静脉压更高(18 ± 9 vs 13 ± 5 mm Hg; P = .0008)。CPB 开始后严重 RVF 相关的超声心动图数据包括：右房长轴直径更长(0.9 ± 0.2 vs 1.1 ± 0.3 cm; P = .008)，右室收缩末面积更大(22.6 ± 8.4 vs 18.5 ± 7.9 cm; P = .03)，面积变化分数更低(20.2 ± 10.8 vs 25.9 ± 12.6; P = .04)，三尖瓣环收缩期移位更小(0.9 ± 0.2 vs 1.1 ± 0.3 cm; P = .008)。右室心衰危险度评分并并非严重 RVF 的显著预测因子。关胸后中心静脉压和关胸后 PAPi 较其它的变量能更好地区分是否发生严重 RVF，其曲线下面积均为 0.75(95% CI, 0.64-0.86)。
结论：关胸后中心静脉压和肺动脉搏动指数与严重右心衰竭显著相关。体外循环后使用超声心动图评估右室功能的参数与严重右室衰竭的相关性较弱。
（黄思铭 译　陈杰 校）
BACKGROUND: Severe right ventricular failure (RVF) after left ventricular assist device (LVAD) implantation increases morbidity and mortality. We investigated the

association between intraoperative right heart hemodynamic data, echocardiographic parameters, and severe versus nonsevere RVF.
METHODS: A review of LVAD patients between March 2013 and March 2016 was performed. Severe RVF was defined by the need for a rightventricular mechanical support device, inotropic, and/or inhaled pulmonary vasodilator requirements for >14 days. From a chart review, the right ventricular failure risk score was calculated and right heart hemodynamic data were collected. Pulmonary artery pulsatility index (PAPi) [(pulmonary artery systolic pressure - pulmonary artery diastolic pressure)/central venous pressure (CVP)] was calculated for 2 periods: (1) 30 minutes before cardiopulmonary bypass (CPB) and (2) after chest closure. Echocardiographic data were recorded pre-CPB and post-CPB by a blinded reviewer. Univariate logistic regression models were used to examine the performance of hemodynamic and echocardiographicmetrics.
RESULTS: A total of 110 LVAD patients were identified. Twenty-five did not meet criteria for RVF. Of the remaining 85 patients, 28 (33%) met criteria for severe RVF. Hemodynamic factors associated with severe RVF included: higher CVP values after chest closure (18 ± 9 vs 13 ± 5 mm Hg; P = .0008) in addition to lower PAPi pre-CPB (1.2 ± 0.6 vs 1.7 ± 1.0; P = .04) and after chest closure (0.9 ± 0.5 vs 1.5 ± 0.8; P = .0008). Post-CPB echocardiographic findings associated with severe RVF included: larger right atrial diameter major axis (5.4 ± 0.9 vs 4.9 ± 1.0 cm; P = .03), larger right ventricle end-systolic area (22.6 ± 8.4 vs 18.5 ± 7.9 cm; P = .03), lower fractional area of change (20.2 ± 10.8 vs 25.9 ± 12.6; P = .04), and lower tricuspid annular plane systolic excursion (0.9 ± 0.2 vs 1.1 ± 0.3 cm; P = .008). Right ventricular failure risk score was not a significant predictor of severe RVF. Post-chest closure CVP and post-chest closure PAPi discriminated severe from nonsevere RVF better than other variables measured, each with an area under the curve of 0.75 (95% CI, 0.64-0.86).
CONCLUSIONS: Post-chest closure values of CVP and PAPi were significantly associated with severe RVF. Echocardiographic assessment of RV function post-CPB was weakly associated with severe RVF.

门诊前交叉韧带重建术中区域阻滞的循证
第一部分 股神经阻滞

Evidence Basis for Regional Anesthesia in Ambulatory Anterior Cruciate Ligament Reconstruction
Part I—Femoral Nerve Block
Vorobeichik L, Brull R, Joshi GP, Abdallah FW.
Anesthesia & Analgesia: 2019 128 58–65

目前门诊前交叉韧带重建术（ACLR）后最佳的疼痛治疗方法尚未明确。股神经阻滞（FNB）被认为能增强术后镇痛，但其作用在现代多模式镇痛中的地位尚不清楚。本文系统综述探讨了无论使用的镇痛方案是否包括局部滴注镇痛（LIA），在多模式镇痛中添加 FNB 对 ACLR 术后镇痛效果的影响。作者检索了与单独使用多模式镇痛（对照）相比，评估多模式镇痛中添加 FNB 对 ACLR 术后镇痛效果影响的随机对照试验。作者将术后 24 小时阿片类药物使用量作为主要预后指

标。次要预后指标包括术后 24-48 小时的阿片类药物使用量、0-48 小时的静息和动态疼痛评分、疼痛解救时间、PACU 停留和住院时间、患者满意度、术后恶心呕吐、功能性预后和长期（>1 个月）股四头肌强度。纳入了 8 项随机对照试验（716 例患者）。5 项试验比较了 FNB 和对照，另外 3 项试验比较了联合 FNB 和 LIA 和单独 LIA。与对照组相比，在 3 个试验中有 2 个试验显示加用 FNB 可适度减少 24 小时阿片类药物使用量，1 个试验中 1 小时内及另一试验中长达 24 小时的静息痛有所改善。然而，与单独 LIA 相比，联合 FNB 和 LIA 在任何试验中都没显示其能减少阿片类药物使用量，仅在 1 个试验中确实在 20 分钟内改善了疼痛评分。回顾性试验中，没有 FNB 对 ACLR 术后长期股四头肌力量或功能影响的评估。当前证据表明，将 FNB 添加到 ACLR 的多模式镇痛中的收益较弱且存在争议。但如果多式镇痛方案包括 LIA，则加入 FNB 没有益处。作者研究结果不支持 ACLR 患者常规使用 FNB 进行镇痛

（蒋长青　译　陈杰 校）

The optimal management of pain after ambulatory anterior cruciate ligament reconstruction (ACLR) is unclear. Femoral nerve block (FNB) is purported to enhance postoperative analgesia, but its effectiveness in the setting of modern multimodal analgesia is unclear. This systematic review examines the effect of adding FNB to multimodal analgesia on analgesic outcomes after ACLR, whether or not the analgesic regimen used included local instillation analgesia (LIA). We retrieved randomized controlled trials evaluating the effects of adding FNB to multimodal analgesia on analgesic outcomes after ACLR, compared to multimodal analgesia alone (control). We designated postoperative opioid consumption at 24 hours as our primary outcome. Secondary outcomes included postoperative opioid consumption at 24-48 hours, rest, and dynamic pain severity between 0 and 48 hours, time to analgesic request, postanesthesia care unit and hospital stay durations, patient satisfaction, postoperative nausea and vomiting, functional outcomes, and long-term (>1 month) quadriceps strength. Eight randomized controlled trials (716 patients) were identified. Five trials compared FNB administration to control, and another 3 compared the combination of FNB and LIA to LIA alone. Compared to control, adding FNB resulted in modest reductions in 24-hour opioid consumption in 2 of 3 trials, and improvements in rest pain at 1 hour in 1 trial and up to 24 hours in another.。In contrast, the combination of FNB and LIA, compared to LIA alone, did not reduce opioid consumption in any of the trials, but it did improve pain scores at 20 minutes only in 1 trial. The effect of FNB on long-term quadriceps strength or function after ACLR was not evaluated in the reviewed trials. Contemporary evidence suggests that the benefits of adding FNB to multimodal analgesia for ACLR are modest and conflicting, but there is no incremental analgesic benefit if the multimodal analgesic regimen included LIA. Our findings do not support the routine use of FNB for analgesia in patients having ACLR.

麻醉影响的过程监测依从性对住院时间的影响：一项结直肠手术加速康复外科队列研究的结果

The Impact of Anesthesia-Influenced Process Measure Compliance on Length of Stay：Results From an Enhanced Recovery After Surgery for Colorectal Surgery Cohort

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Anesthesia & Analgesia: 2019 128 68–74

背景：过程测量的依从性与改善加速康复外科（ERAS）预后相关。在此作者试图评估在结直肠手术中麻醉直接影响的监测指标的依从性对患者预后的影响。
方法：数据纳入了自 2013 年 1 月至 2015 年 4 月参与并完成 ERAS 项目的 1140 名患者，连续记录了 ERAS 实施前后的数据。分析了直接接受麻醉医生或急性疼痛服务的 9 项特定项目过程测量的依从性，确定其对住院时间（LOS）的影响。
结果：过程测量的依从性与 LOS 逐步减少有关。与依从性低的患者（接受 0-2 项过程测量）相比，接受 4 项以上过程测量的患者（依从性高），LOS 明显减少（IRR 0.77；95% Cl，0.70-0.85，p＜0.01）；多变量回归统计结果表明，多模式恶心呕吐预防的应用（IRR，0.78；95% Cl，0.68-0.89；p＜0.001）、有计划的术后非甾体类镇痛药物的应用（IRR, 0.76; 95% Cl,0.51-0.67；p＜0.001）、减少术后爆发痛时阿片类药物的使用（IRR, 0.58;95% Cl，0.51-0.67；p＜0.001），分别可减少 LOS。
结论：作者研究表明，在麻醉医师的直接影响下，并配合正式的麻醉方案，依从性的增加与降低 LOS 有关。整个手术过程中，麻醉医师的参与增加了围手术期监护的整体价值。
（张骁 译　陈杰 校）

BACKGROUND: Process measure compliance has been associated with improved outcomes in enhanced recovery after surgery (ERAS) programs. Herein, we sought to assess the impact of compliance with measures directly influenced by anesthesiology in an ERAS for colorectal surgery cohort.
METHODS: From January 2013 to April 2015, data from 1140 consecutive patients were collected for all patients before (pre-ERAS) and after (ERAS) implementation of an ERAS program. Compliance with 9 specific process measures directly influenced by the anesthesiologist or acute pain service was analyzed to determine the impact on hospital length of stay (LOS).
RESULTS: Process measure compliance was associated with a stepwise reduction in LOS. Patients who received >4 process measures (high compliance) had a significantly shorter LOS (incident rate ratio [IRR], 0.77; 95% CI, 0.70-0.85); P < .001) compared to low compliance (0-2 process measures) counterparts. Multivariable regression suggests that utilization of multimodal nausea and vomiting prophylaxis (IRR, 0.78; 95% CI, 0.68-0.89; P < .001), scheduled postoperative nonsteroidal pain medication use (IRR, 0.76; 95% CI, 0.67-0.85; P < .001), and strict adherence to a postoperative opioid administration (IRR, 0.58; 95% CI, 0.51-0.67; P < .001) protocol for breakthrough pain were independently associated with reduced LOS.
CONCLUSIONS: Our findings suggest that increased compliance with process measures directly influenced by the anesthesiologists and in concert with a formal

anesthesia protocol is associated with reduced LOS. Engaging anesthesiology colleagues throughout the surgical encounter increases the overall value of perioperative care.

终末期肾病患者七氟烷最小苏醒肺泡有效浓度降低

Minimum Alveolar Concentration-Awake of Sevoflurane Is Decreased in Patients With End-Stage Renal Disease

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Wu Y1, Jin S1, Zhang L2, Cheng J3, Hu X1, Chen H1, Zhang Y1.
Anesthesia & Analgesia: 2019 128 77–82

背景：终末期肾病（ESRD）已被证明与神经功能异常密切相关。临床上使用的吸入麻醉药通常通过中枢神经系统中的多个靶受体发挥其作用。大脑中的病理变化可能改变其对吸入性麻醉药的敏感性。本研究旨在确定 ESRD 患者七氟烷最小苏醒肺泡有效浓度（MACawake）与肾功能正常患者相比的差异。
方法：患者接受吸入麻醉诱导，根据改进的 Dixon 序贯法（起始浓度为 1.0%，每次增加 0.2%）设置诱导时七氟烷的浓度。基于先前患者对口头命令的积极或消极反应增减后续患者的七氟烷浓度。与此同时，测量患者血清中神经元特异性烯醇化酶、神经元受损的生物标志物的水平。
结果：本研究招募了 41 名患者，其中 ESRD 组 20 名，对照组 21 名。 ESRD 患者的七氟醚 MACawake 显着低于对照组（0.56％[标准差 0.10％]vs0.67％[标准差 0.08％]; P=0.031）。与对照组相比，ESRD 患者血清中神经元特异性烯醇酶水平更高（16.4ng/mL[标准差 5.0]vs8.7ng/mL[标准差 2.9];P<0.001）。
结论：与肾功能正常者相比，ESRD 患者的七氟醚 MACawake 略低，脑功能受损在其中可能起了部分作用。
（周江平 译 陈杰 校）

BACKGROUND: End-stage renal disease (ESRD) has been shown to be associated with abnormal neural function. Clinically used inhaled anesthetic agents typically exert their effect through multiple target receptors in the central nervous system. Pathological changes in the brain may alter sensitivity to inhaled anesthetic agents. This study aimed to determine the minimum alveolar concentration-awake (MACawake) of sevoflurane in patients with ESRD compared to patients with normal renal function.
METHODS: Patients underwent inhalational induction of anesthesia and received sevoflurane at a preselected concentration according to a modified Dixon "up-and-down" method starting at 1.0% with a step size of 0.2%. The concentration of sevofluraneused for each consecutive patient was increased or decreased based on a positive or negative response to verbal command in the previous patient. Serum neuron-specific enolase, a biomarker of impaired neurons, was also measured.
RESULTS: Forty-one patients were enrolled: 20 with ESRD and 21 as controls. The MACawake of sevoflurane in patients with ESRD was significantly lower than that observed in the control group (0.56% [standard deviation {SD} = 0.10%] vs 0.67% [SD = 0.08%]; P = .031). Patients with ESRD exhibited higher serum neuron-specific

enolase levels compared to the control group (16.4 ng/mL [SD = 5.0] vs 8.7 ng/mL [SD = 2.9]; P < .001).
CONCLUSIONS: MACawake of sevoflurane is somewhat lower in patients with ESRD compared to those with normal renal function. Impaired cerebral function may partly contribute to the reduction in anesthetic requirement.

比较右美托咪定或瑞芬太尼在监护性麻醉下的超声引导下经支气管针吸活检术中的应用

Dexmedetomidine Versus Remifentanil for Monitored Anesthesia Care During Endobronchial Ultrasound-Guided Transbronchial Needle Aspiration
A Randomized Controlled Trial

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Anesthesia & Analgesia: 2019 128 98–106

背景：作者假设：与瑞芬太尼相比，接受右美托咪定的监护性麻醉（MAC）下进行超声引导下经支气管针吸活检术(EBUS-TBNA)的非插管患者不良事件发生率更低，但对围术期条件的满意度并无差异。
方法：60 名择期行 MAC 下 EBUS-TBNA 的患者（ASA I-III 级）随机被分为以下两组：接受瑞芬太尼 0.5μg/ kg 静脉推注持续 10 分钟，然后 0.05-0.25μg/ kg / min 维持；或接受右美托咪定 0.4μg/ kg 静脉推注 10 分钟，然后 0.5-1.0μg/ kg / h 维持。主要预后指标是严重呼吸道不良事件的数量（呼吸过慢、窒息、低氧）。次要预后指标包括血流动力学参数、出 PACU 时间、气管内利多卡因使用量、使用观察者评估警觉/镇静量表评估的镇静深度、手术条件、操作者和患者满意度、疼痛、咳嗽、声带动度、术中知晓、恶心呕吐情况。
结果：与瑞芬太尼相比，右美托咪定组的严重呼吸不良事件（呼吸过慢、窒息、低氧）发生次数显着减少（P =0 .001）：两组呼吸抑制或呼吸暂停次数分别为 0 [0-0]vs 0 [0-0.5]; P = 0.031），两组低氧次数分别为 0 [0-0.5] vs 1 [0-4]; P = .039。右美托咪定组（10 [3-37.5]分钟）EBUS-TBNA 术后患者达到离开 PACU 标准（Aldrete 评分：9）的时间，与瑞芬太尼组（3 [3-5]分钟）相比，所需时间更长（P <.001）。两组在镇静深度（观察者评估警觉/镇静量表）、气管内利多卡因使用量、手术条件、操作者和患者满意度、疼痛度、咳嗽、声带懂度、恶心呕吐方面没有差异。
结论：与瑞芬太尼相比，使用右美托咪定行监护性麻醉下的超声引导下经支气管针吸活检术的不良事件更少，但是整体手术条件无差异。 然而，使用右美托咪定可导致出院延迟。
（宋英才 译　陈杰 校）
BACKGROUND: We hypothesized that, compared to remifentanil, dexmedetomidine used for endobronchial ultrasound-guidedtransbronchial needle aspiration (EBUS-TBNA) performed under monitored anesthesia care (MAC) in nonintubated patients would result in fewer episodes of major respiratory adverse

events (number of episodes of bradypnea, apnea or desaturation) but no difference in satisfaction with perioperative conditions.
METHODS: Sixty (American Society of Anesthesiologists physical status I-III) patients scheduled to undergo EBUS-TBNA under MAC were randomized to receive either remifentanil (0.5 μg/kg IV bolus) in 10 minutes, followed by 0.05-0.25 μg/kg/min, or dexmedetomidine (0.4 μg/kg IV bolus) in 10 minutes, followed by 0.5-1.0 μg/kg/h. The primary outcome was the number of major respiratory adverse events (bradypnea, apnea, or hypoxia). The secondary outcomes included hemodynamic variables, discharge time from the postanesthesia care unit, endotracheal lidocaine use, patient's sedation using the Observer Assessment of Alertness/Sedation Scale, operative conditions, operator and patient satisfaction, pain, coughing, vocal cord mobility, recall, and nausea/vomiting.
RESULTS: Dexmedetomidine produced significantly fewer episodes of major respiratory events (bradypnea, apnea, or desaturation), with 0 [0-0.5] episodes versus 2 [0-5] (median [interquartile range]) (P = .001), than did remifentanil. Fewer episodes of bradypnea or apnea (dexmedetomidine: 0 [0-0] versus remifentanil: 0 [0-0.5]; P = .031), and fewer episodes of desaturation (dexmedetomidine: 0 [0-0.5] versus remifentanil: 1 [0-4]; P = .039) were recorded in the dexmedetomidine group. The time needed for patients to meet postanesthesia care unit discharge criteria (Aldrete score: 9) after EBUS-TBNA was longer in the dexmedetomidine group (10 [3-37.5] minutes) versus the remifentanil group (3 [3-5] minutes) (P < .001). No differences were observed in the 2 groups for sedation depth (Observer Assessment of Alertness/Sedation Scale), endotracheal lidocaine use, operative conditions, operator and patient satisfaction, pain, coughing, vocal cord mobility, recall, and nausea/vomiting episodes.
CONCLUSIONS: Dexmedetomidine resulted in fewer respiratory adverse events during EBUS-TBNA under MAC, when compared to remifentanil, with no difference in overall operative conditions. However, dexmedetomidine use was associated with delayed postoperative discharge

产科麻醉新进展 2017 年 Gerard W. Ostheimer 演讲
What Is New in Obstetric Anesthesia The 2017 Gerard W. Ostheimer Lecture
Bateman, Brian T., MD, MSc Bateman BT
Anesthesia & Analgesia: 2019 128 123–127

每年 Gerard W. Ostheimer 都会在关于产科麻醉与围产期学年度会议上进行演讲，旨在总结对产科麻醉医师临床操作有指导意义的重要新进展。本次回顾着眼于此次演讲中的一些最具总结性的文献资料。此次对于一些可能改变妇产科麻醉操作的具有里程碑意义的临床试验进行了探讨。同时对一些以如何优化椎管内麻醉和术后疼痛管理的几篇文章进行总结。最后，还回顾了以识别系统干预改善产科结局的多项研究。作者陈列了一套“待办事项”清单，重点是可以在妊娠和分娩单位实施质量改进计划。
（金夏　译　陈杰 校）

The Gerard W. Ostheimer lecture is given each year at the Society for Obstetric Anesthesia and Perinatology annual meeting and is intended to summarize important new scientific literature relevant to practicing obstetric anesthesiologists. This review highlights some of the most consequential papers covered in this lecture. It discusses landmark clinical trials that are likely to change the practice of obstetrics and obstetric anesthesia. It summarizes several articles that focus on how to optimize the provision of neuraxial anesthesia and postoperative pain control. Finally, it reviews studies aimed at identifying systems-based interventions that can improve obstetrical outcomes. A proposed "to-do" list focused on quality improvement initiatives that can be implemented on labor and delivery units is provided.

手术患者的管理困境——当输血不是一种选择 2017 年血液管理进展年会

Proceedings from the Society for Advancement of Blood Management Annual Meeting 2017 Management Dilemmas of the Surgical Patient—When Blood Is Not an Option

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围术期的特殊情况预警是很必要的。当输血不再是围术期的一种选择，尤其是对于存在高输血风险的患者中，我们对围术期患者的管理变得更加复杂。近年来的技术和信息使得避免输血成为一项现实可行的围术期管理选项，但这需要围术期管理团队以病人为中心进行相互协调和努力。本文分享了一些关于安全成功避免患者围术期输血的建议。主要方法包括围术期最优化管理，以及一些在术中和术后减少血液丢失的技巧，并介绍了现今对于输血的一些新型替代疗法。同时，本文还有助于通过法律和道德的层面进行考虑和操作，以尊重患者的信仰并确保其安全。

（谢婷婷 译　陈杰 校）

Vigilance is essential in the perioperative period. When blood is not an option for the patient, especially in a procedure/surgery that normally holds a risk for blood transfusion, complexity is added to the management. Current technology and knowledge has made avoidance of blood transfusion a realistic option but it does require a concerted patient-centered effort from the perioperative team. In this article, we provide suggestions for a successful, safe, and bloodless journey for patients. The approaches include preoperative optimization as well as intraoperative and postoperative techniques to reduce blood loss, and also introduces current innovative substitutes for transfusions. This article also assists in considering and maneuvering through the legal and ethical systems to respect patients' beliefs and ensuring their safety.

在猪实验性肺切除术模型中，术中输注艾司洛尔对其全身和肺部炎症的影响

Effects of Intraoperative Infusion of Esmolol on Systemic and Pulmonary Inflammation in a Porcine Experimental Model of Lung Resection Surgery

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背景：肺切除术(LRS)与全身和肺部炎症有关，后者可影响术后预后。β-肾上腺素受体的激活增加了促炎和抗炎介质的表达,而阻断 β-肾上腺素受体可减轻全身炎症反应。本实验目的是在需单肺通气(OLV)的 LRS 实验模型中，研究围术期持续静脉注射艾司洛尔对术后肺水肿的影响。
方法：将 24 头大白猪随机分为 3 组:对照组(CON)，艾司洛尔组(ESM)，假手术组(sham)。ESM 组在整个手术过程中先予以静脉注射艾司洛尔 (0.5 mg/kg)，然后持续输注(0.05 mg·kg·min)。CON 组予以与 ESM 组相同体积的 0.9%生理盐水，并持续输注生理盐水。假手术组在没有 LRS 或 OLV 行左胸切开术。LRS 结束后，复苏动物，24 小时后，再次接受全身麻醉。取肺活检及血浆标本，分析炎症介质的水平及其表达，并收集支气管肺泡灌洗液。
结果：术后 24 小时，与 CON 组相比，ESM 组两侧肺水肿程度较轻，促炎生物标志物肿瘤坏死因子(TNF)和白细胞介素(IL)-1 表达也更低。对于经纵隔肺叶活检，各组肺水肿程度、TNF、IL-1 的均数值及 95%置信区间(CI)分别为 14.3 (95% CI, 5.6-23.1)， P = 0.002; 0.19 (95% CI, 0.07-0.32)， P = 0.002; 0.13 (95% CI, 0.04-0.22)， P = 0.006。左上叶各组的肺水肿程度、TNF、IL-1 的均数值及 95%置信区间(CI)分别为 12.4 (95% CI, 4.2-20.6)，P =0.003; 0.25 (95% CI, 0.12-0.37)，P < 0.001; 0.3 (95% CI, 0.08-0.53) P =0.009。
结论：本研究结果表明，在术中行单肺通气的猪实验性肺切除术模型中，艾司洛尔可减轻术中和术后肺水肿程度及其炎症反应。
（陈冠楠 译 陈杰 校）
BACKGROUND: Lung resection surgery (LRS) is associated with systemic and pulmonary inflammation, which can affect postoperative outcomes. Activation of β-adrenergic receptors increases the expression of proinflammatory and anti-inflammatory mediators, and their blockade may attenuate the systemic inflammatory response. The aim of this study was to analyze the effect of a continuous perioperative intravenous perfusion of esmolol on postoperative pulmonary edema in an experimental model of LRS requiring periods of one-lung ventilation (OLV).
METHODS: Twenty-four large white pigs were randomly assigned to 3 groups: control (CON), esmolol (ESM), and sham. The ESM group received an intravenous esmolol bolus (0.5 mg/kg) and then an esmolol infusion (0.05 mg·kg·minute) throughout the procedure. The CON group received the same volume of 0.9% saline solution as the ESM group plus a continual infusion of saline. The sham group underwent a left thoracotomy without LRS or OLV. At the end of the LRS, the animals were awakened, and after 24 hours, they underwent general anesthesia again. Lung biopsies and plasma samples were obtained to analyze the levels and expression of inflammatory mediators, and the animals also received a bronchoalveolar lavage.

RESULTS: At 24 hours after the operation, the ESM group had less lung edema and lower expression of the proinflammatory biomarkers tumor necrosis factor (TNF) and interleukin (IL)-1 compared to the CON group for both lung lobes. For the mediastinal lobe biopsies, the mean difference and 95% confidence interval (CI) between the groups for edema, TNF, and IL-1 were 14.3 (95% CI, 5.6-23.1), P = .002; 0.19 (95% CI, 0.07-0.32), P = .002; and 0.13 (95% CI, 0.04-0.22), P = .006, respectively. In the left upper lobe, the mean differences for edema, TNF, and IL-1 were 12.4 (95% CI, 4.2-20.6), P = .003; 0.25 (95% CI, 0.12-0.37), P < .001; and 0.3 (95% CI, 0.08-0.53), P = .009.
CONCLUSIONS: Our results suggest that esmolol reduces lung edema and inflammatory responses in the intraoperative and postoperative periods in animals that underwent LRS with OLV.

心血管麻醉医师学会/欧洲心胸麻醉医师协会对房颤患者心脏手术围术期管理的实践咨询

Society of Cardiovascular Anesthesiologists/European Association of Cardiothoracic Anaesthetists Practice Advisory for the Management of Perioperative Atrial Fibrillation in Patients Undergoing Cardiac Surgery

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即便对于心脏手术，术后房颤（POAF）也是术后最常见的不良事件，其与发病率、死亡率、住院时间和重症监护病房停留时间相关。尽管心脏外科手术总死亡率和术后发病率得到逐步改善，但 POAF 的发病率仍保持在 30%-50%之间。近年来，一些主要心血管学会已发布了一些关于心房颤动（AF）围手术期管理的循证建议；然而，医生们对这些指南的遵照执行程度尚不清楚。此外，许多学会建议根据患者房颤情况分为"正常风险组"和"提高风险组"，但分级标准尚未明确界定。为了改善房颤的围手术期管理，心血管麻醉医师学会（SCA）临床实践改进委员会开发了一个多学科房颤工作组，该工作组根据相关专业协会的最新指南总结出包括心脏外科病人的管理在内的当前最佳实践原则。然后发布了一组循证调查问卷来描述当前的围手术期房颤治疗情况。通过与欧洲心胸麻醉师协会（EACTA）的合作，该调查问卷被分发给 SCA 和 EACTA 的联合会员，收到 641 份回馈，使人们对北美、欧洲和其他地区的围手术期房颤管理有了最全面的了解。调查数据表明，用于预防和治疗 POAF 的治疗方法范围广泛，并符合已发表的指南。为了提高依从性，创建了一个图形化的咨询工具，其格式易于访问，可用于床旁管理。最后，鉴于目前还没有基于证据的阈值来区分正常风险患者与高风险患者，SCA/EACTA 房颤工作组使用专家意见并基于已公布的房颤风险评分模型创建了一份房颤风险因素列表。该方法可以用于区分患者风险分组，并有助于遵守图形咨询工具中总结的循证建议。我们希望这些新增加的用于围手术期房颤管理的临床工具可以改善全世界心脏外科患者的循证医学管理及预后。

（吴洁译 李士通校）

Postoperative atrial fibrillation (poAF) is the most common adverse event after cardiac surgery

and is associated with increased morbidity, mortality, and hospital and intensive care unit length of stay. Despite progressive improvements in overall cardiac surgical operative mortality and postoperative morbidity, the incidence of poAF has remained unchanged at 30%–50%. A number of evidence-based recommendations regarding the perioperative management of atrial fibrillation (AF) have been released from leading cardiovascular societies in recent years; however, it is unknown how closely these guidelines are being followed by medical practitioners. In addition, many of these society recommendations are based on patient stratification into “normal” and “elevated” risk groups for AF, but criteria for that stratification have not been clearly defined. In an effort to improve the perioperative management of AF, the Society of Cardiovascular Anesthesiologists (SCA) Clinical Practice Improvement Committee developed a multidisciplinary Atrial Fibrillation Working Group that created a summary of current best practice based on a distillation of recent guidelines from professional societies involved in the care of cardiac surgical patients. An evidence-based set of survey questions was then generated to describe the current practice of perioperative AF management. Through collaboration with the European Association of Cardiothoracic Anaesthetists (EACTA), that survey was distributed to the combined memberships of both the SCA and EACTA, yielding 641 responses and resulting in the most comprehensive understanding to date of perioperative AF management in North America, Europe, and beyond. The survey data demonstrated the broad range of therapies utilized for the prevention and treatment of poAF, as well as a spectrum of adherence to published guidelines. With the goal of improving adherence, a graphical advisory tool was created with an easily accessible format that could be utilized for bedside management. Finally, given that no evidence-based threshold currently exists to differentiate patients at normal risk to develop poAF from those at elevated risk, the SCA/EACTA AF working group created a list of poAF risk factors using expert opinion and based on published risk score models for poAF. This approach allows stratification of patients into risk groups and facilitates adherence to the evidence-based recommendations summarized in the graphical advisory tool. It is our hope that these new additions to the clinical toolkit for the management of perioperative AF will improve the evidence-based care and outcomes of cardiac surgical patients worldwide.

麻醉干扰的过程测量依从性对住院时长的影响来自结直肠手术队列术后恢复增强结果

The Impact of Anesthesia-Influenced Process Measure Compliance on Length of Stay Results From an Enhanced Recovery After Surgery for Colorectal Surgery Cohort

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背景：过程测量依从性与改善加速康复外科（ERAS）结果有关。在此，我们试图评估直接受麻醉影响措施的依从性对结直肠手术 ERAS 队列影响。

方法：收集了 2013 年 1 月至 2015 年 4 月所有 1140 名患者实施 ERAS 策略之前（ERAS 前）和之后（ERAS 后）的数据。分析受麻醉医师或急性疼痛治疗直接影响的 9 项具体措施的遵从情况，以确定其对住院时长（LOS）的影响。

结果：过程测量的依从性与住院时长的逐渐延长有关。接受 4 个以上具体措施（高依从性）的患者与低依从性（0-2 个具体措施）的患者相比，其 LOS（事件率比[IRR]：0.77；95%可信区间：0.70-0.85）；P<0.001）明显较短。多变量回归分析表明，多模式恶心和呕吐的预防（IRR：0.78；95%CI：0.68–0.89；P<0.001）、计划内术后非甾体类药物使用（IRR：0.76；95%CI：0.67–0.85；P<0.001）和严格遵守术后阿片类药物治疗疼痛方案（IRR：0.58；95%CI：0.51–0.67；P<0.001）是降低 LOS 的独立相关因素。

结论：我们的研究结果表明，在麻醉医师的直接影响下，与标准麻醉方案相一致，提高对过程测量的依从性与降低 LOS 有关。让麻醉医师参与进整个手术过程中会提高围手术期管理的整体质量。

（吴洁译 李士通校）

BACKGROUND: Process measure compliance has been associated with improved outcomes in enhanced recovery after surgery (ERAS) programs. Herein, we sought to assess the impact of compliance with measures directly influenced by anesthesiology in an ERAS for colorectal surgery cohort.

METHODS: From January 2013 to April 2015, data from 1140 consecutive patients were collected for all patients before (pre-ERAS) and after (ERAS) implementation of an ERAS program. Compliance with 9 specific process measures directly influenced by the anesthesiologist or acute pain service was analyzed to determine the impact on hospital length of stay (LOS).

RESULTS: Process measure compliance was associated with a stepwise reduction in LOS. Patients who received >4 process measures (high compliance) had a significantly shorter LOS (incident rate ratio [IRR], 0.77; 95% CI, 0.70–0.85); $P < .001$) compared to low compliance (0–2 process measures) counterparts. Multivariable regression suggests that utilization of multimodal nausea and vomiting prophylaxis (IRR, 0.78; 95% CI, 0.68–0.89; $P < .001$), scheduled postoperative use (IRR, 0.76; 95% CI, 0.67–0.85; $P < .001$), and strict adherence to a postoperative opioid administration (IRR, 0.58; 95% CI, 0.51–0.67; $P < .001$) protocol for breakthrough pain were independently associated with reduced LOS.

CONCLUSIONS: Our findings suggest that increased compliance with process measures directly influenced by the anesthesiologists and in concert with a formal anesthesia protocol is associated with reduced LOS. Engaging anesthesiology colleagues throughout the surgical encounter increases the overall value of perioperative care.

环状软骨压迫法作用的可训练性：基于仿真的研究

Trainability of Cricoid Pressure Force Application：A Simulation-Based Study

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背景：吸入胃内容物是导致麻醉期间气道管理相关死亡率的主要原因。环状软骨压迫法（CP）在快速诱导过程中被广泛应用，以防止误吸发生。国际 CP 指南建议失去意识前和失去意识后的实施压力分别为 10 牛顿和 30 牛顿。然而，很少有研究能严格评估临床医师是否接受过如何持续给予这些所需压力的训练。我们假设临床医师接受过训练可以在实施 CP 时有效地持续保持 10-30 N 的压力。

方法：临床医生（主治麻醉医师、麻醉科住院医师、注册护士、或手术室护士）在游标测力

板上模拟实施 CP，在超过 60 秒的时间段选取 4 个时间点进行测量，在失去知觉之前进行 2 次测量，在失去知觉之后进行 2 次测量。所有 4 个时间点压力均在目标范围内（分别为 10±5 和 30±5 N）视为成功。基线评估后（n=100 名临床医生），40 名自愿接受达到推荐目标压力的训练，自我调节练习后，进行 30 个持续 1 分钟的高频模拟循环练习，通过累积和分析来评估他们的实施压力表现变化。

结果：训练前，400 个训练循环中有 5 个周期（1.3%【置信区间置信区间：0.3%–2.50%】）成功。教育和自我调节练习后的表现有所改善（成功周期占 16% [CI：7.8%–25%]，30 个周期中的最后 4 个周期的成功率为 45%（CI：33%–58%）。成功的几率随着练习时间的延长而增加（比值比：1.1；p<0.001）。然而，通过累积和分析，没有志愿者越过 h0 线，表明没有志愿者达到预定目标压力的训练程度。

结论：训练前按照国际指南的规定实施目标压力方面表现不佳。模拟训练提高了成功率，但仍无志愿者达到预先设定的熟练程度阈值。

（吴洁译 李士通校）

BACKGROUND: Aspiration of gastric contents is a leading cause of airway management–related mortality during anesthesia practice. Cricoid pressure (CP) is widely used during rapid sequence induction to prevent aspiration. National guidelines for CP suggest a target force of 10 N before and 30 N after loss of consciousness. However, few studies have rigorously assessed whether clinicians can be trained to consistently achieve these levels of force. We hypothesized that clinicians can be trained effectively to deliver 10–30 N during application of CP.

METHODS: Clinicians (attending anesthesiologist, anesthesiology residents, certified registered nurse anesthetists, or operating room nurses) applied CP on a Vernier force plate simulator with measurements taken at 4 time points over 60 seconds, 2 measurements before and 2 measurements after loss of consciousness. A successful cycle required all 4 time points to be within the target range (10 ± 5 and 30 ± 5 N, respectively). After baseline assessment (n = 100 clinicians), a subset of 40 participants volunteered for education on recommended force targets, underwent self-regulated practice, and then performed 30 1-minute cycles of high-frequency simulation analyzed by cumulative sum analysis to assess their change in performance.

RESULTS: At baseline, 5 cycles (1.3% [confidence interval {CI}, 0.3%–2.50%]) out of 400 were successful. Performance improved after education and self-regulated practice (16% successful cycles [CI, 7.8%–25%]), and performance during the last 4 of 30 cycles was 45% (CI, 33%–58%). The odds of success increased over time (odds ratio, 1.1; $P < .001$). By cumulative sum analysis, however, no subject crossed the h0 line, indicating that no one achieved proficiency of the predefined target forces.

CONCLUSIONS: At baseline, performance was poor at achieving target forces specified by national guidelines. Simulation-based training improved the success rate, but no participant achieved the predefined threshold for proficiency.

全麻加区域阻滞镇痛与全麻加静脉镇痛在小儿心脏手术中的比较：随机临床试验的系统回顾与荟萃分析

Regional Analgesia Added to General Anesthesia Compared With General Anesthesia Plus Systemic Analgesia for Cardiac Surgery in Children: A Systematic Review and Meta-analysis of Randomized Clinical Trials

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背景：本综述目的是比较区域性阻滞镇痛（RA）技术与静脉镇痛对心脏手术患儿术后疼痛、恶心呕吐、资源利用、二次手术、死亡和并发症的影响。
方法：2018 年 5 月，搜索了 PubMed、Embase 和 Cochrane 中心对照试验登记注册中比较区域阻滞镇痛技术和全身镇痛的随机对照试验。使用 Cochrane 工具评估所包括试验的偏倚风险。数据分析采用固定（i 2<25%）或随机效应模型（i 2≥25%）。根据建议评分、发展评分和评估工作组评分表对数据质量进行评分。
结果：我们纳入了 14 个随机对照试验，605 名参与患者（312 名实施 RA，293 名为对照组）。RA 可在术后 24 小时内减轻疼痛。术后 6-8 小时，标准化平均差为−0.81（95%置信区间[CI]：-1.22 至−0.40；低质量证据）。我们没有发现恶心和呕吐发生（风险比[RR]：0.89；95%可信区间：0.61–1.31；非常低质量的证据）、气管插管时间（标准化平均差：−0.18；95%可信区间：−0.40 至 0.05；低质量证据）、重症监护病房住院时间（平均差：−0.10 小时；95%可信区间：−1.31 至 1.12 小时；低-质量证据）、住院时间（平均差异：−0.02 天；95%可信区间：−1.16 至 1.12 天；低质量证据）、二次手术（RR：0.76；95%可信区间：0.17–3.28；低质量证据）、死亡（RR：0.50；95%可信区间：0.05–4.94；低质量证据）和呼吸抑制（RR：2.06；95%可信区间：0.20–21.68；非常低质量证据）。没有试验报告局部麻醉药毒性或与 RA 技术相关的持续性神经性或感染性并发症的迹象。一项试验报告了 1 例胸膜内镇痛引起的同侧膈肌麻痹短暂发作，随着局部麻醉药物停止使用而消失。
结论：与静脉镇痛相比，RA 技术可使接受心脏手术患儿术后 24 小时的疼痛减轻。目前，尚无证据表明小儿心脏外科手术的 RA 对总发病率和死亡率有任何影响。这些结果应该谨慎地解释，因为它们代表了一个小型和异质性研究的荟萃分析。有待进一步研究。
（吴洁译 李士通校）

BACKGROUND: The aim of this systematic review was to compare the effects of regional analgesic (RA) techniques with systemic analgesia on postoperative pain, nausea and vomiting, resources utilization, reoperation, death, and complications of the analgesic techniques in children undergoing cardiac surgery.
METHODS: A search was done in May 2018 in PubMed, Embase, and the Cochrane Central Register of Controlled Trials for randomized controlled trials comparing RA techniques with systemic analgesia. Risks of bias of included trials were judged with the Cochrane tool. Data were analyzed with fixed- ($I^2 < 25\%$) or random-effects models ($I^2 \geq 25\%$). The quality of evidence was graded according to the Grading of Recommendations Assessment, Development, and Evaluation working group scale.
RESULTS: We included 14 randomized controlled trials with 605 participants (312 to RA and 293 to the comparator). RA reduces pain up to 24 hours after surgery. At 6–8 hours after surgery, the standardized mean difference was −0.81 (95% confidence interval [CI], −1.22 to −0.40; low-quality evidence). We did not find a difference for nausea and vomiting (risk ratio [RR], 0.89; 95% CI, 0.61–1.31; very low-quality evidence), duration of tracheal intubation (standardized mean difference, −0.18; 95% CI, −0.40 to 0.05; low-quality evidence), intensive care unit length of stay (mean difference, −0.10 hours; 95% CI, −1.31 to 1.12 hours; low-quality evidence), hospital length of stay (mean difference, −0.02 days; 95% CI, −1.16 to 1.12 days; low-quality evidence), reoperation (RR, 0.76; 95% CI, 0.17–3.28; low-quality evidence), death (RR, 0.50; 95% CI, 0.05–4.94; low-quality evidence), and respiratory depression (RR, 2.06; 95% CI, 0.20–21.68; very low-quality evidence). No trial reported signs of local anesthetic toxicity or lasting

neurological or infectious complications related to the RA techniques. One trial reported 1 transient ipsilateral episode of diaphragmatic paralysis with intrapleural analgesia that resolved with cessation of local anesthetic administration。

CONCLUSIONS: Compared to systemic analgesia, RA techniques reduce postoperative pain up to 24 hours in children undergoing cardiac surgery. Currently, there is no evidence that RA for pediatric cardiac surgery has any impact on major morbidity and mortality. These results should be interpreted cautiously because they represent a meta-analysis of small and heterogeneous studies. Further studies are needed.

成年患者阿片类药物过量住院死亡率的国家趋势及相关因素

National Trends and Factors Associated With Inpatient Mortality in Adult Patients With Opioid Overdose

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背景：阿片类药物滥用和阿片类药物相关死亡率在过去十年中急剧上升。在住院患者中，与阿片类药物过量导致死亡的相关因素证据有限。主要目的是报告阿片类药物过量和死亡率的全国趋势。次要目标是探讨与住院患者死亡率相关的因素，并报告处方阿片类药物过量（POD）与非法阿片类药物过量（IOD）队列的差异。

方法：利用 2010-2014 年全国住院病人样本，我们进行了横断面分析，并确定了 570987 名符合国际疾病分类、第九次修订或 POD 或 IOD 外源性原因的成年患者进行加权评估。我们进行了多变量逻辑回归分析，以确定住院患者死亡率的预测因素。报告了比值比（OR）及其相关的 95%置信区间（CI）。

结果：在 570987 例阿片类药物过量使用患者中，13.8%的患者被诊断为碘缺乏症，其余患者被诊断为 POD。在所有的阿片类药物过量入院患者中，调整后的 IOD 入院率每年增加 31%（OR：1.31；95%CI：1.29–1.31；P<0.001）；然而，调整后的 IOD 入院率每年减少 24%（OR：0.76；95%CI：0.75–0.77；P<0.001）。IOD 和 POD 患者的死亡率分别为 4.7%和 2.3%。住院患者死亡率在住院期间每年增加 8%（OR，1.08；95%CI，1.02–1.14；P<.007）。所有 POD 入院患者的住院死亡率每年增加 6%（OR：1.06；95%CI：1.03–1.09；P<0.001）。与 POD 相比，IOD 组的死亡率更高（OR：2.03；95%CI：1.79–2.29；P<0.001）。年龄大于或等于 80 岁且诊断为实体恶性肿瘤患者的死亡率较高。非裔美国人和白人患者以及接受酒瘾康复治疗的患者住院死亡率较低。

结论：死亡率的增加为进一步的降低风险策略和干预方案的实施提供了强有力的基础支持。对阿片类药物过量及其合并症的医疗管理是需要涉及决策者和医疗保健团队的多学科方法。（吴洁译 李士通校）

BACKGROUND: The prevalence of opioid misuse and opioid-related mortality has increased dramatically over the past decade. There is limited evidence on factors associated with mortality from opioid overdose in the inpatient setting. The primary objective was to report national trends in opioid overdose and mortality. The secondary objectives were to explore factors associated with inpatient mortality and report differences in prescription opioid overdose (POD) versus illicit opioid overdose (IOD) cohorts.

METHODS: Using the 2010–2014 Nationwide Inpatient Sample, we performed a cross-sectional analysis and identified a weighted estimate of 570,987 adult patients with an International

Classification of Disease, Ninth Revision, or External Cause of Injury code of POD or IOD. We performed multivariable logistic regression to identify predictors of inpatient mortality. The odds ratio (OR) and their associated 95% confidence interval (CI) are reported.

RESULTS: Of the 570,987 patients with opioid overdose, 13.8% had an admissions diagnosis of IOD, and the remaining had POD. Among all opioid overdose admissions, the adjusted odds of IOD admissions increased by 31% per year (OR, 1.31; 95% CI, 1.29–1.31; $P < .001$); however, the adjusted odds POD admissions decreased by 24% per year (OR, 0.76; 95% CI, 0.75–0.77; $P < .001$). The mortality was 4.7% and 2.3% among IOD and POD admissions, respectively. The odds of inpatient mortality increased by 8% per year among IOD admissions (OR, 1.08; 95% CI, 1.02–1.14; $P < .007$). The odds of inpatient mortality increased by 6% per year among all POD admissions (OR, 1.06; 95% CI, 1.03–1.09; $P < .001$). Those with IOD compared to POD had higher odds of mortality (OR, 2.03; 95% CI, 1.79–2.29; $P < .001$). Patients with age ≥80 years of age and those with a diagnosis of a solid tumor malignancy had higher odds of mortality. Odds of inpatient mortality were decreased in African American versus Caucasian patients and in patients undergoing alcohol rehabilitation therapy.

CONCLUSIONS: The increase in mortality provides a strong basis for further risk reduction strategies and intervention program implementation. Medical management of not only the opioid overdose but also the comorbidities calls for a multidisciplinary approach that involves policy makers and health care teams.