增强婴儿复苏器的评价：新生儿气囊活瓣面罩复苏器的监测设备

Evaluation of the Augmented Infant Resuscitator: A Monitoring Device for Neonatal Bag-Valve-Mask Resuscitation

Bennett, Desmond J. BA*; Itagaki, Taiga MD*†; Chenelle, Christopher T. BA*; Bittner, Edward A. MD, PhD†; Kacmarek, Robert M. PhD, RRT*†

Anesthesia & Analgesia: 2018 126 947－955

背景：每年有600万新生儿需要气囊活瓣面罩复苏，提供即时反馈有可能提高复苏质量。增强婴儿复苏器（AIR）是一种实时反馈设备，旨在识别气囊活瓣面罩复苏期间的泄漏、阻塞，以及不适当的呼吸频率。但是，它的功能尚未进行评估。

方法：将其连接在呼吸机和呼吸机测试仪之间来测量AIR的阻力。为了测试设备在训练和临床应用的可靠性，将其置于气囊或呼吸机与新生儿人体模型和临床肺模型模拟器之间。肺模型模拟器模拟3种尺寸（2,4和6 kg）的新生儿。评估泄漏，阻塞和呼吸频率的变化。

结果：流量为5L/min时，AIR上的压力降低仅0.38 cm H2O，该设备对呼吸机呼吸参数几乎没有影响。在人体模型试验期间，它能够检测到所有泄漏和阻塞，100%及时正确显示警报。在模拟的临床试验中，AIR在6公斤新生儿模型中效果最佳，其次是4公斤模型，最后是2公斤模型。在所有3种临床模型中，模型显示73.5%的正确指标，当这样做时，耗时1.6±0.9秒。

结论：AIR是可能改善新生儿复苏的一项有希望的创新，但它仅引入阻力边缘值，并仅在新生儿模型上表现良好，在临床使用前仍需改善其固件。

（马益梅译 潘艳、薛张纲校）

BACKGROUND Annually, 6 million newborns require bag-valve-mask resuscitation, and providing live feedback has the potential to improve the quality of resuscitation. The Augmented Infant Resuscitator (AIR), a real-time feedback device, has been designed to identify leaks, obstructions, and inappropriate breath rates during bag-valve-mask resuscitation. However, its function has not been evaluated.

METHODS The resistance of the AIR was measured by attaching it between a ventilator and a ventilator tester. To test the device's reliability in training and clinical-use settings, it was placed in-line between a ventilation bag or ventilator and a neonatal manikin and a clinical lung model simulator. The lung model simulator simulated neonates of 3 sizes (2, 4, and 6 kg). Leaks, obstructions, and respiratory rate alterations were introduced.

RESULTS At a flow of 5 L/min, the pressure drop across the AIR was only 0.38 cm H2O, and the device had almost no effect on ventilator breath parameters. During the manikin trials, it was able to detect all leaks and obstructions, correctly displaying an alarm 100% of the time. During the simulated clinical trials, the AIR performed best on the 6-kg neonatal model, followed by the 4-kg model, and finally the 2-kg model. Over all 3 clinical models, the prototype displayed the correct indicator 73.5% of the time, and when doing so, took 1.6 ± 0.9 seconds.

CONCLUSIONS The AIR is a promising innovation that has the potential to

improve neonatal resuscitation. It introduces only marginal resistance and performs well on neonatal manikins, but its firmware should be improved before clinical use.

腋窝温度如 iThertimor WT701 所记录的很好地代表了成人非心脏手术的核心温度

Axillary Temperature,as Recorded by the iThermonitor WT701, Well Represents CoreTemperature in Adults Having Noncardiac Surgery.

Pei, Lijian MD[*†]; Huang, Yuguang MD[*†]; Mao, Guangmei PhD, MPH[‡§]; Sessler, Daniel I. MD[§]

Anesthesia & Analgesia: 2018 126 833－838

背景：全身麻醉期间，核心温度可以从食管或鼻咽准确测量，但这两个位置都不适合椎管内麻醉。 因此，我们确定了新型无线腋窝温度计的精确度和准确性，iThermonitor，以确定其在椎管内麻醉期间和其他非插管期患者中的适用性。
方法：我们招募了 80 名气管插管的上腹部手术的成年人。 术中测量食管远端的核心温度，用无线仪器估计腋窝的温度。用波士顿医疗公司的 RMonitor WT 701(RAIING Medical，波士顿 MA).每隔 5 分钟监测一次。用线性回归法和重复测量法 Bland-Altman 法对成对的腋窝和食管远端温度进行了比较和总结。我们先验地确定，如果大多数估计值在食管参考的±0.5° C 范围内，则 iThermonitor 具有临床上可接受的准确性，如果一致性限度在±0.5° C 内，则具有合适的精确度。
结果：共有 3339 套配对温度。腋窝温度与食管温度相近，平均差异(食管腋窝)仅为 0.14° C±0.26° C(标准差)。Bland-Altman 95%协议范围相当狭窄，估计上限在 0.66° C，下限在-0.38° C，因此±0.52° C，表明在 34.9° C 至 38.1° C 的平均温度范围内具有良好的一致性。 在 91％的测量中，绝对差值在 0.5° C 以内（95％置信区间，88％-93％）。
结论：腋窝温度，如 iThertror WT701 所记录的，很好地代表了成人非心脏手术的核心温度，因此似乎适合于临床使用。
（吴静怡译 潘艳、薛张纲校）

BACKGROUND: Core temperature can be accurately measured from the esophagus or nasopharynx during general anesthesia, but neither site is suitable for neuraxial anesthesia. We therefore determined the precision and accuracy of a novel wireless axillarythermometer, the iThermonitor, to determine its suitability for use during neuraxial anesthesia and in other patients who are not intubated.METHODS: We enrolled 80 adults having upper abdominal surgery with endotracheal intubation. Intraoperative core temperature was measured in distal esophagus and was estimated at the axilla with a wireless iThermonitor WT701 (Raiing Medical, Boston MA) at 5-minute intervals. Pairs of axillary and reference distal esophageal temperatures were compared and summarized using linear regression and repeated-measured Bland-Altman methods. We a priori determined that

the iThermonitor would have clinically acceptable accuracy if most estimates were within ±0.5° C of the esophageal reference, and suitable precision if the limits of agreement were within ±0.5° C.
RESULTS: There were 3339 sets of paired temperatures. Axillary and esophageal temperatures were similar, with a mean difference (esophageal minus axillary) of only 0.14° C ± 0.26° C (standard deviation). The Bland-Altman 95% limits of agreement were reasonably narrow, with the estimated upper limit at 0.66° C and the lower limit at -0.38° C, thus ±0.52° C, indicating good agreement across the range of mean temperatures from 34.9° C to 38.1° C. The absolute difference was within 0.5° C in 91% of the measurements (95% confidence interval, 88%-93%).
CONCLUSIONS: Axillary temperature, as recorded by the iThermonitor WT701, well represents core temperature in adults havingnoncardiac surgery and thus appears suitable for clinical use.

Macintosh 可视喉镜联合 Bonfils 插管内镜可以给困难气道的病人提供一个建立气道的方法

Macintosh Blade Videolaryngoscopy Combined With Rigid Bonfils Intubation Endoscope Offers a Suitable Alternative for Patients With Difficult Airways.

Pieters, Barbe M. MD, PhD[*]; Theunissen, Maurice MSc, PhD[†]; van Zundert, Andre A. MD, PhD, FRCA, EDRA, FANZA[†‡]
Anesthesia & Analgesia: 2018 126 988–994

背景：在麻醉医师的各项设备中可视喉镜是保护气道安全的重要设备。然而当可视喉镜无法完成插管时，几乎没有其他设备能够完成插管。之前，我们展示了一项在有困难气道历史的病人中采用Macintosh可视喉镜和Bonfils插管内镜联合使用的插管技术。在这项研究中，我们将评估这项技术是否是一个有价值的选择。
方法：在这项单盲非随机对照的研究中，我们包含 38 个有困难气道病史或者有 1 个或 1 个以上困难气道预测因素或者用 Macintosh 喉镜观察 Cormack & Lehane 分级在 3-4 级的病人。这些病人使用 Macintosh 可视喉镜联合 Bonfils 气管内镜的插管方法。在直接喉镜下、可视喉镜下、Macintosh 可视喉镜联合 Bonfils 气管内镜下三种情况下分别用 Cormack & Lehane 评分进行打分。之后 2 个实行盲法的麻醉师根据操作过程中所拍摄的图片评估 Cormack & Lehane 分级。
结果：38 个病人的数据被分析。38 个病人有 33 个病人在应用 Macintosh 可视喉镜联合 Bonfils 气管内镜插管的方法时 Cormack & Lehane 评分得到了提高。（86.8%，95%可信区间，71.9%-95.6%）。评估员 1 认为 38 名病人中有 37 名病人在应用 Macintosh 可视喉镜联合 Bonfils 气管内镜插管的方法时 Cormack & Lehane 评分得到了提高。评估员 2 认为有 33 名病人在应用 Macintosh 可视喉镜联合 Bonfils 气管内镜插管的方法时 Cormack & Lehane 评分得到了提高，有 2 名评分降低。实验中没有发现并发症。
结论：Macintosh 可视喉镜联合 Bonfils 气管内镜的插管方法给麻醉医师对于极端困难气道的病人提供了一个有价值的可选的气管插管方案。
(严欢译 潘艳、薛张纲校)

BACKGROUND: In the armamentarium of an anesthesiologist, videolaryngoscopy is a valuable addition to secure the airway. However, when the videolaryngoscope (VLS) offers no solution, few options remain. Earlier, we presented an intubation technique combining Macintosh blade VLS and Bonfils intubation endoscope (BIE) for a patient with a history of very difficult intubation. In the present study, we evaluated this technique to establish whether it is a valuable alternative.
METHODS: In this single-blinded nonrandomized study, 38 patients with a history of difficult intubation or 1 or more predictors of difficult intubation, scoring a Cormack & Lehane (C&L) grade III or IV using Macintosh blade VLS, were included. Patients were intubated combining the VLS with the BIE. The C&L grade was scored 3 times during (1) direct laryngoscopy; (2) indirect videolaryngoscopy; and (3) using the combined technique (VLS + BIE). Afterward, 2 blinded anesthesiologists assessed the C&L grade using the pictures taken during the procedure.
RESULTS: Data of 38 patients were analyzed. An improvement of the C&L grade with the combined technique occurred in 33 of 38 patients (86.8%; 95% confidence interval, 71.9%-95.6%). Reviewer 1 reported an improvement of the C&L grade with the combined technique in 37 of 38 patients. Reviewer 2 reported improvement in 33 and deterioration in 2 of the patients. No complications occurred.
CONCLUSIONS: The combined use of a VLS with Macintosh blade and BIE gives the anesthesiologist a valuable alternative intubation option in patients with extremely difficult airways.

围术期炎症反应及麻醉药物的调节作用

Perioperative Inflammation and Its Modulation by Anesthetics.

Rossaint, Jan MD; Zarbock, Alexander MD

Anesthesia & Analgesia: 2018 126 1058－1067

全身麻醉期间，手术及其他侵入性治疗可能引起患者的炎症反应。作为机体对干预措施的固有应答，这种炎性反应可能同时具有益处和潜在伤害性。免疫系统是高级生物独特的进化成果，能有效抵御外界病原体。然而，除了细菌，其他非感染性刺激因素，如手术创伤或机械通气也可能引起不同程度的炎性反应。在这些情况下，免疫系统激活并非对患者总是有益的，也可能对宿主细胞、组织甚至器官系统造成损伤。过去十年间，研究者发现了很多关于外科手术患者炎性反应作用通路的信息。围术期患者免疫系统的调节可能通过麻醉药物的使用、手术创伤及支持疗法等触发。对患者的影响是多方面的，包括多种促炎效应。本综述关注围术期炎性反应的原因和效应。另外，我们也强调了未来围术期调控免疫反应的可能措施。
（赵曦宁译 潘艳、薛张纲校）
Surgery and other invasive procedures, which are routinely performed during general anesthesia, may induce an inflammatory response in the patient. This inflammatory response is an inherent answer of the body to

the intervention and can be both beneficial and potentially harmful. The immune system represents a unique evolutionary achievement equipping higher organisms with an effective defense mechanism against exogenous pathogens. However, not only bacteria might evoke an immune response but also other noninfectious stimuli like the surgical trauma or mechanical ventilation may induce an inflammatory response of varying degree. In these cases, the immune system activation is not always beneficial for the patients and might carry the risk of concomitant, harmful effects on host cells, tissues, or even whole organ systems. Research over the past decades has contributed substantial information in which ways surgical patients may be affected by inflammatory reactions. Modulations of the patient's immune system may be evoked by the use of anesthetic agents, the nature of surgical trauma and the use of any supportive therapy during the perioperative period. The effects on the patient may be manifold, including various proinflammatory effects. This review focuses on the causes and effects of inflammation in the perioperative period. In addition, we also highlight possible approaches by which inflammation in the perioperative may be modulated in the future.

扁桃体切除术围手术期类固醇的使用和术后出血再次手术的关系：回顾性队列研究

Perioperative Steroid Use for Tonsillectomy and Its Association With Reoperation for Posttonsillectomy Hemorrhage: A Retrospective Cohort Study

Miyamoto, Yoshihisa MD, MPH; Shinzawa, Maki MD, PhD; Tanaka, Shiro PhD; Tanaka-Mizuno, Sachiko PhD; Kawakami, Koji MD, PhD

Anesthesia & Analgesia: 2018 126 806－814

背景：类固醇可减少扁桃体切除术后的并发症，如恶心、呕吐、疼痛和延迟恢复。然而，类固醇也可能增加扁桃体切除术后严重出血需要再次手术的风险。

方法：为了评估围手术期使用类固醇后发生术后出血需要再次手术的风险，我们使用医院索赔数据库对68家医院接受治疗的6149名患者进行了回顾性队列研究。主要观察结果是术后14天内再次手术的数量。我们通过调整混杂因素后的多因素回归分析来估计围术期类固醇使用和再次手术之间的优势比。我们还估计了调整后的风险差异，将患者分为成人和儿童后进行亚组分析。

结果：扁桃体切除术当天接受激素治疗的患者中，再次手术的发生率没有显着差异（1.8%，n = 15比1.5%，n = 79;校正后OR 0.81,95%置信区间[CI]，0.45-1.43; P = .46）。我们还发现在成人（OR，0.73; 95%CI，0.38-1.38; P = .33）和儿童（OR，1.18; 95%CI，0.34-4.11; P = .80）之间均无显着相关性。回归模型评估调整后的风险差异为-0.30%（95%CI，-1.05至0.45），成人为-0.64%（95%CI，-1.82至0.54），儿童为0.13%（95% CI，-0.93至1.19）。

结论：在扁桃体切除术当天使用类固醇与出血而再次手术的风险增加无关。尽管OR的广泛CI不能消除增加风险的可能性，尤其是在儿童中，但类固醇使用后发

生再次手术的风险在成人和儿童中是可接受的。我们的研究结果支持在扁桃体切除术的围手术期使用类固醇的安全性，同时也考虑到因出血而再次手术的危险程度。

（刘娟兰译 潘艳、薛张纲校）

BACKGROUND: Steroids reduce postoperative complications after tonsillectomy such as nausea and vomiting, pain, and delayed recovery. However, steroids may also increase the risk of severe posttonsillectomy bleeding requiring reoperation.

METHODS: To evaluate the risk of postoperative bleeding requiring reoperation related to perioperative steroid use, we conducted a retrospective cohort study of 6149 patients treated at 68 hospitals using a hospital-based claims database. The primary outcome was reoperation for bleeding within 14 postoperative days. We estimated odds ratios (ORs) between perioperative steroid use and reoperation by multivariable logistic regression analysis adjusted for confounders. We also estimated differences in the adjusted risk. Subgroup analyses after dividing patients into adults and children were also performed.

RESULTS: The incidence of reoperation did not differ significantly between patients who received steroids on the day of tonsillectomy and those who did not (1.8%, n = 15 vs 1.5%, n = 79; adjusted OR 0.81, 95% confidence interval [CI], 0.45-1.43; P = .46). We also found nonsignificant associations in both adults (OR, 0.73; 95% CI, 0.38-1.38; P = .33) and children (OR, 1.18; 95% CI, 0.34-4.11; P = .80). The adjusted risk differences estimated by the logistic regression model were -0.30% (95% CI, -1.05 to 0.45) in all patients, -0.64% (95% CI, -1.82 to 0.54) in adults, and 0.13% (95% CI, -0.93 to 1.19) in children.

CONCLUSIONS: Steroid use on the day of tonsillectomy was not associated with an increased risk of reoperation for bleeding. Although the wide range of CIs for the ORs could not eliminate the possibility of increased risk, especially in children, the incremental risks of reoperation for steroid use were within an acceptable range for both adults and children. Our results support the safety of perioperative steroid use for tonsillectomy, considering the magnitude of risk of reoperation because of bleeding.

在计算机断层扫描中静脉注射非离子型造影剂造成的全身性低血压——碘普罗胺 vs 碘克沙醇

Systemic Hypotension Following Intravenous Administration of Nonionic Contrast Medium During Computed Tomography: Iopromide Versus Iodixanol

Widmann, Gerlig MD*; Bale, Reto MD*; Ulmer, Hanno PhD†; Putzer, Daniel MD*; Schullian, Peter MD*; Wiedermann, Franz-Josef MD‡; Lederer, Wolfgang MD‡

Anesthesia & Analgesia: 2018 126 769－775

背景：鉴于有越来越多的患者在全麻下接受放射性干预，造影剂对于循环和器官灌注的影响十分重要。本研究的目的是系统性地量化静脉注射等渗和低渗非离子型造影剂后对血压、心率和肾功能的影响。
方法：本研究是双盲 IV 期临床对照研究，40 名连续的患者随机分配入组，实验组接受低渗的碘普罗胺或等渗的碘克沙醇注射，对照组接受普通生理盐水注射。在造影剂和生理盐水注射前 1 分钟开始，连续记录受试者血压和心率，直至注射完成后 3 分钟。每小时记录受试者尿量。
结果：碘普罗胺注射后，全身性低血压持续最长至 300 秒（105 ± 61 秒），最低平均动脉压为 39 mm Hg (56.7 ± 12.2 mm Hg)。碘普罗胺导致收缩压/舒张压降低 31/26mmHg (P < .001)，心率显著升高 (P = .042)，尿量显著增多，每小时尿量约对照组的 2 倍(P = .010)。碘克沙醇对于血压的影响与生理盐水无显著差异 (P > .640)。
结论：低渗的碘普罗胺使用后会导致短暂的显著血压下降和心率上升，麻醉医生及放射科医生应充分认识到它会短暂干扰患者的组织微循环，从而存在潜在的临床风险。
（刘雯珺译 潘艳、薛张纲校）
BACKGROUND: In light of the increasing number of radiologic interventions performed under general anesthesia, the effects of contrast media (CM) on circulation and organ perfusion are of paramount importance. The objectives of this study were to systematically quantify effects on blood pressure, heart rate, and kidney function following intravenous administration of nonionic CM with normal and low osmolality.
METHODS: In this controlled, double-blinded phase IV clinical trial, 40 consecutive patients were randomly assigned to receive repeated measures of either low-osmolar iopromide or iso-osmolar iodixanol. Normal saline solution (NSS) served as control. Blood pressure and heart rate were measured continuously from 1 minute before until 3 minutes after administration of CM and NSS. Urine output was recorded hourly.
RESULTS: Administration of iopromide resulted in systemic hypotension lasting up to 300 seconds (105 ± 61 seconds) with the lowest mean arterial pressure of 39 mm Hg (56.7 ± 12.2 mm Hg). Iopromide caused a systolic/diastolic decrease of 31/26 mm Hg (P < .001), significant increase in heart rate (P = .042), and significant diuresis with a 2-fold higher per-hour urine output (P = .010). Administration of iodixanol and NSS had no significant influence on blood pressure (P > .640).
CONCLUSIONS: Administration of low-osmolar iopromide was followed by a significant transient decrease in blood pressure and a rise in heart rate. Anesthetists and radiologists should be aware of these effects in patients in whom short episodes of disturbed tissue microcirculation may pose a clinical risk.

普外科手术患者合并术后并发症影响心跳骤停后的生存率
Postoperative Complications Affecting Survival After Cardiac Arrest in General

Surgery Patients.

Kim, Minjae MD, MS*†; Li, Guohua MD, DrPH*†

Anesthesia & Analgesia: 2018 126 858－864

背景：术后发生心跳骤停并不常见，但是它与普外科手术病人高死亡率相关，并且心跳骤停前常先出现术后并发症。普外科手术病人术后发生心跳骤停前合并术后并发症与心跳骤停后的死亡率之间的相关性尚未被完全地评估。

方法：回顾性观察性队列研究纳入 2012-2013 年美国外科医生学会国家外科质量改进计划中术后当天至术后 30 天内发生心跳骤停的普外科手术病人。心跳骤停前发生的术后并发症定义如下：1.急性肾损伤；2.急性呼吸衰竭；3.深静脉血栓形成/肺栓塞；4.心肌梗死；5.败血症/感染性休克；6.卒中；7.输血。采用 Cox 比例风险模型进行评估术后并发症与心跳骤停后的死亡率之间的相关性，并校正术前危险因素。

结果：纳入 1352 名发生心跳骤停的普外科手术患者，其中 746 名患者（55%）在心跳骤停前至少合并一种术后并发症。合并术后并发症的心跳骤停患者与未合并术后并发症的心跳骤停患者相比，术后 30 天总体死亡率无明显差异。（71%[533/746]vs70%[425/606]，P=0.60）。在校正后的 COX 模型中显示，心脏骤停前合并术后并发症与未合并术后并发症相比，并没有增加死亡风险。（风险比 1.03，95%置信区间为 0.90-1.18，P=0.70）。此外，个案分析显示，心跳骤停前未合并术后并发症与高死亡率相关。

结论：普外科手术患者术后发生心跳骤停前合并术后并发症很常见，但并没有增加死亡率。

（王雨婷译 潘艳、薛张纲校）

BACKGROUND: Postoperative cardiac arrest is uncommon but associated with a high mortality risk in general surgery patients and is often preceded by postoperative complications. The relationships between previous complications and mortality after cardiac arrest in general surgery patients have not been completely Evaluated.

METHODS: A retrospective, observational cohort of general surgery in patients with cardiac arrest occurring after postoperative day (POD) #0 (and up to POD #30) was obtained from the 2012-2013 American College of Surgeons National Surgical Quality Improvement Program. Previous complication was defined as at least one of the following occurring before the POD of cardiac arrest: (1) acute kidney injury; (2) acute respiratory failure; (3) deep vein thrombosis/pulmonary embolus; (4) myocardial infarction; (5) sepsis/septic shock; (6) stroke; and/or (7) transfusion. The associations between previous complications and mortality after cardiac arrest were assessed using Cox proportional hazards models that adjusted for preoperative risk factors.

RESULTS: Of 1352 patients with postoperative cardiac arrest, 746 patients (55%) developed at least 1 complication before cardiac arrest. Overall 30-day mortality was 71% (958/1352) and was similar among patients with and without a previous complication (71% [533/746] vs 70% [425/606]; P = .60). Patients with previous complications did not have an increased

risk of mortality, compared to patients without previous complications, in adjusted Cox models (hazard ratio, 1.03; 95% confidence interval, 0.90-1.18; P = .70). In addition, no previous complication was associated with increased mortality risk in individual analyses.
CONCLUSIONS: Among general surgery patients with cardiac arrest after POD #0, complications occurring before cardiac arrest are common but are not associated with increased mortality risk.

手术室里的心脏骤停：部分 2-围手术期的特殊情况

Cardiac Arrest in the Operating Room: Part 2—Special Situations in the Perioperative Period

McEvoy, Matthew D. MD*; Thies, Karl-Christian MD, FRCA, FERC, DEAA†; Einav, Sharon MD‡; Ruetzler, Kurt MD§〃; Moitra, Vivek K. MD, FCCM¶; Nunnally, Mark E. MD, FCCM#; Banerjee, Arna MD*; Weinberg, Guy MD**; Gabrielli, Andrea MD, FCCM††; Maccioli, Gerald A. MD, FCCM‡‡; Dobson, Gregory MD§§; O'Connor, Michael F. MD, FCCM〃〃
Anesthesia & Analgesia: 2018 126 889－903

在本系列的部分 1 中指出：围术期心脏骤停（PPCA）可以从美国心脏协会的高级心脏生命支持的算法所描述的病因和治疗中鉴别，这在很大程度上运用于院外和围手术空间之外的心脏骤停。明确地说，有几个生命威胁因素导致的 PPCA，它们必须在麻醉医生的技能下管理。然而，以往的研究已经证明，这些场景的不断回顾和培训的管理是十分必要的，也是与提高 PPCA 的治疗和预后相关。有越来越多的文章描述常见 PPCA 的发病率、原因、治疗、和结果（如恶性高热、重大创伤、麻醉全身和局部毒性）；以及这些话题需要在麻醉协会中得到更好、更广泛地认识。本系列的第 1 部分描述到：这些事件总是被围手术期小组的一名成员目睹的，这是经常发生的，并且涉及救援人员对病人和正在经历或已经发生的程序的了解。制定适当的鉴别诊断和快速应用有针对性的干预措施对患者的良好预后是至关重要。复苏算法，包括对导致心脏在围手术期设置的常见原因进行评估和管理。执业麻醉医师需要拥有这些算法的工作知识，以便达到最优化的效果。（张连芳译 潘艳、薛张纲校）

As noted in part 1 of this series, periprocedural cardiac arrest (PPCA) can differ greatly in etiology and treatment from what is described by the American Heart Association advanced cardiac life support algorithms, which were largely developed for use in out-of-hospital cardiac arrest and in-hospital cardiac arrest outside of the perioperative space. Specifically, there are several life-threatening causes of PPCA of which the management should be within the skill set of all anesthesiologists. However, previous research has demonstrated that continued review and training in the management of these scenarios is greatly needed and is also associated with improved delivery of care and outcomes during PPCA. There is a growing body of literature describing the incidence, caus

es, treatment, and outcomes of common causes of PPCA (eg, malignant hyperthermia, massive trauma, and local anesthetic systemic toxicity) and the need for a better awareness of these topics within the anesthesiology community at large. As noted in part 1 of this series, these events are always witnessed by a member of the perioperative team, frequently anticipated, and involve rescuer-providers with knowledge of the patient and the procedure they are undergoing or have had. Formulation of an appropriate differential diagnosis and rapid application of targeted interventions are critical for good patient outcome. Resuscitation algorithms that include the evaluation and management of common causes leading to cardiac in the perioperative setting are presented. Practicing anesthesiologists need a working knowledge of these algorithms to maximize good outcomes.

高频率有条理的专家反馈对区域阻滞基础超声学习曲线的影响

The Effect of High-Frequency, Structured Expert Feedback on the Learning Curves of Basic Interventional Ultrasound Skills Applied to Regional Anesthesia.

de Oliveira Filho, Getúlio Rodrigues MD, PhD; Mettrau, Francisco de Assis Caire MD

Anesthesia & Analgesia: 2018 126 1028–1034

背景：在超声引导的区域阻滞中，熟练地对准针-超声束及准确的入路是十分关键的。本研究评估了高频率、有条理的专家反馈对该技能模拟训练的影响。

方法：42 位受试者随机分为对照组或干预组进行了 2 组试验，每组 25 次。试验一是将针刺入牛肌肉模型使针与超声束平行，即保持针的完整显像。试验二中针需要接触到模型内的目标。干预组在试验之间获得有条理的反馈意见。对照组在试验结束后接受全面的评价。对从成功及失败的试验序列中获得的学习曲线的斜率进行比较。通过变点分析确定试验序列中学习的始点和终点。对干预组与控制组间与学习有关的试验次数、技术错误的数量和训练时间的长短进行比较。

结果：在试验 1 中，两组的学习曲线在成功率上发生了偏离，控制组成功率为 73%，干预组为 76%；斜率(标准误)分别为 0.79%(0.02%)和 0.71%(0.04%)，平均绝对差为 0.18%(95%置信区间[CI]，0.17%-0.19%，P=0);干预组受试者的学习曲线较对照组更短、更陡。在试验 2 中，两组学习曲线的成功率分别为 43%(控制组)和 80%(干预组);斜率(标准误)分别为 1.06%(0.02%)和 0.42%(0.03%)，平均差为 0.65% (95% CI, 0.64%-0.66%;P = 0).两组试验中，反馈与增加学习相关的试验次数有关，试验 1：(平均差，1.55 次;95%可信区间,0.15-3 次;P = 0)，试验 2：(平均差，4.25 次;95%置信区间,1.47-7.03 次;P = 0)；也与减少每次试验中的技术错误相关，试验 1:(平均差，0.19;95%置信区间,0.07-0.30;P = .02)，试验 2：(平均差，0.58;95%置信区间,0.45-0.70;P = 0)，但反馈延长了两组试验的训练时间，试验 1:(平均差，9.2 分钟;95%置信区间,4.15-14.24

分钟;P = .01)，试验 2：(平均差，7.4 分钟;95%置信区间,1.17-13.59 分钟;P = .02)。

结论：高频率、有条理的专家反馈与自主学习相比，优势在于缩短了学习曲线、减少了技术错误并增加训练中技能改善阶段的持续时间，但也导致训练持续时间延长。

（肖亚男译 潘艳、薛张纲校）

BACKGROUND: Proficiency in needle-to-ultrasound beam alignment and accurate approach to structures are pivotal for ultrasound-guided regional anesthesia. This study evaluated the effects of high-frequency, structured expert feedback on simulation training of such abilities.

METHODS: Forty-two subjects randomly allocated as controls or intervention participated in two 25-trial experiments. Experiment 1 consisted of inserting a needle into a bovine muscular phantom parallel to the ultrasound beam while maintaining full imaging of the needle. In experiment 2, the needle aimed to contact a target inside the phantom. Intervention subjects received structured feed back between trials. Controls received a global critique after completing the trials. The slopes of the learning curves derived from the sequences of successes and failures were compared. Change-point analyses identified the start and the end of learning in trial sequences. The number of trials associated with learning, the number of technical errors, and the duration of training sessions were compared between intervention and controls.

RESULTS: In experiment 1, learning curves departed from 73% (controls) and 76% (intervention) success rates; slopes (standard error) were 0.79% (0.02%) and 0.71% (0.04), respectively, with mean absolute difference of 0.18% (95% confidence interval [CI], 0.17%-0.19%; P = 0). Intervention subjects' learning curves were shorter and steeper than those of controls. In experiment 2, the learning curves departed from 43% (controls) and 80% (intervention) success rates; slopes (standard error) were 1.06% (0.02%) and 0.42% (0.03%), respectively, with a mean difference of 0.65% (95% CI, 0.64%-0.66%; P = 0). Feedback was associated with a greater number of trials associated with learning in both experiment 1 (mean difference, 1.55 trials; 95% CI, 0.15-3 trials; P = 0) and experiment 2 (mean difference, 4.25 trials; 95% CI, 1.47-7.03 trials; P = 0) and a lower number of technical errors per trial in experiments 1 (mean difference, 0.19; 95% CI, 0.07-0.30; P = .02) and 2 (mean difference, 0.58; 95% CI, 0.45-0.70; P = 0), but longer training sessions in both experiments 1 (mean difference, 9.2 minutes; 95% CI, 4.15-14.24 minutes; P = .01) and 2 (mean difference, 7.4 minutes; 95% CI, 1.17-13.59 minutes; P = .02).

CONCLUSIONS: High-frequency, structured expert feedback compared favorably to self-directed learning, being associated with

shorter learning curves, smaller number of technical errors, and longer duration of in-training improvement, but increased duration of the training sessions.

分娩过程中使用过催产素的剖宫产患者产后催产素用量增加

Patients Undergoing Cesarean Delivery After Exposure to Oxytocin During Labor Require Higher Postpartum Oxytocin Doses.

Foley, Amanda MD[*]; Gunter, Ashley MD[*]; Nunes, Kenneth J. MD[†]; Shahul, Sajid MD, MPH[*]; Scavone, Barbara M. MD[*†]

Anesthesia & Analgesia: 2018 126 920－924

背景：专家推荐产后使用催产素以预防宫缩乏力及出血，但是催产素可能有剂量依赖性副作用，并且产后催产素的正确剂量目前尚无明确规定。在分娩中使用过催产素的剖宫产患者，其产后催产素的 ED90 值相较于分娩中未使用过催产素的剖宫产患者高。因此，本研究拟对采用同一机构治疗原则的剖宫产患者进行研究，比较剖宫产前使用过催产素者和剖宫产前未使用过催产素的患者产后催产素的使用情况。

方法：本研究采用回顾性图表总结法，对硬膜外麻醉下行剖宫产手术患者的病史、一般情况、相关合并症以及催产素的使用、滴速、以及产前使用持续时间进行回顾。剖宫产前使用催产素的患者（OXY+组）与剖宫产前未使用催产素的患者（OXY-组）进行比较。主要结果变量为按照机构治疗原则使用产后催产素的最大滴速。次要结果变量包括预计出血量，产后出血的患者比例，以及需要其他子宫收缩剂治疗或红细胞输注的患者比例。

结果：相比于 OXY-组，OXY+组患者中初产妇占比更大、估计胎龄更大、新生儿体重更重。此外，OXY+组的绒毛膜羊膜炎发生率更高并且多胎妊娠情况更少。OXY+组患者比 OXY-组产后催产素使用需要高滴速的情况更多（调整后优势比 1.94（95%可信区间，1.19-3.15；P=0.008））。OXY+组需要其他子宫收缩剂的情况更常见。预计出血量、出血速度、及输血速度方面两组之前无显著差异。

结论：在分娩中使用过催产素的产妇其产后缩宫素 ED90 值临床中确实有显著增加。据此，本机构修正了治疗原则，对产前使用过催产素的产妇常规提高产后催产素的滴注速度。

（刘邱阿雪译 潘艳、薛张纲校）

BACKGROUND: Experts recommend postpartum oxytocin to prevent uterine atony and hemorrhage, but oxytocin may be associated with dose-dependent adverse effects, and the correct dose of postpartum oxytocin has yet to be determined. The effective dose in 90% of patients (ED90) of oxytocin after cesarean delivery may be higher in patients exposed to oxytocin during labor compared to patients unexposed. We therefore undertook this study to compare postpartum oxytocin requirements in patients exposed to oxytocin prior to cesarean delivery versus those not exposed, when all were treated according to a specific institutional protocol.

METHODS: In this retrospective chart review, we reviewed medical records of patients who underwent cesarean delivery under neuraxial anesthesia and noted demographic data, relevant comorbidities, and oxytocin exposure,

infusion rate, and duration prior to delivery. Patients exposed to oxytocin before cesarean (OXY+ group) were compared to those not exposed (OXY- group). The primary outcome variable was highest infusion rate of postpartum oxytocin required per institutional protocol. Secondary outcomes included estimated blood loss, proportion of patients with postpartum hemorrhage, and proportions who received other uterotonic medications or red blood cell transfusion.

RESULTS: OXY+ patients were more likely to be nulliparous and had higher estimated gestational age and neonatal weight than OXY- patients. They also had higher incidence of chorioamnionitis and lower incidence of multiple gestation. OXY+ patients required a high postpartum oxytocin infusion rate more often than OXY- patients (adjusted odds ratio 1.94 [95% confidence interval, 1.19-3.15; P = .008]). They also received other uterotonic agents more commonly. Estimated blood loss, hemorrhage rates, and transfusion rates did not differ between groups.

CONCLUSIONS: Reported increases in the ED90 of postpartum oxytocin after oxytocin exposure during labor appear to be clinically significant. We have therefore altered our institutional protocol so that women preexposed to oxytocin routinely receive higher initial postpartum oxytocin infusion rates.

1非体外循环状态下经心尖人工腱索植入治疗二尖瓣返流患者的麻醉管理和手术结果：76例病例系列报道

Anesthetic Management and Procedural Outcomes of Patients Undergoing Off-Pump Transapical Implantation of Artificial Chordae to Correct Mitral Regurgitation: Case Series of 76 Patients

Samalavicius, Robertas Stasys MD, PhD*; Norkiene, Ieva MD, PhD†; Drasutiene, Agne MD‡; Lipnevicius, Arturas MD‡; Janusauskas, Vilius MD, PhD‡; Urbonas, Karolis MD*; Zakarkaite, Diana MD, PhD‡; Aidietis, Audrius MD, PhD‡; Rucinskas, Kestutis MD, PhD‡

Anesthesia & Analgesia: 2018 126 776–784

背景：使用NeoChord系统（NeoChord Inc，Minneapolis，MN）经心尖人工腱索植入是一种新兴的在心脏跳动状态下，通过微创左胸小切口手术矫正二尖瓣返流（MR）的技术。该研究的目的是描述接受该手术患者的麻醉管理和手术结果。

方法：所有在2011年12月至2016年12月期间在作者医院接受使用NeoChord系统行二尖瓣修复手术的患者（n = 76）均纳入本次观察性前瞻性研究。所有患者均使用芬太尼、丙泊酚和七氟醚联合麻醉。只要有可能，每位患者的核心温度都保持在> 36°C。所有患者均使用二维和三维经食管超声心动图，将装置引导至二尖瓣后叶（76例中的68例）、二尖瓣前叶（76例中的3例）或两个瓣叶（76例中的5例）。在有效虏获瓣膜后，放置人工腱索。人工腱索的位置和功能通过评估人工腱索紧张时MR的程度来评估。术后所有患者都转入重症监护病房。

结果：患者的平均年龄为60±13岁（范围33-87岁），男女比例为52/24。大多数患者有严重的MR（25 [33％]例为4 +级患者，51 [67％]例为3 +级患者）。术前平均EuroSCORE II为1.23％±1.16％（范围为0.46％-4.23％）。手术中位持续时间为120min（四分位间距[IQR] 115-145min）。术后，42例（56％）患者有轻微MR，27例（36％）有1+ 级MR，4例（5％）有2级MR，2

例（3％）MR> 2。由于二尖瓣后瓣穿孔，一名患者转为接受传统的二尖瓣修复术。患者对整个过程的耐受性良好，大部分病例的血流动力学保持稳定。只有20例（26％）患者需要低剂量的正性肌力药物支持。所有患者术后平稳。拔管的中位时间为4小时（IQR，2.6-6），重症监护室住院时间为22小时（IQR，21-24）。5（6.6％）例患者需要异体血液制品输注。**结论：**经心脏NeoChord植入手术的麻醉可安全地在心脏跳动条件下进行，围手术期死亡率低，罕见输血。经食道超声心动图对手术的指导，安全性和有效性至关重要。
（张松 译　陈杰 校）

BACKGROUND: Transapical implantation of artificial chordae using the NeoChord system (NeoChord Inc, Minneapolis, MN) is an emerging beating-heart technique for correction of mitral regurgitation (MR) through a minimally invasive left minithoracotomy. The purpose of the study was to describe the anesthetic management and procedural success of patients undergoing this procedure.

METHODS: All patients (n = 76) who underwent mitral valve repair with the NeoChord system in our institution from December 2011 to December 2016 were included in this observational prospective study. Balanced anesthesia with a combination of fentanyl, propofol, and sevoflurane was used in all patients. Each patient's core temperature was maintained at >36°C whenever possible. Two- and 3-dimensional transesophageal echocardiography was used in all patients to navigate the device to the posterior mitral valve leaflet (68 of 76 patients), anterior mitral valve leaflet (3 of 76 patients), or both leaflets (5 of 76 patients). After effective leaflet capture, the artificial chordae were deployed. Position and function of the artificial chordae were assessed by evaluating the degree of MR when the neochordae were tensed. After surgery, all patients were transferred to the intensive care unit.

RESULTS: The mean age of the patients was 60 ± 13 years (range, 33-87 years), and the male/female ratio was 52/24. Most patients had severe MR (grade 4+ in 25 [33%] patients, grade 3+ in 51 [67%] patients). The average preoperative EuroSCORE II was 1.23% ± 1.16% (range, 0.46%-4.23%). The median duration of the procedure was 120 minutes (interquartile range [IQR] 115-145 minutes). After the procedure, 42 (56%) patients had trivial MR, 27 (36%) had grade 1+ MR, 4 (5%) had grade 2+ MR, and 2 (3%) had >2+ MR. One patient underwent conversion to conventional mitral valve repair due to perforation of the posterior mitral valve leaflet. The whole procedure was well tolerated by the patients, with hemodynamics remaining stable in the majority of the cases. Only 20 (26%) patients needed low-dose inotropic support perioperatively. All patients had an uneventful postoperative course. The median time to extubation was 4 hours (IQR, 2.6-6), and the length of intensive care unit stay was 22 hours (IQR, 21-24). Five (6.6%) patients required allogeneic blood products.

CONCLUSIONS: Anesthesia for transapical NeoChord implantation can be safely performed under beating-heart conditions, with low perioperative morbidity and rare blood transfusions. Transesophageal echocardiography is crucial for the guidance, safety, and effectiveness of the procedure.

Rho激酶抑制剂法舒地尔对脊髓缺血再灌注损伤大鼠的神经保护作用

Neuroprotective Effects of Fasudil, a Rho-Kinase Inhibitor, After Spinal Cord Ischemia and Reperfusion in Rats

Ohbuchi, Masahiko DDS[*†]; Kimura, Tetsu MD[*]; Nishikawa, Toshiaki MD[*]; Horiguchi, Takashi MD[*]; Fukuda, Masayuki DDS[†]; Masaki, Yoko PhD[*]

Anesthesia & Analgesia: 2018 126 815–823

背景：卒中后继发Rho/ Rho激酶通路过度激活。作者研究常温条件下大鼠短暂脊髓缺血再灌注模型中法舒地尔（Rho激酶抑制剂）预处理和后处理的神经保护作用。
方法：经动物研究委员会批准后，雄性SD大鼠随机分配至1-6组：预处理、后处理对照组（C）；预处理、后处理法舒地尔组（F）；预处理、后处理sham组（S）。在pre-F或pre-C组中，SD大鼠缺血前使用法舒地尔（10 mg/kg）或生理盐水静脉注射至少30分钟，post-F 或 post-C组中大鼠再灌注后使用法舒地尔（10 mg/kg）或生理盐水静脉注射至少30分钟。Sham组不进行缺血处理。采用主动脉球囊阻断联合控制性降压10分钟诱导缺血。评估缺血后1、7、14天的神经功能缺损评分（NDS；0 - 8分），以及组织病理结果。
结果：pre-F组缺血后7天和14天后NDS评分(中位数[范围]; 3.5 [2–6]和2.5 [0–6])较pre-C组低(5.5 [4–7]和4.5 [4–6]; $P = .046$ 和 $P = .049$),然而post-F和post-C组之间的NDS评分没有明显差异。pre-F和post-F组灰质中完整神经元的数目平均标准差[95%CI]: 25 ± 7 [20–30]和16 ± 5 [12–19])显著高于pre-C和post-C组(11 ± 5 [7–14]和9 ± 3 [7–11]; $P < .001$和$P = .002$)。post-F组完整神经元的数目(16 ± 5 [12–19])低于post-S组(26 ± 2 [24–29]; $P < .001$)。pre-F组和post-F组白质中空泡的百分比(21.5 ± 8.4 [15.5–27.5]和13.6 ± 7.4 [8.3–18.9])低于pre-C和post-C组(43.7 ± 10.4 [36.3–51.1]和40.6 ± 12.3 [31.8–49.4]; $P < .001$和$P < .001$)。
结论：本研究结果表明，常温下大鼠缺血前静脉注射法舒地尔预处理能改善缺血再灌注损伤后的神经学和组织病理学结局，甚至在缺血长达14天之后。而使用法舒地尔后处理仅可改善组织病理学结局。法舒地尔可能成为脊髓缺血高风险的一种预处理模式。
（徐侨翌 译　陈杰 校）

BACKGROUND: Excessive Rho/Rho-kinase pathway activation occurs subsequent to stroke. We examined the neuroprotective effects of pre- and posttreatment with fasudil (a Rho-kinase inhibitor) in a rat transient spinal cord ischemia-reperfusion model under normothermic conditions.
METHODS: After approval by our animal research committee, male Sprague-Dawley rats were assigned to 1 of 6 groups: pre- and postcontrol (C); pre- and postfasudil (F); and pre- and post-sham (S). Fasudil (10 mg/kg) or normal saline was administered intravenously over 30 minutes before ischemia in the pre-F or pre-C groups, and over 30 minutes after reperfusion in the post-F or post-C groups. Sham groups were not subjected to ischemia. Ischemia was induced by aortic occlusion using a balloon catheter combined with hypotension for 10 minutes. Neurologic deficit scores (NDS; 0–8 points) were assessed 1, 7, and 14 days after ischemia, and then histopathologic outcomes were assessed.
RESULTS: NDS 7 and 14 days after ischemia in the pre-F group (median [range]; 3.5 [2–6] and 2.5 [0–6]) were lower than those in the pre-C group (5.5 [4–7] and 4.5 [4–6]; $P = .046$ and $P = .049$), whereas NDS in the post-F group and in the post-C group were not different. The numbers of intact neurons in the gray matter in the pre- and post-F groups (mean ± standard deviation [95% confidence interval]: 25 ± 7 [20–30] and 16 ± 5 [12–19]) were greater than those in the pre- and post-C groups (11 ± 5 [7–14] and 9 ± 3 [7–11]; $P < .001$ and $P = .002$). The number of intact neurons in the post-F group (16 ± 5 [12–19]) was lower than the number in the post-S group (26 ± 2 [24–29]; $P < .001$). The percentages of vacuolation in the white matter in the pre- and post-F groups (21.5 ± 8.4 [15.5–27.5] and 13.6 ± 7.4 [8.3–18.9]) were lower than those in the pre- and post-C groups (43.7 ± 10.4 [36.3–51.1] and 40.6 ± 12.3 [31.8–49.4]; $P < .001$ and $P < .001$).

CONCLUSIONS: Our results demonstrated that intravenous fasudil administered before ischemia improved both neurologic and histopathologic outcomes even 14 days after ischemia, while fasudil administered postinsult improved histopathologic outcomes only in normothermic rats. Fasudil may be a relevant pretreatment paradigm for planned procedures at risk for spinal cord ischemia.

呼吸气体分析—技术方面

Respiratory Gas Analysis—Technical Aspects

Jaffe, Michael B. PhD

Anesthesia & Analgesia: 2018 126 839–845

本文是一篇以二氧化碳分析为重点，专注于技术的呼吸气体分析相关的综述。重点介绍了商业应用的测量技术，讨论了红外光谱和主流与旁流气体采样的基本原理和技术问题。介绍了临床医师特别感兴趣的二氧化碳监测仪相关内容：包括准确性和响应时间，以及相关的标准，并给出了典型的数值。具有代表性的时间和容量的二氧化碳描记图显示与临床相关的参数描述。综述了目前使用术语的一些方面以及对呼吸和呼末值的明确定义。并指出了呼末二氧化碳监测仪是麻醉医师特别感兴趣的应用，并提供了关键的参考文献。记录了在呼吸气体分析方面正在进行的发展，以及那些将会影响到它的发展。

（陈聪 译　陈杰 校）

A technology-focused review of respiratory gas analysis, with an emphasis on carbon dioxide analysis, is presented. The measurement technologies deployed commercially are highlighted, and the basic principles and technical concerns of infrared spectroscopy and mainstream versus sidestream gas sampling are discussed. The specifications of particular interest to the clinician, accuracy and response time, and the related standard, with typical values for a capnometer, are presented. Representative time and volumetric capnograms are shown with the clinically relevant parameters described. Aspects of the terminology in present-day use and the need for clarity in defining what is a breath and an end-tidal value are reviewed. The applications of capnography of particular interest to the anesthesiologist are noted, and key references are provided. Ongoing developments with respect to respiratory gas analysis, and those that will impact it, are noted.

心脏骤停后有针对性的体温管理：一项系统评估和荟萃分析

Targeted Temperature Management After Cardiac Arrest: Systematic Review and Meta-analyses

Kalra, Rajat MBChB[*]; Arora, Garima MD, MRCP[†]; Patel, Nirav MD[†]; Doshi, Rajkumar MBBS, MPH[‡]; Berra, Lorenzo MD[§]; Arora, Pankaj MD, FAHA[†//]; Bajaj, Navkaranbir S. MD, MPH[†¶#]

Anesthesia & Analgesia: 2018 126 867–875

背景：具有治疗性低温的目标体温管理（TTM）是心跳骤停幸存者后期护理不可或缺的组成部分。然而，最近的随机对照试验（RCTs）未能证明TTM对临床结局的益处。作者试图确定来自现有随机对照试验的汇总数据是否支持心脏骤停后使用院前和/或院内TTM。

方法：从1966年到2016年11月，利用预先定义的标准对SCOPUS，Elsevier的同行评审文献的摘要和引文数据库进行了全面搜索。治疗性低温被定义为旨在将心脏骤停后存活者冷却至≤34°C的任何策略。正常体温是≥36℃。作者通过将这些研究分为两组，对患者的死亡率和神经系统结局进行了比较：（1）亚低温与正常体温和（2）院前低温与院内低温相比，采用标准荟萃分析方法。随机效应模型被用来估计比较风险比（RR）和95％置信区间（CIs）。

结果：对5项随机对照试验中的1389名患者比较了低温和正常体温策略，而对6项随机对照试验的3393名患者比较了院前低温和院内低温。作者观察到低温和正常体温策略之间的死亡率（RR，0.88; 95％CI，0.73-1.05）或神经系统结局（RR，1.26; 95％CI，0.92-1.72）无差异。同样，院前低温与住院低温策略之间的死亡率（RR，1.00; 95％CI，0.97-1.03）或神经系统结局（RR，0.96; 95％CI，0.85-1.08）之间没有差异。

结论：本研究结果表明TTM与治疗性低温可能无法改善死亡率或幸存者的神经系统结局。使用治疗性低温作为幸存者后期护理护理策略的标准可能需要重新评估。
（崔璀 译　陈杰 校）

BACKGROUND: Targeted temperature management (TTM) with therapeutic hypothermia is an integral component of postarrest care for survivors. However, recent randomized controlled trials (RCTs) have failed to demonstrate the benefit of TTM on clinical outcomes. We sought to determine if the pooled data from available RCTs support the use of prehospital and/or in-hospital TTM after cardiac arrest.

METHODS: A comprehensive search of SCOPUS, Elsevier's abstract and citation database of peer-reviewed literature, from 1966 to November 2016 was performed using predefined criteria. Therapeutic hypothermia was defined as any strategy that aimed to cool post-cardiac arrest survivors to a temperature ≤34°C. Normothermia was temperature of ≥36°C. We compared mortality and neurologic outcomes in patients by categorizing the studies into 2 groups: (1) hypothermia versus normothermia and (2) prehospital hypothermia versus in-hospital hypothermia using standard meta-analytic methods. A random effects modeling was utilized to estimate comparative risk ratios (RR) and 95% confidence intervals (CIs).

RESULTS: The hypothermia and normothermia strategies were compared in 5 RCTs with 1389 patients, whereas prehospital hypothermia and in-hospital hypothermia were compared in 6 RCTs with 3393 patients. We observed no difference in mortality (RR, 0.88; 95% CI, 0.73-1.05) or neurologic outcomes (RR, 1.26; 95% CI, 0.92-1.72) between the hypothermia and normothermia strategies. Similarly, no difference was observed in mortality (RR, 1.00; 95% CI, 0.97-1.03) or neurologic outcome (RR, 0.96; 95% CI, 0.85-1.08) between the prehospital hypothermia versus in-hospital hypothermia strategies.

CONCLUSIONS: Our results suggest that TTM with therapeutic hypothermia may not improve mortality or neurologic outcomes in postarrest survivors. Using therapeutic hypothermia as a standard of care strategy of postarrest care in survivors may need to be reevaluated.

乳酸是否影响严重钝性创伤患者早期高血糖与多器官功能衰竭之间的关系？

Does Lactate Affect the Association of Early Hyperglycemia and Multiple Organ Failure in Severely Injured Blunt Trauma Patients?

Richards, Justin E. MD[*†‡]; Scalea, Thomas M. MD, FACS, MCCM[§‡]; Mazzeffi, Michael A. MD, MPH[*]; Rock, Peter MD, MBA, FCCM[*]; Galvagno, Samuel M. Jr DO, PhD, FCCM[*†‡]

Anesthesia & Analgesia: 2018 126 904–910

背景：创伤后，早期高血糖与多器官功能衰竭（MOF）相关。但很少研究考虑临床休克程度对其影响作用。作者推测当同时考虑血糖和乳酸时，二者均与严重钝性创伤患者MOF相关。

方法：作者在一家三级医疗创伤中心进行了回顾性调查。纳入标准为患者年龄≥18岁，创伤严重评分（ISS）> 15，病因为钝性损伤且重症监护病房住院时间 > 48小时。排除糖尿病病史和48小时内死亡的患者。记录人口统计学、损伤严重程度和生理数据。在住院24小时内收集血糖和乳酸值。记录多个时间点的血糖和乳酸值：入院的第一个血糖（Glucadm,mg/dl）和乳酸值（Lacadm,mmol/L），平均初始24小时内血糖（Gluc24hMean, mg/dl）和乳酸（Lac24hMean, mmol/L）值和时间加权初始24小时内血糖（Gluc24hTW）和乳酸（Lac24hTW）值。这些指标均以四分位数表示。主要预后指标是MOF。在控制ISS，入院时休克指数和入院后是否手术的因素后，采用单独Cox回归比例风险模型评估血糖和乳酸与MOF之间的关系。在多变量回归模型中评估血糖和乳酸之间的相互作用。结果以血糖和乳酸值四分位数增加的危险比（HRs）[95%可行区间]表示。

结果：本研究总共纳入507名严重钝性损伤患者。507名患者中有46名（9.1%）存在MOF，拥有更高的中位ISS（33.5，四分位数间距[IQR]22-41 vs 27，四分位数间距21-34；P<0.001）和中位休克指数（0.82，IQR:0.68-1.1 vs 0.73，IQR：0.60-0.91；P=0.02）。初始创伤复苏阶段转入手术室更可能发展为　　MOF（119例中20例，14.4% vs 369例中7.1%；P=0.01）。三种独立的Cox回归模型显示，在控制混杂变量前提下，每个血糖四分位数和多器官功能衰竭增加的危险比(HR)关系如下：Glucadm HR:1.35，95% CI：1.02-1.80；Glu24hMean HR:1.63，95%CI：1.14-2.32；Gluc24hTW HR:1.14，95%CI，0.86-1.50。三个独立的Cox比例风险模型还显示，在控制相同的混杂因素的前提下，每个乳酸四分位数和MOF增加的危险比(HR)关系如下：Lacadm HR:1.94，95% CI：1.38-2.96；Lac24hMean HR:1.68，95% CI，1.22-2.31；Lac24Htw HR:1.49, 95% CI，1.10-2.02。当血糖和乳酸同时进入模型分析，显示只有乳酸仍然与MOF显著相关：Lacadm HR：1.86,95% CI，1.29-2.69，Lac24hMean HR:1.54, 95% CI，1.11-2.12，Lac24hTW HR：1.48, 95% CI，1.08-2.01。从主要结局考虑，乳酸与血糖之间并没有显著的相互作用。

结论：在严重钝性创伤患者中，当同时考虑血糖和乳酸时，只有乳酸与多器官功能衰竭显著相关。

（丁曦冰 译　陈杰 校）

BACKGROUND: Early hyperglycemia is associated with multiple organ failure (MOF) after traumatic injury; however, few studies have considered the contribution of depth of clinical shock. We hypothesize that when considered simultaneously, glucose and lactate are associated with MOF in severely injured blunt trauma patients.

METHODS: We performed a retrospective investigation at a single tertiary care trauma center. Inclusion criteria were patient age ≥18 years, injury severity score (ISS) >15, blunt mechanism of injury, and an intensive care unit length of stay >48 hours. Patients with a history of diabetes or who did not survive the initial 48 hours were excluded. Demographics, injury severity, and physiologic data were recorded. Blood glucose and lactate values were collected from admission through the initial 24 hours of hospitalization. Multiple metrics of glucose and lactate were calculated: the first glucose (Glucadm, mg/dL) and lactate (Lacadm, mmol/L) at hospital admission, the mean initial 24-hour glucose (Gluc24hMean, mg/dL) and lactate (Lac24hMean, mmol/L), and the time-weighted initial 24-hour glucose (Gluc24hTW) and lactate (Lac24hTW). These metrics were divided into quartiles. The primary outcome was MOF. Separate Cox proportional hazard models were generated to assess the association of each individual glucose and lactate metric on MOF, after controlling for ISS, admission shock index, and disposition to the operating room after hospital admission. We assessed the interaction between glucose and lactate

metrics in the multivariable models. Results are reported as hazard ratios (HRs) for an increase in the quartile level of glucose and lactate measurements, with 95% confidence intervals (CIs).
RESULTS: A total of 507 severely injured blunt trauma patients were evaluated. MOF occurred in 46 of 507 (9.1%) patients and was associated with a greater median ISS (33.5, interquartile range [IQR]: 22-41 vs 27, IQR: 21-34; P < .001) and a greater median admission shock index (0.82, IQR: 0.68-1.1 vs 0.73, IQR: 0.60-0.91; P = .02). Patients who were transferred to the operating room after the initial trauma resuscitation were also more likely to develop MOF (20 of 119, 14.4% vs 26 of 369, 7.1%; P = .01). Three separate Cox proportional regression models demonstrated the following HR for an increase in the individual glucose metric quartile and MOF, while controlling for confounding variables: Glucadm HR: 1.35, 95% CI, 1.02-1.80; Gluc24hMean HR: 1.63, 95% CI, 1.14-2.32; Gluc24hTW HR: 1.14, 95% CI, 0.86-1.50. Three separate Cox proportional hazards models also demonstrated the following HR for each individual lactate metric quartile while controlling for the same confounders, with MOF again representing the dependent variable: Lacadm HR: 1.94, 95% CI, 1.38-2.96; Lac24hMean HR: 1.68, 95% CI, 1.22-2.31; Lac24hTW HR: 1.49, 95% CI, 1.10-2.02. When metrics of both glucose and lactate were entered into the same model only lactate remained significantly associated with MOF: Lacadm HR: 1.86, 95% CI, 1.29-2.69, Lac24hMean HR: 1.54, 95% CI, 1.11-2.12, and Lac24hTW HR: 1.48, 95% CI, 1.08-2.01. There was no significant interaction between lactate and glucose variables in relation to the primary outcome.
CONCLUSIONS: When glucose and lactate are considered simultaneously, only lactate remained significantly associated with MOF in severely injured blunt trauma patients.

在正常剖宫产期间的胎盘来源的微粒释放

Microparticle Release During Normal Cesarean Delivery

Hofer, Jennifer E. MD[*]; Scavone, Barbara M. MD[*†]

Anesthesia & Analgesia: 2018 126 925–927

妊娠期凝血增加并在分娩时达高峰。作者推测胎盘分离时胎盘来源的血浆中微粒（MP）水平增高，数小时后消退。作者进行了一项前瞻性观察性研究探讨健康产妇剖宫产术前后血浆MP水平。主要结果是产后MP水平与基线水平相比。采用流式细胞术和染色法测定MP水平。胎盘来源的MP以凝血蛋白的存在为特征。在健康产妇分娩后MP立即升高，随后返回到基线水平。

（葛家希 译　陈杰 校）

Coagulation increases during pregnancy and peaks during parturition. We hypothesized that an increase in microparticle (MP) levels in plasma occurs around the time of placental separation and subsides over several hours. We performed a prospective observational pilot study to investigate plasma MP levels in healthy parturients immediately before and after cesarean delivery. The primary outcome was MP levels at postdelivery time points compared to baseline levels. Samples underwent flow cytometry and staining to determine MP levels. Placental-derived MPs were further characterized for the presence of procoagulant proteins. Placental-derived MPs increased immediately after delivery before returning to baseline in healthy parturients.

幼年猪和成年猪模型急性等容血液稀释后的心肺改变：一项前瞻干预性研究

Cardiorespiratory Alterations Following Acute Normovolemic Hemodilution in a Pediatric and an Adult Porcine Model: A Prospective Interventional Study

Albu, Gergely MD, PhD*; Sottas, Cédric MD†; Dolci, Mirko MD†; Walesa, Magali MD‡; Peták, Ferenc PhD, DSc§; Habre, Walid MD, PhD〃

Anesthesia & Analgesia: 2018 126 995–1003

背景：急性等容血液稀释（ANH）被认作是围手术期管理期间节约用血的一项干预措施。作者旨在比较成年猪和断奶仔猪ANH后的心肺变化，以确定这些年龄组降低血细胞比容的效果，从而测试ANH后心肺呼吸变化反映年龄相关生理行为差异的假设。

方法：通过逐步取血（10 mL / kg）并晶体液替代的方式，在麻醉机械通气的成年小型猪和5周龄断奶仔猪中实现ANH。心肺呼吸评估包括测量呼吸道阻力、呼吸组织弹性、有效肺容积、血管外肺水、平均动脉压、肺血流量和心输出量。在控制条件下进行呼吸和血液动力学测量，并在每个ANH条件下进行5至7个步骤。

结果：ANH在两组中均引起气道阻力和组织弹性的即时和渐进性增加，尽管血细胞比容降低相似，但成年更显著恶化。成年猪中血管外肺水的增加明显更多，平均值（DM）差异为25.1％（95％置信区间[CI]，5.3％-44.9％）。进行性ANH仅在成年组中导致肺血流DM（45.3％; 95％CI，19.8％-70.8％）和平均动脉压（36.3％; 95％CI，18.7％-53.9％）的显著降低，而仔猪的中心输出量显著增加（DM，51.6; 95％CI，14.2％-89.0％）。

结论：虽然ANH导致断奶仔猪出现轻微有害心肺呼吸变化，但在成年猪中观察到支气管收缩逐渐发展，肺组织外渗和硬化，全身和肺血流动力学恶化。 ANH可能存在年龄依赖性心肺效应。

（俞苏洋 译　陈杰 校）

BACKGROUND: Acute normovolemic hemodilution (ANH) is considered as a blood-sparing intervention during the perioperative management. We aimed at comparing the cardiopulmonary consequences of ANH between adult pigs and weaned piglets to establish the effects of lowering hematocrit in these age groups, and thereby testing the hypothesis that difference in the age-related physiological behavior will be reflected in the cardiorespiratory changes following ANH.

METHODS: ANH was achieved in anesthetized, mechanically ventilated adult minipigs and 5-week-old weaned piglets by stepwise blood withdrawal (10 mL/kg) with crystalloids replacement. Cardiorespiratory assessments consisted of measuring airway resistance, respiratory tissue elastance, effective lung volume, extravascular lung water, mean arterial pressure, pulmonary blood flow, and cardiac output. Respiratory and hemodynamic measurements were made at control conditions and following each ANH condition obtained with 5 to 7 steps.

RESULTS: ANH induced immediate and progressive increases in airway resistance and tissue elastance in both groups, with more pronounced worsening in adults despite the similar decreases in hematocrit. The increases in extravascular lung water were significantly greater in the adult population with the differences in mean (DM) of 25.1% (95% confidence interval [CI], 5.3%–44.9%). Progressive ANH led to significant decreases in the DM of pulmonary blood flow (45.3%; 95% CI, 19.8%–70.8%) and mean arterial pressure (36.3%; 95% CI, 18.7%–53.9%) only in adults, whereas cardiac output increased significantly only in the piglets (DM, 51.6; 95% CI, 14.2%–89.0%).

CONCLUSIONS: While ANH led to mild detrimental cardiorespiratory changes in weaned piglets, gradual developments of bronchoconstriction, lung tissue extravasation and stiffening, and

deteriorations in systemic and pulmonary hemodynamics were observed in adults. ANH may exert age-dependent cardiorespiratory effect.

儿科程序性镇静临床试验的有效结局指标：一项ACTTION系统性回顾

Efficacy Outcome Measures for Pediatric Procedural Sedation Clinical Trials: An ACTTION Systematic Review

Williams, Mark R. MBBS, BSc[*]; Nayshtut, Michael DO[†]; Hoefnagel, Amie MD[‡]; McKeown, Andrew BS[*]; Carlson, Douglas W. MD[§]; Cravero, Joseph MD[//]; Lightdale, Jenifer MD, MPH[¶]; Mason, Keira P. MD[//]; Wilson, Stephen DMD, PhD[#]; Turk, Dennis C. PhD[**]; Dworkin, Robert H. PhD[††]; Ward, Denham S. MD, PhD[‡‡§§]

Anesthesia & Analgesia: 2018 126 956–967

对比较不同儿科程序性镇静技术和方法的研究进行客观评估受到结局指标缺乏一致性的限制。本研究回顾了现有的（指标）测量方法，这些方法已经历了在儿科程序性镇静环境中的心理学分析，来确定在涵盖各种（操作）流程、年龄组和技术等的范围内，到什么程度和在什么情况下，这些方法的使用是恰当的。作者研究结果表明，许多不同的测量方法已被用于评估儿科程序性镇静的效能和效力。(这些方法中)大多数都缺乏有效性和可靠性的证据，而这些对于推进严格的临床试验设计，新药和新设备的评估是必需的。根据本研究结果，可以开发一套核心的儿科镇静结局情况和结局指标。作者认为，所有利益相关者在评估儿科程序性镇静的适当领域和测量方法方面达成共识是可能的，而且应该推行这类建议的广泛实施。（姚雪雅 译 陈杰 校）

Objective evaluations comparing different techniques and approaches to pediatric procedural sedation studies have been limited by a lack of consistency among the outcome measures used in assessment. This study reviewed those existing measures, which have undergone psychometric analysis in a pediatric procedural sedation setting, to determine to what extent and in what circumstances their use is justified across the spectrum of procedures, age groups, and techniques. The results of our study suggest that a wide range of measures has been used to assess the efficacy and effectiveness of pediatric procedural sedation. Most lack the evidence of validity and reliability that is necessary to facilitate rigorous clinical trial design, as well as the evaluation of new drugs and devices. A set of core pediatric sedation outcome domains and outcome measures can be developed on the basis of our findings. We believe that consensus among all stakeholders regarding appropriate domains and measures to evaluate pediatric procedural sedation is possible and that widespread implementation of such recommendations should be pursued.

术中应用艾司洛尔辅助减少术中阿片类药物用量和减轻术后疼痛：一项系统性回顾、荟萃分析

Intraoperative Esmolol as an Adjunct for Perioperative Opioid and Postoperative Pain Reduction: A Systematic Review, Meta-analysis, and Meta-regression

Gelineau, Amanda M. MD[*]; King, Michael R. MD[†]; Ladha, Karim S. MD, MSc[‡]; Burns, Sara M. MS[*]; Houle, Timothy PhD[*]; Anderson, T. Anthony MD, PhD[*]

Anesthesia & Analgesia: 2018 126 1035–1049

背景：艾司洛尔是一种超短效β1受体拮抗剂。近期研究表明艾司洛尔可以调节疼痛反应。作者进行了一项荟萃分析来探讨术中使用艾司洛尔是否减少阿片类药物的用量或降低疼痛评分。

方法：通过PubMed，CDS，CCRCT，pubget和Google学术进行搜索。设置安慰剂组和阿片类药物组，且患者年龄大于等于18岁的随机对照研究被纳入。为了比较阿片类药物的用量，纳入的研究在术中和/或麻醉复苏室中统计阿片类药物的用量。手术后第一个小时进行疼痛评分。

结果：一共73项研究被纳入，其中23项纳入了系统评价，19项纳入了一项或多项比较。在7项研究共433名患者中，术中应用艾司洛尔减少了术中阿片类药物的用量（[SMD]，-1.60；95％置信区间[CI]，-2.25－-0.96；P ≤ 0.001）。在12项研究共659名患者中，术中应用艾司洛尔降低了麻醉复苏室阿片类药物的使用（SMD，-1.21；95％CI，-1.66－-0.77; P ≤ 0.001）。在11项研究共688名患者中，术后1小时疼痛评分的改变无统计学意义（SMD，-0.60；95％CI，-1.44－0.24；P = 0 .163）。

结论：该项meta分析表明，术中使用艾司洛尔减少术中和术后阿片类药物的用量，而术后疼痛评分无变化。

（翟小竹 译　陈杰 校）

BACKGROUND: Esmolol is an ultrashort β-1 receptor antagonist. Recent studies suggest a role for esmolol in pain response modulation. The authors performed a meta-analysis to determine if the intraoperative use of esmolol reduces opioid consumption or pain scores.

METHODS: PubMed, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, pubget, and Google Scholar were searched. Studies were included if they were randomized, placebo- or opioid-controlled trials written in English, and performed on patients 18 years of age or older. For comparison of opioid use, included studies tracked opioid consumption intraoperatively and/or in the postanesthesia care unit. Pain score comparisons were performed during the first hour after surgery.

RESULTS: Seventy-three studies were identified, 23 were included in the systematic review, and 19 were eligible for 1 or more comparisons. In 433 patients from 7 trials, intraoperative esmolol decreased intraoperative opioid consumption (Standard Mean Difference [SMD], -1.60; 95% confidence interval [CI], -2.25 to -0.96; P ≤ .001). In 659 patients from 12 trials, intraoperative esmolol decreased postanesthesia care unit opioid consumption (SMD, -1.21; 95% CI, -1.66 to -0.77; P ≤ .001). In 688 patients from 11 trials, there was insufficient evidence of change in postoperative 1 hour pain scores (SMD, -0.60; 95% CI, -1.44 to 0.24; P = .163).

CONCLUSIONS: This meta-analysis demonstrates that intraoperative esmolol use reduces both intraoperative and postoperative opioid consumption, with no change in postoperative pain scores.

研究效应量的统计学意义与临床重要性：P值和置信区间真的代表什么？

Statistical Significance Versus Clinical Importance of Observed Effect Sizes: What Do P Values and Confidence Intervals Really Represent?

Schober, Patrick MD, PhD, MMedStat; Bossers, Sebastiaan M. MD, MSc; Schwarte, Lothar A. MD, PhD, MBA

Anesthesia & Analgesia: 2018 126 1068–1072

效应量测量是量化治疗效果或变量之间的关联的一种方式。这种测量包括在手段、风险差异、风险率、比值比，或关联性方面的未标准化及标准化差异，其中超过70%的内容已包含

在此文献的描述中。虚无假设显著性检验是效应量统计推理的主要方法，但该检验的结果常常被曲解，导致其无法为估量的等级提供信息，也无法告知某种效应的临床重要性。因此，研究者们不应仅仅关注统计学意义，还应该汇报其观察到的效应量大小。不过，所有样本在某种程度上都会受到随机性的影响，例如，观察到的效应大小能够多大程度上体现研究群体中效应的等级和方向，在这方面存在一定程度的不确定性。因此，效应量大小的估测值应与此种不确定性进行量化的合理值的整体范围相结合进行判断。这种方式有利于评估观察到的效应在研究群体中应有的实际大小，并由此判断其临床重要性的大小。本教程评述了不同的效应量测量方式，并描述了置信区间在处理观察到的效应或关联的统计学意义及临床重要性方面的应用。另外也讨论了P值的实际所指，及其在有意义及（相对的）无意义二分法方面的补充。本教程有意强调概念的直观解释及结果的直观解析，而不是注重于背后的数学理论或概念。

（张金源 译 陈杰 校）

Effect size measures are used to quantify treatment effects or associations between variables. Such measures, of which >70 have been described in the literature, include unstandardized and standardized differences in means, risk differences, risk ratios, odds ratios, or correlations. While null hypothesis significance testing is the predominant approach to statistical inference on effect sizes, results of such tests are often misinterpreted, provide no information on the magnitude of the estimate, and tell us nothing about the clinically importance of an effect. Hence, researchers should not merely focus on statistical significance but should also report the observed effect size. However, all samples are to some degree affected by randomness, such that there is a certain uncertainty on how well the observed effect size represents the actual magnitude and direction of the effect in the population. Therefore, point estimates of effect sizes should be accompanied by the entire range of plausible values to quantify this uncertainty. This facilitates assessment of how large or small the observed effect could actually be in the population of interest, and hence how clinically important it could be. This tutorial reviews different effect size measures and describes how confidence intervals can be used to address not only the statistical significance but also the clinical significance of the observed effect or association. Moreover, we discuss what P values actually represent, and how they provide supplemental information about the significant versus nonsignificant dichotomy. This tutorial intentionally focuses on an intuitive explanation of concepts and interpretation of results, rather than on the underlying mathematical theory or concepts.

术中运动诱发电位对于预防胸科手术及胸腹部动脉瘤修补术后脊髓损伤的临床应用

Clinical Utility of Intraoperative Motor-Evoked Potential Monitoring to Prevent Postoperative Spinal Cord Injury in Thoracic and Thoracoabdominal Aneurysm Repair: An Audit of the Japanese Association of Spinal Cord Protection in Aortic Surgery Database

Yoshitani, Kenji MD[*]; Masui, Kenichi MD[†,‡]; Kawaguchi, Masahiko MD[§]; Kawamata, Mikito MD[‖]; Kakinohana, Manabu MD[¶]; Kato, Shinya MD[*]; Hasuwa, Kyoko MD[*]; Yamakage, Michiaki MD[#]; Yoshikawa, Yusuke MD[#]; Nishiwaki, Kimitoshi MD[**]; Aoyama, Tadashi MD[**]; Inagaki, Yoshimi MD[††]; Yamasaki, Kazumasa MD[††]; Matsumoto, Mishiya MD[‡‡]; Ishida, Kazuyoshi MD[‡‡]; Yamashita, Atsuo MD[‡‡]; Seo, Katsuhiro MD[§§]; Kakumoto, Shinichi MD[§§]; Hayashi, Hironobu MD[§]; Tanaka, Yuu MD[§]; Tanaka, Satoshi MD[‖]; Ishida, Takashi MD[‖]; Uchino, Hiroyuki MD[‖‖];

Kakinuma, Takayasu MD[III]; Yamada, Yoshitsugu MD[¶¶]; Mori, Yoshiteru MD[¶¶]; Izumi, Shunsuke MD[¶]; Nishimura, Kunihiro MD, PhD[##]; Nakai, Michikazu PhD[##]; Ohnishi, Yoshihiko MD[*]
Anesthesia & Analgesia: 2018 126 763–768

背景：脊髓缺血再灌注损伤是降主动脉及胸腹部主动脉术后严重的并发症。运动诱发电位（Motor-evoked potentials ，MEPs）曾被用于评估术中运动神经束功能，但是 MEP 检测是否可以减少术后运动缺陷的发生尚不清楚。因此，我们评估了多个医疗中心进行过降主动脉及胸腹部主动脉修补手术（包括开放手术以及介入手术）患者的医疗记录以评估 MEP 检测与术后运动功能损伤的关系。

方法：本研究中纳入的病例为于 2000 年至 2013 年之间在隶属于日本主动脉手术脊髓保护协会的 12 家医院中进行降主动脉或胸腹主动脉修补术的患者。应用多变量混合回归分析，我们探索是否术中 MEP 检测与患者出院时开放及介入主动脉修补术后运动缺陷相关。

结果：我们收集到 1214 例患者病例资料（开放手术有 601 例（49.5%）；介入手术有 613 例（50.5%））。其中 631 例患者进行了 MEP 检测剩余 583 例未进行检测。75 位患者（6.2%）于出院时发生术后运动功能损伤。多变量回归分析结果表明出院时术后运动功能损伤与 MEP 检测无显著关联（矫正后比值比 [OR]：1.13；95%置信区间[CI]：0.69–1.88; P = 0.624），但与其他因素相关：神经损伤病史（矫正后 OR: 6.08； 95% CI:3.10–11.91； P <0 .001）；脑脊液引流术史（矫正后 OR: 2.14； 95% CI: 1.32–3.47； P =0.002）；介入操作（校正后 OR: 0.45; 95% CI:0.27–0.76； P =0.003。术中 MEP 值小于控制阈值的 25%用于预测出院时运动功能损伤的敏感性及特异性分别为 37.8% (95% CI, 26.5%–49.5%) 及 95.5% (95% CI, 94.7%–96.4%)。

结论：术中 MEP 检测与主动脉手术患者出院是运动功能损伤无相关性。

（兰海丹译 李士通校）

BACKGROUND: Spinal cord ischemic injury is the most devastating sequela of descending and thoracoabdominal aortic surgery. Motor-evoked potentials (MEPs) have been used to intraoperatively assess motor tract function, but it remains unclear whether MEP monitoring can decrease the incidence of postoperative motor deficits. Therefore, we reviewed multicenter medical records of patients who had undergone descending and thoracoabdominal aortic repair (both open surgery and endovascular repair) to assess the association of MEP monitoring with postoperative motor deficits.

METHODS: Patients included in the study underwent descending or thoracoabdominal aortic repair at 12 hospitals belonging to the Japanese Association of Spinal Cord Protection in Aortic Surgery between 2000 and 2013. Using multivariable mixed-effects logistic regression analysis, we investigated whether intraoperative MEP monitoring was associated with postoperative motor deficits at discharge after open and endovascular aortic repair.

RESULTS: We reviewed data from 1214 patients (open surgery, 601 [49.5%]; endovascular repair, 613 [50.5%]). MEP monitoring was performed in 631 patients and not performed in the remaining 583 patients. Postoperative motor deficits were observed in 75 (6.2%) patients at discharge. Multivariable logistic regression analysis revealed that postoperative motor deficits at discharge did not have a significant association with MEP monitoring (adjusted odds ratio [OR], 1.13; 95% confidence interval [CI], 0.69–1.88; P = .624), but with other factors: history of neural deficits (adjusted OR, 6.08; 95% CI, 3.10–11.91; P < .001), spinal drainage (adjusted OR, 2.14; 95% CI, 1.32–3.47; P = .002), and endovascular procedure (adjusted OR, 0.45; 95% CI, 0.27–0.76; P = .003). The sensitivity and specificity of MEP <25% of control value for motor deficits at discharge were 37.8% (95% CI, 26.5%–49.5%) and 95.5% (95% CI, 94.7%–96.4%), respectively.

CONCLUSIONS: MEP monitoring was not significantly associated with motor deficits at discharge.

吸入麻醉药对于供肝者肝脏再生能力的影响——倾向性评分匹配分析

Impact of Inhalational Anesthetics on Liver Regeneration After Living Donor Hepatectomy: A Propensity Score-Matched Analysis

Jung, Kyeo-Woon MD*; Kim, Wan-Joon MD†; Jeong, Hye-Won MD*; Kwon, Hye-Mee MD*; Moon, Young-Jin MD*; Jun, In-Gu MD, PhD*; Song, Jun-Gol MD, PhD*; Hwang, Gyu-Sam MD, PhD*

Anesthesia & Analgesia: 2018 126 796–804

背景：虽然地氟烷及七氟烷是吸入麻醉药中最常被使用的吸入麻醉药，但其曾与术后肝脏损伤相关，其对肝脏再生功能的影响尚不清楚。我们比较这两种麻醉药对活供体肝切除术（ living donor hepatectomy ，LDH）后肝脏再生指数（ liver regeneration index ，LRI）的影响。

方法：我们对在 2008 年 1 月至 2016 年 8 月间为 LDH 进行左肝切除术的 1629 例患者进行了回顾性表格分析。患者被分为七氟烷组（1206 例）及地氟烷组（423 例）。使用多变量回归分析探讨与 LRI 相关的因素。倾向性评分匹配分析比较了两组间早期（术后 1 周）及后期（术后 1-2 个月）LRIs 以及肝功能的延迟恢复。

结果：1629 例患者平均早期及后期 LRIs 分别为 63.3% ± 41.5% 及 93.7% ± 48.1%。倾向性评分匹配后，七氟烷组及地氟烷组将早期及后期 LRIs 均未观察到显著差异（早期 LRI: 61.2% ± 41.5% vs 58.9% ± 42.4%, P = 0.438; 后期 LRI: 88.3% ± 44.3% vs 94.6% ± 52.4%, P = 0.168）。男性（回归系数[β]: 4.6; 置信区间:1.6-7.6; P = 0.003）及剩余肝体积（β: -4.92; 置信区间: -5.2 to -4.7; P < 0.001）与 LRI 相关。LDH 术后肝功能延迟恢复的发生率为 3.6%（n=29），但两组间差异无统计学意义(3.0% vs 4.2%, P = 0.375) 。

结论：七氟烷和地氟烷均可安全地用于 LDH 不会影响术后肝脏再生以及延迟肝功能恢复。（兰海丹译 李士通校）

BACKGROUND: Although desflurane and sevoflurane, the most commonly used inhalational anesthetics, have been linked to postoperative liver injury, their impact on liver regeneration remains unclear. We compared the influence of these anesthetics on the postoperative liver regeneration index (LRI) after living donor hepatectomy (LDH).

METHODS: We conducted a retrospective chart review of 1629 living donors who underwent right hepatectomy for LDH between January 2008 and August 2016. The patients were divided into sevoflurane (n = 1206) and desflurane (n = 423) groups. Factors associated with LRI were investigated using multivariable logistic regression analysis. Propensity score matching analysis compared early (1 postoperative week) and late (within 1-2 months) LRIs and delayed recovery of hepatic function between the 2 groups.

RESULTS: The mean early and late LRIs in the 1629 patients were 63.3% ± 41.5% and 93.7% ± 48.1%, respectively. After propensity score matching (n = 403 pairs), there were no significant differences in early and late LRIs between the sevoflurane and desflurane groups (early LRI: 61.2% ± 41.5% vs 58.9% ± 42.4%, P = .438; late LRI: 88.3% ± 44.3% vs 94.6% ± 52.4%, P = .168). Male sex (regression coefficient [β], 4.6; confidence interval, 1.6-7.6; P = .003) and remnant liver volume (β, -4.92; confidence interval, -5.2 to -4.7; P < .001) were associated with LRI. The incidence of delayed recovery of hepatic function was 3.6% (n = 29) with no significant

difference between the 2 groups (3.0% vs 4.2%, P = .375) after LDH.

CONCLUSIONS: Both sevoflurane and desflurane can be safely used without affecting liver regeneration and delaying liver function recovery after LDH.

患者术后呼吸室内空气与吸氧氧饱和度下降特点和呼吸频率有何不同？

Characteristics of Desaturation and Respiratory Rate in Postoperative Patients Breathing Room Air Versus Supplemental Oxygen: Are They Different?

Taenzer, Andreas H. MS, MD[*]; Perreard, Irina M. PhD[*]; MacKenzie, Todd PhD[†]; McGrath, Susan P. PhD[*]

Anesthesia & Analgesia: 2018 126 826–832

背景：术后常规监测患者的脉搏氧饱和度已被证实能减少不良事件的发生。然而，通过脉搏血氧饱和度检测患者饱和度下降的速度有限，往往无法及时给予吸氧等干预措施。为了解决这些问题，本研究比较术后呼吸室内空气患者与吸氧患者氧饱和度下降特点和呼吸频率之间的差异。

方法：根据脉搏氧饱和度值和患者特点，分别监测 67 例术后患者夜间接受吸氧或呼吸室内空气的饱和度情况。本研究比较了这两种不同方式的患者，饱和度降低的速度、程度和持续时间。此外，我们还比较了患者夜间脉率、氧饱和度、呼吸频率、和从正常的氧饱和度水平过渡到降低水平的时间。统计方法包括多变量回归、调节吸氧和呼吸室内空气患者之间的不平衡性的逆概率加权，和线性混合效应模型。

结果：本研究包括 33 名呼吸室内空气患者和 34 名吸氧患者。两类患者氧饱和度下降速度无差异吸空气患者下降速度 22.4%, 95%可信区间-51.5%至 209%; P = .67；吸氧患者下降速度 -17.3%, 95%可信区间-53.8% 至 47.6%; P = .52。接受吸氧的患者平均氧饱和度较高，平均相差 2.4，95%可信区间[0.7-4.0]，P = .006。两组患者夜间平均呼吸、脉率和低氧饱和度持续时间均无差异。吸氧从正常的氧饱和度（92%）下降到 88%或以下的过渡时间稍短，P = .42，两组差异 26.1%，95% 可信区间-28.1%至 121%。两组患者总体呼吸频率、氧饱和度下降时呼吸频率和恢复阶段呼吸频率均无差异。

结论：在这项研究中，吸氧患者和呼吸室内空气患者在氧饱和度下降速度、程度和持续时间均无差异。两组患者氧饱和度下降至低氧警报界线的过渡时间也无差异，而在这些事件中，患者呼吸速率均保持在正常范围内。这些结果表明，基于脉搏的氧饱和度监测对于吸氧患者和呼吸室内空气患者同样有效。

（陆晓斐 译 李士通 审校）

BACKGROUND: Routine monitoring of postoperative patients with pulse oximetry-based surveillance monitoring has been shown to reduce adverse events. However, there is some concern that pulse oximetry is limited in its ability to detect deterioration quickly enough to allow for intervention in patients receiving supplemental oxygen. To address such concerns, this study expands on the current limited knowledge of differences in desaturation and respiratory rate characteristics between patients breathing room air and those receiving supplemental oxygen.

METHODS: Pulse oximetry-derived data and patient characteristics were used to examine overnight desaturation patterns of 67 postoperative patients who were receiving either supplemental oxygen or breathing room air. The 2 modalities with respect to the speed of desaturation, in addition to magnitude and duration of desaturation events, are compared. Night-time pulse rate, oxygen saturation, respiratory rate, and the transition times from normal oxygen saturation levels to desaturated states are also compared. The behavior of respiratory rate

in proximity to desaturation events is described. Statistical methods included multivariable regression and inverse probability of treatment weighted to adjust for any imbalance in patient characteristics between the oxygen and room air patients and linear mixed effect models to account for clustering by patient.

RESULTS: The study included 33 patients on room air and 34 receiving supplemental oxygen. The speed of desaturation was not different for room air versus oxygen for 2 types of desaturation (adjusted % difference, 95% confidence interval [CI]: type I; 22.4%, -51.5% to 209%; P = .67, type II; -17.3%, -53.8% to 47.6%; P = .52). Patients receiving supplemental oxygen had a higher mean oxygen saturation (adjusted difference, 95% CI, 2.4 [0.7-4.0]; P = .006). No differences were found for the average overnight respiratory or pulse rate, or proportion of time in desaturation states between the 2 groups. The time to transition from a normal oxygen saturation (92%) to 88% or below was not longer for supplemental oxygen patients (P = .42, adjusted difference 26.1%: 95% CI, -28.1% to 121%). Respiratory rates did not differ between the overall mean and desaturation or recovery phases or between the oxygen and room air group.

CONCLUSIONS: In this study, desaturation characteristics did not differ between patients receiving supplemental oxygen and breathing room air with regard to speed, depth, or duration of desaturation. Transition time for desaturations to reach low oxygen saturation alarms was not different, while respiratory rate remained in the normal range during these events. These findings suggest that pulse oximetry-based surveillance monitoring for deterioration detection can be used equally effectively for patients on supplemental oxygen and for those on room air.

应用潜在类别分析腹部手术患者术后主要并发症的危险分层

Risk Stratification for Major Postoperative Complications in Patients Undergoing Intra-abdominal General Surgery Using Latent Class Analysis

Kim, Minjae MD, MS[*†]; Wall, Melanie M. PhD[‡]; Li, Guohua MD, DrPH[*†]

Anesthesia & Analgesia: 2018 126 848–857

背景：术前危险分层是评估手术风险和获益的关键因素。已有研究证明，腹部手术患者可以根据其合并症和危险因素进行潜在类别分析（LCA），LCA 是一项基于聚类技术以找出具有相似特征患者组的模型。此外，潜在风险等级可预测患者 30 天的死亡率。我们评估使用潜在风险分级来预测患者术后主要并发症的可行性。

方法：本研究对 2005 至 2010 年间美国外科医师学会全国外科质量改善计划中行腹部手术患者进行了一项观察性、回顾性队列研究。将已知的术前合并症和危险因素数据输入 LCA 模型，以确定潜在风险类别。其中并发症包括：急性肾损伤、急性呼吸衰竭、心脏骤停、深静脉血栓、心肌梗塞、器官腔隙感染、肺炎、术后出血、肺栓塞、败血症或感染性休克、脑卒中、非计划二次插管，和伤口裂开。在调整手术过程后，使用相对风险回归研究潜在类别与患者 30 天并发症风险之间的关系。使用 ROC 曲线下面积（AUC）评估该模型性能。

结果：根据 LCA 将 466177 例受试者分为 9 级模型。患者整体并发症风险为 18.4%，包括从最低风险等级患者的 7.7%至最高风险等级患者的 56.7%。在调整后，患者潜在风险等级与并发症显著相关，相对于平均风险而言，最低风险等级患者的风险比为 0.56（0.54–0.58，95%置信区间），而最高风险等级患者的风险比为 2.15（2.11–2.20），其间相差 4 倍。在合并手术方案、潜在的风险级别，与美国麻醉医师身体状况的模型中，并发症的 AUC 为 0.76（0.76–0.76）。然而，使用该模型评估一些特别的并发症存在异质性，例如肺动脉栓塞 AUC 为 0.70（0.69–0.71），而急性呼吸衰竭 AUC 为 0.90（0.90–0.90）。

结论：LCA 可用于根据术前危险因素对腹部手术患者进行分类，该分类与术后并发症密切相关。然而，该模型对于某些并发症的评估存在异质性，导致该术前风险分层方法的效果取决于被评估的并发症。

（陆晓斐 译 李士通 审校）

BACKGROUND: Preoperative risk stratification is a critical element in assessing the risks and benefits of surgery. Prior work has demonstrated that intra-abdominal general surgery patients can be classified based on their comorbidities and risk factors using latent class analysis (LCA), a model-based clustering technique designed to find groups of patients that are similar with respect to characteristics entered into the model. Moreover, the latent risk classes were predictive of 30-day mortality. We evaluated the use of latent risk classes to predict the risk of major postoperative complications.

METHODS: An observational, retrospective cohort of patients undergoing intra-abdominal general surgery in the 2005 to 2010 American College of Surgeons National Surgical Quality Improvement Program was obtained. Known preoperative comorbidity and risk factor data were entered into LCA models to identify the latent risk classes. Complications were defined as: acute kidney injury, acute respiratory failure, cardiac arrest, deep vein thrombosis, myocardial infarction, organ space infection, pneumonia, postoperative bleeding, pulmonary embolism, sepsis/septic shock, stroke, unplanned reintubation, and/or wound dehiscence. Relative risk regression determined the associations between the latent classes and the 30-day complication risks, with adjustments for the surgical procedure. The area under the curve (AUC) of the receiver operator characteristic curve assessed model performance.

RESULTS: LCA fit a 9-class model on 466,177 observations. The composite complication risk was 18.4% but varied from 7.7% in the lowest risk class to 56.7% in the highest risk class. After adjusting for procedure, the latent risk classes were significantly associated with complications, with risk ratios (95% confidence intervals) (compared to the class with the average risk) varying from 0.56 (0.54–0.58) in the lowest risk class to 2.15 (2.11–2.20) in the highest risk class, a 4-fold difference. In models incorporating surgical procedure, latent risk class, and the American Society of Anesthesiologists Physical Status, the AUC for composite complications was 0.76 (0.76–0.76). However, for individual complications, there was heterogeneity in model performance using these variables, with AUCs ranging from 0.70 (0.69–0.71) for pulmonary embolus to 0.90 (0.90–0.90) for acute respiratory failure.

CONCLUSIONS: LCA can be used to classify patients undergoing intra-abdominal general surgery based on preoperative risk factors, and the classes are independently associated with postoperative complications. However, model performance is not uniform across individual complications, resulting in variations in the utility of preoperative risk stratification tools depending on the complication evaluated.

手术室内心脏骤停：麻醉医师抢救和治疗的第 1 部分

Cardiac Arrest in the Operating Room: Resuscitation and Management for the Anesthesiologist Part 1

Moitra, Vivek K. MD[*]; Einav, Sharon MD[†]; Thies, Karl-Christian MD[‡]; Nunnally, Mark E. MD[§]; Gabrielli, Andrea MD[‖]; Maccioli, Gerald A. MD[¶]; Weinberg, Guy MD[#]; Banerjee, Arna MD[**]; Ruetzler, Kurt MD[††]; Dobson, Gregory MD[‡‡]; McEvoy, Matthew D. MD[**]; O'Connor, Michael F. MD, FCCM[§§]

Anesthesia & Analgesia: March 2018 - Volume 126 - Issue 3 - p 876–888

发生在手术室内和常规区域中的心脏骤停有不同的原因（如低血容量、空气栓塞和高钾血症），对这些原因进行快速适当的评估和处理，需要改变传统心脏骤停的步骤。有一小部分但越来越多的文献，记载了关于循环危象和围手术期心脏骤停的发病率、原因、治疗和结局。这些事件几乎总是被发现且经常被人所知，并且涉及救治人员对病人及其过程的了解。在这种情况下，可以制定鉴别诊断和有针对性的干预措施，以处理危机潜在的根本原因，同时处理危机本身。围手术期患者的心脏骤停救治是基于专家的意见、生理基础以及对这些事件发生的背景的理解。抢救步骤应考虑围手术期内对这些危机原因的评估和处理。
（俞泳 译 李士通 审校）

Cardiac arrest in the operating room and procedural areas has a different spectrum of causes (ie, hypovolemia, gas embolism, and hyperkalemia), and rapid and appropriate evaluation and management of these causes require modification of traditional cardiac arrest algorithms. There is a small but growing body of literature describing the incidence, causes, treatments, and outcomes of circulatory crisis and perioperative cardiac arrest. These events are almost always witnessed, frequently known, and involve rescuer providers with knowledge of the patient and their procedure. In this setting, there can be formulation of a differential diagnosis and a directed intervention that treats the likely underlying cause(s) of the crisis while concurrently managing the crisis itself. Management of cardiac arrest of the perioperative patient is predicated on expert opinion, physiologic rationale, and an understanding of the context in which these events occur. Resuscitation algorithms should consider the evaluation and management of these causes of crisis in the perioperative setting.

光电容积脉搏波和心率变异性诊断先兆子痫

Photoplethysmography and Heart Rate Variability for the Diagnosis of Preeclampsia

Euliano, Tammy Y. MD[*]; Michalopoulos, Kostas PhD[†]; Singh, Savyasachi PhD[†]; Gregg, Anthony R. MD[‡]; Del Rio, Mariem MPH[*]; Vasilopoulos, Terrie PhD[*§]; Johnson, Amber M. BS[*]; Onkala, Allison MPAS[*]; Darmanjian, Shalom PhD[†]; Euliano, Neil R. PhD[†]; Ho, Monique MD[‡]

Anesthesia & Analgesia: 2018 126 913–919

背景：这项研究的目标是，通过无创性监测孕妇心电图和光电容积描记标识来鉴别先兆子痫患者，以建立一组时机、发展和统计特征。

方法：进入接生房的孕妇采用脉搏血氧仪和心电图监测 30 分钟。从每个数据集中提取光电容积描记图特征和心率变异性，并将其应用到序列特征选择算法中，以区分具有来自血压正常和高血压对照严重特征的先兆子痫孕妇。选择分类边界以减少预期误分类的成本。假设错误分类成本的先验概率是相等的。

结果：37 例临床上诊断为重度先兆子痫的患者与 43 例正常对照组比较，均为早产或引产。最终模型中使用了 6 个变量。受试者操作特征曲线下面积为 0.907（标准误差[SE] = 0.004）（灵敏度 78.2%[SE = 0.3%]，特异性 89.9%[SE = 0.1%]），阳性预测值为 0.883（SE =0.001）。将 28 例慢性或妊娠高血压患者与同一先兆子痫组进行比较，生成一个具有 5 个特征的模型，其曲线下面积为 0.795（SE = 0.007；敏感度 79.0%[SE = 0.2%]，特异性 68.7% [SE = 0.4%]），阳性预测值为 0.799（SE = 0.002）。

结论：通过光电容积描记术和心率变异性无创性评估血管参数，可能在筛查怀疑患有先兆子痫的孕妇中发挥作用，特别是在资源有限的地区。
（俞泳 译 李士通 审校）
BACKGROUND: The goal of this study was to determine a set of timing, shape, and statistical features available through noninvasive monitoring of maternal electrocardiogram and photoplethysmography that identifies preeclamptic patients.
METHODS: Pregnant women admitted to Labor and Delivery were monitored with pulse oximetry and electrocardiogram for 30 minutes. Photoplethysmogram features and heart rate variability were extracted from each data set and applied to a sequential feature selection algorithm to discriminate women with preeclampsia with severe features, from normotensive and hypertensive controls. The classification boundary was chosen to minimize the expected misclassification cost. The prior probabilities of the misclassification costs were assumed to be equal.
RESULTS: Thirty-seven patients with clinically diagnosed preeclampsia with severe features were compared with 43 normotensive controls; all were in early labor or beginning induction. Six variables were used in the final model. The area under the receiver operating characteristic curve was 0.907 (standard error [SE] = 0.004) (sensitivity 78.2% [SE = 0.3%], specificity 89.9% [SE = 0.1%]) with a positive predictive value of 0.883 (SE = 0.001). Twenty-eight subjects with chronic or gestational hypertension were compared with the same preeclampsia group, generating a model with 5 features with an area under the curve of 0.795 (SE = 0.007; sensitivity 79.0% [SE = 0.2%], specificity 68.7% [SE = 0.4%]), and a positive predictive value of 0.799 (SE = 0.002).
CONCLUSIONS: Vascular parameters, as assessed noninvasively by photoplethysmography and heart rate variability, may have a role in screening women suspected of having preeclampsia, particularly in areas with limited resources.

产科麻醉和围产期学共识声明关于孕妇和产后妇女接受血栓预防或更高剂量抗凝剂的麻醉管理

The Society for Obstetric Anesthesia and Perinatology Consensus Statement on the Anesthetic Management of Pregnant and Postpartum Women Receiving Thromboprophylaxis or Higher Dose Anticoagulants

Leffert, Lisa MD[*]; Butwick, Alexander MBBS, FRCA, MS[†]; Carvalho, Brendan MBBCh, FRCA, MDCH[†]; Arendt, Katherine MD[‡]; Bates, Shannon M. MDCM, MSc[§]; Friedman, Alex MD[‖]; Horlocker, Terese MD[‡]; Houle, Timothy PhD[*]; Landau, Ruth MD[¶]; Dubois, Heloise BS; Fernando, Roshan MBChB, FRCA; Houle, Tim PhD; Kopp, Sandra MD; Montgomery, Douglas MD; Pellegrini, Joseph PhD, CRNA, FAAN; Smiley, Richard MD, PhD; Toledo, Paloma MD, MPHthe members of the SOAP VTE Taskforce

Anesthesia & Analgesia: 2018 126 928–944

静脉血栓栓塞被认为是导致美国孕产妇死亡的主要原因。血栓预防被强调为减少孕产妇因静脉血栓栓塞而死亡的一项重要预防措施。然而，在产科中扩大血栓预防的使用将会对女性进行阴道或剖宫产术和其他产科手术的使用和时机的椎管内麻醉产生重大影响。来自产科麻醉和会计学协会、美国区域麻醉学协会和血液学协会的专家们合作开发了这一综合性的、妊娠特异性的关于产科病人接受血栓预防或更高剂量抗凝血剂的神经轴程序的共识声明。到

目前为止，现有的麻醉协会的建议都没有考虑到在血栓预防的情况下，椎管内的潜在风险，在全身麻醉中存在潜在的困难的气道，或者是由于避免或延迟的椎管内麻醉而造成的母体或胎儿的伤害。此外，现有的指南还没有将抗凝剂的药代动力学和药效学结合在产科人群中。这一共识声明的目标是提供一个实用指南如何适当地在产前期,生产中,产后时期来识别、准备和管理孕妇接受血栓的预防或高剂量抗凝剂。促进多学科交流、循证药代动力学和脊髓硬膜外血肿数据的策略和决策辅助手段应有助于与患者进行风险利益讨论并促进共同决策。
（董欣怡译 李士通校）

Venous thromboembolism is recognized as a leading cause of maternal death in the United States. Thromboprophylaxis has been highlighted as a key preventive measure to reduce venous thromboembolism-related maternal deaths. However, the expanded use of thromboprophylaxis in obstetrics will have a major impact on the use and timing of neuraxial analgesia and anesthesia for women undergoing vaginal or cesarean delivery and other obstetric surgeries. Experts from the Society of Obstetric Anesthesia and Perinatology, the American Society of Regional Anesthesia, and hematology have collaborated to develop this comprehensive, pregnancy-specific consensus statement on neuraxial procedures in obstetric patients receiving thromboprophylaxis or higher dose anticoagulants. To date, none of the existing anesthesia societies' recommendations have weighed the potential risks of neuraxial procedures in the presence of thromboprophylaxis, with the competing risks of general anesthesia with a potentially difficult airway, or maternal or fetal harm from avoidance or delayed neuraxial anesthesia. Furthermore, existing guidelines have not integrated the pharmacokinetics and pharmacodynamics of anticoagulants in the obstetric population. The goal of this consensus statement is to provide a practical guide of how to appropriately identify, prepare, and manage pregnant women receivingthromboprophylaxis or higher dose anticoagulants during the ante-, intra-, and postpartum periods. The tactics to facilitate multidisciplinary communication, evidence-based pharmacokinetic and spinal epidural hematoma data, and Decision Aids should help inform risk-benefit discussions with patients and facilitate shared decision making.

内窥镜和开放修复颅缝早闭的婴儿使用倾向得分匹配比较结果:一项多中心研究儿科颅面的协作组

Endoscopic Versus Open Repair for Craniosynostosis in Infants Using Propensity Score Matching to Compare Outcomes: A Multicenter Study from the Pediatric Craniofacial Collaborative Group

Thompson, Douglas R. MD[*]; Zurakowski, David MS, PhD[†]; Haberkern, Charles M. MD, MPH[*‡]; Stricker, Paul A. MD[§]; Meier, Petra M. MD, DEAA[†]; Bannister, Carolyn; Benzon, Hubert; Binstock, Wendy; Bosenberg, Adrian; Brzenski, Alyssa; Budac, Stefan; Busso, Veronica; Capehart, Samantha; Chiao, Franklin; Cladis, Franklyn; Collins, Michael; Cusick, Jordan; Dabek, Rachel; Dalesio, Nicholas; Falcon, Ricardo; Fernandez, Allison; Fernandez, Patrick; Fiadjoe, John; Gangadharan, Meera; Gentry, Katherine; Glover, Chris; Goobie, Susan; Gries, Heike; Griffin, Allison; Groenewald, Cornelius Botha; Hajduk, John; Hall, Rebecca; Hansen, Jennifer; Hetmaniuk, Mali; Hsieh, Vincent; Huang, Henry; Ingelmo, Pablo; Ivanova, Iskra; Jain, Ranu; Koh, Jeffrey; Kowalczyk-Derderian, Courtney; Kugler, Jane; Labovsky, Kristen; Martinez, José Luis; Mujallid, Razaz; Muldowney, Bridget; Nguyen, Kim-Phuong; Nguyen, Thanh; Olutuye, Olutoyin; Soneru, Codruta; Petersen,

Timothy; Poteet-Schwartz, Kim; Reddy, Srijaya; Reid, Russell; Ricketts, Karene; Rubens, Daniel; Skitt, Rochelle; Sohn, Lisa; Staudt, Susan; Sung, Wai; Syed, Tariq; Szmuk, Peter; Taicher, Brad; Tetreault, Lisa; Watts, Rheana; Wong, Karen; Young, Vanessa; Zamora, LillianThe Pediatric Craniofacial Collaborative Group
Anesthesia & Analgesia: 2018 126 968–975

背景：北美儿科颅面协作组(PCCG)建立了儿童颅面部手术围手术期，以评估婴儿和儿童进行颅骨组织修复的结果。这项多中心研究的目的是利用本登记处评估血液利用、重症监护病房(ICU)的使用率、住院时间和内窥镜辅助治疗(ESC)的围手术期并发症和颅缝早闭婴儿的开放性修复。我们假设从单中心研究的 ESC 的优点将基于一个大型多中心注册中心的合并数据进行验证。

方法：31 个机构在 2012 年 6 月至 2015 年 9 月期间提供了数据。我们分析了 1382 名年龄在 12 个月以下的婴儿(前和/或后颅穹窿重建，改良 pi 程序，或带状颅骨切除术)或内镜下颅骨切除术。主要结果包括输血数据、ICU 使用率、住院时间、围手术期并发症;次要结果包括麻醉和手术持续时间。非匹配组比较(ESC: N = 311, open repair: N = 1071)，倾向评分 2:1 匹配组(ESC: N = 311, open repair: N = 622)，采用条件逻辑回归分析。

结果：由于 ESC 的手术选择标准，基线年龄和体重的失衡是内在的。在平衡年龄和体重之间，ESC 和开放组之间的倾向评分匹配的质量由倾向评分的五分位数。与开放组相比，在 ESC 组中，对配对组的分析证实，血液的利用率显著降低(26% vs 81%， P < 0.001)，凝血(3% vs 16%， P < 0.001)。中位供血者暴露(0 比 1)、麻醉(168 vs 248 分钟)和手术持续时间(70 vs 130 分钟)、ICU (0 vs 2)、住院时间(2 比 4)均显著低于 ESC 组(P < 0.001)。平均红细胞体积管理显著低于 ESC(19.6 vs 26.9 毫升/公斤,P = .035) ，差异的减少大约 7 毫升/公斤的 ESC(95%置信区间的差异,3 - 12 毫升/公斤),而凝固的平均体积产品 2 组之间没有明显不同(21.2 vs 24.6 毫升/公斤,P = =.73)。需要治疗的并发症包括低血压发生率与作用于血管的药物(3% vs 4%),静脉空气栓塞(1%),和体温过低,定义为< 35°C(22% vs 26%),两组之间的相似,而插管术后明显高于开放组(2%比 10%,P <.001)。

结论：该多中心研究的 ESC 与开放颅缝修复是迄今为止最大的比较。它展示了 ESC 对年幼婴儿的显著优势，这可能会改善临床结果，并增加安全性。

（董欣怡译 李士通校）

BACKGROUND: TheNorthAmerican Pediatric Craniofacial Collaborative Group (PCCG) established the Pediatric Craniofacial Surgery Perioperative Registry to evaluate outcomes in infants and children undergoing craniosynostosis repair. The goal of this multicenter study was to utilize this registry to assess differences in blood utilization, intensive care unit (ICU) utilization, duration of hospitalization, and perioperative complications between endoscopic-assisted (ESC) and open repair in infants with craniosynostosis. We hypothesized that advantages of ESC from single-center studies would be validated based on combined data from a large multicenter registry.

METHODS: Thirty-one institutions contributed data from June 2012 to September 2015. We analyzed 1382 infants younger than 12 months undergoing open (anterior and/or posterior cranial vault reconstruction, modified-Pi procedure, or strip craniectomy) or endoscopic craniectomy. The primary outcomes included transfusion data, ICU utilization, hospital length of stay, and perioperative complications; secondary outcomes included anesthesia and surgical duration. Comparison of unmatched groups (ESC: N = 311, open repair: N = 1071) and propensity score 2:1 matched groups (ESC: N = 311, open repair: N = 622) were performed by conditional logistic

regression analysis.

RESULTS: Imbalances in baseline age and weight are inherent due to surgical selection criteria for ESC. Quality of propensity score matching in balancing age and weight between ESC and open groups was assessed by quintiles of the propensity scores. Analysis of matched groups confirmed significantly reduced utilization of blood (26% vs 81%, P < .001) and coagulation (3% vs 16%, P < .001) products in the ESC group compared to the open group. Median blood donor exposure (0 vs 1), anesthesia (168 vs 248 minutes) and surgical duration (70 vs 130 minutes), days in ICU (0 vs 2), and hospital length of stay (2 vs 4) were all significantly lower in the ESC group (all P < .001). Median volume of red blood cell administered was significantly lower in ESC (19.6 vs 26.9 mL/kg, P = .035), with a difference of approximately 7 mL/kg less for the ESC (95% confidence interval for the difference, 3-12 mL/kg), whereas the median volume of coagulation products was not significantly different between the 2 groups (21.2 vs 24.6 mL/kg, P = .73). Incidence of complications including hypotension requiring treatment with vasoactive agents (3% vs 4%), venous air embolism (1%), and hypothermia, defined as <35°C (22% vs 26%), was similar between the 2 groups, whereas postoperative intubation was significantly higher in the open group (2% vs 10%, P < .001).

CONCLUSIONS: This multicenter study of ESC versus open craniosynostosis repair represents the largest comparison to date. It demonstrates striking advantages of ESC for young infants that may result in improved clinical outcomes, as well as increased safety.

一项关于全膝关节置换术后 6 周内收肌管阻滞对膝关节伸肌肌力的影响的随机对照试验

The Effect of Adductor Canal Block on Knee Extensor Muscle Strength 6 Weeks After Total Knee Arthroplasty: A Randomized, Controlled Trial

Rousseau-Saine, Nicolas MD[*]; Williams, Stephan R. MD, PhD[*]; Girard, François MD, FRCPC[*]; Hébert, Luc J. PhD, PT, CD[†]; Robin, Florian MD[*]; Duchesne, Luc PHT[‡]; Lavoie, Frédéric MD, MSc, FRCSC[§]; Ruel, Monique RN, CCRP[*]

Anesthesia & Analgesia: 2018 126 1019–1027

背景：基于相对大量的局部麻醉剂优化内收管阻滞（ACB）的假设，我们推测，与持续输注相比，以重复推注施用的 ACB 会改善镇痛而不会损害移动性。

方法：我们进行了一项随机、双盲、对照的研究，其中包括脊柱麻醉下全膝关节置换术患者。患者接受 0.2%罗哌卡因经收肌管为重复间歇丸给药导管（21 毫升/ 3 小时）或连续输注（7 毫升/小时）。主要结果为术后第一天（POD），0 - 2）阿片类药物作为病人自控镇痛的总消耗量（mg）。疼痛、行走和股四头肌肌力是次要的结果。

结果：我们对 110 例患者进行随机分组，其中 107 例进行了分析。 推注组的总阿片类药物消耗量（POD，0-2）为 23 mg（0-139），输注组为 26 mg（3-120）（估计的中位数差异为 4 mg; 95％ 置信区间[CI]，-13 至 5; P = .29）。线性混合模型分析显示膝关节屈曲时疼痛无统计学差异（平均差 2.6 mm; 95％CI，-2.9 至 8.0）或静息时（平均差 1.7 mm; 95％CI，-1.5 至 4.9）。推注组患者股四头肌的POD 2 节律得到改善（中位数差异为7.4％; 95％CI为0.5％-15.5％）。然而，这种差异在 POD 1 上没有出现或者在步行试验中反映出来（P> 0.05）。

讨论：将 ACB 的给药方式从连续输注改变为反复间歇性推注不会减少阿片类药物的消耗，疼痛或移动。

（吕良策译 李士通校）

BACKGROUND: Based on the assumption that relatively large volumes of local anesthetic

optimize an adductor canal block (ACB), we theorized that an ACB administered as repeated boluses would improve analgesia without compromising mobility, compared with a continuous infusion.

METHODS: We performed a randomized, blinded, controlled study, including patients scheduled for total knee arthroplasty with spinal anesthesia. Patients received 0.2% ropivacaine via a catheter in the adductor canal administered as either repeated intermittent boluses (21 mL/3 h) or continuous infusion (7 mL/h). The primary outcome was total (postoperative day [POD], 0–2) opioid consumption (mg), administered as patient-controlled analgesia. Pain, ambulation, and quadriceps muscle strength were secondary outcomes.

RESULTS: We randomized 110 patients, of whom 107 were analyzed. Total opioid consumption (POD, 0–2) was a median (range) of 23 mg (0–139) in the bolus group and 26 mg (3–120) in the infusion group (estimated median difference, 4 mg; 95% confidence interval [CI], −13 to 5; P = .29). Linear mixed-model analyses revealed no difference in pain during knee flexion (mean difference, 2.6 mm; 95% CI, −2.9 to 8.0) or at rest (mean difference, 1.7 mm; 95% CI, −1.5 to 4.9). Patients in the bolus group had improved quadriceps sparing on POD 2 (median difference, 7.4%; 95% CI, 0.5%–15.5%). However, this difference was not present on POD 1 or reflected in the ambulation tests (P > .05).

CONCLUSIONS: Changing the mode of administration for an ACB from continuous infusion to repeated intermittent boluses did not decrease opioid consumption, pain, nor mobility.

被截短的具有 6 个跨膜区的 μ 受体是阿片类药物镇痛的关键

Truncated μ-Opioid Receptors With 6 Transmembrane Domains Are Essential for Opioid Analgesia

Lu, Zhigang PhD[*†]; Xu, Jin MD[‡]; Xu, Mingming MS[‡]; Rossi, Grace C. PhD[§]; Majumdar, Susruta PhD[‡]; Pasternak, Gavril W. MD, PhD[‡]; Pan, Ying-Xian MD, PhD[‡]

Anesthesia & Analgesia: 2018 126 1050–1057

背景：大多数临床阿片类药物通过 μ 阿片受体起作用。它们有效地减轻了疼痛，但受到副作用的限制，如便秘，呼吸抑制，依赖和成瘾。已经做出许多努力来开发无副作用的有效镇痛剂。三碘苯甲酰-6β-纳曲酮（IBNtxA）是一类新型的阿片类药物，能够抵抗热，炎症和神经性疼痛，无呼吸抑制，身体依赖和奖励行为。 μ-阿片受体（OPRM1）基因经历广泛的替代前体信使核糖核酸剪接，产生从啮齿动物保守到人类的多种剪接变体。一种类型的变体是包含 6 个跨膜结构域（6TM 变体）的外显子 11（E11）相关的截短变体。在小鼠 OPRM1 基因中有 5 个 6TM 变体，包括 mMOR-1G，mMOR-1M，mMOR-1N，mMOR-1K 和 mMOR-1L。基因靶向小鼠模型中敲除 6tm 选择性去除 E11 变种（KO）小鼠消除 ibntxa 镇痛不影响吗啡的镇痛作用。相反，在没有全部 7 个跨膜（7TM）变体但保留 6TM 变体表达，而 IBNtxA 止痛保持完整的外显子 1（E1）KO 小鼠中，吗啡镇痛丧失。在 E1 / E11 双 KO 小鼠中消除 E1 和 E11 均消除吗啡和 IBNtxA 镇痛。通过慢病毒表达重建 E1 / E11 KO 小鼠中 6TM 变体 mMOR-1G 的表达，挽救 IBNtxA 而不是吗啡镇痛。本研究的目的是研究 E1 / E11 KO 小鼠中其他 6TM 变体的慢病毒表达对 IBNtxA 镇痛的影响。

方法：将表达 6TM 变体的慢病毒包装在 HEK293T 细胞中，通过超速离心浓缩，并鞘内给药 3 次。 使用辐射热甩尾测定法测定阿片样镇痛。 通过聚合酶链式反应（PCR）或定量 PCR 检测慢病毒 6TM 变体信使核糖核酸的表达。

结果：所有 6TM 变体在 E1 / E11 KO 小鼠中恢复 IBNtxA 镇痛，而吗啡保持无效。 通过 PCR 或定量 PCR 证实慢病毒 6TM 变体的表达。 IBNtx 从救助小鼠的累积剂量反应研究确定的半数有效剂量值与野生型动物无法区分。 在救援小鼠中 IBNtxA 止痛维持长达 33 周，并且容易被阿片拮抗剂利瓦洛凡拮抗。

结论：我们的研究证明了小鼠 6TM 变体在 IBNtxA 镇痛中的药理学相关性，并且证实与由外显子 2 和 3 编码的跨膜结构域相对应的受体的共同功能核心足以用于活性。 因此，6TM 变体为一类不同类型的镇痛药提供了潜在的治疗靶点，这些镇痛药对广谱疼痛模型有效，没有许多与传统阿片类药物相关的副作用。

（吕良策译 李士通校）

BACKGROUND: Most clinical opioids act through μ-opioid receptors. They effectively relieve pain but are limited by side effects, such as constipation, respiratory depression, dependence, and addiction. Many efforts have been made toward developing potent analgesics tha t lack side effects. Three-iodobenzoyl-6β-naltrexamide (IBNtxA) is a novel class of opioid active against thermal, inflammatory, and neuropathic pain, without respiratory depression, physical depe ndence, and reward behavior. The μ-opioid receptor (OPRM1) gene undergoes extensive alternati ve precursor messenger ribonucleic acid splicing, generating multiple splice variants that are cons erved from rodents to humans. One type of variant is the exon 11 (E11)–
associated truncated variant containing 6 transmembrane domains (6TM variant). There are 5 6T M variants in the mouse OPRM1 gene, including mMOR-1G, mMOR-1M, mMOR-1N, mMOR-1 K, and mMOR-1L. Gene-targeting mouse models selectively removing 6TM variants in E11 knoc kout (KO) mice eliminated IBNtxA analgesia without affecting morphine analgesia. Conversely, morphine analgesia is lost in an exon 1 (E1) KO mouse that lacks all 7 transmembrane (7TM) vari ants but retains 6TM variant expression, while IBNtxA analgesia remains intact. Elimination of bo th E1 and E11 in an E1/E11 double KO mice abolishes both morphine and IBNtxA analgesia. Rec onstituting expression of the 6TM variant mMOR-1G in E1/E11 KO mice through lentiviral expre ssion rescued IBNtxA but not morphine analgesia. The aim of this study was to investigate the eff ect of lentiviral expression of the other 6TM variants in E1/E11 KO mice on IBNtxA analgesia.

METHODS: Lentiviruses expressing 6TM variants were packaged in HEK293T cells, concentrate d by ultracentrifugation, and intrathecally administered 3 times. Opioid analgesia was determined using a radiant-heat tail-flick assay. Expression of lentiviral 6TM variant messenger ribonucleic ac ids was examined by polymerase chain reaction (PCR) or quantitative PCR.

RESULTS: All the 6TM variants restored IBNtxA analgesia in the E1/E11 KO mouse, while morp hine remained inactive. Expression of lentiviral 6TM variants was confirmed by PCR or quantitati ve PCR. IBNtxA median effective dose values determined from cumulative dose–
response studies in the rescued mice were indistinguishable from wild-type animals. IBNtxA anal gesia was maintained for up to 33 weeks in the rescue mice and was readily antagonized by the op ioid antagonist levallorphan.

CONCLUSIONS: Our study demonstrated the pharmacological relevance of mouse 6TM variants in IBNtxA analgesia and established that a common functional core of the receptors correspondin g to the transmembrane domains encoded by exons 2 and 3 is sufficient for activity. Thus, 6TM va riants offer potential therapeutic targets for a distinct class of analgesics that are effective against b road-spectrum pain models without many side effects associated with traditional opioids.