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Postoperative Activity, but Not Preoperative Activity, of Antithrombin Is Associated with Major Adverse Cardiac Events After Coronary Artery Bypass Graft Surgery

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Background: Low levels of antithrombin (AT) have been independently associated with prolonged intensive care unit stay and an increased incidence of neurologic and thromboembolic events after cardiac surgery. We hypothesized that perioperative AT activity is independently associated with postoperative major adverse cardiac events (MACEs) in patients undergoing coronary artery bypass graft (CABG) surgery.
METHODS: We prospectively studied 1403 patients undergoing primary CABG surgery with cardiopulmonary bypass (CPB). The primary clinical end point was occurrence of MACE, defined as a composite outcome of any one or more of the following: postoperative death, reoperation for coronary graft occlusion, myocardial infarction, stroke, pulmonary embolism, or cardiac arrest until first hospital discharge. Plasma AT activity was measured before surgery, after post-CPB protamine, and on postoperative days (PODs) 1-5. Multivariate logistic regression modeling was performed to estimate the independent effect of perioperative AT activity upon MACE.

RESULTS: MACE occurred in 146 patients (10.4%), consisting of postoperative mortality (n = 12), myocardial infarction (n = 108), stroke (n = 17), pulmonary embolism (n = 8), cardiac arrest (n = 16), or a subsequent postoperative or catheter-based treatment for graft occlusion (n = 6). AT activity at baseline did not differ between patients with (0.91 ± 0.13 IU/mL; n = 146) and without (0.92 ± 0.13 IU/mL; n = 1257) (P = 0.18) MACE. AT activity in both groups was markedly reduced immediately after CPB and recovered to baseline values over the ensuing 5 PODs. Postoperative AT activity was significantly lower in patients with MACE than those without MACE. After adjustment for clinical predictors of MACE, AT activity on PODs 2 and 3 was associated with MACE.

CONCLUSIONS: Preoperative AT activity is not associated with MACE after CABG surgery. MACE is independently associated with postoperative AT activity but only at time points occurring predominantly after the MACE.

在气管导管套囊或口腔粘膜上予以盐酸苄达明喷雾治疗术后咽喉痛的效果
The Effectiveness of Benzydamine Hydrochloride Spraying on the Endotracheal Tube Cuff or Oral Mucosa for Postoperative Sore Throat
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背景：一般认为喉镜检查、插管损伤或膨胀的气管导管套囊对于气道粘膜的挤压是术后咽喉痛（POST）的病因。在本次研究中，我们比较了盐酸苄达明（BH）用不同的方法喷雾在气管导管（ET）套囊、口咽腔或以上两处对于减轻POST的效果。

方法：在本次前瞻性双盲研究中，我们招募了380名病人，他们被随机分成以下4组：A组为在口咽腔内喷BH，在ET套囊上喷蒸馏水；B组为在口咽腔内及ET套囊上均喷BH；C组为在ET套囊上喷BH，在口咽腔内喷蒸馏水；D组为在口咽腔内及ET套囊上均喷蒸馏水。我们检测病人们在拔管后0、2、4和24小时咽喉痛的程度（无、轻、中、重）。

结果：A、B、C和D组POST的发生率分别为23.2%、13.8%、14.7%和40.4%。B组和C组POST的发生率明显低于D组（OR=0.36；95%CI为0.21-0.60；P <
0.05）。然而，A组和D组POST的发生率无显著差异（OR=0.62；95%CI为0.38-1.01）。此外，对于POST的发生率在口咽腔内和ET套囊上喷BH之间无显著的相互作用（P=0.088）。与B组和C组相比，D组POST显著较重（P<0.001）。与D组相比，B组的局部麻木感、烧灼感、伴或不伴有针刺感的发生率显著较高（P<0.05）。

结论：本研究表明在气管导管套囊上予以BH喷雾可降低POST的发生率及减轻POST的严重性，并且不增加BH相关的副作用。

（毛祖旻 译 马皓琳 李士通 校）

BACKGROUND: The etiology of postoperative sore throat (POST) is considered to be the result of laryngoscopy, intubation damage, or inflated cuff compression of the tracheal mucosa. In this study, we compared the effectiveness in alleviating POST using different approaches to benzydamine hydrochloride (BH) administration by spraying the endotracheal tube (ET) cuff or the oropharyngeal cavity, or both.

METHODS: Three hundred eighty patients were included in this prospective and double-blind study, which was randomized into 4 groups: group A, oropharyngeal cavity spray of BH, and distilled water on the ET cuff; group B, both the oropharyngeal cavity and the ET cuff received BH spray; group C, the ET cuff received BH spray, and the oropharyngeal cavity received distilled water; and group D, distilled water sprayed on both the ET tube and into the oropharyngeal cavity. The patients were examined for sore throat (none, mild, moderate, severe) at 0, 2, 4, and 24 hours postextubation.

RESULTS: The incidence of POST was 23.2%, 13.8%, 14.7%, and 40.4% in groups A, B, C, and D, respectively. POST occurred significantly less frequently in groups B and C compared with group D (odds ratio: 0.36; 95% confidence interval: 0.21-0.60; P < 0.05). However, there was no significant difference between groups A and D (odds ratio: 0.62; 95% confidence interval: 0.38-1.01). Moreover, there was no significant interaction between spraying BH over the oropharyngeal cavity and the ET cuff on the incidence of POST (P = 0.088). The severity of POST was significantly more intense in group D compared with groups B and C (P < 0.001). Group B had a significantly higher incidence of local numbness, burning, and/or stinging sensation compared with patients in group D (P < 0.05).

CONCLUSIONS: This study indicates that spraying BH on the ET cuff decreases the incidence and severity of POST without increased BH-related adverse effects.
BACKGROUND: Spontaneous breathing during mechanical ventilation improves arterial oxygenation and cardiovascular function, but is depressed by opioids during critical care. Opioid-induced ventilatory depression was shown to be counteracted in anesthetized rats by serotonin(1A)-receptor (5-HT1A-R)-agonist 8-OH-DPAT, which cannot be applied to humans. Repinotan hydrochloride is a selective 5-HT1A-R-agonist already investigated in humans, but the effects on ventilation and nociception are unknown. In this study, we sought to establish (a) the effects of repinotan on spontaneous breathing and nociception, and (b) the interaction with the standard opiate morphine.

METHODS: The dose-dependent effects of repinotan, given alone or in combination with morphine, on spontaneous minute ventilation (MV) and nociceptive tail-flick reflex latencies (TFLs) were measured simultaneously in spontaneously breathing anesthetized rats. An additional series with NaCl 0.9% and the 5-HT1A-R-antagonist WAY 100 135 served as controls.

RESULTS: (a) Repinotan dose-dependently activated spontaneous breathing (MV, mean [95% confidence interval]; 53% [29%-77%] of pretreatment level) and suppressed nociception (TFL, 91% maximum possible effect [68%-114%]) with higher doses of repinotan (2-200 μg/kg). On the contrary, nociception was enhanced with a small dose of morphine (0.2 μg/kg; TFL, ?47% maximum possible effect [?95% to 2%]). Effects were prevented by 5-HT1A-antagonist WAY 100 135. (b) Morphine-induced depression of ventilation (MV, ?72% [?100% to ?44%]) was reversed by repinotan (20 μg/kg), which returned spontaneous ventilation to pretreatment levels (MV, 18% [?40% to 77%]). The morphine-induced complete depression of nociception was sustained throughout
repinotan and NaCl 0.9% administration. Despite a mild decrease in mean arterial blood pressure, there were no serious cardiovascular side effects from repinotan.

**CONCLUSIONS:** The 5-HT1A-R-agonist repinotan activates spontaneous breathing in anesthetized rats even in morphine-induced ventilatory depression. The potency of 5-HT1A-R-agonists to stimulate spontaneous breathing and their antinociceptive effects should be researched further.

**Oxygen Delivery During Transtracheal Oxygenation: A Comparison of Two Manual Devices**

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**BACKGROUND:** The Manujet? and the ENK Oxygen Flow Modulator? (ENK) deliver oxygen during transtracheal oxygenation. We sought to describe the ventilation characteristics of these 2 devices.

**METHODS:** The study was conducted in an artificial lung model consisting of a 15-cm ringed tube, simulating the trachea, connected via a flow analyzer and an artificial lung.
A 15-gauge transtracheal wire reinforced catheter was used for transtracheal oxygenation. The ENK and Manujet were studied for 3 minutes at respiratory rates of 0, 4, and 12 breaths/min, with and without the artificial lung, in a totally and a partially occluded airway. Statistical analysis was performed using analysis of variance followed by a Fisher exact test; P < 0.05 was considered significant.

RESULTS: Gas flow and tidal volume were 3 times greater with the Manujet than the ENK (approximately 37 vs 14 L · min⁻¹ and 700 vs 250 mL, respectively) and were not dependent on the respiratory rate. In the absence of ventilation, the ENK delivered a 0.6 ± 0.1 L · min⁻¹ constant gas flow. In the totally occluded airway, lung pressures increased to 136 cm H₂O after 3 insufflations with the Manujet, whereas the ENK, which has a pressure release vent, generated acceptable pressures at a low respiratory rate (4 breaths/min) (peak pressure at 27.7 ± 0.7 and end-expiratory pressure at 18.8 ± 3.8 cm H₂O). When used at a respiratory rate of 12 breaths/min, the ENK generated higher pressures (peak pressure at 95.9 ± 21.2 and end-expiratory pressure at 51.4 ± 21.4 cm H₂O). In the partially occluded airway, lung pressures were significantly greater with the Manujet compared with the ENK, and pressures increased with the respiratory rate with both devices. Finally, the gas flow and tidal volume generated by the Manujet varied proportionally with the driving pressure.

DISCUSSION: This study confirms the absolute necessity of allowing gas exhalation between 2 insufflations and maintaining low respiratory rates during transtracheal oxygenation. In the case of total airway obstruction, the ENK may be less deleterious because it has a pressure release vent. Using a Manujet at lower driving pressures may decrease the risk of barotrauma and allow the safe use of higher respiratory rates.
BACKGROUND: Age-related deterioration in both cognitive function and the capacity to control fine motor movements has been demonstrated in numerous studies. However, this decline has not been described with respect to complex clinical anesthesia skills. Cricothyroidotomy is an example of a complex, lifesaving procedure that requires competency in the domains of both cognitive processing and fine motor control. Proficiency in this skill is vital to minimize time to reestablish oxygenation during a "cannot intubate, cannot ventilate" scenario. In this prospective, controlled, single-blinded study, we tested the hypothesis that age affects the learning and performance of emergency percutaneous cricothyroidotomy in a high-fidelity simulated cannot intubate/cannot ventilate scenario.

METHODS: Thirty-six staff anesthesiologists (19 aged younger than 45 years and 17 older than 45 years) managed a high-fidelity cannot intubate/cannot ventilate scenario in a high-fidelity simulator before and after a 1-hour standardized training session. The group division cutoff age of 45 years was based on the median age of our sample subject population before enrollment. The scenarios required the insertion of an emergency percutaneous cricothyroidotomy. We compared cricothyroidotomy skills in the older group with those in the younger group using procedural time, 5-point task-specific checklist score, and global rating scale score. Correlation based on age, years from residency, weekly clinical hours worked, previous continuing medical education in airway management, and previous simulation experience was also performed.

RESULTS: In both prestandardization and poststandardization, age and years from residency correlated with procedural time, checklist scores, and global rating scores. Baseline, prestandardization variables were all better for the younger group, with a mean age of 37 years, compared with the older group, with a mean age of 58 years. Procedural
Time was 100 (72-128) seconds versus 152 (120-261) seconds. Checklist scores were 7.0 (6.1-8.0) versus 6.0 (4.8-8.0). Global rating scale scores were 22.0 (17.8-29.8) versus 17.5 (10.4-20.6). After the 1-hour standardized training session, the younger group continued to perform better than the older group with procedural time of 75 (66-91) seconds versus 87 (78-123) seconds, checklist scores of 10.0 (9.1-10.0) versus 9.0 (8.0-10.0), and global rating scale scores of 35.0 (32.1-35.0) versus 32.0 (29.0-33.8).

Regression analysis was performed on the poststandardization data. Both age and years from residency independently affected procedural time, checklist scores, and global rating scale scores (all \( P < 0.05 \)).

**CONCLUSIONS:** Baseline proficiency with simulated emergency cricothyroidotomy is associated with age and years from residency. Despite standardized training, operator age and years from residency were associated with decreased proficiency. Further research should explore the potential of using age and years from residency as factors for implementing periodic continuing medical education.

**时间生物学的缺陷：以髓内注射布比卡因麻醉为例的一个被建议的分析**

**Pitfalls in Chronobiology: A Suggested Analysis Using Intrathecal Bupivacaine Analgesia as an Example**

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**背景:** 已有研究显示产妇硬膜外给予局部麻醉药的镇痛持续时间随着不同的给药时间呈现一定的节律模式。我们的研究是为了确定产妇鞘内注射布比卡因后是否会遵循同样的模式。分析的过程中，我们逐渐发现，一些与医护人员交接班相一致的数据点会受到非生物、医疗保健制度因素的影响，因此才错误地提示了分娩镇痛持续时间的周期信号。我们开发了图形和分析工具以助于评估个别数据点对时间生物学分析的影响。

**方法:** 单胎足月妊娠、顶先露、宫口扩张 3-5cm、疼痛评分 > 50mm（最痛为 100mm）且要求分娩镇痛的产妇入组研究。应用腰硬联合麻醉技术，先给予患者鞘内注射 2.5mg 布比卡因 2mL，从鞘内注药到第一次要求额外镇痛的时间记为镇痛持续时间。镇痛持续时间的分析采用数据目视检测、光滑函数（超光平滑法；LOWESS 和 LOESS【局部加权回归散点光滑函数】)、方差分析、余弦（时间吻合）、Excel 和 NONMEM（非线性混合效应模型法）。利用 PLT 工具对可信区间（CIs）进行引导分析（用取代进行 1000 次复制抽样）。

**结果:** 82 名产妇被纳入研究。利用 3 阶平滑函数检查的原始数据，呈现一个双峰模式，一个峰大约位于 06:30，随后一个峰位于下午或晚上，取决于其平滑度。午夜至 06:00 鞘内注射时的镇痛持续时间与其他时间鞘内注射后的镇痛持续时间相比
方差分析并没有明显的统计学差异。余弦分析、Excel 和 NONMEM 都得到了一致的结果：镇痛持续时间平均为 38.4 分钟（95% 可信区间：35.4-41.6 分钟），波形周期为 8 小时，振幅为 5.8 分钟（95% 可信区间：2.1-10.7 分钟），相位偏移为 6.5 小时（95% 可信区间：5.4-8.0 小时）。在 40% 的引导分析中 8 小时周期模型并没有统计学意义，提示 8 小时周期模型的统计学意义取决于数据子集。在 07:00 换班前的两个数据点对周期波形的统计学意义的影响最大。没有这些数据点，就无法证明鞘内注射布比卡因镇痛呈 8 小时周期波形。

结论：时间生物学包括所在环境中外界昼夜节律（例如护理交班）和人体生物节律的影响。我们可以联合几种新的分析方法来区分外界节律的影响：（1）叠加原始数据、外界节律（比如，护理和麻醉交接班）和光滑函数的图示；（2）每一个数据点对统计学意义的影响的图示；（3）用来判断统计学意义是否高度依赖于数据子集的引导分析。这些方法提示，两个数据点的变化可能与护理和麻醉交接班有关。如果去掉这些点，即无法证明鞘内注射布比卡因镇痛持续时间有生物学节律。

（徐妍君 译 马皓琳 李士通 校）

BACKGROUND: The duration of analgesia from epidural administration of local anesthetics to parturients has been shown to follow a rhythmic pattern according to the time of drug administration. We studied whether there was a similar pattern after intrathecal administration of bupivacaine in parturients. In the course of the analysis, we came to believe that some data points coincident with provider shift changes were influenced by nonbiological, health care system factors, thus incorrectly suggesting a periodic signal in duration of labor analgesia. We developed graphical and analytical tools to help assess the influence of individual points on the chronobiological analysis.

METHODS: Women with singleton term pregnancies in vertex presentation, cervical dilation 3 to 5 cm, pain score >50 mm (of 100 mm), and requesting labor analgesia were enrolled in this study. Patients received 2.5 mg of intrathecal bupivacaine in 2 mL using a combined spinal-epidural technique. Analgesia duration was the time from intrathecal injection until the first request for additional analgesia. The duration of analgesia was analyzed by visual inspection of the data, application of smoothing functions (Supersmoother; LOWESS and LOESS [locally weighted scatterplot smoothing functions]), analysis of variance, Cosinor (Chronos-Fit), Excel, and NONMEM (nonlinear mixed effect modeling). Confidence intervals (CIs) were determined by bootstrap analysis (1000 replications with replacement) using PLT Tools.

RESULTS: Eighty-two women were included in the study. Examination of the raw data using 3 smoothing functions revealed a bimodal pattern, with a peak at approximately 0630 and a subsequent peak in the afternoon or evening, depending on the smoother. Analysis of variance did not identify any statistically significant difference between the duration of analgesia when intrathecal injection was given from midnight to 0600 compared with the duration of analgesia after intrathecal injection at other times. Chronos-Fit, Excel, and NONMEM produced identical results, with a mean duration of analgesia of 38.4 minutes (95% CI: 35.4-41.6 minutes), an 8-hour periodic waveform with an amplitude of 5.8 minutes (95% CI: 2.1-10.7 minutes), and a phase offset of 6.5 hours (95% CI: 5.4-8.0 hours) relative to midnight. The 8-hour periodic model did not reach statistical significance in 40% of bootstrap analyses, implying that statistical significance of the 8-hour periodic model was dependent on a subset of the data. Two data points before the change of shift at 0700 contributed most strongly to the statistical
significance of the periodic waveform. Without these data points, there was no evidence of an 8-hour periodic waveform for intrathecal bupivacaine analgesia.

**CONCLUSION:** Chronobiology includes the influence of external daily rhythms in the environment (e.g., nursing shifts) as well as human biological rhythms. We were able to distinguish the influence of an external rhythm by combining several novel analyses: (1) graphical presentation superimposing the raw data, external rhythms (e.g., nursing and anesthesia provider shifts), and smoothing functions; (2) graphical display of the contribution of each data point to the statistical significance; and (3) bootstrap analysis to identify whether the statistical significance was highly dependent on a data subset. These approaches suggested that 2 data points were likely artifacts of the change in nursing and anesthesia shifts. When these points were removed, there was no suggestion of biological rhythm in the duration of intrathecal bupivacaine analgesia.

**Dexmedetomidine Infusion for Analgesia and Prevention of Emergence Agitation in Children with Obstructive Sleep Apnea Syndrome Undergoing Tonsillectomy and Adenoidectomy**

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**背景：** 右美托咪定是一种特异性α2激动剂，具有节省镇痛药的作用并且能减少躁动。我们在接受增殖腺扁桃体切除术（T&A）的阻塞性睡眠呼吸暂停综合征患儿中比较了术中输注右美托咪定与单次剂量的芬太尼对围术期阿片类药物的使用及苏醒期躁动的减少作用。

**方法：** 122 名年龄 2 至 10 岁，接受 T&A（增殖腺扁桃体切除术）的阻塞性睡眠呼吸暂停综合征患者完成了这项前瞻性、随机性的美国食品和药物管理局许可的研究。通过面罩七氟烷诱导后，D 组接受静脉输注右美托咪定 2 μg·kg⁻¹ 10 分钟后改为 0.7 μg·kg⁻¹·h⁻¹，F 组接受单次静脉注射芬太尼 1 μg·kg⁻¹。麻醉由七氟烷、氧气与氧化亚氮维持。术中心率或收缩压比术前水平高 30%并持续超过 5 分钟则给予芬太尼 0.5~1 μg·kg⁻¹。麻醉后恢复室（PACU）中的观察者对于组别是盲法的。用客观疼痛评分评估患者送往 PACU 当刻、5 分钟、15 分钟以及随后的 120 分钟内每 15 分钟时刻的疼痛评分。相同的时间间隔内通过两种尺度评估苏醒期躁动：小儿麻醉的苏醒谵妄量表以及科尔描述的 5 分制量表。若疼痛评分超过四分或严重躁动（4 分或 5 分）持续超过 5 分钟则给予吗啡 0.05~0.1mg·kg⁻¹。

**结果：** D 组中 9.8%的患者需要术中增加芬太尼，而 F 组则是 36%（P = 0.001）。D 组平均收缩压以及心率明显较低（P < 0.05）。最低肺泡有效浓度在两组之间有显著差异（P = 0.015）。D 组客观疼痛评分中位数是 3，而 F 组为 5 (P = 0.001)。D
组中10位患者（16.3%）需要接受吗啡，而F组则29位（47.5%）需要吗啡治疗（P = 0.002）。到达PACU当刻发生严重苏醒期躁动的发生率D组为18%，而F组为45.9%（P = 0.004）；在5分钟以及15分钟时，D组躁动的发生率较低（P = 0.028）。科尓量表上躁动的持续时间D组明显较短（P = 0.004）。18%的D组患者以及40.9%的F组患者发生脉搏氧饱和度低于95%的事件。

结论：术中输注右美托咪定联合吸入麻醉药可为T&A（增殖腺扁桃体切除术）提供满意的手术条件，且无血流动力学的不良反应。术后阿片类药物需求显著减少，苏醒期严重躁动的发生减少以及持续时间缩短，而且较少数病人发生了氧饱和度下降的事件。
（龚寅译 马皓琳 李士通 校）

BACKGROUND: Dexmedetomidine, a specific α2 agonist, has an analgesic-sparing effect and reduces emergence agitation. We compared an intraoperative dexmedetomidine infusion with bolus fentanyl to reduce perioperative opioid use and decrease emergence agitation in children with obstructive sleep apnea syndrome undergoing adenotonsillectomy (T&A).

METHODS: One hundred twenty-two patients with obstructive sleep apnea syndrome undergoing T&A, ages 2 to 10 years, completed this prospective, randomized, U.S. Food and Drug Administration-approved study. After mask induction with sevoflurane, group D received IV dexmedetomidine 2 μg · kg⁻¹ over 10 minutes, followed by 0.7 μg · kg⁻¹ · h⁻¹, and group F received IV fentanyl bolus 1 μg · kg⁻¹. Anesthesia was maintained with sevoflurane, oxygen, and nitrous oxide. Fentanyl 0.5 to 1 μg · kg⁻¹ was given to subjects in both groups for an increase in heart rate or systolic blood pressure 30% above preincision values that continued for 5 minutes. Observers in the postanesthesia care unit (PACU) were blinded to treatment groups. Pain was evaluated using the objective pain score in the PACU on arrival, at 5 minutes, at 15 minutes, then every 15 minutes for 120 minutes. Emergence agitation was evaluated at the same intervals by 2 scales: the Pediatric Anesthesia Emergence Delirium scale and a 5-point scale described by Cole. Morphine (0.05 to 0.1 mg · kg⁻¹) was given for pain (score >4) or severe agitation (score 4 or 5) lasting more than 5 minutes.

RESULTS: In group D, 9.8% patients needed intraoperative rescue fentanyl in comparison with 36% in group F (P = 0.001). Mean systolic blood pressure and heart rate were significantly lower in group D (P < 0.05). Minimum alveolar concentration values were significantly different between the 2 groups (P = 0.015). The median objective pain score was 3 for group D and 5 for group F (P = 0.001). In group D, 10 (16.3%) patients required rescue morphine, in comparison with 29 (47.5%) in group F (P = 0.002). The frequency of severe emergence agitation on arrival in the PACU was 18% in group D and 45.9% in group F (P = 0.004); at 5 minutes and at 15 minutes, it was lower in group D (P = 0.028). The duration of agitation on the Cole scale was statistically lower in group D (P = 0.004). In group D, 18% of patients and 40.9% in group F had an episode of SPO2 below 95% (P = 0.01).

CONCLUSIONS: An intraoperative infusion of dexmedetomidine combined with inhalation anesthetics provided satisfactory intraoperative conditions for T&A without adverse hemodynamic effects. Postoperative opioid requirements were significantly reduced, and the incidence and duration of severe emergence agitation was lower with fewer patients having desaturation episodes.
A Comparison of Liver Function After Hepatectomy with Inflow Occlusion Between Sevoflurane and Propofol Anesthesia

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BACKGROUND: In this study, we compared liver function tests after hepatectomy with inflow occlusion as a function of propofol versus sevoflurane anesthesia.

METHODS: One hundred patients undergoing elective liver resection with inflow occlusion were randomized into a sevoflurane group or a propofol group. General anesthesia was induced with 3 μg/kg fentanyl, 0.2 mg/kg cisatracurium, and target-controlled infusion of propofol, set at a plasma target concentration of 4 to 6 μg/mL, or sevoflurane initially started at 8%. Anesthesia was maintained with target-controlled infusion of propofol (2-4 μg/mL) or sevoflurane (1.5%-2.5%). The primary end point was postoperative liver injury assessed by peak values of liver transaminases.

RESULTS: Transaminase levels peaked between the first and the third postoperative day. Peak alanine aminotransferase was 504 and 571 U/L in the sevoflurane group and the propofol group, respectively. Peak aspartate aminotransferase was 435 U/L after sevoflurane and 581 U/L in the propofol group. There were no significant differences in peak alanine aminotransferase or peak aspartate aminotransferase between groups. Other liver function tests including bilirubin and alkaline phosphatase, and peak values of white blood cell counts and creatinine, were also not different between groups.
CONCLUSIONS: Sevoflurane and propofol anesthetics resulted in similar patterns of liver function tests after hepatectomy with inflow occlusion. These data suggest that the 2 anesthetics are equivalent in this clinical context.
decreasing the local anesthetic volume on the pharmacodynamic characteristics of nerve block remain unstudied. We designed a randomized, double-blind controlled comparison between neurostimulation and ultrasound guidance to estimate the MEAV of 1.5% mepivacaine and pharmacodynamics in median and ulnar nerve blocks.

METHODS: Patients scheduled for carpal tunnel release were randomized to ultrasound guidance (UG) or neurostimulation (NS) groups. A step-up/step-down study model (Dixon method) was used to determine the MEAV with nonprobability sequential dosing based on the outcome of the previous patient. The starting dose of 1.5% mepivacaine was 13 and 11 mL for median and ulnar nerves at the humeral canal. Block success/failure resulted in a decrease/increase of 2 mL. A blinded physician assessed sensory blockade at 2-minute intervals for 20 minutes. Block onset time and duration were noted.

RESULTS: The MEAV50 (SD) of the median nerve was lower in the UG group 2 (0.1) mL (95% confidence interval [CI] = [1, 96] to [2, 04]) than in the NS group 4 (3.8) mL (95% CI = [2, 4] to [5, 6]) (P = 0.017). There was no difference for the ulnar nerve between UG group 2 (0.1) mL (95% CI = [1, 96] to [2, 04]) and NS group 2.4 (0.6) mL (95% CI = [2, 1] to [2, 7]). The duration of sensory blockade was significantly correlated to local anesthetic volume, but onset time was not modified.

CONCLUSION: Ultrasound guidance selectively provided a 50% reduction in the MEAV of mepivacaine 1.5% for median nerve sensory blockade in comparison with neurostimulation. Decreasing the local anesthetic volume can decrease sensory block duration but not onset time.

比较加温加湿器和热量湿度交换器用于通气的成人和儿童
Heated Humidification Versus Heat and Moisture Exchangers for Ventilated Adults and Children

M Kelly, D Gillies, DA Todd, C Lockwood.
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背景：在机械通气过程中上呼吸道为旁路时，必须通过人工方法给予加湿。在这种情况下，加热加湿器（HH）和热量湿度交换器（HMEs）是最常用的人工湿化类型。

目的：确定 HHs 和 HMEs 哪种加湿方法能够更有效地预防机械通气患者死亡和其他并发症。

检索方法：我们搜索了 Cochrane 的对照试验中央寄存器(Cochrane 书库 2010, 第4期)、MEDLINE、EMBASE 和 CINAHL（2010年1月）来辨别出相关的随机对照试验。

选择标准：我们入选了在机械通气的成人和新生儿中比较 HMEs 和 HHs 的随机对照试验。我们也入选了随机交叉研究。

数据收集和分析：我们评估了每个研究的质量并提取有关数据。对从合适的有关研究得到的结果进行荟萃分析以得出个别结果。

主要结果：我们入选了33项试验，共2833例。25项研究（n=2710）是平行组设计，8项研究（n=123）是交叉组设计。只有3项入选的研究报导了婴儿或儿童的
BACKGROUND: Humidification by artificial means must be provided when the upper airway is bypassed during mechanical ventilation. Heated humidification (HH) and heat and moisture exchangers (HMEs) are the most commonly used types of artificial humidification in this situation.

OBJECTIVES: To determine whether HHs or HMEs are more effective in preventing mortality and other complications in people who are mechanically ventilated.

SEARCH STRATEGY: We searched the Cochrane Central Register of Controlled Trials (The Cochrane Library 2010, Issue 4) and MEDLINE, EMBASE and CINAHL (January, 2010) to identify relevant randomized controlled trials.

SELECTION CRITERIA: We included randomized controlled trials comparing HMEs to HHs in mechanically ventilated adults and children. We included randomized crossover studies.

DATA COLLECTION AND ANALYSIS: We assessed the quality of each study and extracted the relevant data. Where appropriate, results from relevant studies were meta-analyzed for individual outcomes.

MAIN RESULTS: We included 33 trials with 2833 participants; 25 studies were parallel group design (n = 2710) and 8 crossover design (n = 123). Only 3 included studies reported data for infants or children. There was no overall effect on artificial airway occlusion, mortality, pneumonia, or respiratory complications; however, the PaCO2 and minute ventilation were increased when HMEs were compared to HHs and body temperature was lower. The cost of HMEs was lower in all studies that reported this outcome. There was some evidence that hydrophobic HMEs may reduce the risk of pneumonia and that blockages of artificial airways may be increased with the use of HMEs in certain subgroups of patients.

AUTHORS' CONCLUSIONS: There is little evidence of an overall difference between HMEs and HHs. However, hydrophobic HMEs may reduce the risk of pneumonia and the use of an HMEs may increase artificial airway occlusion in certain subgroups of patients. Therefore, HMEs may not be suitable for patients with limited respiratory reserve or prone to airway blockage. Further research is needed relating to hydrophobic versus hygroscopic HMEs and the use of HMEs in the pediatric and neonatal populations. As the design of HMEs evolves, evaluation of new generation HMEs will also need to be undertaken.
Heparin Dose Response Is Independent of Preoperative Antithrombin Activity in Patients Undergoing Coronary Artery Bypass Graft Surgery Using Low Heparin Concentrations

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背景：普通肝素主要作用为提高抗凝血酶（AT）的活性。作者推测冠脉搭桥术患者术前的 AT 活性与肝素剂量反应（HDR）及肝素敏感指数（HSI）有关。

方法：收集 304 例首次接受冠状动脉搭桥术患者的个人信息及围手术期的数据。全身麻醉诱导后测定 AT 的活性，用比色测定法（Siemens Healthcare Diagnostics, Tarrytown, NY）。激活凝血酶原时间（ACT），肝素剂量反应（HDR），以及 HSI 均采用 Hepcon HMS Plus 系统（Medtronic, Minneapolis, MN）检测。根据相同系统测出的 HDR 来设定相应肝素剂量。采用多元线性回归分析来确定肝素剂量反应（HDR）的独立危险因素。并选取可能出现肝素抵抗的 AT 活性较低患者（<正常的 80%；<0.813 U/mL）作为亚组进行分析。

结果：基础激活凝血酶原时间（ACT）平均值为 135 ± 18 秒。肝素剂量反应（HDR）平均值为 98 ± 21 s/U/mL。AT 活性平均值为 0.93 ± 0.13 U/mL，基础 AT 活性与 ACT, HDR, 或 HSI 基础值及肝素化值没有明显关联。在包含 HDR 及 HSI 的多变量线性回归模型中增加 AT 活性因素，并没有显著提高模型的性能。亚组 49 例 AT 活性<正常 80%分析结果为较低 AT 活性与 HDR 或 HIS 没有明显关联。术前 AT 活性，HDR 及 HSI 与术后第一天心肌肌钙蛋白 I 水平，ICU 时间，或住院时间没有关联。

结论：虽然提高 AT 活性是肝素促进体外循环抗凝的主要机制，但是 ACTs 为 300 至 350 秒时，术前较低的 AT 活性与肝素反应受损或临床结果没有相关性。

（陈毓雯 译 陈杰 校）

BACKGROUND: Unfractionated heparin's primary mechanism of action is to enhance the enzymatic activity of antithrombin (AT). We hypothesized that there would be a direct association between preoperative AT activity and both heparin dose response (HDR) and heparin sensitivity index (HSI) in patients undergoing coronary artery bypass graft surgery.

METHODS: Demographic and perioperative data were collected from 304 patients undergoing primary coronary artery bypass graft surgery. AT activity was measured after induction of general anesthesia using a colorimetric method (Siemens Healthcare Diagnostics, Tarrytown, NY). Activated coagulation time (ACT), HDR, and HSI were measured using the Hepcon HMS Plus system (Medtronic, Minneapolis, MN). Heparin dose was calculated for a target ACT using measured HDR by the same system. Multivariate linear regression was performed to identify independent predictors of HDR.
Subgroup analysis of patients with low AT activity (<80% normal; <0.813 U/mL) who may be at risk for heparin resistance was also performed.

**RESULTS:** Mean baseline ACT was 135 ± 18 seconds. Mean calculated HDR was 98 ± 21 s/U/mL. Mean baseline AT activity was 0.93 ± 0.13 U/mL. Baseline AT activity was not significantly associated with baseline or postheparin ACT, HDR, or HSI. Addition of AT activity to multivariable linear regression models of both HDR and HSI did not significantly improve model performance. Subgroup analysis of 49 patients with baseline AT <80% of normal levels did not reveal a relationship between low AT activity and HDR or HSI. Preoperative AT activity, HDR, and HSI were not associated with cardiac troponin I levels on the first postoperative day, intensive care unit duration, or hospital length of stay.

**CONCLUSION:** Although enhancing AT activity is the primary mechanism by which heparin facilitates cardiopulmonary bypass anticoagulation, low preoperative AT activity is not associated with impaired response to heparin or to clinical outcomes when using target ACTs of 300 to 350 seconds.

在气管导管套囊上分别喷射盐酸消炎痛、10%利多卡因和2%利多卡因对术后喉痛的作用

**Effect on Postoperative Sore Throat of Spraying the Endotracheal Tube Cuff with Benzydamine Hydrochloride, 10% Lidocaine, and 2% Lidocaine**

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**背景：**术后喉痛（POST）是气管插管后的常见并发症。本研究的目的是比较气管导管套囊上喷射盐酸消炎痛、10%利多卡因或2%利多卡因后术后因气管插管引起的喉痛的差异。

**方法：**372例患者随机分成4组。4组患者分别在插管前于气管导管套囊上喷射盐酸消炎痛、10%利多卡因、2%利多卡因或生理盐水。插管后，给套管充气使气道压力在20cmH2O。丙泊酚维持麻醉。分别于拔管后1、6、12、24h测试病人的喉痛程度（没有，轻微，中度或者重度）。

**结果：**4组患者插管后喉痛发生率最高的时间均在拔管后6h。在各个观察点上，消炎痛组患者喉痛发生率均显著低于10%利多卡因组、2%利多卡因组和生理盐水组（p<0.05）。拔管后6h，消炎痛组术后喉痛的发生率（17%）也低于10%利多卡因组（53.7%）、2%利多卡因组（37%）和生理盐水组（40.8%）（p<0.05）。与其他3组相比，在各个观察时间点上，消炎痛组术后喉痛的严重程度低于其它组（p<0.05）。另外，本研究发现，在拔管后1、6和12h这3个观察点上，与2%利多卡因组和生理盐水组相比，10%利多卡因组明显增加了喉痛的严重程度。局部和全身副作用，各组间无明显差别。
CONCLUSIONS: Spraying benzydamine hydrochloride on the ETT cuff is a simple and effective method to reduce the incidence and severity of POST.
术后24小时F组（13.33%,13.33%,25%）也比C组(40%,41.67%,50%)低。术后1h F组中重度声嘶的发生率比C组也显著降低（P<0.05）。

结论：吸入氟替卡松丙酸酯能降低全麻下行剖宫产术患者的术后喉痛、咳嗽、声音嘶哑的发生率和严重程度。
（唐颖 译 陈杰 校）

BACKGROUND: Sore throat is a common complication after surgery. Postoperative cough and hoarseness can also be distressing to patients. We sought to determine the effect of an inhaler steroid on sore throat, cough, and hoarseness during the first 24 hours of the postoperative period.

METHODS: We enrolled 120 women with ASA physical status I or II and term singleton pregnancy who were scheduled for elective cesarean delivery under general anesthesia. Patients were randomized into 2 groups: in the sitting position, group F patients received 500 μg inhaled fluticasone propionate via a spacer device during 2 deep inspirations, after arrival in the operating room, and group C had no treatment. The patients were interviewed by a blinded investigator for postoperative sore throat, cough, and hoarseness at 1 and 24 hours after surgery.

RESULTS: There were no significant differences in age, height, weight, body mass index, duration of surgery, intubation, and grade of laryngeal exposure between the 2 groups. The incidence of sore throat, cough, and hoarseness was significantly lower in group F (3.33%, 3.33%, and 3.33%) compared with the control group (36.67%, 18.33%, and 35%) (P<0.05 for all comparisons), not only in the first postoperative hour but also 24 hours after surgery (13.33%, 13.33%, and 25% in group F vs 40%, 41.67%, and 50% in the control group). The incidence of moderate and severe hoarseness in group F at the first hour was significantly less than the control group (P<0.05).

CONCLUSIONS: Inhaled fluticasone propionate decreases the incidence and severity of postoperative sore throat, cough, and hoarseness in patients undergoing cesarean delivery under general anesthesia.

A Long-Term Clinical Evaluation of AutoFlow During Assist-Controlled Ventilation: A Randomized Controlled Trial

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背景：许多新机械通气模式并未经过任何临床研究。“双控模式”，例如自由呼吸的开放模式(AutoFlow)，用于促进人机协调并减少报警。作者设计了一项长期的临床研究，来评估辅助通气模式下采用AutoFlow的安全性和有效性，其中以报警为关注点。

方法：将42例使用Dräger Evita 4呼吸机，机械通气大于两天的成年人，随机分为两组，分别使用常规通气模式（n=21）和AutoFlow模式（n=21）。由护士根据指
BACKGROUND: Many new mechanical ventilation modes are proposed without any clinical evaluation. “Dual-controlled” modes, such as AutoFlow™, are supposed to improve patient–ventilator interfacing and could lead to fewer alarms. We performed a long-term clinical evaluation of the efficacy and safety of AutoFlow during assist-controlled ventilation, focusing on ventilator alarms.

METHODS: Forty-two adult patients, receiving mechanical ventilation for more than 2 days with a Dräger Evita 4 ventilator were randomized to conventional (n = 21) or AutoFlow (n = 21) assist-controlled ventilation. Sedation was given using a nurse-driven protocol. Ventilator-generated alarms were exhaustively recorded from the ventilator logbook with a computer. Daily blood gases and ventilation outcome were recorded.

RESULTS: A total of 403 days of mechanical ventilation were studied and 45,022 alarms were recorded over a period of 8074 hours. The course of respiratory rate, minute ventilation, Fio₂, positive end-expiratory pressure, Pao₂/Fio₂, Paco₂, and pH and doses and duration of sedation did not differ between the 2 groups. Outcome (duration of mechanical ventilation, ventilator-associated pneumonia, course of Sequential Organ Failure Assessment score, or death) was not different between the 2 groups. The number of alarms per hour was lower with AutoFlow assist-controlled ventilation: 3.3 [1.5 to 17] versus 9.1 [5 to 19], P < 0.0001 (median [quartile range]). In multivariate analysis, a low alarm rate was associated with activation of AutoFlow and a higher midazolam dose.

CONCLUSIONS: This first long-term clinical evaluation of the AutoFlow mode demonstrated its safety with regard to gas exchange and patient outcome. AutoFlow also allowed a very marked reduction in the number of ventilator alarms.
Virulent respiratory infectious diseases may present a life-threatening risk for health care professionals during aerosol-generating procedures, including endotracheal intubation. The 2009 Pandemic Influenza A (H1N1) brings this concern to the immediate forefront. The Centers for Disease Control and Prevention have stated that, when performing or participating in aerosol-generating procedures on patients with virulent contagious respiratory diseases, health care professionals must wear a minimum of the N95 respirator, and they may wish to consider using the powered air purifying respirator (PAPR). For influenza and other diseases transmitted by both respiratory and contact modes, protective respirators must be combined with contact precautions. The PAPR provides 2.5 to 100 times greater protection than the N95, when used within the context of an Occupational Safety and Health Administration–compliant respiratory protection program. The relative protective capability of a respirator is quantified using the assigned protection factor. The level of protection designated by the APF can only be achieved with appropriate training and correct use of the respirator.

Face seal leakage limits the protective capability of the N95 respirator, and fit testing does not assure the ability to maintain a tight face seal. The protective capability of the PAPR will be defeated by improper handling of contaminated equipment, incorrect assembly and maintenance, and improper don (put on) and doff (take off) procedures. Stress, discomfort, and physical encumbrance may impair performance. Acclimatization through training will mitigate these effects.
Training in the use of PAPRs in advance of their need is strongly advised. “Just in time” training is unlikely to provide adequate preparation for groups of practitioners requiring specialized personal protective equipment during a pandemic. Employee health departments in hospitals may not presently have a PAPR training program in place. Anesthesia and critical care providers would be well advised to take the lead in working with their hospitals' employee health departments to establish a PAPR training program where none exists.

User instructions state that the PAPR should not be used during surgery because it generates positive outward airflow, and may increase the risk of wound infection. Clarification of this prohibition and acceptable solutions are currently lacking and need to be addressed. The surgical hood system is not an acceptable alternative.

We provide online a PAPR training workshop. Supporting information is presented here. Anesthesia and critical care providers may use this workshop to supplement, but not substitute for, the manufacturers' detailed use and maintenance instructions.

肺复张和呼气末正压在健康肺和病肺有不同的 CO2 清除作用

Lung Recruitment and Positive End-Expiratory Pressure Have Different Effects on CO2 Elimination in Healthy and Sick Lungs

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背景：作者研究了肺复张手法和 PEEP 对每次呼吸的 CO2 清除量的影响 (Vtco2,br)。

方法：分别对 7 例健康和 7 例肺灌洗猪肺施以恒定潮气量通气，每隔 10 分钟，以 6 cm H2O 为间隔，其 PEEP 从 0 增加至 18 cm H2O 后再降至 0。在 18 cm H2O PEEP 间隔内对健康肺和灌洗肺分别予以 2 分钟的周期性肺复张，其平台压/PEEP 分别对应为 40/20 cm H2O, 50/25 cm H2O。需要记录的数据包括容积二氧化碳图、呼吸力学、血气分析以及血液动力学数据。

结果：在未行肺复张的健康肺，Vtco2,br 与 PEEP 成正相关：在 0-PEEP 水平，Vtco2,br 为 4.0 mL (3.6-4.4 mL)（对应为中位数，四分位数间距），在 18-PEEP 水平，则降为 3.1 (2.8-3.4 mL) (P < 0.05)。在肺复张后，Vtco2,br 增加至 18-PEEP 的 3.3 (3-3.6 mL) 以及 0-PEEP 的 4.0 (3.5-4.5 mL) (P < 0.05)。灌洗肺行肺复张前，Vtco2,br 最初从 0-PEEP 水平的 2.0 (1.7-2.3) mL 增加至 12-PEEP 水平的 2.6 (2.2-3) mL (P < 0.05)，但当 PEEP 增加至 18 cm H2O 时，其 Vtco2,br 降为 2.4 (2-2.8) mL (P < 0.05)。肺复张后，最高的 Vtco2,br 出现在 12-PEEP，其值为 2.9 (2.1-3.7) mL，而在 0-PEEP 则减至 2.5 (1.9-3.1) mL (P < 0.05)。Vtco2,br 与肺灌注、气体交换面积、肺泡通气量的变化正相关，与死腔量负相关。
BACKGROUND: We studied the effects that the lung recruitment maneuver (RM) and positive end-expiratory pressure (PEEP) have on the elimination of CO2 per breath (Vtco2,br).

METHODS: In 7 healthy and 7 lung-lavaged pigs at constant ventilation, PEEP was increased from 0 to 18 cm H2O and then decreased to 0 in steps of 6 cm H2O every 10 minutes. Cycling RMs with plateau pressure/PEEP of 40/20 (healthy) and 50/25 (lavaged) cm H2O were applied for 2 minutes between 18-PEEP steps. Volumetric capnography, respiratory mechanics, blood gas, and hemodynamic data were recorded.

RESULTS: In healthy lungs before the RM, Vtco2,br was inversely proportional to PEEP decreasing from 4.0 (3.6–4.4) mL (median and interquartile range) at 0-PEEP to 3.1 (2.8–3.4) mL at 18-PEEP (P < 0.05). After the RM, Vtco2,br increased from 3.3 (3–3.6) mL at 18-PEEP to 4.0 (3.5–4.5) mL at 0-PEEP (P < 0.05). In lavaged lungs before the RM, Vtco2,br increased initially from 2.0 (1.7–2.3) mL at 0-PEEP to 2.6 (2.2–3) mL at 12-PEEP (P < 0.05) but then decreased to 2.4 (2–2.8) mL when PEEP was increased further to 18 cm H2O (P < 0.05). After the RM, the highest Vtco2,br of 2.9 (2.1–3.7) mL was observed at 12-PEEP and then decreased to 2.5 (1.9–3.1) mL at 0-PEEP (P < 0.05). Vtco2,br was directly related to changes in lung perfusion, the area of gas exchange, and alveolar ventilation but inversely related to changes in dead space.

CONCLUSIONS: CO2 elimination by the lungs was dependent on PEEP and recruitment and showed major differences between healthy and lavaged lungs.

同侧腹横肌平面阻滞可为小儿阑尾术后提供有效的镇痛：一项随机对照实验
Ipsilateral Transversus Abdominis Plane Block Provides Effective Analgesia After Appendectomy in Children: A Randomized Controlled Trial

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背景：腹横肌平面阻滞（TAP）在成人的腹部外科手术中能提供有效的镇痛效果，它的效果在小儿中还不清楚，并且在这些人群中还没有随机的临床试验。在这项随机、对照、双盲的临床研究中，作者评估 TAP 对阑尾手术的腹部切口在第一个术后 48 小时的镇痛效果。

方法：40 例阑尾切除术的小儿随机分为罗哌卡因组 (n = 19) 和安慰剂组 (n = 21)，单侧行 TAP 阻滞。除此之外，标准的术后镇痛包括静脉吗啡和定时使用双氯芬酸及对乙酰氨基酚。所有患者均接受标准的全身麻醉，在麻醉诱导后，使用 0.75%的罗哌卡因或是等量的盐水在切口同侧通过体表解剖定位法来行 TAP 阻滞。
BACKGROUND: The transversus abdominis plane (TAP) block provides effective postoperative analgesia in adults undergoing major abdominal surgery. Its efficacy in children remains unclear, with no randomized clinical trials in this population. In this study, we evaluated its analgesic efficacy over the first 48 postoperative hours after appendectomy performed through an open abdominal incision, in a randomized, controlled, double-blind clinical trial.

METHODS: Forty children undergoing appendectomy were randomized to undergo unilateral TAP block with ropivacaine (n = 19) versus placebo (n = 21) in addition to standard postoperative analgesia comprising IV morphine analgesia and regular diclofenac and acetaminophen. All patients received a standard general anesthetic, and after induction of anesthesia, a TAP block was performed using the landmark technique with 2.5 mg · kg⁻¹ ropivacaine 0.75% or an equal volume (0.3 mL · kg⁻¹) of saline on the ipsilateral side to the incision.

RESULTS: The TAP block with ropivacaine reduced mean (±SD) morphine requirements in the first 48 postoperative hours (10.3 ± 12.7 vs 22.3 ± 14.7 mg; P < 0.01) compared with placebo block. The TAP block also reduced postoperative visual analog scale pain scores at rest and on movement compared with placebo. Interval morphine consumption was reduced over the first 24 postoperative hours. There were no between-group differences in the incidence of sedation or nausea and vomiting. There were no complications attributable to the TAP block.

CONCLUSIONS: Unilateral TAP block, as a component of a multimodal analgesic regimen, provided superior analgesia compared with placebo in the first 48 postoperative hours after appendectomy in children.
Asphyxiation by an inhaled foreign body is a leading cause of accidental death among children younger than 4 years. We analyzed the recent epidemiology of foreign body aspiration and reviewed the current trends in diagnosis and management. In this article, we discuss anesthetic management of bronchoscopy to remove objects. The reviewed articles total 12,979 pediatric bronchoscopies. Most aspirated foreign bodies are organic materials (81%, confidence interval [CI] = 77%–86%), nuts and seeds being the most common. The majority of foreign bodies (88%, CI = 85%–91%) lodge in the bronchial tree, with the remainder catching in the larynx or trachea. The incidence of right-sided foreign bodies (52%, CI = 48%–55%) is higher than that of left-sided foreign bodies (33%, CI = 30%–37%). A small number of objects fragment and lodge in different parts of the airways. Only 11% (CI = 8%–16%) of the foreign bodies were radio-opaque on radiograph, with chest radiographs being normal in 17% of children (CI = 13%–22%). Although rigid bronchoscopy is the traditional diagnostic “gold standard,” the use of computerized tomography, virtual bronchoscopy, and flexible bronchoscopy is increasing. Reported mortality during bronchoscopy is 0.42%. Although asphyxia at presentation or initial emergency bronchoscopy causes some deaths, hypoxic cardiac arrest during retrieval of the object, bronchial rupture, and unspecified intraoperative complications in previously stable patients constitute the majority of in-hospital fatalities. Major complications include severe laryngeal edema or bronchospasm requiring tracheotomy or reintubation, pneumothorax, pneumomediastinum, cardiac arrest, tracheal or bronchial laceration, and hypoxic brain damage (0.96%). Aspiration of gastric contents is not reported. Preoperative assessment should determine where the aspirated foreign body has lodged, what was aspirated, and when the aspiration occurred (“what, where, when”). The choices of inhaled or IV induction, spontaneous or controlled ventilation, and inhaled or IV maintenance may be individualized to the circumstances. Although several
anesthetic techniques are effective for managing children with foreign body aspiration, there is no consensus from the literature as to which technique is optimal. An induction that maintains spontaneous ventilation is commonly practiced to minimize the risk of converting a partial proximal obstruction to a complete obstruction. Controlled ventilation combined with IV drugs and paralysis allows for suitable rigid bronchoscopy conditions and a consistent level of anesthesia. Close communication between the anesthesiologist, bronchoscopist, and assistants is essential.

**The Effect of Ketamine Anesthesia on the Immune Function of Mice with Postoperative Septicemia**

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**背景**：目前尚未阐明氯胺酮对免疫方面的效应如何影响术后败血症患者的预后。作者通过研究观察氯胺酮麻醉对剖腹手术小鼠术后用脂多糖或埃希氏大肠杆菌激发败血症，观察肝巨噬细胞和细胞因子的产生。

**方法**：C57BL/6 小鼠接受氯胺酮或者七氟醚麻醉下行剖腹手术，小鼠用埃希大肠菌属或者是脂多糖激发败血症，随后检查小鼠的生存率和细胞因子的分泌，评估 β 受体阻滞剂纳多洛尔对氯胺酮麻醉的效应，用来阐明氯胺酮引起的免疫抑制效应的机制。

**结果**：与七氟醚麻醉相比，氯胺酮麻醉提高了剖腹手术后脂多糖激发败血症小鼠的生存率，但是在埃希大肠菌属激发组，氯胺酮没有发现有上述作用。在脂多糖和埃希大肠菌属注射后，氯胺酮抑制 TNF 和 IFN-γ 分泌物，当用抗生素抑制细菌的生长，与七氟醚麻醉相比，氯胺酮麻醉可以有效提高注射埃希大肠菌属小鼠的生存率。在使用抗生素的七氟醚麻醉组，中和 TNF 可以提高生存率和减少 IFN-γ 分泌，表明氯胺酮对 TNF 的抑制可以提高生存率。在脂多糖激发组氯胺酮可以抑制活体肝巨噬细胞对微球体内的吞噬作用。在脂多糖激发组，使用麻醉剂量的氯胺酮联合使用纳多洛尔不会恢复 TNF 的抑制，这表明和 β-肾上腺素能通路无关。然而，它恢复在低剂量氯胺酮（10%的麻醉剂量）TNF 的分泌。与此相反，麻醉剂量的氯胺酮通过 β-肾上腺素能通路，纳多洛尔恢复了肝巨噬细胞的吞噬功能。

**结论**：氯胺酮抑制 TNF 的产生和枯否细胞/巨噬细胞的吞噬功能。因此 除非细菌的生长被很好的控制（用抗生素），尽管减少了炎症反应但是术后感染不会很好的控制。

（刘世文  译  陈杰  校）
**BACKGROUND:** It is unknown how ketamine anesthesia immunologically affects the outcome of patients with postoperative sepsis. We investigated the effects of ketamine anesthesia on mice with an *Escherichia coli* or lipopolysaccharide (LPS) challenge after laparotomy, focusing on phagocytosis by liver macrophages (Kupffer cells) and cytokine production.

**METHODS:** C57BL/6 mice received ketamine or sevoflurane anesthesia during laparotomy, which was followed by an *E. coli* or LPS challenge; thereafter, mouse survival rates and cytokine secretions were examined. The effects of a β-adrenoceptor antagonist, nadolol, on ketamine anesthesia were also assessed to clarify the mechanisms of ketamine-induced immunosuppressive effects.

**RESULTS:** Ketamine anesthesia increased the mouse survival rate after LPS challenge compared with sevoflurane anesthesia, whereas such an effect of ketamine was not observed after *E. coli* challenge. Ketamine suppressed tumor necrosis factor (TNF) and interferon (IFN)-γ secretion after LPS and *E. coli* challenge. When bacterial growth was inhibited using an antibiotic, ketamine anesthesia effectively improved mouse survival after *E. coli* challenge compared with sevoflurane anesthesia. Neutralization of TNF also improved survival and decreased IFN-γ secretion after bacterial challenge in antibiotic-treated mice with sevoflurane anesthesia, suggesting that ketamine's suppression of TNF may improve survival. Ketamine also suppressed in vivo phagocytosis of microspheres by Kupffer cells in LPS-challenged mice. Concomitant use of nadolol with an anesthetic dose of ketamine did not restore TNF suppression in LPS-challenged mice, suggesting a mechanism independent of the β-adrenergic pathway. However, it restored TNF secretion under low-dose ketamine (10% anesthetic dose). In contrast, nadolol restored the decrease in phagocytosis by Kupffer cells, which was induced by the anesthetic dose of ketamine via the β-adrenergic pathway, suggesting distinct mechanisms.

**CONCLUSION:** Ketamine suppresses TNF production and phagocytosis by Kupffer cells/macrophages. Therefore, unless bacterial growth is well controlled (by an antibiotic), postoperative infection might not improve despite reduction of the inflammatory response.

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**Cochrane Corner:**锁骨下臂丛神经阻滞用于下臂手术的局部麻醉

**Cochrane Corner: Infraclavicular Brachial Plexus Block for Regional Anaesthesia of the Lower Arm**

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Anesth Analg October 2010 111:1072;

**背景：**臂丛神经阻滞有多种不同的路线。尽管锁骨下法臂丛神经阻滞（简称 ICBC）有多个优势技术，但目前尚不清楚下臂手术臂丛麻醉哪一路径为首选。因此，研究者对ICB和其他臂丛神经阻滞（BPBs）做了系统回顾评价。

**目的：**评价ICB和其他BPBs在下臂区域麻醉中的疗效和安全性。

BACKGROUND: Several approaches exist to produce local anaesthetic blockade of the brachial plexus. It is not clear which is the technique of choice for providing surgical anaesthesia of the lower arm although infraclavicular blockade (ICB) has several purported advantages. We therefore performed a systematic review of ICB compared to the other brachial plexus blocks (BPBs).

OBJECTIVES: To evaluate the efficacy and safety of ICB compared to other BPBs in providing regional anaesthesia of the lower arm.

SEARCH STRATEGY: We searched CENTRAL (The Cochrane Library 2008, Issue 3), MEDLINE (1950 to September 22nd 2008) and EMBASE (1980 to September 22nd 2008). We also searched conference proceedings (from 2004 to 2008) and the www.clinicaltrials.gov registry. No language restriction was applied.

SELECTION CRITERIA: We included any randomized controlled trials (RCTs) that compared ICB with other BPBs as the sole anaesthetic techniques for surgery on the lower arm.

DATA COLLECTION AND ANALYSIS: The primary outcome was adequate surgical anaesthesia within 30 minutes of block completion. Secondary outcomes included sensory block of individual nerves, tourniquet pain, onset time of sensory blockade, block performance time, block-associated pain and complications related to the block.
MAIN RESULTS: We identified 15 studies with 1020 participants, of whom 510 received ICB and 510 received other BPBs. The control group intervention was the axillary block in 10 studies, mid-humeral block in two studies, supraclavicular block in two studies and parascalene block in one study. Three studies employed ultrasound-guided ICB. The risk of failed surgical anaesthesia and of complications were low and similar for ICB and all other BPBs. Tourniquet pain was less likely with ICB (risk ratio (RR) 0.47, 95% CI 0.24 to 0.92, P = 0.03). When compared to a single-injection axillary block, ICB was better at providing complete sensory block of the musculocutaneous nerve (RR for failure 0.46, 95% CI 0.27 to 0.60, P < 0.0001) and the axillary nerve (RR of failure 0.37, 95% CI 0.24 to 0.58, P < 0.0001). ICB was faster to perform than multiple-injection axillary (mean difference (MD) −2.7 min, 95% CI −4.2 to −1.1, P = 0.0006) or midhumeral blocks (MD −4.8 min, 95% CI −6.0 to −3.6, P < 0.00001) but this was offset by a longer sensory block onset time (MD 3.9 min, 95% CI 3.2 to 4.5, P < 0.00001).

AUTHORS' CONCLUSIONS: ICB is a safe and simple technique for providing surgical anaesthesia of the lower arm, with an efficacy comparable to other BPBs. The advantages of ICB include a lower likelihood of tourniquet pain during surgery, and more reliable blockade of the musculocutaneous and axillary nerves when compared to a single-injection axillary block. The efficacy of ICB is likely to be improved if adequate time is allowed for block onset (at least 30 minutes) and if a volume of at least 40 ml is injected. Since publication of many of the trials included in this review, it has become clear that a distal posterior cord motor response is the appropriate endpoint for electrostimulation-guided ICB; we recommend it be used in all future comparative studies. There is also a need for additional RCTs comparing ultrasound-guided ICB with other BPBs.

心脏手术抗凝所需的肝素浓度不能可靠预测肝素的注射剂量

Heparin Concentration-Based Anticoagulation for Cardiac Surgery Fails to Reliably Predict Heparin Bolus Dose Requirements.

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背景：先进的床旁诊断检验信息系统现已逐步成为止血管理的新技术，其通过对抗凝所需肝素浓度的计算为患者提供个性化的肝素注射方案。Hepcon止血管理系
统（美敦力公司，明尼阿波利斯，明尼苏达州）可对肝素剂量、活化凝血时间（ACT）及肝素剂量响应（HDR）进行评估。然而在大样本人群中，此类测试的
系统性评价尚未开展与实施。

方法：此次研究共调查了2005年2月至2008年7月间所有于我院行体外循环下
心脏手术患者的数据资料。在此期间，Hepcon止血管理系统专用于肝素剂量与凝
血监测的评估。研究所需记录的数据信息包括详尽的人口统计学资料、手术情况、
BACKGROUND: Hemostasis management has evolved to include sophisticated point-of-care systems that provide individualized dosing through heparin concentration-based anticoagulation. The Hepcon HMS Plus system (Medtronic, Minneapolis, MN) estimates heparin dose, activated clotting time (ACT), and heparin dose response (HDR). However, the accuracy of this test has not been systematically evaluated in large cohorts.

METHODS: We examined institutional databases for all patients who underwent cardiac surgery with cardiopulmonary bypass (CPB) at our institution from February 2005 to July 2008. During this period, the Hepcon HMS Plus was used exclusively for assessment of heparin dosing and coagulation monitoring. Detailed demographic, surgical, laboratory, and heparin dosing data were recorded. ACT, calculated and measured HDR, and heparin concentrations were recorded. Performance of the Hepcon HMS Plus was assessed by comparison of actual and target ACT values and calculated and measured HDR.

RESULTS: In 3880 patients undergoing cardiac surgery, heparin bolus dosing to a target ACT resulted in wide variation in the postheparin ACT (r^2 = 0.03). The postheparin ACT did not reach the target ACT threshold in 7.4% (i.e., when target ACT was 300 s) and 16.9% (i.e., when target ACT was 350 s) of patients. Similarly, the target heparin level calculated from the HDR did not correlate with the postbolus heparin level, with 18.5% of samples differing by more than 2 levels of the assay. Calculated and measured HDR were not linearly related at any heparin level.

CONCLUSIONS: The Hepcon HMS Plus system poorly estimates heparin bolus requirements in the pre-CPB period. Further prospective studies are needed to elucidate what constitutes adequate anticoagulation for CPB and how clinicians can reliably and practically assess anticoagulation in the operating room.

β2-adrenergic receptor-coupled phosphoinositide 3-kinase constrains cAMP-dependent increases in cardiac inotropy through phosphodiesterase 4 activation.
Gregg CJ, Steppan J, Gonzalez DR, Champion HC, Phan AC, Nyhan D, Shoukas AA, Hare JM, Barouch LA, Berkowitz DE.
BACKGROUND: Emerging evidence suggests that phosphoinositide 3-kinase (PI3K) may modulate cardiac inotropy; however, the underlying mechanism remains elusive. We hypothesized that β(2)-adrenergic receptor (AR)-coupled PI3K constrains increases in cardiac inotropy through cyclic adenosine monophosphate (cAMP)-dependent phosphodiesterase (PDE) activation.

METHODS: We tested the effects of PI3K and PDE4 inhibition on myocardial contractility by using isolated murine cardiac myocytes to study physiologic functions (sarcomere shortening [SS] and intracellular Ca(+) transients), as well as cAMP and PDE activity.

RESULTS: PI3K inhibition with the reversible inhibitor LY294002 (LY) resulted in a significant increase in SS and Ca(2+) handling, indicating enhanced contractility. This response depended on G(iα) protein activity, because incubation with pertussis toxin (an irreversible G(iα) inhibitor) abolished the LY-induced hypercontractility. In addition, PI3K inhibition had no greater effect on SS than both a PDE3,4 inhibitor (milrinone) and LY combined. Furthermore, LY decreased PDE4 activity in a concentration-dependent manner (58.0% of PDE4 activity at LY concentrations of 10 μM). Notably, PI3K(γ) coimmunoprecipitated with PDE4D. The β(2)-AR inverse agonist, ICI 118,551 (ICI), abolished induced increases in contractility.

CONCLUSIONS: PI3K modulates myocardial contractility by a cAMP-dependent mechanism through the regulation of the catalytic activity of PDE4. Furthermore, basal
agonist-independent activity of the β(2)-AR and its resultant cAMP production and enhancement of the catalytic activity of PDE4 through PI3K represents an example of integrative cellular signaling, which controls cAMP dynamics and thereby contractility in the cardiac myocyte. These results help to explain the mechanism by which milrinone is able to increase myocardial contractility in the absence of direct β-adrenergic stimulation and why it can further augment contractility in the presence of maximal β-adrenergic stimulation.

Strepsils®用于减轻气管插管后喉部疼痛和声音嘶哑的研究
Strepsils® Tablets Reduce Sore Throat and Hoarseness After Tracheal Intubation
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Anesth Analg October 2010 111:892-894

背景：Strepsils已成功用于预防和治疗口腔炎症，但用于插管后喉部疼痛和声嘶疗效未知。进行此项研究即为评估Strepsils对气管插管术后减轻咽喉疼痛和声嘶的疗效。

方法：对150名ASA分级Ⅰ级和Ⅱ级需行择期整形或妇产科手术的病人给予全身麻醉，受试者被随机分为2组。入手术室前，一组给予Strepsils，另一组给相似的安慰剂。然后评估术后即刻和术后24小时咽喉疼痛和声嘶的发病率和严重度。

结果：术后早期咽喉疼痛发病率Strepsils组和对照组分别是13.7%和33.3%；声嘶的发病率在受试组和对照组分别是12.3%和26.4%（P<0.05）；术后24小时，在受试组和对照组咽喉疼痛发病率分别降低到6.8%和18.1%，而声嘶症状在受试组和对照组分别降到8.2%和19.4%（P<0.05）。

结论：围手术期应用Strepsils可以减轻术后咽喉疼痛及声嘶症状。

(毛慧译，薛张刚校)

BACKGROUND: Amyl-m-cresol (Strepsils) has been successfully used in the prophylaxis and treatment of oral inflammations, but its effects on postintubation sore throat and hoarseness are unknown. We conducted this study to evaluate the effects of Strepsils in reducing postintubation sore throat and hoarseness.

METHODS: One hundred fifty patients, ASA physical status I to II, scheduled to undergo general anesthesia and elective orthopedic or gynecologic surgery were enrolled. Participants were randomly allocated to receive either Strepsils or identical-looking placebo tablets immediately before arrival to the operating room. The incidence and severity of postoperative sore throat and hoarseness were evaluated immediately and 24 hours after surgery.

RESULTS: The incidence of early postoperative sore throat was 13.7% and 33.3% and hoarseness was 12.3% and 26.4% in the Strepsils and placebo groups, respectively (P<0.05). One day after surgery, the incidence of sore throat decreased to 6.8% and 18.1% in the Strepsils and control groups, respectively. The incidence of hoarseness 1 day after the operation decreased to 8.2% in the Strepsils group and 19.4% in the placebo group, but the difference remained statistically significant (P<0.05).
CONCLUSION: Perioperative use of Strepsils tablets reduces postoperative sore throat and hoarseness of voice. (Anesth Analg 2010;111:892–4)

Goal-directed fluid management based on the pulse oximeter-derived pleth variability index reduces lactate levels and improves fluid management.

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BACKGROUND: Dynamic variables predict fluid responsiveness and may improve fluid management during surgery. We investigated whether displaying the variability in the pulse oximeter plethysmogram (pleth variability index; PVI) would guide intraoperative fluid management and improve circulation as assessed by lactate levels.

METHODS: Eighty-two patients scheduled for major abdominal surgery were randomized into 2 groups to compare intraoperative PVI-directed fluid management (PVI group) versus standard care (control group). After the induction of general anesthesia, the PVI group received a 500-mL crystalloid bolus and a crystalloid infusion of 2 mL·kg(-1)·h(-1). Colloids of 250 mL were administered if the PVI was >13% if vasoactive drug support was given to maintain the mean arterial blood pressure above 65 mm Hg. In the control group, an infusion of 500 mL of crystalloids was followed by fluid management on the basis of fluid challenges and their effects on mean arterial blood and central venous pressure. Perioperative lactate levels, hemodynamic data, and postoperative complications were recorded prospectively.

RESULTS: Intraoperative crystalloids and total volume infused were significantly lower in the goal-directed PVI group. Lactate levels were significantly lower in the PVI group during surgery and 48 hours after surgery (P < 0.05).
CONCLUSIONS: PVI-based goal-directed fluid management reduced the volume of intraoperative fluid infused and reduced intraoperative and postoperative lactate levels.

Two serial check valves can prevent cross-contamination through intravenous tubing during total intravenous anesthesia.
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BACKGROUND: Nonsterile handling of propofol for anesthesia has been linked with severe sepsis and death. Placing a single check valve in the IV tubing does not prevent retrograde ascension of pathogens into propofol-filled syringes, so we designed an IV tubing set with multiple check valves. To estimate the efficacy of this design, we measured the concentration of pathogens detected upstream in the IV tubing in relation to the pathogen concentration in a model of a contaminated patient.

METHODS: A glass container with a rubber sealed port was filled with a suspension of either bacteria or phagocytes and kept at 37°C ("contaminated patient“ model). A bag of normal saline was connected to an IV cannula, punctured through the rubber sealed port of the patient model. Two additional sidestream infusion lines were connected to syringes in 2 standard infusion pumps. One of the syringes contained propofol and the other contained normal saline as a substitute for an opioid preparation. After 5 hours of infusion, we obtained samples from different parts of the infusion lines and syringes. The
samples were streaked out on blood agar plates and incubated at 37°C for 24 hours. We repeated this experiment with 6 different pathogens.

RESULTS: We incubated 825 agar plates. Whereas the concentration of bacteria and phagocytes in the "patient" had significantly increased during the 5-hour experiments (positive control), no bacterial growth could be detected in any of the incubated plates.

CONCLUSION: The data from this experimental setting suggest that the design with multiple check valves in paired configuration prevents retrograde contamination. Of note, this does not permit the reuse of propofol syringes because reusing is against the manufacturer's recommendations.

Adaptive support ventilation with protocolized de-escalation and escalation does not accelerate tracheal extubation of patients after nonfast-track cardiothoracic surgery.

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背景：自适应辅助通气（adaptive support ventilation，ASV）能否加快非快速通道心胸手术患者的气管拔管尚不清楚。降低呼吸机设定的 ASV 分钟通气量百分比可能会使患者更早从控制通气转化为辅助通气，可能加快气管拔管。我们假定，在接受非快速通道冠脉搭桥术且术后没有并发症的患者中，与标准 ASV（设置固定的 ASV 分钟通气量百分比）相比，可变 ASV（ASV-DE，即通过标准化流程降低或者提高呼吸机设定的 ASV 分钟通气量百分比）可以缩短拔管时间。

方法：我们进行了随机对照试验来比较 ASV-DE 和标准 ASV。在 ASV-DE 组，只要机体体温＞35.0℃且 pH ＞7.25，呼吸机设定的 ASV 通气百分比逐步降低至最低 70%。

结果：63 例患者随机分入 ASV-DE 组，另外 63 例患者分入标准 ASV 组。两组的机械通气时间无统计学差异（ASV-DE 组为 10.8 [6.5-16.1] 小时，标准 ASV 组为 10.7 [6.6-13.9] 小时，P = 0.32）。ASV-DE 组的控制通气到第一次辅助通气的时间更短（3.1 [2.0-6.7] vs 3.9 [2.1-7.5] 小时），辅助通气的次数更多（78 [34-176] vs 57 [32-116]次），但两者均没有达到统计学意义。到气管拔管为止，两组的辅助通气次数有统计学差异（ASV-DE 组为 2.5 [0.9-4.6]小时，而标准 ASV 组为 1.4 [0.3-3.5] 小时，P < 0.05）。

结论：在行非快速通道的冠脉搭桥术的患者中，与标准 ASV 相比，通过标准化流程降低或提高 ASV 的分钟通气量百分比（ASV-DE）不能缩短患者的拔管时间。
BACKGROUND: It is uncertain whether adaptive support ventilation (ASV) accelerates weaning of nonfast-track cardiothoracic surgery patients. A lower operator set %-minute ventilation with ASV may allow for an earlier definite switch from controlled to assisted ventilation, potentially hastening tracheal extubation. We hypothesized that ASV using protocolized de-escalation and escalation of operator set %-minute ventilation (ASV-DE) reduces time until tracheal extubation compared with ASV using a fixed operator set %-minute ventilation (standard ASV) in uncomplicated patients after nonfast-track coronary artery bypass graft.

METHODS: We performed a randomized controlled trial comparing ASV-DE with standard ASV. With ASV-DE, as soon as body temperature was >35.0°C with pH >7.25, operator set %-minute ventilation was decreased stepwise to a minimum of 70%.

RESULTS: Sixty-three patients were randomized to ASV-DE, and 63 patients to standard ASV. The duration of mechanical ventilation was not different between groups (10.8 [6.5–16.1] vs 10.7 [6.6–13.9] hours, ASV-DE versus standard ASV; P = 0.32). Time until the first assisted breathing period was shorter (3.1 [2.0–6.7] vs 3.9 [2.1–7.5] hours) and the number of assisted ventilation episodes was higher (78 [34–176] vs 57 [32–116] episodes), but differences did not reach statistical significance. The duration of assisted ventilation episodes that ended with tracheal extubation was different between groups (2.5 [0.9–4.6] vs 1.4 [0.3–3.5] hours, ASV-DE versus standard ASV; P < 0.05).

CONCLUSION: Compared with standard ASV, weaning of patients after nonfast-track coronary artery bypass graft using ASV with protocolized de-escalation and escalation does not shorten time to tracheal extubation.

The Influence of Time of Day of Administration on Duration of Opioid Labor Analgesia
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背景: 分娩镇痛中注入硬膜外腔或蛛网膜下腔的药物可能会因为注入的时间而产生不同的效应，而这可能会影响到临床研究中特殊药物药理学的观察。在这个回顾性研究中，我们对一天内不同时间在蛛网膜下腔注入芬太尼和全身使用氢吗啡酮后的效应进行评估。资料来源于观察镇痛方法对于分娩结局影响的随机临床试验。

方法: 六百九十二名临产妇在分娩早期提出第一次镇痛需求时随机进入腰硬联合分娩镇痛（蛛网膜下腔25ug芬太尼，随后注入一个利多卡因混合肾上腺素的硬膜外试验剂量）或者全身性的分娩镇痛（氢吗啡酮1mg静脉注射，1mg肌肉注射）。除非病人再提出镇痛需求（第二次镇痛需求），否则不再给予镇痛药物。如果初始镇痛药物（区域或是全身）在7:01和23:00之间注入的，则受试者进入日间组，如在23:01至7:00之间注入则进入夜间组。在每一种镇痛模式中（区域或是全身）对日间组和夜间组进行比较。主要的结局变量是镇痛持续时间，定义为首次注入镇痛药物至第二次提出镇痛需求的时间间隔。同时在两组间比较第一次镇痛需求
BACKGROUND: Medications administered into the epidural or intrathecal space for labor analgesia may demonstrate variable effects dependent on time of day, and this may affect clinical research trials investigating the pharmacology of specific drugs. In this retrospective study, we evaluated the effect of time of day of administration of intrathecal fentanyl and systemic hydromorphone labor analgesia from data collected as part of a randomized clinical trial examining the influence of analgesia method on labor outcome.

METHODS: Six hundred ninety-two healthy parturients were randomized early in labor to receive combined spinal-epidural (intrathecal fentanyl 25 μg followed by a lidocaine and epinephrine containing epidural test dose) versus systemic (hydromorphone 1 mg IV and 1 mg IM) labor analgesia at first analgesia request. No further analgesics were administered until the patient requested additional analgesia (second analgesia request). Subjects were assigned to the daytime group (DAY) if initial analgesia (neuraxial or systemic) was administered between the hours of 07:01 and 23:00 and to the nighttime group (NIGHT) if it was administered between 23:01 and 07:00. Within each mode of analgesia study arm (neuraxial or systemic), the DAY and NIGHT groups were compared. The primary outcome variable was analgesia duration, defined as the time interval from administration of labor analgesia until the second analgesia request. Cervical dilation at first and second analgesia requests, pain score at first analgesia request, and average amount of pain between analgesia administration and second analgesia request were also compared between DAY and NIGHT groups. Rhythm analyses for duration of analgesia, cervical dilation, and pain scores were performed.

RESULTS: There was no difference in the median duration of either neuraxial or systemic analgesia in DAY versus NIGHT subjects, and no harmonic variation was observed for analgesia duration. Rhythm analysis demonstrated a 24-h harmonic cycle for cervical dilation at first analgesia request with maximum values occurring near 17:00 and minimum values near 05:00, but the amplitude of the difference was very small. Rhythm analysis demonstrated a 24-h harmonic cycle with maximum values occurring near 22:00 and minimum values near 10:00 for the average amount of pain between analgesia administration and second analgesia request in neuraxial group patients, but amplitude was small.

CONCLUSIONS: Time of day of administration did not seem to influence combined spinal-epidural or systemic labor analgesia duration under these study conditions.
Epidemiology of Ambulatory Anesthesia for Children in the United States: 2006 and 1996
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BACKGROUND: There are few data that describe the frequency, anesthetic type, provider, or disposition of children requiring outpatient anesthesia in the United States (US). Since the early 1980s, the frequency of ambulatory surgery has increased dramatically because of advances in medical technology and changes in payment arrangements. Our primary aim in this study was to quantify the number of ambulatory anesthetics for children that occur annually and to study the change in utilization of pediatric anesthetic care over a decade.

METHODS: The US National Center for Health Statistics performed the National Survey of Ambulatory Surgery in 1994 through 1996 and again in 2006. The survey is based on data abstracted from a national sample of ambulatory surgery centers and provides data on visits for surgical and nonsurgical procedures for patients of all ages. We abstracted data for children who had general anesthesia, regional anesthesia, or monitored anesthesia care during the ambulatory visit. We obtained the information from the 2006 and 1996 databases and used population census data to estimate the annual utilization of ambulatory anesthesia per 1000 children in the US.

RESULTS: In 2006, an estimated 2.3 million ambulatory anesthesia episodes of care were provided in the US to children younger than 15 years (38 of 1000 children). This
amount compares with 26 per 1000 children of the same age group in 1996. In most cases, an anesthesiologist was involved in both time periods (74% in 2006 and 85% in 1996). Of the children, 14,200 were admitted to the hospital postoperatively, a rate of 6 per 1000 ambulatory anesthesia episodes.

CONCLUSION: The number and rate of ambulatory anesthesia episodes for US children increased dramatically over a decade. This study provides an example of how databases can provide useful information to health care policy makers and educators on the utilization of ambulatory surgical centers by children.

较大择期手术后延伸急性疼痛服务对临床预后作用的成本与收益
The Costs and Benefits of Extending the Role of the Acute Pain Service on Clinical Outcomes After Major Elective Surgery
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背景：急性疼痛服务已被广泛接受，并得到学院和组织的正式支持，但是关于成本与收益的有效证据极少。尽管在对多数较大手术后给予急性疼痛服务方面已达成一致，但是对其他手术的益处还不清楚。需要数据来证明急性疼痛服务任何扩展的合理性。在这项随机对照临床试验中，我们将急性疼痛服务对临床预后的成本和效应与传统的病房内疼痛处理进行比较。试验中的患者都由他们的麻醉医生为其决定选择其中一种适合于手术方式的疼痛处理方法。

方法：423名实施较大择期手术的患者随机分入由一位麻醉医生领导的以护士为基础的患者自控镇痛急性疼痛服务组，或分入单次肌注或静注阿片类镇痛药的对照组。两组均用药物治疗阿片类相关副作用，并接受健康专家为病房设计的常规护理。主要的预后测量指标是恢复评分质量、疼痛强度测量、治疗有效性的总体测量以及全部的疼痛处理成本。画出成本-效应可接受曲线来检测两组间成本-效应关系连接点的不同。

结果：处理组与对照组之间术后一天的恢复评分质量无差别（平均差值，0；95%可信区间，-0.7〜0.7；P=0.94），或者恢复评分质量提高率无差别（平均差值，-0.1；95%可信区间，-0.4〜0.1；P=0.34）。急性疼痛服务组中获得一天或数天高效疼痛治疗的患者比例较对照组高（86%比 75%；P<0.01）。急性疼痛服务组所耗成本更高（平均差值，46美元；95%可信区间，每位患者44〜48美元；P<0.001）。成本-效应可接受曲线显示，如果决策者愿意为每个患者每天多付于546美元来获得更有效的治疗，急性疼痛服务在提供更有效的疼痛治疗时较对照具有更高的成效。

结论：在对接受较大手术的特殊患者群体延伸急性疼痛服务作用过程中，急性疼痛服务可能是有成效的。
（朱兰芳译，薛张纲校）
BACKGROUND: Acute pain services have received widespread acceptance and formal support from institutions and organizations, but available evidence on their costs and benefits is scarce. Although there is good agreement on the provision of acute pain services after many major surgical procedures, there are other procedures for which the benefits are unclear. Data are required to justify any expansion of acute pain services. In this randomized, controlled clinical trial we compared the costs and effects of acute pain service care on clinical outcomes with conventional pain management on the ward. Patients included in the trial were considered by their anesthesiologist to have either arm be suitable for the procedure.

METHODS: Four hundred twenty-three patients undergoing major elective surgery were randomized either to an anesthesiologist-led, nurse-based acute pain service group with patient-controlled analgesia or to a control group with IM or IV boluses of opioid analgesia. Both groups were treated with medications to treat opioid-related adverse effects and received the usual care from health professionals assigned to the ward. The main outcome measures were quality of recovery scores, pain intensity measures, global measure of treatment effectiveness, and overall pain treatment cost. Cost-effectiveness acceptability curves were drawn to detect a difference in the joint cost-effect relationship between groups.

RESULTS: There was no difference in quality of recovery score on postoperative day 1 between treatment and control groups (mean difference, 0; 95% confidence interval [CI], −0.7 to 0.7; P = 0.94) or in the rate of improvement in quality of recovery score (mean difference, −0.1; 95% CI, −0.4 to 0.1; P = 0.34). The proportion of patients with 1 or more days of highly effective pain management was higher in the acute pain service group than in the control group (86% vs. 75%; P < 0.01). Costs were higher in the acute pain service group (mean difference, US$46; 95% CI, $44 to $48 per patient; P < 0.001). A cost-effectiveness acceptability curve showed that the acute pain service was more cost effective than was control for providing highly effective pain management if the decision maker was willing to pay more than US$546 per patient per 1 day with highly effective treatment.

CONCLUSION: In extending the role of the acute pain service to a specific group of major surgical procedures, the acute pain service was likely to be cost effective.

**通过脉搏氧饱和度测定丙胺卡因区域麻醉导致的高铁血红蛋白血症水平**

Pulse-Oximetric Measurement of Prilocaine-Induced Methemoglobinemia in Regional Anesthesia

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背景：Masimo Radical 7®是一种新的测定高铁血红蛋白水平的脉搏 CO 饱和度的仪器。但是这种设备在临床上还没有进行评估。
METHODS: In this prospective observational study we compared the arterial methemoglobin levels and the corresponding pulse CO-oximetric values of the Radical 7® in regional anesthesia with prilocaine.

RESULTS: We analyzed 360 data pairs with methemoglobin values up to 6.6%. The mean bias and limits (±1.96 SD) of the device were 0.27% (±1.33%).

CONCLUSION: We found a high degree of agreement in measurement of methemoglobin between the 2 methods.