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异丙酚减少了咪达唑仑的分布和清除

Propofol Reduces the Distribution and Clearance of Midazolam

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背景：镇静剂量的咪达唑仑增加异丙酚血药浓度约 25%。本研究评价异丙酚对于咪达唑仑药代动力学的影响。

方法：8 名健康志愿者被安排进行两次随机交叉研究。在 A 研究期间，志愿者接受 0.035-0.05 毫克/公斤咪达唑仑，1 分钟内静脉注射，随后以 0.035-0.05 毫克/公斤/小时的速度输注 59 分钟。在 B 研究期间，除注射咪达唑仑外，于咪达唑仑注射开始

前 15 分钟至结束后 6 小时以靶控输注异丙酚（靶浓度：0.6 或 1.0ug/ml）。在咪达唑仑注射结束后 6 小时采集动脉血标本分析异丙酚和咪达唑仑的浓度。运用 Akaike 信息理论标准筛选模型，以非线性混合效应模型观察异丙酚和血流动力学变化对于咪达唑仑药代动力学的影响。

结果：在异丙酚平均血药浓度为 1.2ug/ml 时，血浆咪达唑仑浓度比单一给药时升高了 26.9%±9.4%。异丙酚（血药浓度 1.2ug/ml）使咪达唑仑分布的中央室容积从 5.37L 下降至 2.98L，消除清除率从 0.39L/min 降至 0.31L/min，快速分布清除率从 2.77L/min 降至 2.11L/min。如将心率这一指标包括在内进一步改变了咪达唑仑的药代动力学模型。

结论：异丙酚以浓度依赖的方式减少咪达唑仑的分布和清除，此外，将心率作为共变量通过减少个体间差异改善了咪达唑仑的药代动力学模型。

（黄剑译 薛张纲校）

BACKGROUND: Midazolam, at sedative levels, increases blood propofol concentrations by 25%. We evaluated the reverse interaction and determined the influence of propofol on the pharmacokinetics of midazolam.

METHODS: Eight healthy male volunteers were studied on 2 occasions in a random crossover manner. During session A, volunteers received midazolam 0.035 to 0.05 mg · kg⁻¹ IV for 1 minute followed by an infusion of 0.035 to 0.05 mg · kg⁻¹ · h⁻¹ for 59 minutes. During session B, in addition to this midazolam infusion scheme, a target-controlled infusion of propofol (constant C_T: 0.6 or 1.0 μg · mL⁻¹) was given from 15 minutes before the start until 6 hours after termination of the midazolam infusion. Arterial blood samples for propofol and midazolam concentration analysis were taken until 6 hours after termination of the midazolam infusion. Nonlinear mixed-effect models examining the influence of propofol and hemodynamic variables on midazolam pharmacokinetics were constructed using Akaike's information-theoretic criterion for model selection.

RESULTS: In the presence of a mean blood propofol concentration of 1.2 μg · mL⁻¹, the plasma midazolam concentration was increased by 26.9% ± 9.4% compared with midazolam given as a single drug. Propofol (C_{blood}: 1.2 μg · mL⁻¹) reduced midazolam central volume of distribution from 5.37 to 2.98 L, elimination clearance from 0.39 to 0.31 L · min⁻¹, and rapid distribution clearance from 2.77 to 2.11 L · min⁻¹. Inclusion of heart rate further improved the pharmacokinetic model of midazolam.

CONCLUSIONS: Propofol reduces the distribution and clearance of midazolam in a concentration-dependent manner. In addition, inclusion of heart rate as a covariate improved the pharmacokinetic model of midazolam predominantly through a reduction in the intraindividual variability.

线内过滤器是否应用于外周静脉导管来预防输液相关静脉炎？随机对照研究的系统回顾

Should In-line Filters Be Used in Peripheral Intravenous Catheters to Prevent Infusion-Related Phlebitis? A Systematic Review of Randomized Controlled Trials

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背景：在这个系统回顾中，我们评价了线内过滤器在外周静脉导管有关的输液相关静脉炎的作用。本研究为随机对照研究的系统回顾和荟萃分析。运用 MEDLINE 和 Cochrane 数据库收集 2009 年 8 月 10 日之前的数据。

方法：两名研究者分别评价临床试验的质量并提取数据。运用随机性效应模型综合合格的静脉炎患者的数据。运用双变量 meta 分析模型进行 meta 回归分析线内过滤器在控制组中对于发生静脉炎危险的影响。研究证据的分级运用了 GRADE 分级（推荐等级的评估，制定和评价）。

结果：本系统回顾共收集了 11 个临床对照研究（1633 个外周导管）对住院患者中线内过滤器对于静脉炎发生率影响进行比较。不同的临床试验间静脉炎的基线发生率在 23% 至 96% 之间。所有试验的 meta 分析显示线内过滤器降低了输液相关静脉炎的危险。（相对危险度，0.66；95% 置信区间，0.43-1.00）。然而这一优势是不确定的，因为这些试验在数据分析方面有严重的缺陷，meta 分析揭示了显著的不能解释的数据异质性（ $P < 0.0000$, $I^2 = 90.4\%$ ）。估计得出的优势并不依赖于基线发生率。

结论：外周静脉导管的线内过滤器并不推荐常规应用，因为这一益处的优势不确定。

（姚敏敏译 薛张纲校）

BACKGROUND: In this systematic review, we assessed the effect of in-line filters on infusion-related phlebitis associated with peripheral IV catheters. The study was designed as a systematic review and meta-analysis of randomized controlled trials. We used MEDLINE and the Cochrane Controlled Trial Register up to August 10, 2009.

METHODS: Two reviewers independently assessed trial quality and extracted data. Data on phlebitis were combined when appropriate, using a random-effects model. The impact of the risk of phlebitis in the control group (baseline risk) on the effect of in-line filters was studied by using meta-regression based on the bivariate meta-analysis model. The quality of the evidence was determined by using the GRADE (Grading of Recommendations Assessment, Development, and Evaluation) method.

RESULTS: Eleven trials (1633 peripheral catheters) were included in this review to compare the effect of in-line filters on the incidence of phlebitis in hospitalized patients. Baseline risks across trials ranged from 23% to 96%. Meta-analysis of all trials showed that in-line filters reduced the risk of infusion-related phlebitis (relative risk, 0.66; 95% confidence interval, 0.43–1.00). This benefit, however, is very uncertain, because the trials had serious methodological shortcomings and meta-analysis revealed marked unexplained statistical heterogeneity ($P < 0.0000$, $I^2 = 90.4\%$). The estimated benefit did not depend on baseline risk.

CONCLUSION: In-line filters in peripheral IV catheters cannot be recommended routinely, because evidence of their benefit is uncertain.

对于正常肺组织，小潮气量和高呼气末正压机械通气增加肺部炎症和呼吸机相关性肺损伤的发生

Low Tidal Volume and High Positive End-Expiratory Pressure Mechanical Ventilation Results in Increased Inflammation and Ventilator-Associated Lung Injury in Normal Lungs

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.Anesth Analg June 2010 110:1652-1660

背景：通过小潮气量（VT）和低平台压力机械通气可以降低死亡率，并减少呼吸窘迫综合症患者行机械通气时间。在手术期间，保护正常肺组织的机械通气策略可能会提高患者的预后。我们进行的动物试验，分别比较了三种机械通气策略对于正常肺组织的影响。我们比较了肺动力学，炎症介质，肺组织损伤情况。

方法：母猪随机分成3组。H-VT/3组（n=6）机械通气的潮气量（VT）为15 mL/kg 预期体重（PBW）/呼气末正压（PEEP）为3 cm H₂O；L-VT/3组（n=6）的VT为6 mL/kg PBW/PEEP为3 cm H₂O；L-VT/10组（n=6）的VT为6 mL/kg PBW/PEEP为10 cm H₂O，机械通气时间为8小时。分别监测血流动力学、气道力学、动脉血气以及炎症标志物。支气管肺泡灌洗液（BAL）用来进行分析炎症标志物和蛋白质浓度。测定右下肺叶的特异性细胞因子基因表达。右下肺叶及右上肺叶进行组织学评价。

结果：相比于H-VT/3组和L-VT/3组，L-VT/10组在肺泡灌洗液中炎症介质的浓度是前者的6倍高压（P < 0.001）。H-VT/3组和L-VT/3组在BAL中细胞因子含量相似。相比于L-VT/3组和L-VT/10组，H-VT/3组肺损伤分数较低。

结论：比较术中机械通气策略，高PEEP的机械通气可以导致炎症标志物增加。低PEEP的炎症标志物较低。高VT/低PEEP可以致较少组织学方面的肺损伤。

(陈珺珺译 薛张纲)

BACKGROUND: Protective mechanical ventilation with low tidal volume (VT) and low plateau pressure reduces mortality and decreases the length of mechanical ventilation in patients with acute respiratory distress syndrome. Mechanical ventilation that will protect normal lungs during major surgical procedures of long duration may improve postoperative outcomes. We performed an animal study comparing 3 ventilation strategies used in the operating room in normal lungs. We compared the effects on pulmonary mechanics, inflammatory mediators, and lung tissue injury.

METHODS: Female pigs were randomized into 3 groups. Group H-VT/3 (n = 6) was ventilated with a VT of 15 mL/kg predicted body weight (PBW)/positive end-expiratory pressure (PEEP) of 3 cm H₂O, group L-VT/3 (n = 6) with a VT of 6 mL/kg PBW/PEEP of 3 cm H₂O, and group L-VT/10 (n = 6) with a VT of 6 mL/kg PBW/PEEP of 10 cm H₂O, for 8 hours. Hemodynamics, airway mechanics, arterial blood gases, and inflammatory markers were monitored. Bronchoalveolar lavage (BAL) was analyzed for inflammatory markers and protein concentration. The right lower lobe was assayed for

mRNA of specific cytokines. The right lower lobe and right upper lobe were evaluated histologically.

RESULTS: In contrast to groups H-VT/3 and L-VT/3, group L-VT/10 exhibited a 6-fold increase in inflammatory mediators in BAL ($P < 0.001$). Cytokines in BAL were similar in groups H-VT/3 and L-VT/3. Group H-VT/3 had a significantly lower lung injury score than groups L-VT/3 and L-VT/10.

CONCLUSION: Comparing intraoperative strategies, ventilation with high PEEP resulted in increased production of inflammatory markers. Low PEEP resulted in lower levels of inflammatory markers. High VT/low PEEP resulted in less histologic lung injury.

小儿面罩压力控制通气：压力限制是多少？

Facemask Pressure-Controlled Ventilation in Children: What Is the Pressure Limit?

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From the *SAR 3, Centre Hospitalo-Universitaire Bordeaux; †Université Victor Ségalen Bordeaux 2; and ‡SAR 1, Centre Hospitalo-Universitaire Bordeaux, Bordeaux, France. *Anesth Analg.* 2010 110:1676-1679

背景：在这项研究中，我们依据年龄寻找确定为小儿提供充足和安全通气而不带来任何胃内充气风险的吸气压力限值。

方法：前瞻性研究 100 名年龄从 1 天至 16 岁 ASA 分级 I–II 级择期行全麻的小儿。全麻诱导后，对小儿的肺进行压力控制通气。开始时吸气压力为 10 cm H₂O，然后每次增加 5 cm H₂O，至最高值 25 cm H₂O。每次增加时，胃内充气由上腹部听诊检测。记录年龄和体重。同时还记录每次增加时的吸气压力、呼吸频率、潮气量、分钟通气量和胃内充气的发生。

结果：78 明小儿发生胃内充气。1 岁以内小儿 95% 发生胃内充气，1 至 5 岁为 93%，大于 5 岁为 56% ($P = 0.001$)。发生胃内充气的压力阈值随着年龄增加而增加：小儿年龄越小，压力阈值越低。潮气量随着吸气压力增加，但当压力 > 15 cm H₂O 后，潮气量增加不明显。

结论：发生胃内充气的吸气压力阈值依据年龄而定。压力在婴儿是低的并随着年龄增加。在大多数病例中，吸气压力 ≤ 15 cm H₂O 时可获得合适的通气而不发生胃内充气。在此阈值之上增加吸气压力导致胃内充气增加而潮气量不变。

(朱兰芳译，薛张纲校)

BACKGROUND: In this study, we sought to determine the level of inspiratory pressures allowing adequate and safe ventilation without any risk of gastric insufflation (GI) in children according to age.

METHODS: One hundred children, aged 1 day to 16 years, ASA physical status I to II, scheduled for general anesthesia were studied prospectively. After induction of anesthesia, children's lungs were ventilated with pressure-controlled ventilation. The initial inspiratory pressure was 10 cm H₂O and was increased by steps of 5 cm H₂O, up to a maximum of 25 cm H₂O. At each step, GI was detected by epigastric auscultation. The

recorded data were age and weight. At each step, the inspiratory pressure, the respiratory rate, the expired tidal volume, the minute ventilation, and the occurrence of GI were also recorded.

RESULTS: GI occurred in 78 children. GI occurred in 95% of children younger than 1 year, in 93% of children aged 1 to 5 years, and 56% of children older than 5 years ($P = 0.001$). The pressure threshold at which GI occurred increased with age: the younger the child, the lower the GI pressure threshold. Tidal volume increased with inspiratory pressure, but at >15 cm H₂O, tidal volume did not change significantly.

CONCLUSION: The inspiratory pressure threshold at which GI can occur depends on age. It is low in infants and increases with age. In most cases, proper ventilation without GI was obtained with an inspiratory pressure ≤ 15 cm H₂O. Increasing inspiratory pressure above this threshold results in an increase in GI and no change in tidal volume.

对于行肝切除患者围手术期通过给予葡萄糖和胰岛素（GIN 治疗术）来维持正常血糖

Perioperative Glucose and Insulin Administration While Maintaining Normoglycemia (GIN Therapy) in Patients Undergoing Major Liver Resection

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背景：尽管高血糖是公认的心脏手术的高危因素，但是在非心脏手术围手术期血糖控制并没有引起足够重视。我们设计了这个试验用以评估高血糖对肝切除术的影响，并验证假设，即围手术期给予葡萄糖和胰岛素（GIN 治疗术）来维持正常血糖优于传统的单纯使用胰岛素控制血糖。

方法：患者随机分为 GIN 治疗组和标准治疗组（对照组）。在 GIN 组，在手术过程中给予胰岛素 $2\text{mU} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ 。在手术结束时，胰岛素用量下降到 $1\text{mU} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ ，并持续使用 24 小时。20%葡萄糖持续输注，剂量更具血糖水平进行调整，维持血糖在 3.5 至 $6.1\text{mmol} \cdot \text{L}^{-1}$ 水平（ $63\text{-}110\text{mg} \cdot \text{dL}^{-1}$ ）。在标准治疗组，术中及术后患者根据传统的浮动算法调节胰岛素用量。计算血糖的平均值及标准差。为了评估每个患者的自身差异，计算了血糖的变异系数（CV）。当发生严重低血糖，即血糖 $2.2\text{mmol} \cdot \text{L}^{-1}$ ($40\text{mg} \cdot \text{dL}^{-1}$)，记录该事件。主要结果是正常血糖水平的比例。

结果：我们研究了 52 例患者。GIN 组患者血糖水平始终维持在目标范围内。GIN 组的平均血糖水平低于标准治疗组（在手术过程中， $p < 0.01$ ；手术后， $p < 0.001$ ）。非糖尿病患者 19 例接受 GIN 治疗，在手术期间 90.1% 的血糖测量值在目标水平，在术后 77.8% 的测量值在目标水平。7 名糖尿病患者接受 GIN 治疗，术中 81.2% 的血糖值在目标水平，术后 70.5% 的血糖值在目标水平。19 名非糖尿病

患者接受标准治疗，术中 37.4% 的血糖测量值在目标水平，术后 18.3% 的测量值在目标水平。7 名糖尿病患者接受标准治疗，术中 4.3% 的血糖值达到目标，术后 2.9% 的血糖值达到目标。相比于标准治疗组，GIN 组患者的血糖值的标准差及变异系数较小，特别是在非糖尿病患者手术后血糖控制方面（SD, $P < 0.001$; CV, $P = 0.027$ ）。GIN 组没有病人在手术过程中出现严重的低血糖。1 例患者接受 GIN 治疗的患者在术后重症监护室出现低血糖，但是没有出现神经系统后遗症。

结论：GIN 疗法应用于行肝切除手术患者，能够有效控制血糖水平（临床试验，NCT00774098）。

（陈珺珺译 薛张纲校）

BACKGROUND: Although hyperglycemia is a well-recognized risk factor in the context of cardiac surgery, the relevance of perioperative glycemic control for patients undergoing major noncardiac operations has received little attention. We designed this study to assess the hyperglycemic response to liver resection, and to test the hypothesis that perioperative glucose and insulin administration while maintaining normoglycemia (GIN therapy) provides glycemic control superior to that achieved by the conventional use of insulin.

METHODS: Patients were randomly assigned to GIN therapy or standard therapy (control group). In the GIN therapy group, insulin was administered at $2 \text{ mU} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ during surgery. At the end of surgery, the insulin infusion was decreased to $1 \text{ mU} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ and continued for 24 hours. Dextrose 20% was infused at a rate adjusted to maintain blood glucose within the target range of 3.5 to $6.1 \text{ mmol} \cdot \text{L}^{-1}$ (63 – $110 \text{ mg} \cdot \text{dL}^{-1}$). Patients in the standard therapy group received a conventional insulin sliding scale during and after surgery. The mean and SD of blood glucose as well as the percentage of blood glucose values within the target range were calculated. To evaluate intrasubject variability, the coefficient of variability (CV) of blood glucose was calculated for each patient. Episodes of severe hypoglycemia, i.e., blood glucose $< 2.2 \text{ mmol} \cdot \text{L}^{-1}$ ($40 \text{ mg} \cdot \text{dL}^{-1}$), were recorded. The primary outcome was the proportion of normoglycemic measurements.

RESULTS: We studied 52 patients. The mean blood glucose value in patients receiving GIN therapy always remained within the target range. The blood glucose levels were lower in the GIN therapy group than in the standard therapy group (during surgery, $P < 0.01$; after surgery, $P < 0.001$). In nondiabetic patients receiving GIN therapy ($n = 19$), target glycemia was achieved in 90.1% of the blood glucose measurements during surgery and in 77.8% of the measurements after surgery. In diabetic patients receiving GIN therapy ($n = 7$), target glycemia was achieved in 81.2% of the blood glucose measurements during surgery and in 70.5% of the measurements after surgery. In nondiabetic patients receiving standard therapy ($n = 19$), target glycemia was achieved in 37.4% of the blood glucose measurements during surgery and in 18.3% of the measurements after surgery. In diabetic patients receiving standard therapy ($n = 7$), target glycemia was achieved in 4.3% of the blood glucose measurements during surgery and in 2.9% of the measurements after surgery. The SD and CV of blood glucose were smaller in the GIN therapy group than in the standard therapy group, especially in nondiabetic patients after surgery (SD, $P < 0.001$; CV, $P = 0.027$). No patients receiving GIN therapy experienced severe hypoglycemia during surgery. One patient receiving GIN therapy

experienced hypoglycemia in the intensive care unit after surgery without neurological sequelae.

CONCLUSIONS: GIN therapy effectively provides normoglycemia in patients undergoing liver resection (clinicaltrials.gov, NCT00774098).

超声引导下胸段椎旁阻滞：一项尸体研究

Ultrasound-Guided Thoracic Paravertebral Blockade: A Cadaveric Study

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背景：多种进路到达椎旁间隙用来胸部手术术后镇痛。由于可直接看到椎旁间隙、周围结构和针的位置，超声引导下局部麻醉有可提高成功率，并减少并发症。我们比较了尸体模型在超声引导下单次和两次穿刺行椎旁阻滞，与在一具尸体模型双椎旁注射技术封锁的超声引导下，评价对照染料扩散范围及导管位置。

方法：在 10 具新鲜尸体上，进行了 30 次椎旁注射和 20 次留置导管操作。通过线性传感器，在水平面通过超声探头确定椎旁间隙。使用面内针穿刺。使用苯胺对照染料，通过经穿刺针留置的导管，在 T6 – 7 单次注射 20ml，或双技术即 T3 – 4 和 T7 – 8 分别注射 10ml 该染料。然后解剖尸体来评估对照染料扩散的范围及导管的位置。

结果：通过超声，在每具尸体上很容易确定椎旁空间。在尸体椎旁躯体神经及交感神经周围、肋间、硬膜外间隙可以看见对照染料。20 次中有 10 次造影剂超过了 3 – 4 个节段的椎旁间隙，并且单次注射和双技术注射没有显著差异。单次注射时对照染料扩散到肋间段的范围跨越 4.5 个节段（范围 2-10），而双技术注射时该范围达到 6 个节段（范围 2-8）（P = 0.03）。单次及双技术注射时，对照染料有 40% 扩散到硬膜外间隙。导管位于椎旁间隙占 60%，椎前间隙占 20% 和硬膜外间隙占 5%。

结论：通过超声引导下使用面内针行胸段椎旁穿刺是很方便和可靠的。然而，由于椎旁间隙的差异，镇痛的效果也有差异。相比于单次注射，在不同节段行双技术穿刺由于可以沿肋间覆盖更广的范围。使用面内针穿刺时，有 40% 的导管位置并不理想。

（陈珺珺译 薛张纲校）

BACKGROUND: Multiple approaches to the paravertebral space have been described to produce analgesia after thoracic surgery. Ultrasound-guided regional anesthesia has the potential to improve efficacy and reduce complications via real-time visualization of the paravertebral space, surrounding structures, and the approaching needle. We compared a single- versus dual-injection technique for ultrasound-guided paravertebral blockade in a cadaver model, evaluating the spread of contrast dye and location of a catheter.

METHODS: Thirty paravertebral injections and 20 catheter placements were performed on 10 fresh cadavers. The paravertebral space was identified using an ultrasound probe in the transverse plane using a linear transducer. An in-plane needle approach was used. Using analine contrast dye, a single 20-mL injection at T6-7 on one side and a dual-injection technique of 10 mL at T3-4 and T7-8 on the contralateral side were performed on each cadaver, followed by insertion of a catheter through the needle. The cadaver was then dissected to evaluate spread of contrast dye and catheter location.

RESULTS: The paravertebral space was easily identified with ultrasound on each cadaver. Contrast dye was seen to surround somatic and sympathetic nerves in the paravertebral, intercostal, and epidural spaces. Contrast dye was present in 19 of 20 paravertebral spaces over 3 to 4 segments (range, 0–10) with no significant differences between single- and dual-injection techniques. Contrast dye spread more extensively across intercostal segments with 4.5 spaces (range, 2–10) covered with a single injection and 6 spaces (range, 2–8) covered with a dual-injection technique ($P = 0.03$). There was epidural spread of contrast in 40% of paravertebral injections in both single- and dual-injection techniques. Catheters were located in the paravertebral space (60%), prevertebral space (20%), and epidural space (5%).

CONCLUSIONS: Transverse in-plane ultrasound-guided needle insertion into the thoracic paravertebral space is both feasible and reliable. However, paravertebral spread of contrast is highly variable with intercostal and epidural spread likely contributing significantly to the analgesic efficacy. A dual-injection technique at separate levels seems to cover more thoracic dermatomes because of greater segmental intercostal spread (rather than paravertebral spread) than a single-injection approach. Catheters are located in nonideal positions in 40% of cases using this in-plane technique.

三维经食道超声心动图对于进行心脏手术的患者术中临床管理是一个较大的进步：一篇核心综述

Three-Dimensional Transesophageal Echocardiography Is a Major Advance for Intraoperative Clinical Management of Patients Undergoing Cardiac Surgery: A Core Review

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超声心动图是评价心脏结构和功能的关键评估工具。应用三维（3D）超声心动图显影心脏结构得到了进一步进展。本文我们呈现了这种新出现的三维超声的一些关键特征，并对其尤其在实时三维经食道超声心动图上的应用进行综述。

（胡艳译 马皓琳 李士通校）

Echocardiography is a key assessment tool for the evaluation of cardiac structure and function. The ability to image cardiac structures using 3-dimensional (3D) echocardiography is evolving. In this article, we present some of the key features of the emerging 3D technology and review its applications with an emphasis on real-time 3D transesophageal echocardiography.

缺氧患者的术中呼吸机管理和通气策略概述

A Description of Intraoperative Ventilator Management and Ventilation Strategies in Hypoxic Patients

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背景：缺氧是麻醉患者的常见表现。尽管有很多方法介绍缺氧，但尚未证明麻醉医生在面对缺氧病人时采取何种策略。研究发现肺保护性的通气策略对于急性呼吸窘迫综合征（ARDS）病人增加氧合及降低死亡率均有有利的效果。我们希望在由 PaO₂ 与吸入氧分数（FiO₂）的比值（P/F）定义的不同缺氧程度的麻醉患者中来描述通气策略。

方法：我们对 2005 年 1 月 1 日至 2009 年 7 月 31 日之间所有实施的用全身麻醉药的手术记录进行回顾，除外心外科和胸外科手术，来评估对于 P/F 比值不同的病人采取的通气设置。18 岁以上接受全身麻醉的病人在研究范围内。我们用 P/F >300、300 ≥ P/F > 200、200 ≥ P/F > 100、100 ≥ P/F 将动脉血气（ABGs）分为 4 组。我们用标准预计体重(PBW)方程计算病人每公斤 PBW 的肺通气量毫升数 (mL/kg PBW)。比较呼气末正压（PEEP）、吸气压峰值(PIPs)、FiO₂、氧饱和度 (SaO₂)和每公斤 PBW 的潮气量毫升数。

结果：从 11445 例手术病例中取得的 28706 个动脉血气分析符合入选标准，其中 19679 个 ABGs 来自 P/F >300 组，5364 个来自 300 ≥ P/F > 200 组，3101 个来自 200 ≥ P/F > 100 组以及 562 个来自 100 ≥ P/F 组。比较通气策略发现差异有统计学显著意义，但没有临床意义。潮气量的范围是 8.64 至 9.16，平均 PEEP 范围在 2.5 至 5.5 cm H₂O 之间。各组之间在平均 FiO₂ 和 PIP 上有明显差异，分别为 59% 至 91% 和 22 至 29 cm H₂O。

结论：对于 P/F 比值不同的患者，在 mL/kg PBW 和 PEEP 上采用相似的通气策略。本研究的结果提示了麻醉医生通常使用更高的 FiO₂ 和 PIP 来治疗缺氧。平均 FiO₂ 和 PIP 显著增大，其增大程度与 P/F 比相关。

（刘伍翻译，马皓琳、李士通校正）

BACKGROUND: Hypoxia is a common finding in the anesthetized patient. Although there are a variety of methods to address hypoxia, it is not well documented what strategies are used by anesthesiologists when faced with a hypoxic patient. Studies have identified that lung protective ventilation strategies have beneficial effects in both oxygenation and mortality in acute respiratory distress syndrome. We sought to describe the ventilation strategies in anesthetized patients with varying degrees of hypoxemia as defined by the Pao₂ to fraction of inspired oxygen (FiO₂) (P/F) ratio.

METHODS: We conducted a review of all operations performed between January 1, 2005, and July 31, 2009, using a general anesthetic, excluding cardiac and thoracic procedures, to assess the ventilation settings that were used in patients with different P/F ratios. Patients older than 18 years who received a general anesthetic were included. Four cohorts of arterial blood gases (ABGs) were identified with P/F >300, 300 ≥ P/F > 200,

$200 \geq P/F > 100$, $100 \geq P/F$. Using the standard predicted body weight (PBW) equation, we calculated the milliliters per kilogram (mL/kg PBW) with which the patient's lungs were being ventilated. Positive end-expiratory pressure (PEEP), peak inspiratory pressures (PIPs), Fio₂, oxygen saturation (Sao₂), and tidal volume in mL/kg PBW were compared.

RESULTS: A total of 28,706 ABGs from 11,445 operative cases met criteria for inclusion. There were 19,679 ABGs from the $P/F > 300$ group, 5364 ABGs from the $300 \geq P/F > 200$ group, 3101 ABGs from the $200 \geq P/F > 100$ group, and 562 ABGs from the $100 \geq P/F$ group identified. A comparison of ventilation strategies found statistical significance but clinically irrelevant differences. Tidal volumes ranged between 8.64 and 9.16 and the average PEEP varied from 2.5 to 5.5 cm H₂O. There were substantial differences in the average Fio₂ and PIP among the groups, 59% to 91% and 22 to 29 cm H₂O, respectively.

CONCLUSION: Similar ventilation strategies in mL/kg PBW and PEEP were used among patients regardless of P/F ratio. The results of this study suggest that anesthesiologists, in general, are treating hypoxemia with higher Fio₂ and PIP. The average Fio₂ and PIP were significantly escalated depending on the P/F ratio.

围手术期对癌症手术后复发的作用

The Role of the Perioperative Period in Recurrence After Cancer Surgery

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有许多基础科学数据支持了这个假设，即手术应激反应增加了癌症手术中和术后癌症传播和转移的可能性。因此，癌症病人的麻醉管理可能潜在地影响长期的预后。临床前数据表明有益措施包括诱导药物的选择（如丙泊酚）、尽量减少挥发性麻醉药的使用及全身阿片类药物和环氧合酶抑制剂的联合使用。回顾性的临床试验表明，加用区域麻醉可能降低癌症手术后的复发。其他因素如输血、温度调节和他汀类药物也可能影响长期预后。

（滕凌雅 译 马皓琳 李士通 校）

A wealth of basic science data supports the hypothesis that the surgical stress response increases the likelihood of cancer dissemination and metastasis during and after cancer surgery. Anesthetic management of the cancer patient, therefore, could potentially influence long-term outcome. Preclinical data suggest that beneficial approaches might include selection of induction drugs such as propofol, minimizing the use of volatile anesthetics, and coadministration of cyclooxygenase antagonists with systemic opioids. Retrospective clinical trials suggest that the addition of regional anesthesia might decrease recurrence after cancer surgery. Other factors such as blood transfusion, temperature regulation, and statin administration may also affect long-term outcome.

呼气末正压通气对麻醉状态下成人颈内静脉横截面积的影响

Effects of Positive End-Expiratory Pressure on Internal Jugular Vein Cross-Sectional Area in Anesthetized Adults

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我们在 45 名 ASA 体格状态 I 级和 II 级成人中，验证了呼气末正压通气（PEEP）能否增加右侧颈内静脉（RIJV）横截面积（CSA）。对所有病人进行标准化的静脉液体推注、全麻诱导、气管插管和机械通气。我们使用超声评估不使用 PEEP（对照）和使用 PEEP（10 cm H₂O）两种情况下在水平仰卧位右颈内静脉的横截面积。附加 PEEP 增加了 RIJV CSA $0.42 \pm 0.41 \text{ cm}^2$ （均值 \pm 标准差，中位数 0.34 cm^2 ， $P < 0.001$ ），这些数据说明横截面积平均增加了 41%。

（王海涛 译 马皓琳 李士通 校）

We tested whether positive end-expiratory pressure (PEEP) increases right internal jugular vein (RIJV) cross-sectional area (CSA) in 45 ASA physical status I and II adults. All patients received a standardized IV fluid bolus, induction of general anesthesia, tracheal intubation, and mechanical ventilation. We evaluated the CSA of the RIJV using ultrasound without PEEP (control) and with PEEP (10 cm H₂O) in the supine, level position. Addition of PEEP increased RIJV CSA $0.42 \pm 0.41 \text{ cm}^2$ (mean \pm SD, median 0.34 cm^2 , $P < 0.001$), which represented a 41% mean increase in CSA.

麻醉医师将如何上麻醉？神经外科操作方法的趋势

What Will Anesthesiologists Be Anesthetizing? Trends in Neurosurgical Procedure Usage

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背景：为了预测神经外科麻醉实践的未来变化，我们检验了经常进行手术操作的神经外科领域内全国性的趋势。

方法：我们用全国住院病人的样本，对 1993 至 2007 年间近 20% 的美国医院做随机抽样。基于国际疾病分类法第 9 版临床修订 (ICD-9-CM) 的操作码，建立了手术神经外科的八大分类。我们列表显示了总容量、平均住院时间和住院病人死亡率，计算了整个研究阶段、最近五年和最近两年的生长率。我们检验了 1993 到 2007 年最常见 ICD-9-CM 操作码分类中每个神经外科种类的每年的容量。

结果：颅内血管内操作在整个研究期间（32%）、最近4年（29%）、最近2年（12%）有最高的复合年生长率。颅骨切开的血管手术在整个期间减少（-4.2%）。脊柱融合术在研究期间绝对增加最大（从1993年的54,000到2007年的350,000）。除颅骨切开血管手术以外的所有分类在整个研究阶段住院时间缩短，伴随复合年生长率从-1.2%（心室和膜的分流）到-6.6%（深度脑刺激）。颅内血管内操作的住院时间的生长率较血管手术在最近2年（14%比1.0%）和5年里（5.6%比1.5%）均明显提高。

结论：手术神经外科中最高容量的趋势是脊柱融合术（以每年近12,000例的速度增长）、肿瘤或其他目的的颅骨切开术（以每年近2,700例的速度增长），但在分流术中则减少（以每年近3,000例的速度减少）。这些数据提示颅内血管内治疗仍然相对罕见，但正在呈指数级增长，且住院时间正在增加，但住院病人死亡率在减少。本研究的结论受限于ICD-9-CM操作码不严格的性质、我们使用的分类方案和全国住院病人样本的抽样方法。

（唐李隽 译 马皓琳 李士通 校）

BACKGROUND: To anticipate future changes to the practice of neuroanesthesia, we examined the nationwide trends in frequently performed operative neurosurgery.

METHODS: We used the Nationwide Inpatient Sample, a random sampling of approximately 20% of United States hospitals from 1993 to 2007. Eight categories of operative neurosurgery were developed, based on procedure codes from the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM). We tabulated total volume, mean length of stay, and inhospital mortality and calculated growth rates over the entire period, the most recent 5-year period, and the most recent 2-year period. We examined annual volumes from 1993 to 2007 for each neurosurgical category for the most common ICD-9-CM procedure code within each category.

RESULTS: Intracranial endovascular procedures had the highest compound annual growth rate over the entire study period (32%), the most recent 4 years (29%), and the most recent 2 years (12%). Craniotomy for vascular surgery decreased over the entire period (-4.2%). Spinal fusion had the largest absolute increase over the study period (from 54,000 in 1993 to 350,000 in 2007). All categories except craniotomy for vascular surgery had decreased length of stay across the study period, with compound annual growth rates of -1.2% (ventricular and thecal shunt) to -6.6% (deep brain stimulation). Intracranial endovascular procedures had a much higher growth rate of length of stay than vascular surgery over the most recent 2-year (14% vs 1.0%) and 5-year periods (5.6% vs 1.5%).

CONCLUSIONS: The highest volume trends in operative neurosurgery are for spinal fusion (increasing at a rate of approximately 12,000 procedures/y), craniotomy for tumors and other purposes (increasing at a rate of approximately 2,700 procedures/y), and a decrease in shunts (decreasing at a rate of approximately 3,000 per year). The data suggest that intracranial endovascular treatment remains relatively rare, but it is growing exponentially, and lengths of stay are increasing, whereas inhospital deaths are decreasing. The conclusions of this study are limited by the imprecise nature of the ICD-9-CM procedure codes, the categorization scheme we used, and by the sampling methods of the National Inpatient Sample.

在行腋路臂丛神经阻滞时，肌皮神经是否确实在喙肱肌内走行？一项超声学研究

Is the Musculocutaneous Nerve Really in the Coracobrachialis Muscle When Performing an Axillary Block? An Ultrasound Study

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背景：在描述腋路臂丛阻滞的参考教科书里，尺神经、桡神经和正中神经位于包绕腋动脉的同一个鞘内。相反，肌皮神经被描述为位于鞘外的喙肱肌内。在最近的一项关于超声引导腋路臂丛阻滞的病例报道中，提出肌皮神经伴行正中神经而位于该肌肉之外。本研究评价了在腋路臂丛阻滞中不典型的肌皮神经走行的发生率。

方法：所有入选的病人在 2006 年 12 月至 2008 年 12 月期间行超声引导下的腋路臂丛神经阻滞。在进针之前，用超声定位肌皮神经、正中神经、尺神经和桡神经。用神经刺激器确定非典型的神经定位。在注射局麻药后，观察肌皮神经和正中神经的解剖关系。

结果：在分析的 387 例阻滞麻醉中，肌皮神经位于喙肱肌外的有 83 例（占 22%）。其中有 22 例接近腋动脉（占 6%）。61 例肌皮神经和正中神经表现出共同的神经结构（占 16%）。在注射局麻药后，61 例中有 16 例肌皮神经和正中神经表现出共同的主干（占 26%），37 例表现出肌皮神经和正中神经分离（占 61%），正中神经分出两根（包括或不包括分离的肌皮神经）的有 6 例（占 10%）。2 例不能确定（占 3%）。伴有非典型肌皮神经定位的 83 名患者的尺神经位置与那些伴有典型的肌皮神经定位的患者不同。

结论：在腋路臂丛神经阻滞时，有 1/5 的患者的肌皮神经位于喙肱肌外。在行腋路阻滞时，应当将这种非典型定位考虑进去，以避免反复的肌肉内穿刺。

(黄丽娜 译 马皓琳 李士通 校)

BACKGROUND: In reference textbooks describing axillary block, the ulnar, radial, and median nerves are located in a common sheath surrounding the axillary artery. In contrast, the musculocutaneous nerve is described as lying outside this sheath in the coracobrachialis muscle. In a recent case report of ultrasound-guided axillary block, the musculocutaneous nerve was joined to the median nerve outside this muscle. Our study evaluated the prevalence of atypical musculocutaneous nerve localizations during axillary block.

METHODS: All patients undergoing ultrasound-guided axillary block were included from December 2006 to December 2008. Before needle insertion, musculocutaneous, median, ulnar, and radial nerves were localized using ultrasound. Nerve stimulation confirmed atypical nerve localization. After injection of local anesthetics, musculocutaneous and median nerve anatomical relationships were observed.

RESULTS: The musculocutaneous nerve was outside the coracobrachialis muscle in 83 of the 387 analyzed blocks (22%). It was near the axillary artery in 22 cases (6%). The musculocutaneous and median nerves appeared as a common neural structure in 61 cases (16%). After local anesthetic injection, a common trunk persisted in 16 of 61 cases (26%), musculocutaneous and median nerves separated in 37 cases (61%), and 2 roots of the median nerve appeared (with or without a separated musculocutaneous nerve) in 6 cases (10%). Two cases (3%) remained undefined. Ulnar nerve location of the 83 patients with atypical musculocutaneous nerve position differed from the ones with a classical musculocutaneous nerve localization.

CONCLUSIONS: During axillary block, the musculocutaneous nerve is outside the coracobrachialis muscle in 1 of 5 patients. This atypical location should be considered during performance of axillary blockade to avoid repeated IM puncture.

神经刺激器触发的运动反应可以预测一次成功的锁骨上臂丛神经阻滞

Nerve Stimulator Evoked Motor Response Predicting a Successful Supraclavicular Brachial Plexus Block

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背景：我们检测了神经刺激诱发的不同的运动反应预测锁骨上臂丛神经阻滞的成功率。

方法：本次多中心观察研究包括了 377 名病人。记录每次阻滞中，0.25mA 的电流持续 2 毫秒时诱发的运动反应。注射 0.25% 的布比卡因 30 mL，观察阻滞是否成功。

结果：共 317 名病人麻醉实施成功(84.1%)。当诱发的运动反应为病人同时屈曲第三和第四根指或者屈曲所有的四个手指（第二到第五根手指）无论有没有拇指的对掌，成功率均是 100%。

结论：第三和第四根手指同时屈曲（无论有没有其他手指发生屈曲）与锁骨上臂丛神经阻滞最高的成功率有非常大的联系。

（姜旭晖译，马皓琳，李士通校）

BACKGROUND: We examined the success rate of supraclavicular brachial plexus block after the different evoked motor responses to nerve stimulation.

METHODS: This multicenter observational study included 377 patients. For each block, the evoked motor response elicited at 0.25 mA for 2 milliseconds was recorded, 30 mL bupivacaine 0.25% was injected, and the block was observed for success or failure.

RESULTS: Complete anesthesia occurred in 317 cases (84.1%). The success rate was 100% when the evoked motor response was simultaneous flexion of the third and fourth digits or flexion of all 4 digits (digits 2–5) with or without thumb opposition.

CONCLUSION: Simultaneous flexion of the third and fourth digits with or without other digits is associated with the highest success rate of supraclavicular brachial plexus block.

**成年心脏手术病人的血浆中性粒细胞明胶酶相关脂质运载蛋白和术后急性肾损伤
Plasma Neutrophil Gelatinase-Associated Lipocalin and Acute Postoperative
Kidney Injury in Adult Cardiac Surgical Patients.**

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背景：冠状动脉旁路移植术（CABG）后急性肾损伤（AKI）增加术后并发症发生率和死亡率。作者猜测：在心肺转流（CPB）后即刻测定的血浆中性粒细胞明胶酶相关脂质运载蛋白（NGAL），其含量增加可预测 CABG 术后的 AKI。

方法：在一项回顾性观察研究中，作者使用多元 logistic 回归分析 879 名 CABG 术后患者，考察 CPB 后测定血浆 NGAL 对预测 AKI（急性肾损伤定义为血肌酐值较术前增加 50% 以上）发生风险的价值。分析受试者工作特征曲线（ROC）的曲线下面积（AUC）来评估术后血浆 NGAL 水平对 AKI 预测的敏感度、特异性和界值。

结果：75 名患者（8.6%）发生术后 AKI。那些继发 AKI 患者 CPB 后的血浆 NGAL 水平要高于那些非继发者（AKI 患者: 268.8 ng/mL [207.5–459.5 ng/mL], 中位数 [四分位间距], vs 非 AKI 患者: 238.4 ng/mL [172.0–319.1 ng/mL]; $P < 0.001$ ），且在术后四天维持较高水平。理想的血浆 NGAL 界值在 CPB 后即刻为 353.5 ng/mL，此界值有 38.7% 敏感度、81.5% 特异性，对 AKI 的阳性预测值达到 16.3%。在我们多元回归模型中，CPB 后血浆 NGAL 水平大于 353.5 ng/mL 与术后 AKI 发生有独立相关性（相对危险度：2.3; 95% 可信区间：1.5–6.5; $P = 0.002$ ）。

结论：在进行 CABG 术的成人患者中，尽管 CPB 后早期血浆 NGAL 水平增加与术后 AKI 发生相关，但此方法的敏感度较低。因此，在此类人群，早期血浆 NGAL 水平预测 AKI 价值有限。

（於章杰 译 陈杰 校）

BACKGROUND: Acute kidney injury (AKI) after coronary artery bypass graft (CABG) surgery is associated with increased postoperative morbidity and mortality. We hypothesized that increased plasma neutrophil gelatinase-associated lipocalin (NGAL) measured immediately after separating from cardiopulmonary bypass (CPB) would predict AKI after CABG surgery.

METHODS: In a retrospective observational study, we examined the value of plasma NGAL measured after CPB for predicting the risk of developing AKI (defined as a $\geq 50\%$ increase in serum creatinine from preoperative levels) in 879 patients after CABG surgery using multivariable logistic regression. Area under the curve of receiver operating characteristic curves was analyzed to assess sensitivities, specificities, and cutoff points for postoperative plasma NGAL levels to predict AKI.

RESULTS: Seventy-five patients (8.6%) developed postoperative AKI. Plasma NGAL levels measured after CPB were higher in patients who subsequently developed AKI than in those who did not (AKI: 268.8 ng/mL [207.5–459.5 ng/mL], median [interquartile range], vs no AKI: 238.4 ng/mL [172.0–319.1 ng/mL]; $P < 0.001$) and remained higher through postoperative day 4. An optimal serum plasma NGAL cutoff of 353.5 ng/mL at the post-CPB time point had a sensitivity of 38.7%, specificity of 81.5%, and a positive predictive value of 16.3% for predicting AKI. In our multivariate regression model, post-CPB plasma NGAL levels >353.5 ng/mL were independently associated with postoperative AKI (odds ratio, 2.3; 95% confidence interval, 1.5–6.5; $P = 0.002$).

CONCLUSION: An early increase of post-CPB plasma NGAL is associated with AKI in adult patients undergoing CABG surgery, although the sensitivity is low. Therefore, assessing early plasma NGAL alone has limited utility for predicting AKI in this patient population.

全麻药的突触前作用是大鼠海马 CA1 区的突触传导频率依赖性改变的原因

Presynaptic Actions of General Anesthetics Are Responsible for Frequency-Dependent Modification of Synaptic Transmission in the Rat Hippocampal CA1.

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背景:在临床麻醉中,术中强烈的外科应激偶尔可引起非预期的轻度麻醉效果。为了验证这个假说,即神经传入状态可以通过中枢神经系统的突触前变化而改变全身麻醉药效应,作者调查全麻状态下刺激频率改变大鼠海马突触传递的机制。

方法:对 Schaffer 侧枝-连合纤维行顺向传导刺激(测试脉冲),来诱发海马 CA1 区锥体神经元的场群峰电位(PSs)。第二个放置在海马槽区域的刺激电极是用来活化对 CA1 区域周期性抑制(预脉冲)。100–200 Hz 连续预脉冲刺激可激活抑制性中间神经元突触前末梢神经递质(γ -氨基丁酸)的释放和耗竭。

结果:使用预脉冲活化抑制性中间神经元后,静脉麻醉药(硫喷妥钠和戊巴比妥)和吸入麻醉药(七氟醚和异氟醚)减弱了测试脉冲引起的群体峰电位波幅。静脉麻醉药而不是吸入麻醉药产生刺激频率和使用依赖性的测试群峰电位的周期性抑制。无论是 GABA A 型激动剂还是 GABA 再摄取抑制剂都不能产生频率依赖的改变。连续的预脉冲方案揭示静脉麻醉药,而不是吸入麻醉药能加强 GABA 从突触前末梢的释放。

结论：静脉麻醉药，而不是吸入麻醉药，加强含有 GABA 囊泡从突触前末梢释放。使用高频刺激来耗竭活化的 GABA 池能在静脉麻醉药的存在下产生频率依赖和使用依赖的周期性抑制。刺激频率依赖的突触传导改变可能是全麻下静脉麻醉药应用后体动或镇静失败的原因。

(於章杰 译 陈杰 校)

BACKGROUND: In clinical anesthesia, robust surgical stress occasionally causes unintended light anesthesia during operation. To test the hypothesis that neural input condition could modify actions of general anesthetics as a result of presynaptic alteration in the central nervous system, we investigated the mechanisms by which the stimulus frequency modifies synaptic transmission of the rat hippocampus in the presence of general anesthetics.

METHODS: Field population spikes (PSs) of CA1 pyramidal neurons were elicited using orthodromic stimulation of Schaffer collateral-commissural fibers (test-pulse). A second stimulating electrode was placed in the region of the alveus hippocampi to activate recurrent inhibition of area CA1 (pre-pulse). The pre-pulses were applied as train stimuli (100–200 Hz) to activate release and then deplete the neurotransmitter (γ -aminobutyric acid [GABA]) at presynaptic terminals of inhibitory interneurons.

RESULTS: After the activation of inhibitory interneurons with pre-pulses, both IV (thiopental and pentobarbital) and volatile (sevoflurane and isoflurane) anesthetics attenuated the PS amplitudes elicited with test-pulses (test-PS). The IV anesthetics, but not the volatile drugs, produced stimulus frequency- and use-dependent recurrent inhibition of test-PSs. Neither a GABA type A agonist nor a GABA uptake inhibitor produced frequency-dependent modification. The pre-pulse train protocol revealed that IV anesthetics, but not volatile drugs, can enhance GABA release from presynaptic terminals.

CONCLUSIONS: IV anesthetics, but not volatile drugs, enhance the discharge of a readily releasable pool of GABA vesicles from presynaptic terminals. Depletion of an active pool of GABA after high-frequency stimuli would produce frequency- and use-dependent recurrent inhibition in the presence of IV anesthetics. The stimulus frequency-dependent modification of synaptic transmission might be responsible for the unsuccessful immobilization or hypnosis during general anesthesia after IV anesthetic administration.

乳房切除术中镇痛药是否影响乳房癌的复发？一项回顾性分析

Do Intraoperative Analgesics Influence Breast Cancer Recurrence After Mastectomy? A Retrospective Analysis.

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背景：术中镇痛药是否影响术后癌症复发尚不清楚。一些调查表明，阿片类药物可能促使癌症复发，区域镇痛和非甾体抗炎药可能改善癌症预后。作者回顾性分析了一系列乳腺癌手术患者。

方法：本回顾性研究包括 327 例接受了乳房切除及腋窝淋巴结清扫术的乳癌患者。主要目的是比较使用不同术中镇痛药患者的癌症复发率。

结果：不论镇痛药的管理，围术期特点、癌症的预后因素和手术长度都是类似的。单因素和多因素分析显示术前给与酮咯酸癌症的复发率较低 ($P=0.019$)。其它镇痛药（舒芬太尼、氯胺酮和可乐定）在作者的研究中与显著降低癌症复发率无关。

结论：本回顾性分析表明与其它镇痛药相比，酮咯酸的术中应用可降低乳腺癌复发的风险。

(唐颖 译 陈杰 校)

BACKGROUND: Whether intraoperative analgesics have an impact on postoperative cancer recurrence is unknown. Some investigations suggest that the opioids could favor relapse and that regional analgesia and nonsteroidal antiinflammatory drugs could improve cancer prognosis. We retrospectively reviewed our series of breast cancer surgery patients.

METHODS: This retrospective study included 327 consecutive women who underwent mastectomy with axillary dissection for breast cancer. The main objective was to compare the incidence of cancer recurrence among patients who received different analgesics during surgery.

RESULTS: Perioperative characteristics, cancer prognostic factors, and the length of surgery were comparable regardless of the analgesics administered. Univariate and multivariate analyses showed a lower cancer recurrence rate when ketorolac was given before surgery ($P = 0.019$). Other analgesics (sufentanil, ketamine, and clonidine) were not associated with a significant reduction in cancer recurrence rates in our series.

CONCLUSION: This retrospective analysis suggests that intraoperative administration of ketorolac decreases the risk of breast cancer relapse compared with other analgesics.

全氟化碳部分液体通气中的通气血流比值

Ventilation-Perfusion Ratio in Perflubron During Partial Liquid Ventilation

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背景：氟-19 标记的功能性磁共振成像 (fMRI) 能够映射以全氟化碳为介质的肺泡腔内的氧分压。理论上来说, fMRI 检测肺泡氧分压可结合 Fick 原理, 即通气带来的氧气的吸入及灌注带来的氧气的运输之间的质量平衡, 为了量化肺区域的通气血流比, 测量混合静脉血液和氧气的吸入氧分数, 这些在整个肺部都是相同的。此外, 局部的呼末氧浓度和毛细血管氧含量, 它们在不同的肺区域是不一致的, 可以使用 fMRI 检测的氧分压来计算。作者研究了使用数值模拟技术, 在以全氟化碳为介质的部分液体通气中用它来量化局部的 VA/Q 比值。

方法：数值模拟方法用来分析 VA/Q 计算的敏感性, 并与 Rizi 等人在 2004 年 (*Magn Reson Med* 2004;52:65-72) 提出的另一种方法相比较。该方法应用在进行液体通气的 7 只麻醉的猪的实验中。肺泡氧分压以 19-氟标记全氟化碳显示。呼吸气体、动脉及混合静脉血液样本被提取用来量化氧分压和含量。使用 Fick 原理, 估计局部通气血流比值。并且检验 VA/Q 的影响因素如重力 (下肺或者上肺)、全氟化碳的浓度 (全氟化碳 10 vs 20 mL/kg) 和吸入氧浓度 (0.4-1.0)。

结果：在数值模拟中, 证明了 Fick 原理在 VA/Q 比值从 0.02 至 2.5 的范围内是适用的。这个比值在 Rizi 等人发表的方法相一致。在实验设置中, 低平均 VA/Q 值在全氟化肺中出现 (可信区间为 0.08-0.29, 全氟化碳 20 mL/kg)。在这个剂量下, 上肺的 VA/Q 比值 (CI 0.18-0.39) 高于下肺 (CI 0.06-0.16; $P = 0.006$)。对于全氟化碳浓度或者吸入氧浓度的依赖程度不同, 但均较小。

结论：研究表明, 在全氟化肺中使用 fMRI 从局部氧分压中推断 VA/Q 是可行的。低 VA/Q 比值说明氧的运输在全氟化肺中受到了显著抑制。

(张蕾 译 陈杰 校)

BACKGROUND: Functional magnetic resonance imaging (fMRI) of fluorine-19 allows for the mapping of oxygen partial pressure within perfluorocarbons in the alveolar space (PAO_2). Theoretically, fMRI-detected PAO_2 can be combined with the Fick principle approach, i.e., a mass balance of oxygen uptake by ventilation and delivery by perfusion, to quantify the ventilation-perfusion ratio (VA/Q) of a lung region: The mixed venous blood and the inspiratory oxygen fraction, which are equal for all lung regions, are measured. In addition, the local expiratory oxygen fraction and the end capillary oxygen content, both of which may differ between the lung regions, are calculated using the fMRI-detected PAO_2 . We investigated this approach by numerical simulations and applied it to quantify local VA/Q in the perfluorocarbons during partial liquid ventilation.

METHODS: Numerical simulations were performed to analyze the sensitivity of the VA/Q calculation and to compare this approach with another one proposed by Rizi et al. in 2004 (*Magn Reson Med* 2004;52:65-72). Experimentally, the method was used during partial liquid ventilation in 7 anesthetized pigs. The PAO_2 distribution in intraalveolar perflubron was measured by fluorine-19 MRI. Respiratory gas fractions together with arterial and mixed venous blood samples were taken to quantify oxygen partial pressure and content. Using the Fick principle, the local VA/Q was estimated. The impact of gravity (nondependent versus dependent) of perflubron dose (10 vs 20 mL/kg body weight) and of inspired oxygen fraction (FIO_2) (0.4-1.0) on VA/Q was examined.

RESULTS: In numerical simulations, the Fick principle proved to be appropriate over the VA/Q range from 0.02 to 2.5. VA/Q values were in acceptable agreement with the method published by Rizi et al. In the experimental setting, low mean VA/Q values were found in perflubron (confidence interval [CI] 0.08-0.29 with 20 mL/kg perflubron). At this dose, VA/Q in the nondependent lung was higher (CI 0.18-0.39) than in the dependent lung regions (CI 0.06-0.16; $P = 0.006$; Student *t* test). Differences depending on FIO_2 or perflubron dose were, however, small.

CONCLUSION: The results show that derivation of VA/Q from local PO₂ measurements using fMRI in perflubron is feasible. The low detected VA/Q suggests that oxygen transport into the perflubron-filled alveolar space is significantly restrained.

新生儿高流量体外循环心脏手术后癫痫发作脑电图

Electroencephalographic Seizures After Neonatal Cardiac Surgery with High-Flow Cardiopulmonary Bypass

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背景：有报道称新生儿体外循环心脏手术后 14% 到 20% 出现癫痫发作脑电图。癫痫发作脑电图和长时间深低温停循环有关，导致不利长期的神经发展。在新生儿心脏手术前到术后 72 小时，作者用高流量体外循环和脑氧监测行视频/脑电图监测，以确定发生率，严重程度，和与癫痫发作脑电图的相关因素。

方法：体外循环设定 150 mL/kg/min 流量，调整 pH 稳定，红细胞压积>30%，和高流量顺行脑灌注，监测局部脑氧饱和度，并有局部脑氧饱和度<50%的治疗方案，脑电图评估癫痫发作。

结果：68 例患儿（36 个单心室和 32 个双心室），共监测了 4824 小时。单心室组总咪唑安定的剂量是 2.4 mg/kg (1.0–2.7 mg/kg)，双心室组为 1.3 mg/kg (1.0–2.7 mg/kg) ($P = 0.009$)。一例单心室病人术后有 2 次短暂癫痫发作脑电图(1.5% 发生率; 95% 可信区间: 0.3%–7.9%)。单心室组病人术中脑氧饱和度下降的发生率高(脑氧饱和度 <45% for >240 minutes) (18 个单心室组 vs 0 个双心室组病人, $P < 0.001$)。这种差异并不影响癫痫发作脑电图的发生和其他脑电图特征。

结论：发作脑电图在新生儿经历高流量体外循环手术中并不多见。脑氧饱和度的下降并不影响脑电图癫痫样发作的发生。然而，苯二氮卓类药可能在抑制术后因脑低氧血症而导致癫痫发作脑电图中起作用。用这种麻醉药和手术方案，这类人群中癫痫发作脑电图是急性神经损伤的一个较差的替代指标。

(陈灵科 译 陈杰 校)

BACKGROUND: Postoperative electroencephalographic (EEG) seizures are reported to occur in 14% to 20% of neonates after cardiac surgery with cardiopulmonary bypass (CPB). EEG seizures are associated with prolonged deep hypothermic circulatory arrest and with adverse long-term neurodevelopmental outcomes. We performed video/EEG monitoring before and for 72 hours after neonatal cardiac surgery, using a high-flow CPB

protocol and cerebral oxygenation monitoring, to ascertain incidence, severity, and factors associated with EEG seizures.

METHODS: The CPB protocol included 150 mL/kg/min flows, pH stat management, hematocrit >30%, and high-flow antegrade cerebral perfusion. Regional cerebral oxygen saturation (rSO₂) was monitored, with a treatment protocol for rSO₂ <50%. EEG was assessed for seizures.

RESULTS: Sixty-eight patients (36 single ventricle [SV] and 32 2-ventricle [2V]) were monitored for a total of 4824 hours. The total midazolam dose was 2.4 mg/kg (1.5–7.3 mg/kg) (median, 25th–75th percentile) for the SV group and 1.3 mg/kg (1.0–2.7 mg/kg) for the 2V group ($P = 0.009$). One SV patient experienced 2 brief EEG seizures postoperatively (1.5% incidence; 95% confidence interval: 0.3%–7.9%). The SV patients experienced a significant incidence of cerebral desaturation (rSO₂ <45% for >240 minutes total) perioperatively (18 of 36 SV vs 0 of 32 2V patients, $P < 0.001$). This difference did not affect electrographic seizure occurrence or other EEG characteristics.

CONCLUSIONS: EEG seizures are infrequent in neonates undergoing surgery with high-flow CPB. Cerebral desaturation did not affect EEG seizure occurrence; however, benzodiazepines may play a role in suppressing postoperative seizures caused by cerebral hypoxemia in this patient population. Using this anesthetic and surgical protocol, EEG seizures are a poor surrogate marker for acute neurological injury in this population.

腰大肌肌沟阻滞和周围神经置管穿刺前超声成像以预测横突及腰丛深度：一项前瞻性，观察性研究

Prepuncture Ultrasound Imaging to Predict Transverse Process and Lumbar Plexus Depth for Psoas Compartment Block and Perineural Catheter Insertion: A Prospective, Observational Study

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背景：所有广泛使用的腰大肌肌沟阻滞或留置导管技术受到一相同的限制：体表进针点并不能精确提示腰丛深度，如果没有被横突或者腰丛所拦截，操作者就只能猜测何时可以停止穿刺针的前进。作者评估了超声在进针前估测横突的深度的精确度，以及腰大肌肌沟神经阻滞和周围神经置管所需的实际的进针深度。

方法：在进针前，应用超声测量脊柱线正前方横突的深度。若横突没有位于脊柱线的正前方，则在此线略朝尾端即可找到突起。超声探头应保持在旁矢状平面，并与皮肤垂直。随后，移开超声探头，用一根与神经刺激仪相连的绝缘针定位于旁矢状平面，并标记横突（如果可碰到）以及腰丛的深度。然后再予置管。

结果：入选的 53 个病例中，50 例（占 94%）超声所测到的横突深度中位数为 5.0cm（椎体间距 4.5-5.5cm，范围 3.5-7.5cm）。其中 27 例（占 54%）横突定位于脊柱线正前方，在所有的病例中，横突被穿刺针触到（实际深度）与预计深度的（误差）中位数为 0.5cm(0.0–1.0 cm; 0.0–1.0 cm)。在横突被超声定位的 50 个病例中，实际所测得的腰丛深度中位数为 7.5cm (7.0–8.5 cm; 5.0–9.5 cm),并超过超声所提示的横突深度的中位数为 2.5 cm (2.0–3.0 cm; 0.2–4.0 cm)。脊柱线中外三分之二

与正中线以及经过髂后上棘的外侧线的交点太靠外侧，以致 50% 病例不能使穿刺针与横突所接触。但是，所有病例中探头若朝正中线 0.75cm 则可使横突显现。

结论：对于腰大肌肌沟阻滞或置管，超声成像下穿刺可精确测量横突深度使误差在 1cm 以内，如果腰丛与横突间距在 3cm 以内，超声可提供误差 1cm 以内的腰丛深度预计值。

(邹巧群 译 陈杰 校)

BACKGROUND: All widely used psoas compartment block/catheter techniques have a common limitation: external landmarks do not accurately predict lumbar plexus depth, leaving practitioners to “guess” at what depth to stop advancing the placement needle when neither transverse process nor lumbar plexus is intercepted. We assessed the accuracy of ultrasound in estimating transverse process depth before needle insertion and prediction of actual needle-to-plexus intercept depth for psoas compartment nerve blocks and perineural catheter insertion.

METHODS: Before needle insertion, ultrasound was used to estimate the depth of the transverse process lying directly anterior to the intercrestal line. If a transverse process was not directly anterior to the intercrestal line, then the process immediately caudad to the line was imaged. The ultrasound transducer remained in the parasagittal plane, perpendicular to the skin. After this measurement, the transducer was removed, an insulated needle connected to a nerve stimulator inserted in the parasagittal plane, and the depth of both the transverse process (if contacted) and lumbar plexus noted. A perineural catheter was subsequently inserted.

RESULTS: Of 53 enrolled subjects, in 50 cases (94%), the transverse processes were identified by ultrasound at a median (interquartile; range) depth of 5.0 cm (4.5–5.5 cm; 3.5–7.5 cm). In 27 subjects (54%), a transverse process was positioned directly anterior to the intercrestal line, and in all of these subjects, the transverse process was intercepted with the block needle a median of 0.5 cm (0.0–1.0 cm; 0.0–1.0 cm) within the predicted depth. In all 50 subjects in whom the transverse processes were identified by ultrasound, the actual lumbar plexus depth measured with the needle was a median of 7.5 cm (7.0–8.5 cm; 5.0–9.5 cm), and the plexus depth was a median of 2.5 cm (2.0–3.0 cm; 0.2–4.0 cm) past the estimated transverse process depth by ultrasound. By ultrasound, the intersection of the middle and lateral thirds of the intercrestal line between the midline and a parallel line through the posterosuperior iliac spine was too lateral to permit needle–transverse process contact in 50% of the subjects. However, moving the transducer 0.75 cm toward the midline allowed for transverse process imaging in all subjects.

CONCLUSIONS: For psoas compartment blocks/catheters, prepuncture ultrasound imaging accurately predicts transverse process depth to within 1 cm, and if the lumbar plexus is estimated to be within 3 cm of the transverse process, ultrasound allows prediction of maximal lumbar plexus depth to within 1 cm.

简要报告：椎旁神经阻滞：一项系统性回顾

Brief Reports: Paravertebral Block for Anesthesia: A Systematic Review

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背景：本文目的是通过回顾同类文献评价胸部和腰部椎旁神经阻滞在外科手术麻醉中应用的安全性和有效性。并与全身麻醉或者其他局部麻醉技术相比较。

方法：搜索 2008 年 5 月以来的资料库信息，包括联机医学文献分析和检索系统，荷兰医学文摘，cochrane 图书馆。包含的研究都是经筛选的随机对照试验。包括 8 个随机对照试验，其中 6 组使用椎旁神经阻滞进行乳房手术，2 组使用椎旁神经阻滞进行疝修补术。

结果：各种研究结果的多样化和评估标准的不同，使结论的可靠性受到限制。椎旁神经阻滞的失败率≤13%，患者表示椎旁神经阻滞麻醉比全身麻醉舒适。有迹象表明椎旁神经阻滞的住院时间较全身麻醉短。椎旁神经阻滞比全身麻醉显著减少恶心呕吐的发生（相对风险：0.25，95%CI：0.13-0.50；P < 0.05），但可能带来穿破胸膜和硬膜外广泛阻滞的危险。

结论：根据目前资料，椎旁神经阻滞用于胸腰段的外科手术麻醉与全身麻醉相比，较少的术后疼痛，同时术后恶心呕吐发生较少，且更为舒适。

（杨秋娟 译 陈杰 校）

BACKGROUND: The objective of this review was to assess the safety and efficacy of thoracic and lumbar paravertebral blocks (PVBs) for surgical anesthesia through a systematic review of the peer-reviewed literature. PVBs for surgical anesthesia were compared with general anesthesia (GA) or other regional anesthetic techniques.

METHODS: We searched literature databases including MEDLINE, EMBASE, and The Cochrane Library up to May 2008. Included studies were limited to eligible randomized controlled trials. Eight randomized controlled trials were included in this review, 6 of which used PVBs for anesthesia during breast surgery, and 2 trials used PVB for anesthesia during herniorrhaphy.

RESULTS: The ability to obtain firm conclusions was limited by the diversity of outcomes and how they were measured, which varied across studies. The PVB failure rate was not >13%, and patients were more satisfied with PVB than with GA. There was some indication that PVB could achieve shorter hospital stays than GA. PVB for anesthesia substantially reduces nausea and vomiting in comparison with GA (relative risk: 0.25, 95% CI: 0.13–0.50; *P* < 0.05), although it does carry a risk of pleural puncture and epidural spread of local anesthetic.

CONCLUSIONS: In conclusion, based on the current evidence, PVBs for surgical anesthesia at the level of the thoracic and lumbar vertebrae are associated with less pain during the immediate postoperative period, as well as less postoperative nausea and vomiting, and greater patient satisfaction compared with GA.

